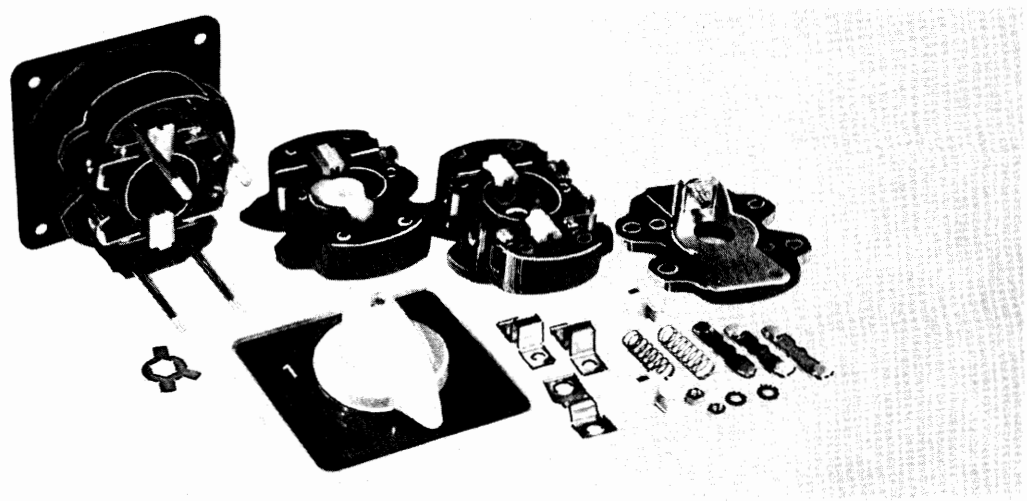
Introduction

The present "TECHNICAL DATA" provides, in condensed form, all technical data on our Telux rotary cam switches. We trust that this will prove of assistance to you and facilitate selection of the correct switchgear for your requirements.
The Technical Data contains no prices and is designed to serve primarily for selection of the required type of switch based on existing circuit diagrams together with electrical data and mechanical requirements. We have endeavoured to show and explain as clearly and comprehensively as possible all possibilities which might arise in the use of Telux Cam Switches.
In Particular we would draw attention to the wide range of assorted ancillary devices for complementing and equipping the basic switches. These ancillary devices expand the range of applications for Telux Cam Switches enabling virtually all demands normally arising in the practical applications of switches to be fullfilled. In addition, we have endeavoured, on the basis of past experience, to supplement various headings in the Technical Data by generous illustrations and precise explanatory detail to a point where this handbook serves not only as a simple, straight forward reference work but also as a great time saver.

General Comments

Telux Cam Switches are assembled on the building block principle. They function with double interruption per pole and owing to the arrangement of two pairs of contacts for each cell, offer virtually inexhaustable combination of switching arrangements in connection with the layout of special switching programmes.



All individual switch components are manufactured of highest grade materials and their great mechanical strength and temperature resistance ensures a long service life. Special hard silver alloys used in the contacts not only increase the possible number of switch operation but also, owing to the low contact resistances, renders them suitable for use at lower voltages. Telux Cam switches are A. C. carriers and can be loaded to their rated switching current only at D. C. voltages below 30 volts, or only in those cases where currentless switch operation is guaranteed (see relevant Tables).

Current Ratings, Voltage Ratings

A complete range of TELUX Cam Switches is available. This comprises the following switch sizes:
The voltage rating for all Telux Cam Switches is 500 Volt A. C.

1. MINI Series: **M 10,** 10 Amp.
M 16, 16 Amp. 2 double break contacts per stage
designs: panel mounting E, panel mounting central fixing EZ 22,5 mm Ø, EZO 22, EZS 22, EZSRE 22
panel mounting central fixing 30,5 mm Ø, EZO, EZS, EZSRE
base mounting V, plastic enclosure P. cast enclosure (only M 16, 1 – 3 cells).

2. Standard Series: 2 double break contacts per stage
N 16, 16 Amp. **N 100,** 100 Amp.
N 20, 20 Amp. **N 40,** 40 Amp. **N 200,** 200 Amp.
N 32, 32 Amp. **N 60,** 63 Amp.
designs: panel mounting E, panel mounting central fixing 30,5 mm Ø, EZO 30, EZS 30, EZSRE 30 (only sizes N 16, N 20, N 32, N 40), base mounting V, plastic enclosure P, metal enclosure G.

3. T-Series: 3 double break contacts per stage
T 310, 10 Amp. **T 316,** 16 Amp.
designs: panel mounting E, panel mounting central fixing 22,5 mm Ø, EZO 22, EZS 22, EZSRE 22, base mounting V, plastic enclosure P.

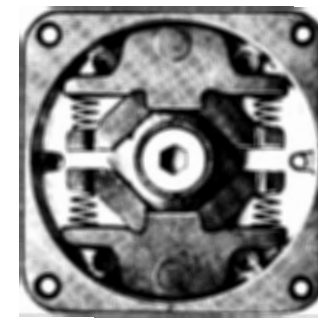
4. Series, load switches:
L 40, 40 Amp. **L 100,** 100 Amp. **L 400,** 400 Amp. **L 800,** 800 Amp.
L 60, 63 Amp. **L 160,** 160 Amp. **L 600,** 600 Amp. **L 1200,** 1200 Amp.
designs: panel mounting E, base mounting V.

Following components are common to all types of switches: handles, escutcheon plates, latching mechanisms, mounting units and enclosures, optional extras.

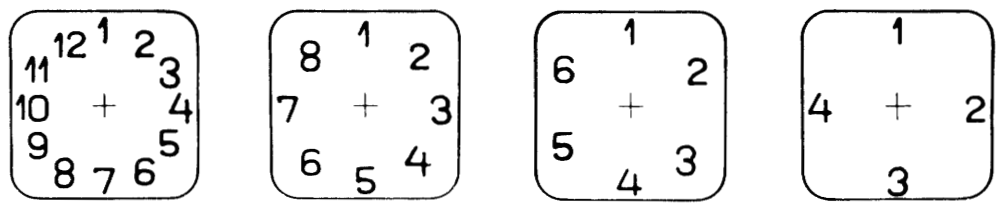
In principle, all types of switches contain two main elements, the latching mechanism and the switching unit. The switch assembly and the stop mechanisms are carried on a common drive shaft of solid aluminium or (on larger sizes) steel, and rigidly clamped together in their relative positions by metal tie-rods. Switching is absolutely positive regardless of switch length.

Superior quality melamine injection mouldings are used having high levels of mechanical and thermal stability which are uneffected by humid conditions.

A notched cam type mechanism, embodying nylon stops operating in conjunction with spring levers, controls switching at predetermined positions. In principle all switches can be arranged with positions at either 90° (max. four positions), 60° (max. six positions), 45° (max. eight positions) or 30° (max. twelve positions). Switches of series T 310 and T 316 are only available with switch angles 30° or 60°.



stop mechanism N 100



The stop springs are in the form of thrust springs proportioned for a service life of 5 million switch operations.
Large terminals, ensure easy accessibility for wiring on site. Identification is by tags which are available to suit any circuit code. Angled or AMP flat plug terminals can be provided if required.

The switch assembly

The switch assembly consists of one or more switch cells in each of which provision is made for accommodating two, fully independent pairs of contacts. In this instance a pair of contacts is interpreted as two fixed contact members with the connecting or opening contact bridge, i. e. the shortest form of a complete current path in the switch. The T 310 and T 316 switch cell contains 3 independant pairs of contacts.

full stage N 100

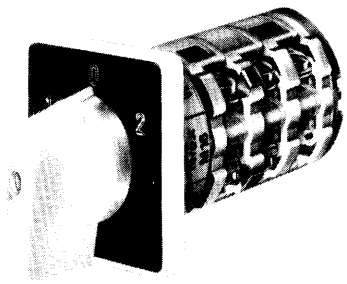
In those instances where the total switching angle exceeds 180° (for T 310 and T 316 120° the switch cell can be utilised fully only if two corresponding contact pairs can be found in the switch programmes. This relationship is attributable to the fact that only one cam located centrally in the cell controls all contacts. With overall switching angles below 180° (for T 310 and T 316 less than 120°) the number of switch cells required is calculated as half the number of contact pairs required for the overall switchprogramme. The radial thrust of the cam is transmitted by rollers to switching plungers which act against the contact springs. When the contact is closed no thrust force is present, as the contact bridge lies on the fixed contact members held by the contact spring. The switch cell walls are of high quality mouldings having high mechanical and electrical properties. Punched circuit connections are provided for connecting adjacent switch terminals in the switch assembly and these do not in any way obstruct attachements of the connecting lead terminals. Where terminals which do not lie adjacent or superimposed have to be connected this must be done with the aid of suitable wire connections. Each terminals is designed to allow connection of two leads of a cross-section appropriate for the switch size. A number of suitable handles and legend plates are available for each switch size.

Basic designs for TELUX Cam Switches

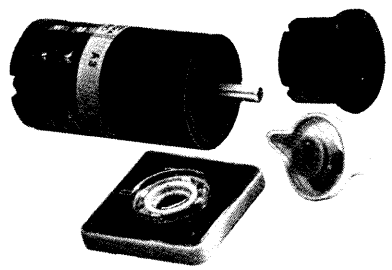
Panel mounting E

Protection Class:
Distribution Boards: From the front IP 40
From the rear IP 00

Switches of this type are suitable for mounting in Distribution Boards, Machines and similar appliances. It is possible to mount the switch from the front through a circular cut-out or from the rear in the normal way, making a hole for the shaft and mounting the front panel and knob on the surface of the board.
In each case the fixing screws are covered by the escutcheon plate. Each switch is supplied with a star shaped plastic adaptor plate to enable different escutcheon plates to be fitted.
The only holes needed are for the fixing screws and shaft.
A special design feature of the knob enables the knob to be fixed without consideration for the length of the shaft.
For panels above 7 mm, special switches must be ordered.
Optionally, a sealing element can be supplied to seal the shaft to comply with Protection Class IP 44 (+ Wd).



Panel mounting E, M 16



Panel mounting central fixing EZ (DIN 43696)

Protection Class: From front and rear IP 00

The following versions are available:

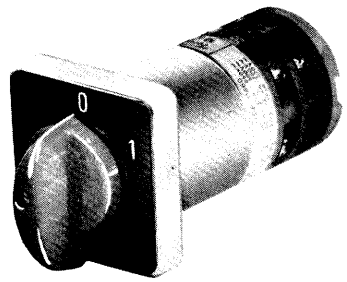
EZO: The switch is supplied without escutcheon plate. The marking of the switch position is done by other means. On request we can supply a black oxidised aluminium plate (60 mm x 60 mm or 60 mm x 72 mm) with a centre hole 30.5 mm.

EZS: Each switch is supplied with a square escutcheon plate (E size).

EZSRE: The same as EZS, but the escutcheon plate is rectangular to allow additional space for markings.

EZ 30: Switches of size M 10, M 16, N 16, N 20, N 32 can be supplied for one hole central fixing with a standard of 30.5 mm diameter.

EZ 22: Switches of size M 10 and M 16 are also available for one hole central fixing of 22.5 mm diameter.

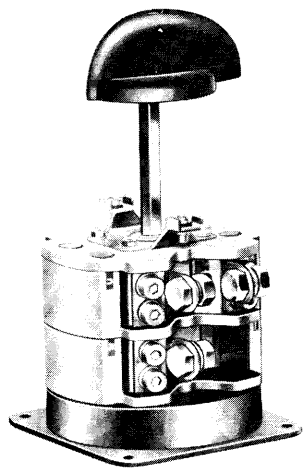


Central Fixing EZS

Base mounting V

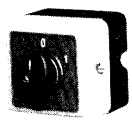
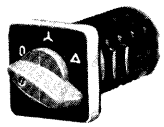
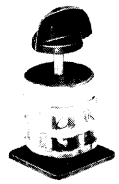
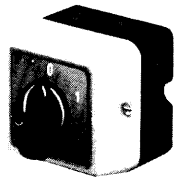
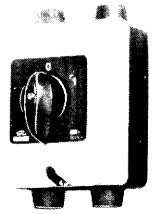
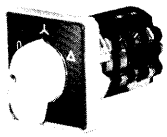
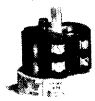
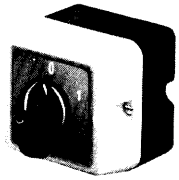
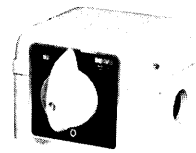
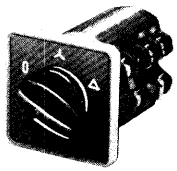
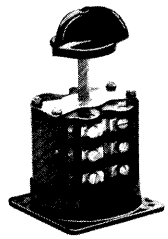
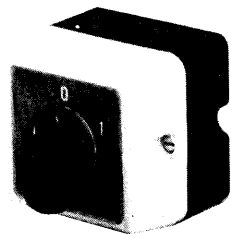
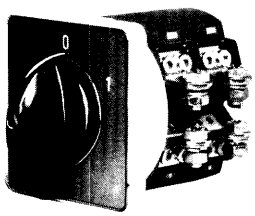
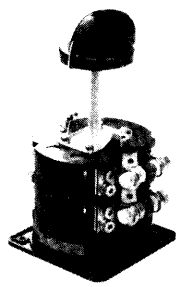
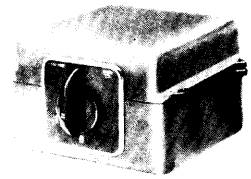
Protection Class: From the front IP 40
From the rear IP 00

This type can be mounted by the base to distribution boards with detachable covers to avoid flexible connection cables.
Optionally, a sealing element can be supplied to seal the shaft to comply with Protection Class IP 44. (+ Wd)
For switch boxes with hinged doors, a door coupling has been developed which allows the door to be opened without having to remove the knobs. (Please see Page 23.)
On request, the shaft can be supplied with special shaft lengths. Standard lengths are shown on Page 56.
Where it is difficult to reach the screwheads, special angled brackets at 45° can be supplied.

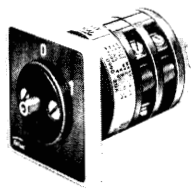
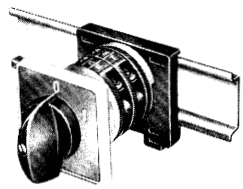
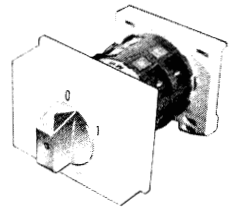
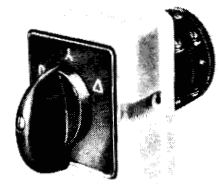
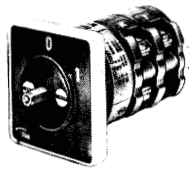
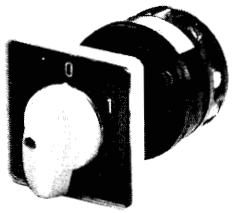
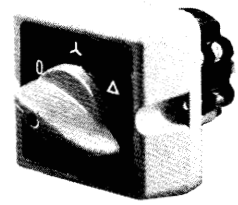
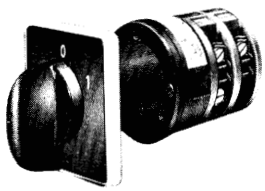
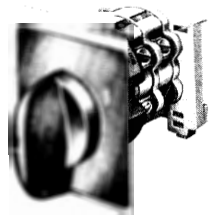


Base Mounting V, N 200

Basic designs of Telux CAM SWITCHES

	panel mounting E	base mounting V	in moulded case P/PF	in cast case G/GF
M 10				—
M 16				—
T 310 **T 316**				—
N 16 **N 20** **N 32**				
N 40 **N 60**				
N 100 **N 200**			—	

Further designs of Telux CAM SWITCHES

panel mounting central fixing EZ 22	panel mounting central fixing EZ 30	quick mounting for DIN-rail SM	quick mounting with installation cover SMA	mounting within the terminal boxes KE
				
				
—		—	—	
—			—	
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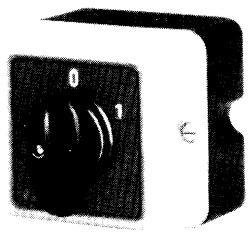
Plastic cases P and PF



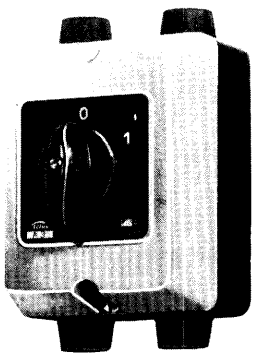
ON-OFF 3 Pole, 10 Amp.
M 10 PA 3

These switches have unbreakable plastic cases intended for wall mounting or for direct fixing to machines and similar equipment.

The standard version, Type P, conforms to protection class IP 40. The two-colour case is a light grey top and dark grey (anthracite) base, but on request they can be supplied in white or, for alarm switches, in red.

For cable entry 4-threaded PG knock-outs are provided.

Switch size	M 10	M 16, N 16, N 20	N 32, N 40, N 60	T 310, T 316
Conduit entries	PG 11	PG 16	PG 21	Rubber cable inlets



ON-OFF 3 Pole, 16 Amp.
T 316 PA 3

In case sizes T 310 and T 316 flexible sleeves may be cut in accordance with the size of the cables. All plastic cases have facilities for base entry and these are 35 mm diameter or 50 mm diameter depending upon case size.

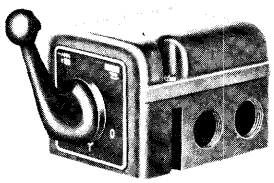
The switches are not fixed to the base in sizes M 10, M 16, T 310, T 316, N 16, N 20, N 32, N 40 and N 60, making it easier to remove for wiring.

On special request in all plastic housings, two terminals can be provided for through earth connections.

Facilities exist on these switches for fitting 1 or 2 neon lamps through the front and escutcheon plate. Details on request.

Housings of all sizes can be sealed for use in dusty and moist atmospheres (Type PF), which comply with IP 44 (Protection against harmful dust deposits and protection against splashed water).

Cast Aluminium Enclosures G and GF



Star-Delta switch in
Cast Alum. Enclos. N 20 GSD

These switches are particularly used in the more arduous conditions or in very humid or dusty rooms.

The standard G version complies with IP 40, when only up to 6 switching cells are used on types N 16, N 20, N 32, N 40, N 60 and N 100 and up to 4 cells on the size N 200. Switches with cast enclosure can be supplied to conform to IP 54 (complete protection against dust and also hose proof [Type GF]) at extra cost.

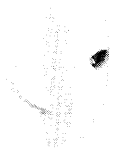
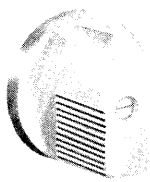
Tapped holes are provided at top and bottom cable entries.

With switches up to 2 switching cells only one entry, top and bottom, is provided.

Operating knobs and handles

Telux Rotary Cam Switches are supplied with black knobs and handles as standard. Other types and colours available are as shown below.

A particularly useful feature is that the knobs can be fitted to the shafts irrespective of the length of the shaft exposed through the panel within the limits laid down below.

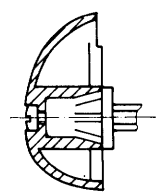
Twist knob RG	Toggle knob KBG	Pointer knob ZG	Ball type handle KG	Lever handle HG	Switch size
					
black, red, white, yellow, grey	black, red, white, grey	black, red, white, grey	—	—	M 10, M 16
black, red, white, yellow, grey	—	black, red	black, red	black, red, white	N16, N20, N32 T 310, T 316 N 40, N 60
black, red, white, yellow, grey	—	—	black, red	—	L 60, L 100 L 160
black, red, white, yellow, grey	—	—	black, red	—	N 100 N 200 L 400 L 600, L 800

For the switchsizes N 100, N 200, L 400, L 600, L 800 and L 1200 a hand wheel instead the operating knob is available (diameter 200 mm).

All operating knobs can be fastened within limits by a special device irrespective of the length of the free shaft. This is of advantage especially for the mounting of panel and base mounted switches, because here it is important to know the thickness of boards or the depth of boxes.

The following table shows the degree of the knob movement and the hexagonal shaft dimension.

Switch size		M 10 — M 16	N 16, N 20, N 32 T 310, T 316	N 40, N 60	N 100, N 200
Knob movement V	mm	7	7	11	15
Shaft dimension	mm	5	7	9	12



Ordering Codes

When ordering switches listed in this catalogue, the type number should be sufficient as below.

Switch size – Type – Switching functions – plus any additional features.

Examples:

N 40-P-WU 3
- N 40 – Switch size
- P – Plastic housing
- WU 3 – Reversing switch 3 pole (see page 35)

N 100-E-SDR
- N 100 – Switch size
- E – Panel mounting
- SDR – Star Delta switch (see page 36)

N 16-E-St.072
- N 16 – Switch size
- E – Panel mounting
- St. – Multi-step switch. Seven step. Two pole (see page 53)

Selection and ordering

(Please also refer to page 9)

The existing specifications for switches are grouped in accordance with the various applications.
In order to select the correct switch from the following tables, determine: –

1 Maximum current to be switched.
2 Peak in rush current (when motor switching).
3 Frequency of operation.

The values below are based upon the life test of 5 x 10^5 operations. The mechanical life of Telux switches is 3 x 10^6 operations.
The life of a switch is not only dependant upon the current to be switched, it also depends upon the frequency of operation, which in turn affects the working temperature.
The maximum values shown in the load tables were obtained by tests carried out at the rate of 50 operations per hour, which would give a life of over 10 years based upon a 9 hour working day.

Utilisation categories:

AC 1 and AC 21 ON-OFF switching of units and parts of installations, industrial applications, non inductive loads.
AC 2 Stator/Rotor starting and Star/Delta switching of small and medium motors.
AC 22 ON/OFF switching of inductive loads.
AC 3 Direct-on-line starting and Star/Delta starting of large motors.
AC 23 Direct-on-line starting of High inductive loads.
AC 4 Direct-on-line starting, inching, reversing, plugging.
AC 11 Control switches, switching of magnetic appliances, solenoid valves, coils of contactors.

Nominal values for TELUX Rotary Cam Switches

	Nominal working voltage (V)			Continuous Thermal current	Nominal working current (I)				
	VDE 0660 IEC 408 IEC 292	VDE 0630 CEE 24 CEE 14	SEV	VDE 0660 part 1 $I_{th\ 2}$ (Amp) open	Non induct loads AC 1 VDE 0660	Switches for appliances CEE 24 VDE 0630 resist. I_r	Switches for appliances CEE 24 VDE 0630 motor load I_n	Switches for domestic use CEE 14	Disconect switches AC 21 IEC 408 VDE
M 10	660	380	500	20	20	10	7	6	20
M 16	660	380	500	25	25	16	10	10	25
T 310	500	380	500	16	16	10	7	6	16
T 316	500	380	500	20	20	16	10	10	20
N 16	660	380	500	25	25	16	10	16	25
N 20	660	380	500	32	32	16	10	16	32
L 40	660	380	500	50	40	—	—	—	40
N 32	660	380	500	40	40	25	10	20	40
N 40	660	380	500	63	63	32	10	25	63
N 60	660	380	500	80	80	40	10	40	80
L 60	500	380	500	80	80	—	—	—	80
L 100	500	—	500	125	125	—	—	—	125
L 160	500	—	500	180	180	—	—	—	150
N 100	660	—	500	150	150	—	—	—	150
N 200	660	—	500	250	250	—	—	—	250
L 400	500	—	500	400	400	—	—	—	400
L 600	500	—	500	600	500	—	—	—	400
L 800	500	—	500	800	600	—	—	—	400

Selection of switch size according to breaking capacity

Switch ratings according VDE 0660, IEC 292, IEC 337, IEC 408

The figures shown in the following table are maximum values and should not be exceeded if the expected service life is to be reached.

Special consideration must be given when high initial peak current is likely a higher rated switch, dependant upon this peak current, should be used.

Switch size rated current		AC 1 AC 21 Load Switches per pole Amp.	three pole KW	AC 2 Slip ring motors starting KW	AC 2 AC 22 Star delta switches KW	AC 3 AC 23 squirrel cage motor Star-delta starting KW	AC 4 Extreme loads KW
220 Volt	M 10	20	4,1	2,4	2,4	2,2	0,55
	M 16	25	5,7	4,8	4,8	4	1
	T 310	16	3,6	1,8	2,2	2,2	0,75
	T 316	20	5,7	3	3	2,6	1,1
	N 16	25	5,8	4,8	4,8	4	1,1
	N 20	32	7	5,5	5,5	4,8	1,8
	N 32	40	11	7,5	7,5	5,5	3
	N 40	63	14	11	11	7,5	4
	N 60	80	22	18,5	15	15	5,5
	N 100	150	35	24	27	22	11
	N 200	250	70	46	50	40	18,5
380 Volt	M 10	20	6	4,4	4,4	4	1,5
	M 16	25	9,6	7,5	7,5	7,5	3
	T 310	16	6,2	4,4	4,4	4	1,5
	T 316	20	9,8	5,5	5,5	5,5	2,2
	N 16	25	10	7,5	7,5	7,5	3
	N 20	32	12	8,5	8,5	8,5	4
	N 32	40	19	15	15	11	5,5
	N 40	63	24	18,5	18,5	15	7,5
	N 60	80	40	25	26	25	11
	N 100	150	60	40	40	40	18,5
	N 200	250	120	70	75	70	35
500 Volt	M 10	20	8,2	4,4	4,4	4	1,5
	M 16	25	12,5	7,5	7,5	7,5	3
	T 310	16	8,2	4,4	5,5	4	1,5
	T 316	20	13	5,5	5,5	5,5	2,2
	N 16	25	13,5	8,5	8,5	7,5	3
	N 20	32	16	11	8,5	8,5	4
	N 32	40	25	15	15	13	5,5
	N 40	63	32	20	20	15	11
	N 60	80	50	25	30	25	15
	N 100	150	80	40	50	40	22
	N 200	250	160	70	90	70	40

Selection of switch size for utilization category AC 11

CONTROL switches in utilization categories AC 11 are used for switching magnetic circuits. Notice, that under normal condition current variations in the size of ten times of steady (magnetising) current are experienced.

For the selection of the correct switch size the switch rated current cannot be compared with the magnetising current.

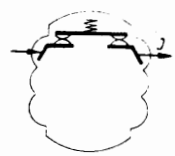
In the table below are shown the maximum values of rated power of the switches magnetic systems.

Switch size	rated current	rated input of magnetic system in VA by: 110 V	220 V	380 V
M 10	6	600	1 200	2 000
M 16	10	1 000	2 000	3 500
T 310	8	800	1 600	2 800
T 316	10	1 000	2 000	3 500
N 16	12	1 200	2 400	4 000
N 20	14	1 400	2 800	4 800
N 32	20	2 000	4 000	7 000

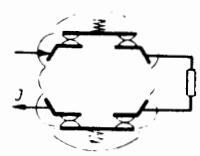
Load Capacity with Direct Current (D. C.) Circuits

Resistive

Telux Cam Switches are constructed of components primarily designed for switching AC circuits.
Because of slow switch operation and small contact gaps when open, the breaking arcs on D. C. can not be suppressed. Cam switches can therefore only be used on D. C. circuits where the supply is incapable of maintaining an arc on switch off.
The contact materials used are suitable for connecting in series to enable simultaneous opening contacts to share the load.
When operating at D. C. voltages below 30 V, Telux Cam Switches can be operated up to their rated value. At higher D. C. voltages to ensure satisfactory switch operation it is necessary to couple in series as many contacts as the supply voltage divided by 30.
The service life of the switch however drops to about 50% by comparison with A. C. switch values.
The following table gives the D. C. values which can be switched without series coupled contacts.
There is a distinction between various switch sizes with relation to maximum break currents due to the difference in contact opening gaps.
These values do not apply to inductive loads.



single pole



double pole

		cut off circuit by single pole break				cut off by double pole break			
D. C. Voltage		110	150	220	440	110	150	220	440
Switch sizes	**M 10, M 16**	0,4	0,3	0,2	—	1	0,8	0,5	—
	T 310, T 316	1,5	1	0,6	0,3	4	2,5	1,5	0,8
	N 16, N 20, N 32	3	1,5	0,8	0,4	6	4	2,5	1
	N 40, N 60	4	2,5	1,3	0,6	7	5,5	3,5	1,2
	N 100, N 200	6,5	4	2,5	0,7	25	20	6	1,4

Influence of inductive load

Note that examination of the D. C. switching capacity reveals every D. C. circuit to contain to same degree, inductance.
The higher the valve of inductance of the circuit to be broken, the lower the switching capacity of the switch.
The measure of the inductive load of a switch circuit is the time constant T (T = L/R millihenry/ohm in m. sec.).
With the increasing valve of T, the breaking capacity of each switch as shown in the table above must be reduced by the following reduction factors.

time constant ms.	< 0,2	0,2—5	5—10	10—20	20—50
reduction factor	1	0,6	0,4	0,3	0,2

selection of expected values of T:

heating coils, lamp circuits . . . . . T < 0,2
relay coils, shunt motors overload coils . . . . . T = 2—5
contactor coils, magnetic valves . . . . . T = 5—10
series motors . . . . . T = 10—20
magnets, medium lifting magnets, solenoids . . . . . T = 20—50
large clutches, giant lifting magnets . . . . . T > 50

Ratings – Short Time and Constant Loads

The following table contains maximum current values in amperes to which TELUX Cam switches can be subjected over short periods without damage. This is, however subject to the follow conditions:

1. The connecting lead must have the prescribed wire cross sectional area.
2. The wire ends must be longer than 35 mm.
3. The contacts must be clean.
4. The temperature of the contacts should be approximately 30° C or below.

The sixth column shows the constant values to which TELUX Cam switches can be subjected for any length of time with inadmissibly high contact heating.

The short time current ratings applies to contacts already closed, not as making current.

Switch Size	Load Duration 3 sec.	10 sec.	30 sec.	60 sec.	Constant Load	Wire Cross Section mm²
M 10	100	60	35	25	20	2,5
M 16	150	110	60	40	25	4
T 310	100	60	35	30	16	4
T 316	160	100	60	40	20	4
N 16	200	120	80	60	25	4
N 20	200	130	85	65	32	4
L 40	350	200	120	90	50	10
N 32	350	230	110	80	40	6
N 40	400	250	160	110	63	10

Switch Size	Load Duration 3 sec.	10 sec.	30 sec.	60 sec.	Constant Load	Wire Cross Section mm²
L 60	600	320	200	150	63	25
L 100	800	500	320	180	100	50
N 60	600	400	250	200	63	16
L 160	1200	800	480	380	160	cable socket
N 100	1000	600	500	370	100	35
N 200	2000	1200	600	480	200	50
L 400	3600	2000	1200	960	400	flat contact
L 600	5000	3200	1700	1300	600	rail
L 800	6500	4000	2200	1700	800	
L 1200	8000	5800	3200	2300	1200	

Short circuit behaviour – preliminary fusing

In the event of short circuits the switches could be damaged as a result of the electrodynamic forces which arise when subjected to extremely high currents. To prevent possible damage it is necessary to use preliminary fuses. The nominal current rating of which must not exceed the values listed in the following table. The values are dependant upon the maximum instant aneous short circuit A. C. current (k. A. r. m. s.).

Maximum Instantaneous Short Circuit A. C.	SWITCH SIZE M 10	T 310 M 16	T 316 N 16 N 20	N 32	N 40 L 40	N 60 L 60	N 100 L 100	L 160	N 200
DZ 10 kArms	20	35	50	60	100	100	125	160	200
HRC 10 kArms	15	25	35	50	80	100	125	160	160
DZ 25 kArms	15	20	35	50	80	100	125	160	200
HRC 25 kArms	—	25	25	35	60	80	100	160	160
DZ 40 kArms	15	20	35	50	60	100	125	160	200
HRC 40 kArms	—	—	25	35	50	80	100	125	125
DZ 63 kArms	—	—	—	—	—	—	—	—	—
HRC 63 kArms	—	—	25	35	50	80	80	100	100

Load Switches L 400 – L 1200 can only be protected by fuses against flow through short circuit currents. This method is only fully effective with the contacts closed but not for switching onto a short circuit.
The values in column N 200 must be multiplied by the appropriate number of 200 A parallel switched contacts (L 400 ... x 2, L 600 ... x 3, L 800 ... x 4, L 1200 ... x 6).

The values in the above table apply to Quick Acting Fuses, When Delayed Action Fuses are used the nominal value of the preliminary fuse should be selected one value lower.

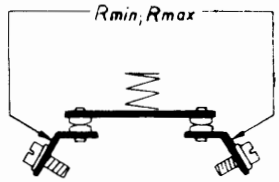
Rating for Capacitive Loads – Maximum Switching Capability

When switching capacitive loads the inrush peak currents have to be taken into consideration. Consequently it is necessary to select a larger size of switch than would normally be required by the capacitor's mominal rating. The following table shows the operating peak current permitted for the various switch sizes. These values apply for all voltages up 500 Volts, and assume occasional switching where the contact temperature is approximately 30° C.

Switch size	M 10	M 16 T 310	N 16 T 316	N 20	N 32	N 40 L 40	N 60 L 60	N 100 L 100	L 160	N 200	L 400, L 600, L 800, L 1200
Max. Inrush Current (A)	140	180	240	300	350	400	600	900 500	650	1800	1800

Mean Contact Resistance

By using silver as the contact material it is possible for TELUX Cam switches also to be used for circuits with extremly low voltages. However it should be noted that oxidization causes a gradual increase on the initial resistances at the contact points and that the influence of dust particles depositing on these points is of considerable importance. Particular in applications where no arcing occurs (self cleaning) a constant resistance cannot be expected over a long period.
Due to low contact resistance TELUX Cam switches are suitable for use in applications where the operating voltage is 100 mV or above.
The contacts on TELUX Cam switches must be free of grease at all times and should never be lubricated. The contact points never need any maintenance with the possible exception of occaisional rubbing with a strip of fine emery should they become badly burnt.
The contact area can also be cleaned using oil free compressed air. The following table shows mean values for contact resistance, provided with a double break contact path (measured at the terminal points).



