

Subscriber Apparatus Components

Uniselectors



BPO Types 2&3

These BPO-approved electro-mechanical switches are used extensively in telephone exchange systems and in a variety of industrial, light-current switching equipment.

Operation is based on a single-coil magnet and ratchet to rotate wipers (conducting arms) axially over a semi-circular bank of contacts for specific contact selection.

Wipers are electrically driven either by self-interrupted action or by external pulses.

Both types are reverse-drive action switches i.e. they step once as the armature restores to normal.

A typical unselector is shown in Figure 1.

Type 2 is suitable for heavy usage in circuits demanding a life expectancy of 100 million steps. Alternatively

Type 3 is for light-duty work when a maximum of 25 million steps is acceptable.

Electrical Specification

Breakdown voltage

Not less than 500V a.c. (r.m.s.) between any two points not electrically connected or any part and earth.

Insulation resistance

Not less than 40 MΩ at 500V d.c. between bank contacts.

Through resistance

Approx. 1Ω at 50 mA between brushes and bank contact.

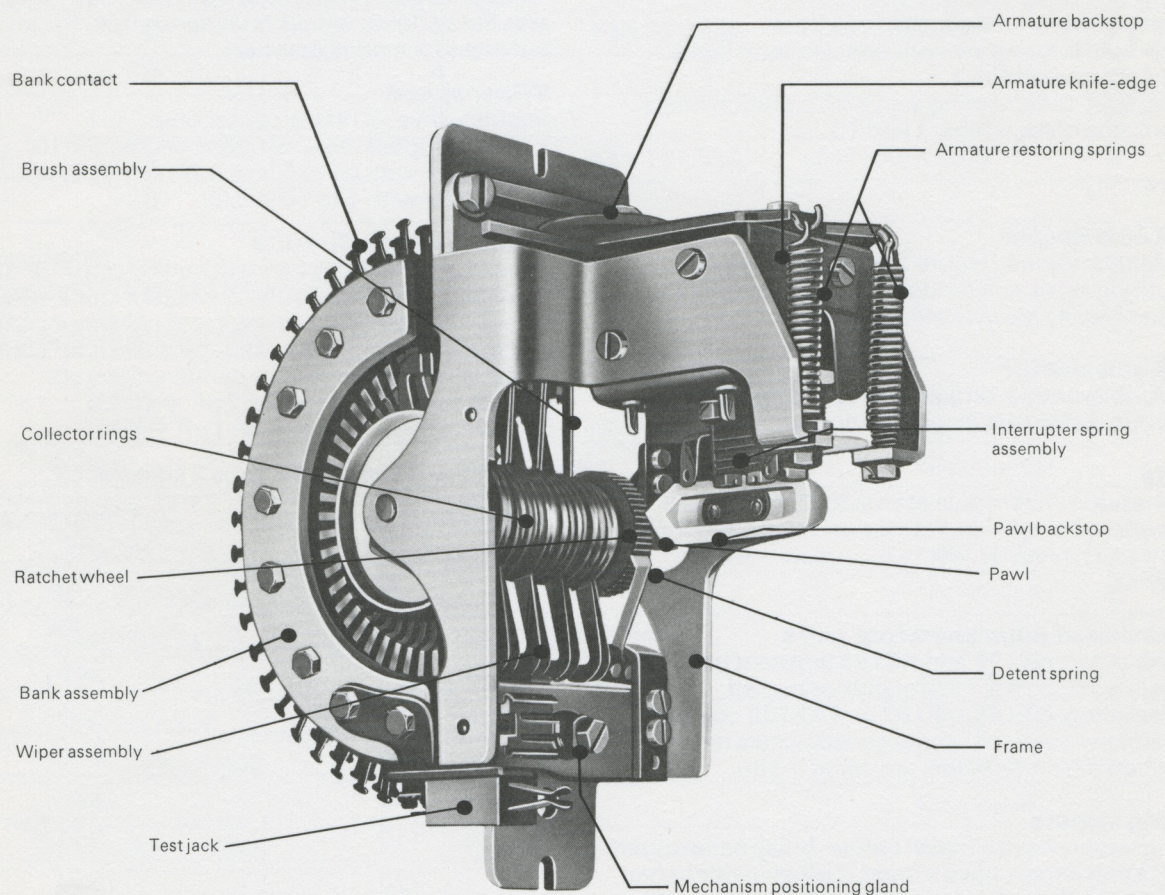


Figure 1 Typical unselector



Uniselectors continued

Contact rating

1A (12W max.) for wiper and bank contacts.
5A (Type 2) or 1A (Type 3) for interrupter contacts.

