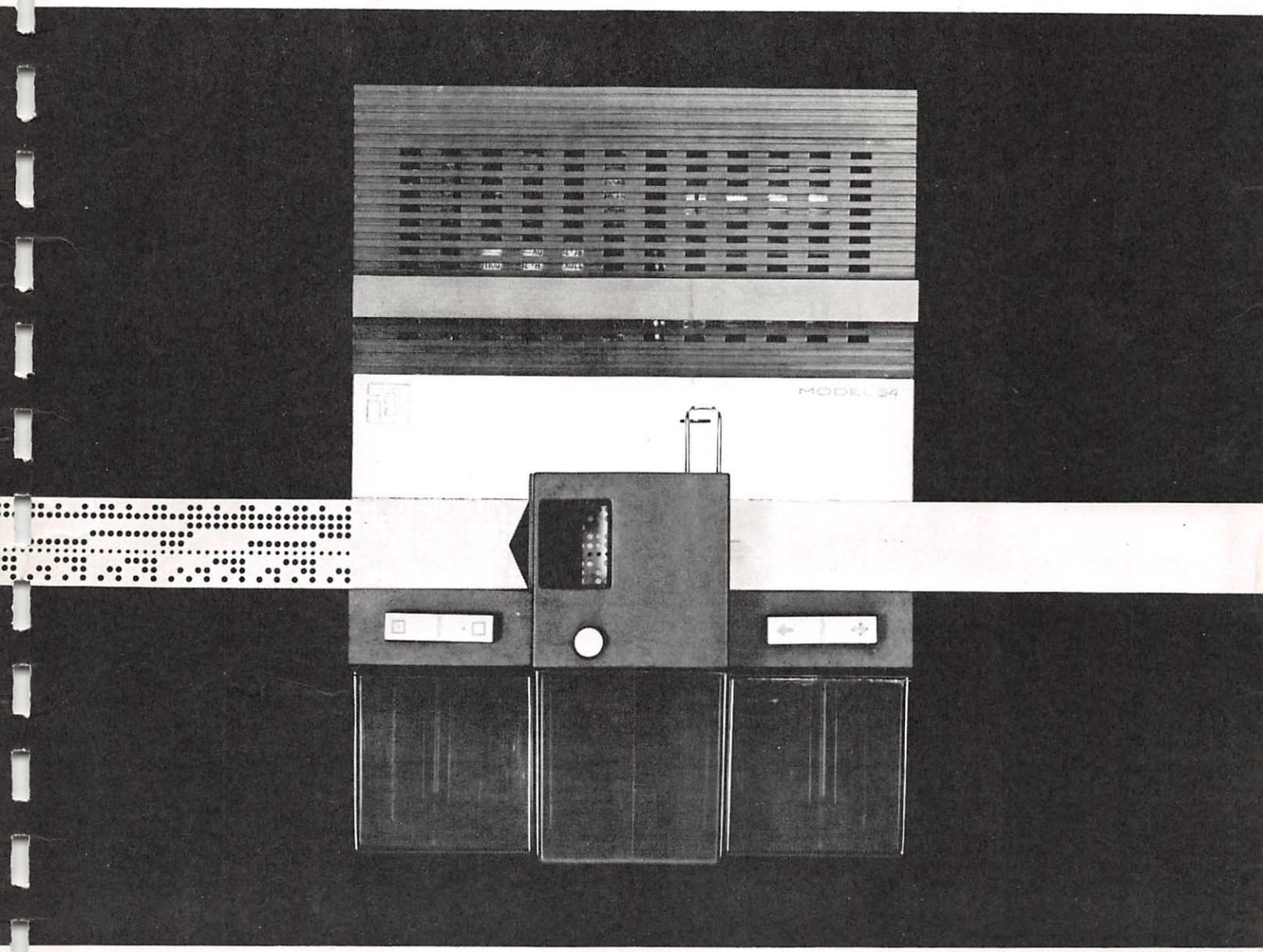
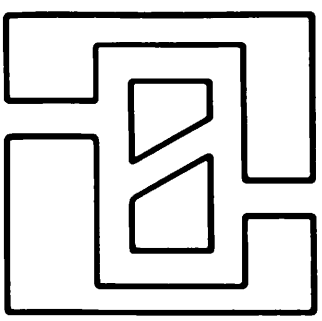


TAPE AND CARD PUNCH MODEL 34

GNT AUTOMATIC A/S



GNT AUTOMATIC A/S

6, Telefonvej, DK-2860 Soeborg, Copenhagen, Denmark
Phone: (01) 69 51 88, Cables: Nortelmatic, Telex: 2 70 64

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cont. next page

I

CONTENTS cont'd

The manual is valid for punches with base no. from 170000.

II

1. SPECIFICATION

1.1 GENERAL

1.1.1 Dimensions and Weight

Width: 165 mm (6 1/2")

Depth: 165 mm (6 1/2")

Height: 120 mm (4 3/4")

Weight: 4.7 kg (10 lb 5 oz)

1.1.2 Mounting

Model 34 is normally supplied as a free standing unit, but it can readily be flush or rack mounted. Care should be taken to ensure adequate ventilation to the punch.

Model 34 punch will operate in any position except with tape running vertically upwards, provided that free flow of chad cuttings from the punch block is not hindered or impeded in any way.

1.1.3 Colour

Two tone grey cabinet with top platform in brushed anodized aluminium grey and neutral.

1.1.4 Tape

Type of Tape

Dry paper and oiled paper.

(Other types of tape can be used but pre-check type with supplier of punch before use.)

Width of Tape

The following standard widths of tape can be used without adjustment or alteration to the punch.

5-track 11/16".

6-track 7/8".

7-track 7/8".

8-track 1".

A special version for TTS tape can be supplied upon request.

Hole pitch nominal 1/10" laterally and longitudinally.

1.1.5 Card

Width up to 127 mm (5").

For cards wider than 3.25", special care must be taken to ensure adequate ventilation to the model 34.

Single cards up to 215 mm (8.5"), in length.

Paper quality and thickness in accordance with ISO/R1681.

1-1

1.1.6 Tolerances of Punching

In accordance with ISO Recommendation R 1154 and BS 3880: 1965 and DIN 66016.

1.1.7 Punching Speed

Fast Version:

Approx. 70 ch/sec. synchronous. (tape)

Approx. 45 ch/sec. asynchronous. (tape)

Approx. 30 ch/sec. asynchronous. (card)

Back-space in card is possible, but not recommended.

Slow Version (Tape and Edge Punched Cards):

Approx. 40 ch/sec. synchronous.

Approx. 30 ch/sec. asynchronous.

(Care must be taken when using cards to ensure proper feeding and stacking of cards).

1.1.8 Ambient Temperature Range

+8°C to +40°C. See 1.1.2

1.1.9 Humidity Range

5 to 95% humidity over full temperature range (without condensation).

For special environmental operating conditions please consult GNT AUTOMATIC A/S or contact supplier.

1.2 INPUTS

1.2.1 Motor Specification

Standard Version:

220 V AC ± 10%, 50 Hz, approx. 50 W.

Other Versions Available:

240 V AC ± 10%, 50 Hz, approx. 50 W.

115 V AC ± 10%, 60 Hz, approx. 65 W.

Thermostatically operated cut-out built into the motor winding.

Cut-off temperature: 118°C ± 10°C.

1.2.2 Electrical Control

Clutch, back-space, and selector magnets:

24 V ± 10%.

Coil resistance 230 Ω.

Other voltages on special request.

1.2.3 Drive Pulse Lengths

Clutch control and back-space magnets:

8 ± 1 ms.

Selector magnets:

Fast version: 16 ± 1 ms.
Slow version: 19 ± 1 ms.

See also timing diagram, Fig. 4.1.

The pulse lengths should normally be controlled by the timing cam contacts. See timing diagrams, Fig. 4.2 and 4.3.

1-2

NOTE: The maximum average power dissipation permitted in the selector box is 10 W, corresponding to a duty cycle of 50%.

1.3 MANUAL CONTROL

1.3.1 Tape Latch Release

Pushbutton for tape and card insertion.

1.3.2 Feed Hole Selector

If cards with prepunched feed holes are used, the feed hole selector may be used to disengage the feed hole punch to prevent overpunching.

1.3.3 Motor on/off Button (Optional)

Fitted on the left-hand side of the punch switches the motor on and off.

1.3.4 Feed Control Button (Optional)

Fitted on the right-hand side of the punch to actuate either of two control switches and thereby (depending on customer's external wiring) initiate "skip" or "back-space" or similar functions.

Control switches:

SPDT. 250 V AC, 2 A max.

1.4 OUTPUTS

1.4.1 Timing Contacts

Two timing contacts independently adjustable through 360°.

Max. voltage 48 V.

Max. current 100 mA.

Resistive load.

1.4.2 Card Position Sensing Switch

Provided to ensure correct 1st character start position of cards.

Same specifications as control switches.

1.4.3 Check-back Contacts (Optional)

One switch for each code channel actuated by the movement of the punching knife.

Max. voltage 48 V.

Max. current 100 mA.

Resistive load.

1.5 ACCESSORIES

1.5.1 Card Guide

Card guide type 34/1590 can be fitted to the punch. Continuously adjustable up to 127 mm (5") wide cards.

1-3

1.5.2 Multiplugs

For connection of the control cable to the associated equipment a 26-pole female Harting plug can be supplied.

The plug has the spare part number 34/3012. If the punch is equipped with check-back contacts an extra 14-pole Harting plug can be supplied. Part number 34/3014.

1.5.3 Tape Handler Model 3403 and Tape Handler Model 3405

Motordriven tape handler for 19" standard rack mounting. Designed to operate with the Tape and Card Punch Model 34.

1.5.4 Tape Winder Model 2082

Motordriven tape winder for free standing or rack mounting.

1.5.5 Spooling Equipment

A wide range of spools, dispensers and hand spooling equipment are available.

Special cataloque on request.

1-4

2. CONSTRUCTION

2.1 COVER

The cover is made of sheet steel and comprises a surround frame and base plate. The cover is fastened to the punch mechanism by a lock in the base plate which engages with a bracket over the motor.

The upper rim of the surround frame is rubber lined and the underside of the base plate is felt lined to prevent scratching of working surfaces. This also has a sound deadening effect.

The mains and signal cables are lead through a cut out in the base and the surrounding. The rear of the surround frame is provided with vent holes for the motor fan. Because this is a radial fan the cover is a part of the ventilation system.

2.2 MOTOR

A single phase, rubber mounted motor, is fixed to the platform unit.

2.3 TRANSMISSION

Transmission from the motor to the punch mechanism is via two drive belts, the first of round section and the second of flat section with serrations in its inner face. This latter engages with the clutch on the main shaft.

2.4 CENTRIFUGAL CLUTCH

(Fig. 2.2)

Sufficient torque from the motor to drive the punch mechanism, is ensured by engagement of a centrifugal clutch fitted to the intermediate drive pulley.

This clutch comprises a cork lined clutch housing, driven part (34/1612) upon the circumference of which the flat section drive belt runs.

The driving part contains the round section belt pulley and two centrifugal members (34/1624) with a retaining spring in a groove in their circumference.

Two pins (34/1622-2) in the inner face of the driving part engage in cut-outs in the centrifugal members, and when the motor speed reaches approx. 2,200 r.p.m. the members engage with the cork lined housing and transmit drive to the flat-section belt.

The assembly is mounted on a shaft (34/1612-2) and has self lubricating sintered bronze bearings.

2.5 PUNCH CONTROL

(Fig. 2.3 and 2.4)

Drive from the flat drive belt to the main shaft is controlled through an electromagnetically operated clutch.

The driven part (34/1672) of the clutch is three-pronged and engages in the three lobe main shaft (34/1752).

2-1

Two of the prongs on the clutch are positioned close to, but not touching, the face of the pulley (34/1652) and in the normal stop position the prongs are within the angle subtended by the flat drive belt around the pulley. The third-brake-prong is formed in the opposite direction to the other two and is used in conjunction with the clutch lever (34/1963) to control the main shaft rotation and punch action.

The stop position of the main shaft will be maintained whilst the pawl (34/1955) and clutch lever is held in position by the magnet armature (34/1925).

When the magnet is energized, the pawl is released and the clutch lever will rotate about its pivot on support (34/1972) under the action of spring (34/1966), this action releases the brake prong of the three prong clutch from its held stop position.

The spring (34/1788, Fig. 2.4), exerts a turning moment on the main shaft through the connecting rod (34/1782), and as the main shaft is coupled to the three pronged clutch the turning moment will be transferred to cause the first prong to engage with the inner surface of the flat drive belt and the pulley (34/1652). The drive belt now continues to drive the clutch and main shaft and during the rotation the second prong will be engaged to complete the 360^{o} cycle of the mechanism. At the end of which, provided the electromagnet has been de-energized, the brake prong will be arrested by the clutch lever. The resetting of the clutch lever is mechanical and occurs during part 2 of the cycle (Fig. 2.4) when the bush (34/1786), on the connecting rod (34/1782), engages with a shoulder on the clutch lever. During its resetting action, the clutch lever re-engages with the pawl (34/1955) on the magnet. The clutch lever will remain locked in this position unless the magnet has been re-energized.

The third-brake-prong on the three pronged shaft is retained between two plast rings (34/1982 and 34/1986). The rings are free to rotate to reduce wear due to repeated braking on fixed sections and to distribute the wear evenly over the surfaces of the rings.

2.6 PUNCHING MECHANISM
(Fig. 2.4)

The punch mechanism is mounted on a pressure die cast chassis which is an integral part of the tape platform.

The three lobe mainshaft (34/1752) fits in the square hole in the connecting rod (34/1782) and when the main shaft rotates the pecker head (34/1842) will follow a square motion as shown by the dotted line (Fig. 2.4). The pecker head is maintained perpendicular to the top plate by means of

2-2

	Feed mechanism	Punch mechanism
1	Feed pecker head (34/1842) and media advance approx. 1.27 mm.	Interposers (34/2276) move forward if a hole in the respective channel is to be punched. The punch knives (34/1722) do not move.
2	Punch knives move upward and pierce media and retain position of same during retraction of feed pecker head.	Punch knives, held by the interposers (34/2276) and driven by the punch bridge (34/1812) pierce the media. The interposers are flexible and follow the bridge movement.
3	Feed pecker head (34/1842) moves backwards one pitch.	Interposers may retract under action of springs (34/2259). No movement of the punch knives.
4	Feed pecker head moves upwards and the peckers (34/1842-2) engage in the media feed holes.	Punch knives are withdrawn from the media mechanically by the extractor (34/1817). Interposers may retract.
5	Feed pecker head (34/1842) and media advance approx. 1.27 mm.	No movement of punch knives.

Table 1

the bearing (34/1855), U-bracket (34/1852), and spring (34/1845), which ensures that the pecker head follows the round section of the connecting rod (34/1782) during the cycle.

The four feed pecker pins are engaged in the feed holes in the media when the punch is in the stop- or rest condition.

When the main shaft begins to rotate the actions described in Table 1 concerning the feed and punch mechanisms occur.

2.7 SELECTOR UNIT
(Fig. 2.4)

The selector unit (34/2202) contains 8 electromagnets which are connected through a short cable form to a socket on the main frame and from the socket into the main cable and multiplug (34/2502).

When the electromagnets are energized, the interposers (34/2276) are pushed forwards approx. 1 mm and the ends interpose between the punch bridge (34/1812) and the lower ends of the punch knives.

2-3

When the interposer magnets are de-energized, the spring (34/2259) pulls them out of engagement from the punch knives.

The feed hole interposer can be manually retracted by the lever (34/2257) actuated by movement of the selector arm (Section 6.2). This prevents overpunching of pre-punched feed holes in cards.

2.8 TAPE LATCH
(Fig. 2.6)

When tape or card is inserted in the punch the feed peckers (34/1842-2) must be retracted by depression of the button (34/1588) which moves the arm (34/2116) downwards.

This engages the end of the arm (34/2116) with the angular guide (34/1852) and moves the pecker head (34/1842) out of engagement with the media against the spring (34/1845). The pecker head will move downwards because the hole in it is oblong and only the lower half is used as a bearing for the connecting rod (34/1782, Fig. 2.4), round section.

The downward movement of the arm (34/2116) also moves an arm (34/1548) in the tape latch and this lifts the three tape guide springs (34/1547) to clear the path for the media.

2.9 BACK-SPACING
(Fig. 2.5)

The back-space operation involves moving the media forward one pitch and backwards two pitches i.e. a resultant effective one step backwards.

Throughout the back-space cycle, all selector magnets MUST be de-energized and the back-space mechanism must mechanically render the feed hole punch knife inoperative.

The back-space mechanism comprises an electromagnet release unit, a back-space pecker (34/2272) and a back-space arm (34/2718).

The back-space pecker (34/2722) is pivoted on the back-space arm (34/2718) and a spring (34/2724) exerts a pull which will tend to move the pecker upwards and anti-clockwise in relation to the arm (34/2718).

This movement, will be restricted, in the normal non-activated condition, by a projection (34/2733) on the plate (34/2730).

This projection will be engaged by the hooked lower end of the back-space pecker (34/2722).

When the back-space magnet is energized, its armature, via the spring (34/2734), will push the hooked end of the pecker clear of the projection on the plate (34/2730) and due to the action of the

2-4

	Pecker head	Back-space pecker
1	Pecker head (34/1842) advances half a pitch.	Pecker fork (34/2722) is below platform level.
2	Pecker head moves down disengaging from media.	Pecker fork moves up and engages in media.
3	Pecker head moves back one pitch.	Pecker fork carries media two pitches backwards.
4	Pecker head moves upwards and engages in media.	Pecker fork moves down disengaging from media. Hooked end catches projection until next release.
5	Pecker head advances half a pitch.	

Table 2

spring (34/2724) the pecker will move to rest against the pecker head (34/1842) and will subsequently follow its movement forwards and backwards. The back-space pecker will move vertically up and down according to the movement of the rocker arm (34/1792) such that when the pecker head goes down the back-space pecker will go up and vice versa.

The fulcrum point of the back-space pecker is the pivot of the back-space arm (34/2718). The "hump" on the back-space pecker facing the pecker head (34/1842), is positioned midway between the pivot on the pecker arm (34/2722) and the pecker fork. Thus the movement of the pecker fork in relation to the movement of the pecker head will be twice as great.

The actions during a back-space operation are listed in Table 2.

If the back-space release magnet has not been de-energized by the time the back-space pecker returns to its rest position, the spring (34/2734) will be pushed aside by the pecker during motion 4 (Fig. 2.4) and a further back-space action will not be initiated until the magnet has been de-energized and then energized again, i.e.

2-5

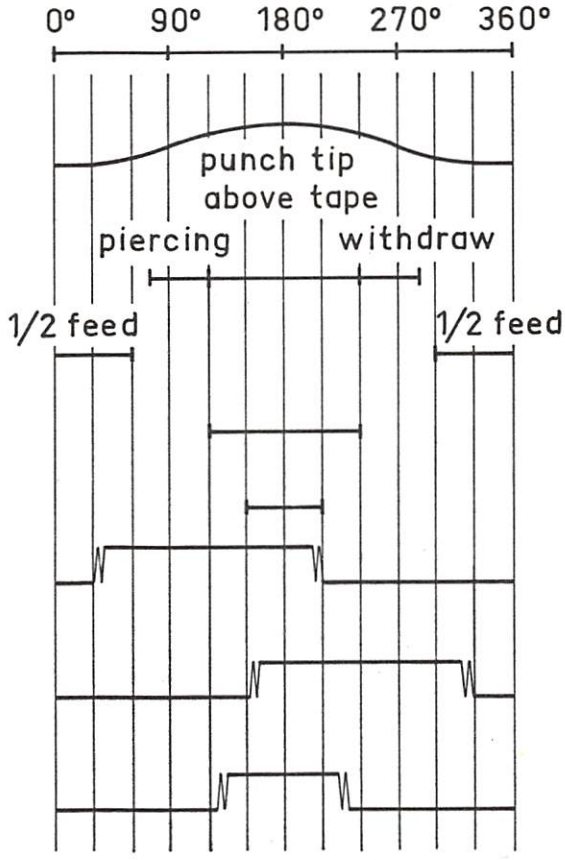
only one back-space action will be initiated irrespective of the maximum pulse applied to the magnet. The feed hole punch interposer must be disengaged during the back-space action and this is mechanically achieved as follows:

The forward movement of the feed hole interposer is controlled by a spring loaded lever (34/2752) which due to the spring tends to turn clockwise disengaging the interposer. In its normal non-operative position, the back-space lever will retain the lever (34/2752) against the spring in an anti-clockwise position thus engaging the interposer between the punch bridge (34/1812) and the lower end of the punch knife. When the back-space action is initiated, the back-space lever will release the lever (34/2752) and the interposer will disengage from the bridge and punch knife.

NOTE: To initiate a back-space operation both the clutch control and back-space magnets must be energized simultaneously.