		SWITCH SIZE																
		M 10	T 310 M 16	T 316 N 16	N 20	N 32	N 40	L 40	N 60	L 60	N 100	L 100	L 160	N 200	L 400	L 600	L 800	L1200
lower limit value	R min [Ω]	6×10^{-4}	5×10^{-4}	5×10^{-4}	$4{,}5\times 10^{-4}$	$4{,}2\times 10^{-4}$	4×10^{-4}	3×10^{-4}	$3{,}2\times 10^{-4}$	3×10^{-4}	2×10^{-4}	$2{,}5\times 10^{-4}$	2×10^{-4}	$1{,}4\times 10^{-4}$	$0{,}9\times 10^{-4}$	$0{,}7\times 10^{-4}$	$0{,}5\times 10^{-4}$	$0{,}4\times 10^{-4}$
upper limit value	R max [Ω]	10^{-3}	9×10^{-4}	9×10^{-4}	$8{,}6\times 10^{-4}$	8×10^{-4}	$7{,}5\times 10^{-4}$	6×10^{-4}	$4{,}1\times 10^{-4}$	6×10^{-4}	$3{,}2\times 10^{-4}$	5×10^{-4}	3×10^{-4}	$2{,}2\times 10^{-4}$	$1{,}6\times 10^{-4}$	$1{,}2\times 10^{-4}$	$0{,}8\times 10^{-4}$	$0{,}7\times 10^{-4}$

Switches with gold plated contacts are available for switching low voltages.

Permissible wire cross sections for connecting leads and terminal screw sizes

Switch size	M 10	T 310, T 316 M16, N16, N20	N 32	N 40	L 40	N 60	L 60	N 100	L 100	L 160	N 200	L 400	L 600	L800	L 1200
max. wire cross sections	2,5	4	6	10	10	16	25	50	50	cable socket		strip connector*)			
terminal screw sizes	M 3	M 4	M 4	M 5	2×M4	2×M5	2×M5	2×M6	2×M6	M 8	M 10	M 12	M 16	M 16	M 16

*) Recommendation for strip connector dimensions
L 400 . . . 30 x 5 mm, L 600 . . . 40 x 10 mm, L 800 . . . 2 strips 40 x 10 mm, L 1200 . . . 2 strips 50 x 10 mm.

Maximum Structural Lengths of TELUX Cam Switches

For mechanical reasons certain limits are imposed on the possibility of assembling an unlimited number of switch cells into one switch assembly. These limits can be determined only approximately, since a significant role is played by the number of contacts actuated simultaneously at a given switch setting. Particularly where the switch programme requires switch operations at which numerous contacts are to be opened simultaneously major torsional forces arise in the switch assembly.
A further reason for limiting switch lengths is that there is only a restricted number of case lengths available, for the enclosed switch types shows the normal maximum number of cells. We would point out that the values under special circumstances have to be reduced considerably for the reasons mentioned above. In the event of doubt please let us have your enquiries.
If the operating force needed to actuate a larger number of contacts in the switch no longer permits sensitive switch operation we recommend the use of ball type handle.
Switches in which the number of contacts entails greater structural length than shown above are spread over two or three columns which are interconnected by a system of gears.

switch type	SWITCH SIZE (per switching column)														
	M 10 M 16	T 310 T 316	N 16 N 20 N 32	N 40	L 40	N 60	L 60	N 100	L 100	L 160	N 200	*) L 400	*) L 600	*) L 800	*) L 1200
panel mounting **E**	12	15	15	15	12	12	12	15	12	12	12	6	4	3	2
base mounting **V**	12	15	15	15	12	12	12	15	12	12	12	6	4	3	2
plastic enclosure **P/PF**	6	4	9	9	—	4	—	—	—	—	—	—	—	—	—
cast enclosure **G**	—	—	12	9	—	7	—	6	—	—	4	—	—	—	—
ditto splashproof **GF**	—	—	6	6	—	7	—	6	—	—	4	—	—	—	—

*) 1 switching cell L 400 = 2 cells N 200, 1 switching cell L 600 = 3 cells N 200,
1 switching cell L 800 = 4 cells N 200, 1 switching cell L 1200 = 6 cells N 200.

All TELUX Load Switches are capable of carrying the nominal current indeffinitely and will break 1,25 x nominal current at full voltage in accordance with the relevant specifications.
Load Switches are manufactured by fitting two switching cells in parallel, and fitted with suitable termination points. TELUX Load Switches are only available in panel and base mounting versions (40 L to 1200 L).
The letter "L" is used as a suffix to the code to identify the switches as "Load Switches". The required Load Switch nominal current prefixes the switch type. (Example: 160 Ampere, 2 pole, changeover switch panel mounting = 160 EU 2 L.)

TELUX Load Switches are constructed in the following manner using standard cells.

40 L . . . 2 cell blocks N 20
60 L . . . 2 cell blocks N 32
100 L . . . 2 cell blocks N 40
160 L . . . 2 cell blocks N 60
400 L . . . 2 cell blocks N 200
600 L . . . 3 cell blocks N 200
800 L . . . 4 cell blocks N 200
1200 L . . . 6 cell blocks N 200

Description	Type		No of switch cells				
	panel mounted	base mounted	40 L to 100 L	160 L 400 L	600 L	800 L	1200 L
on-off switches 0–1 A							
single pole	EA 1 L	VA 1 L	2	1	3	2	3
double pole	EA 2 L	VA 2 L	2	2	3	4	6
three pole	EA 3 L	VA 3 L	4	3	6	6	9
four pole	EA 4 L	VA 4 L	4	4	6	8	12
four pole, one pole made before break	EA 4 VL	VA 4 VL	4	4	6	8	12
change over switches 1–0–2 U, with off							
single pole	EU 1 L	VU 1 L	2	2	3	4	6
double pole	EU 2 L	VU 2 L	4	4	6	8	12
three pole	EU 3 L	VU 3 L	6	6	9	8+4	12 +6
four pole	EU 4 L	VU 4 L	8	8	6+6	8+8	12 +12
four pole, one pole made before break	EU 4 VL	VU 4 VL	8	8	6+6	8+8	12 +12
change over switches 1–2 W, without off							
single pole	EW 1 L	VW 1 L	2	2	3	4	6
double pole	EW 2 L	VW 2 L	4	4	6	8	12
three pole	EW 3 L	VW 3 L	6	6	9	8+4	12 +6
four pole	EW 4 L	VW 4 L	8	8	6+6	8+8	12 +12
four pole, one pole made before break	EW 4 VL	VW 4 VL	8	8	6+6	8+8	12 +12
stepping switches single pole, without off St 1							
3 steps	ESt 31 L	VSt 31 L	4	3	6	6	9
4 steps	ESt 41 L	VSt 41 L	4	4	6	8	12
5 steps	ESt 51 L	VSt 51 L	6	5	9	—	—
6 steps	ESt 61 L	VSt 61 L	6	6	9	—	—
7 steps	ESt 71 L	VSt 71 L	8	7	—	—	—

Description	Type		No of switch cells			
	panel mounted	base mounted	40 L to 100 L	160 L 400 L	600 L	800 L
stepping switches single pole, without off St 1						
8 steps	ESt 81 L	VSt 81 L	8	8	—	—
9 steps	ESt 91 L	VSt 91 L	10	9	—	—
10 steps	ESt 101 L	VSt 101 L	10	10	—	—
11 steps	ESt 111 L	VSt 111 L	12	11	—	—
12 steps	ESt 121 L	VSt 121 L	12	12	—	—
stepping switches single pole, with off St 01						
2 steps	ESt 021 L	VSt 021 L	2	2	3	4
3 steps	ESt 031 L	VSt 031 L	4	3	6	8
4 steps	ESt 041 L	VSt 041 L	4	4	6	—
5 steps	ESt 051 L	VSt 051 L	6	5	—	—
6 steps	ESt 061 L	VSt 061 L	8	7	—	—
7 steps	ESt 071 L	VSt 071 L	8	8	—	—
8 steps	ESt 081 L	VSt 081 L	10	9	—	—
9 steps	ESt 091 L	VSt 091 L	10	10	—	—
10 steps	ESt 0101 L	VSt 0101 L	12	11	—	—
11 steps	ESt 0111 L	VSt 0111 L	12	12	—	—
Group switches GR						
2 circuits A + B single pole 0–A–A + B	EGr 11 L	VGr 11 L	2	2	—	—
2 circuits A + B single pole 0–A–B–A + B	EGr 12 L	VGr 12 L	2	2	—	—
2 circuits A + B 2 pole 0–A–A + B	EGr 21 L	VGr 21 L	4	4	—	—
2 circuits A + B 2 pole 0–A–B–A + B	EGr 22 L	VGr 22 L	4	4	—	—
2 circuits A + B 3 pole 0–A–A + B	EGr 31 L	VGr 31 L	6	6	—	—
2 circuits A + B 3 pole 0–A–B–A + B	EGr 32 L	VGr 32 L	6	6	—	—

Arrangements of switch settings

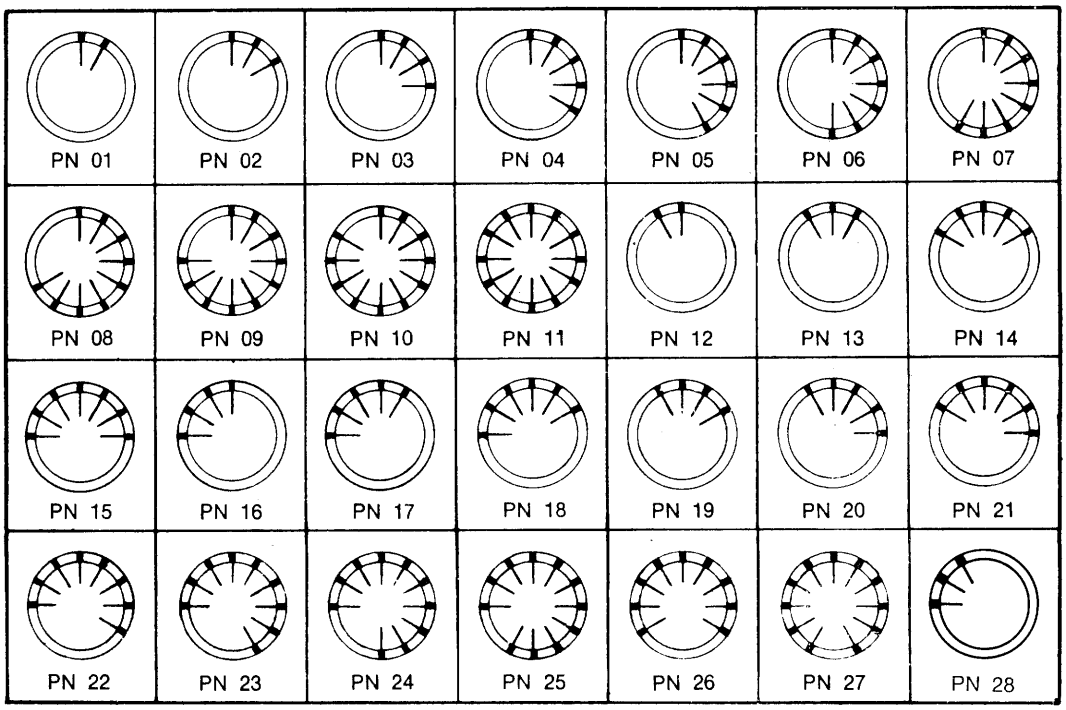
In the following tables all possibilities for arranging switch settings on TELUX Cam Switches are shown and designated by positional code numbers. Thereby a distinction is drawn not only between the various switch angles but also between switches with engaged settings, selector settings and those with combinations of both.

Knowledge of the following variations is extremely important, particularly when planning the use of special type switches.

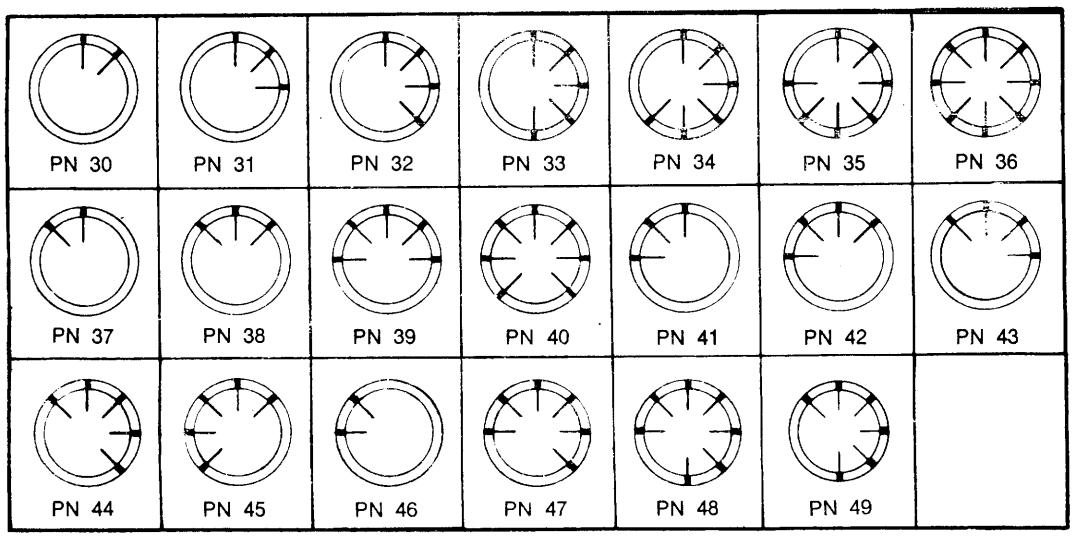
When ordering special switches it is necessary to quote the relevant positional code numbers, as otherwise we shall be obliged to select the switch angle and position of switch settings on the basis of optimum possibility.

All switch types shown in the catalogue have been designed with the most suitable switch angles, but as an optional extra and insofar as the switching programme permits, it is also possible to select other switch angles.

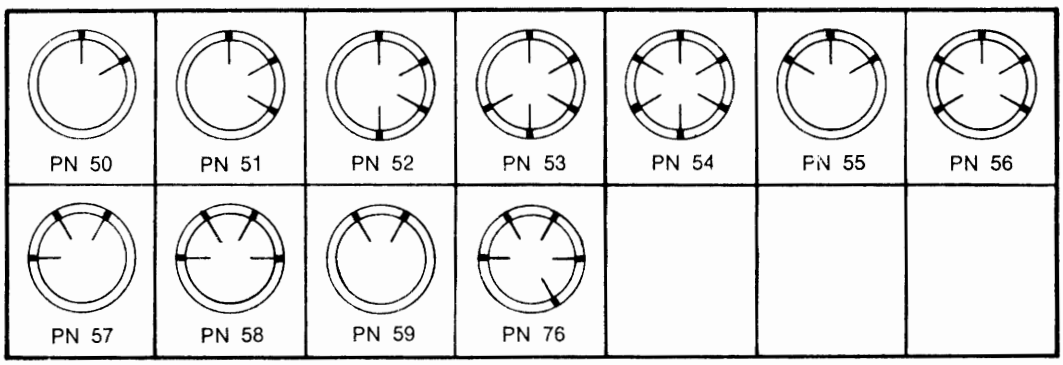
30° Switch Angle:



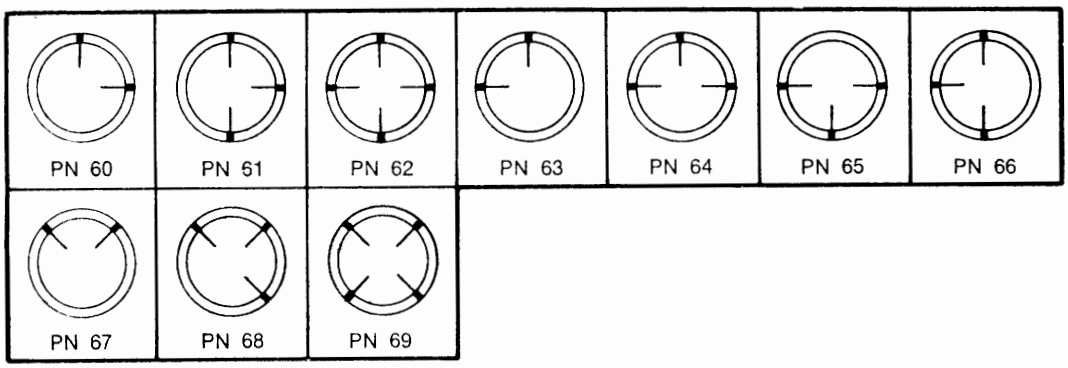
45° Switch Angle:



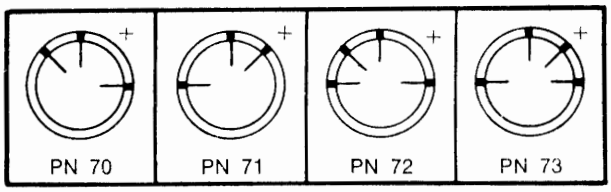
60° Switch Angle:



90° Switch Angle:

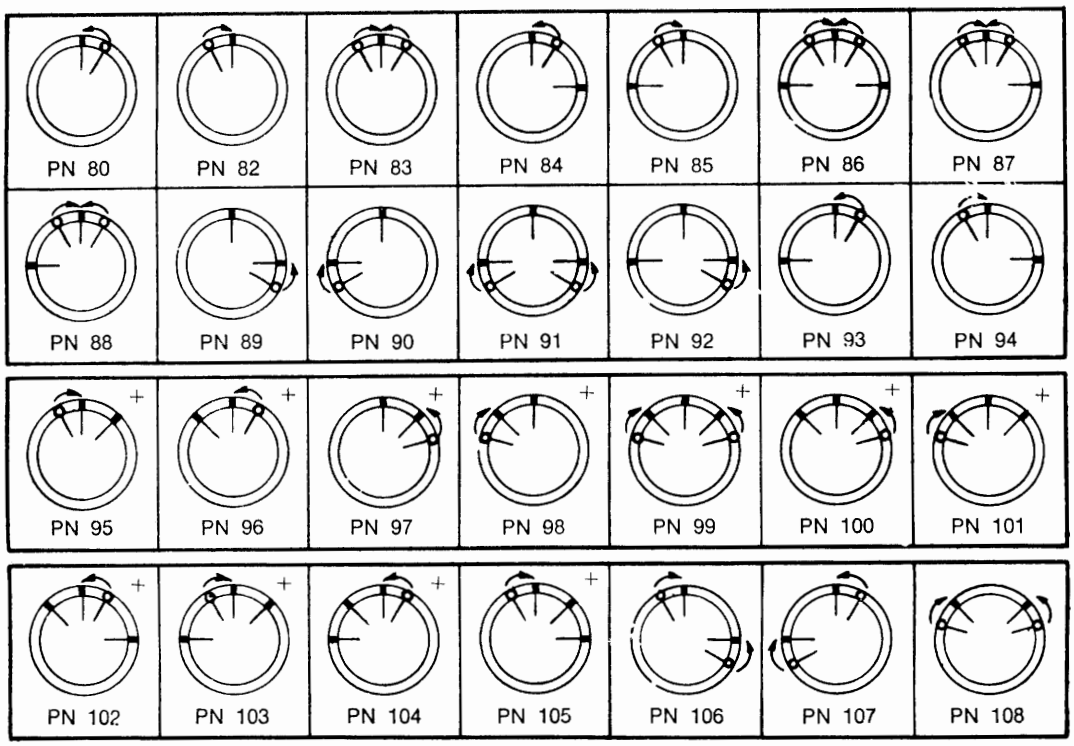


Combinations 45° / 90° (without selector settings)



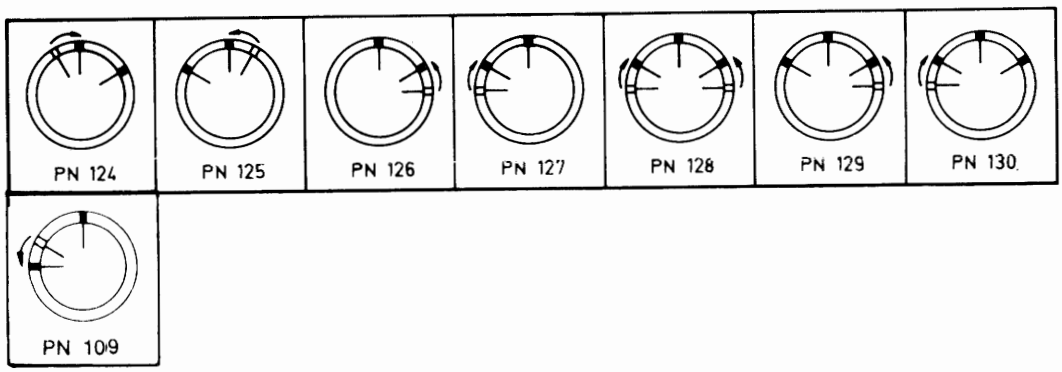
+ . . . not available in switch sizes M 10 and M 16.

Selector settings and special combinations:

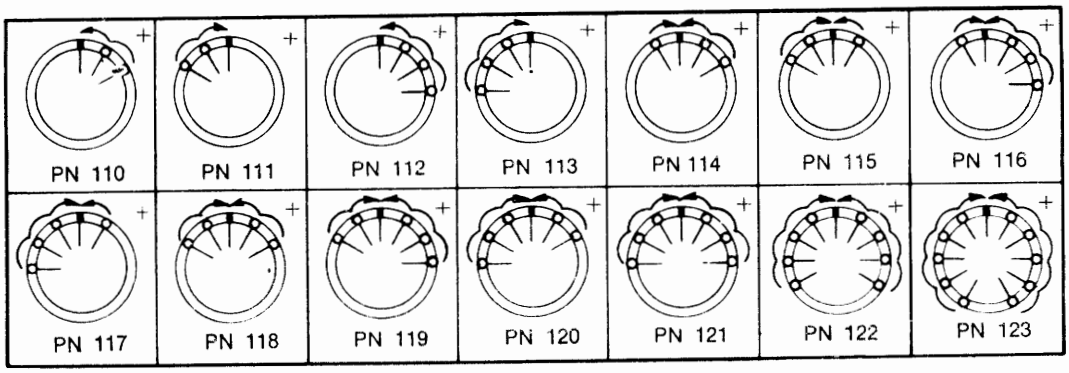


Spring return see Page 16

Selector settings and special combinations



Spring return over several settings



Escutcheon plates

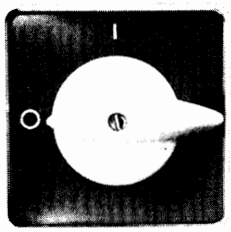
In the standard version of every E and V switch a square plastic face plate is fitted. Each plate consists of a black insert (contrast) and a clear plastic plate which carries the markings for the various handle positions.

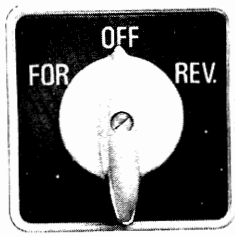
The escutcheon plate is supplied with a star-shaped plate to which it is fixed. The plate is fitted in turn to the switch front mounting plate for E switches, and the front panel of the V type switches. (See page 3.)

For details of the standard engravings, see pages 17–20.

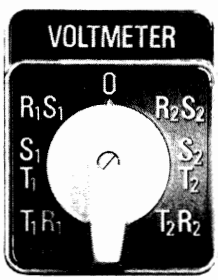
switch size	square plate	rect. plate
M 10, M 16	48 x 48 mm	48 x 60 mm
N 16, N 20, N 32, T 310, T 316, L 40	66 x 66 mm	66 x 79 mm
N 40, N 60, L 60, L 100, L 160	92 x 92 mm	92 x 110 mm
N 100, N 200, L 400, L 600, L 800	132 x 132 mm	132 x 162 mm

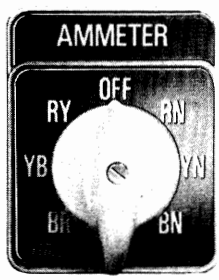
square plate

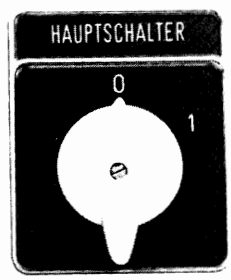




rectangular plate







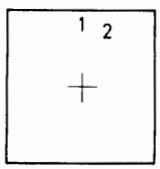
Special engravings on escutcheon plates

Special engravings are sometimes limited to the space available. The text is engraved on the plastic plate. For larger quantities on frequent repeats of the same design, we suggest you order a form insert. The cost of making the insert will be passed on to you at cost. The economical quantity for this special arrangement is 300.

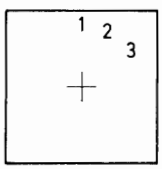
Standard engraving for plastic escutcheon plates

The following engraving on Plastic escutcheon plates for switches type E and V are available without extra cost. Non standard engraving are also available and will be invoiced at additional charge.
The figures below the individual pictures show in which switch size the engraving is standard.
A . . . M 10, M 16 E . . . . N 16, N 20, N 32, T 310, T 316, 40 L H . . . . N 40, N 60, 60 L, 100 L, 160 L L . . . . N 100, N 200 400 L, 600 L, 800 L

Standard engraving 30°:

..090


A E H L

..060


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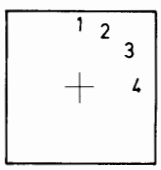
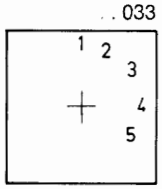
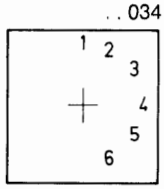
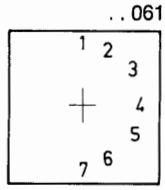


..033


E

..034


A

..061


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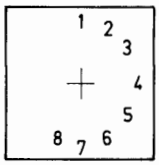

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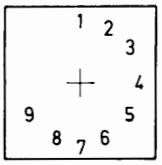

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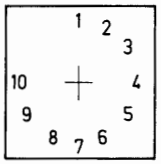

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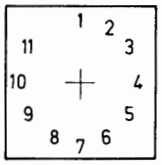

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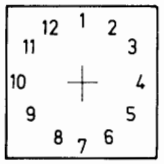
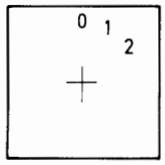


A E

..073


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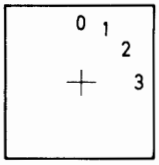

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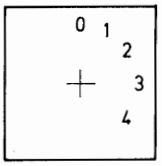

A

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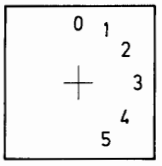

A

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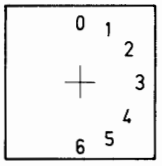

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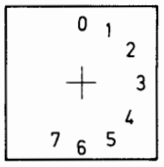

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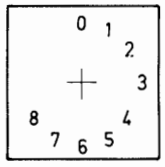

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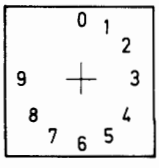

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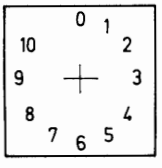

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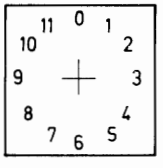

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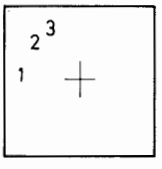
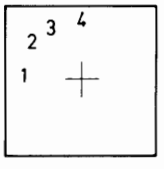


E

..066


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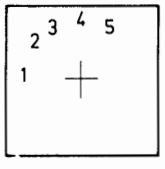
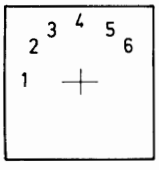


A E H L

..101


A E H L

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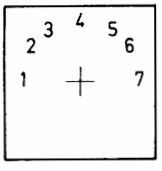

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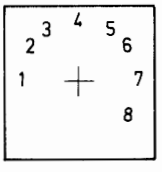

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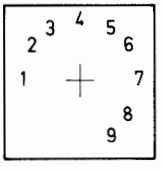
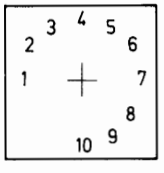
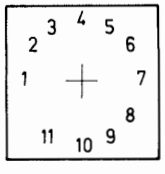


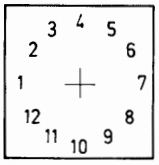
A E H L

..103


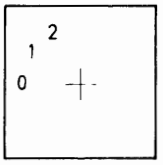
A E H L

..104


A E H L

..105


A E H L

..069


E

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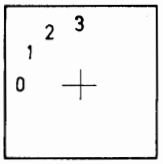
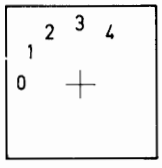
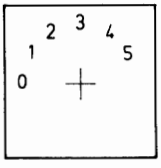


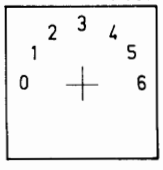
E

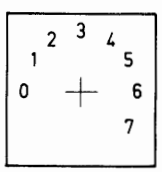
..106


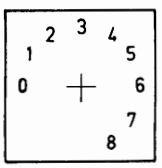
A E H L

..107


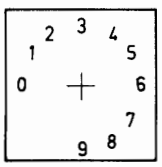
A E H L

..137


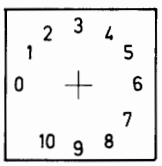
..138


..108


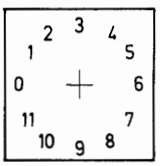
A E H L

..109


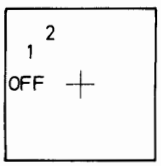
A E H L

..110


A E H L

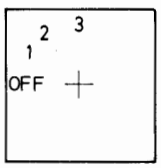
..111


A E H L

..099


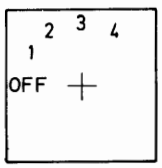
Standard engraving 30°:

..150



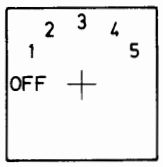
E

..112



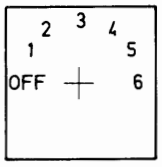
A E

..113



A E

..151



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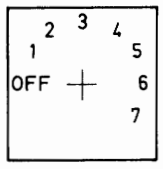

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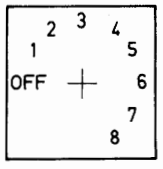

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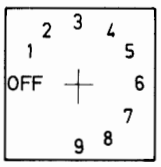

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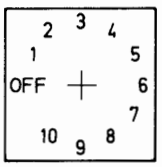

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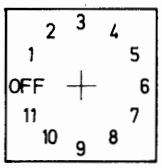

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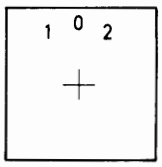

A E H L

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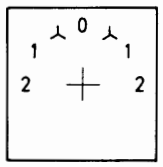

A E H L

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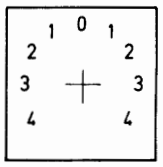

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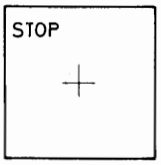

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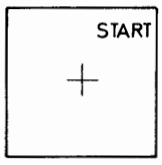

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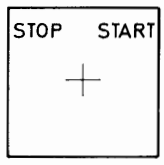

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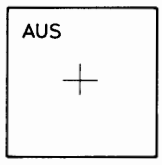

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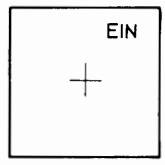

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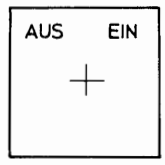

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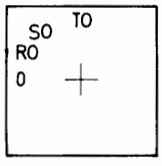

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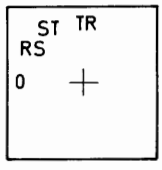

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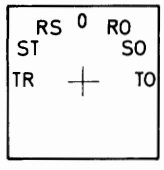

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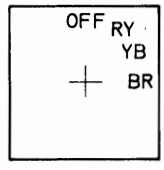

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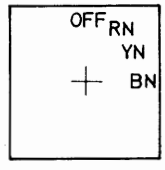

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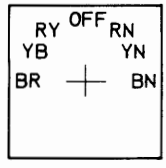

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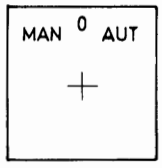

A E

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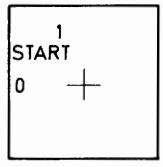

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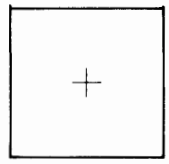

Standard engraving 45°:

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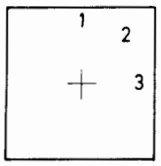

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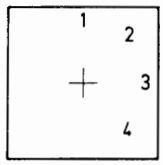

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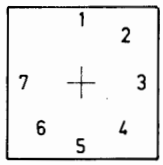

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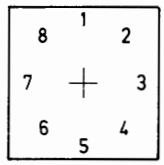

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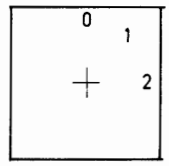
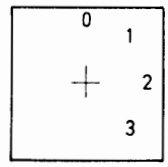


A L

..042



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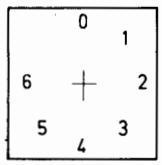

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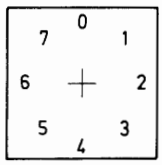

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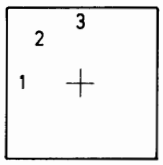

A E H L

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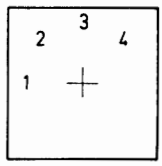

A E H L

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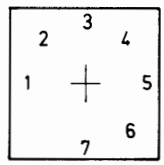

A E H L

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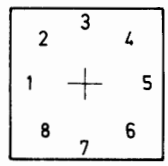
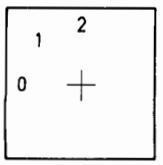