Bank

A bank has one or more bank levels consisting of:
(a) 25 contacts, or
(b) homing arc(s) with one or more home position contacts.

Homing arcs

Homing arcs are fitted on the levels nearest the number wheel.

Types available for unselector Type 2 are:

- (a) Single homing arc with one home position on contact No. 1.
- (b) Twin homing arcs with one common home position on contact No. 1.
- (c) Two split-twin homing arcs with common home positions on contacts Nos. 1 and 13.

Types available for unselector Type 3 are:

- (a) One twin homing arc with one common home position on contact No. 1.
- (b) Two split-twin homing arcs with common home positions on contacts Nos. 1 and 13.

Wipers

Type 2 unselector

3 to 8 double-ended (Figure 2) or 4 to 10 single-ended, bridging or non-bridging wipers (or a combination of both) are available.

Type 3 unselector

4 or 5 double-ended bridging or non-bridging wipers (or a combination of both) are available.

Outlets

Double-ended wipers give access to 25 outlets per bank level, and single-ended wipers, connected in adjacent pairs, gives access to 50 outlets over two bank levels.

Connection of adjacent wiper pairs

For uniselectors N8189 and N8193 adjacent pairs of single-ended wipers are integrally connected.
For uniselectors N8185, N8187 and N8188 connection of adjacent pairs of single-ended wipers must be made when the uniselectors are wired in situ.

Bridging wipers

Bridging wipers have a make-before-break action, and non-bridging wipers have a break-before-make action. When fitted to Type 2 unselector, bridging wipers are on the levels nearest to the number wheel regardless of

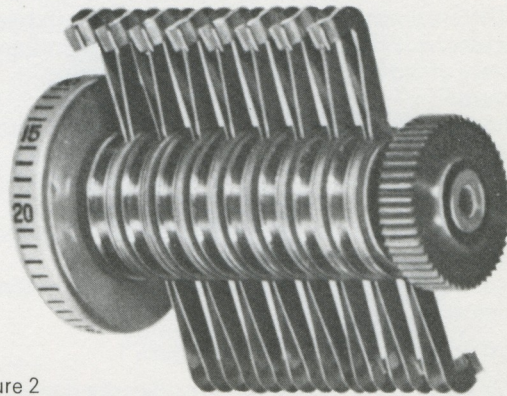


Figure 2

8-level, double-ended wiper unit including ratchet wheel

whether or not homing arcs are fitted to the bank. On Type 3 uniselectors without homing arcs, bridging wipers, when fitted, are on the levels nearest the number wheel. When these switches have homing arcs the bridging wipers commence from the level next but one to the number wheel.

Wiper speed

Impulse drive: 30 steps per second.

Self-interrupted drive: 60 steps per second for unselector with up to 5 levels. 50 steps per second for unselector with 6 to 10 levels.

Spark-Quench Circuits

When a unselector is being driven by self-interruption through its own interrupter contacts a spark-quench circuit, consisting of a resistor and capacitor connected in series must be fitted across the interrupter contacts. Suitable resistor/capacitor combinations are:

- (a) For voltages up to 60V: $1\ \mu\text{F} + 220\ \Omega$.
- (b) For voltages above 60V: $1\ \mu\text{F} + 500\ \Omega$.

Table 1 Coil Ratings for Type 2 Unselector

Coil Operating Voltage $\pm 20\%$	Coil Resistance Ω
22	18
36	40
40	46
50*	75
60	112
80	180
110	360
220	1500

* Standard coil operating voltage

Note: For voltages up to 60V, a combined resistor/capacitor component is available that fixes directly to the uniselector mechanism; this facility is not available for voltages above 60V.

Wipers should not be used to interrupt the external electrical circuit. However, if this interruption is necessary then adequate spark quenching should be incorporated.

In all cases capacitors and resistors for spark quenching must be ordered separately.

Coil Ratings

Operating voltages for various coils used with Type 2 uniselectors are shown in Table 1.

Note: Coil operating voltage of Type 3 uniselectors is 50V with a coil resistance of 100 Ω .