2-6

MECHANICAL OPERATION



Contact closed — Contact open

Timing contacts I and II are independently adjustable through 360^{o}

Standard setting: Timing contact I closes at $40^{o} \pm 10^{o}$
Timing contact II closes at $160^{o} \pm 10^{o}$
On/off ratio = 0.8 - 1.0
(approx. 170^{o} closed and 190^{o} open)

Fig. 2.1 Timing diagram

2-7

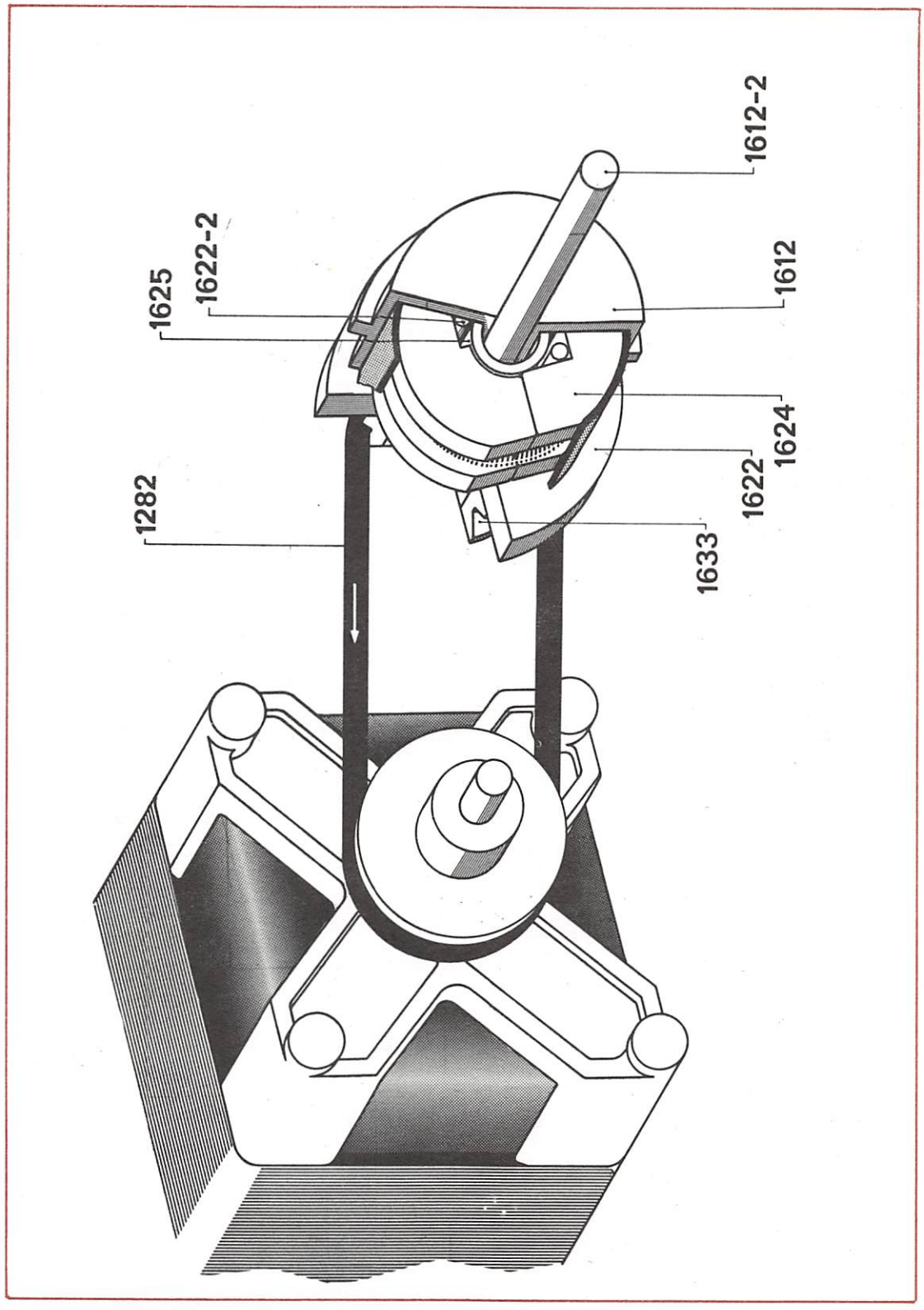


Fig. 2. 2 Centrifugal clutch

2-8

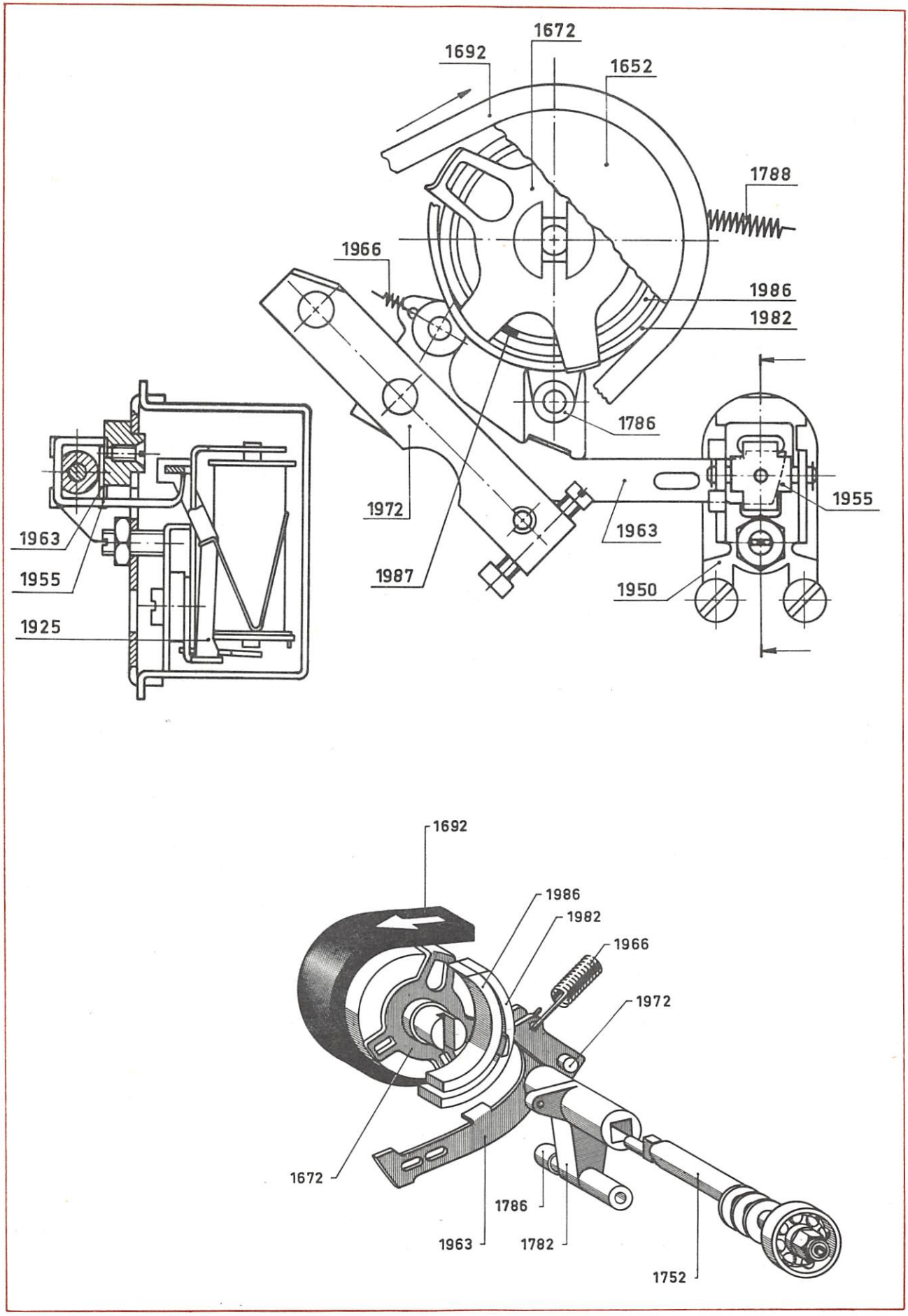


Fig. 2.3 Punch control clutch

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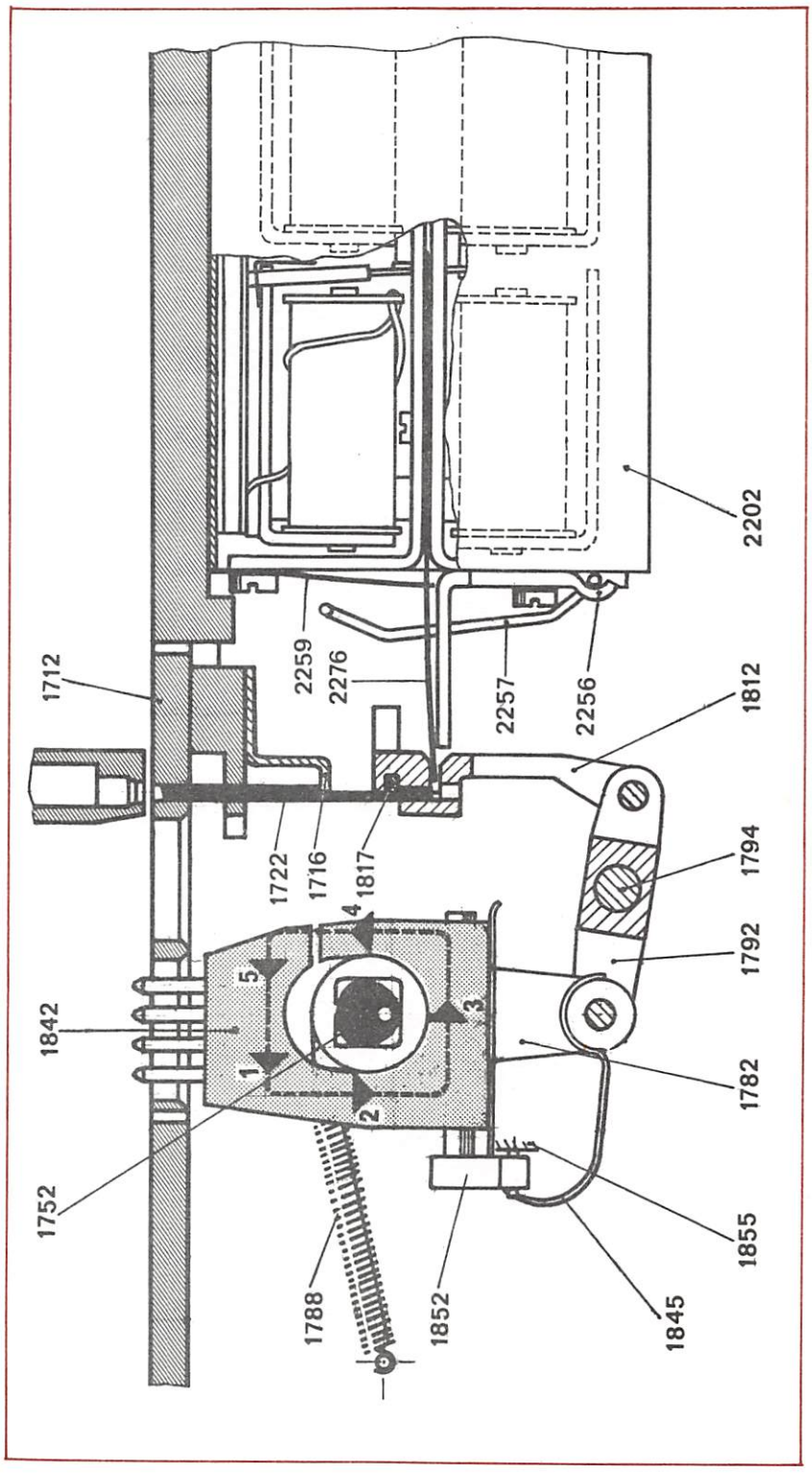

Fig. 2. 4 Punching mechanism

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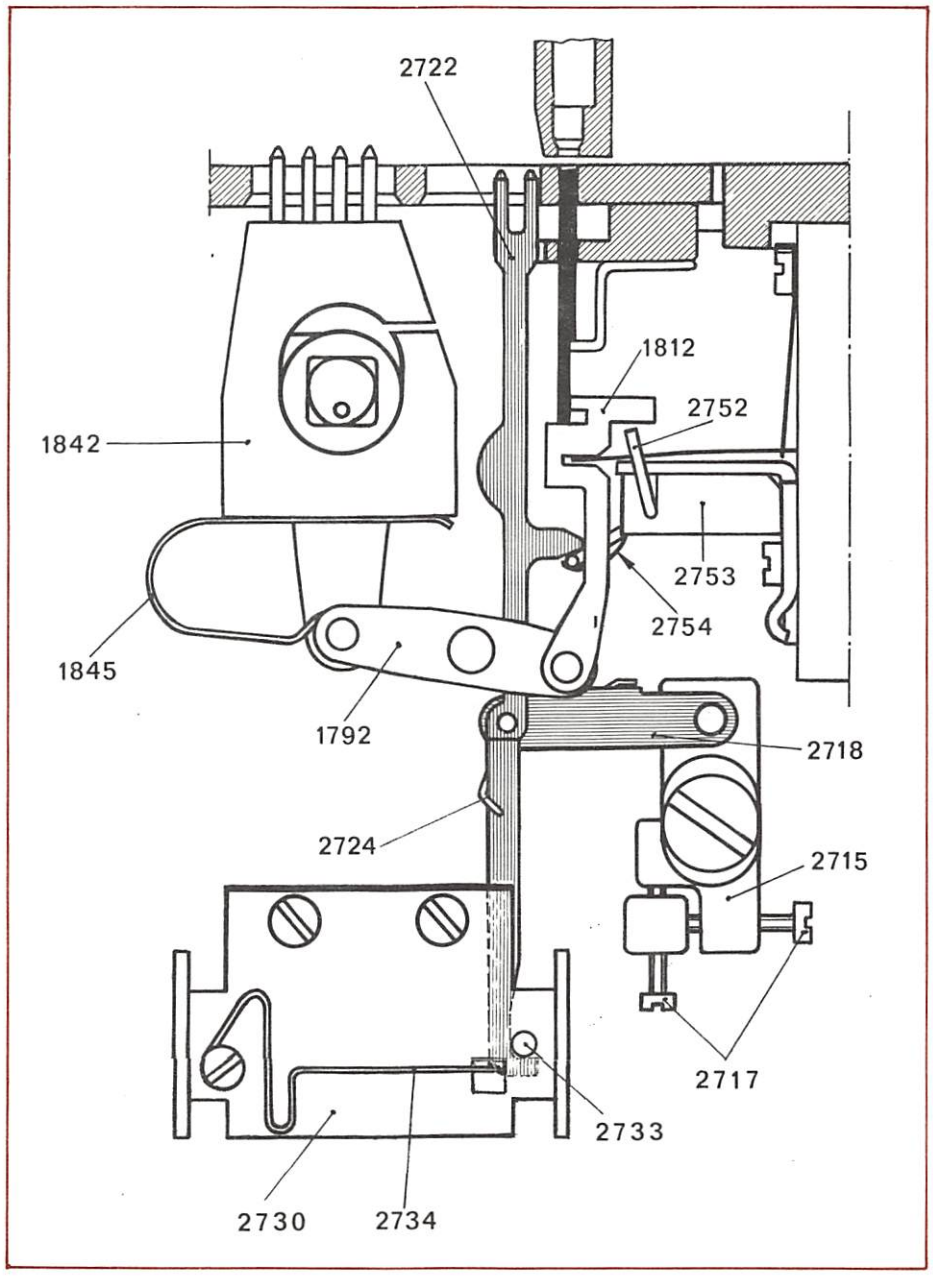


Fig. 2. 5 Back-space arrangement

2-11

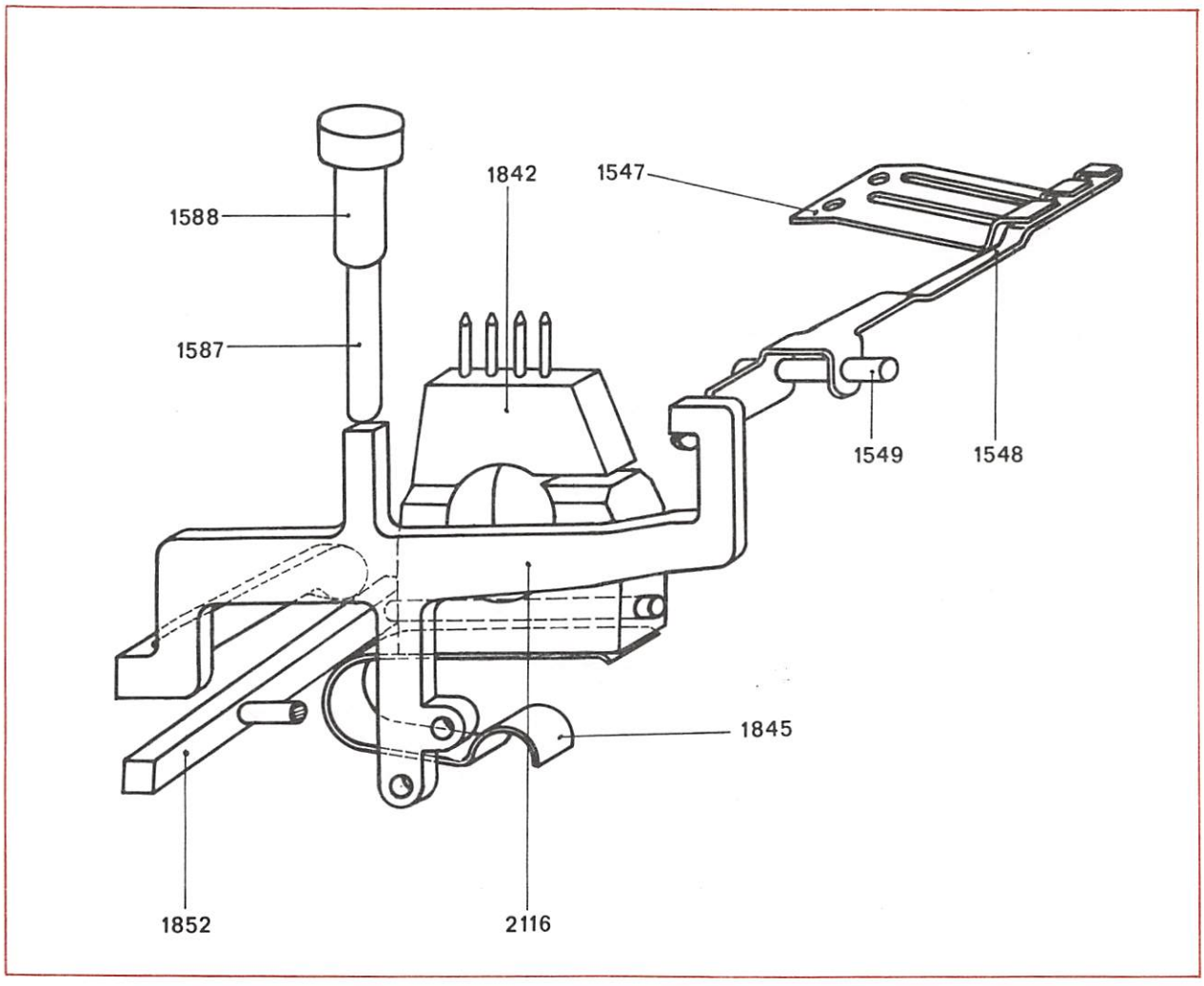


Fig. 2. 6 Tape latch

2-12

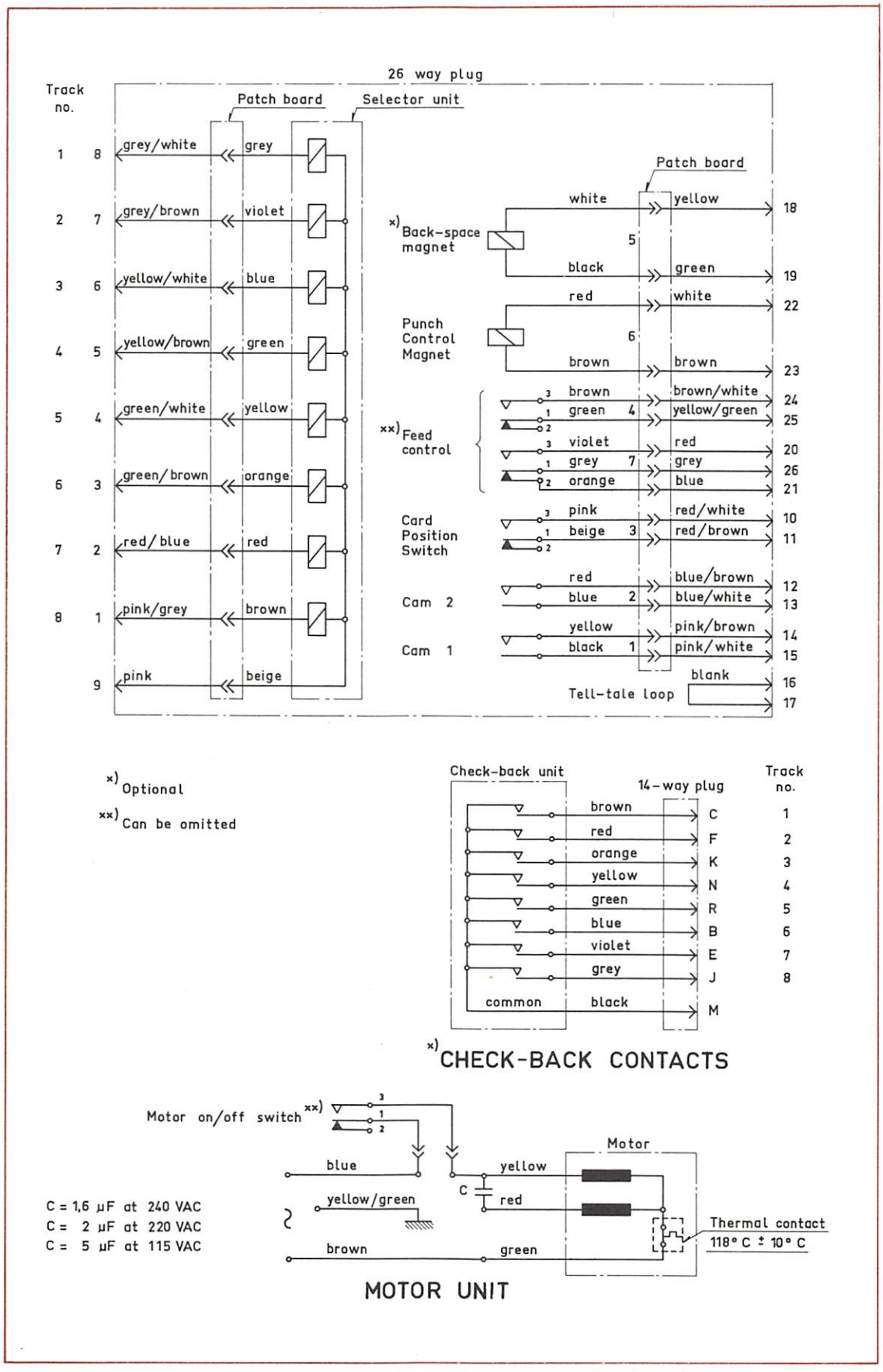


Fig. 2.7 Circuit diagram

2-13

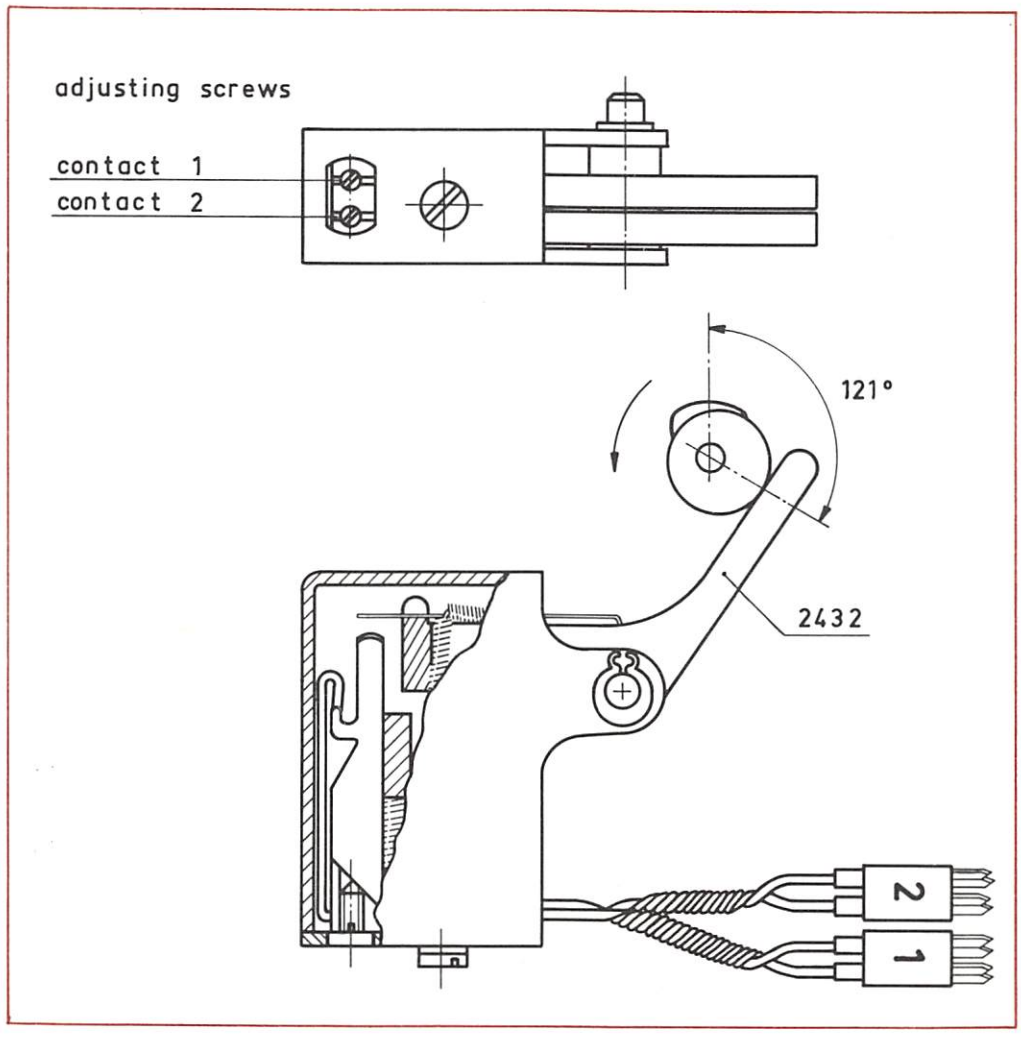


Fig. 2. 8 Timing contacts

2-14

3. INTERCONNECTION OF ELECTRONIC AND MECHANICAL EQUIPMENT

3.1 INTRODUCTION

The control of the input to and output from an electromechanical device usually involves mechanically operated contacts and electromagnets. These can be internal and/or external.

Correct functioning and reliable life requires several important factors to be taken into account before interconnection is carried out e.g. the load range and operate time (where electromagnets are involved).

3.2 CONTACTS

With the model 34 punch, a principal requirement is that the longest possible life shall be obtained from the timing contacts and check-back contacts - where fitted.

Welding - or fusion - of the contacts can occur if the specified figures for I_{max} are exceeded even for very short periods.