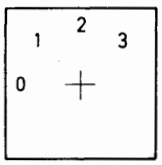
A E H L

..122



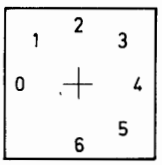
A E H L

..123



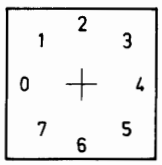
A E H L

..124



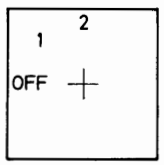
A E H L

..125



A E H L

..126



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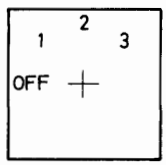
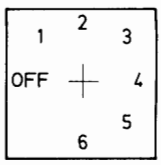


A E

Standard engraving 45°:

..128



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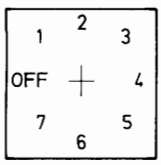

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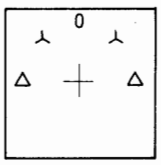
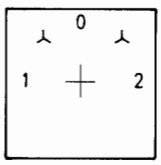


A E H L

..159



A E H L

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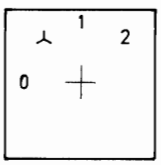

A E H L

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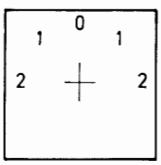
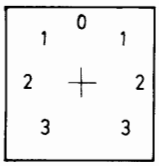


A E

..059



A E H L

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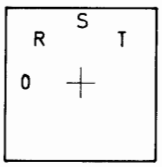

A E

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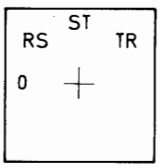

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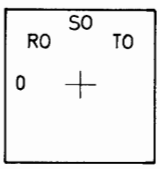

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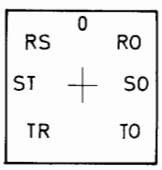
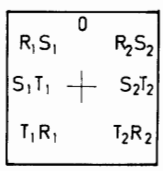


A E

..131



A E

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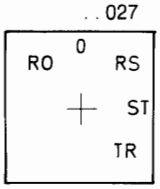

A E

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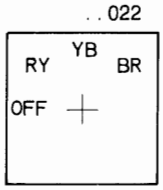

A E

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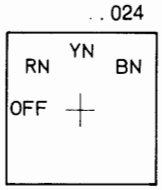

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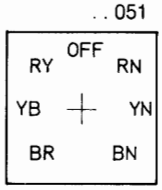
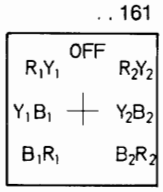


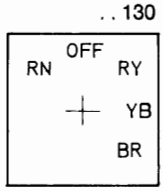
A E

..161



A E

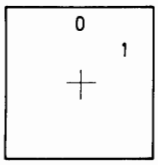
..130



A E

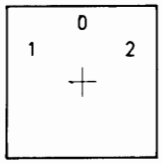
Standard engraving 60°:

..002



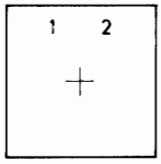
A E H L

..006



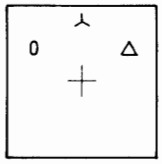
A E H L

..132



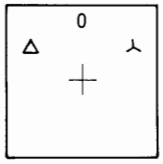
A E

..010



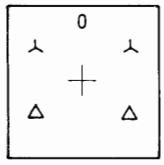
A E H L

..162



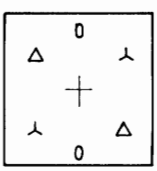
A E H L

..163



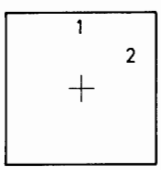
A E H L

..084



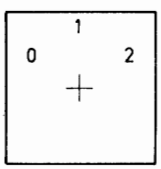
A E H L

..004



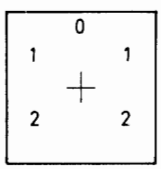
A E H L

..011



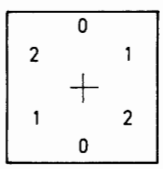
A E H L

..164



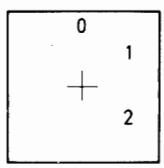
A E H L

..165



A E H L

..053



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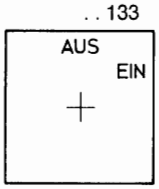
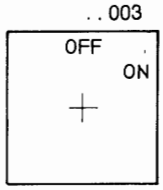
..133



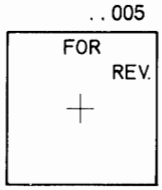
A E

..003



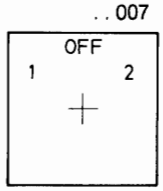
A E H L

..005



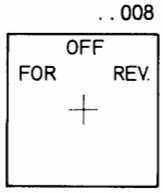
A E H L

..007



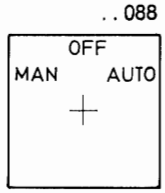
A E H L

..008



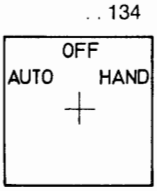
A E H L

..088



A E

..134



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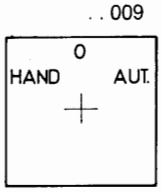
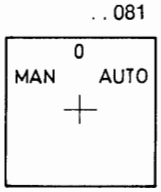
..009



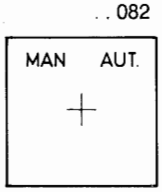
A E

..081



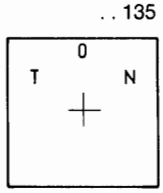
A E

..082



A E

..135



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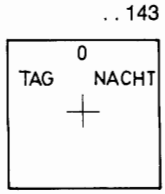
..143



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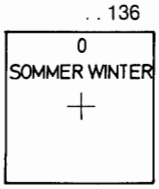
..136

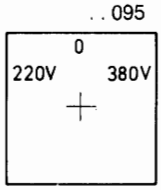


A

..166

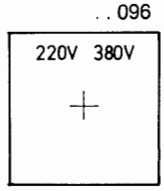
A

..095



E

..096

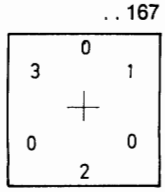


E

..080

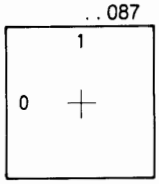
A E

..167

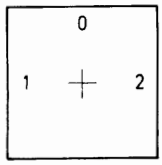


E

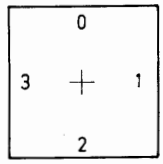
Standard engraving 90°:

..087


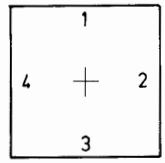
A E H L

..145


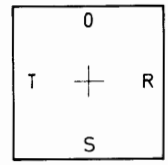
A E H L

..028


A E H L

..089


A E H L

..029


A E

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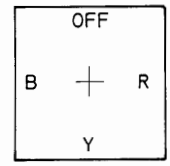
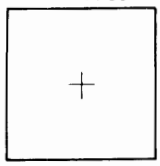
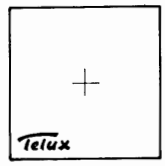
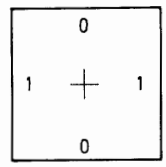


A E

..001

A E H L

..000


A E H L

..056


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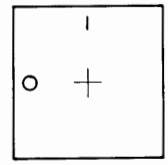
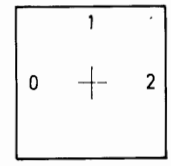
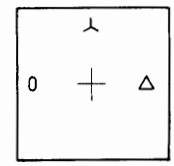


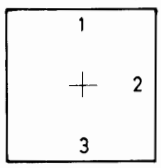
A E H L

..168


A

..144


A E H L

..146


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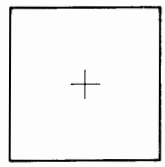

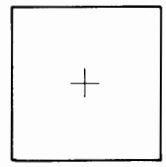

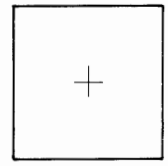

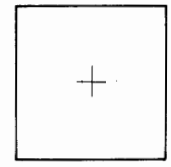

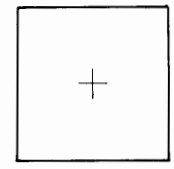

Standard engraving miscellaneous:

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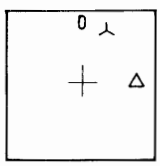
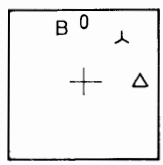
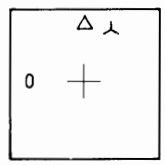


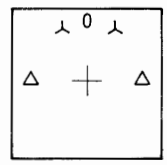
A E H L

..020


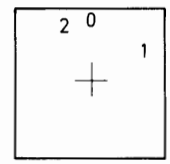
A E H L

..170


A E H L

..092


E

..055


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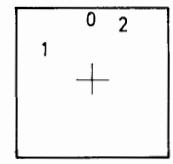
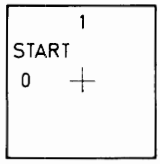
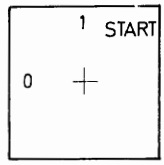
..147


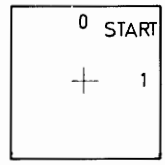
A E H L

..148


A E H

..149


A E H

..171


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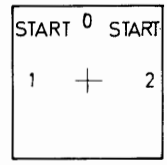
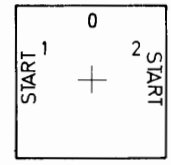
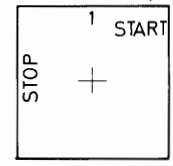
..057


A E H

..172


A E H

..054


A E

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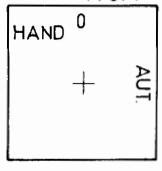

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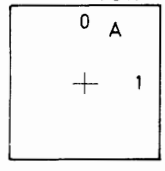

A E

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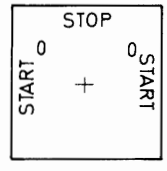

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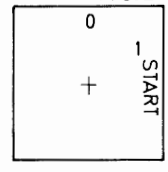

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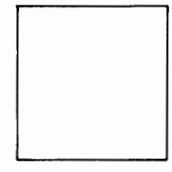

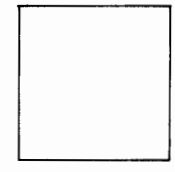

+ Sre-Additional Escutcheon Plate

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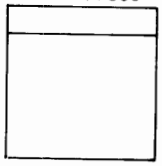
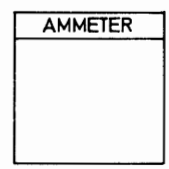

A E H L

..501


A E H L

..502


E

..503


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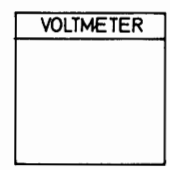

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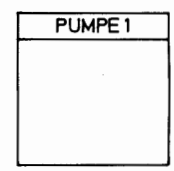

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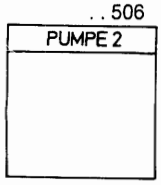
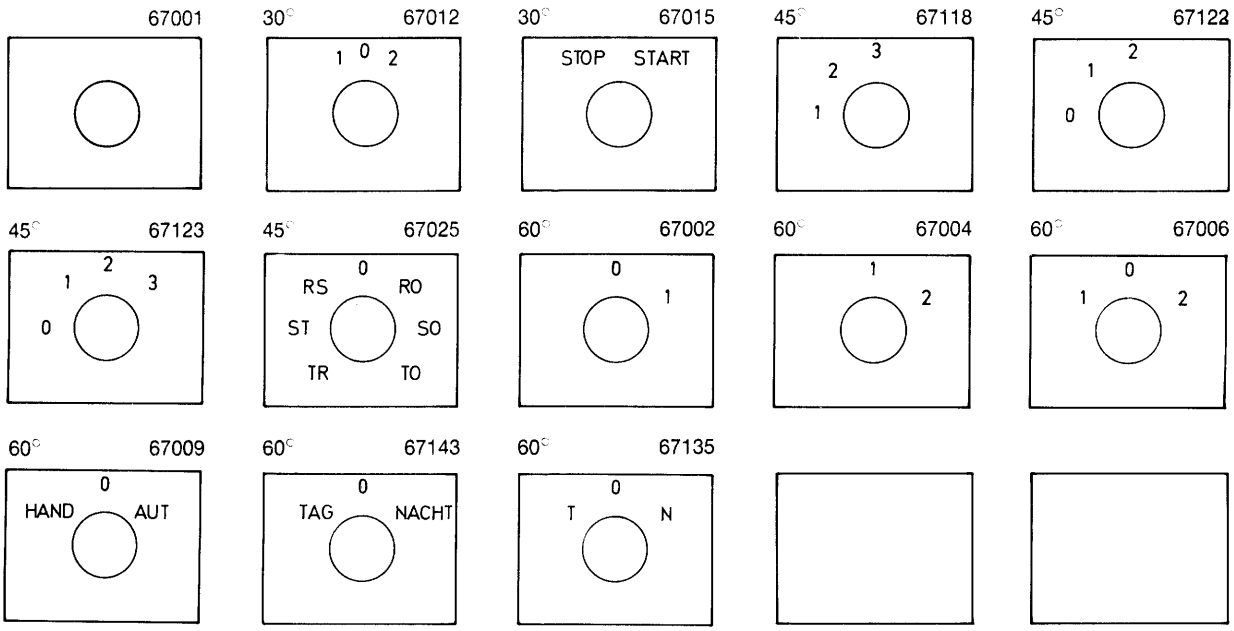


A

When ordering a complete Sre-plate the figure 84 must be marked with accidental to the three digit identification number. If only the plastic plate of the Sre-plate is required, then please use 87.

Standard-Lettering for Installation Cover + SMA Quick Mounting



Main and Safety Switches

For machines to VDE 0113/12.73 or IEC 204

1. Main Switches

In accordance with the above specifications, machines must be fitted with a main switch which can be locked in the 'off' position.

The main terminal connections of the switch are to be isolated by a cover.

3 and 4 pole TELUX switches are manufactured to comply with these requirements by adding additional features as follows;

a) Mains terminal cover: The mains terminals are situated on one side of the switch, and after wiring the terminals a plastic cover is fitted.

The cover is marked with the 'High Voltage' sign to indicate the presence of high voltage terminals within the cover, which is available for switch sizes N 16, N 20, N 32, N 40, N 60, N 100 and N 200.

b) Padlock locking devices + SV 3 and + SV 4

In order to do maintenance and repairs on machines it is necessary to isolate the electrical circuit of the machine. The mains switch must be lockable in the 'off' position. For this purpose locking devices + SV 3 and + SV 4 are supplied comprising 3 or 4 padlocks. It is not possible, therefore, to switch the machine 'on' until all padlocks have been removed. At present the following types and sizes can be supplied;

aa) Panel mounting E, Base mounting V
SV 3: size N 32, N 40, N 60, N 100, N 200
SV 4: size M 16 GFP, N 16, N 20, N 32

bb) Plastic housing P
SV 4: size M 16, N 16, N 20

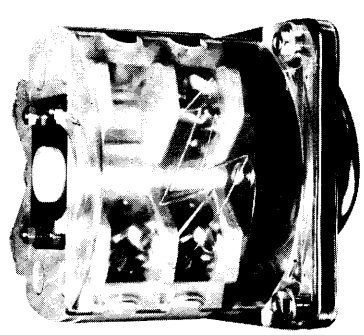
cc) Cast metal cases G:
SV 3: size N 60, N 100
SV 4: size M 16, N 16, N 20, N 32

2. Emergency Stop Switches

The regulations VDE 0113 apply to emergency stop switches, but they do not have to be lockable or to have terminal covers. However the switch lever must be coloured RED and the escutcheon plate contrasted in YELLOW.

TELUX flush mounting switches are available in the following sizes:
N 16, N 20, N 32, N 40, N 60, N 100, N 200 as emergency stop switches.

The regulations also apply to **combinations of Main and Emergency stop switches.** Switches are to be lockable, with terminal cover plates, Red handles and Yellow plates.



Anciliary attachements and optional extras

The following table shows clearly the switch sizes and types for which the individual ancillary attachements are available.
More detailed descriptions, illustrations and code abbreviations are shown in this catalogues.

		panel mounting **E**						base mounting **V**						plastic enclosure **P** and **PF**				cast enclosure **G**				cast enclosure splashproof **GF**			
		M 10 M 16	N16 N20 N32	N40	N60	400 L to 800 L N100 N200	T 310 T 316	M 10 M 16	N16 N20 N32	N40	N60	400 L to 800 L N100 N200	T 310 T 316	M 10 M 16	N16 N20	N32 N40	T 310 T 316	N16 N20 N32	N40	N60	N100 N200	N16 N20 N32	N40	N60	N100 N200
switch knobs	+KG		+	+	+	+	+		+	+	+	+	+		+	+	+	+	+	+	+	+	+	+	+
	+HG		+				+		+				+		+		+	+				+			
	+ZG	+	+					+	+					+	+			+				+			
	+KBG	+	+				+	+	+				+	+	+		+	+				+			
	+HR					+						+													
additional operation members	+Stgr 1	+	+	+	+	+		+	+	+	+	+		+	+	+		+	+	+					
	+Stgr 2	+	+	+	+	+												+	+	+					
	+RH, RHS		+	+	+													+	+	+		+	+	+	
	+ÖH, ÖHS		+	+	+													+	+	+		+	+	+	
	+ÖH 2		+				+								+		+								
	+TK	+	+	+	+	+	+	+	+	+	+	+	+												
	+TK 2	+	+	+	+	+	+	+	+	+	+	+	+												
	+TKFR	+	+	+	+	+	+	+	+	+	+	+	+												
	+TK2FR	+	+	+	+	+	+	+	+	+	+	+	+												
	+TKSZ	+	+	+	+	+		+	+	+	+	+													
	+Foot 1																	+	+			+	+		
	+Foot 2																	+	+			+	+		
	+Foot 3																	+				+			
lockable switches interlocks	+Sa	+	+	+				+	+	+				+	+	+		+							
	+SaGZ		+	+																					
	+Sz	+	+	+	+	+	+	+	+	+	+	+	+												
	+Sz 2	+	+	+	+	+	+	+	+	+	+	+	+												
	+SV 3		+	+	+	+	+		+	+	+	+	+												
	+SV 4	+	+	+	+		+	+	+	+	+		+	+	+	+	+								
	+DV		+	+	+	+	+		+	+	+	+	+												
	+ET		+	+	+	+	+		+	+	+	+	+												
	+GV		+	+	+	+			+	+	+	+													
	+MV		+	+	+	+																			
circular switching switch couplings	+Ru	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	+RS 1	+	+	+	+			+	+	+	+				+	+		+	+	+		+	+	+	
	+RS 2	+	+	+	+			+	+	+	+				+	+		+	+	+		+	+	+	
	+ZK 2	+	+	+	+	+	+	+	+	+	+	+	+												
	+ZK 3	+	+	+	+	+	+	+	+	+	+	+	+												
	+SK	+	+	+	+																				
accessories	+WK	+	+	+	+	+	+	+	+	+	+	+	+					+	+	+	+	+	+	+	+
	+AMP-Z	+	+				+	+	+				+												
	+SKr		+				+		+				+												
	FR-shroud	+	+	+																					
concealed switches	+UP	+	+																						
	+MU 2/3		+																						
panel and base mount. switch	+VW	+	+	+	+	+	+	+	+	+	+	+	+												
	+WD	+	+	+	+	+	+	+	+	+	+	+	+												
	+GFP	+	+					+	+																
	+SL	+	+	+	+	+	+							+	+	+	+								
	2nd latch mechanism	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	gold plated cont.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	tropical proof type	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

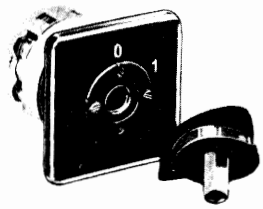
Optional extras and ancilliary attachments for TELUX Cam Switches

From the table shown on page 21 you will find the switch sizes and types for which additional accessories can be delivered. The exact definition of the additional accessory for a switch size will be given by its initials (for instance: N 16 EA + Sa).

Further Operations Members:

Removable Knob Drive: + StGr 1 and + StGr 2

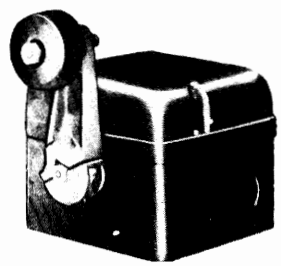
The switch knob is of the removable plug type, suitable for withdrawing optionally either at individual settings or at all settings. The switch shaft is recessed in the front plate or back in the switch housing to avoid unauthorised switch operation even with the aid of simple tools. The removable knob switch is not available in the moisture-protected version.



Panel mounted switch N 16 with removable knob drive

Switch with Roller Arm: + RH, + RHS

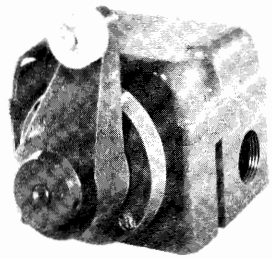
For switch sizes N 16, N 20, N 32, N 40 and N 60 plastic lever arms with rollers (N 16 and N 20 – 24 mm. dia.; N 32, N 40 and N 60 – 30 mm. dia.) are available. The operating force must be transmitted to the roller by means of a crank system, forked arm or similar members. Application is usually with selfcancelling limit switches. Also available is a version with reinforced bearing (+ RHS).



Switch N 40 with roller arm

Switch with Eyelet Lever: + ÖH, + ÖH 2, + ÖHS

Switches in cast housings can also be fitted with eyelet levers. Operation is then by cable or chain pull. Here also it is possible for the switch shaft seating to be greatly reinforced (+ ÖHS).
The eyelet lever can also be of the double arm type (+ ÖH 2).



Switch N 16 with roller arm reinforced

Foot Operated Switches:

TELUX Cam Switches in cast housings can also be fitted with foot operation. In principle there are three versions available:

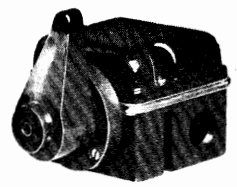
1. As **footswitch**
2. As **stepswitch** and
3. With two-armed **footrocker**

1. **Footswitch + Foot 1:**

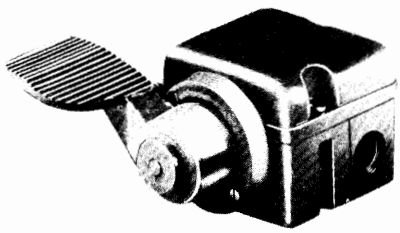
   The single-armed foot lever is returned immediately to original position after release by a powerful return spring, thus also switching back the switch insert. This version therefore acts as a foot operated pivot switch with one rest position and one operating position.

2. **Stepswitch + Foot 2:**

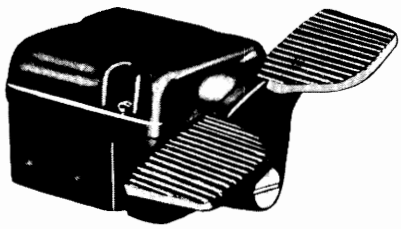
   When the foot lever is depressed the switch insert is switched to the next setting. The insert remains at this setting despite the fact that, after release, the foot lever is returned by spring pressure to start position. When it is again depressed the switch is once again actuated, i. e. it is switched to the next position. Step switches presuppose that the switch insert is provided with a circular switching system, i. e. that the pivotal motion of the switch shaft always follows the same rotary sense. On switches in which the number of switch settings would not normally allow for circular switching it may be necessary to provide some assistance by arranging intermediate zero settings. **The total number of switch settings per cycle must always amount to 12** as the step angle is a uniform 30° between two consecutive switch settings.
   On cutout switches normally provided with only two settings, for example, it would be necessary to provide for each cycle six zero settings and six operating settings, following consecutively.



Switch N 16 with eyelet lever ÖHS



Switch N 16 foot operated + Foot 1 or + Foot 2



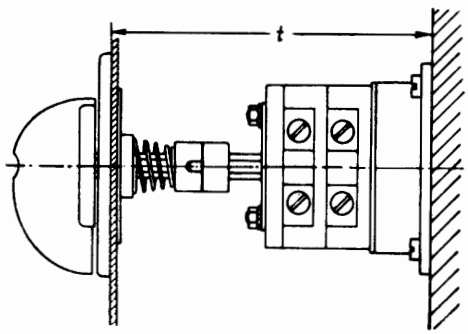
reversing switch foot operated
N 16 GWU3 + Foot 3

3. **Two-armed footrocker + Foot 3:**

A two-armed foot-rocker is available for switches with **2 or 3 switch settings.** This remains in the selected switch setting after depression. Therefore the footrocker has no return action and must consequently be reset by foot. This version is used particularly on cutout and change-over switches with zero setting and on reversing switches. The switch angle between adjacent settings on switches with **2 switch settings is 60°** and on those with **3 switch settings a uniform 30°.**

Door Switches: + Tk

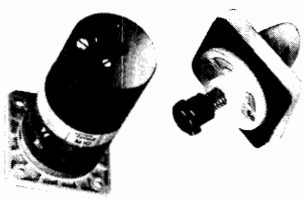
Door switches are available for fitting in switch boxes or distributors with hinged doors. These permit the door to be opened without first having to remove the switch knob. In most cases this relates to distributor type V switches fastened on the back wall of the cabinet or on the floor of the distributor box. The switch shaft carried a member which engages on the door switch driver and acts as a torque transmitter. When the cabinet door is open the relative positions of the switch shaft and the door switch shaft are changed so that the two elements no longer fit positively together. It is possible that the relative location of the switch shaft and the clutch shaft of the door changes while the door is open and therefore no proper power connection is given. For this reason the clutch shaft of the door is spring-loaded so that no damage to either the switch or the clutch is possible if the door is closed.



base mounted switch with door coupling

The door switch can be fitted in the box door either on the front after making an appropriate circular aperture or from the rear. In the latter case it will be necessary to drill bores for the drive shaft and for the four fastening screws.

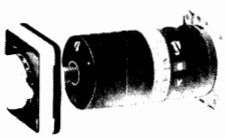
For accurate dimensioning of the switch shaft length it will be necessary to know installation depth "t". This dimension "t" also includes the thickness of the wall to which the door switch is fastened.



door clutch unit + TK
size M 10/M 16

In addition a special version of the door switch is available which incorporates a door lock. With this type of switch it is possible to open the box door only when the switch is at a certain setting — e. g. at zero setting.

The code abbreviation for this type is ..... **+ Tk 2.**

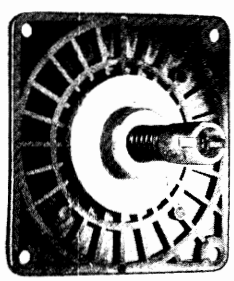


door clutch unit with
interlock + TK 2

Door switches can also be supplied ready protected against penetration of dust and moisture.

The code abbreviation for these is ..... **+ TkFR** or **+ Tk 2 FR.**

A further variation is the lockable door switch. These represent a combination of ancillary units Tk and Sz. By means of a special cylinder lock it is possible to lock one or more switch settings. The switch knob can then only be turned when the switch is unlocked. The cylinder lock is incorporated in the door switch assembly.



door clutch unit + TK
size N 100/200

The code abbreviation for this is ..... **+ TkSz.**

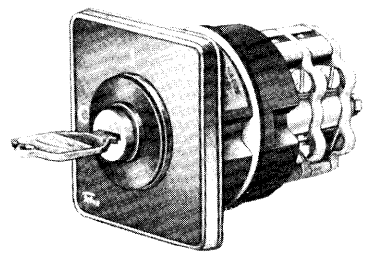
The following door switch versions are therefore available:

Standard version door switch	**+ Tk**
Door switch incorporating door lock	**+ Tk2**
Moisture-protected door switch	**+ TkFR, + Tk 2 FR**
Lockable door switch	**+ TkSz**

Lockable switches

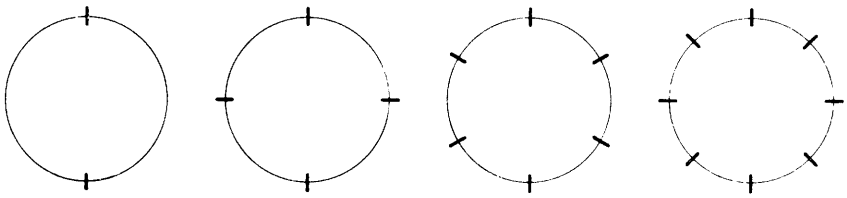
Key operated switch: + Sa

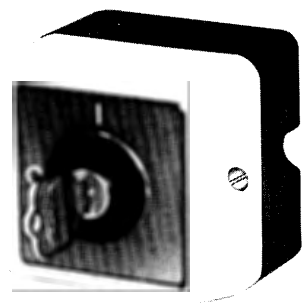
On the key operated switches the switch shaft is coupled with a cylinder lock so that the switch is operated by the key. The key can be withdrawn and replaces the switch knob. Owing to the low motive torque which can be achieved with the key this type of switch can only be used on equipment with up to 4 contacts. Whilst the key is inseated in the lock the switch is not lockable.
Key removable position = locked position.



Key operated switch N 16/20 E + Sa

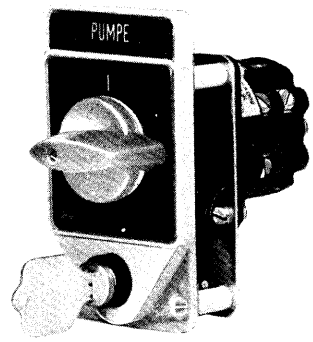
The internal assembly of the switch cylinder provides to remove the key in the positions as shown in the following table (key position = switch position). Lock switches, where the key can be removed only in one switch position (for e. g. in 0 position) are also available.





Key operated switch N 16/20 P + Sa

The key operated locking switch is restricted to switch sizes M 10, M 16, N 16, N 20 and N 32 of the integral and distributor types and those enclosed in plastic housings. All key operated switches are normally supplied with 2 keys and fitted with the standard lock number. Additional keys and different lock numbers must be ordered specifically.



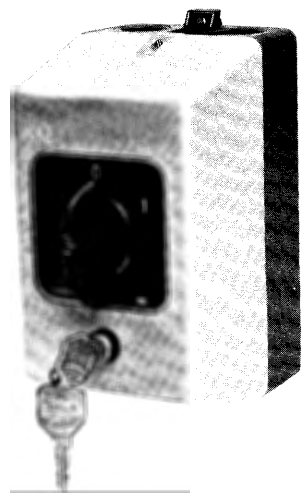
Lock switch N 16/20 E + Sz

Key operated switch with large cylinder: + SaGz

Available in switch sizes N 16, N 20, N 32 and N 40 fitted with large cylinder lock. These flush mounting switches are mainly used for high security applications such as garage doors. Special lock numbers are available.

Lock Switch: + Sz (ancillary lock)

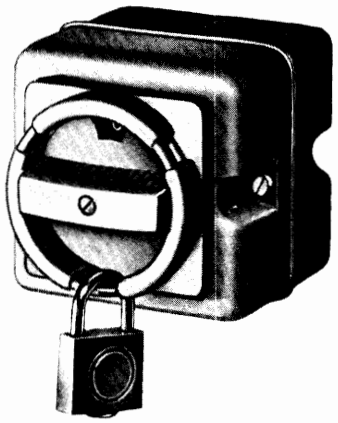
All panel or base type TELUX Cam switches can be fitted with an ancillary lock allowing the switch to be locked at individual settings or in all switch settings. The key can be withdrawn either in locked or unlocked state. If it is desirable to prevent the key being withdrawn at any particular position it will be necessary to accept the fact that the switch cannot be supplied with provision for locking at those settings.



Lock switch P N 60 . . . + Sz

For cutout switches a special version of the ancillary lock is available with which the switch can be turned on only after unlocking but which it is possible to turn off at any time even without first operating the key. The key can be withdrawn in both switch settings. The code abbreviation for this type: + **Sz 2.**

All lock switches are normally uniform and supplied with 2 keys (i. e. having the same lock number). Additional keys or different types of lock combinations must be ordered specifically.

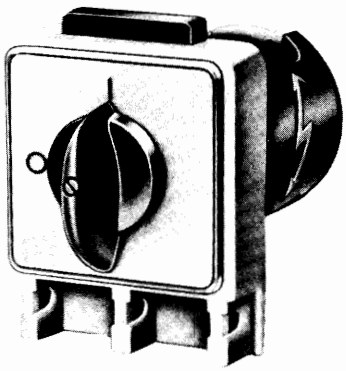


Interlocking device + SV 4

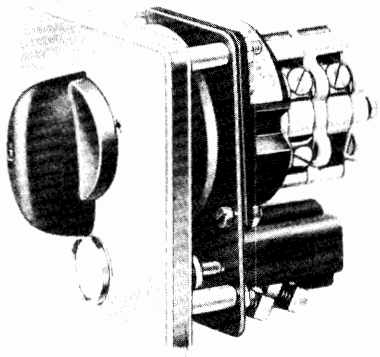
Interlocking device for padlocks + SV 3, + SV 4

Switches with interlocking device + SV 3 can be blocked up by one to three padlocks. An operating of switches is only possible when all padlocks are taken off. You notice by a visible red locking button that the switch can be operated. This red locking button must be pressed in order to put in the first padlock.
Interlocking device + SV 4 is for using up to four padlocks.

If machines and control panels are checked by several persons before putting into operation this device can be used as protection.



Interlocking device + SV 3

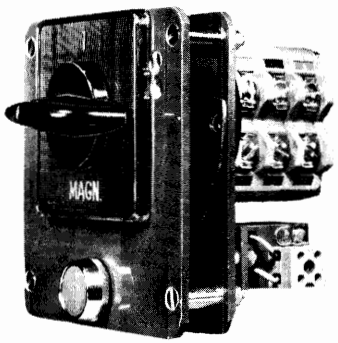


Switch interlock with
electrical contact + ET

Push-Buttom Switch Lock: + DV

To avoid accidental switch operation the panel and base mounted type TELUX Cam switches can be fitted with a pushbutton lock. This allows the switch to be operated only when the pushbutton is depressed (2-hand operation). The locking action can be confined to all or to individual switch settings.

This type of locking system is frequently used when the operator is either to be obliged to use both hands when switching or where it is desirable to oblige him to perform a deliberate, considered action by first depressing the pushbutton (example: as a selector switch when operating eccentric presses).