Table 2 Uniselector types

Type No.	No. of 25 PT Levels (Double-ended Wipers)	No. of 50 PT Levels (Single-ended Wipers)	Dimensions (Without Spark-Quench)		Maximum Weight	
			in	(mm)	lb oz	(g)
N8184	3	—	$5\frac{3}{4} \times 2$	$\times 5\frac{13}{32}$	(146 x 51 x 137)	1 9 $\frac{3}{4}$ (730)
N8185	4	2	"	"	"	"
N8186	5	—	"	"	"	"
N8193	—	3	"	"	"	"
N8187	6	3	$5\frac{3}{4} \times 2\frac{7}{8} \times 5\frac{13}{32}$	(146 x 73 x 137)	2 2 $\frac{1}{2}$	(978)
N8188	8	4	"	"	"	"
N8189	—	5	"	"	"	"
N8190*	4	—	$5\frac{3}{4} \times 1\frac{7}{8} \times 5\frac{13}{32}$	(146 x 48 x 137)	1 8	(680)
N8191*	5	—	"	"	"	"

*Type 3 uniselector

Note: Number of levels includes homing arc when fitted.

Table 3 Component materials

Component	Materials	
	Type 2 Uniselector	Type 3 Uniselector
Wipers	Nickel silver	Nickel silver
Brushes	" "	" "
Collector rings	" "	Hard brass
Bank contacts	" "	Nickel silver
Ratchet wheel	Aluminium-bronze	Manganese brass
Pawl	Hardened steel	Hardened steel
Pawl backstop	Acetal resin	Hardened steel
Armature backstop	Phosphor bronze	Phosphor bronze
Frame	Mild steel	Mild steel
Interrupter contacts	Tungsten or platinum	Platinum

Note: Interrupter contacts for Type 2 uniselector are normally of tungsten, but platinum is employed for switches that are used infrequently.



Private Communication Systems



Mounting Arrangements

Uniselectors mount on pairs of anti-microphonic spring mountings (Figure 3) made from durable nylon, with the coil in the vertical plane.

Type 2 uniselectors with up to 5 levels mount on $2\frac{1}{4}$ in (57 mm) horizontal centres.

Uniselectors with more than 5 levels mount on 3 in (76.2 mm) horizontal centres.

Type 3 uniselectors mount on 2 in (50.8 mm) horizontal centres but can be mounted side by side on $1\frac{3}{4}$ in (44.5 mm) centres where space is limited.

Vertical distance between fixing screw centres is $5\frac{7}{16}$ in (138 mm).

Mountings are available for frame thicknesses shown in Table 4.

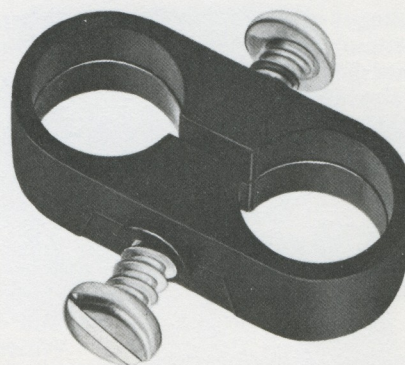


Figure 3
Typical spring mounting

Table 4 Mounting Details

Spring Mounting Code No.	BPO Code U/S Mounting Code	Frame Thickness	
		in	(mm)
N108100A1	1A	$\frac{1}{16}$ to $\frac{3}{32}$	(1.59 to 2.38)
N108100A2	1B	$\frac{1}{8}$ to $\frac{3}{16}$	(3.18 to 4.76)
N108100A3	1C	$\frac{1}{4}$	(6.35)

Note: A uniselector requires two mountings.

Ordering Information

When ordering, please provide the following particulars (a) to (g) as appropriate.

- (a) Type number of uniselector and number of points required.
- (b) Bridging or non-bridging wipers or a combination of both.
- (c) Operating voltage.
- (d) Type of homing arc.
- (e) Tungsten or platinum interrupter contacts.
- (f) Spark-quench capacitor and resistor, and if to be fitted to uniselector or supplied separately.
- (g) Spring mountings required (see Table 4).

Ordering example:

N8187/25 point/1 bridging/50V/1 single homing arc/
tungsten interrupter contacts/spark-quench
 $1\mu\text{F} + 220\Omega$ fitted/spring mountings N108100A2.

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