Similarly, "glow discharge" or arcing with subsequent heavy contact erosion can occur if a voltage in excess of V_{max} is applied.

Resistive loads are therefore recommended to ensure longest possible life of contacts and the lowest possible voltages and currents conducive with the circuitry used should be applied i.e. 1 - 10 V and 1 - 10 mA which are suitable for use with transistor and associated devices.

3.3 MAGNETS

Fig. 3.1 shows the behaviour of an electromagnet "controlled" by a contact. The typical variations in voltage V_k and current I_m - through the contact and coil respectively - are shown as functions of the contact "make" and "break" time together with the armature movement as a function of time.

It can be seen that the amplitude of the voltage V_k (back e.m.f.) at contact "break" reaches a level requiring protection to be given to the contacts. The high peak voltage reached is a resultant of the prolonged period of decline of the current due to the self-inductance of the electromagnet.

This back e.m.f. can be reduced by the connection of a parallel impedance across the coil of the electromagnet.

3-1

The magnet release time t_R is relatively short but it is dependant upon the type of back e.m.f. suppression circuit used. The operate time t_O under normal conditions is independant of the circuit used, but by increasing the operate current the time t_O can be reduced. Such a permanent increase in current is not always permissable because heating problems may arise.

3.4 CONTACT PROTECTION

The problem of contact protection can best be solved by a detailed knowledge of the contact specifications, especially the three quantities $I_{max.}$, $V_{max.}$, and $P_{max.}$.

If, for example, it is desired to control magnets by transistor amplifiers, the transistors are in fact the contacts which should be protected. In this case the voltage peak V_{Kpeak} which appears often affects reliable transistor functioning, because it will not always be possible merely to limit this back e.m.f. without the risk of introducing an unacceptable

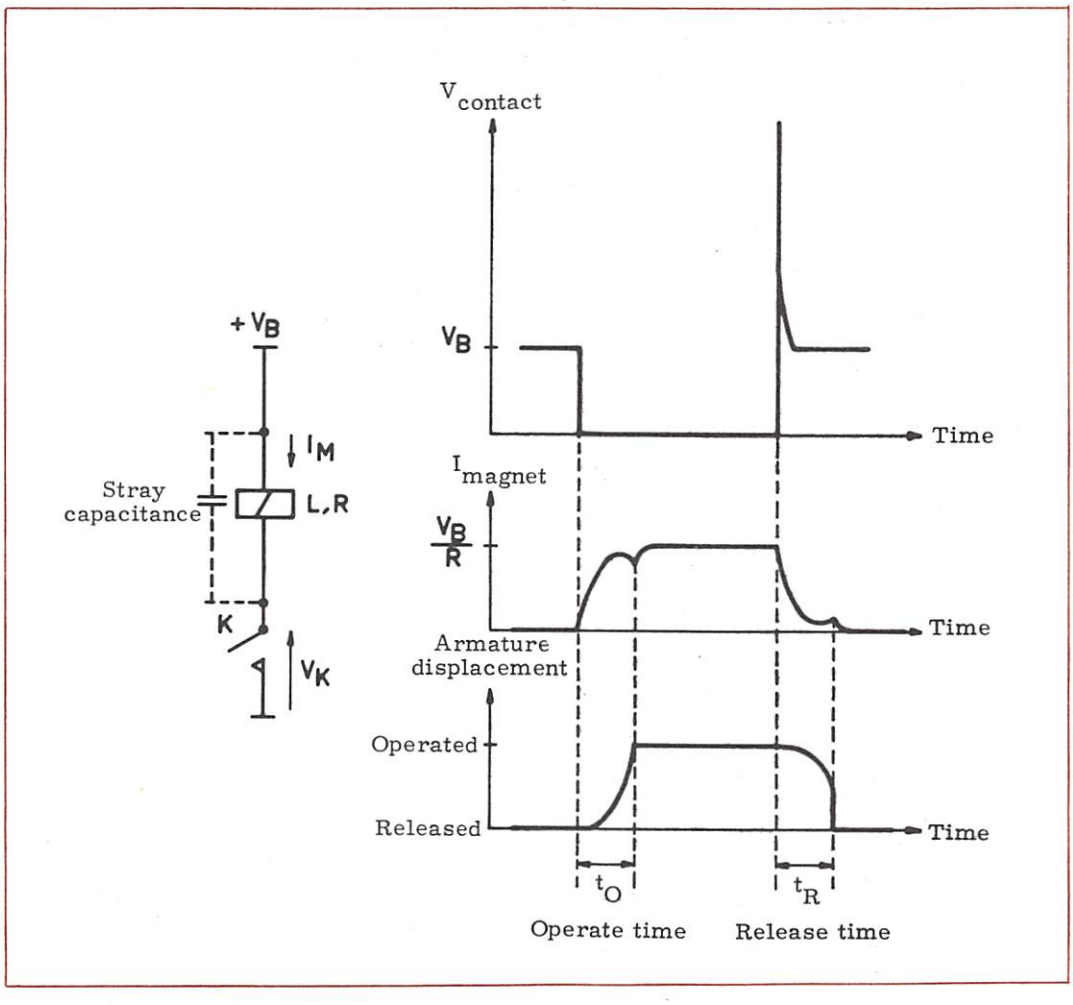


Fig. 3.1 Magnet controlled by contact

3-2

increase in magnet release time t_R. An extended release time can, in the model 34 punch, result in double stepping.

From measurements, carried out under various conditions, on the electromagnets in the selector box in the model 34 punch, problems associated with contact protection in relation to the measurements taken are as follows:

In the RC circuit (Fig. 3.2), where R equals approx. the magnet resistance R_M and C is approx. 220 nF, a release time t_{Rmin} of approx. 3.5 ms is achieved, with a peak voltage V_{Kpeak} (back e.m.f.) of approx. 95 V. The latter decreases with increase of C.

With an RD (resistor/diode) circuit, the release times are longer and with R = 680 Ω, release time t_R is 12 ms and V_{Kpeak} is 95 V.

A V_ZD (zener diode/diode) circuit has a release time t_R of 6 ms when V_Z is 30 V, V_{Kpeak} being limited to 60 V.

From Fig. 3.3, an RC + V_ZD gives t_R = 4.5 ms with V_{Kpeak} limited to 60 V.

Comparison of the four circuits shows that the RC protection is most suitable where short release times are required and for further illustration Figs. 3.4 and 3.5 can be considered:

From Fig. 3.4 it will be seen, that t_R and V_{Kpeak} are only slightly affected by variations of R.

Fig. 3.5 shows, that whereas t_R is only slightly affected by a variation of the battery voltage V_B, V_{Kpeak} increases at nearly twice the rate of V_B.

By making the values of R equal to R_M the switched current should be nearly equal to the static magnet current and the voltage step at the time the contact breaks will equal the supply voltage.

CONCLUSION: There are many forms of circuit and a diode, sometimes in series with a resistor, is a cheap and simple form but when applied to the model 34 punch is unsatisfactory because it delays the release time of the magnet considerably.

The RC circuit is to be recommended for long and trouble free service and reasonable magnet dynamics.

3-3

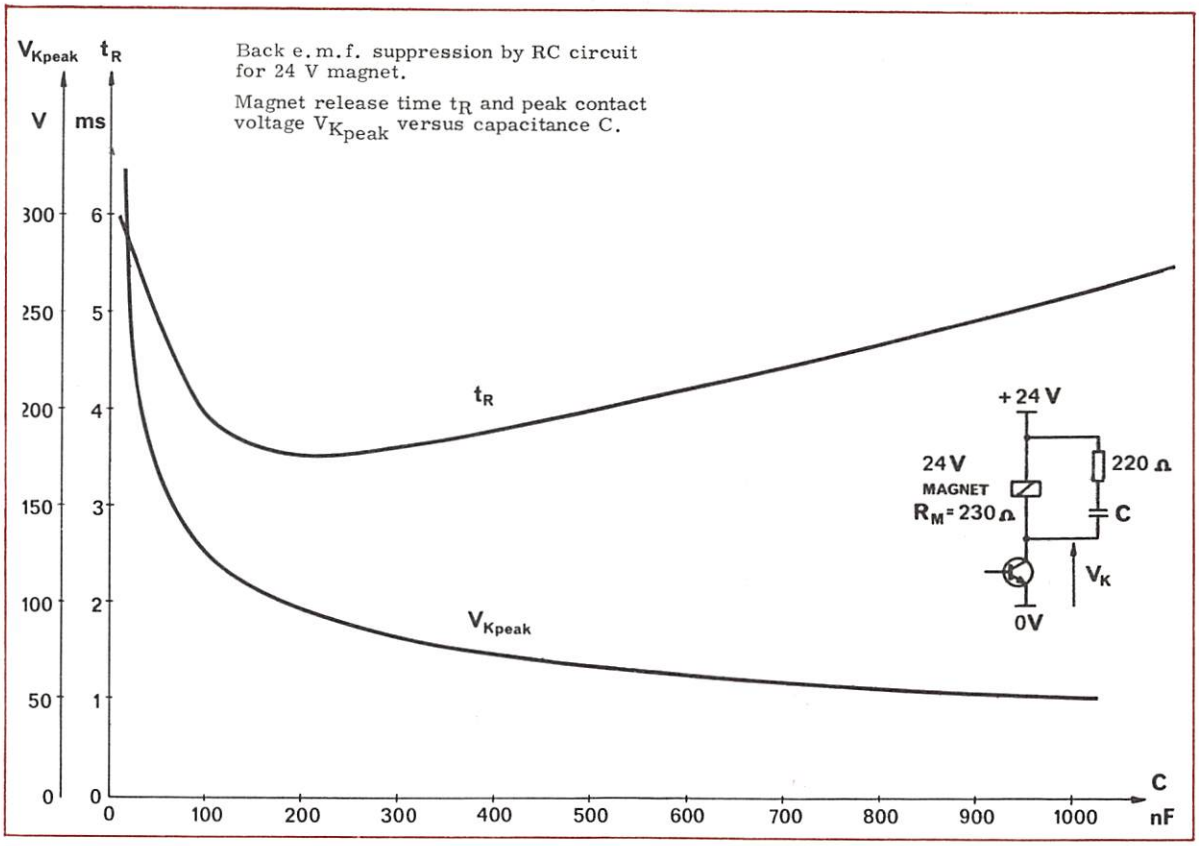


Fig. 3.2 RC protection of contact, 24 V magnet

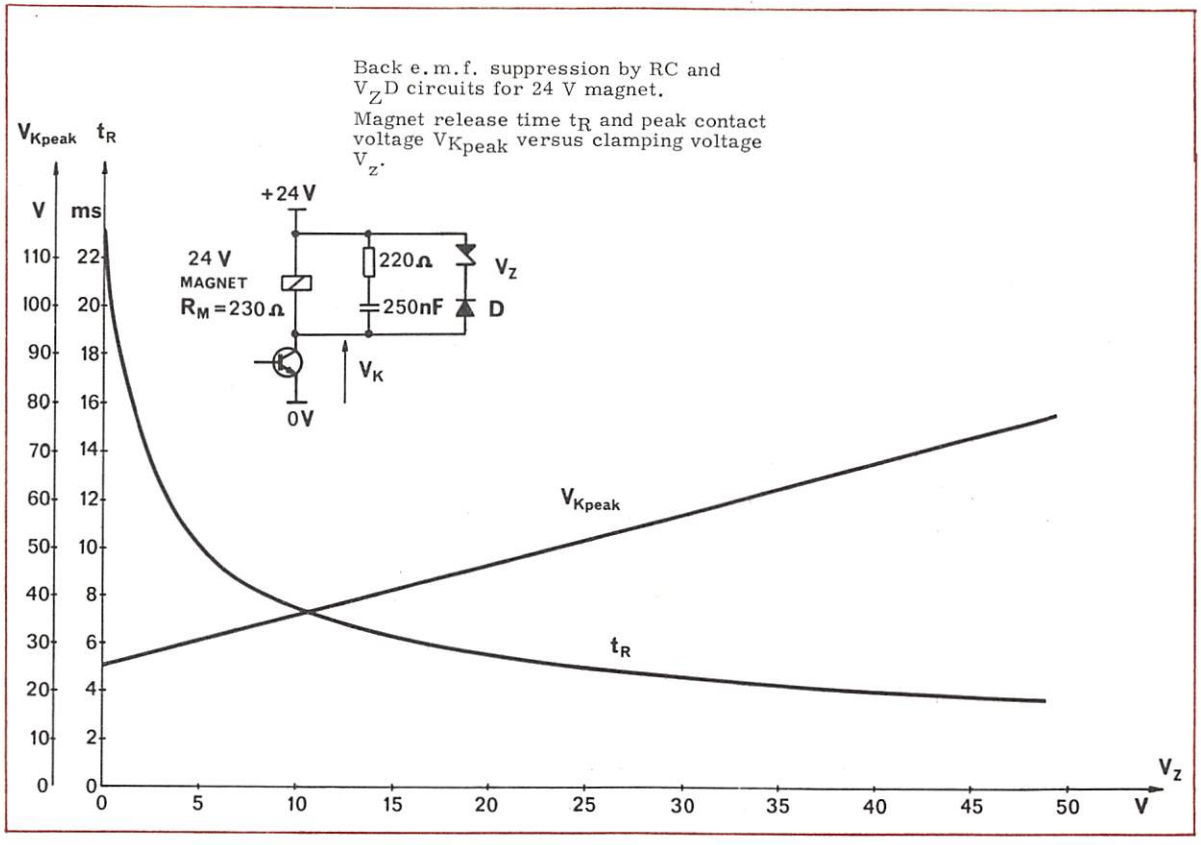


Fig. 3.3 RC and V_ZD protection of contact, 24 V magnet

3-4

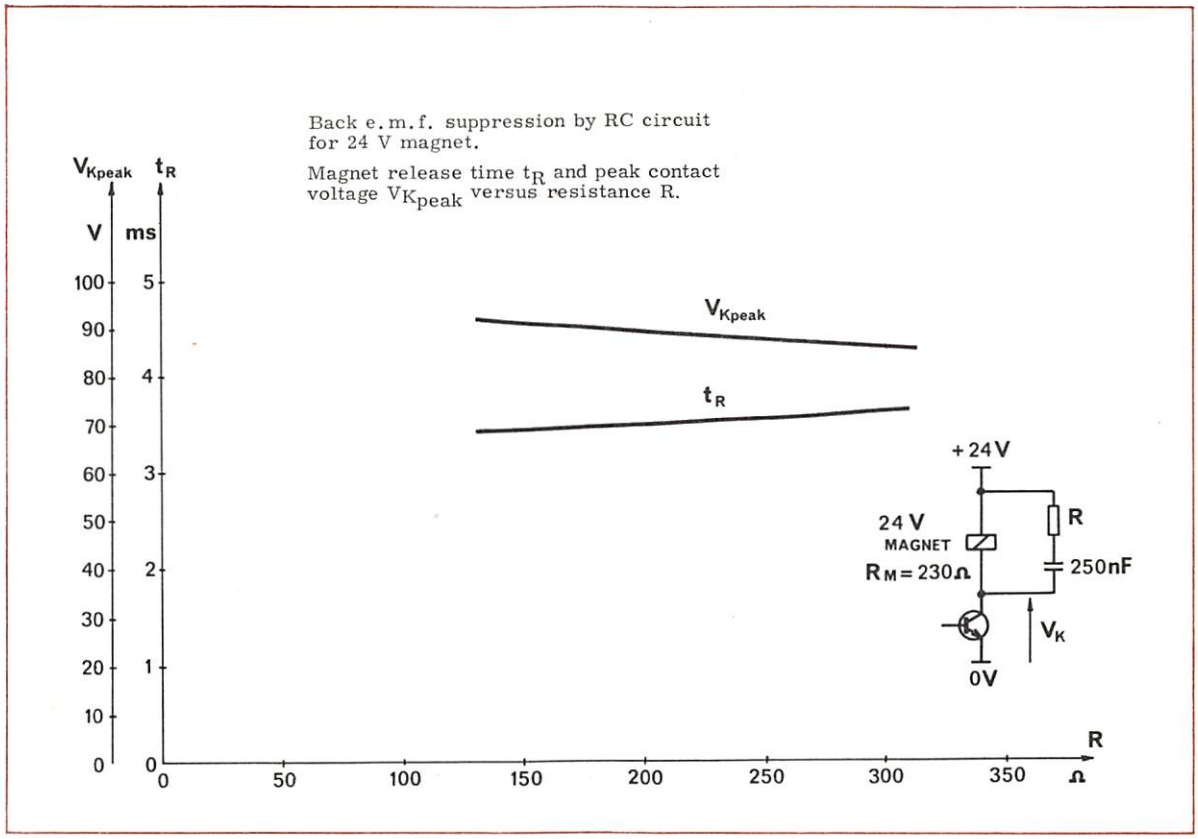


Fig. 3.4 RC protection of contact 24 V magnet

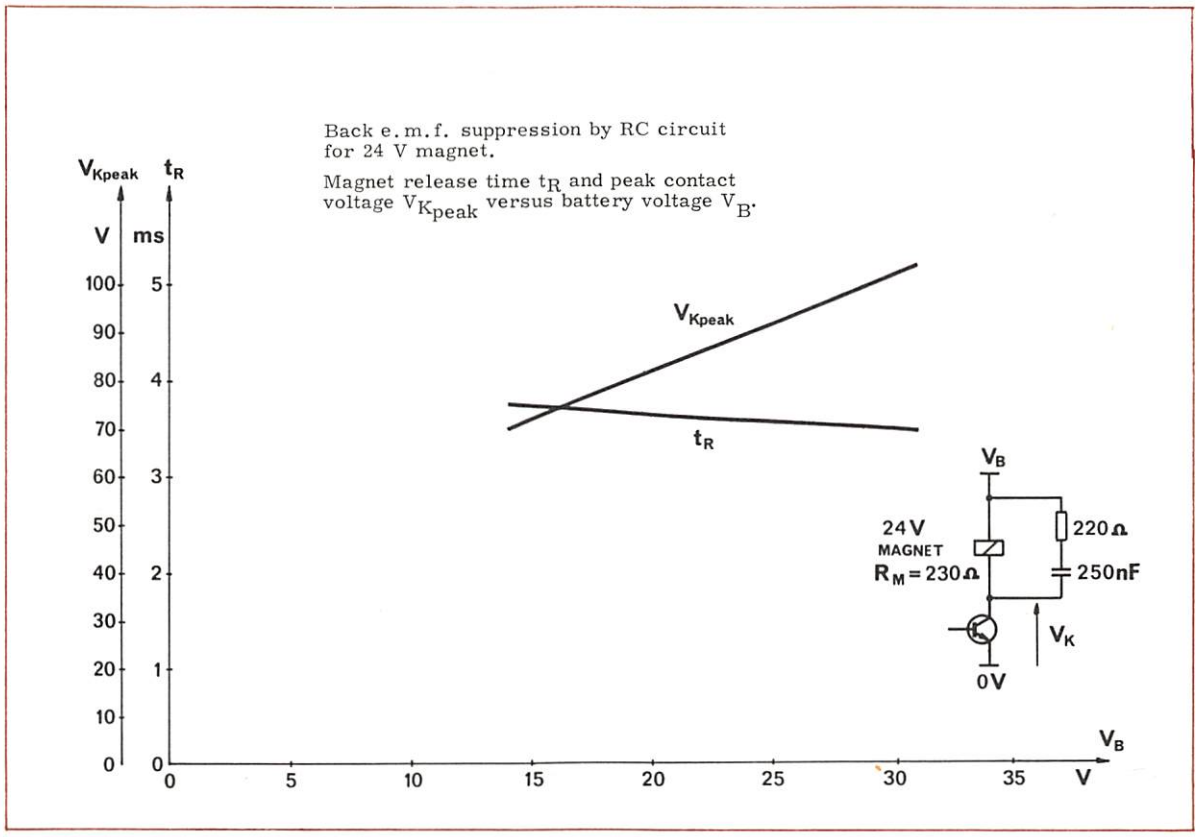


Fig. 3.5 RC protection of contact 24 V magnet

3-5

4. TIMING

4.1 TIMING OF CLUTCH MAGNET

The clutch will be released when the clutch magnet is energized and the punch will continue to operate until it is re-engaged mechanically.

To ensure correct operation, certain conditions must be observed:

OPERATE TIME

When a voltage is applied to energise the clutch, a period of time will elapse before the mechanical cycle commences. This is due to the current build up in the coil not being instantaneous and its relationship with the movement of the armature before it has moved sufficient distance to release the clutch lever. This total time is from 3 to 5 ms.

When the punch is operating in the step-by-step mode (asynchronously), the 3 to 5 ms must be added to the continuous (free running) time and this effectively results in a "slowing down" of the punch.

With use of the timing contacts in the punch, a new clutch release can be initiated before the punch has completed its previous cycle. This must be carried out with consideration of the logic conditions i.e. "New Character Available", "Character Correctly Punched", etc.

RELEASE TIME

When the clutch magnet is de-energized, a certain time will elapse before the armature reaches the position where it can catch the clutch lever, thus preventing initiation of a new cycle. The release time is 4 to 6 ms, provided that suitable spark quenches are fitted.

As mechanical arresting of the clutch lever takes place when the main shaft has turned 200^{o} from rest position, the clutch magnet armature must be released (completed its movement after de-energizing) before this point, to prevent two cycles being performed when one is ordered.

At 70 characters per second, the cycle time is

$$\frac{1000}{70} \text{ ms} = \text{approx. } 14 \text{ ms.}$$

Thus, 200^{o} is reached approx. 8 ms after start. As the release time for the magnet is approx. 6 ms, this should be de-energized before 2 ms or 51^{o} after cycle start to ensure proper operation.

4-1

4.2 TIMING OF SELECTOR MAGNETS

The selector unit contains eight selector magnets, one for each selector. When a selector magnet is energized, the associated selector is pushed forward to engage the corresponding punch pin. Certain conditions must be taken into consideration to ensure proper operation of the selector magnets:

OPERATE TIME

When a selector magnet is energized, a certain time will elapse before the selector is pushed far enough forward to engage the punch pin. This time is 3 to 5 ms which means that the selector information must be available 3 to 5 ms before the information is needed on the punch pins. It is therefore recommended, that drive pulse is applied to the selector magnets at the same time as the step pulse is applied.

RELEASE TIME

When a selector magnet is de-energized, a certain time will elapse before the selector has returned to its neutral position. This time is 4 to 6 ms. Two conditions determine the limits between which the selector magnets must be de-energized to ensure correct operation:

a) The selector information on the punch pins is required until 120°; consequently, the drive pulse must be maintained long enough to ensure that the fastest selector is still in engagement with the punch pin at this time. It is recommended not to remove the drive pulse before 100°.

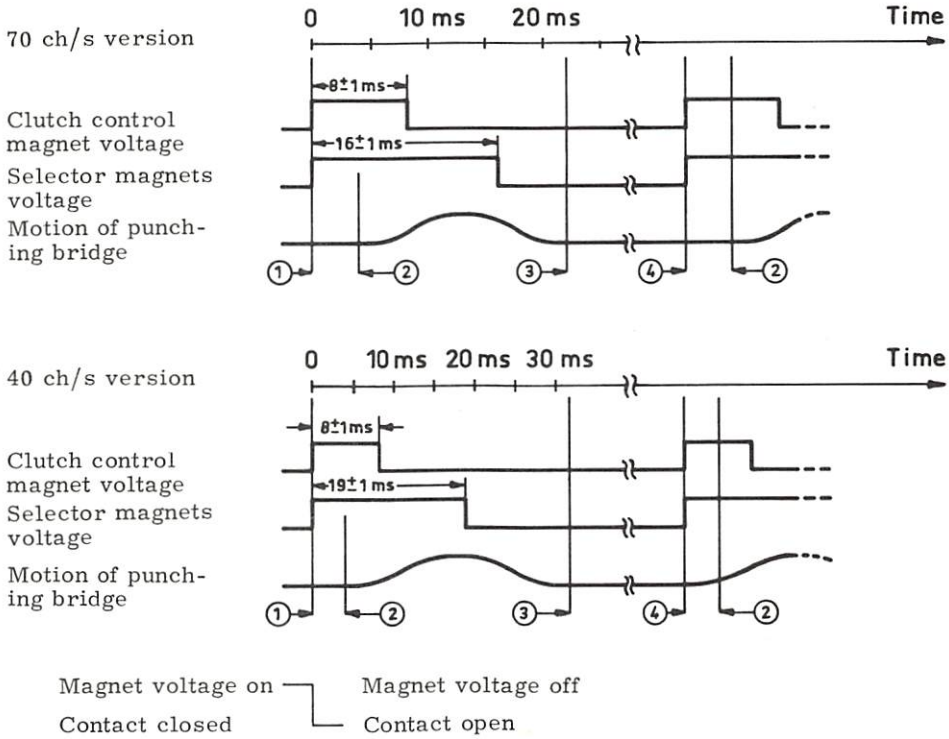
b) The selector coils must be de-energized early enough in the cycle to ensure that the slowest retracting selector is completely disengaged from the punch bridge before the next piercing action occurs. As this commences at approx. 60° (2.3 ms at 70 ch/s) after the start of the mechanical cycle and as the release time of the magnets is approx. 6 ms, the magnets must be de-energized not later than 240° after the start of the cycle.