Switch with
Magnetic Interlock N 60 A + MV

Switch Interlock with Electrical Contact: + ET

Function and construction is identical to the above described switch interlock with pushbutton DV, but when the pushbutton is depressed this also actuates an electrical unit containing a rest and a working contact. This enables ancillary current circuits to be opened or closed before the switch knob can be turned. Currentless switching is possible in conjunction with a series-coupled contactor. The main field of application is on stepped switches for automatic regulating transformers where currentless switch-over is required, panel switch N 16 with push-button interlock.

Switch with Magnetic Interlock and spring return: + MV

The switch can be operated only when an interlock has been cancelled by energising an electromagnet. When ordering it is necessary to specify the service voltage, current and period for which the magnetic coil is switched on. This type can be used on all sizes of integral switches.

Switch with Mutual Interlock: + GV

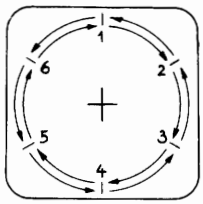
Two or more panel switches mounted on a common front plate can be mutually interlocked in such a fashion that one piece of equipment can be switched only when the other switch is at certain settings (example: voltage selector switches or pole-changing reversing switches).

The interlock action is effected by the engagement of locking discs.

Circular Switch: + Ru.

Switches with 4, 6, 8 or 12 switch cells can be fitted without limit, so that it is possible to continue switching from the final setting on to the first setting again. This may result in slightly longer switches, owing to the unavoidable inadequate utilisation of the switching cells.

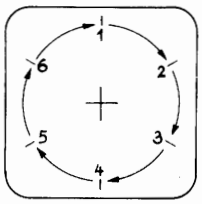
+ Ru



Backswitch Interlock: + Rs.

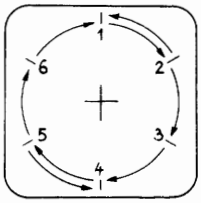
Switches with an integral backswitch interlock can be switched only in one direction. The essential requirement here is for the use of the circular switching system. Consequently, the only switches suitable for use in this connection are those with 4, 6, 8 or 12 switch settings. A main field of application for this is reversing switches for motors with several speeds whereby there must be no possibility for switching back from the high speed to a lower speed owing to the dangerous retardation which might arise.

+ RS 1



Particularly in the case of high speed woodworking machines this can cause serious machine damage.

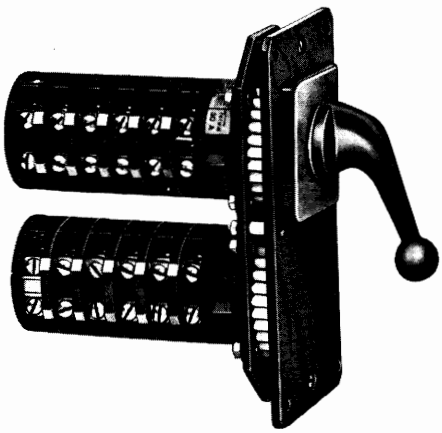
+ RS 2



There are two different types of backswitch interlock:

a) complete lock: + RS 1.
This backswitch interlock is effective at all switch positions.

b) partial lock: + RS 2.
This acts only at individual settings which must be specified in detail when ordering.



Tandem drive E, N 16

Geared Switch: + Zk

Switches with large numbers of switching cells are spread over several columns interconnected by gears. (Application: where the installation depth is restricted.) However, this is possible only with switch types E or distributor type V.

The distinction is drawn depending on the number of columns as follows:

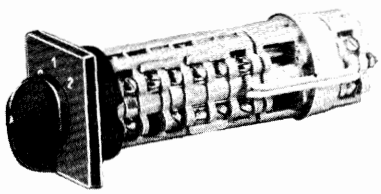
a) twin column switch: + Zk 2 and

b) triple column switch: + Zk 3.
see scale drawings + Zk.

Delayed Action Switch: + Sk.

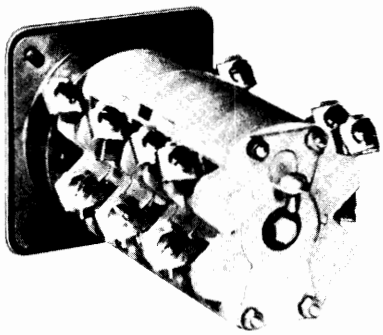
An ancillary switch is coupled with the main switch in such a manner that the main switch contacts are actuated only after certain switch settings are reached on the main switch.

(Example: currentless backswitching on reversing switches, delayed action contacts, plus recording.)



Panel mounting switch with slip clutch N 16

Angled Terminals: + WK



Panel mounting switch
with angle terminals

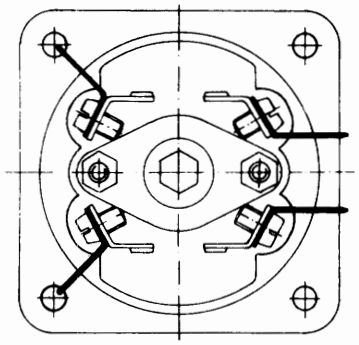
On panel and base type switches the connecting terminals are sometimes difficult to reach. This applies for example when several switches are mounted close together or if great depth or restricted width prevents orderly and convenient connection of incoming leads on the distributor boxes. For such cases angle terminals are available for all switch sizes. These project to one side out of the switch pack after assembly. Only size N 200 switches are supplied with angled terminals as standard equipment.

A distinction is drawn between "**Left**" and "**Right**" angled terminals. Viewed from the switch end an integral switch fitted with angled terminals displays the "Left" angled terminals at the top left and bottom right and the "Right" angled terminals at the top right and bottom left in the switch cells. The heads of the terminal screws are aligned uniformly below 45° outward and relative to the switch ends.

Angled terminals can be fitted on each switch on all or only on individual terminals.

Load switches have specially dimensioned angle terminals at every clamping spot, which allow the connecting of the conductor-cross sections according to the table on page 12 or at higher currents the connecting of strips. Another function of these angle terminals is the coupling in parallel of homogenous contacts in neighbouring cells.

Switches with Terminals for Push On Connection + AMP-Z



Arrangement for switch cell
with AMP lugs

In recent years greater rationalisation measures in respect of connecting leads to switch terminals have led to increasing use of standardised flat plugs. We have accordingly developed flat connecting lugs for our switch sizes M 10, M 16, N 16 and N 20 with rated sizes of 6.3 x 0.8 for fitting to the conventional FASTON flat lugs.

Flat lugs in this size are designed for connecting wire sizes within a cross sectional range of 0.3 to 6.0 mm^2 and are admissible for use at currents rated up to 25 A. They are designed to fit firmly after being pushed onto the plug stabs and ensure perfect contact with the switch terminals.

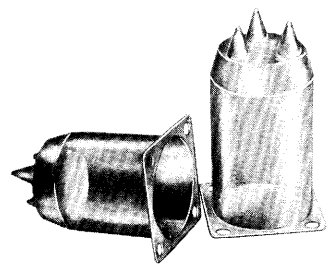
Connection of the wires by the flat plugs has proved a great time saver, particularly in mass production of washing machines, domestic appliances, office machinery, machine tools, etc. The adjacent diagrammatic drawing shows the manner in which the plug pins are fitted on the connecting contact members of the switches. Owing to the distance to which these pins extend, they are suitable only for use on switch types "panel E" and "base V". The flat plug lugs, which are fitted on the wire ends, are not included in our normal production programme but can be obtained from us on request.

AMP-Flat connector

Moisture Protected Version of panel Switches: + Wd (IP 65)

Type E panel switches and base type V switches can be fitted optionally with sealing elements on the switch shafts, thus protecting them reliably against penetration of dust and moisture through the shaft bores into switch-boxes etc. The seal is rounded at the point where it is seated on the switch shaft. Integral switches must be screwed into position with a space equivalent to the thickness of the seal. The requisite four spacer collars are supplied with the switches.

Moisture Proofing Caps for panel Switches: + FR shroud (IP 54)

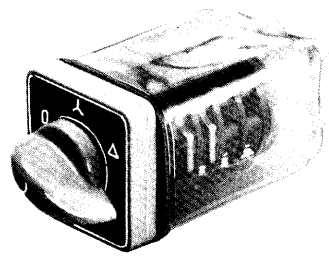


For sizes M 10, M 16, N 16, N 20, N 32 and N 40 TELUX panel Switches protective caps are available which ensure a considerable degree of protection against dust and moisture when the units are fitted. Panel switches are frequently installed in the hollow space in machine bases and similar, where frequently they can be subject to the damaging influences of grinding dust, oil drips or various types of moisture, resulting in gradual fouling of the contacts.

A simple solution to this problem which still ensures perfect protection of the integral switch has been found in these protective caps. They are manufactured of flexible, oil-proof plastics and available for all integral switches up to a maximum number of five switching cells. They are therefore ideal for all motor switches with conventional switching programmes.

In addition to protection against dust and moisture the use of protective caps also brings the advantage of greater insulation reliability (protection against accidental contact).

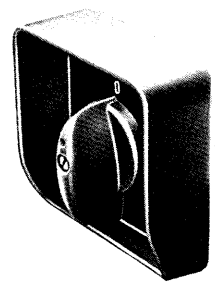
A further and not inconsiderable advantage in the use of protective caps is that, when properly fitted, they also protect the ends of incoming wiring against penetration of moisture.



The switches with protective caps can be installed in exactly the same simple manner as normal integral switches. As is known, this involves two methods, either the switch is installed from the front, through a circular installation aperture, or from behind or internally with a shaft stump protruding through the fastening wall.

The protective caps are provided with a square coupling flange of the same size as the front plate of the switch. When fitting from the front this flange is clamped between the front plate and the fastening wall. When the switch is fitted from behind or inside the flange is clamped into position on the front plate with the aid of our fastening screws. The wiring is set in through three tapered unions on the rear end of the protective cap. These unions are sealed off when the cap is delivered and are trimmed off a suitable pair of pliers or cable knife as required for the wiring diameter.

Protective Collars for Integral Switches N 16, N 20, N 32: + Skr



Panel mounting switch with protective colar and moisture proof caps

To protect the switch knob against accidental impact, contact and against precipitation of dirt, a protective collar can be provided when panel switches are fitted. This is used frequently, particularly, where the switch is being installed on machine bases or similar and where there is a risk of inadvertent operation of the switch by people or objects brushing past the knob. Naturally the protective collar can also be used in conjunction with the moisture proof protective cap (see above).

The switch is fastened in the protective collar with its front plate (fitting from front), so that for fitting purposes it is only necessary to provide the two fastening boards for the collar and the installation aperture with a dia. of 57 mm. The square flange of the moisture proof cap is pressed by the front plate of the switch on to the inner wall of the protective collar.

TELUX Cam Switches for DIN-Rail Mounting (DIN 46277/3)

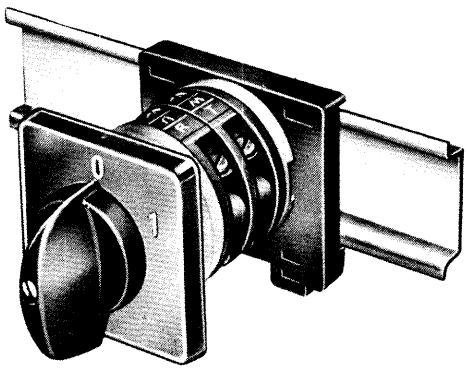
a) + SM . . . Quick Mounting

TELUX Cam switches sizes M 10, M 16, N 16, N 20 and N 32 are available with a mounting plate suitable for attachment to DIN-rail (DIN 46277/3).

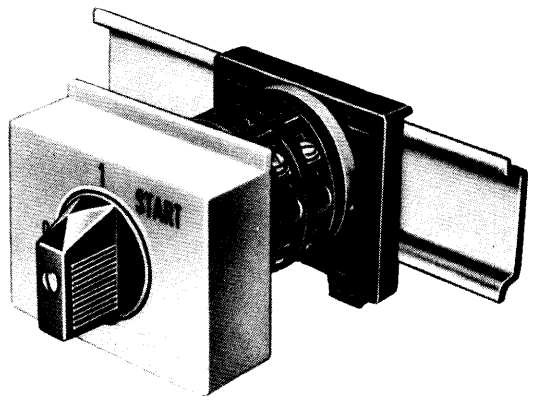
On sizes M 10 and M 16 switches the mounting plate is fixed to the switch with self tapping screws, therefore switches for panel mounting and base mounting can be quickly converted into rail mounting.

On sizes N 16, N 20 and N 32 switches, the mounting plate is fixed to the switch via the two tie rods passing right through the switch assembly. Therefore the convertion of panel and base mounting switches to DIN-rail mounting can only be achieved by replacing the two tie rods by some more of the appropriate length

Switches of the + SM type are supplied with plastic escutcheon plates as standard, rectangular escutcheon plates are also available where additional engraving is required (refer to relevant catalogue page).



SM



SMA

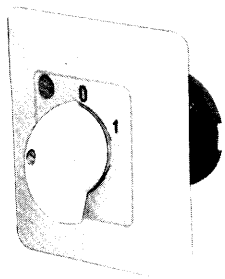
b) + SMA . . . Quick Mounting with Installation Cover

The switches have the same facilities as the + SM type (Quick Mounting), which enables the switch to be snapped on to DIN-rail. Instead of the plastic escutcheon plate this type is supplied with a plastic installation cover, these covers fit a slot of 45 mm high x 62 mm wide. The installation cover is held in place by a support ring which has four different height positions giving a maximum adjustment range of 9 mm. Knob adjustment is independant of the position of the coverplate relative to the switch shaft.

Switches with + SMA are only available in sizes M 10 and M 16 because the installation cover only accepts knobs of the KBG-type.
When ordering switches with + SMA, the distance from the upper edge of the DIN-rail to the inside front edge of the installation cover must taken into consideration (dimension "X"). The switches are available in standard form with the following values for dimension "X". (For others see below table.)

	Dim. X		
	46 mm	61 mm	70 mm
Size M 10	2 cells	4 cells	5 cells
Size M 16	2 cells	3 cells	4 cells

Other dimensions are obtainable by fitting distance pieces to the switch assembly which are attached with self tapping screws onto the end of the switching packet. Distance pieces are available 6 mm and 13 mm alternatively by using empty cells M 10 . . . 9,5 mm, M 16 . . . 12,5 mm.



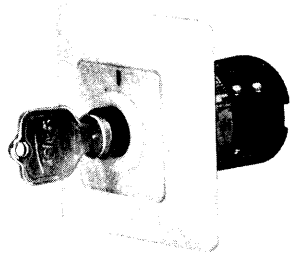
Mini-Switch M 10 UP and M 16 UP

Flush Mounting Versions

Miniature Switches M 10 UP and M 16 UP

TELUX mini-switches M 10 UP and M 16 UP with 1 or 2 switch cells are suitable for mounting in 65 mm boxes and mounting plates which can be supplied on request. The inserts of the switch have a circular front cover where the fixing holes line up with the 65 mm box.

Switch inserts, front plate and escutcheon plates are supplied in white.



M 16 UP lockable

Switches with Flush Mounting Box + UP

Switches N 16, N 20 and N 32 in panel mounting form, E, which are intended for flush mounting, can be supplied with a specially adapted flush mounting box which is designed in such a way as to allow plenty of room for the cables inside.

The plastic cover plate is square, but the length of the switch (insertion depth) limits the switch to 5 switching cells.

Switches with Second Latch Mechanism + RW 2

When it is necessary to operate a large number of contacts simultaneously, there may not be enough power to do this. In this case, a second latching mechanism is fitted to larger switches to ensure satisfactory operation, especially with overlapping contacts.

Switches with Indicator Lamps + SL

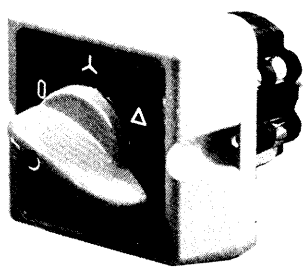
Flush mounting switches can be supplied with indicator lamps. The colours available are red, white and green. Please specify the operating voltage of the lamps when ordering.

Large Front Plate for Flush Mounting M 10, M 16 + GFP

All panel mounting, E, and base mounting, V, switches of sizes M 10 and M 16 can be supplied at a small extra charge with a front plate, cover plate and knobs used on the larger switches N 16 and N 20 with fixing holes 48 mm x 48 mm.

This feature is of particular interest when it is necessary to replace older type switches with smaller newer types, without having to change the fixing holes.

Switches N 16, N 20 and N 32 can also be supplied with the cover plate and knob of the N 40, but a larger front plate is not available.



Switches for Motor terminal box mounting: + KE

When switching motors it is often preferred for switches to be mounted within the motor case to avoid having to supply a separate box for the switch alone.

Switches can be mounted through hole in the existing lid.

M 10, M 16 . . . 48 mm dia.
N 16, N 20 . . . 50 mm dia.
N 32 . . . 70 mm dia.

A gasket is supplied for the above types, for fitting between the coverplate and the motor terminal box to prevent dust and daupness entering.

Motor supply connections are made in the normal manner though the lower section of the terminal box. In order to make sufficient room for the switch it may be necessary to remove the motor terminal connection block.

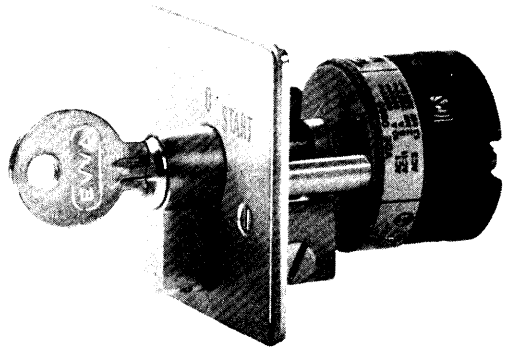
Further Special Versions

Extended Shaft Length + VW,
Tropicalised Versions + TR
Please enquire regarding the following: Make-before-Break, fleeting, impulse contacts and special engraving on escutcheon plates.

Key Operated Switches with Barrel for special security functions + SaSi

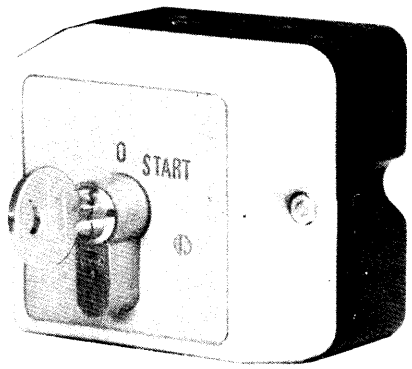
More and more there are applications for switches in practice where security arrangements can only be operated if a certain key is available as e. g. metal fences in front of a shop-window, electric operated doors of a garage, alarm-signal-facilities etc. Furthermore there is also the necessity that the access to the conducting-wires, which are connected to the terminals of the switch, should be prevented. In this way it should be avoided that the security arrangement can be operated by short circuit instead of switch contacts. TELUX-Key Operated Switches + SaSi do by all means meet all the requirements. In this connection with all designs, panel mounting switches or panel mounting switches with flush mounting box as well as switches in moulded cases all construction – screws are covered in this way that they are only accessible for operation with the proper key. Accordingly this means that the assembly of these switches can only be operated when the key is fixed on the switch because with the key a cover-plate is locked as a result of the last proceeding in the assembling.

On switches in moulded cases the lid of the switch and the lower part of switch are riveted tight together. The wiring and the panel mounting of the inserts of the switch is effected by means of an opening as to allow plenty of room for the cables inside. This opening is covered with a cover-plate in this way that there is no access to the screws. This plate can only be mounted at a certain position of the lock-nose of the barrel.



Panel Mounting E + SaSi

Switch with Flush Mounting Box E + SaSi + UP

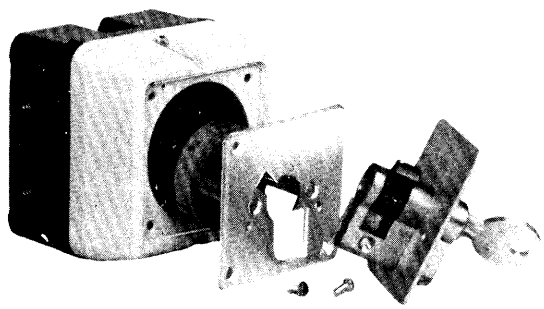


Designs and Sizes available:

a) Panel Mounting E + SaSi
Sizes M 10, M 16, N 16, N 20

b) Switches with Flush Mounting Box E + SaSi + UP
Sizes M 10, M 16, N 16, N 20

c) Switches in Moulded Case P + SaSi
Sizes M 10, M 16
For use in the open air: PF + SaSi
Sizes M 10, M 16



Switch in Moulded Case P + SaSi

TELUX Cam Switches with Special Programme

Owing to their building block structural principle TELUX Cam Switches are particularly suitable for use in the manufacture of special switches. The operation of each contact pair in the switch is arranged for the intended switching programme by appropriate shaping of the cam. In the case of switches with a total switching angle exceeding 180° it is necessary to take account of the fact that in each switch cell one cam controls two opposing independant contact pairs, the programme of which must therefore correspond. The switch sizes T 310 and T 316, each cam operates 3 pairs of contact in one cell and in this case it is necessary to co-ordinate after 120° the neighbouring contacts. In most cases this is only partially possible, as a result of which the individual switch cells can be used to only half (T 310 and T 316 one or two thirds) of their capacity, i. e. fitted with only one pair of contacts. On all special switches with overall switch angles below 180° (120° for T-Series) the number of switch cells required is calculated from half the number of all contacts in the switch.

When designing switches with special programme a major rule is therefore played by selection of the most favourable switch angle. The summary of all possibilities relating to the arrangement of switch settings as shown on pages 14, 15, 16 is intended to provide some assistance in this connection (Items Numbered PN).

For convenient arrangement of special programme we supply printed forms free of charge on request as illustrated below.

On these forms are entered the switch size, design, type of knob, desired switch angle and the function of the contacts. Furthermore provision is made for entering details on possible coverplate engraving and other special requirements. Forms of this type are also available suitable for reproduction.

Data required when ordering TELUX Cam Switches

In the case of switches shown in the catalogue, it is sufficient to quote the type designation which is compromised as follows:

Switch size — Structural Form — Switch Type

Example: Reversing switch, three-pole, 40 A, in plastics housing, Type: 40 PWU 3.

Reversing star delta switch, 100 A, panel type, Type 100 ESDR, Stepped switch two pole 7 Stages with zero setting, 16 A, panel type, Type: 16 EST 072.

ORDER SHEET for TELUX cam switches

with special programme

customer

a. switch size

M 10		T 310	
M 16		T 316	
N 16		40 L	
N 20		60 L	
N 32		100 L	
N 40		160 L	
N 60		400 L	
N 100		600 L	
N 200		800 L	

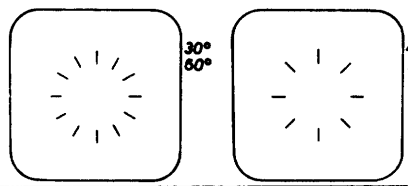
b. type of design

panel mounting	E	
base mounting	V	
plastic enclosure	P	
cast enclosure	G	

plastic enclosure splash proof	PF	
cast enclosure splash proof	GF	

c. type of operator

twist knob (st.)	
ball type handle	
black (standard)	
creme	
red	



d. switch angle and positionsnumber engraving in position . . .

1:	5:	9:
2:	6:	10:
3:	7:	11:
4:	8:	12:

e) contact arrangement:

Position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1																								
2																								
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								

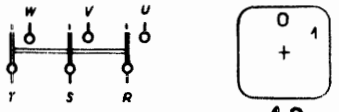
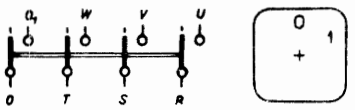
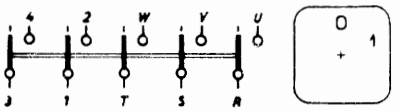
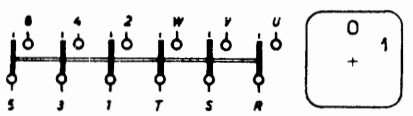
Please indicate terminal markings required on switch

Remarks and other requirements:

Enterdetails:
X . . Contact closed
| . . Spring return from position
(. . Contact closed over many positions

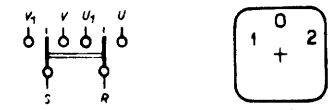
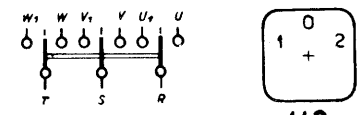
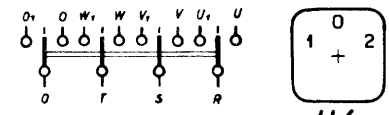
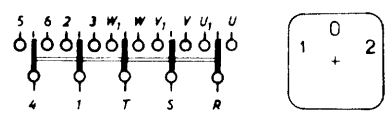
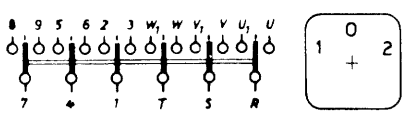
Telux-CAM SWITCHES

On-Off Switches A

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Single pole 0–1	 A1	1	60° PN 50	M 10 M 16	10 16	E A 1	V A 1	P A 1	PF A 1	G A 1	GF A 1
				N 16 N 20	16 20			—	—	—	—
				N 32 N 40 N 60	32 40 63			—	—	—	—
				N 100 N 200	100 200			—	—	—	—
				T 310 T 316	10 16			—	—	—	—
Two pole 0–1	 A2	1	60° PN 50	M 10 M 16	10 16	E A 2	V A 2	P A 2	PF A 2	G A 2	GF A 2
				N 16 N 20	16 20			—	—	—	—
				N 32 N 40 N 60	32 40 63			—	—	—	—
				N 100 N 200	100 200			—	—	—	—
				T 310 T 316	10 16			—	—	—	—
Three pole 0–1	 A3	2	60° PN 50	M 10 M 16	10 16	E A 3	V A 3	P A 3	PF A 3	G A 3	GF A 3
				N 16 N 20	16 20			—	—	—	—
				N 32 N 40 N 60	32 40 63			—	—	—	—
				N 100 N 200	100 200			—	—	—	—
		1		T 310 T 316	10 16			—	—	—	—
Four pole 0–1	 A4	2	60° PN 50	M 10 M 16	10 16	E A 4	V A 4	P A 4	PF A 4	G A 4	GF A 4
				N 16 N 20	16 20			—	—	—	—
				N 32 N 40 N 60	32 40 63			—	—	—	—
				N 100 N 200	100 200			—	—	—	—
				T 310 T 316	10 16			—	—	—	—
Five pole 0–1	 A5	3	60° PN 50	M 10 M 16	10 16	E A 5	V A 5	P A 5	PF A 5	G A 5	GF A 5
				N 16 N 20	16 20			—	—	—	—
				N 32 N 40 N 60	32 40 63			—	—	—	—
				N 100 N 200	100 200			—	—	—	—
		2		T 310 T 316	10 16			—	—	—	—
Six pole 0–1	 A6	3	60° PN 50	M 10 M 16	10 16	E A 6	V A 6	P A 6	PF A 6	G A 6	GF A 6
				N 16 N 20	16 20			—	—	—	—
				N 32 N 40 N 60	32 40 63			—	—	—	—
				N 100 N 200	100 200			—	—	—	—
		2		T 310 T 316	10 16			—	—	—	—

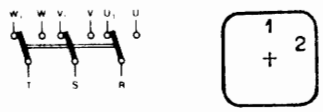
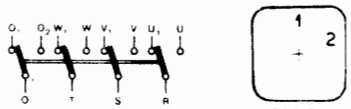
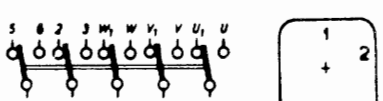
On-off switches are also available with switch angle of 30°, 45° and 90° with spring return to off.

Changeover Switches U

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Single pole 1–0–2	 U1	1	60° PN 55	M 10	10	E U1	V U1	P U1	PF U1	G U1	GF U1
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100						
				N 200	200						
			30 13	T 310	10						
				T 316	16						
Two pole 1–0–2	 U2	2	60° PN 55	M 10	10	E U2	V U2	P U2	PF U2	G U2	GF U2
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100						
				N 200	200						
			30° 13	T 310	10						
				T 316	16						
Three pole 1–0–2	 U3	3	60° PN 55	M 10	10	E U3	V U3	P U3	PF U3	G U3	GF U3
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100						
				N 200	200						
		2	30 13	T 310	10						
				T 316	16						
Four pole 1–0–2	 U4	4	60° PN 55	M 10	10	E U4	V U4	P U4	PF U4	G U4	GF U4
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100						
				N 200	200						
		3	30 13	T 310	10						
				T 316	16						
Five pole 1–0–2	 U5	5	60 PN 55	M 10	10	E U5	V U5	P U5	PF U5	G U5	GF U5
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100						
				N 200	200						
		4	30 13	T 310	10						
				T 316	16						
Six pole 1–0–2	 U6	6	60 PN 55	M 10	10	E U6	V U6	P U6	PF U6	G U6	GF U6
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100						
				N 200	200						
		4	30 13	T 310	10						
				T 316	16						

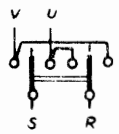
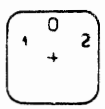
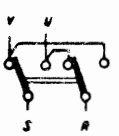
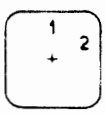
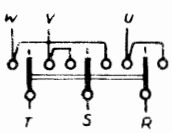
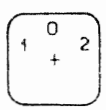
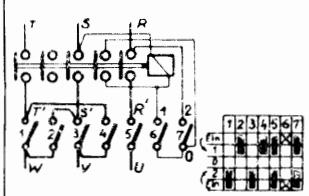
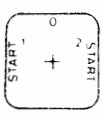
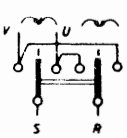
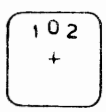
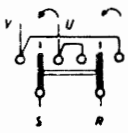
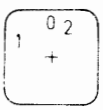
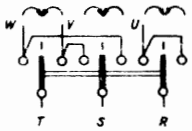
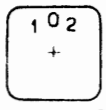
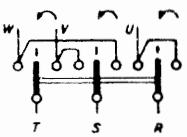
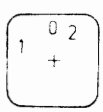
Change over switches are also available with switch angle 30, 45 and 90° and also with spring return to off.

Double Throw Switches without off W

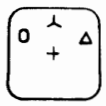
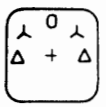
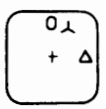
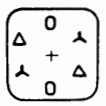
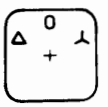
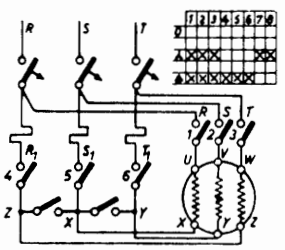
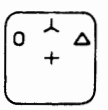
Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Single pole 1–2	 W1	1	60° PN 50	M 10	10	E W 1	V W 1	P W 1	PF W 1	G W 1	GF W 1
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100						
				N 200	200						
			30° 01	T 310	10						
				T 316	16						
Two pole 1–2	 W2	2	60° PN 50	M 10	10	E W 2	V W 2	P W 2	PF W 2	G W 2	GF W 2
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100						
				N 200	200						
			30° 01	T 310	10						
				T 316	16						
Three pole 1–2	 W3	3	60° PN 50	M 10	10	E W 3	V W 3	P W 3	PF W 3	G W 3	GF W 3
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100						
				N 200	200						
		2	30 01	T 310	10						
				T 316	16						
Four pole 1–2	 W4	4	60° PN 50	M 10	10	E W 4	V W 4	P W 4	PF W 4	G W 4	GF W 4
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100						
				N 200	200						
		3	30° 01	T 310	10						
				T 316	16						
Five pole 1–2	 W5	5	60° PN 50	M 10	10	E W 5	V W 5	P W 5	PF W 5	G W 5	GF W 5
				N 16	16						
				M 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100						
				N 200	200						
		4	30° 01	T 310	10						
				T 316	16						
Six pole 1–2	 W6	6	60° PN 50	M 10	10	E W 6	V W 6	P W 6	PF W 6	G W 6	GF W 6
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100						
				N 200	200						
		4	30° 01	T 310	10						
				T 316	16						

Double throw switches are also available with switch angles of 30, 45 and 90° and for continous switching with an overlapping make contact (Extra price).