CONCLUSION: The selector and clutch magnets must be energized simultaneously and the selector magnets must be de-energized between 100° and 240°. The clutch magnet must be de-energized before 50°.

4-2

Step-by-step operation:

Examples showing timing of the pulses for the clutch control magnet and the selector magnets. The timing contacts are not used.



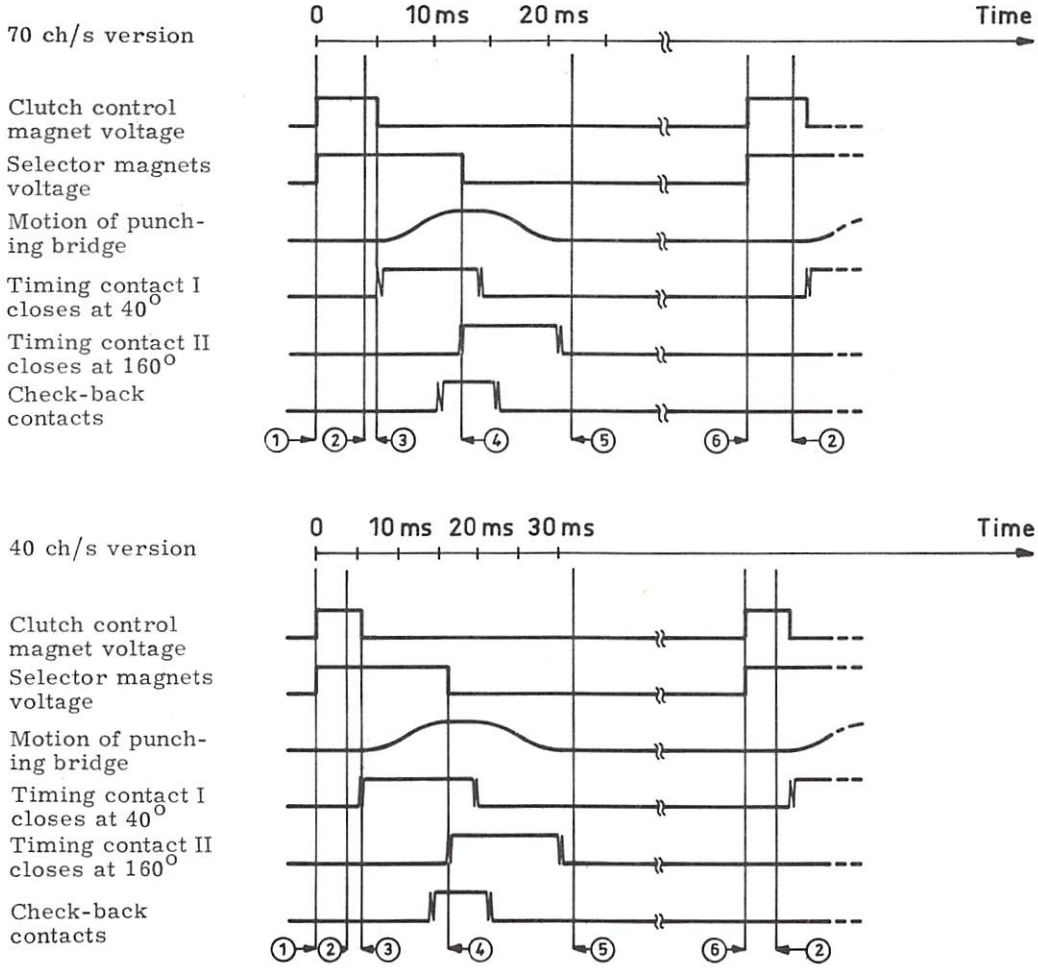
①: First character start
②: The punch starts running
③: The punch stops
④:Second character start

Fig. 4. 1 Timing diagram

4-3

Step-by-step operation using the timing contacts:

Examples showing timing of the pulses for the clutch control magnet and the selector magnets.



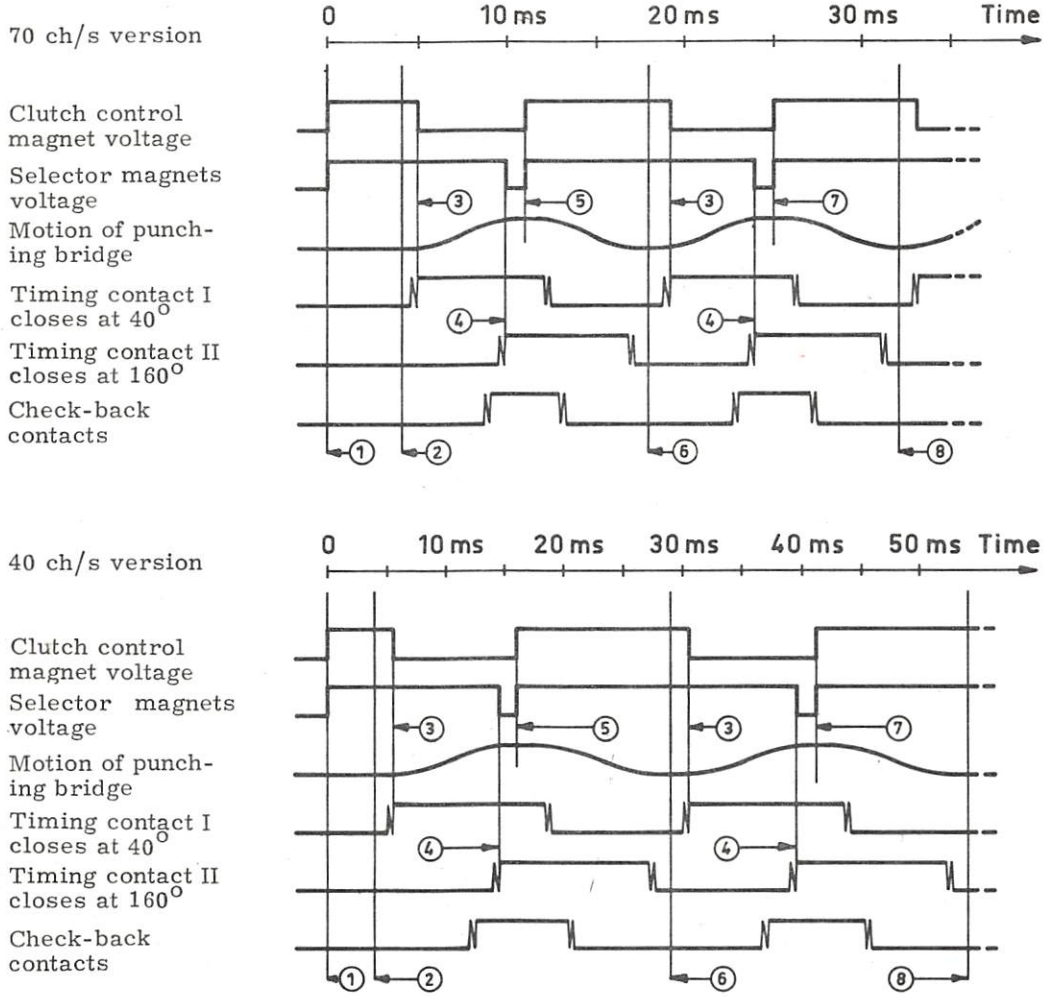
①: First character start
②: The perforator starts running
③: Clutch control magnet voltage off
④: Selector magnets voltage off
⑤: The perforator stops
⑥: Second character start

Fig. 4. 2 Timing diagram

4-4

Continuous operation:

Examples showing timing of the pulses for the clutch control magnet and the selector magnets.



①: First character start
②: The perforator starts running
③: Clutch control magnet voltage off
④: Selector magnets voltage off
⑤: Second character start
⑥: First cycle completed
⑦: Third character start
⑧: Second cycle completed

Fig. 4. 3 Timing diagram

4-5

4.3 INPUT-OUTPUT SIGNALS

Important facts concerning control of the model 34 punch are listed below. The figures shown in brackets refer to the slow speed (40 ch/s) version.

4.3.1 Clutch Control Magnet

The duration of the drive pulse applied to the clutch magnet coil should be 8 ± 1 ms, or alternatively the applied voltage should be removed not later than 50° (115°) after commencement of the mechanical cycle.

Recommended values: 8 ms (8 ms), 40° (40°).

4.3.2 Selector Magnets

N.B. The voltage applied to the selector and clutch magnet coils should be applied simultaneously.

The duration of the selector magnet drive pulse should be 16 ± 1 ms (19 ms), or alternatively the applied voltage should be removed not later than 240° (275°).

Recommended values: 16 ms (19 ms), 160° (160°).

4.3.3 Back-space Magnet

N.B. Voltage must be applied simultaneously to the back-space and clutch magnet coils to obtain a back-space operation.

The duration of the drive pulses should be as for the clutch magnet.

The selector magnet coils MUST be de-energized during the back-space operation.

4.3.4 Controlling the Magnets

To ensure short release times the magnet coils should be controlled by transistors protected by a suitable circuit. If necessary a voltage limiter, (diode/zener diode) circuit can be used.

Recommended circuit for 24 V magnets:

RC circuit

R = 220 Ω

C = 220 nF

4.3.5 Skip Function

The selector magnets should be de-energized during skip operation.

4.3.6 Timing Contacts

It is recommended that the timing contacts are used to provide control signals from the mechanical operation of the punch.

The two timing cams are adjustable through 360° with a normal on/off ratio of 0.9 (170° closed, 190° open).

Standard setting: Timing contact I closes at 40° ± 10°.

Timing contact II closes at 160° ± 10°.

4-6

4.3.7 Check-back Contacts

The model 34 punch can be fitted with an optional check-back contact unit containing a switch for each code channel. For a code hole punched the respective contact "makes" at approx. 135° and "breaks" at approx. 225°. Where no code hole is punched the contact remains "open".

4.3.8 Timing Contacts and Check-back Contacts

The use of resistive loads with low current and voltage are recommended. For example: 1 - 10 ms and 1 - 10 V which are suitable with transistor circuits.

Contact bounce should be eliminated with suitable low-pass filters before the signals are applied to transistor circuits.

Timing contacts: Bounce max. 0.5 ms.

Check-back contacts: Bounce max. 2.0 ms should be catered for.

4-7

5. INTERFACE

5.1 INTRODUCTION

Typical circuits that can be used for interfacing between systems and model 34 punch are described in the following sections.

Fig. 5.1 shows an arbitrary system requirement.

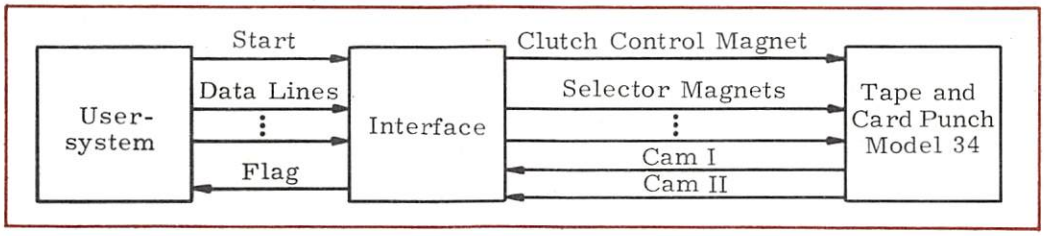


Fig. 5.1

The "Start" and "Data lines" indicate to the punch when and what to punch respectively. The "Flag" line level changes when the punch has received a start command and thus indicates that the punch is "busy". The magnet coils will be energized at the correct times and the signals from cam I and II contacts will indicate to the interface where the punch is in its mechanical cycle during operation.

5.2 ELECTRONIC INTERFACE CIRCUITS

In Fig. 5.2 a circuit is shown for two magnet amplifiers for operation at 24 V. The inputs can be controlled by mechanical and/or electronic switches (RTL, DTL, and TTL circuits). The magnet coils will be energized when the inputs are open circuit or above + 2 V and will be de-energized when the inputs are short-circuited to 0 V or less than + 0.5 V.

The back emf from each coil is suppressed with an RC circuit and a voltage overswing limiter (zener diode/diode) circuit. The latter provides a limitation to the voltage of 48 V. A similar result can be achieved by using a common battery supply of + 46 V instead of the zener diode.

5-1

Fig. 5.3 shows a circuit recommended for bounce suppression of mechanical switch contacts. It comprises a low-pass filter, Schmitt trigger and amplifier. A closure of the mechanical contact causes the output level to change from 0 V to +5 V after a delay of approx. 7 ms. When the contacts open the output level changes from +5 V to 0 V after a delay of approx. 5 ms. The delay periods can be altered by changing the value of capacitance in the low-pass filter.

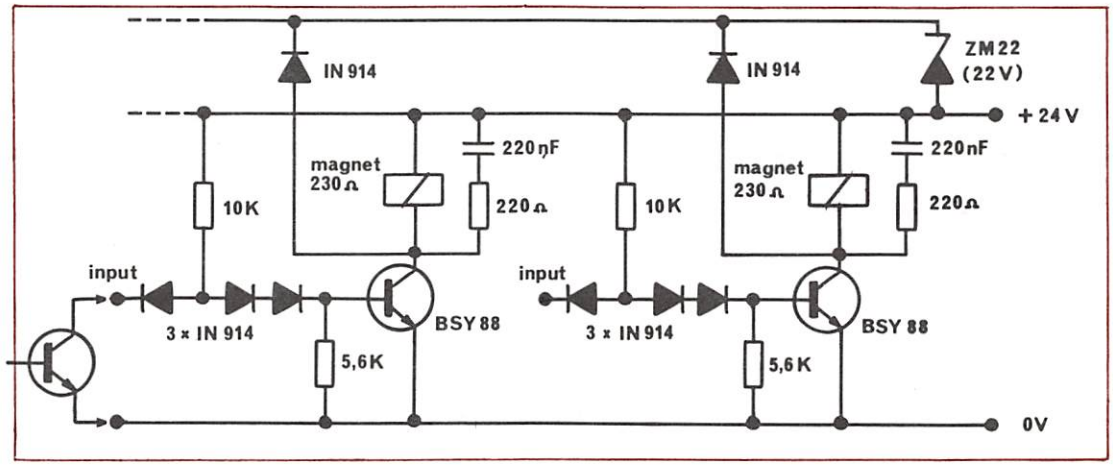


Fig. 5.2 Magnet amplifiers

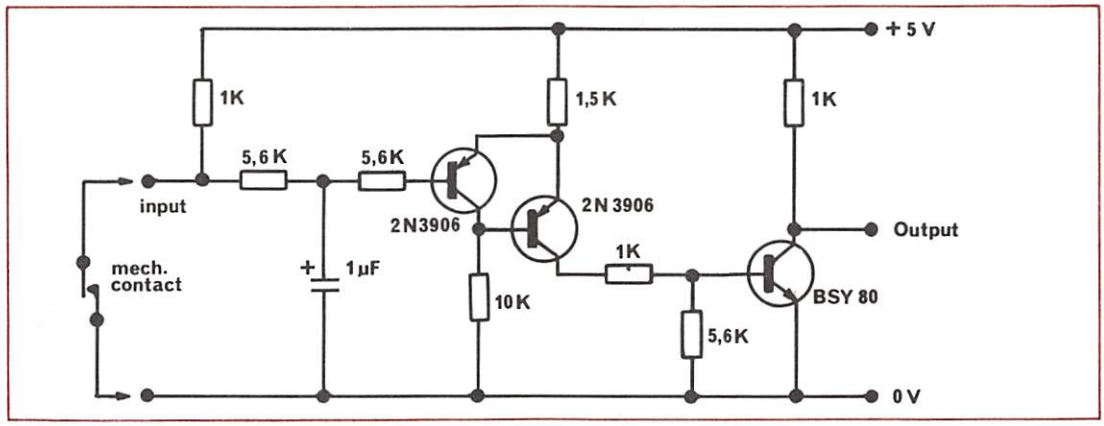


Fig. 5.3 Pulse shaper

5-2

5.3 INTERFACE EXAMPLES

Fig. 5.4 shows an interface circuit using TTL logic. Inputs can be controlled by mechanical and/or electronic switches (RTL, DTL and TTL).

The circuit consists of a one character register store which via transistors controls the selector magnets.

The clutch control flip-flop controls, via a transistor, the clutch magnet energisation.

The selector flip-flop is used to gate the information from the register to the selector magnets at the correct time and is also used to generate the "Flag" signal.

5.3.1 Circuit Operation

The operation of the interface circuit is as follows:

a) "Flag" at logical "1" - indicates that the punch is not busy.

b) A logical "1" is applied to the "Start Punch" line. The clutch control F/F will be set and the clutch control magnet energized.

The selector F/F will be set and the information on the "Data Lines" will be transferred into the register.

Logical "1" for hole, logical "0" for no hole.

The register contents will cause the selector magnets to be energized.

The "Flag" signal will change from "1" to "0" indicating that the data information has been stored in the register and that the input information is no longer required. The "Flag" signal will remain at "0" until the completion of the cycle. The punch is now "busy" and will commence its mechanical cycle and no further start pulse will be accepted or acknowledged.

c) After the main shaft in the punch has rotated through 40° the cam I timing contact will signal to the clutch control F/F, which will be reset and cause the clutch magnet to be de-energized. The punch cycle will continue.

5-3

d) When the punch main shaft has rotated through 160° the cam II timing contact 2 will signal to the selector F/F which will reset and cause the selector magnets to be de-energized.

The "Flag" signal will also change from "0" to "1" and thus indicate that the punch operation is complete and ready for new input.

e) If no new input is supplied the punch will wait with the mechanical cycle completed.

"Arrest Punch"

If this is at "0" the punch will not start on command of a "Start" level. If not required the line should be left open-circuit.

"Cam Signal", "A", "B", "C", "Back-space Enable" and "Back-space Response"

These connections are for use in conjunction with back-space and check-back functions.

All should be left open-circuited if not used except for "B" and "C" which should be linked together.

"Skip Remote Control"

The punch will "run-out" tape whilst this is at "0".

5.3.2 Back-space Function

Fig. 5.5 shows the additional circuitry and connections required to add back-space control to the circuit of Fig. 5.4.

The "Back-space Enable", "Back-space Response", "A", "B", "Flag" and "Cam Signal" connections must be made to the circuit (Fig. 5.4) and that of circuit (Fig. 5.5).

Line "B" must be left open-circuit.

A "1" on the back-space remote control both sets the back-space F/F and the clutch control F/F. The back-space and clutch magnet coils will be energized via transistors and a mechanical back-space operation will be initiated. Timing contact 2 will operate at 160° and will re-set the back-space F/F and clutch F/F.

The "Flag" signal will indicate when the punch is ready for a new command.

5-4

5.3.3 Check-back Function

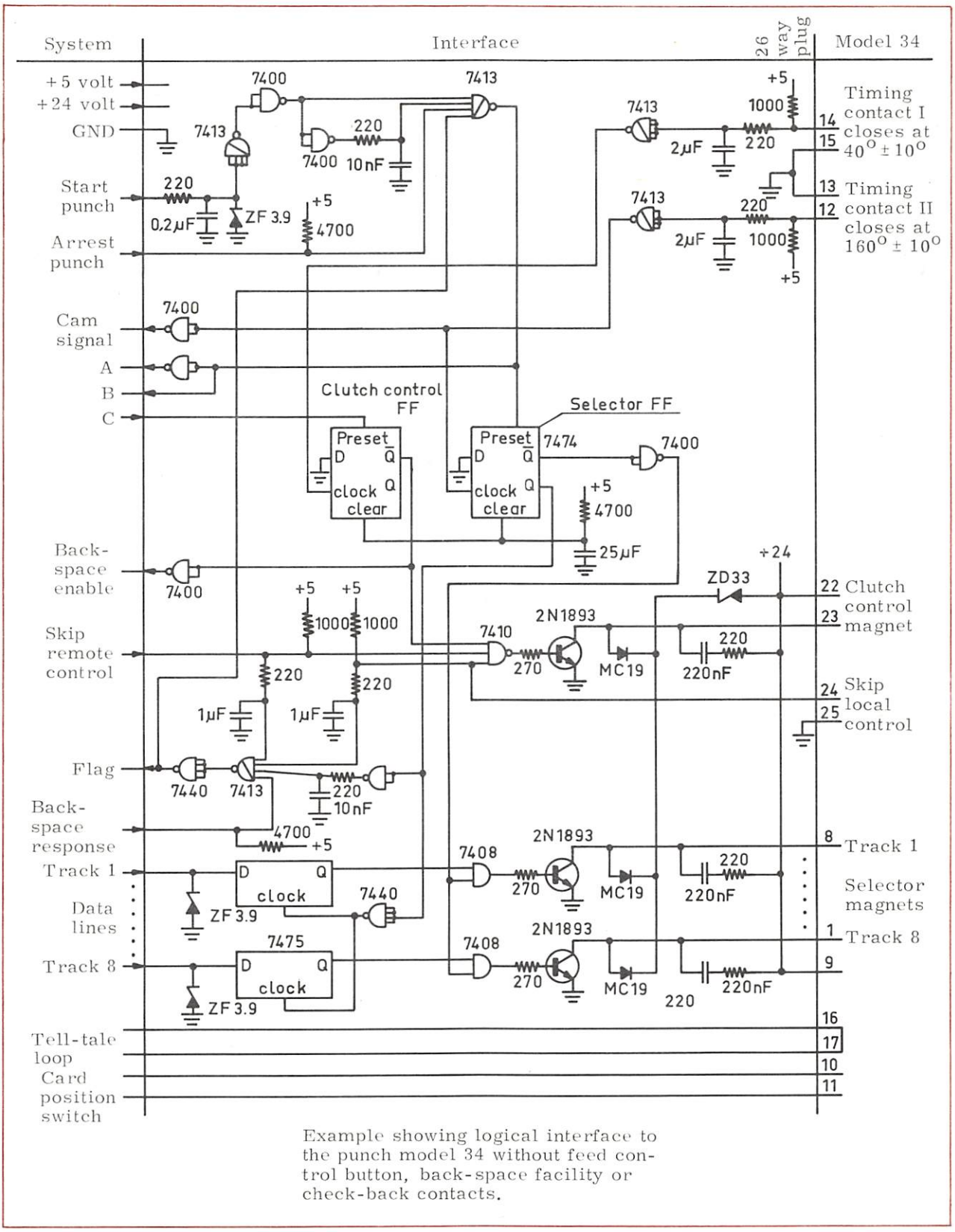
Fig. 5.6 shows the additional circuitry and connections required for addition of odd or even parity check when the punch is fitted with check-back contacts.

A logical "0" on "even parity" will check even parity, logical "0" on "odd parity" will check odd parity.

In the event of a parity error, the "Error signal" will change from "1" to "0" and remain until a "0" on the "Reset Punch" line appears - usually manually generated - to re-set the "Error" F/F.

The "Error signal" can be linked to the "Arrest Punch" line and this will prevent further punch action until the "Reset Punch" has been activated.

5-5



Example showing logical interface to the punch model 34 without feed control button, back-space facility or check-back contacts.

Fig. 5.4 Interface diagram

5-6

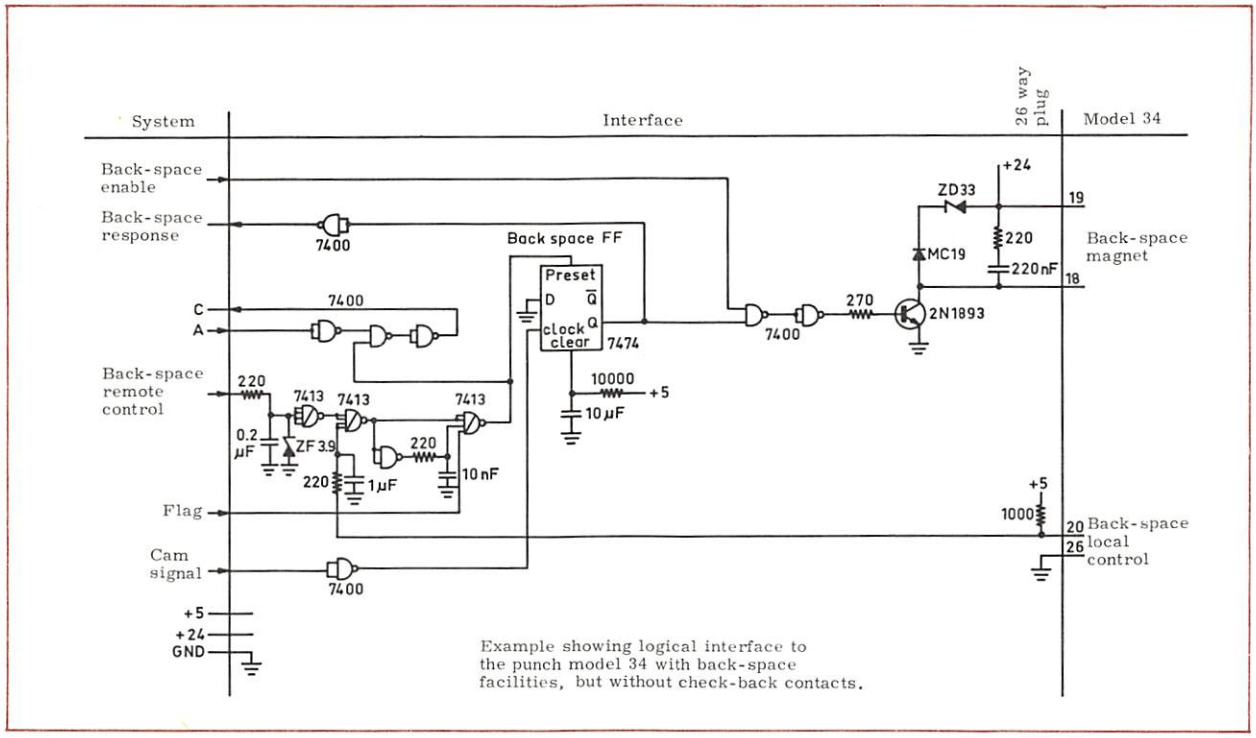


Fig. 5. 5 Interface diagram

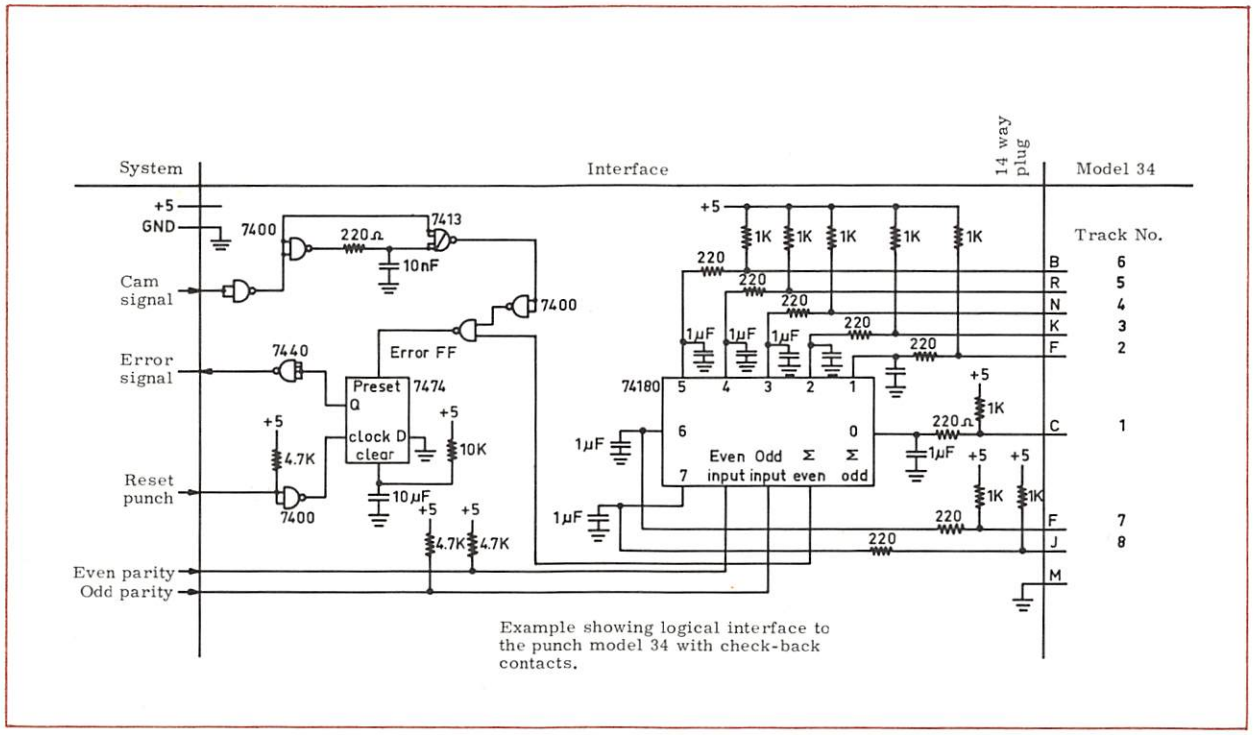


Fig. 5. 6 Interface diagram

5-7

6. OPERATING INSTRUCTIONS

6.1 INSERTION OF TAPE

Depress the button INSERT and hold down whilst inserting the media against the guide blocks. The motor ON/OFF switch is positioned to the left of the tape latch. Depression on the left hand side of the button will switch the motor on and lock the button down. Depression of the right hand side of the button releases the lock and switches the motor off.

NOTE: Should the motor have been switched off during a punching cycle, the punching knives may be in their upper position and thereby making it impossible to remove or insert tape. Switch the motor on so that the punch can complete its cycle and return to its stop position.

6.2 INSERTION OF CARDS

Depress the button INSERT and place the card under the tape latch as shown.

NOTE: The card must slide freely between the card guide and the guide blocks.

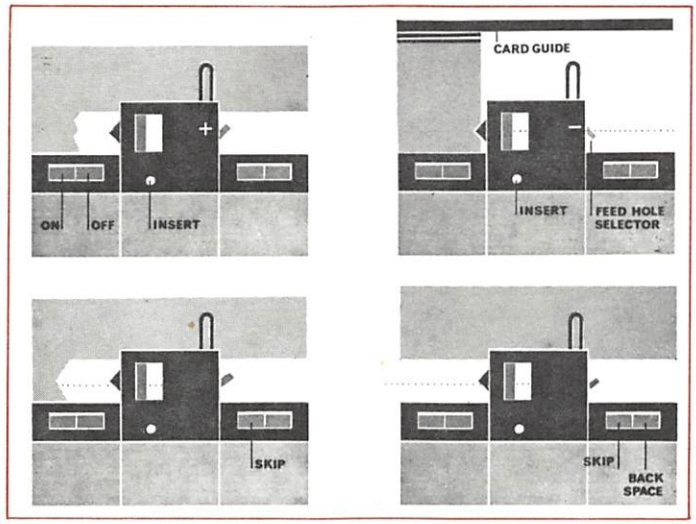
When cards with pre-punched feed holes are used the feed hole selector lever should be placed in the position shown. This prevents overpunching of the feed holes and possible distortion of same.

6.3 PUNCH CONTROL

The button to the right hand side of the punch INSERT button is for use with control circuits. Depression of the left hand side of the button causes a switch to "close" whilst the button is depressed. Similarly depression of the right hand side of the button causes another switch to "close" (see Fig. 2.7).

The application of these switches is dependent upon the interface circuitry in the system but typical uses are:

Left hand depression - media skip.
Right hand depression - back-space.



6-1

7. DISMANTLING AND ASSEMBLING

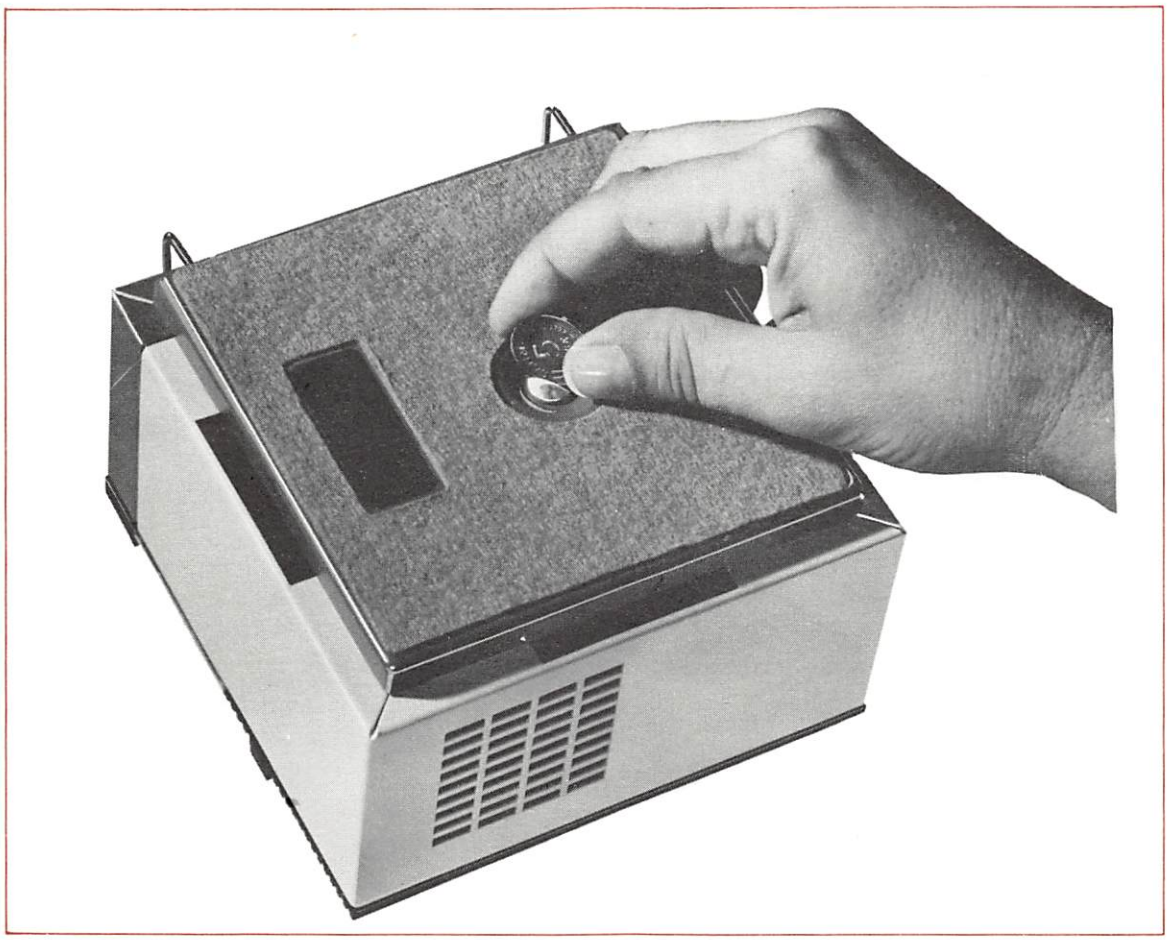
7.1 COVER

The surround and base frame are fastened to the punch mechanism assembly by a lock in the base. A thin coin can be used to release the lock by insertion in the slot and turning anti-clockwise. A "click" indicates release and similarly for refitting of the surround and base but with clockwise rotation of the screw.

Removal of the base plate is achieved by lifting it clear of the surround frame which can also be withdrawn from the main mechanism.

The chad chute on the top of the tape platform is secured by "snap" fasteners and can be removed with an upward pull.

The ventilation slots in the surround frame must be positioned adjacent to the fan on the motor. The mains and signal cables can be lead out through cutouts in the surround and base units as required.



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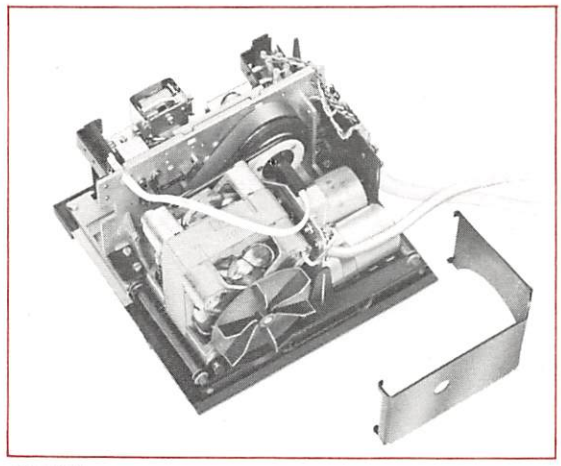
7-1



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7.2 MOTOR

With the base and surround frame removed, the motor unit can be detached from the punch mechanism by unclipping the bracket over the motor, unplugging the plug and cable lead and disengaging the round-section drive belt from the pulleys. The motor unit can then be pulled away from the mechanism.

7.3 SELECTOR UNIT

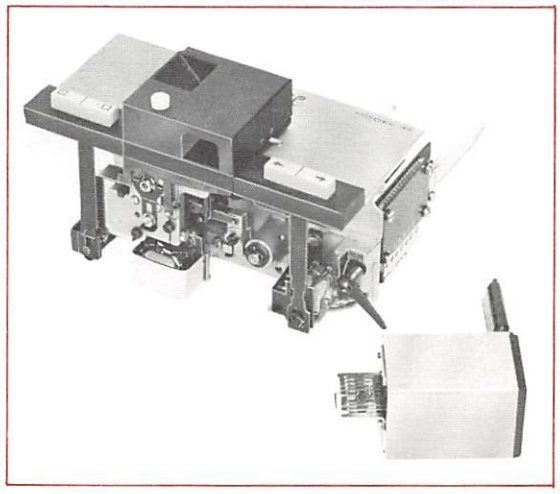
The selector unit can be removed - after the surround frame and base have been removed - by unplugging the short cable from the selector unit, depressing the lever retaining the unit and sliding it from the mechanism.

If the punch has back-space care must be taken by replacing the selector unit that the lever (34/2752) for the feed hole interposer is engaged below the projection on the back-space pecker (34/2722, see Fig. 2.5).

NOTE: The selector unit should only be opened by specially trained engineers.

7.4 MAIN SHAFT

See section 8.4.12 Timing Cams.



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7-2

8. MAINTENANCE

At 6 monthly intervals or after one hundred 1,000 ft rolls of "dry" paper tape have been used - whichever is the sooner. If cards are used, the period between maintenance should be after 8 to 10 million characters have been punched.

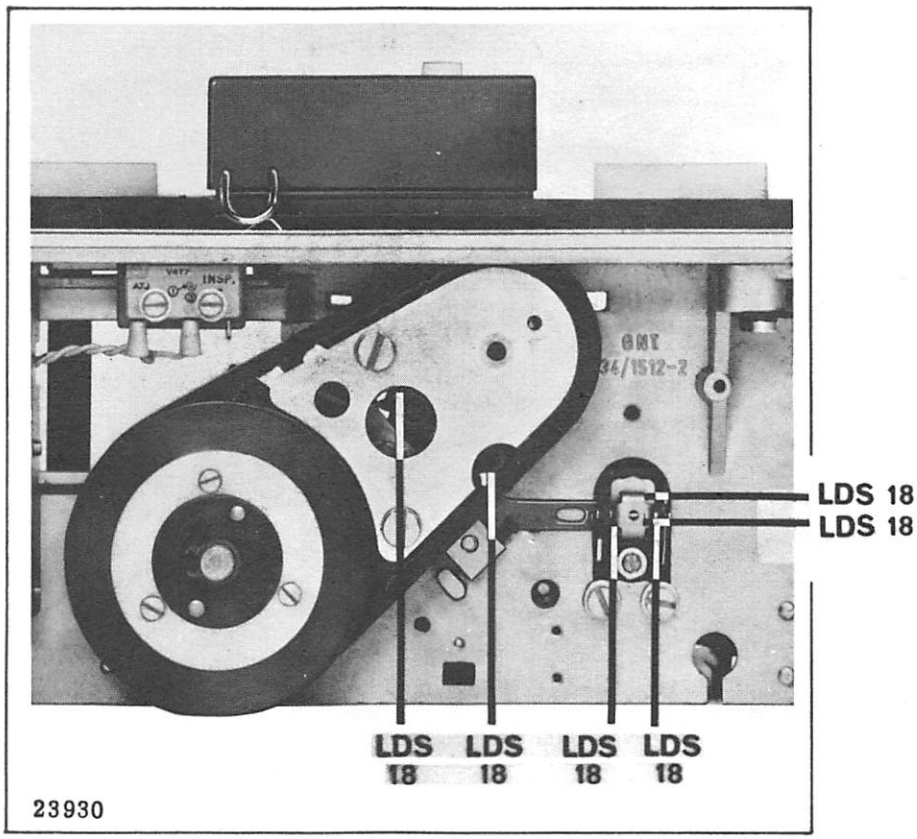
The environmental operating conditions must be considered before applying the above periods between maintenance.

8.1 CLEANING

Remove the cover (see section 7.) and clean the interior with a soft brush. A small - car type - vacuum cleaner will be useful to collect accumulated dust and paper cuttings.

Special care should be taken to clean the following:

Tape latch
Slots in the dieblock
Selector unit (exterior only)
Check-back contacts - where fitted
Timing contacts
Punch mechanism
Flat drive belt



8-1

8.2 LUBRICATION

The following lubricants are suitable for the model 34 punch:

Klüber grease - Type LDS 18, Special A
Esso oil - Type MILLCOT K 55.

When ordering from GNT AUTOMATIC A/S or agents please specify:

MP3-00412 Klüber grease (100 g).
34/3061 Esso oil MILLCOT K 55 (100 ml).

Lubricate the following points with Klüber grease:

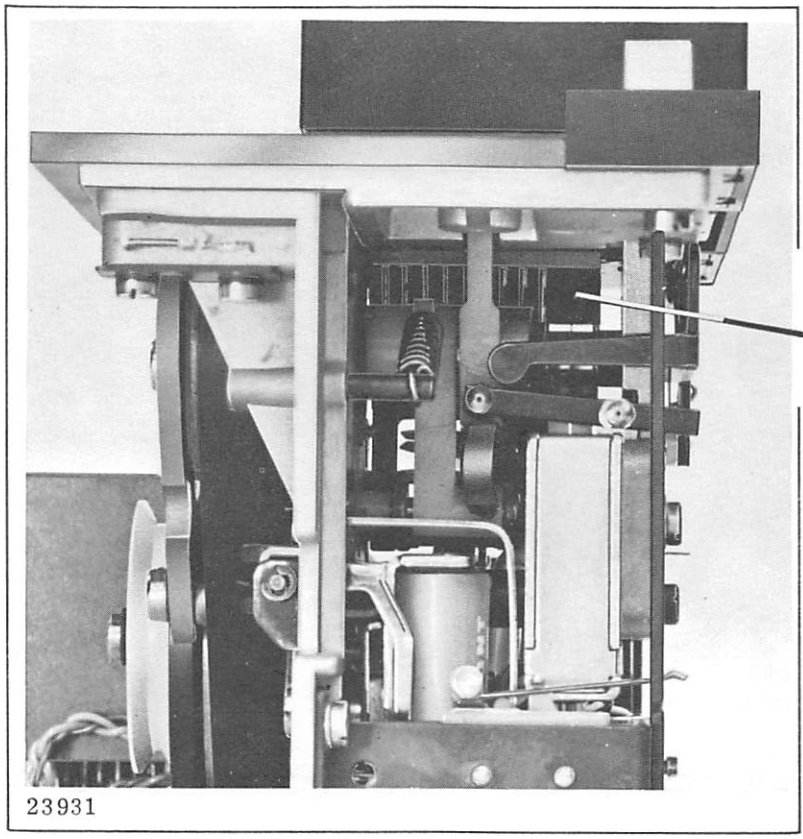
Clutch release unit
U-bracket
Rocking lever
Punching bridge
Levers for check-back contacts
Arm - square hole
Springs on selector unit (sparingly)
Arms for pushbuttons
Timing cams
Back-space mechanism.

Lubricate the following points with ESSO MILLCOT K 55:

Lubricating felt on brake lever pivot
Lubricating felt for punch needles
Ball bearing (front)
Intermediate shaft (oil hole).

NOTE: Care should be taken to keep following parts clean and free of any lubricating agent:

Drive belts
Brake rings.