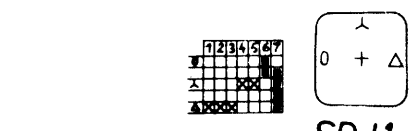
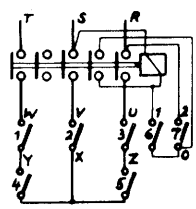
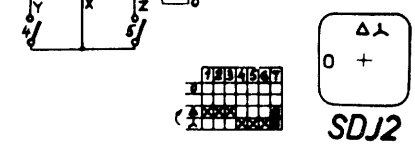
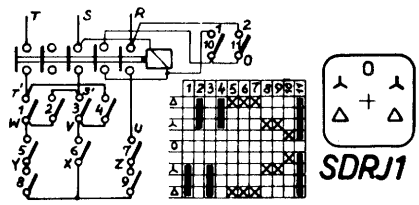
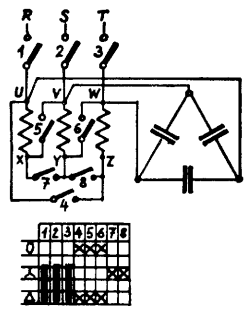
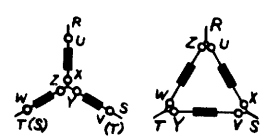
Reversing Switches WU

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Two pole 1–0–2	  WU2	2	60° PN 55	**M 10** 10 **M 16** 16 **N 16** 16 **N 20** 20 **N 32** 32 **N 40** 40 **N 60** 63 **N 100** 100 **N 200** 200 **T 310** 10 **T 316** 16		E WU 2	V WU 2	P WU 2	PF WU 2	G WU 2	GF WU 2
Two pole, without off, cross switch 1–2	  WK2	2	60° PN 50	**M 10** 10 **M 16** 16 **N 16** 16 **N 20** 20 **N 32** 32 **N 40** 40 **N 60** 63 **N 100** 100 **N 200** 200 **T 310** 10 **T 316** 16		E WK 2	V WK 2	P WK 2	PF WK 2	G WK 2	GF WK 2
Three pole, for reversing of 3-phase motors 1–0–2	  WU3	3 2	60° PN 55	**M 10** 10 **M 16** 16 **N 16** 16 **N 20** 20 **N 32** 32 **N 40** 40 **N 60** 63 **N 100** 100 **N 200** 200 **T 310** 10 **T 316** 16		E WU 3	V WU 3	P WU 3	PF WU 3	G WU 3	GF WU 3
Reversing switch 3 pole for use with contactor, spring return from start to 1 and 2 1–0–2	  WUJ	4	60° + 30° PN 128	**M 10** 10 **M 16** 16 **N 16** 16 **N 20** 20 **N 32** 32 **N 40** 40		E WUJ	V WUJ	P WUJ	PF WUJ	G WUJ	GF WUJ
Reversing switch 2 pole with spring return from both sides to off 1–0–2	  WU2R2	2	30° PN 83	**M 10** 10 **M 16** 16 **N 16** 16 **N 20** 20 **N 32** 32 **N 40** 40		EWU 2 R 2	VWU 2 R 2	PWU 2 R 2	PF WU 2 R 2	GWU 2 R 2	GF WU 2 R 2
Reversing switch 2 pole position 1 latched position 2 spring return to off 1–0–2	  WU2R1	2	60° + 30° PN 125	**M 10** 10 **M 16** 16 **N 16** 16 **N 20** 20 **N 32** 32 **N 40** 40		EWU 2 R 1	VWU 2 R 1	PWU 2 R 1	PF WU 2 R 1	GWU 2 R 1	GF WU 2 R 1
Reversing switch 3 pole with spring return to off from both sides 1–0–2	  WU3R2	3	30° PN 83	**M 10** 10 **M 16** 16 **N 16** 16 **N 20** 20 **N 32** 32 **N 40** 40		EWU 3 R 2	VWU 3 R 2	PWU 3 R 2	PF WU 3 R 2	GWU 3 R 2	GF WU 3 R 2
Reversing switch 3 pole position 1 latched, position 2 spring return to off 1–0–2	  WU3R1	3	60° + 30° PN 125	**M 10** 10 **M 16** 16 **N 16** 16 **N 20** 20 **N 32** 32 **N 40** 40		EWU 3 R 1	VWU 3 R 1	PWU 3 R 1	PF WU 3 R 1	GWU 3 R 1	GF WU 3 R 1

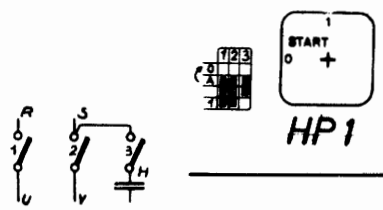
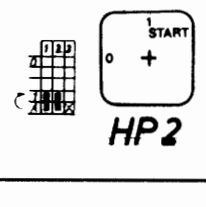
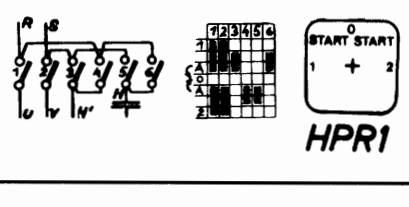
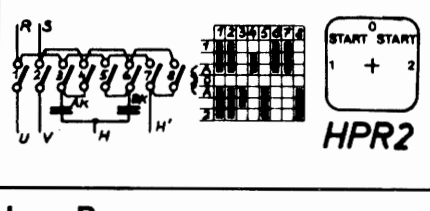
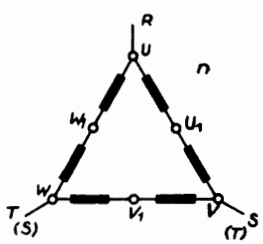
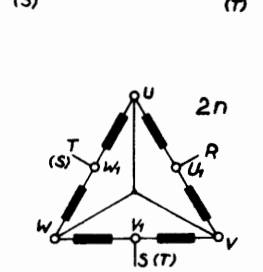
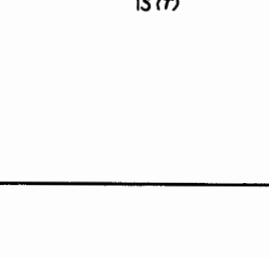
Star Delta Switches SD

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminium G	Cast aluminium splashproof GF
One rotary direction 0– ⅄ –△	 SD	4	60° PN 55	M 10 M 16	10 16	E SD	V SD	P SD	PF SD	G SD	GF SD
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—		
		3		T 310 T 316	10 16					—	—
Both rotary directions △– ⅄ –0– ⅄ –△	 SDR	5	45° PN 39	M 10 M 16	10 16	E SDR	V SDR	P SDR	PF SDR	G SDR	GF SDR
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—	—	—
One rotary direction spring return from ⅄ to 0 0– ⅄ –△	 SrD	4	30° + 60° PN 84	M 10 M 16	10 16	E SrD	V SrD	P SrD	PF SrD	G SrD	GF SrD
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63	—	—	—	—	—	—
				N 100 N 200	100 200	—	—	—	—	—	—
Star delta switch clockwise operation between ⅄ –△, and △–0	 SDru	5	60° PN 54	M 10 M 16	10 16	E SD ru	V SD ru	P SD ru	PF SD ru	G SD ru	GF SD ru
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—	—	—
Star delta selector switch (available also without position off) △–0– ⅄	 SDU	4	60° PN 55	M 10 M 16	10 16	E SDU	V SDU	P SDU	PF SDU	G SDU	GF SDU
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—		
		3		T 310 T 316	10 16					—	—
Star delta switch with double outfeed phases for use with overload protection 0– ⅄ –△	  SDmo	4	60° PN 55	M 10 M 16	10 16	E SD mo	V SD mo	P SD mo	PF SD mo	G SD mo	GF SD mo
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—		

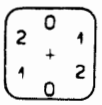
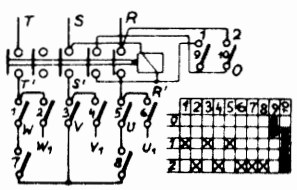
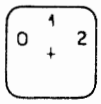
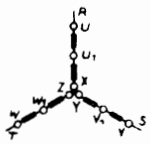
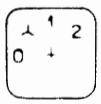
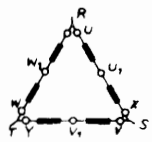
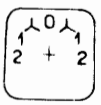
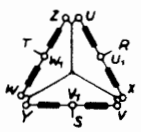
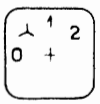
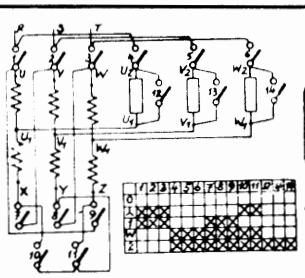
Star Delta Switches SD

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
With auxiliary contact for contactor control, without main contacts automatic zero setting in event of mains breakdown 0–⅄–△	  SDJ1	4	90° PN 64	M 10 M 16	10 16	E SDJ 1	V SDJ 1	P SDJ 1	PF SDJ 1	G SDJ 1	GF SDJ 1
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63			— —	— —		
				N 100 N 200	100 200			— —	— —		
With auxiliary contacts for contactor control, without main contacts, automatic zero setting in event of mains breakdown, spring return to ⅄ 0–△–⅄	 SDJ2	4	90° + 30° PN 93	M 10 M 16	10 16	E SDJ 2	V SDJ 2	P SDJ 2	PF SDJ 2	G SDJ 2	GF SDJ 2
				N 16 N 20	16 20						
				N 32 N 40	32 40						
As type SDJ 1, but for both rotary directions △–⅄–0–⅄–△	 SDRJ1	7	60° PN 56	M 10 M 16	10 16	E SDR J 1	V SDR J 1	— P SDR J 1	— PF SDR J 1	— — G SDR J 1	—
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63			— —	— —	— —	
				N 100 N 200	100 200			— —	— —	— —	
Star delta switch for single compensated motors, one rotary direction 0–⅄–△	 SDK	4	60° PN 55	M 10 M 16	10 16	E SDK	V SDK	P SDK	PF SDK	— — G SDK	— — GF SDK
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63			— —	— —		
				N 100 N 200	100 200			— —	— —		
As Type SDK, but for both rotary directions △–⅄–0–⅄–△	SDRK	5	45° PN 39	M 10 M 16	10 16	E SDRK	V SDRK	P SDRK	PF SDRK	— — G SDRK	— — GF SDRK
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63			— —	— —		
				N 100 N 200	100 200			— —	— —	— —	— —
Star delta switch with brake position (counter current braking). The brake position is a momentary operation B–0–⅄–△	 SDB	5	30° + 45° PN 105	M 10 M 16	10 16	E SDB	V SDB	P SDB	PF SDB	— — G SDB	— — GF SDB
				N 16 N 20	16 20						
				N 32 N 40	32 40						

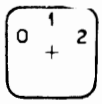
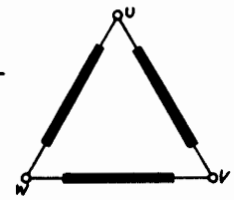
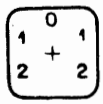
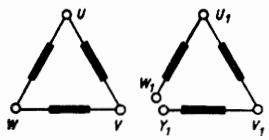
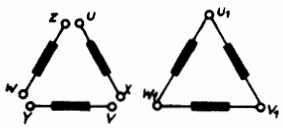
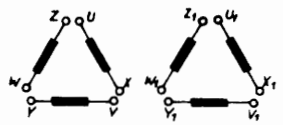
In practical use star delta switches are required with the most varied types of auxiliary and interlocking contacts. As it would exceed our limitations to include these variants in this list, we request your enquiry in the event of need. On drive systems subject to unusually heavy starting up conditions (e. g. vibratory conveyors), motors are used in which the windings are in delta form for starting but star-switched in operation. For this purpose delta-star switches (Type DS) are available which are comparable in size and price with the type SDU shown in the catalogue. In this case the switch size must be selected according to the starting up current in delta setting (Switch current rating approximately one-sixth of the starting up current).

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Split Phase Switch HP											
For starting up single-phase motors with split-phase. The starting position is not latched 0–Start–1	 HP 1	2	30° + 60° PN 109	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40**	10 16 16 20 32 40	E HP 1	V HP 1	P HP 1	PF HP 1	G HP 1	GF HP 1
		1	PN 28	**T 310** **T 316**	10 16					—	—
As type HP 1 but with start position as preset. Spring return from start to 1. 0–1–Start	 HP 2	2	90° + 30° PN 93	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40**	10 16 16 20 32 40	E HP 2	V HP 2	P HP 2	PF HP 2	G HP 2	GF HP 2
		1	PN 126	**T 310** **T 316**	10 16					—	—
As type HP 1, but for both directions of rotation 1–Start–0–Start–2	 HPR 1	3	60° + 30° + 30° + 60° PN 86	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40**	10 16 16 20 32 40	E HPR 1	V HPR 1	P HPR 1	PF HPR 1	G HPR 1	GF HPR 1
As type HPR 1, but for two condensers (1 starting and 1 operating condenser) 1–Start–0–Start–2	 HPR 2	4	60° + 30° + 30° + 60° PN 86	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40**	10 16 16 20 32 40	E HPR 2	V HPR 2	P HPR 2	PF HPR 2	G HPR 2	GF HPR 2
Multi Speed Switches P for motors with a Dahlander winding, two speeds											
One Dahlander winding, one rotary direction 0–1–2	 P 61	4	60° PN 55	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200** **T 310** **T 316**	10 16 16 20 32 40 63 100 200 10 16	E P 61	V P 61	P P 61	PF P 61	G P 61	GF P 61
One Dahlander winding, one rotary direction 1–0–2	 P 62	4	60° PN 55	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	E P 62	V P 62	P P 62	PF P 62	G P 62	GF P 62
		3	30° 13	**T 310** **T 316**	10 16					—	—
One Dahlander winding, both rotary directions 2–1–0–1–2	 P 61 R	7	45° PN 39	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	E P 61 R	V P 61 R	P P 61 R	PF P 61 R	G P 61 R	GF P 61 R

Multi Speed Switches P for motors with a'Dahlander winding, two speeds

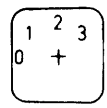
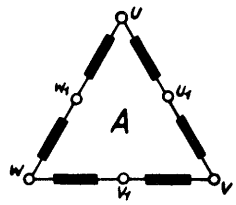
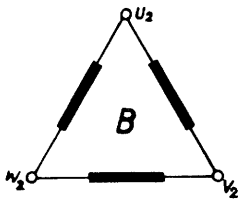
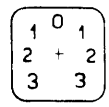
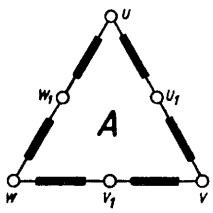
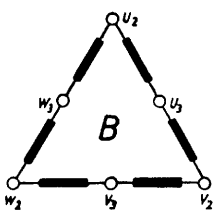
Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Single Dahlander winding clockwise operation between position 1 and 2, 2 and 0. 0–1–2–0–1–2	Circuit Diagram, see as Type P 61  P61ru	5	60° PN 54	M 10 M 16	10 16	E P 61 ru	V P 61 ru	P P 61 ru	PF P 61 ru	G P 61 ru	GF P 61 ru
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63			—	—		
				N 100 N 200	100 200			—	—	—	—
Single Dahlander winding with auxiliary contact for use with contactor checked off-position in event of mains breakdown Open Dahlander 0–1–2	  P61J	5	60° PN 55	M 10 M 16	10 16	E P 61 J	V P 61 J	P P 61 J	PF P 61 J	G P 61 J	GF P 61 J
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63			—	—		
				N 100 N 200	100 200			—	—	—	—
Open Dahlander-winding, 9 motors terminals, one rotary direction, low speed with SD-starting 0–⅄–1–2	  P91	6	45° PN 42	M 10 M 16	10 16	E P 91	V P 91	P P 91	PF P 91	G P 91	GF P 91
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63			—	—		
				N 100 N 200	100 200			—	—	—	—
Open Dahlander winding, 9 motor terminals, both rotary directions, low speed 2–1–⅄–0–⅄–1–2 each with SD starting	  P91R	8	30° PN 15	M 10 M 16	10 16	E P 91 R	V P 91 R	P P 91 R	PF P 91 R	G P 91 R	—
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63			—	—		
				N 100 N 200	100 200			—	—	—	
Same as Type P 91 no load return to 0 0–⅄–1–2	  P91S	11	45° PN 42	N 16 N 20	16 20	E P 91 S	V P 91 S	—	—	G P 91 S	—
				N 32 N 40 N 60	32 40 63					—	
				N 100 N 200	100 200						
Same as P 91 but with additional start position (starting resistor) for the high speed (price without starting resistor) 0–⅄–1–W–2	  P91W	7	30° PN 17	N 16 N 20	16 20	E P 91 W	V P 91 W	P P 91 W	PF P 91 W	G P 91 W	—
				N 32 N 40 N 60	32 40 63			—	—	—	
				N 100 N 200	100 200			—	—	—	

Multi Speed Switches P for motors with two normal windings, two speeds

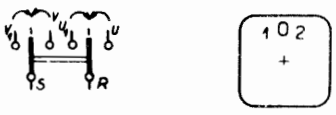
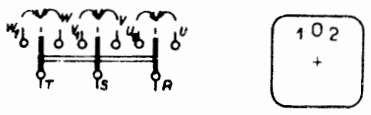
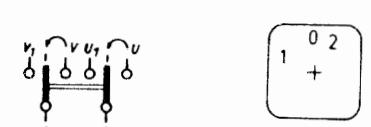
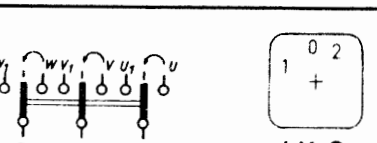
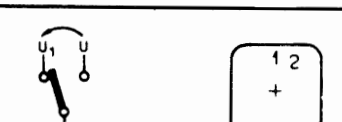
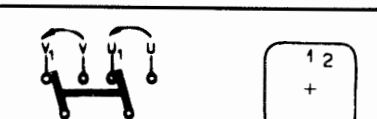
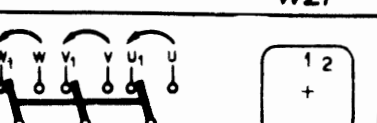
Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Two separate windings, one rotary direction 0–1–2	 P63	3	60° PN 55	**M 10** **M 16**	10 16	E P 63	V P 63	P P 63	PF P 63	G P 63	GF P 63
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	32 40 63						
				N 100 **N 200**	100 200			—	—		
		2	30° 13	**T 310** **T 316**	10 16					—	—
Two separate windings, one rotary direction 1–0–2	 P64	3	60° PN 55	**M 10** **M 16**	10 16	E P 64	V P 64	P P 64	PF P 64	G P 64	GF P 64
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	32 40 63						
				N 100 **N 200**	100 200			—	—		
		2	30° 13	**T 310** **T 316**	10 16					—	—
Two separate windings, both rotary directions 2–1–0–1–2	 P66	5	60° PN 56	**M 10** **M 16**	10 16	E P 66	V P 66	P P 66	PF P 66	G P 66	GF P 66
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	32 40 63			—	—		
				N 100 **N 200**	100 200			—	—		
				T 310 **T 316**	10 16					—	—
Two separate windings, one opened, 7 motor terminals, one rotary direction 0–1–2	 P71	4	60° PN 55	**M 10** **M 16**	10 16	E P 71	V P 71	P P 71	PF P 71	G P 71	GF P 71
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	32 40 63			—	—		
				N 100 **N 200**	100 200			—	—		
Two separate windings, one rotary direction, first speed with SD starting 0–人–1–2	 P96	6	45° PN 42	**M 10** **M 16**	10 16	E P 96	V P 96	P P 96	PF P 96	G P 96	GF P 96
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	32 40 63			—	—		
				N 100 **N 200**	100 200			—	—	—	—
Two separate windings, one rotary direction, both speeds with SD starting 1–人–0–人–2	 P122	8	45° PN 39	**M 10** **M 16**	10 16	E P 122	V P 122	P P 122	PF P 122	G P 122	—
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	32 40 63			—	—		
				N 100 **N 200**	100 200			—	—	—	

Multi Speed Switches P

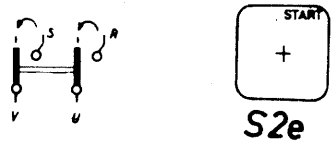
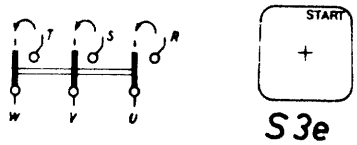
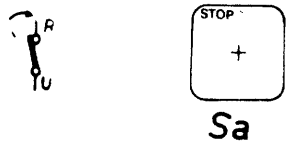
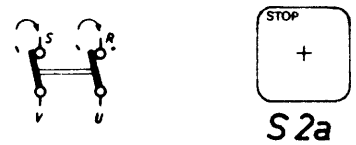
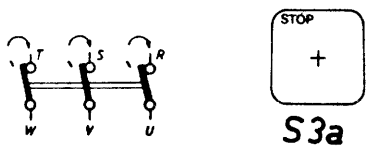
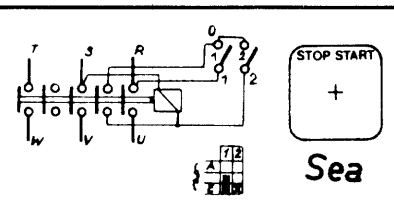
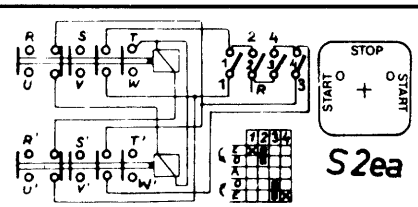
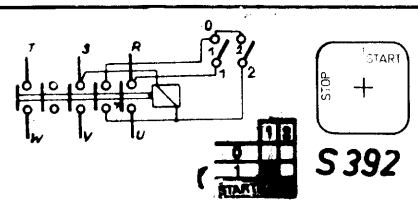
for motors witch one Dahlander and one normal winding, three-speeds and those with 2 Dahlander windings, four speeds

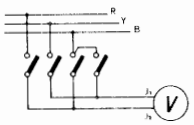
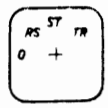
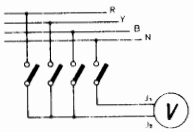
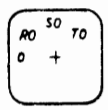
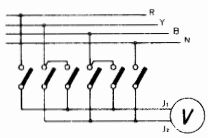
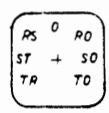
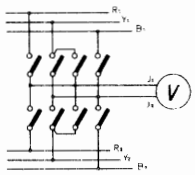
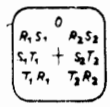
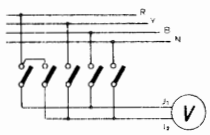
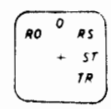
Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
One Dahlander winding A, one normal winding B, three speeds switch sequence 0–A△–B⅄–A⅄⅄ 0–1–2–3	 P93	6	45° PN 42	M 10 M 16	10 16	E P 93	V P 93	P P 93	PF P 93	G P 93	GF P 93
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63			—	—		
				N 100 N 200	100 200			—	—	—	—
One Dahlander winding A, one normal winding B, three speeds switch sequence 0–B⅄–A△–A⅄⅄ 0–1–2–3	 P94	6	45° PN 42	M 10 M 16	10 16	E P 94	V P 94	P P 94	PF P 94	G P 94	GF P 94
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63			—	—		
				N 100 N 200	100 200			—	—	—	—
One Dahlander winding A, one normal winding B, three speeds switch sequence 0–A△–A⅄⅄–B⅄ 0–1–2–3	 P95	6	45° PN 42	M 10 M 16	10 16	E P 95	V P 95	P P 95	PF P 95	G P 95	GF P 95
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63			—	—		
				N 100 N 200	100 200			—	—	—	—
Switch sequence as on types P 93 or P 94 or P 95, but for both rotary directions 3–2–1–0–1–2–3	 P93R, P94R, P95R.	9	45° PN 40	M 10 M 16	10 16	E P 93 R or E P 94 R or E P 95 R	V P 93 R or V P 94 R or V P 95 R	—	—	—	—
				N 16 N 20	16 20			P P 93 R P 94 R P 95 R	PF P 93 R P 94 R P 95 R	G P 93 R P 94 R P 95 R	—
				N 32 N 40 N 60	32 40 63			—	—		
				N 100 N 200	100 200			—	—	—	—
Two Dahlander windings A and B, 4 speeds Switch sequence 0–A△–B△– –A⅄⅄–B⅄⅄ 0–1–2–3–4	 P124	8	30° PN 17	M 10 M 16	10 16	E P 124	V P 124	—	—	—	—
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63			P P 124	PF P 124	G P 124	—
				N 100 N 200	100 200			—	—	—	—
Switch sequence as on type P 124, but for both rotary directions 4–3–2–1–0– –1–2–3–4	 P124R	12	30° PN 26	M 10 M 16	10 16	E P 124 R	V P 124 R	—	—	—	—
				N 16 N 20	16 20					G P 124 R	—
				N 32 N 40 N 60	32 40 63					—	
				N 100 N 200	100 200						

Telux-CAM SWITCHES

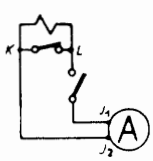
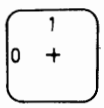
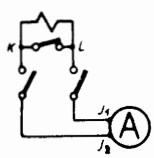
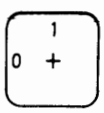
Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Change over switches with spring return to position 0 Ur											
Single pole 1–0–2		1	30° PN 83	**M 10** **M 16**	10 16	E Ur 1	V Ur 1	P Ur 1	PF Ur 1	— — G Ur 1	— — GF Ur 1
				N 16 **N 20**	16 20						
				N 32 **N 40**	32 40						
Two pole 1–0–2		2	30° PN 83	**M 10** **M 16**	10 16	E Ur 2	V Ur 2	P Ur 2	PF Ur 2	— — G Ur 2	— — GF Ur 2
				N 16 **N 20**	16 20						
				N 32 **N 40**	32 40						
Three pole 1–0–2		3	30° PN 83	**M 10** **M 16**	10 16	E Ur 3	V Ur 3	P Ur 3	PF Ur 3	— — G Ur 3	— — GF Ur 3
				N 16 **N 20**	16 20						
				N 32 **N 40**	32 40						
Change over switches with one latched and one momentary control position Uk											
Single pole, position 1 latched position 2 with spring-return to 0 1–0–2		1	60° + 30° PN 125	**M 10** **M 16**	10 16	E Uk 1	V Uk 1	P Uk 1	PF Uk 1	— — G Uk 1	— — GF Uk 1
				N 16 **N 20**	16 20						
				N 32 **N 40**	32 40						
Two pole, position 1 latched position 2 with spring return to 0 1–0–2		2	60° + 30° PN 125	**M 10** **M 16**	10 16	E Uk 2	V Uk 2	P Uk 2	PF Uk 2	— — G Uk 2	— — GF Uk 2
				N 16 **N 20**	16 20						
				N 32 **N 40**	32 40						
Three pole, position 1 latched position 2 with spring return to 0 1–0–2		3	60° + 30° PN 125	**M 10** **M 16**	10 16	E Uk 3	V Uk 3	P Uk 3	PF Uk 3	— — G Uk 3	— — GF Uk 3
				N 16 **N 20**	16 20						
				N 32 **N 40**	32 40						
Double Throw switches with spring return to Pos. 1 Wr											
Single pole 1–2		1	30° PN 80	**M 10** **M 16**	10 16	E W 1r	V W 1r	P W 1r	PF W 1r	— — G W 1r	— — GF W 1r
				N 16 **N 20**	16 20						
				N 32 **N 40**	32 40						
Two pole 1–2		2	30° PN 80	**M 10** **M 16**	10 16	E W 2r	V W 2r	P W 2r	PF W 2r	— — G W 2r	— — GF W 2r
				N 16 **N 20**	16 20						
				N 32 **N 40**	32 40						
Three pole 1–2		3	30° PN 80	**M 10** **M 16**	10 16	E W 3r	V W 3r	P W 3r	PF W 3r	— — G W 3r	— — GF W 3r
				N 16 **N 20**	16 20						
				N 32 **N 40**	32 40						

Telux-CAM SWITCHES

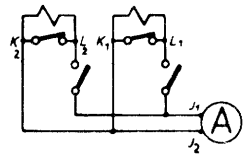
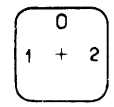
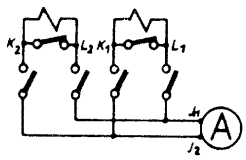
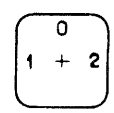
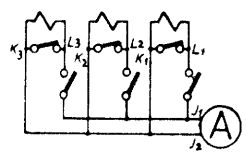
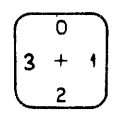
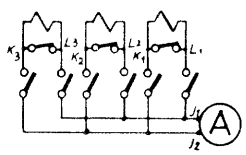
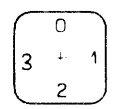
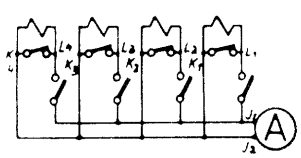
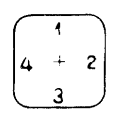
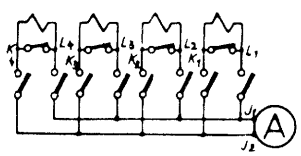
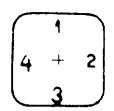
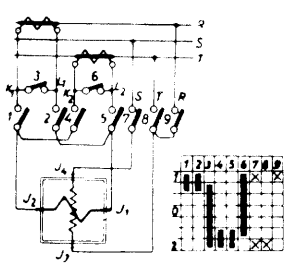
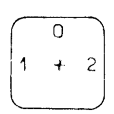
Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Start-Stop-Switches	Momentary control switches are available with any combination of normally closed and normally opened contacts up to a maximum number of ten contacts.										
Start–switch single pole one normally open contact 0–Start		1	30° PN 80	M 10 M 16	10 16	E Se	V Se	P Se	PF Se	G Se	GF Se
				N 16 N 20	16 20						
				N 32	32						
				T 310	10						
Start–switch two pole two normally open contacts 0–Start		1	30° PN 80	M 10 M 16	10 16	E S 2e	V S 2e	P S 2e	PF S 2e	G S 2e	GF S 2e
				N 16 N 20	16 20						
				N 32	32						
				T 310	10						
Start–switch three pole three normally open contacts 0–Start		2 / 1	30° PN 80	M 10 M 16	10 16	E S 3e	V S 3e	P S 3e	PF S 3e	G S 3e	GF S 3e
				N 16 N 20	16 20						
				N 32	32						
				T 310	10						
Stop–switch single pole one normally closed 0–Stop		1	30° PN 82	M 10 M 16	10 16	E Sa	V Sa	P Sa	PF Sa	G Sa	GF Sa
				N 16 N 20	16 20						
				N 32	32						
				T 310	10						
Stop–switch two pole two normally closed contacts 0–Stop		1	30° PN 82	M 10 M 16	10 16	E S 2a	V S 2a	P S 2a	PF S 2a	G S 2a	GF S 2a
				N 16 N 20	16 20						
				N 32	32						
				T 310	10						
Stop-switch three pole three normally closed contacts 0–Stop		2 / 1	30° PN 82	M 10 M 16	10 16	E S 3a	V S 3a	P S 3a	PF S 3a	G S 3a	GF S 3a
				N 16 N 20	16 20						
				N 32	32						
				T 310	10						
Start–stop–switch two normally open- one normally closed contact Start–0–Stop		1	30° + 30 PN 83	M 10 M 16	10 16	E Sea	V Sea	P Sea	PF Sea	G Sea	GF Sea
				N 16 N 20	16 20						
				N 32	32						
				T 310	10						
Double Start–stop–switch two normally open- two normally closed contacts Start–0–Stop–0–Start		2	30° + 60° + 60° + 30° PN 128	M 10 M 16	10 16	E S 2ea	V S 2ea	P S 2ea	PF S 2ea	G S 2ea	GF S 2ea
				N 16 N 20	16 20						
				N 32	32						
				–	–	—	—	—	—	—	—
Start–stop–switch as Sea however Positions 0 and 1 latched 0–On–Start		1	90° + 30° PN 93	M 10 M 16	10 16	E S 392	V S 392	P S 392	PF S 392	G S 392	GF S 392
				N 16 N 20	16 20						
				N 32	32						
				–	–	—	—	—	—	—	—

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Voltmeter Selector Switch V											
Three line voltages OFF–RY–YB–BR	  V3	2	45° PN 42	**M 10** **M 16**	10 16	E V 3	V V 3	P V 3	PF V 3	— — G V 3	— — GF V 3
				N 16 **N 20**	16 20						
				N 32	32						
			30° 16	**T 310** **T 316**	10 16					— —	— —
Three phase voltages OFF–RN–YN–BN	  V0	2	45° PN 42	**M 10** **M 16**	10 16	E V 0	V V 0	P V 0	PF V 0	— — G V 0	— — GF V 0
				N 16 **N 20**	16 20						
				N 32	32						
			30° 16	**T 310** **T 316**	10 16					— —	— —
Three line and three phase voltages BR–YB–RY–OFF–RN–YN–BN	  V1	5	45° PN 40	**M 10** **M 16**	10 16	E V 1	V V 1	P V 1	PF V 1	— — G V 1	— — GF V 1
				N 16 **N 20**	16 20						
				N 32	32						
		3	30° 15	**T 310** **T 316**	10 16					— —	– - —
Two three phase systems, two times three line voltages B_1R_1–Y_1B_1–R_1Y_1–OFF–R_2Y_2–Y_2B_2–B_2R_2	  V32	4	45° PN 40	**M 10** **M 16**	10 16	E V 32	V V 32	P V 32	PF V 32	— — G V 32	— — GF V 32
				N 16 **N 20**	16 20						
				N 32	32						
Three line and one phase voltage RN–OFF–RY–YB–BR	  V13	3	45° PN 44	**M 10** **M 16**	10 16	E V 13	V V 13	P V 13	PF V 13	— — G V 13	— — GF V 13
				N 16 **N 20**	16 20						
				N 32	32						

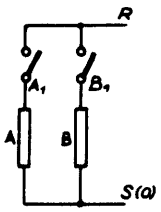
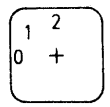
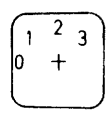
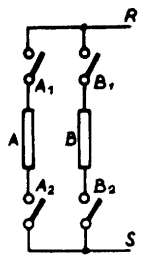
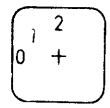
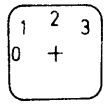
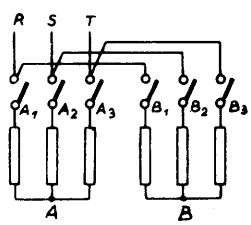
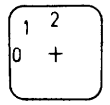
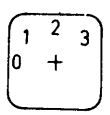
The two pole stepped switches shown on pages 51 to 54 are suitable for measuring DC. voltages with one instrument.