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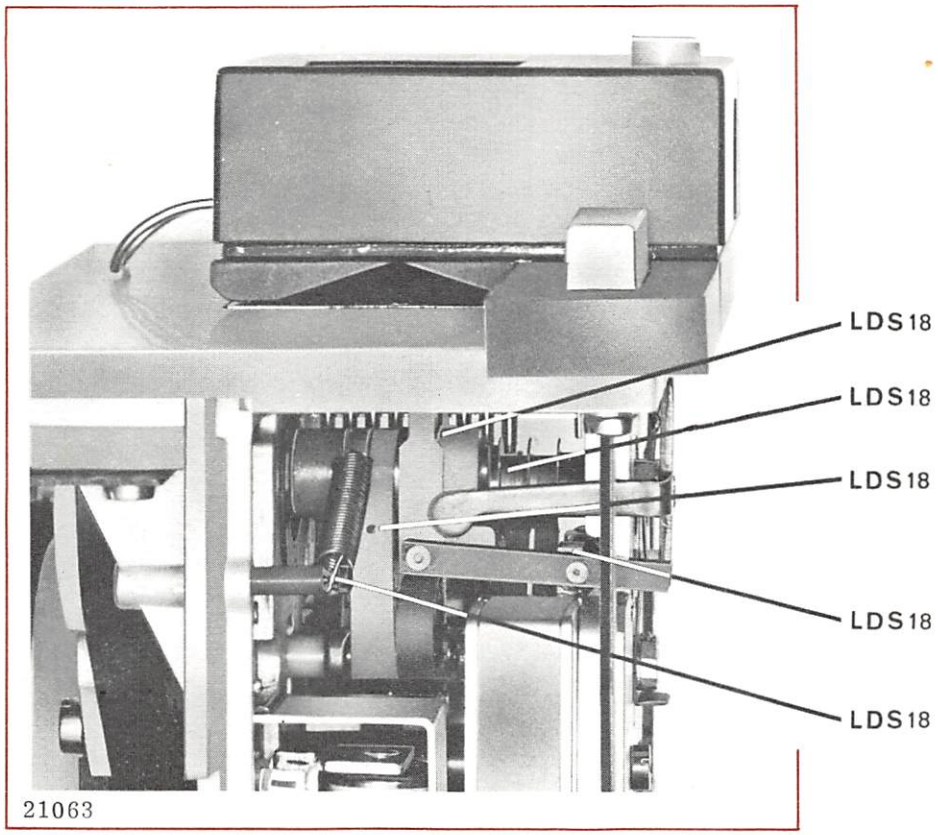

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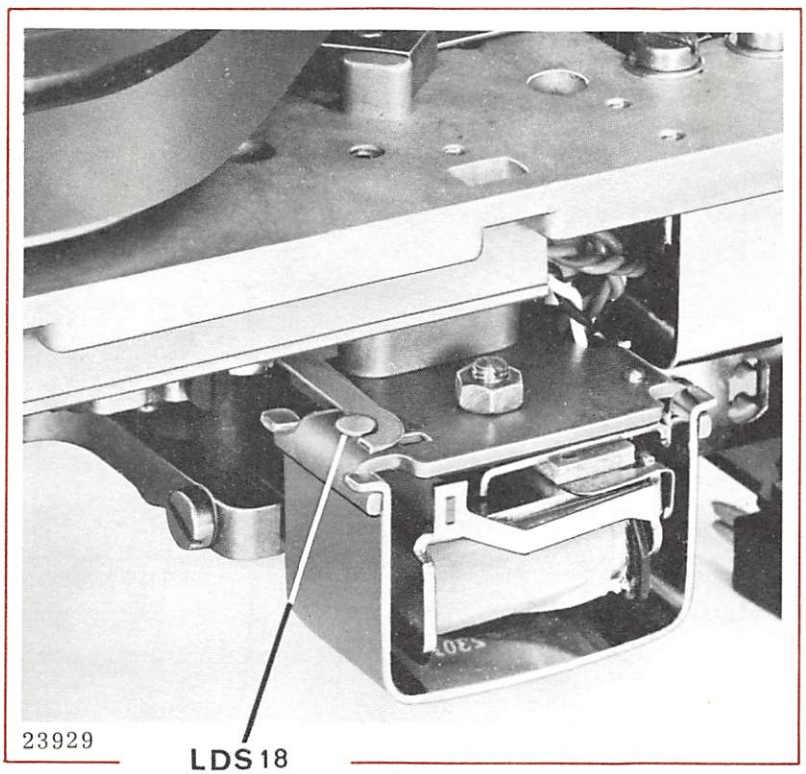

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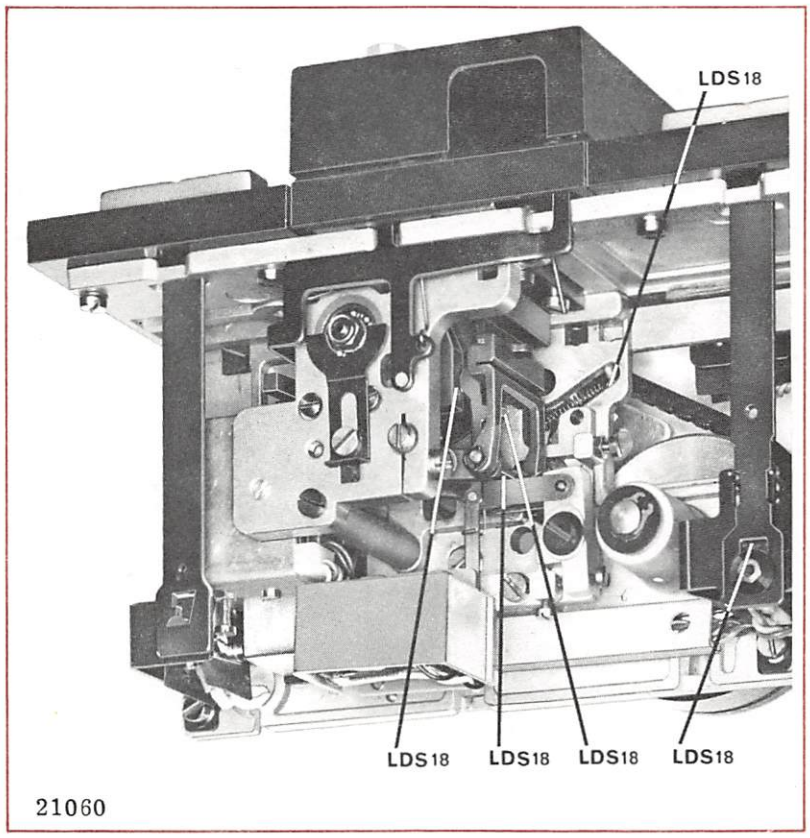

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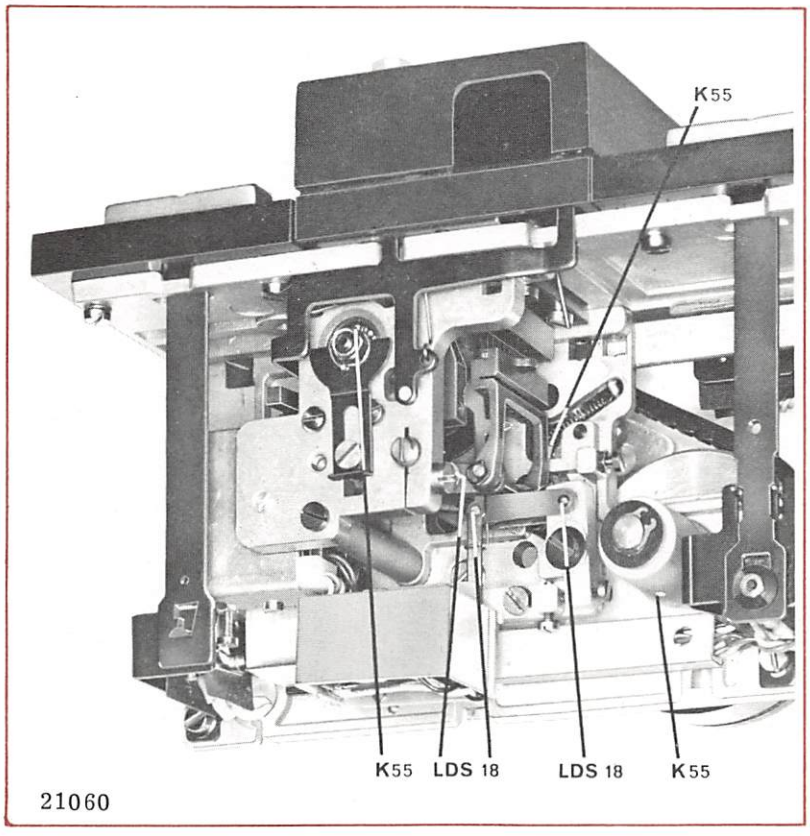

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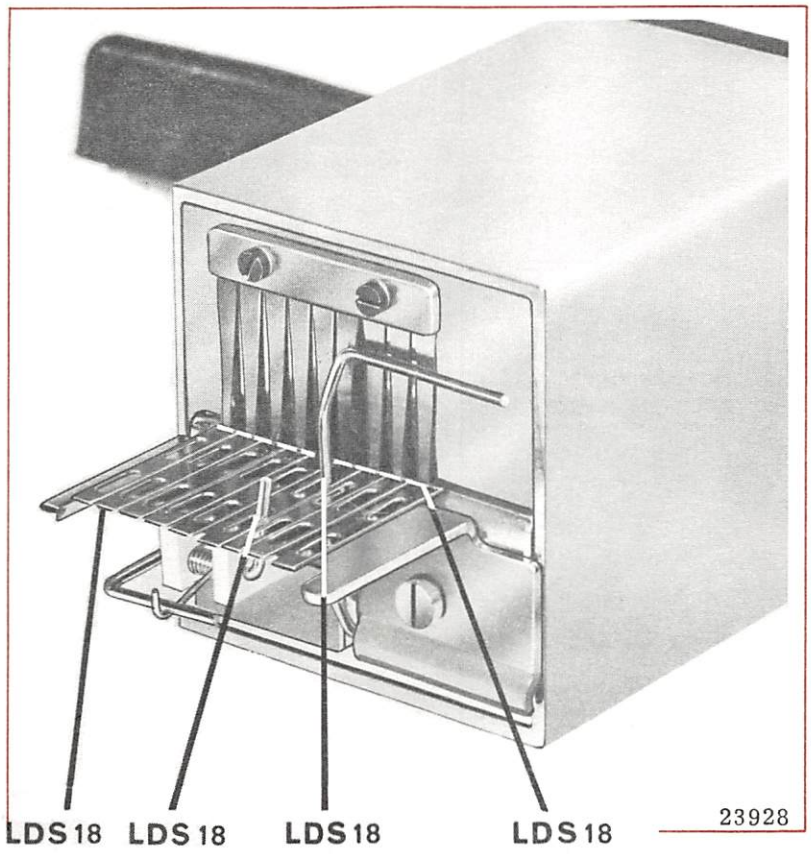


8.3 CHECK OF OPERATIONS

Carefully inspect the punch for worn or damaged parts during the cleaning and lubrication procedures.

Ensure that the following are correctly adjusted in accordance with the instructions under section 8.4:

Clutch lever support (stop position)

Release unit

Bearing for U-bracket (correct tape feed)

Back-space mechanism

Selector unit

Test of check-back and timing contacts.

8.4 ADJUSTMENTS

As the model 34 punch is a precision instrument, unnecessary maintenance or attempts to improve performance must be avoided.

Any adjustments found necessary should only be carried out by trained personnel equipped with the correct equipment and tools, otherwise proper operation will not be obtained.

Certain repairs and adjustments may be found necessary which are beyond the scope of service personnel, these are therefore not described in this manual. In these circumstances or in similar events, the punch should be returned to GNT AUTOMATIC A/S or to accredited agents for repair.

8-5

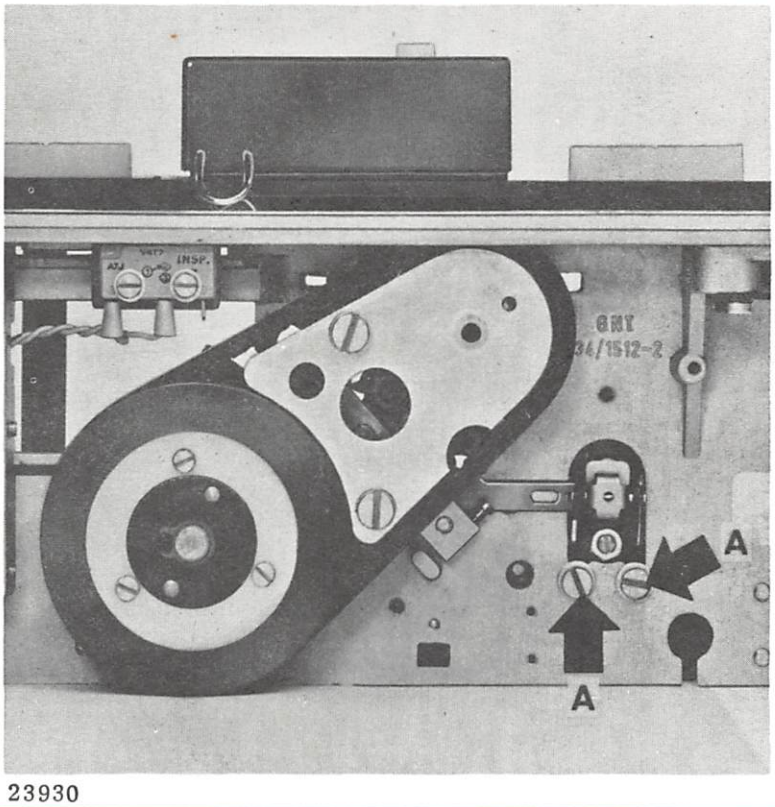
8.4.1 Adjustment of Clutch Magnet

To ensure the reliable function of the clutch lever (34/1963) and pawl (34/1955), a clearance of 0.5 to 1.0 mm must exist between the nose of the pawl and the magnet armature (34/1925), when the clutch lever is in its lowest position.

The correct clearance can be obtained by slackening the two securing screws A and moving the unit vertically up or down as required.

Ensure that the "tread" surface of the clutch lever is parallel with the corresponding surface of the pawl.

NOTE: Readjustment may be necessary after adjusting the stop position in accordance with 8.4.3.



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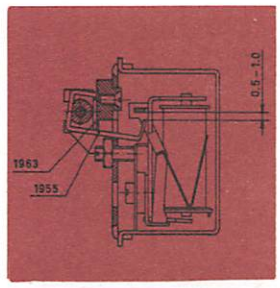

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8.4.2 Positioning of Magnet

Ensure that a clearance of 0.15 to 0.25 mm exists between the pawl (34/1955) and the magnet.

Adjust if necessary as follows:

Slacken the lock-nut A.

Turn screw B until the specified clearance is obtained.

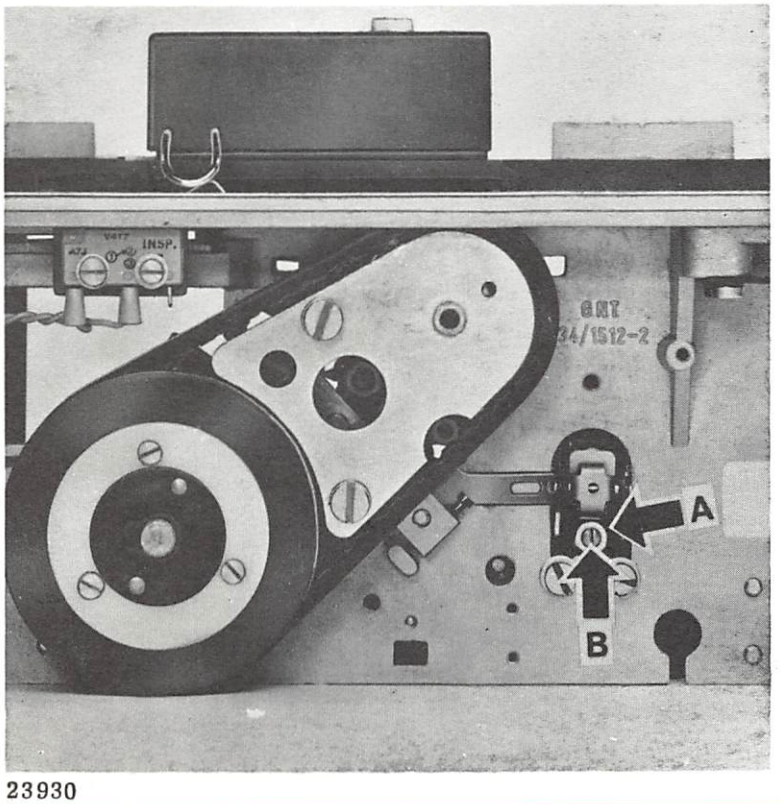
In the possible event of replacement of clutch magnet (34/1904) and/or bracket unit (34/1950), care must be taken that the lower prong of the pawl (34/1955) is in horizontal position when the punch is in the stop position.

If necessary adjust as follows:

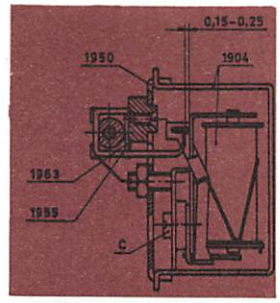
Loosen screw C.

Move the magnet in a vertical direction until the above demand is met.

Tighten screw C.



23930

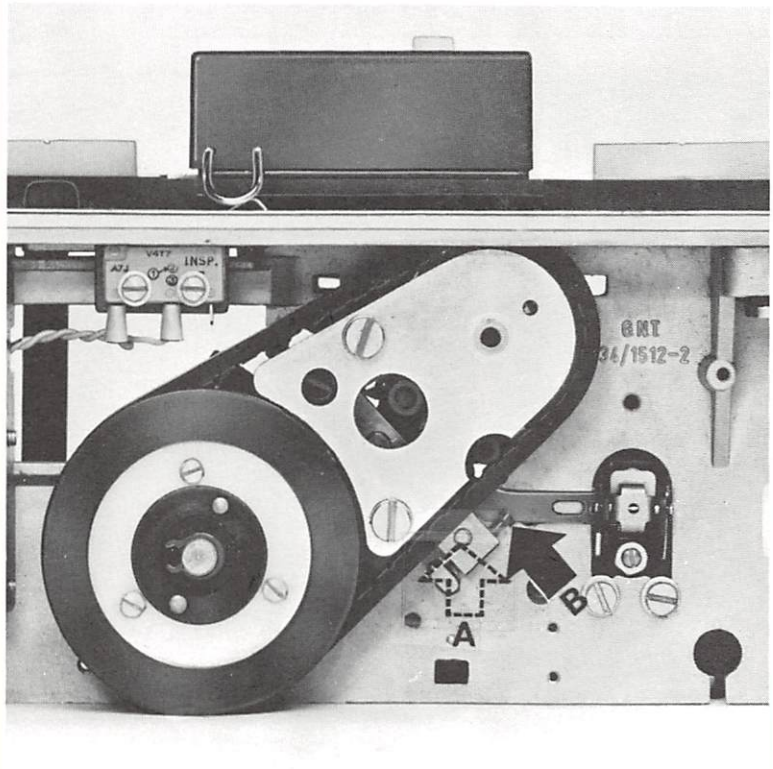


8-7

8.4.3 Stop Position of Clutch

The clutch must stop in a position such that neither prong of the driven part is in contact with the drive belt.

To adjust this position, the punch must be running in step-by-step mode. Slacken the fixing screw A and turn the adjusting screw B until the correct setting is achieved.



23930

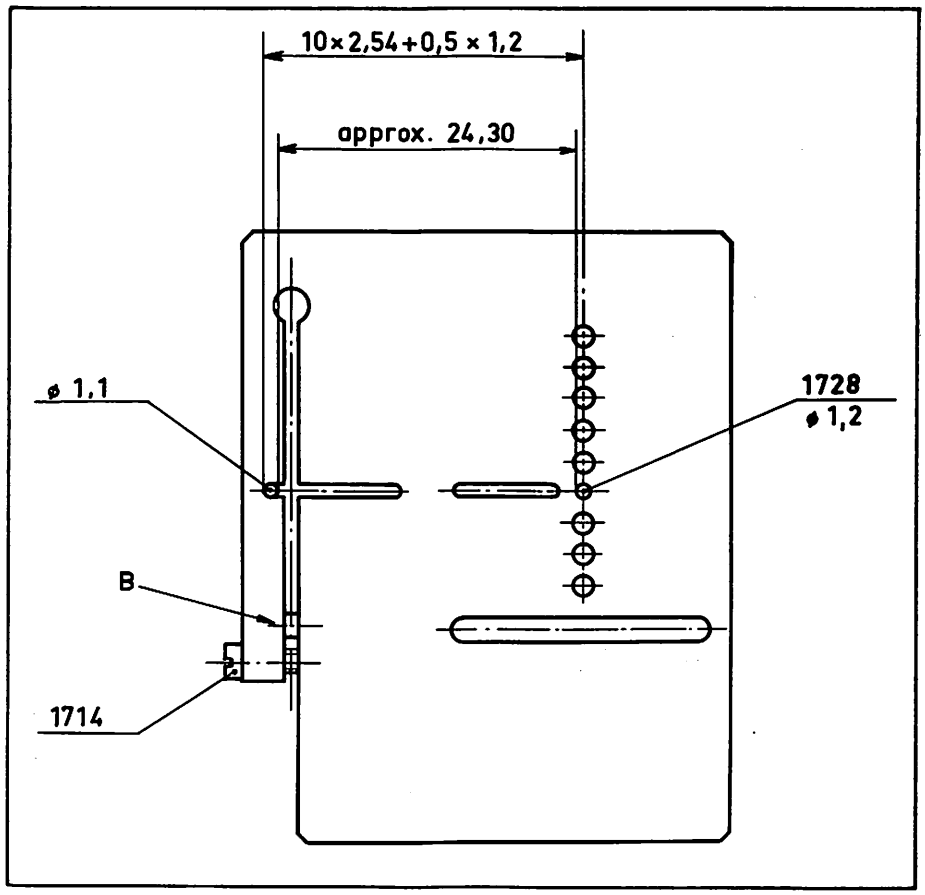
8-8

8.4.4 Tape Pitch

Adjustment to the tape pitch can be carried out by turning screw (34/1714) in conjunction with the 2 mm Unbrako screw (B) adjacent to it. To attain access to the screws remove the tape latch and the left hand pushbutton and guide block.

The nominal distance from the centre of the feed hole punch knife to the end of the slot is 26.00 mm.

To aid pre-adjustment, a 1.1 mm pin and a slide gauge set to 24.30 mm can be used.



8-9

8.4.5 Bearing for U-bracket

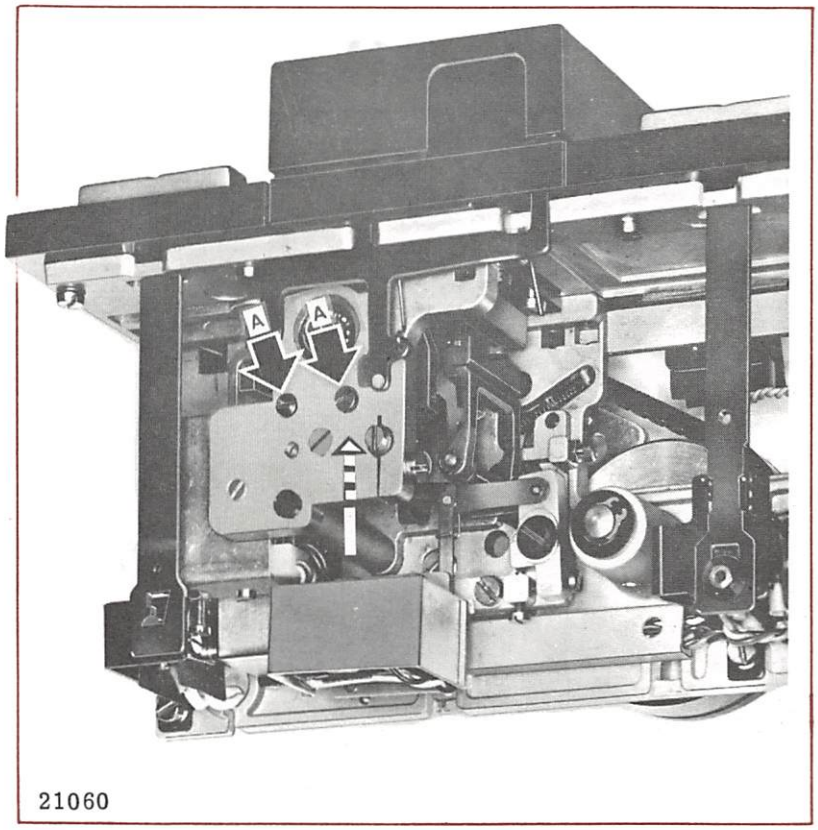
To obtain the correct engagement between the feed peckers and the media feed hole perforations the U-bracket (34/1855) must be correctly set.

Remove the tape latch and the Y-clamp retaining the main shaft. Manually release the clutch and turn the main shaft until the feed peckers and feed hole punch knife are just protruding above the guide plate surface.

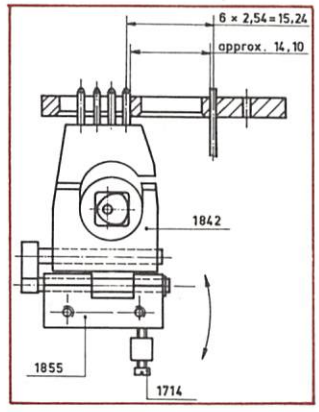
Slacken the two fixing screws A and turn the adjusting screw (34/1714) inside the chassis until approx. 14.10 mm clearance is obtained between the feed hole punch knife and the first (nearest) pecker.

Fine adjustment of Tape Pitch (8.4.4) may be necessary following this adjustment. Ensure the following conditions during the adjustment:

1. That the feed peckers engage exactly in the feed holes.
2. That the forward traverse of the feed peckers is limited by the end of the slot in the guide plate otherwise the correct tape pitch will not be obtained.



21060



8-10

8.4.6 Pin for Rocking Fork

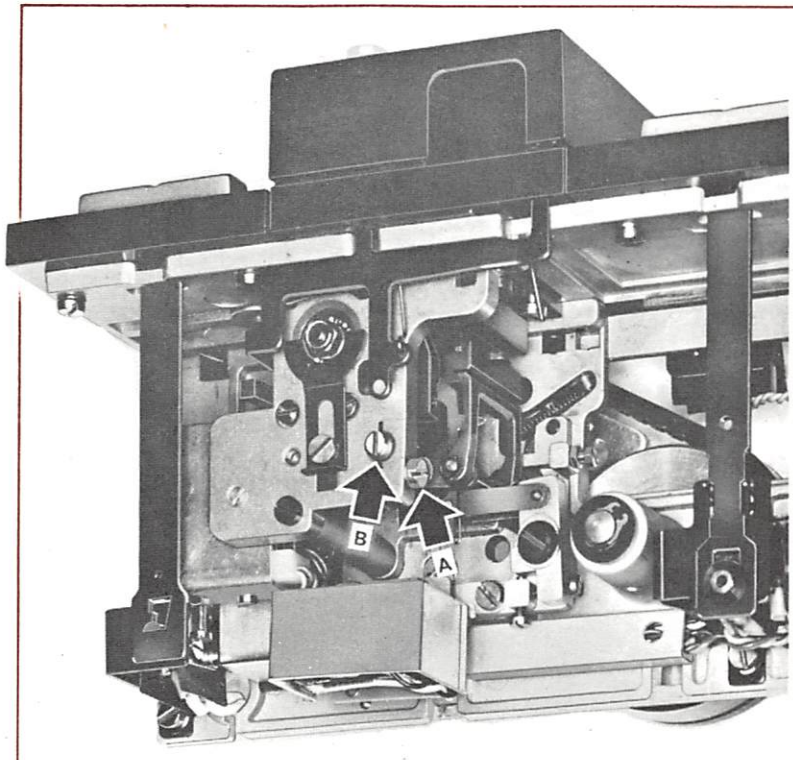
Adjustment of the height of the punch bridge is facilitated by provision of an eccentric rocking fork pin.

The position of the punch bridge should be as high as possible but the slot for the interposers must be clear of the punch knives in the stop (lowest) position.

To adjust, slacken the screw A and turn the rocking fork pin B so that the punch bridge is in its uppermost position - the notch in the pin vertical.

Turn the rocking fork pin clockwise until the slot for the interposers is clear of the punch needles.

Note: If the punch is equipped with check-back contact (34/2800) a readjustment of the contact duty cycle is necessary. See appendix at the back of the manual.



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8-11

8.4.7 Positioning of Selector Unit

Incorrect punching can be caused by an incorrectly set of the selector unit, but before resetting its position a check of the unit itself should be carried out as follows:

Without any selector magnets energized, feed holes only should be punched when tape is run through the punch.

Set the control circuits such that all selector magnets are energized and ensure that all holes are correctly punched.

If errors occur, remove the selector box and examine the interposer blades. The face of the blades must be in line within 0.3 mm with all selectors energized and de-energized. If any variation outside this limit is observed the unit must be replaced and a factory overhaul of the faulty unit carried out.

To adjust a selector unit in a punch, proceed as follows:

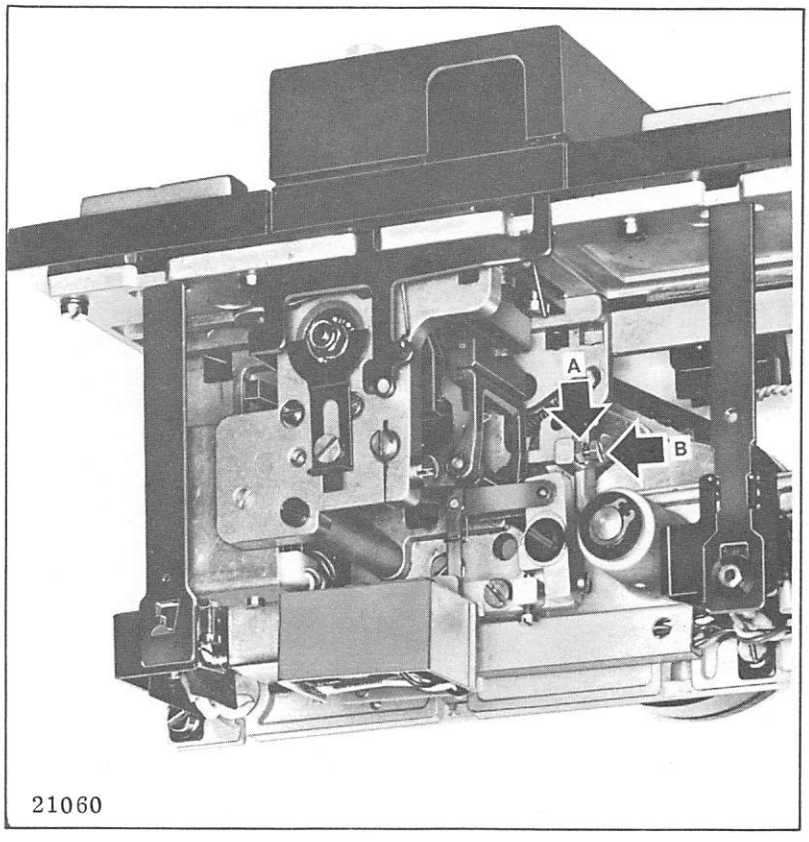
Release the clutch manually and turn the mechanism until the punch knives can be seen in the slot in the punch bridge, retain the mechanism in this position.

Slacken the lock nut A on the adjusting screw.

Turn the adjusting screw B until the interposers - de-energized - just engage with (touch) the punch knives.

Turn the adjusting screw anti-clockwise 3/4 turn and tighten the lock nut.

Ensure that correct punching is obtained with manual pressure on the selector unit.



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8-12

8.4.8 Back-space Peckers I

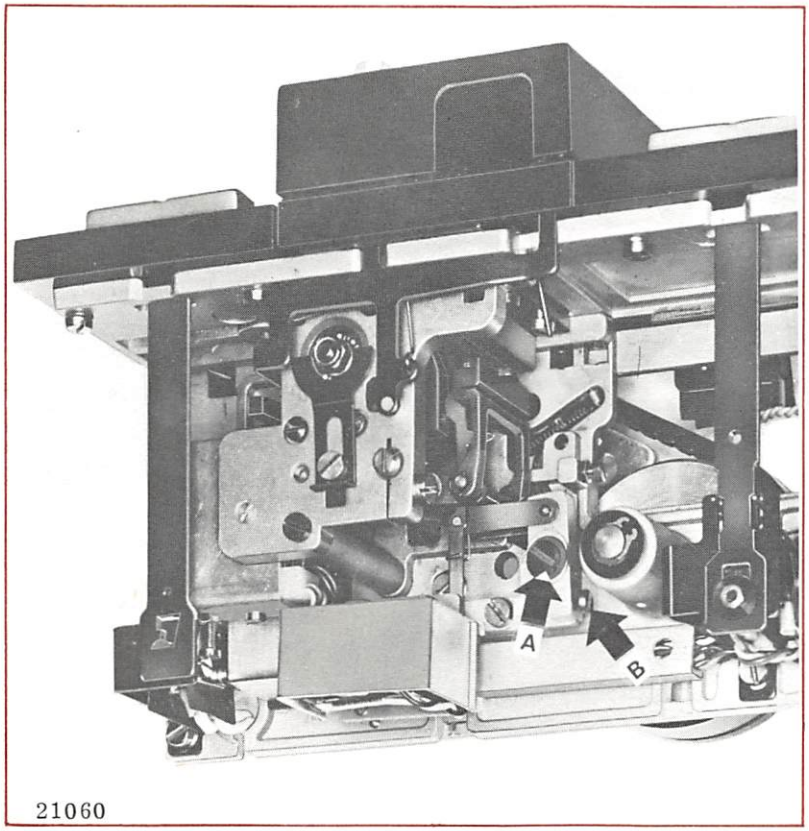
Damaged feed holes can occur due to incorrect back-space pitch.

Adjustment is carried out as follows:

Insert a length of tape with the correct pitch in the punch. Release the back-space and feed magnets manually and turn the mechanism until the pecker head is rising and the back-space pecker lowering.

Slacken the screw A and turn the adjusting screw B until the feed pecker moves with the peckers exactly engaging in the feed holes as the back-space peckers withdraw.

Tighten up the screw A, and recheck the action.



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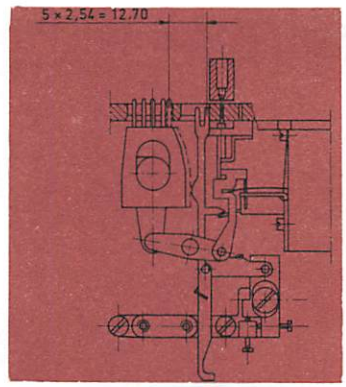
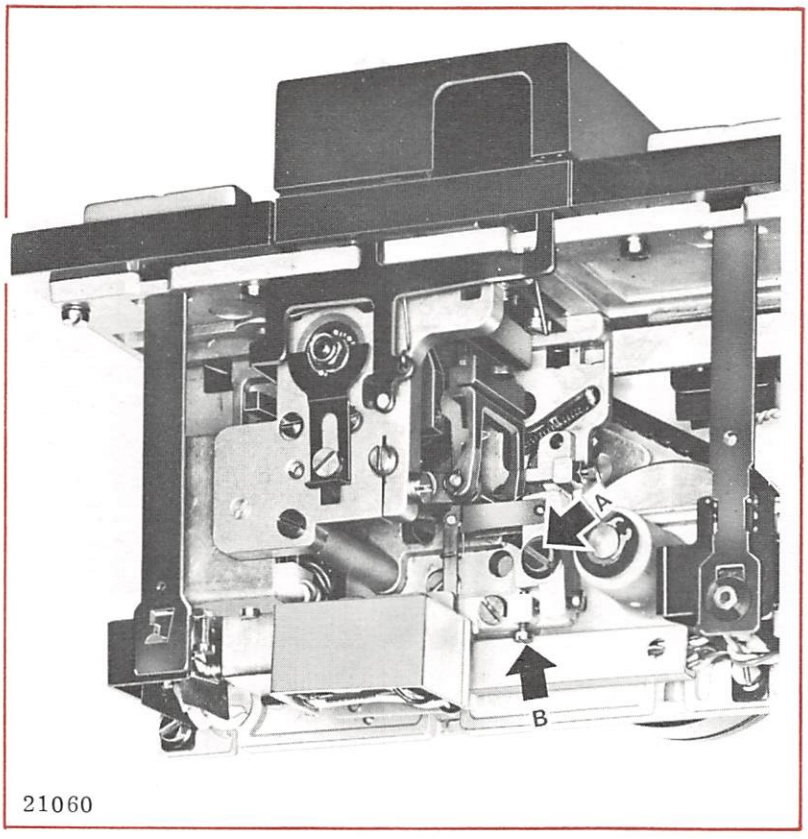


8-13

8.4.9 Back-space Peckers II

To adjust the back-space pecker in its "upper right" position, slacken the fixing screw A and turn the adjusting screw B until the top of the pecker is 2.2 to 2.5 mm above the guide plate.

Tighten the screw A.



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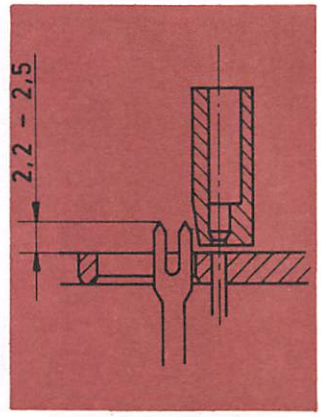
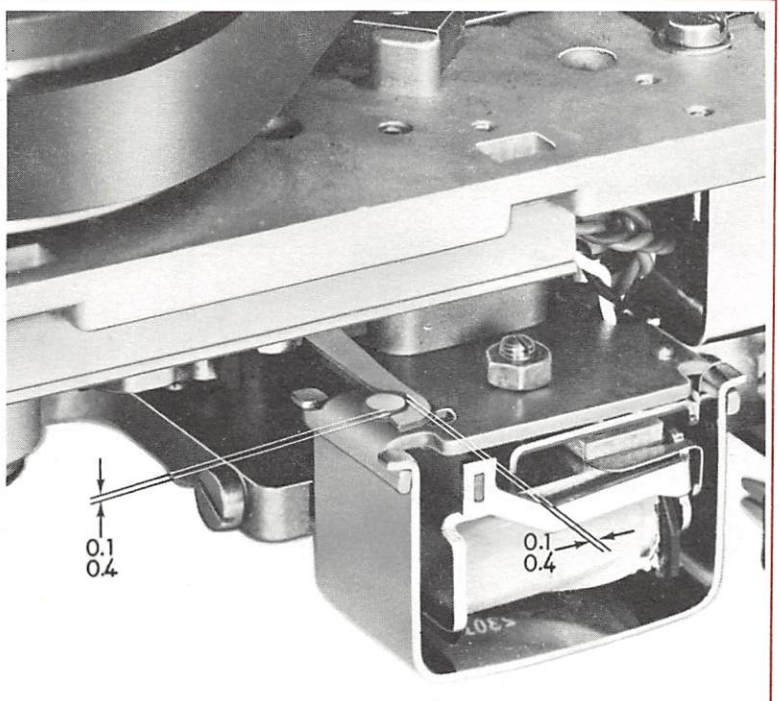


8-14

8.4.10 Back-space Magnet

The back-space magnet must be adjusted such that the lower end of the back-space pecker has 0.1 to 0.4 mm free play both horizontally and vertically when in its lowest position. To obtain this play, slacken the two screws and move the bracket (34/2730). (Fig. 2.5).



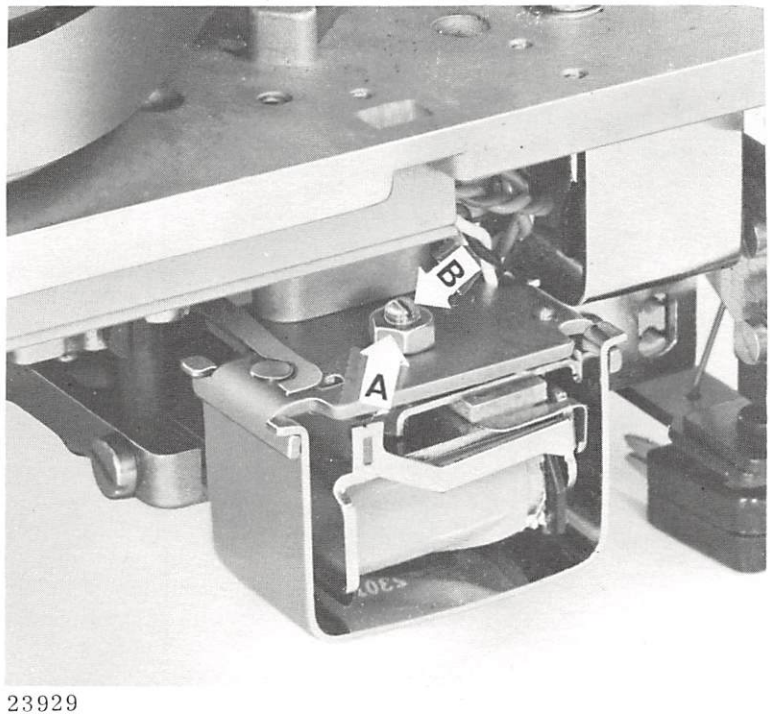
23929

8-15

8.4.11 Release Movement of Back-space Magnet

To ensure reliable back-space operation, a clearance of 0 to 0.2 mm must be maintained between the release spring (34/2734) and the back-space pecker (34/2722).

To adjust, slacken the lock nut A and turn the adjusting screw B to obtain the required clearance. Tighten the lock nut A. Check that by actuating the back-space magnet only one back-space operation takes place.



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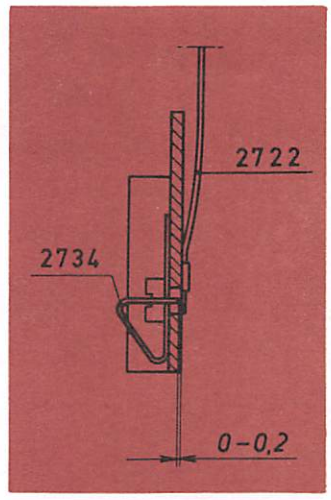


8-16

8.4.12 Timing Cams

Adjustment to setting of cams on the main shaft:

1. Removing the main shaft:

   Ensure that the mechanism is in its stop position.

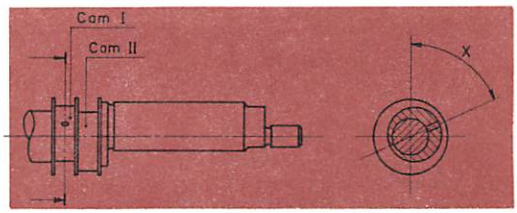
   Slacken the screw securing the Y-clamp retaining spring (34/1769) and move the Y-clamp away from the main shaft.

   Unhook the start spring (34/1788) from its anchor.

   Withdraw the main shaft but carefully lift the cam levers (34/2432) to clear the guide discs on the main shaft whilst doing so.

2. Adjusting the cams:

   Slacken the nut on the end of the main shaft and the cams can be rotated independently as required. The small holes in the cam faces indicate the peak of the cams.



   To obtain a particular cam setting proceed as follows:

   Calculate the mid point (M^{o}) of the closed period - measured from the stop position.

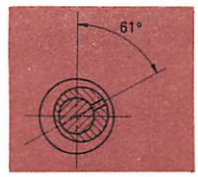
   Adjust the cam sleeve such that X^{o}= M^{o} minus 59^{o}.

   Example: If a cam setting is required such that the cam switch makes at 30^{o} and breaks at 210^{o}.

   Therefore:

$$M^{o} = \frac{30^{o} + 210^{o}}{2} = 120^{o}$$

$$X^{o} = 120^{o} - 59^{o} = 61^{o}.$$



   After setting the cams tighten the nut on the main shaft.

   For this adjustment a simple tool is available. Ask for "Tool for cam setting" (34/3051).

3. Replacing the main shaft:

   The clutch (34/1672) must be in the stop position.

   Insert the main shaft with the carrier upwards (Fig. 2.3) with the cam levers (34/2432) lifted as for removal of the shaft.

   Hook the start spring on to its anchor and reposition the Y-clamp holding it in position whilst tightening the securing screw.

8-17

8.4.13 Timing Contacts

The on/off (closed/open) ratio can be adjusted for each contact by means of adjusting screws in the base of the switch unit (34/2400)(See Fig. 2.8).

Turning the screws clockwise increases the on/off ratio and anti-clockwise reduces it.

Max. on/off ratio: 1.5 : 1.

Min. on/off ratio: 1 : 1.5.

Fine adjustment of timing:

With the cams correctly set, fine adjustment to the switch on/off setting can be made with the adjustment screws.

Check of switch operating points and settings:

Connect a meter set to Ohms across the leads from the switch to be checked. Mark the stop position of the main shaft on the Y-clamp and main shaft nut i.e. with a pencil mark.

Activate the clutch magnet manually with the motor off.

Turn the main shaft via the belt (34/1692) and the degrees in the mechanical cycle at which the switch is operated can be seen in relation to the mark on the main shaft to the mark on the Y-clamp.

The standard factory setting of the cams is:

Cam 1 to close at 40^{o}. Cam 2 to close at 160^{o}.

On/off ratio: 0.9 (170^{o} closed and 190^{o} open).

Special settings are available on request at time of ordering.

8-18

8.5 FAULT-FINDING KEY

Fault	Probable cause/examine
Non-rotation of motor.	Mains connection - supply cable - supply socket - motor switch.
Motor rotates but stops after a short period of operation.	Motor temperature too high. Examine ventilation conditions.
Motor rotates but mechanism operates sluggishly or not at all.	Mechanism blocked - transmission belts - centrifugal clutch - bearings for centrifugal clutch.
Noisy punching mechanism.	Incorrect stop position (8.4.3) - ball bearing in guide plate (34/1652) - transmission belt (34/1692).
Clutch does not release.	DC voltage - impulse too short - adjustment of magnet (8.4.3) - main shaft turned 180° (Fig. 2.3).
Clutch constantly released.	Impulse too long - adjustment of magnet (8.4.1).
Punch carries out double step.	Impulse too long (spark suppression 3.3 & 3.4) - adjustment of magnet (8.4.1).
Feed holes damaged.	Possible spooling equipment offers too great a resistance (static and/or dynamic) - dust and paper cuttings between punch set (34/1702) and tape latch (34/1542) - adjustment of bearing for U-bracket (8.4.5) - adjustment of pin for rocking fork (8.4.6).
Feed holes damaged after back-space operations.	Adjustment of back-space pecker (8.4.8 & 8.4.9) - lever (34/2752) incorrectly adjusted (break adjustment) - back-space magnet not releasing quickly enough (possibly needs adjusting in acc. with 8.4.11) - selector magnets are not de-energized - incorrect placement of selector box (8.4.7).
Feed holes missing.	Arm for feed hole selector in position ÷ - lever (34/2752) not correctly engaged with back-space pecker (8.4.8) - lever (34/2752) fitted to punch without back-space.
Back-space constantly released.	Adjustment of back-space magnet (8.4.10 & 8.4.11).

8-19

Fault	Probable cause/examine
Code holes wrong or not fully punched.	Interface equipment - length or timing of selector impulses - adjustment of cam contacts (8.4.12 & 8.4.13) - placement of selector box (8.4.7) - adjustment of pin for rocking fork (8.4.6) - start/stop speed too high.
Incorrect pitch.	Unwinding equipment offers too great a resistance (static and/or dynamic) - adjustment of punch set (8.4.4) - adjustment of bearing for U-bracket (8.4.5).

8-20

9. PARTS LIST

PARTS ORDERING PROCEDURE

To order a replacement part, find the part required in the parts list, and order by part number and name listed.

Give the model and serial number of the unit on which it is to be used.

Spare parts are normally ordered direct from the factory.

GNT AUTOMATIC A/S
6, Telefonvej
DK-2860 Soeborg
Denmark

where a major inventory of replacement parts is maintained for prompt service, or from our local representative.

Spares which should be kept at major service centers are compiled in the list of recommended spares. Parts subject to wear and replaceable by the user of the punch are listed under essential spares.