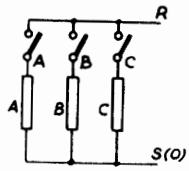
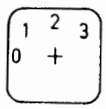
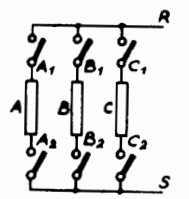
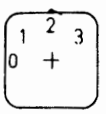
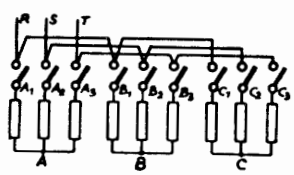
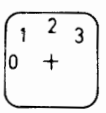
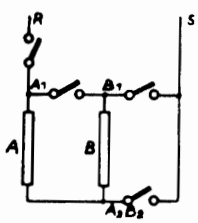
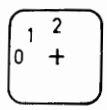
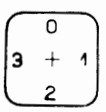
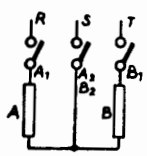
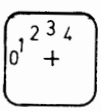
Ammeter Selector Switch M											
For one current transformer circuit, one pole 0–1	  M 11	1	90° PN 63	**M 10** **M 16**	10 16	E M 11	V M 11	P M 11	PF M 11	— — G M 11	— — GF M 11
				N 16 **N 20**	16 20						
				N 32	32						
			60 50	**T 310** **T 316**	10 16					— —	— —
For one current transformer circuit or direct current measurement in one phase, two pole 0–1	  M 12	2	90° PN 63	**M 10** **M 16**	10 16	E M 12	V M 12	P M 12	PF M 12	— — G M 12	— — GF M 12
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	32 40 63						
				N 100 **N 200**	100 200			— —	— —		
		1	60 50	**T 310** **T 316**	10 16					— —	— —

It is essential to note that only two-pole types are suitable for direct current measurement (without transformer).

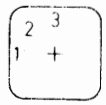
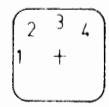
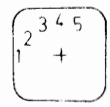
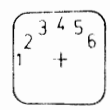
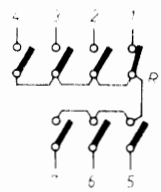
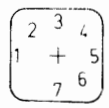
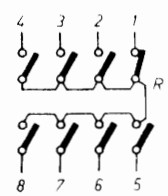
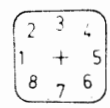
Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Ammeter and Wattmeter Selector Switch											
Two current transformer circuits, single pole 1–0–2	  M21	2	90° PN 64	**M 10** **M 16**	10 16	E M 21	V M 21	P M 21	PF M 21	G M 21	GF M 21
				N 16 **N 20**	16 20						
				N 32	32						
			60° 55	**T 310** **T 316**	10 16						
For two current transformer circuits, or direct current measurement in two phases, two pole 1–0–2	  M22	3	90° PN 64	**M 10** **M 16**	10 16	E M 22	V M 22	P M 22	PF M 22	G M 22	GF M 22
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	32 40 63						
				N 100 **N 200**	100 200			—	—		
		2	60° 55	**T 310** **T 316**	10 16						
For three current transformer circuits, single pole 0–1–2–3	  M31	4	90° PN 62	**M 10** **M 16**	10 16	E M 31	V M 31	P M 31	PF M 31	G M 31	GF M 31
				N 16 **N 20**	16 20						
				N 32	32						
		2	60° 54	**T 310** **T 316**	10 16						
For three current transformer circuits or direct current measurement in three phases, two poles 0–1–2–3	  M32	6	90° PN 62	**M 10** **M 16**	10 16	E M 32	V M 32	P M 32	PF M 32	G M 32	GF M 32
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	32 40 63						
				N 100 **N 200**	100 200			—	—		
		3	60° 54	**T 310** **T 316**	10 16						
For four current transformer circuits, single pole 1–2–3–4	  M41	4	90° PN 62	**M 10** **M 16**	10 16	E M 41	V M 41	P M 41	PF M 41	G M 41	GF M 41
				N 16 **N 20**	16 20						
				N 32	32						
For four current transformer circuits or direct current measurement in four circuits two poles 1–2–3–4	  M42	6	90° PN 62	**M 10** **M 16**	10 16	E M 42	V M 42	P M 42	PF M 42	G M 42	GF M 42
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	32 40 63						
				N 100 **N 200**	100 200			—	—		
For output measurement in three phase systems by the two watt meter method 1–0–2	  M2W	5	90 PN 64	**M 10** **M 16**	10 16	E M 2 W	V M 2 W	P M 2 W	PF M 2 W	G M 2 W	GF M 2 W
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	32 40 63						
				N 100 **N 200**	100 200			—	—		

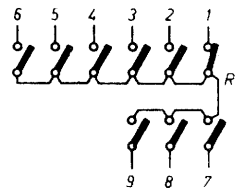
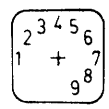
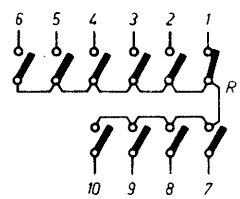
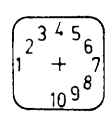
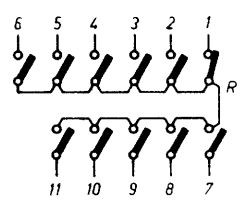
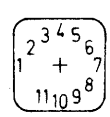
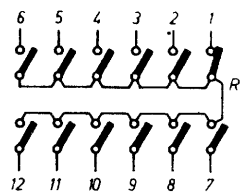
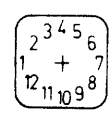
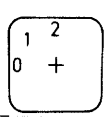
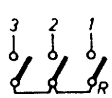
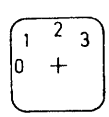
Gang-Switches Gr

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Two circuits A and B single pole 0–A–A+B	  Gr 11	1	45° PN 41	**M 10**	10	E Gr 11	V Gr 11	P Gr 11	PF Gr 11	G Gr 11	GF Gr 11
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100			—	—		
				N 200	200			—	—		
			30° 28	**T 310**	10					—	—
				T 316	16					—	—
Two circuits A and B single pole 0–A–B–A+B	 Gr 12	1	45° PN 42	**M 10**	10	E Gr 12	V Gr 12	P Gr 12	PF Gr 12	G Gr 12	GF Gr 12
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100			—	—		
				N 200	200			—	—		
			30° 16	**T 310**	10					—	—
				T 316	16					—	—
Two circuits A and B two pole 0–A–A+B	  Gr 21	2	45° PN 41	**M 10**	10	E Gr 21	V Gr 21	P Gr 21	PF Gr 21	G Gr 21	GF Gr 21
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100			—	—		
				N 200	200			—	—		
			30° 28	**T 310**	10					—	—
				T 316	16					—	—
Two circuits A and B Two pole 0–A–B–A+B	 Gr 22	2	45° PN 42	**M 10**	10	E Gr 22	V Gr 22	P Gr 22	PF Gr 22	G Gr 22	GF Gr 22
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100			—	—		
				N 200	200			—	—		
			30° 16	**T 310**	10					- -	—
				T 316	16					- -	—
Two circuits A and B Three pole 0–A–A+B	  Gr 31	3	45° PN 41	**M 10**	10	E Gr 31	V Gr 31	P Gr 31	PF Gr 31	G Gr 31	GF Gr 31
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100			—	—		
				N 200	200			—	—		
			30° 28	**T 310**	10					—	—
				T 316	16					—	—
Two circuits A and B Three pole 0–A–B–A+B	 Gr 32	3	45° PN 42	**M 10**	10	E Gr 32	V Gr 32	P Gr 32	PF Gr 32	G Gr 32	GF Gr 32
				M 16	16						
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100			—	—		
				N 200	200			—	—		
		2	30° 16	**T 310**	10					—	—
				T 316	16					—	—

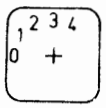
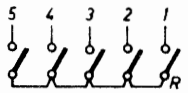
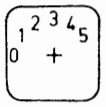
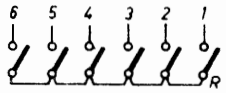
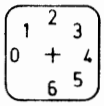
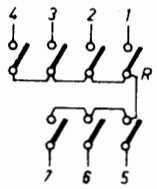
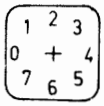
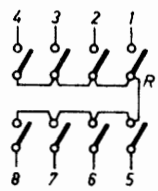
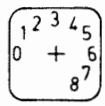
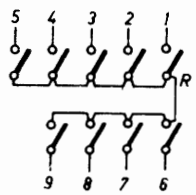
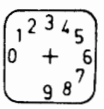
Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Gang Switches Gr											
Three circuits A, B, and C single pole 0–A–A+B–A+B+C	  Gr 14	2	45° PN 42	M 10 M 16	10 16	E Gr 14	V Gr 14	P Gr 14	PF Gr 14	G Gr 14	GF Gr 14
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—		
		1	30° 16	T 310 T 316	10 16			—	—	—	—
Three circuits A, B and C two pole 0–A–A+B–A+B+C	  Gr 23	3	45° PN 42	M 10 M 16	10 16	E Gr 23	V Gr 23	P Gr 23	PF Gr 23	G Gr 23	GF Gr 23
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—		
Three circuits A, B and C three pole 0–A–A+B–A+B+C	  Gr 33	5	45° PN 42	M 10 M 16	10 16	E Gr 33	V Gr 33	P Gr 33	PF Gr 33	G Gr 33	GF Gr 33
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—		
		3	30° 16	T 310 T 316	10 16			—	—	—	—
Series-Parallel-Switches Sp											
Two circuits A and B two pole 0–A+B (Series)– –A ‖ B (parallel)	  SP 1	2	45° PN 41	M 10 M 16	10 16	E SP 1	V SP 1	P SP 1	PF SP 1	G SP 1	GF SP 1
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—		
Two circuits A and B two pole with circular switching 0–A ‖ B (parallel)– –A–A+B (Series)	 SP 4	3	90° PN 62	M 10 M 16	10 16	E SP 4	V SP 4	P SP 4	PF SP 4	G SP 4	GF SP 4
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—		
Two circuits A and B for three phase current 0–A+B (Series)– –A–B–A ‖ B (parallel)	  SP 3	2	30° PN 17	M 10 M 16	10 16	E SP 3	V SP 3	P SP 3	PF SP 3	G SP 3	GF SP 3
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—		

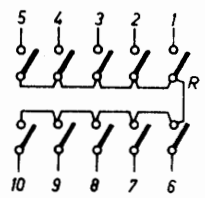
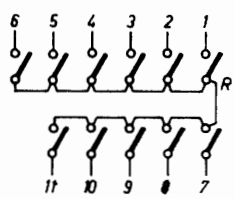
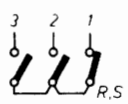
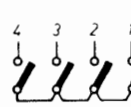
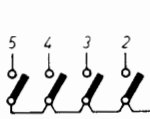
Multi step switches, single pole without off, St 1

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminium G	Cast aluminium splashproof GF
Three step 1–2–3	  St31	2	45° PN 41	M 10	10	E St 31	V St 31	P St 31	PF St 31	G St 31	GF St 31
				M 16	16					—	—
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100			—	—		
				N 200	200			—	—		
		1	30° 28	T 310	10					—	—
				T 316	16					—	—
Four step 1–2–3–4	  St41	2	45° PN 42	M 10	10	E St 41	V St 41	P St 41	PF St 41	G St 41	GF St 41
				M 16	16					—	—
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100			—	—		
				N 200	200			—	—		
			30° 16	T 310	10					—	—
				T 316	16					—	—
Five step 1–2–3–4–5	  St51	3	30° PN 17	M 10	10	E St 51	V St 51	P St 51	PF St 51	G St 51	GF St 51
				M 16	16					—	—
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100			—	—		
				N 200	200			—	—		
		2		T 310	10					—	—
				T 316	16					—	—
Six step 1–2–3–4–5–6	  St61	3	30° PN 18	M 10	10	E St 61	V St 61	P St 61	PF St 61	G St 61	GF St 61
				M 16	16					—	—
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100			—	—		
				N 200	200			—	—		
		2		T 310	10					—	—
				T 316	16					—	—
Seven step 1–2–3–4–5–6–7	  St71	4	45° PN 48	M 10	10	E St 71	V St 71	P St 71	PF St 71	G St 71	GF St 71
				M 16	16					—	—
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100			—	—		
				N 200	200			—	—		
		3	30° 15	T 310	10					—	—
				T 316	16					—	—
Eight step 1–2–3–4–5–6–7–8	  St81	4	45° PN 36	M 10	10	E St 81	V St 81	P St 81	PF St 81	G St 81	GF St 81
				M 16	16					—	—
				N 16	16						
				N 20	20						
				N 32	32						
				N 40	40						
				N 60	63						
				N 100	100			—	—		
				N 200	200			—	—		
			30° 22	T 310	10					—	—
				T 316	16					—	—

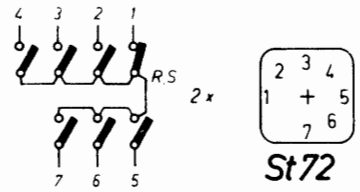
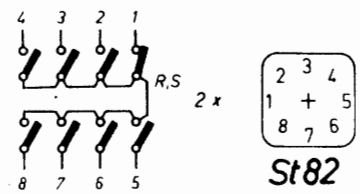
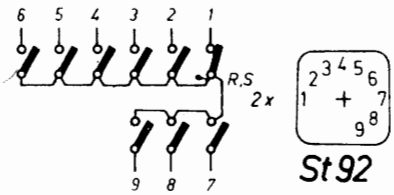
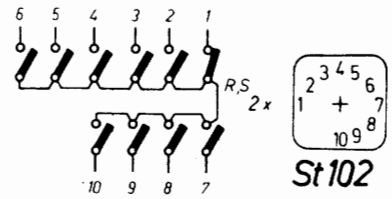
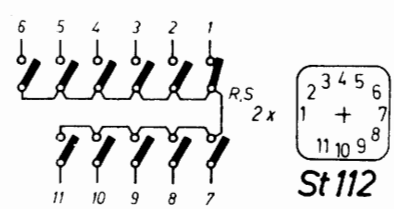
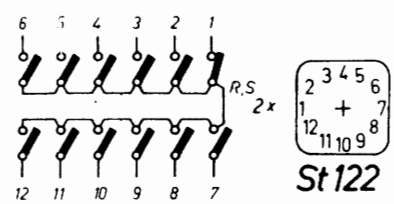
Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Multi step switches, single pole, without off St 1											
Nine step 1–2–3–4–5–6– –7–8–9	  St91	5	30° PN 23	M 10 M 16	10 16	E St 91	V St 91	P St 91	PF St 91	G St 91	GF St 91
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200						
		4		T 310 T 316	10 16						
Ten step 1–2–3–4–5–6– –7–8–9–10	  St101	5	30° PN 24	M 10 M 16	10 16	E St 101	V St 101	P St 101	PF St 101	G St 101	GF St 101
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200						
		4		T 310 T 316	10 16						
Eleven step 1–2–3–4–5–6– –7–8–9–10–11	  St111	6	30° PN 25	M 10 M 16	10 16	E St 111	V St 111	P St 111	PF St 111	G St 111	GF St 111
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200						
		4		T 310 T 316	10 16						
Twelve step 1–2–3–4–5–6– –7–8–9–10–11–12	  St121	6	30° PN 11	M 10 M 16	10 16	E St 121	V St 121	P St 121	PF St 121	G St 121	GF St 121
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200						
		4		T 310 T 316	10 16						
Multi step switches, single pole, with off St 01											
Two step 0–1–2	  St021	1	45° PN 41	M 10 M 16	10 16	E St 021	V St 021	P St 021	PF St 021	G St 021	GF St 021
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200						
			30° 28	T 310 T 316	10 16						
Three step 0–1–2–3	  St031	2	45° PN 42	M 10 M 16	10 16	E St 031	V St 031	P St 031	PF St 031	G St 031	GF St 031
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200						
		1	30° 16	T 310 T 316	10 16						

Multi step switches, single pole, with off St 01

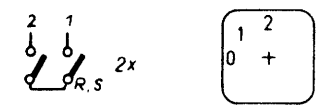
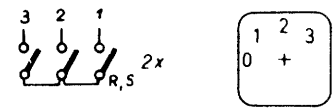
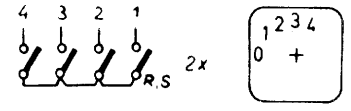
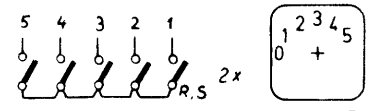
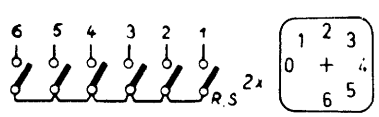
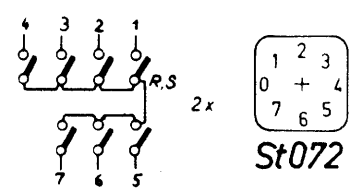
Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Four step 0–1–2–3–4	  St041	2	30° PN 17	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200** **T 310** **T 316**	10 16 16 20 32 40 63 100 200 10 16	E St 041	V St 041	P St 041 — —	PF St 041 — —	G St 041 — —	GF St 041 — —
Five step 0–1–2–3–4–5	  St051	3 2	30° PN 18	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200** **T 310** **T 316**	10 16 16 20 32 40 63 100 200 10 16	E St 051	V St 051	P St 051 — —	PF St 051 — —	G St 051 — —	GF St 051 — —
Six step 0–1–2–3–4–5–6	  St061	4 3	45° PN 48 30° 15	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200** **T 310** **T 316**	10 16 16 20 32 40 63 100 200 10 16	E St 061	V St 061	P St 061 — —	PF St 061 — —	G St 061 — —	GF St 061 — —
Seven step 0–1–2–3–4–5–6–7	  St071	4	45° PN 36 30° 22	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200** **T 310** **T 316**	10 16 16 20 32 40 63 100 200 10 16	E St 071	V St 071	P St 071 — —	PF St 071 — —	G St 071 — —	GF St 071 — —
Eight step 0–1–2–3–4–5– –6–7–8	  St081	5 4	30° PN 23	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200** **T 310** **T 316**	10 16 16 20 32 40 63 100 200 10 16	E St 081	V St 081	P St 081 — —	PF St 081 — —	G St 081 — —	GF St 081 — —
Nine step 0–1–2–3–4–5– –6–7–8–9	  St091	5 4	30° PN 24	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200** **T 310** **T 316**	10 16 16 20 32 40 63 100 200 10 16	E St 091	V St 091	P St 091 — —	PF St 091 — —	G St 091 — —	GF St 091 — —

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	E Panel mounting	V Base mounting	P in plastic enclosure	PF in plastic enclosure splashproof	G Cast aluminiuum	GF Cast aluminiuum splashproof
Multi step switches, single pole, with off St 01											
Ten step 0–1–2–3–4–5– –6–7–8–9–10	 St0101	6	30° PN 25	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	ESt 0101	VSt 0101	PSt 0101 — — —	PFSt 0101 — — —	GSt 0101	GFSt 0101
		4		**T 310** **T 316**	10 16					—	—
Eleven step 0–1–2–3–4–5– –6–7–8–9–10–11	 St0111	6	30° PN 11	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	ESt 0111	VSt 0111	PSt 0111 — — —	PFSt 0111 — — —	GSt 0111	GFSt 0111
		4		**T 310** **T 316**	10 16					—	—
Multi step switches, two pole, without off, St 2											
Three step 1–2–3	 St32	3	45° PN 41	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	E St 32	V St 32	P St 32 — —	PF St 32 — —	G St 32	GF St 32
		2	30° 28	**T 310** **T 316**	10 16					—	—
Four step 1–2–3–4	 St42	4	45° PN 42	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	E St 42	V St 42	P St 42 — —	PF St 42 — —	G St 42	GF St 42
		3	30° 16	**T 310** **T 316**	10 16					—	—
Five step 1–2–3–4–5	 St52	5	30° PN 17	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	E St 52	V St 52	P St 52 — —	PF St 52 — —	G St 52	GF St 52
		4		**T 310** **T 316**	10 16					—	—
Six step 1–2–3–4–5–6	 St62	6	30° PN 18	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	E St 62	V St 62	P St 62 — —	PF St 62 — —	G St 62	GF St 62
		4		**T 310** **T 316**	10 16					—	—

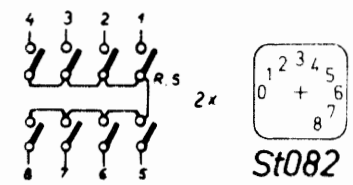
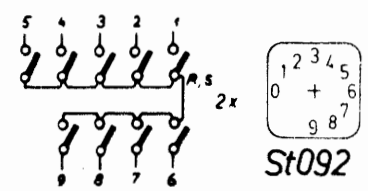
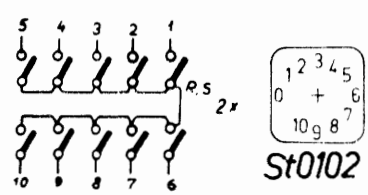
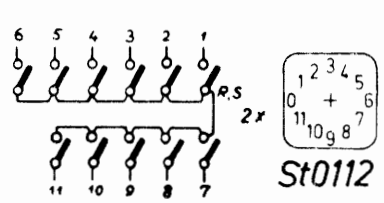
Multi step switches, two pole, without off, St 2

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Seven step 1–2–3–4–5–6–7		7	45° PN 48	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	E St 72	V St 72	P St 72	PF St 72	G St 72	—
		6	30° 15	**T 310** **T 316**	10 16						
Eight step 1–2–3–4–5–6–7–8		8	45° PN 36	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	E St 82	V St 82	P St 82	PF St 82	G St 82	—
			30° 22	**T 310** **T 316**	10 16						
Nine step 1–2–3–4–5– –6–7–8–9		9	30° PN 23	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	E St 92	V St 92	P St 92	PF St 92	G St 92	—
		8		**T 310** **T 316**	10 16						
Ten step 1–2–3–4–5– –6–7–8–9–10		10	30° PN 24	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	E St 102	V St 102	—	—	— G St 102 —	—
		8		**T 310** **T 316**	10 16						
Eleven step 1–2–3–4–5– –6–7–8–9–10–11		11	30° PN 25	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	E St 112	V St 112	—	—	— G St 112 —	—
		8		**T 310** **T 316**	10 16						
Twelve step 1–2–3–4–5–6– –7–8–9–10–11–12		12	30° PN 11	**M 10** **M 16** **N 16** **N 20** **N 32** **N 40** **N 60** **N 100** **N 200**	10 16 16 20 32 40 63 100 200	E St 122	V St 122	—	—	— G St 122 —	—
		8		**T 310** **T 316**	10 16						

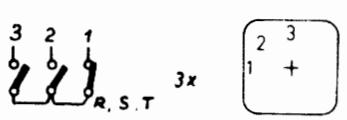
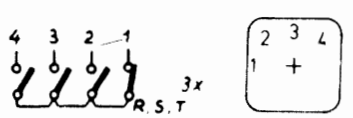
Multi step switches, two pole, with off, St 02

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Two step 0–1–2		2	45° PN 41	M 10 M 16	10 16	E St 022	V St 022	P St 022	PF St 022	G St 022	GF St 022
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—		
			30° 28	T 310 T 316	10 16					—	—
Three step 0–1–2–3		3	45° PN 42	M 10 M 16	10 16	E St 032	V St 032	P St 032	PF St 032	G St 032	GF St 032
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—		
		2	30° 16	T 310 T 316	10 16					—	—
Four step 0–1–2–3–4		4	30° PN 17	M 10 M 16	10 16	E St 042	V St 042	P St 042	PF St 042	G St 042	GF St 042
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—		
				T 310 T 316	10 16					—	—
Five step 0–1–2–3–4–5		5	30° PN 18	M 10 M 16	10 16	E St 052	V St 052	P St 052	PF St 052	G St 052	GF St 052
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—	—	—
		4		T 310 T 316	10 16					—	—
Six step 0–1–2–3–4–5–6		7	45° PN 48	M 10 M 16	10 16	E St 062	V St 062	P St 062	PF St 062	G St 062	—
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—	—	
		6	30° 15	T 310 T 316	10 16					—	
Seven step 0–1–2–3–4–5–6–7		8	45° PN 36	M 10 M 16	10 16	E St 072	V St 072	P St 072	PF St 072	G St 072	—
				N 16 N 20	16 20						
				N 32 N 40 N 60	32 40 63						
				N 100 N 200	100 200			—	—	—	
			30° 22	T 310 T 316	10 16					—	

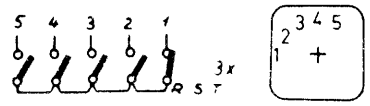
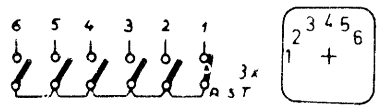
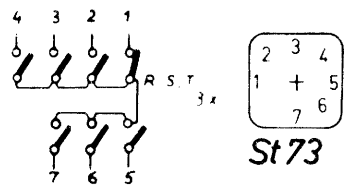
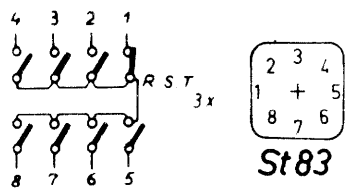
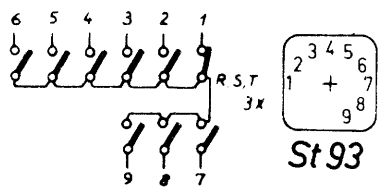
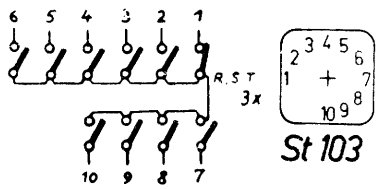
Multi step switches, two pole, with off, St 02

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Eight step 0–1–2–3–4–5– –6–7–8	 St082	9 8	30° PN 23	M 10 M 16 N 16 N 20 N 32 N 40 N 60 N 100 N 200 T 310 T 316	10 16 16 20 32 40 63 100 200 10 16	E St 082	V St 082	P St 082	PF St 082	G St 082	—
Nine step 0–1–2–3–4–5– –6–7–8–9	 St092	10 8	30° PN 24	M 10 M 16 N 16 N 20 N 32 N 40 N 60 N 100 N 200 T 310 T 316	10 16 16 20 32 40 63 100 200 10 16	E St 092	V St 092	—	—	— GSt 092 —	—
Ten step 0–1–2–3–4–5– –6–7–8–9–10	 St0102	11 9	30° PN 25	M 10 M 16 N 16 N 20 N 32 N 40 N 60 N 100 N 200 T 310 T 316	10 16 16 20 32 40 63 100 200 10 16	ESt 0102	VSt 0102	—	—	— GSt 0102 —	—
Eleven step 0–1–2–3–4–5– –6–7–8–9–10–11	 St0112	12 9	30° PN 11	M 10 M 16 N 16 N 20 N 32 N 40 N 60 N 100 N 200 T 310 T 316	10 16 16 20 32 40 63 100 200 10 16	ESt 0112	VSt 0112	—	—	— GSt 0112 —	—

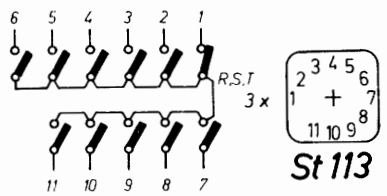
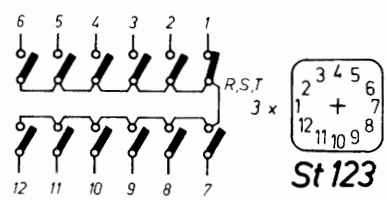
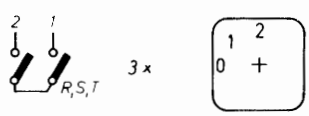
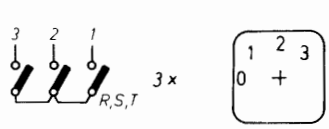
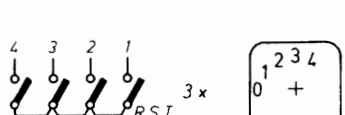
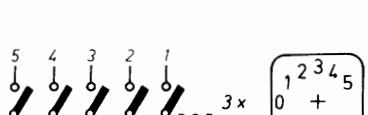
Multi step switches, three pole, without off, St 3

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Three step 1–2–3	 St 33	5 3	45° PN 41 30° 28	M 10 M 16 N 16 N 20 N 32 N 40 N 60 N 100 N 200 T 310 T 316	10 16 16 20 32 40 63 100 200 10 16	E St 33	V St 33	P St 33	PF St 33	G St 33	GF St 33
Four step 1–2–3–4	 St 43	6 4	45° PN 42 30° 16	M 10 M 16 N 16 N 20 N 32 N 40 N 60 N 100 N 200 T 310 T 316	10 16 16 20 32 40 63 100 200 10 16	E St 43	V St 43	P St 43	PF St 43	G St 43	GF St 43

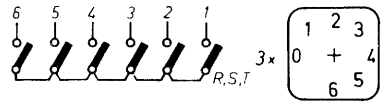
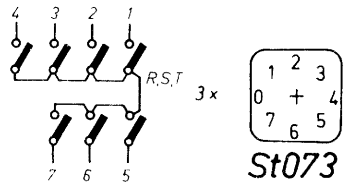
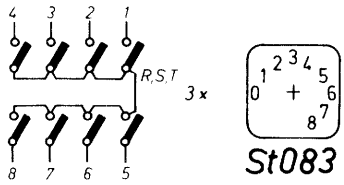
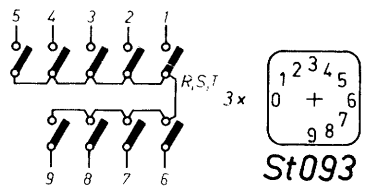
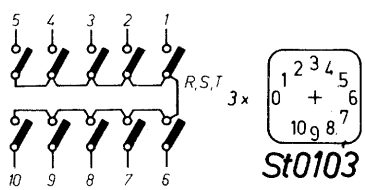
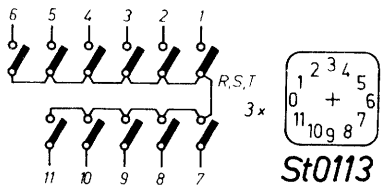
Multi step switches, three pole, without off, St 3

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Five step 1–2–3–4–5		8	30° PN 17	M 10 M 16 N 16 N 20 N 32 N 40 N 60 N 100 N 200	10 16 16 20 32 40 63 100 200	E St 53	V St 53	— — P St 53 — — — — —	— — PF St 53 — — — — —	— — G St 53 — — — — —	—
		6		T 310 T 316	10 16			—	—	—	
Six step 1–2–3–4–5–6		9	30° PN 18	M 10 M 16 N 16 N 20 N 32 N 40 N 60 N 100 N 200	10 16 16 20 32 40 63 100 200	E St 63	V St 63	— — P St 63 — — — — —	— — PF St 63 — — — — —	— — G St 63 — — — — —	—
		6		T 310 T 316	10 16			—	—	—	
Seven step 1–2–3–4–5–6–7		11	45 PN 48	M 10 M 16 N 16 N 20 N 32 N 40 N 60 N 100 N 200	10 16 16 20 32 40 63 100 200	E St 73	V St 73	—	—	— G St 73 —	—
		9	30 15	T 310 T 316	10 16						
Eight step 1–2–3–4–5–6–7–8		12	45 PN 36	M 10 M 16 N 16 N 20 N 32 N 40 N 60 N 100 N 200	10 16 16 20 32 40 63 100 200	E St 83	V St 83	—	—	— G St 83 —	—
			30 22	T 310 T 316	10 16						
Nine step 1–2–3–4–5– –6–7–8–9		14	30° PN 23	M 10 M 16 N 16 N 20 N 32 N 40 N 60 N 100 N 200	10 16 16 20 32 40 63 100 200	E St 93	V St 93	—	—	—	—
Ten step 1–2–3–4–5– –6–7–8–9–10		15	30° PN 24	M 10 M 16 N 16 N 20 N 32 N 40 N 60 N 100 N 200	10 16 16 20 32 40 63 100 200	E St 103	V St 103	—	—	—	—

Telux-CAM SWITCHES

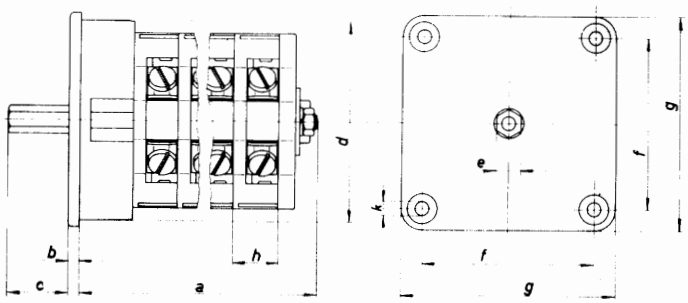
Description	Circuit diagram and switch programme	No. of cells	Angle of rotation	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Multi step switches, three pole, without off, St 3											
Eleven step 1–2–3–4–5– –6–7–8–9–10–11		17	30° PN 25	N 16 N 20	16 20	E St 113	V St 113	—	—	—	—
				N 32 N 40 N 60	30 40 63						
				N 100 N 200	100 200						
Twelve step 1–2–3–4–5–6– –7–8–9–10–11–12		18	30° PN 11	N 16 N 20	16 20	E St 123	V St 123	—	—	—	—
				N 32 N 40 N 60	30 40 63						
				N 100 N 200	100 200						
Multi step switches, three pole, with off, St 03											
Two step 0–1–2		3	45° PN 41	M 10 M 16	10 16	E St 023	V St 023	P St 023	PF St 023	G St 023	GF St 023
				N 16 N 20	16 20						
				N 32 N 40 N 60	30 40 63						
				N 100 N 200	100 200			—	—		
		2	30° 28	T 310 T 316	10 16					—	—
Three step 0–1–2–3		5	45° PN 42	M 10 M 16	10 16	E St 033	V St 033	P St 033	PF St 033	G St 033	GF St 033
				N 16 N 20	16 20						
				N 32 N 40 N 60	30 40 63			—	—		
				N 100 N 200	100 200			—	—	—	
		3	30° 16	T 310 T 316	10 16					—	—
Four step 0–1–2–3–4		6	30° PN 17	M 10 M 16	10 16	E St 043	V St 043	P St 043	PF St 043	G St 043	GF St 043
				N 16 N 20	16 20						
				N 32 N 40 N 60	30 40 63			—	—		
				N 100 N 200	100 200			—	—	—	
				T 310 T 316	10 16			—	—	—	—
Five step 0–1–2–3–4–5		8	30° PN 18	M 10 M 16	10 16	E St 053	V St 053	P St 053	PF St 053	G St 053	—
				N 16 N 20	16 20						
				N 32 N 40 N 60	30 40 63			—	—		
				N 100 N 200	100 200			—	—	—	
		6		T 310 T 316	10 16			—	—	—	

Multi step switches, three pole, with off, St 03

Description	Circuit diagram and switch programme	No. of cells	Angle of rotation PN	Switch size	Current rating A	Panel mounting E	Base mounting V	in plastic enclosure P	in plastic enclosure splashproof PF	Cast aluminiuum G	Cast aluminiuum splashproof GF
Six step 1–2–3–4–5–6		11	45° PN 48	**M 10** **M 16**	10 16	E St 063	V St 063	—	—	— GSt 063 —	—
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	30 40 63						
				N 100 **N 200**	100 200						
		9	30° 15	**T 310** **T 316**	10 16						
Seven step 1–2–3–4–5–6–7		12	45° PN 36	**M 10** **M 16**	10 16	E St 073	V St 073	—	—	— GSt 073 —	—
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	30 40 63						
				N 100 **N 200**	100 200						
			30° 22	**T 310** **T 316**	10 16						
Eight step 1–2–3–4–5–6–7–8		14	30° PN 23	**M 10** **M 16**	10 16	E St 083	V St 083	—	—	—	—
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	30 40 63						
				N 100 **N 200**	100 200						
Nine step 1–2–3–4–5– –6–7–8–9		15	30° PN 24	**M 10** **M 16**	10 16	E St 093	V St 093	—	—	—	—
				N 16 **N 20**	16 20						
				N 32 **N 40** **N 60**	30 40 63						
				N 100 **N 200**	100 200						
Ten step 1–2–3–4–5– –6–7–8–9–10		17	30° PN 25	**N 16** **N 20**	16 20	ESt 0103	VSt 0103	—	—	—	—
				N 32 **N 40** **N 60**	30 40 63						
				N 100 **N 200**	100 200						
Eleven step 1–2–3–4–5– –6–7–8–9–10–11		18	30° PN 11	**N 16** **N 20**	16 20	ESt 0113	VSt 0113	—	—	—	—
				N 32 **N 40** **N 60**	30 40 63						
				N 100 **N 200**	100 200						

Dimensions

Panel Mounting E

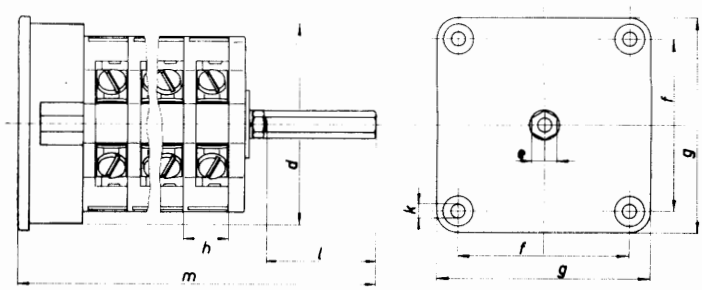


Switchsize	dim. (mm)	e	d	k	f	g	h	c	b
	M 10	S W 5	39	4	36	48	9,5	19	3,5
	M 16	S W 5	39	4	36	48	12,5	19	3,5
	N 16, N 20	S W 7	56	4,2	48	64	12,5	20	3
	N 32	S W 7	56	4,2	48	64	15	20	3
	N 40	S W 9	80	5,2	68	86	18	24,5	3,5
	N 60	S W 9	80	5,2	68	86	29,5	24,5	3,5
	N 100	S W 12	128	6,2	110	132	30	37	5

Switchsize	escutcheon plates	Plastic	Alu
	M 10 M 16	48 x 48 (mm)	—
	N 16 N 20 N 32	66 x 66 (mm)	64 x 64 mm
	N 40 N 60	92 x 92 (mm)	95 x 95 mm
	N 100	132 x 132 (mm)	137 x 137 mm

Switchsize	no. of cells	dim. a (mm) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	M 10	31	40,5	50	59,5	69	78,5	88	97,5	107	116,5	126	135,5			
	M 16	35	47,5	60	72,5	85	97,5	110	122,5	135	147,5	160	172,5			
	N 16, N 20	37,5	50	62,5	75	87,5	100	112,5	125	137,5	150	162,5	175	187,5	200	212,5
	N 32	40	55	70	85	100	115	130	145	160	175	190	205			
	N 40	49	67	85	103	121	139	157	175	193	211	229	247			
	N 60	60,5	90	119,5	149	178,5	208	237,5	267	296,5	326	355,5	385			
	N 100	83	113	143	173	203	233	263	293	323	353	383	413			

Base mounted V



Switchsize	dim. (mm)	e	d	k	f	g	h	l
	M 10	S W 5	39	4	36	48	9,5	41
	M 16	S W 5	39	4	36	48	12,5	47
	N 16, N 20	S W 7	56	4,2	48	64	12,5	29
	N 32	S W 7	56	4,2	48	64	15	31,5
	N 40	S W 9	80	5,2	68	86	18	38,5
	N 60	S W 9	80	5,2	68	86	29,5	49,5
	N 100	S W 12	128	6,2	110	132	30	79,5

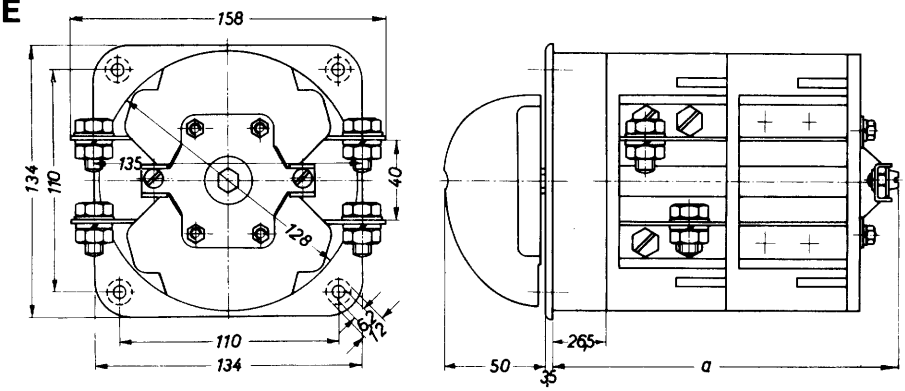
Switches E and V; M 10, M 16 as well as N 16, N 20, N 32 are available with front plate, escutcheon plate and knob of the next size upwards (ordering code = + GFP).

Switchsize	no. of cells	dim. m (mm) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	M 10	75	84,5	94	103,5	113	122,5	132	141,5	151	160,5	170	197,5			
	M 16	85	97,5	110	122,5	135	147,5	160	172,5	186	197,5	210	222,5			
	N 16, N 20	70	82,5	95	107,5	120	132,5	145	157,5	170	182,5	195	208	220	233	245
	N 32	75	90	105	120	135	150	165	180	195	210	225	240			
	N 40	91	109	127	145	163	181	199	217	235	253	271	289			
	N 60	113,5	143	172,5	202	231,5	261	290,5	320	349,5	379	408,5	438			
	N 100	166	197	227	257	288	318	348	378	409	439	469	499			

Telux-CAM SWITCHES

Panel Mounting E

N 200



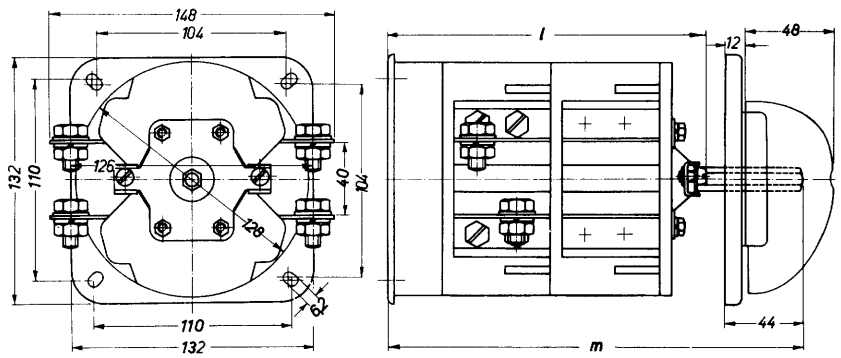
Escutcheon plate sizes
Plastic 132 x 132 mm
Aluminium 137 x 137 mm

no. of cells	1	2	3	4	5	6	7	8	9	10	11	12
dim. a (mm)	91	131	171	211	251	301	341	381	421	461	511	551

Dimension a, increases by 40 mm with each cell.

Base mounted V

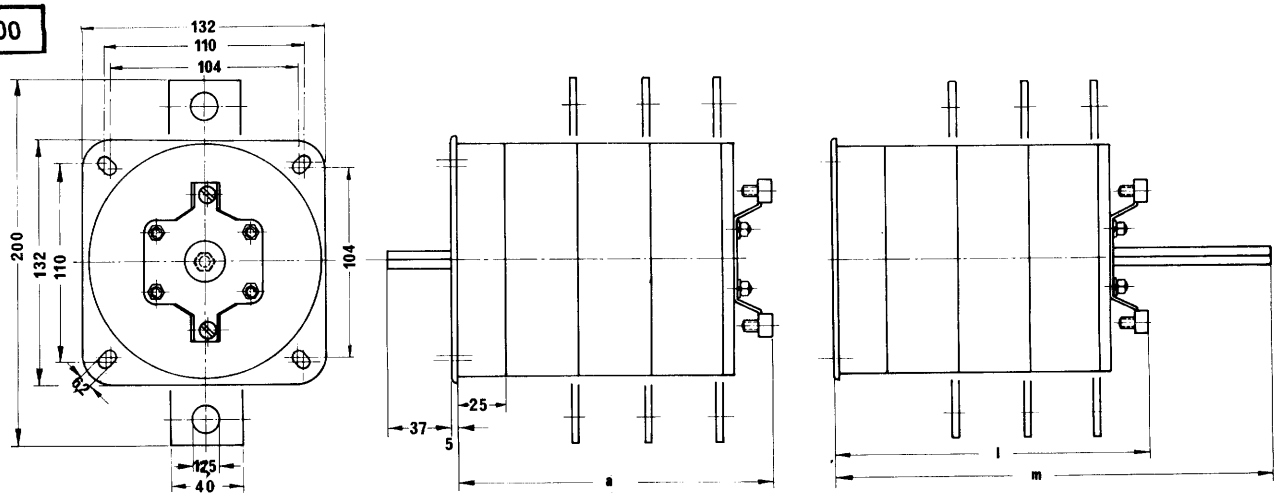
N 200



dim.	no. of cells	2	3	4	5	6	7	8
l	96	136	176	226	266	306	346	396
m	198	240	280	320	360	400	440	480

LOAD SWITCHES Panel Mounting E Base mounted V

L 400



Number of 200 A switching cells used on the most popular types of switches (see also page 13).

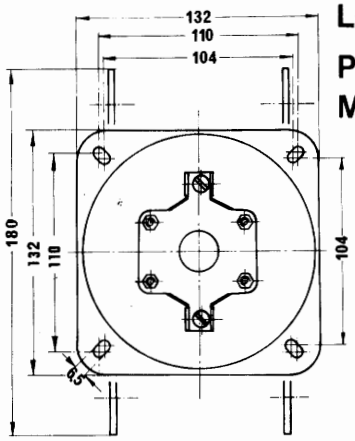
Rated current A	A 1	A 2	A 3	A 4	U 1, W 1	U 2, W 2	U 3, W 3	W 4, W 4 V U 4, U 4 V
400	1	2	3	4	2	4	6	8
600	3	3	6	6	3	6	9	6+ 6*)
800	2	4	6	8	4	8	8+4*)	8+ 8*)
1200	3	6	9	12	6	12	12+6*)	12+12*)

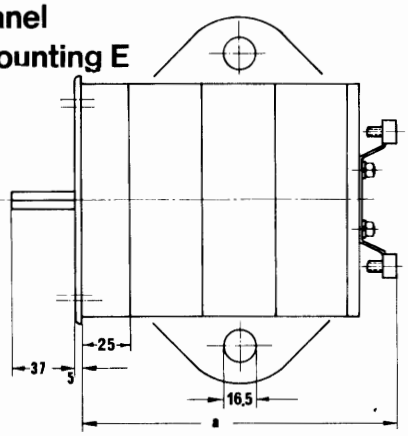
Dim. a, l, m
see Page 62

LOAD SWITCHES

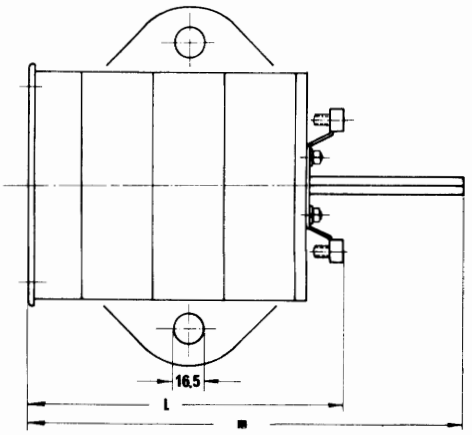
600 L

Panel Mounting E

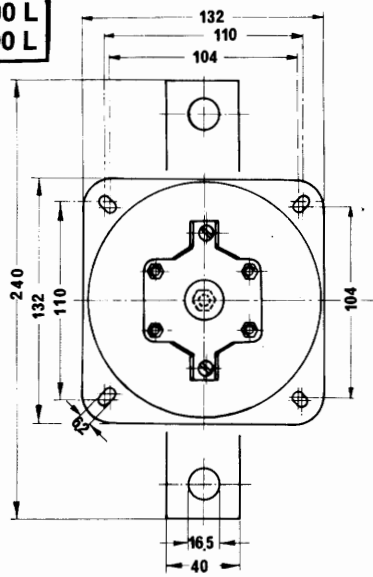


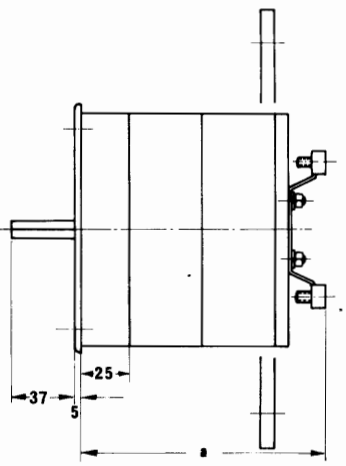


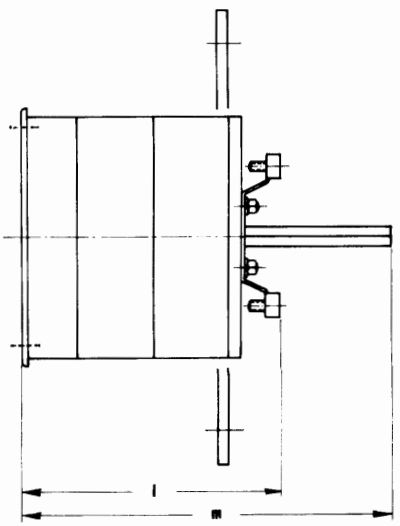
Base mounted V



800 L
1200 L







number of 200 A switching cells		1	2	3	4	6	8	9
dimensions (mm)	a	91	131	171	211	301	381	421
	l	96	136	176	216	306	386	426
	m	198	240	280	320	400	480	520

Terminal screws	
400 L	M 12
600 L	M 16
800 L	M 16
1200 L	M 16

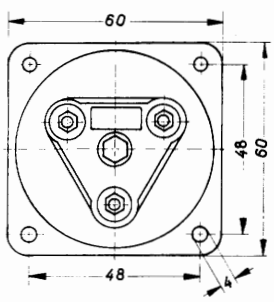
The number of 200 A switching cells used in each switch varies according to type and size. Refer to tables on Page 13 or Page 61.

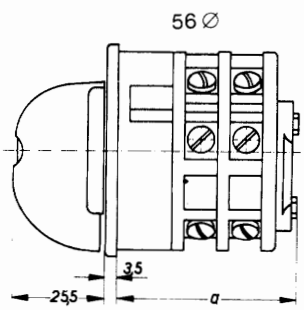
*) Load switches, which are divided into columns are supplied with a hand wheel.

Panel Mounting E

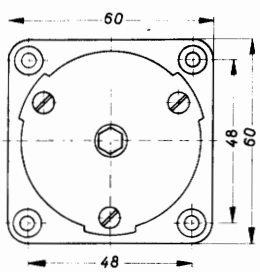
T 310
T 316

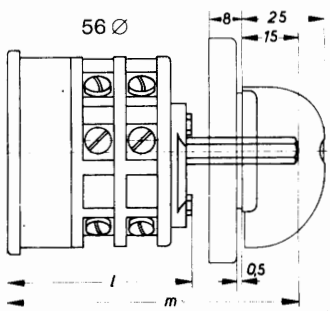
no. of cells		1	2	3	4	5	6	7	8	9
dim. a	(mm)	37,5	50	62,5	75	87,5	100	112,5	125	137,5
dim. l	(mm)	41	54	66	79	91	104	116	129	142
dim. m	(mm)	71	84	96	109	121	134	146	159	172





Base mounted V



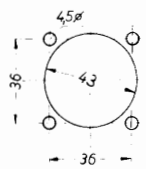


Telux-CAM SWITCHES

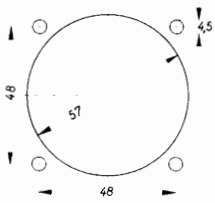
Drilling dimension for panel mounted switches.

1. **Built in from front:** switches of size N 200 can only built in from rear

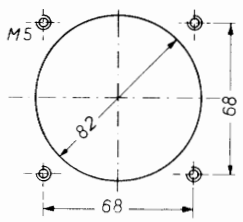
M 10
M 16



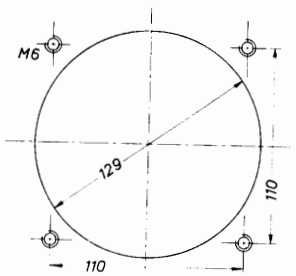
N 16
N 20
N 310
T 316
N 32
L 60



N 40
N 60
L 100
L 160

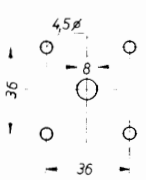


N 100
N 200
L 400
L 600
L 800
L 1200

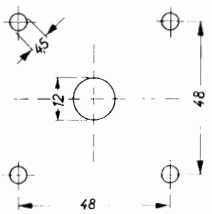


2. **Built in from rear:** Every panel mounted switch will be delivered with plastic mounting star. In these are all required holes for the fixing of the escutcheon plate included. By the fitting of the switch it is only necessary to make the bore holes for the frontplate and the shaft as shown in the table below

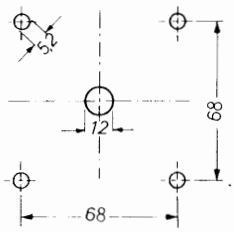
M 10
M 16



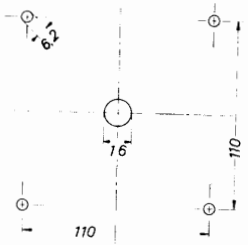
N 16
N 20
T 310
T 316
N 32
L 60



N 40
N 60
L 100
L 160



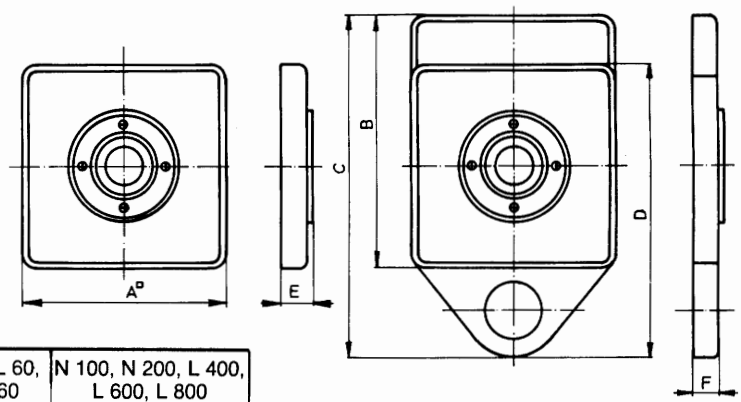
N 100
N 200
L 400
L 600
L 800
L 1200



Escutcheon plates for type E and V

Plastic face plate
(Standard)

Every escutcheon plate consist of two parts, namely the clear face plate which shows also the engraving and the contrast plate behind.



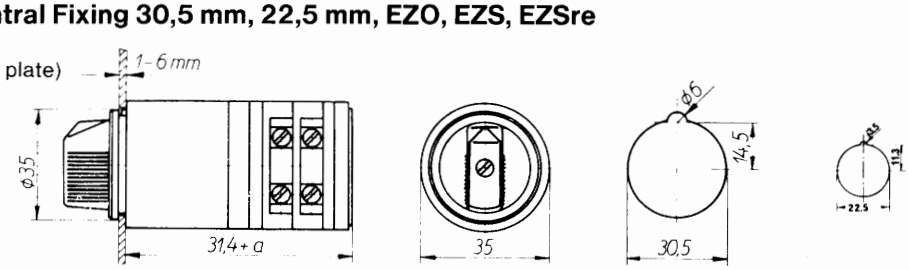
dim. (mm)	M 10, M 16	N 40, N 20, T 310, T 316, N 32, L 40	N 40, N 60, L 60, L 100, L 160	N 100, N 200, L 400, L 600, L 800
A	48	64	88	132
B	60	79	110	162
C	79	92	121	170
D	91	107	143	200
E	9	10	10	12
F	7	7	8	9

Aluminium face plate

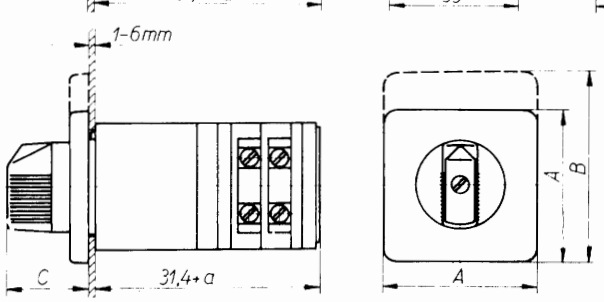
Except the sizes M 10 and M 16 all switches can be supplied with black anodised aluminium plates to an extra over price
(64 x 64 mm, 95 x 95 mm, 137 x 137 mm)

Panel Mounting Central Fixing 30,5 mm, 22,5 mm, EZO, EZS, EZSre

EZO (without escutcheon plate)
M 10
M 16
N 16
N 20
N 32
N 40



EZS, EZSre:
M 10
M 16
N 16
N 20
N 32
N 40

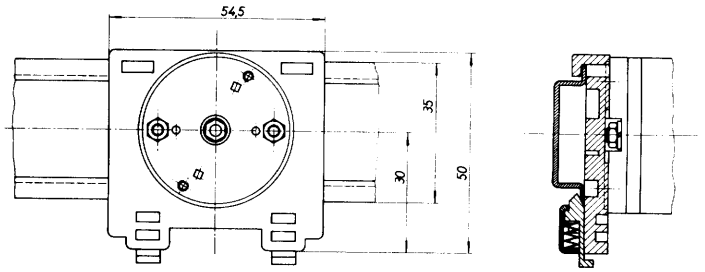


dim. (mm)	A	B	C
M 10, M 16	48	60	26
N 16 N 20 N 32	64	79	31
N 40	88	110	41

Dimension a see Page 60

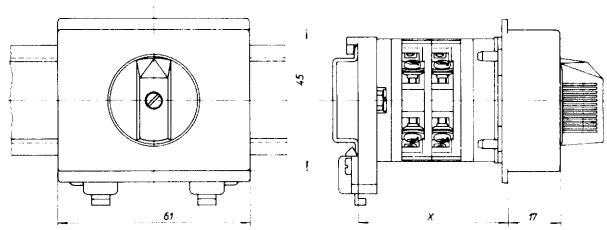
Quick mounting + SM

+ D. I. N. mounting plate
standard track DIN 46277



Quick mounting for distribution panels + SMA

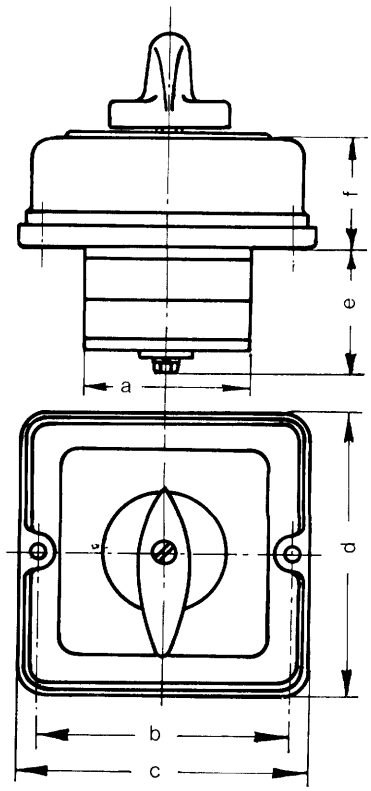
dim. x	46 mm	61 mm	70 mm
size M 10	2 cells	4 cells	5 cells
size M 16	2 cells	3 cells	4 cells



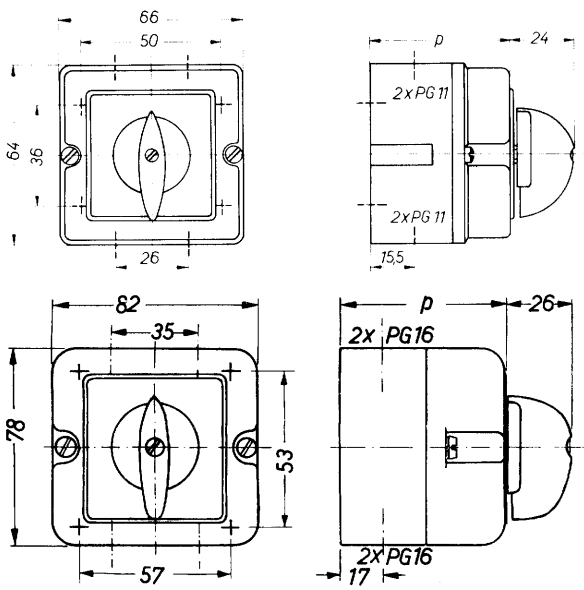
Mounting into terminal box + KE

dim. (mm)	switch-sizes	a	b	c	d	dim. e no. of cells 2	3	4	5	f
	M 10	43	58	68	66	25	34,5	44	53,5	24
	M 16	43	58	68	66	31	43	55	67	24
	N 16, N 20	57	71	82	78	23,5	36	49,5	61	35
	N 32	57	100	110	114	17	32	47	62	49

If the depth of the terminal box is not deep enough for the length of the switch, spacers can be supplied.



Plastic enclosure type P and PF (splashproof)



M 10

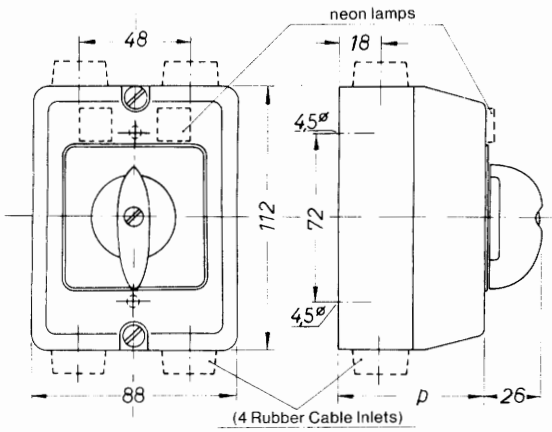
	no. of cells 1	2	3	4	5	6
dim. p (mm)	43	52	62	71	81	90

M 16
N 16
N 20

	no. of cells 1	2	3	4	5	6
dim. p (mm)	67	67	79	92	104	117

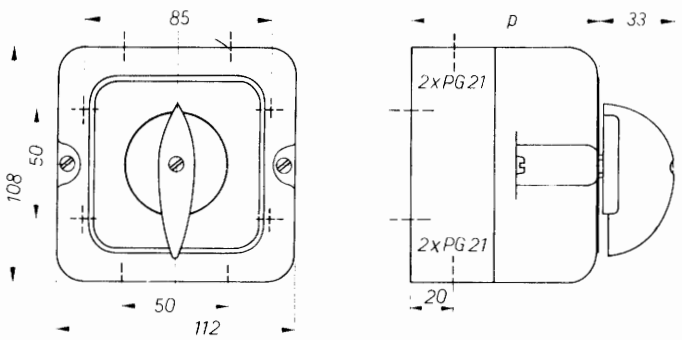
Telux-CAM SWITCHES

Plastic enclosure type P and PF (splashproof)



T 310
T 316

dim. p (mm)	no. of cells					
	1	2	3	4	5	6
T 310, T 316	68	68	81,5	94	106,5	119

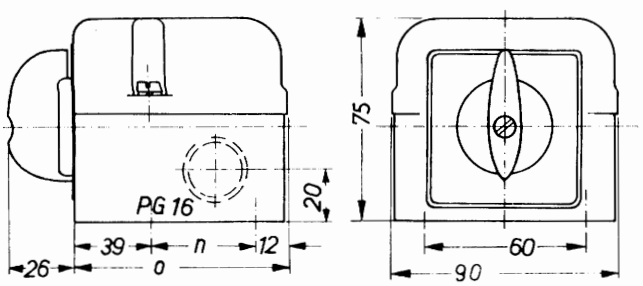


N 32
N 40
N 60

		no. of cells					
		1	2	3	4	5	6
dim. p (mm)	N 40	90	90	110	130	150	170
	N 60	90	110	150	—	—	—
	N 32	90	90	110	110	130	130

Cast enclosure type G and GF (splashproof)

Cast aluminium cases are not available for M 10, M 16, T 310 and T 316

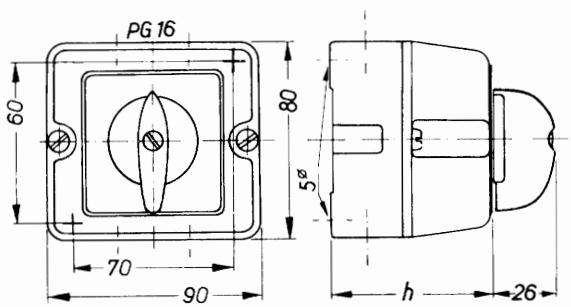


N 16
N 20

no. of cells	1—2	3—4	5—6	7—9	10—12
dim. n (mm)	29	54	79	116,5	154
dim. o (mm)	80	105	130	167,5	205

threaded PG 16: 2 cells, 1 on each side, 3–6 cells, 2 on each side, 7–12 cells, 3 on each side.

Cast enclosure type G and GF (splashproof)



N 16, N 20 (splashproof)

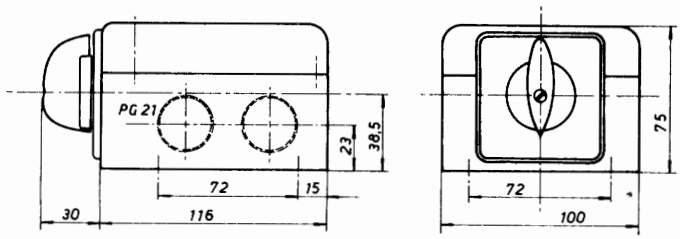
	2	3	4
dim. h (mm)	64	76,5	89

On request, the versions up to 4 switching cells without any seals are supplied at the same price as the standard version.

threaded PG 16: 2 cells, 1 on each side, 3–4 cells, 2 on each side.

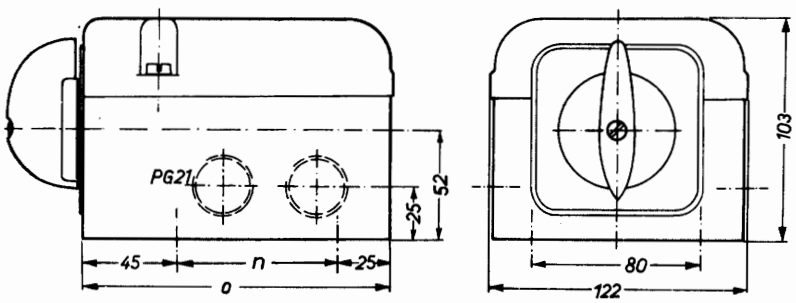
Telux-CAM SWITCHES

Cast enclosure type G and GF (splashproof)



N 32

1–4 cells (available)
5–6 cells (in preparation)

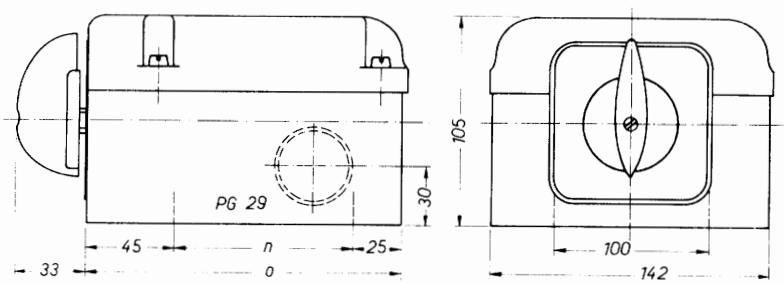


Thread PG 21 : 2 cells 1 bothsides, 3 to 6 cells 2 bothsides.

N 40

No of cells	1–2	3–4	5–6
dimension n mm	43	76	115
dimension o mm	113	149	185
weight kg	1,30	1,90	2,50

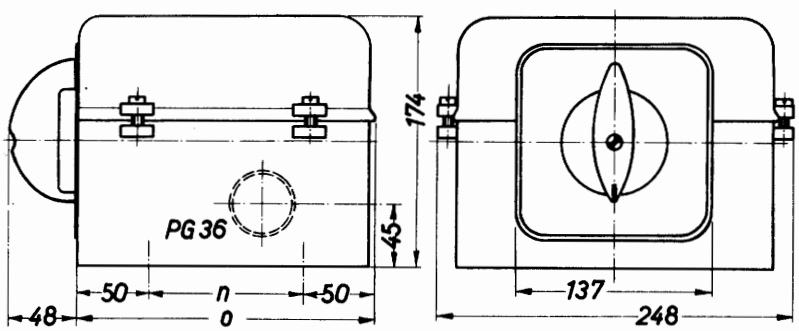
Switches with 7 and 8 cells will be built in enclosures 60 Amp 4 cells and such with 9 to 12 stages in enclosures 60 Amp 5 to 6 cells.



Thread PG 29: 2 cells 1 bothsides, 3 to 6 cells 2 bothsides or on request.

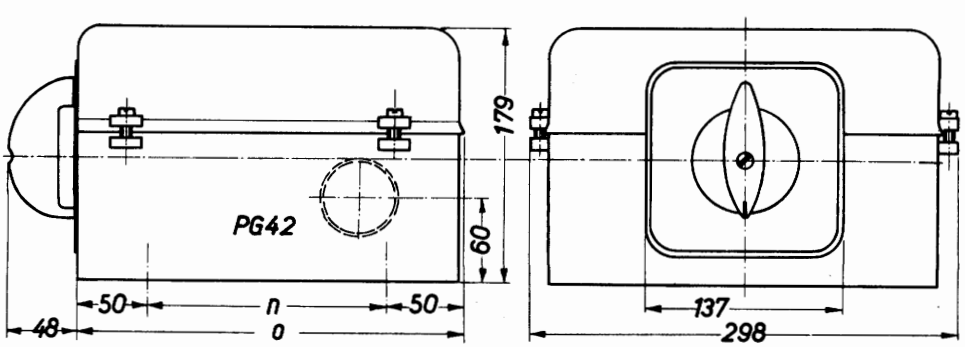
N 60

No of stages	1–2	3–4	5	6–7
dimension n (mm)	74	110	146	218
dimension o (mm)	144	180	216	288
weight kg	1,80	2,25	2,70	3,60



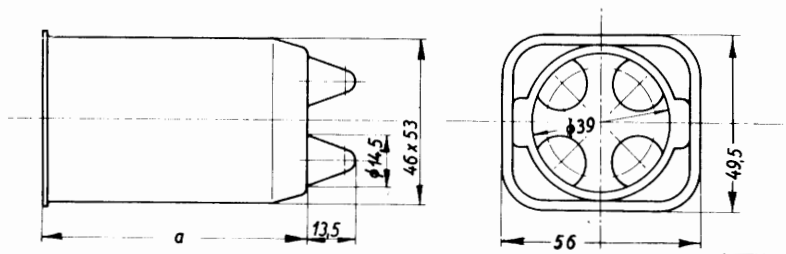
N 100, N 200

No of cells		1	2	3	4	5–6
dimension n (mm)	100 A	100	100	160	160	220
	200 A	168	168	288	288	—
dimension o (mm)	100 A	200	200	260	260	320
	200 A	268	268	388	388	—
weight kg	100 A	3,70	4,00	6,40	7,00	10,40
	200 A	5,80	6,80	9,60	10,60	—

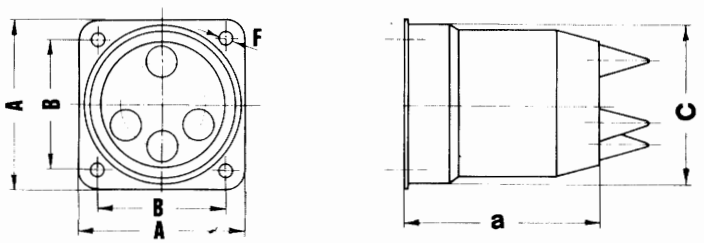


100 Amp: Thread PG 36: 2 cells 1 bothsides, 3 to 6 cells 2 bothsides or on request.
200 Amp: Thread PG 42: 1–2 cells 1 bothsides 3–4 cells 2 bothsides or on request.

Moisture proofing caps for panel switches M 10, M 16, N 16, N 20, N 40 + FR



dim. a	No of cells M 10	M 16
55	1—2	1—2
75	3—4	—3
88	5—6	—4

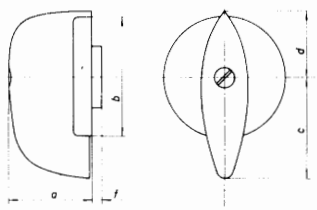


No of cells			1	2	3	4	5
dim. mm	A	N 16/20	60 x 60				
		N 40	87 x 87				—
	B	N 16/20	48 x 48				
		N 40	68 x 68				—
	a	N 16/20	68			91	
		N 40	82		117		—
	C	N 16/20	59				
		N 40	83				—
	F		N 16/20 . . . 5,5 ∅, N 40 . . . 5,5 ∅				

Operating knobs:

Twist knob

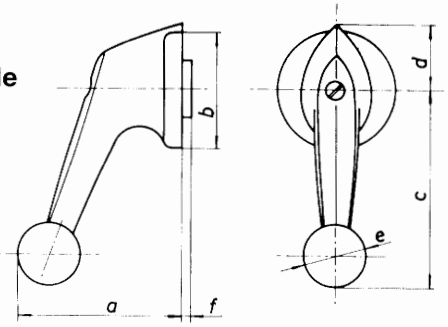
M 10 N 40
M 16 N 60
N 16 40 L
N 20 60 L
T 310 100 L
T 316 160 L
N 32 N 100
N 200



size	RG dimensions mm a	b	c	d	f
M 10 M 16	20,5	28	25	15	4
N 16, N 20 N 32	24	36	29,5	19	3
N 40, N 60	31	49	41	28	3,5
N 100, N 200	50	75	62	41	2,5

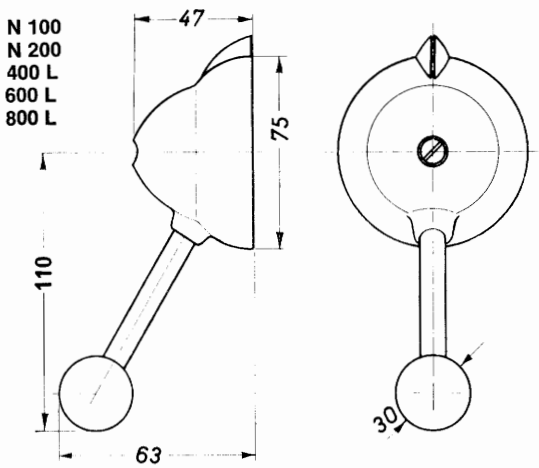
Ball type handle

N 16 N 60
N 20 40 L
T 310 60 L
T 316 100 L
N 32 160 L
N 40



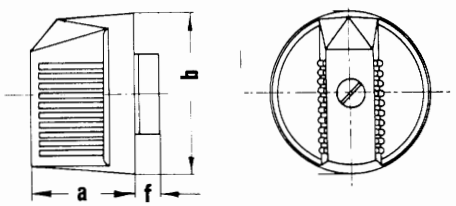
size	KG dimensions (mm) a	b	c	d	e	f
N 16, N 20 N 32	53	36,5	64	21	20	3
N 40, N 60	62	49	82	31	22,5	3,5

N 100
N 200
400 L
600 L
800 L



toggle knob

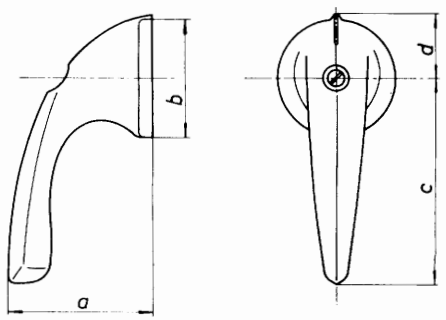
M 10
M 16



	dim. (mm) a	b	f
M 10, M 16	18,5	28	4
N 16, N 20, N 32	24	36	3

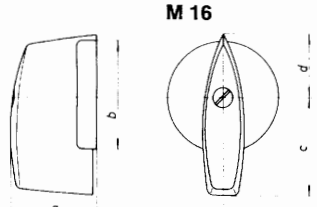
Lever hande HG

N 16
N 20
T 310
T 316
N 32
L 40



dim. (mm) HG	a	b	c	d
	44	36	65	20

Pointer knob M 10 M 16



N 16, N 20
N 32
figures in brackets

	dim. (mm) a	b	c	d
M 10, M 16	22	28	24	16
N 16, N 20, N 32	25	36	30,5	19,5

Telux-CAM SWITCHES

Key operated switch + Sa

It is possible to mount the key operated switch from the front through a circular cut-off.

dim. (mm)	A	B	C	F
M 10, M 16	48	36	39	4
N 16, N 20, N 32	64	48	56	4,2
N 40	86	68	82	5,2

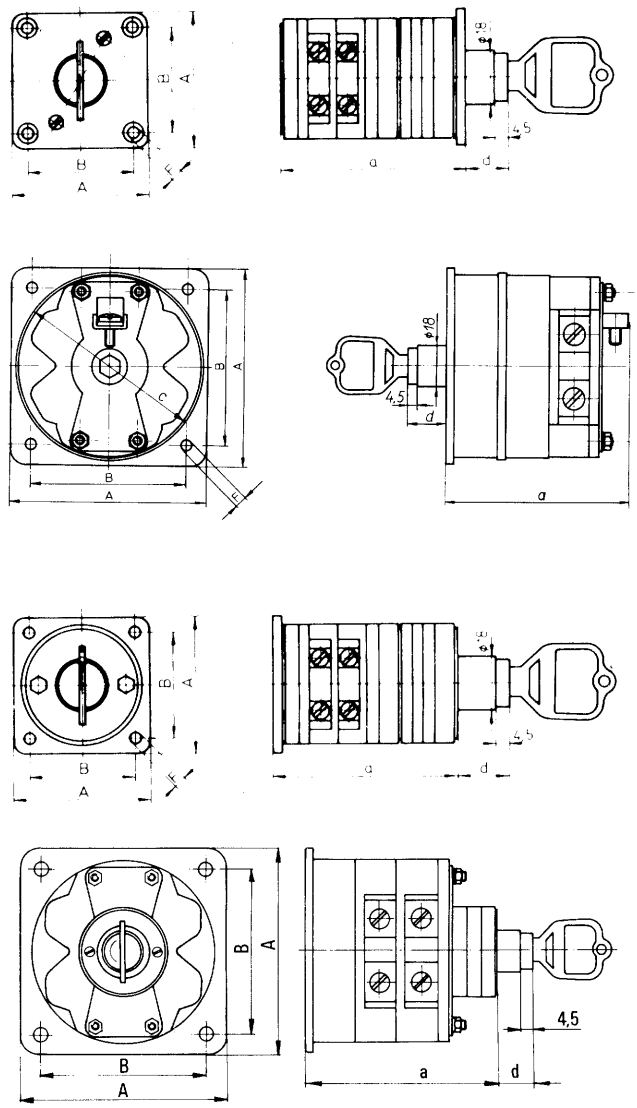
d. (mm)	M 10, M 16	N 16, N 20, N 32	N 40
E	17,5	17,5	15
V	22	22	15

Panel mounting E

dim. a (mm)	1	2	3	4	5	6
M 10	52,5	62	71,5	81	90,5	100
M 16	55,5	68	80,5	93	105,5	118
N 16, N 20	51	63,5	76	88,5	101	113,5
N 32	53	68	83	98	113	128
N 40	76	94	112	130	—	—

Base mounting V

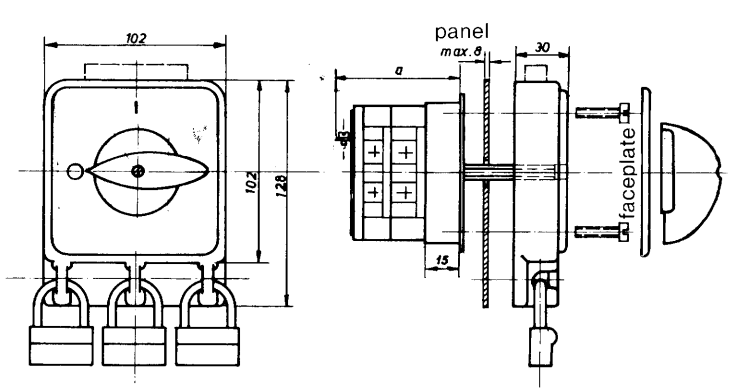
dim. a (mm)	1	2	3	4	5	6
M 10	52,5	62	71,5	81	90,5	100
M 16	55,5	68	80,5	93	105,5	118
N 16, N 20	48	80,5	73	85,5	98	110,5
N 32	50	65	80	95	110	125
N 40	67,5	85,5	103	120,5	—	—



Interlocking device + SV 3

for 1–3 padlocks

For the switchsizes N 16, N 20, N 32, N 40 and N 60 the dimensions are as table beside: For sizes N 100 and N 200 the dimensions of the padlock device are 132 x 132 x 30 mm. The axial length of the switch (dimension a) is shown on tables page 60.



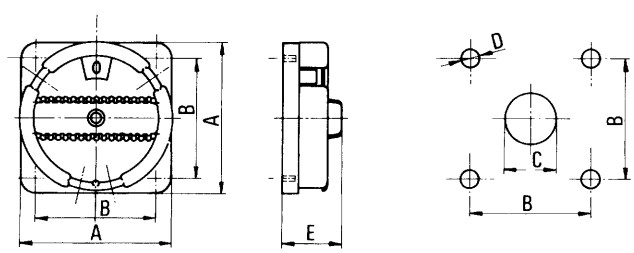
Interlocking device + SV 4 for 1–4 padlocks

available for the following sizes and designs: (size N 40, N 60 in preparation)

M 16 E+GFP, M 16 V+GFP, M 16 P,
N 16 E, N 16 V, N 16 P,
N 40 E, N 40 V, N 40 P

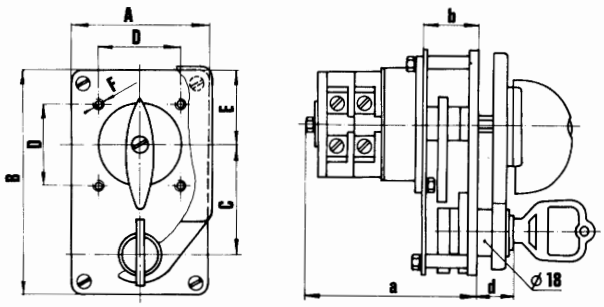
N 20 E, N 20 V, N 20 P,
N 32 E, N 32 V, N 32 P,
N 60 E, N 60 V, N 60 P

	dim. (mm)				
	A	B	C	D	E
M 16, N 16, N 20, N 32	60	48	20	4,5	23
N 40, N 60	84	68	15	5,2	30

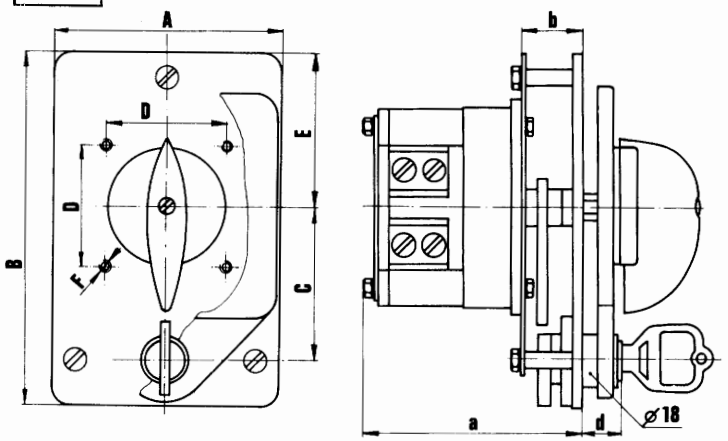


Lock Switch: + Sz (ancillary lock)
+ Sz 2

M 10
M 16
N 16
N 20
T 310
T 316
N 32
N 40
N 60



N 100
N 200



Panel mounting E

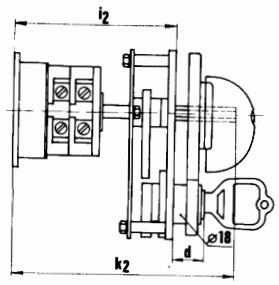
The mounting of Lock switches + Sz is possible only from the rear. Because of the limited length of the lock a maximum thickness of 3–4 mm for the panel is given.

dim. (mm)	M 10 M 16	N 16, N 20, N 32 T 310, T 316	N 40 N 60	N 100 N 200
A	60	60	90	140
B	90	90	142	180
C	40	45	61	83
D	36	36	48	110
E	32	32	61,5	90,5
F	M 4	M 4	M 4	M 6
b	22,5	22,5	24	27
d	17	17	15,5	12,5

Base mounting V

Dimensions i_2 and k_2 can be quoted from the tables on page 60 by using dimension m.

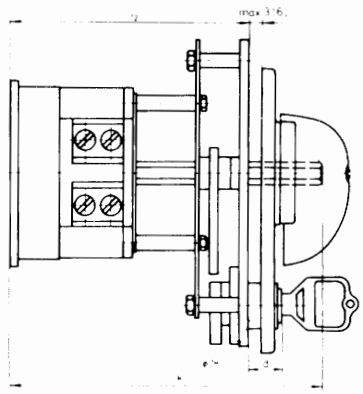
M 10
M 16
N 16
N 20
T 310
T 316
N 32
N 40
N 60



dimension a (mm)						
no. of cells	1	2	3	4	5	6
M 10	57	66,5	76	85,5	96	104,5
M 16	61	73,5	86	98,5	111	123,5
N 16, N 20	63	75,5	88	100,5	113	125,5
T 310, T 316	63	75,5	88	100,5	113	125,5
N 32	65,5	80,5	95,5	110,5	125,5	140,5
N 40	76,5	94,5	112,5	130,5	148,5	166,5
N 60	88	117,5	147	176,5	206	235,5
N 100	115	145	175	205	235	265
N 200	123	163	203	243	283	323

switch size	i_2 (mm)	k_2 (mm)
M 10	m – 20	m +22,5
M 16	m – 20	m +22,5
N 16, N 20, N 32 T 310, T 316	m – 20	m
N 40	m – 26	m
N 60	m –26	m
N 100	m – 45	m
N 200	m – 45	m

N 100
N 200



Dimension i_2 and k_2 can be adapted to existing enclosures. A waterproof version is not available.

Push-Button switch lock : + DV
Switch Interlock with Electrical Contact: + ET

The structure and the assembly facilities are for both types the same.

Panel Mounting E

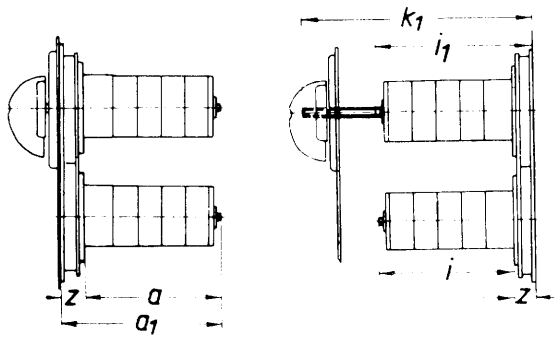
Base Mounting V

Dimensions + DV or ET correspond to the dimension of + SZ. The drilling dimension for the push-button is Ø 22,5 mm.

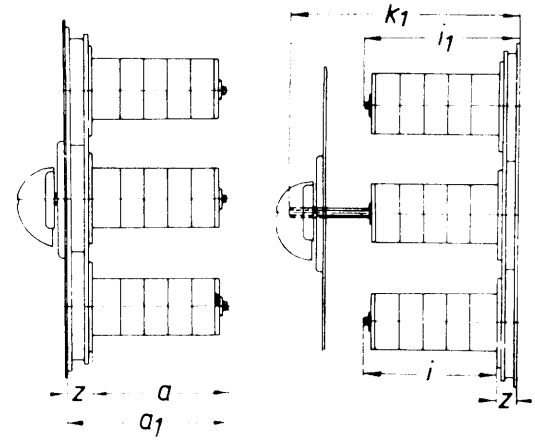
Geared Switch (Tandem drive) + ZK

Panel mounted E **Base mounted V** **Panel mounted E** **Base mounted V**

2 column (Zk 2)



3 column (Zk 3)



The dimensions of the frontplate (panel mounted E) and the baseplate (base mounted V) are equal (see table).

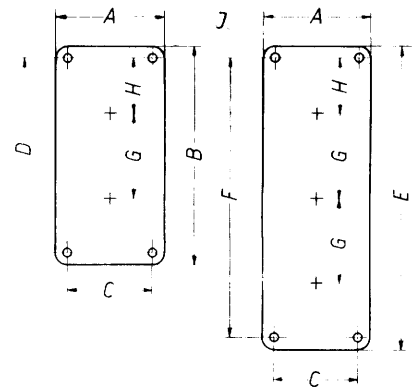
Panel mounted:

The dimension a1 can be calculated by addition of switches length a and dimension z of the tandem drive. The dimension of a is shown in the table page 60.

Base mounted:

The dimensions k1 and l1 can be calculated by addition of the corresponding data l and m as shown in the tables on page 60 plus the thickness of the tandem drive z.
The longer column is normally direct driven.

Front and baseplate for Zk 2 and Zk 3:

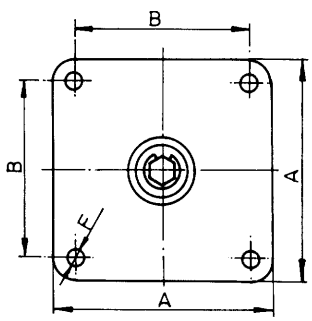


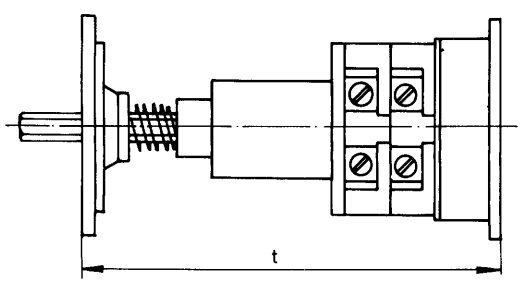
Switchsize	z [mm]
M 10, M 16	20
N 16, N 20, N 32 T 310, T 316	22
N 40, N 60	23
N 100, N 200	25

Switchsize	A	B	C	D	E	F	G	H	J
M 10, M 16	70	170	52	156	240	226	70	43	5,5
N 16, N 20 T 310, T 316	70	170	52	156	240	226	70	43	5,5
N 40, N 60	170	190	150	168	290	269	100	33	6,5
N 100, N 200	180	340	150	310	490	460	126	80	6,5

Door clutch + TK

The door clutch unit must be fixed on the panel door. It transmits the switchforce via a follower to the switchshaft.

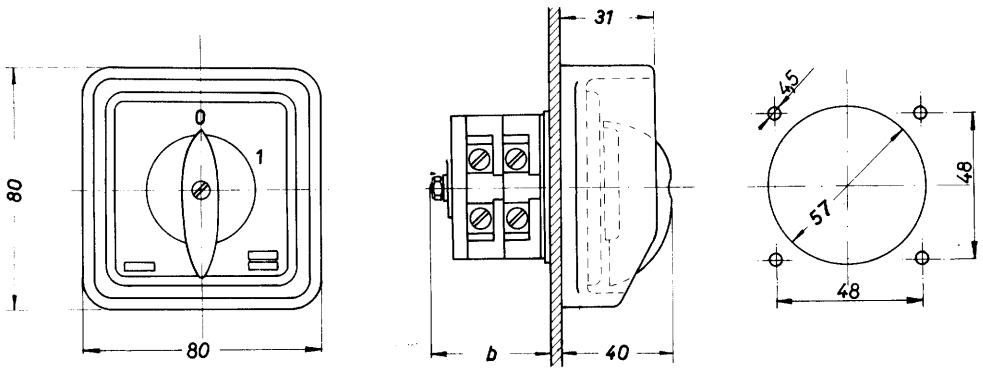




Switchsize	M 10, M 16	N 16, N 20 L 40, T 310 T 316, N 32	N 40, N 60 L 60, L 100 L 160	N 100, N 200 L 400 L 600, L 800
dim. A mm	48	64	64	127
dim. B mm	36	48	48	110
dim. F mm	4	4,2	4,2	6,5

	no. of cells	M 10	M 16	N 16, N 20	N 32	N 40	N 60	N 100	N 200
t	1	91,5	94,5	96,5	99	119,5	131,5	198	208
	2	101	107	109	114	137,5	161	228	248
	3	110,5	119,5	121,5	129	155,5	190,5	258	288
	4	120	132	134	144	172,5	220	288	328
	5	129,5	144,5	146,5	159	191,5	249,5	318	368
	6	139	157	159	174	209,5	279	348	408
	7	148	169,5	171,5	189	227,5	308,5	378	448
	8	158	182	184	204	245,5	338	408	488

Protection Collar for panel Switches N 16, N 20, N 32, T 310, T 316 + Skr

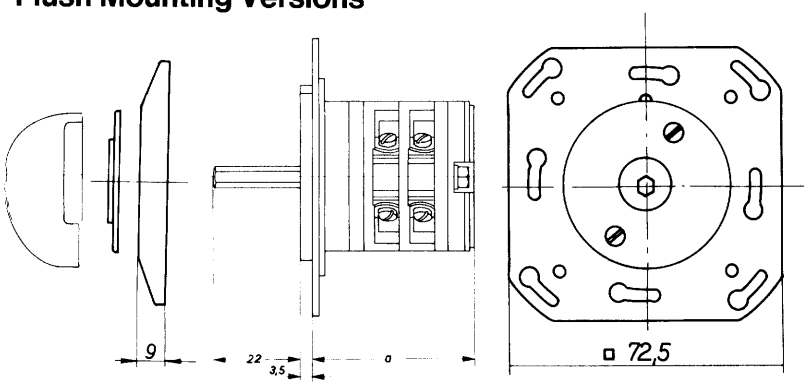


The dimensions b are as on Page 60 less 10 mm.

The protection collar can be used in conjunction with the FR protection cover (on pages 67 and 29).

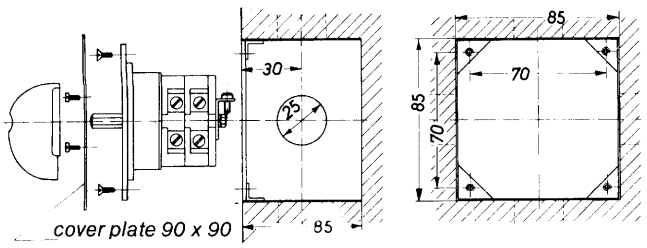
Flush Mounting Versions

M 10 UP
M 16 UP



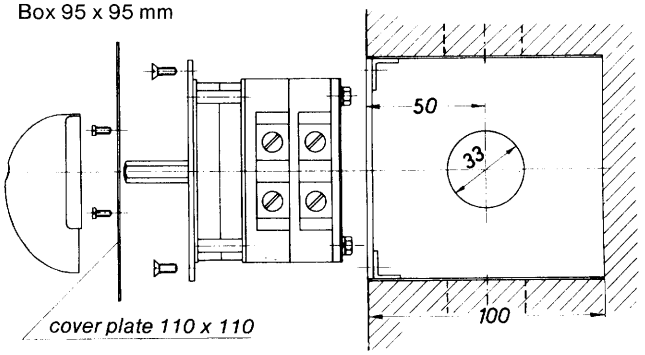
Switches M 10 UP and M 16 UP are normally delivered with white knob, white front plate and plastic plate with a white contrasting plate behind. They are to be fitted into standard flush tin wall mounting box of 65 mm and used with Unitas plates (box and Unitas plates available on request).

+ UP, N 16, N 20 + N 32



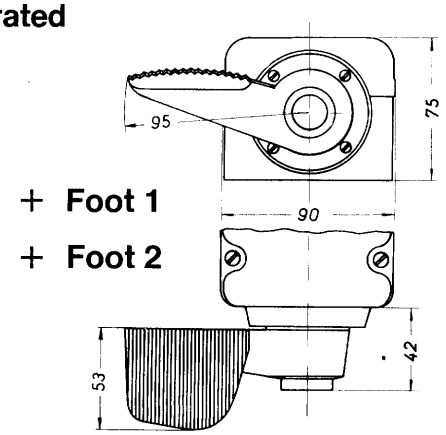
+ UP, N 40

Box 95 x 95 mm



The cable entries of the flush mounting box can be supplied in each size. The depth of the boxes must correspond with the switches as shown on Page 56.

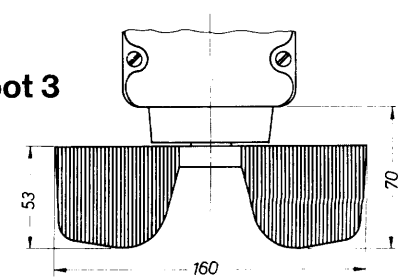
Foot operated Switches



+ Foot 1

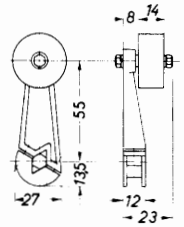
+ Foot 2

+ Foot 3

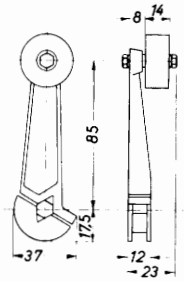


Roller Arm: + RH

N 16
N 20
T 310
T 316
N 32



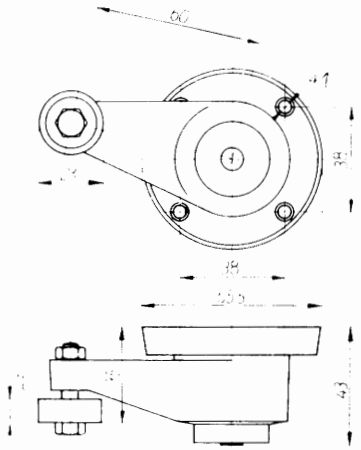
N 40
N 60



Roller Arm: + RHS

N 16
N 20

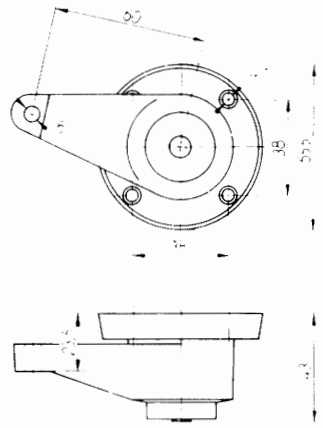
N 32
N 40



Eyelet Lever: + ÖHS

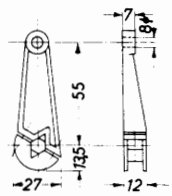
N 16
N 20

N 32
N 40

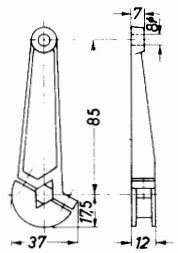


Eyelet Lever: + ÖH

N 16
N 20
T 310
T 316
N 32



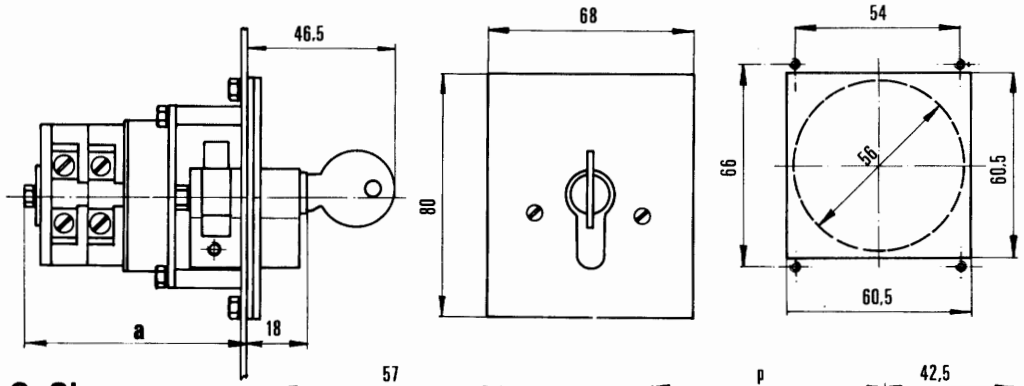
N 40
N 60



The mounting of the switch is only possible from the front. For sizes M 10/M 16 a circular cut-off of 56 mm ⌀ is necessary and for N 16/N 20 a quadratic cut-off of 60,5 x 60,5 mm.

Key Operated Switch with security Barrel + SaSi

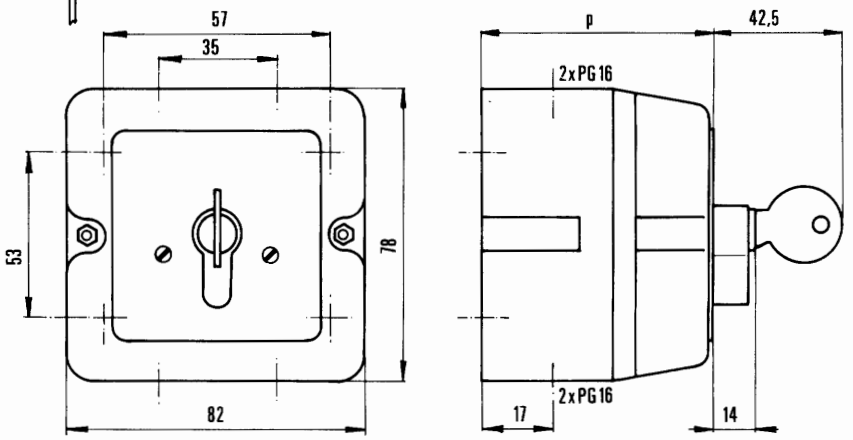
dim. (mm)				
no. of cells	1	2	3	4
M 10	54,5	64	73,5	83
M 16	58,5	71	83,5	96
N 16, N 20	64	76,5	89	101,5



In plastic enclosure P + SaSi

dim. (mm)				
no. of cells	1	2	3	4
M 10	67	79,5	92	104,5
M 16	79,5	92	104,5	117

available only for
switchsize M 10 and M 16



UP + SaSi

M 10/M 16
3 cells max.

N 16/N 20
2 cells max.