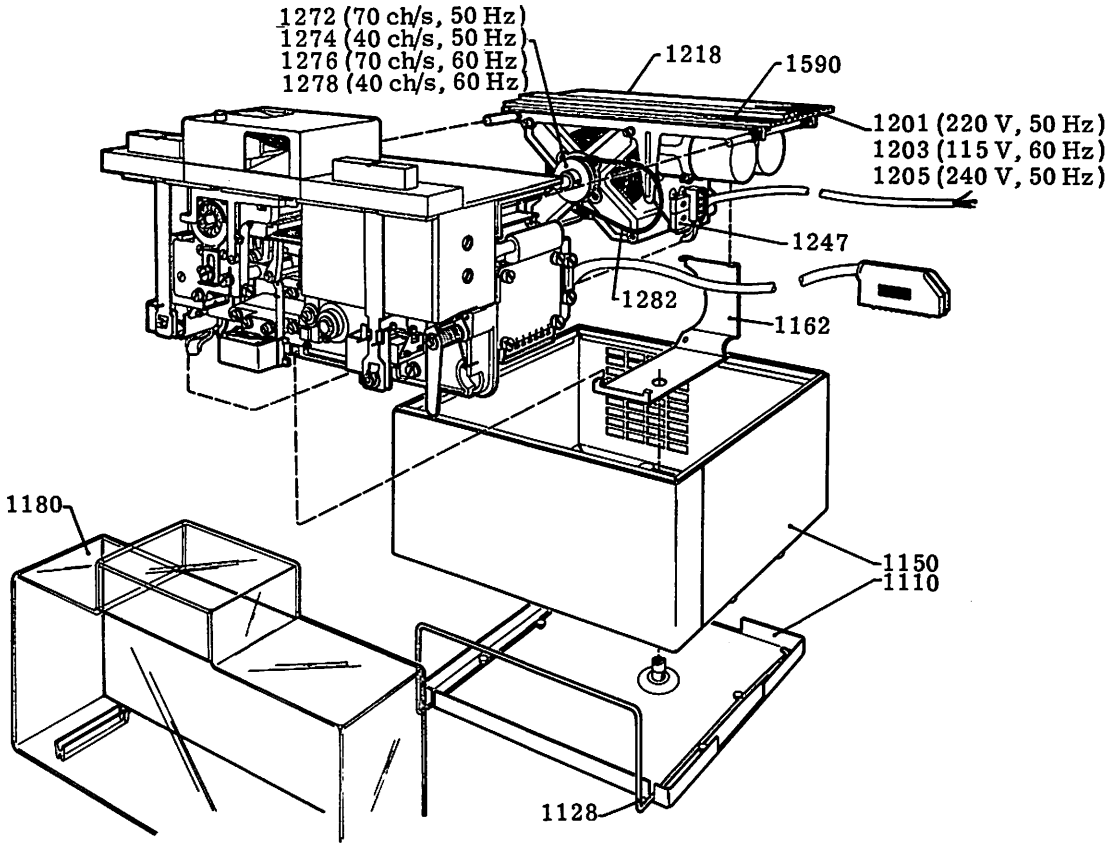
9-1

RECOMMENDED SPARES	
Motor, unit, 220 V, 50 Hz	34/1201
Motor, unit, 115 V, 60 Hz	34/1203
Motor, unit, 240 V, 50 Hz	34/1205
Round sectioned drive belt	34/1282
Clutch, driven part	34/1670
Drive belt, flat	34/1692
Punch set, unit	34/1702
Bushing for resetting	34/1786
Spring for 34/1782	34/1788
Pecker head	34/1842
Clutch magnet, 24 V	34/1904
Bracket	34/1950
Clutch lever	34/1963
Spring for 34/1963	34/1966
Bearing for 34/1963	34/1972
Brake ring, outer	34/1982
Card position switch	34/2140
Switch unit for control circuit	34/2160
Spring for pushbutton	34/2176
Switch unit for motor	34/2180
Selector unit, 24 V	34/2202
Timing contacts, unit	34/2400
Back-space magnet, 24 V	34/2742

ESSENTIAL SPARES	
Part No.	Part Name
34/1282	Round sectioned drive belt
34/1692	Drive belt, flat

9-2

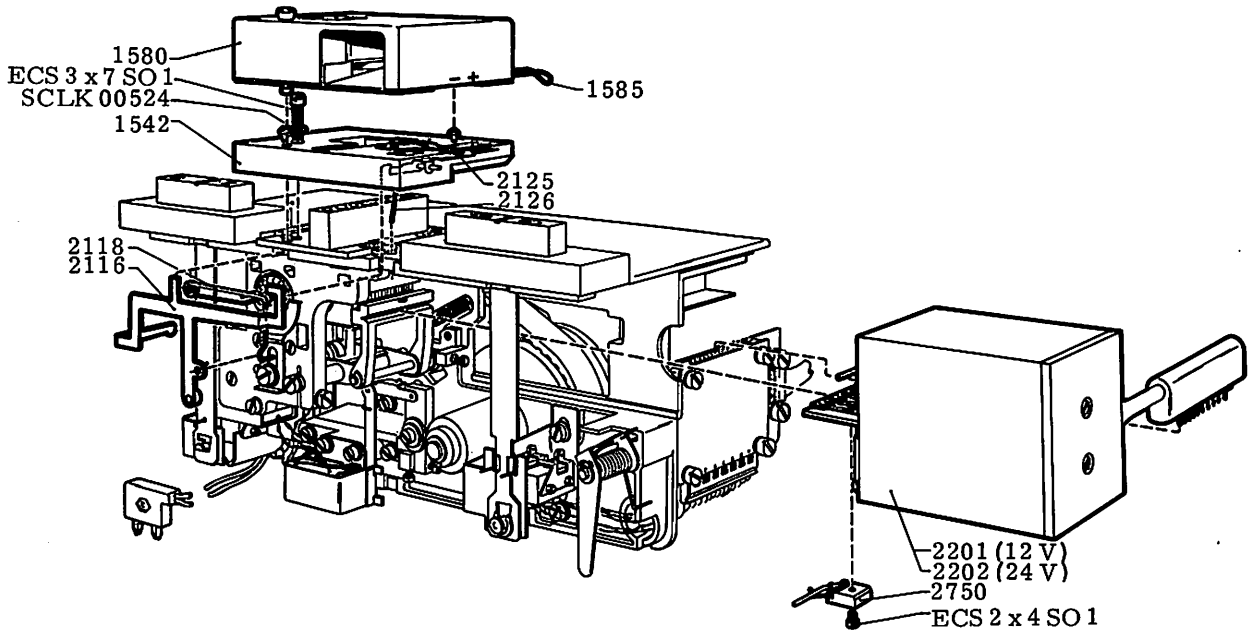
TAPE AND CARD PUNCH 34



No.	Qty.	PART NAME
34/1110	1	Bottom cover, unit
34/1128	1	Bracket for chad box
34/1150	1	Cover, unit
34/1162	1	Locking bracket
34/1180	1	Chad box
34/1201	1	Motor, unit, 220 V, 50 Hz
34/1203	1	Motor, unit, 115 V, 60 Hz
34/1205	1	Motor, unit, 240 V, 50 Hz
34/1218	1	Fan for motor
34/1247	1	Shorting plug (for punch without pushbuttons)
34/1272	1	Pulley, 70 ch/s, 50 Hz
34/1274	1	Pulley, 40 ch/s, 50 Hz
34/1276	1	Pulley, 70 ch/s, 60 Hz
34/1278	1	Pulley, 40 ch/s, 60 Hz
34/1282	1	Round-sectioned drive belt
34/1590	1	Card guide
(34/3019)	(1)	(Fan for motor, axial (for punch without cover only))

9-3

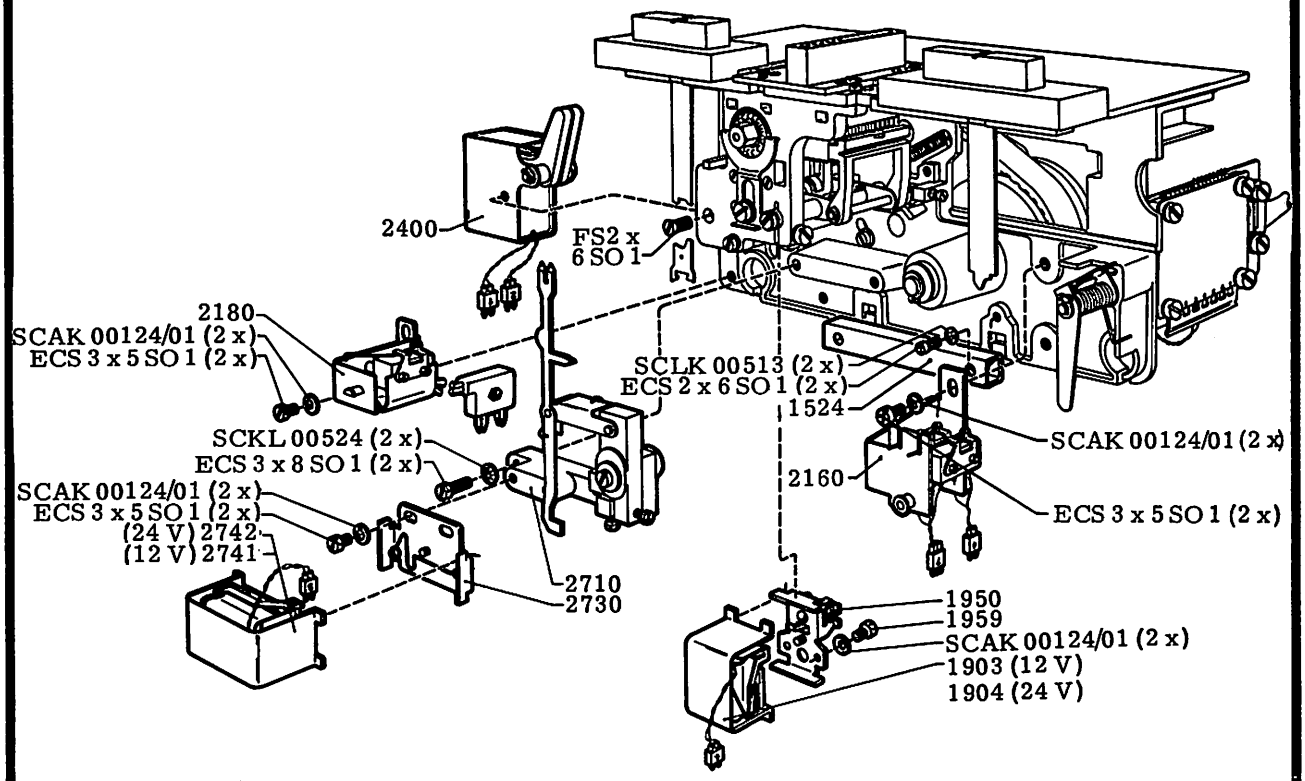
TAPE AND CARD PUNCH 34



No.	Qty.	PART NAME
34/1542	1	Tape latch, unit
34/1580	1	Chad chute
34/1585	1	Card position bracket
34/2116	1	Release arm
34/2118	1	Spring for 34/2116
34/2125	1	Feed hole selector
34/2126	1	Actuating pin
34/2201	1	Selector box, unit, 12 V
34/2202	1	Selector box, unit, 24 V
34/2750	1	Actuating unit for feed hole interposer (This unit is supplied automatically together with 34/2201 and 34/2202)

9-4

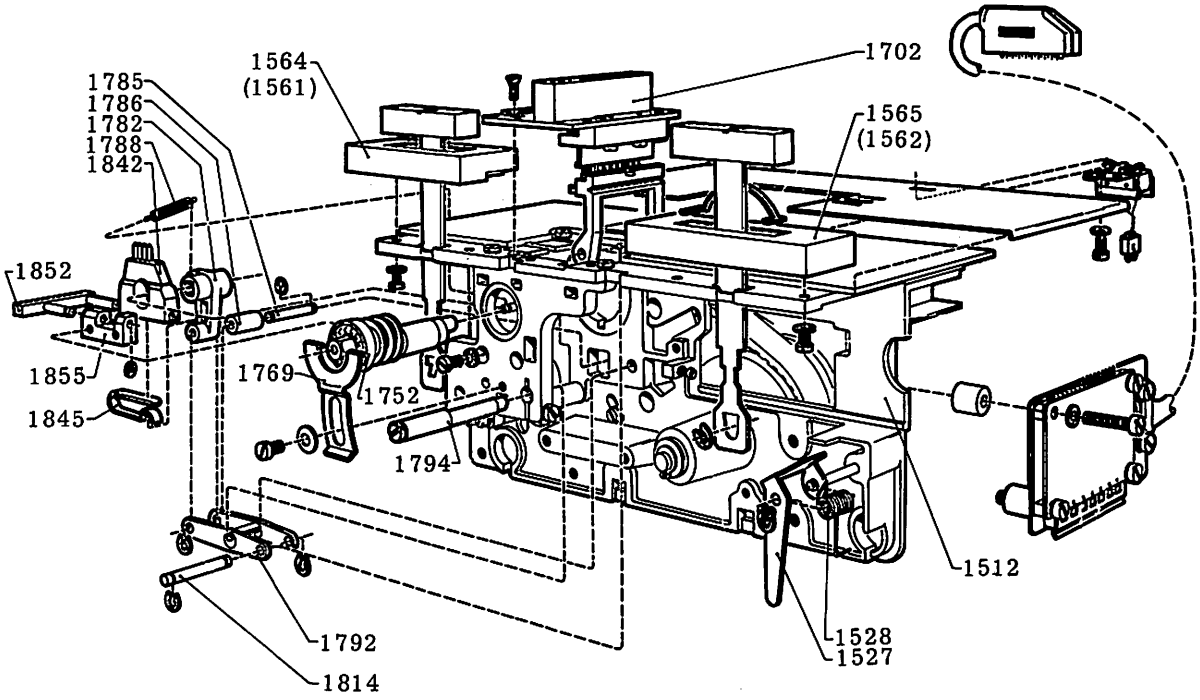
TAPE AND CARD PUNCH 34



No.	Qty.	PART NAME
34/1524	1	Cable duct
34/1903	1	Clutch magnet, 12 V
34/1904	1	Clutch magnet, 24 V
34/1950	1	Bracket, unit
34/1959	2	Screw for bracket
34/2160	1	Switch, unit, for control circuit
34/2180	1	Switch, unit, for motor
34/2400	1	Timing contact, unit
34/2710	1	Back-space, unit
34/2730	1	Bracket, unit
34/2741	1	Back-space magnet, 12 V
34/2742	1	Back-space magnet, 24 V

9-5

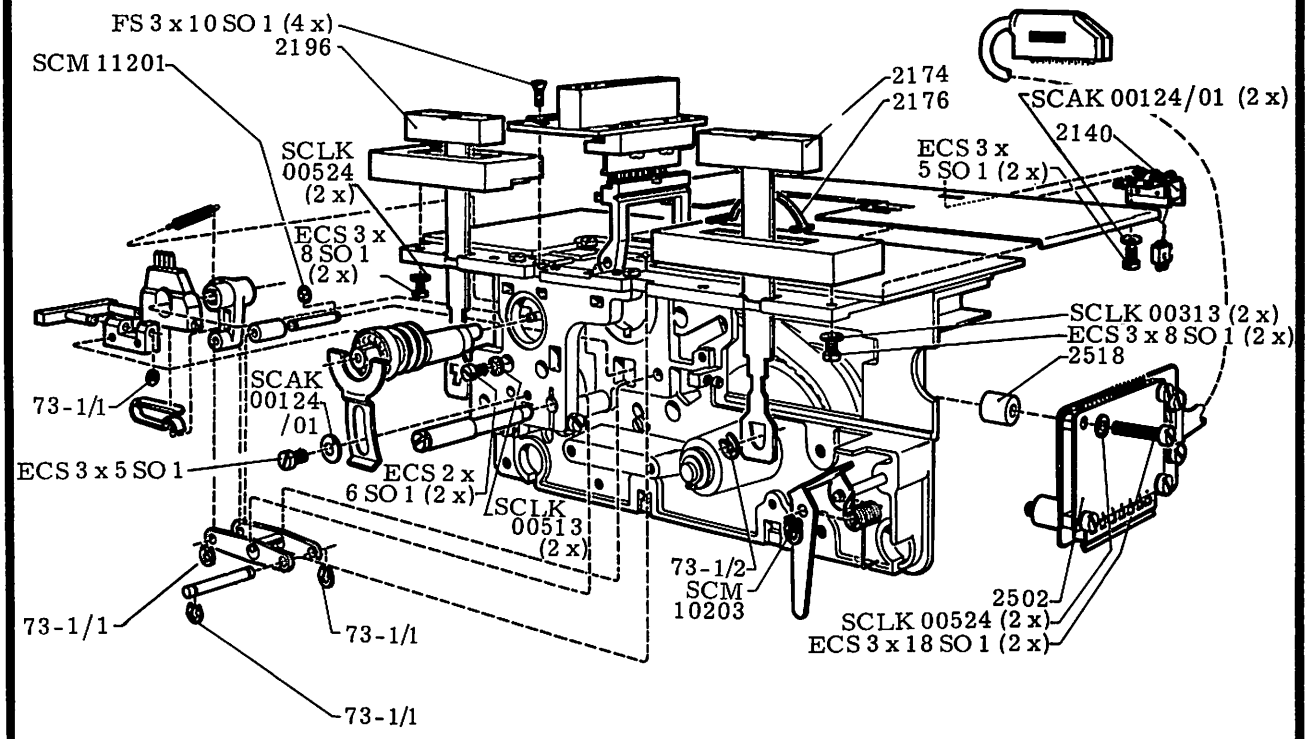
TAPE AND CARD PUNCH 34



No.	Qty.	PART NAME
34/1512	1	Chassis
34/1527	1	Lock for selector box
34/1528	1	Spring for 34/1527
34/1561	1	Guide rail, without pushbutton, left
34/1562	1	Guide rail, without pushbutton, right
34/1564	1	Guide rail for pushbutton, left
34/1565	1	Guide rail for pushbutton, right
34/1702	1	Punch set, unit
34/1752	1	Main shaft, unit
34/1769	1	Y-shaped clamp
34/1782	1	Connecting rod
34/1785	1	Pin for 34/1782
34/1786	1	Bushing for resetting
34/1788	1	Spring for 34/1782
34/1792	1	Rocking fork
34/1794	1	Pin for 34/1792
34/1814	1	Pin for 34/1812 (see 34/1702)
34/1842	1	Pecker head
34/1845	1	Spring for pecker head
34/1852	1	U-bracket
34/1855	1	Bearing for 34/1852

9-6

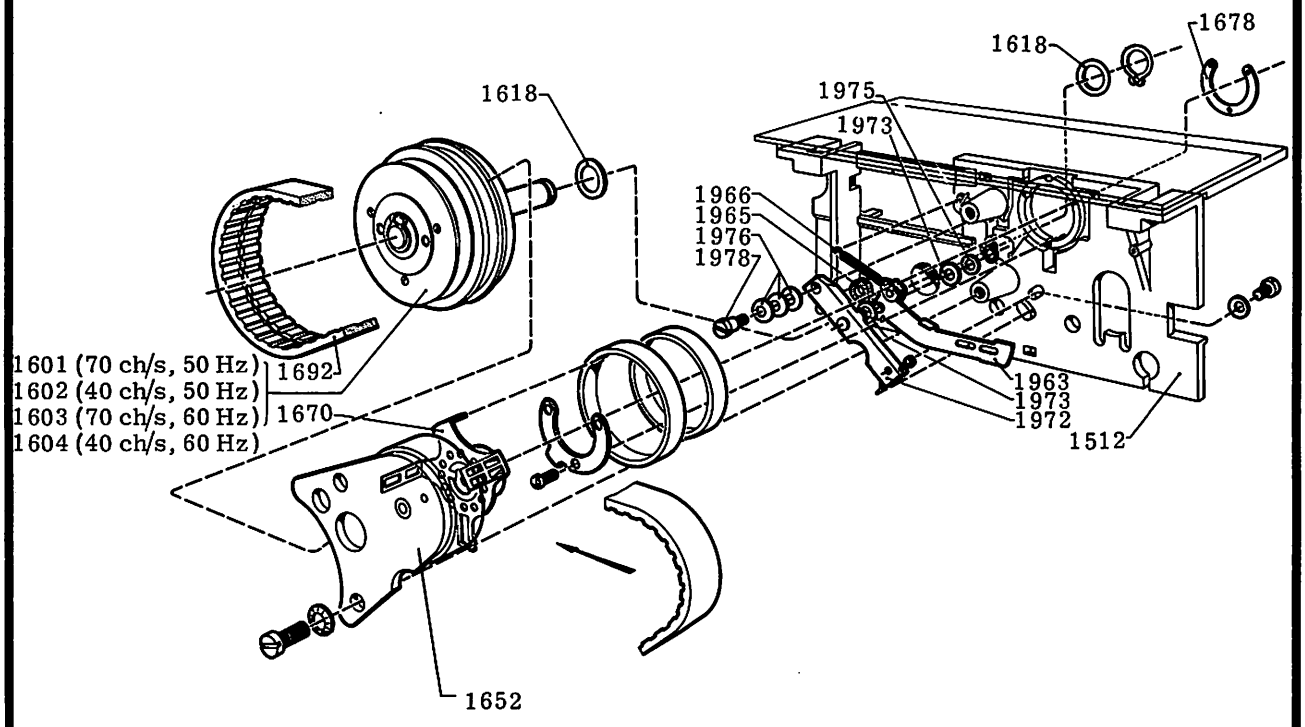
TAPE AND CARD PUNCH 34



No.	Qty.	PART NAME
34/2140	1	Card position switch
34/2174	1	Pushbutton for control circuit
34/2176	2	Spring for pushbutton
34/2196	1	Pushbutton for motor
34/2502	1	Patch board with control cable and plug
34/2518	2	Spacer bushing for 34/2502

9-7

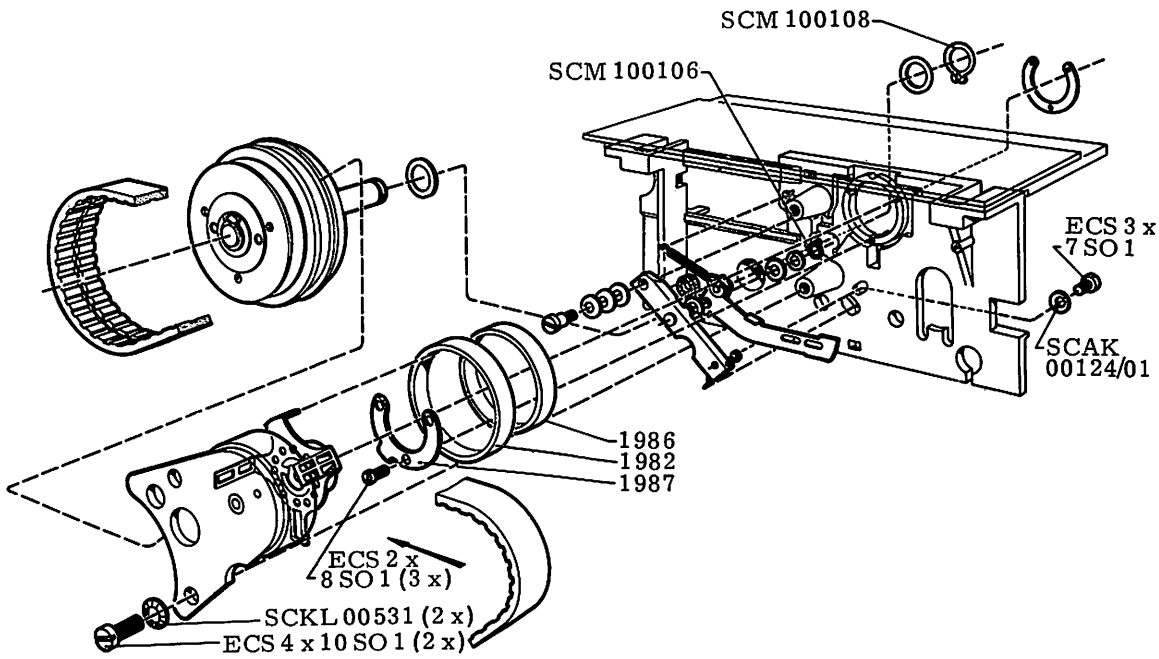
TAPE AND CARD PUNCH 34



No.	Qty.	PART NAME
34/1512	1	Chassis
34/1601	1	Centrifugal clutch, unit, 70 ch/s, 50 Hz
34/1602	1	Centrifugal clutch, unit, 40 ch/s, 50 Hz
34/1603	1	Centrifugal clutch, unit, 70 ch/s, 60 Hz
34/1604	1	Centrifugal clutch, unit, 40 ch/s, 60 Hz
34/1618	2	Washer, fibre, for 34/1601 etc.
34/1652	1	Guide plate with pulley
34/1670	1	Clutch, driven part
34/1678	1	Ball bearing retainer
34/1692	1	Drive belt, flat
34/1963	1	Clutch lever
34/1965	1	Lubrication felt
34/1966	1	Spring for 34/1963
34/1972	1	Bearing
34/1973	2	Washer
34/1975	1	Washer, fibre
34/1976	3	Spring washer
34/1978	1	Shoulder screw

9-8

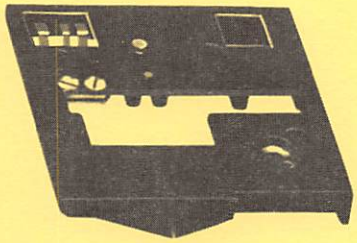
TAPE AND CARD PUNCH 34



No.	Qty.	PART NAME
34/1982	1	Brake ring, outer
34/1986	1	Brake ring, inner
34/1987	1	Support ring

9-9

TAPE AND CARD PUNCH 34



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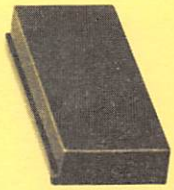

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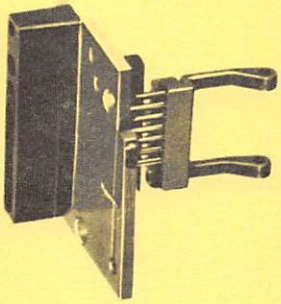


1703

1843

No.	Qty.	PART NAME
		SPECIAL PARTS FOR TTS
34/1552	1	Tape latch
34/1554	1	Tape guide
34/1566	(1)	Guide rail without pushbutton, left
34/1567	(1)	Guide rail without pushbutton, right
34/1568	1	Guide rail for pushbutton, left
34/1569	1	Guide rail for pushbutton, right
34/1703	1	Punch set, unit
34/1843	1	Pecker head

1568-0671

CHECK-BACK CONTACT UNIT 34/2800
DIRECTIONS FOR INSTALLATION AND ADJUSTMENT

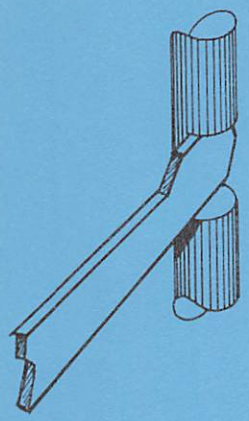


Fig.1

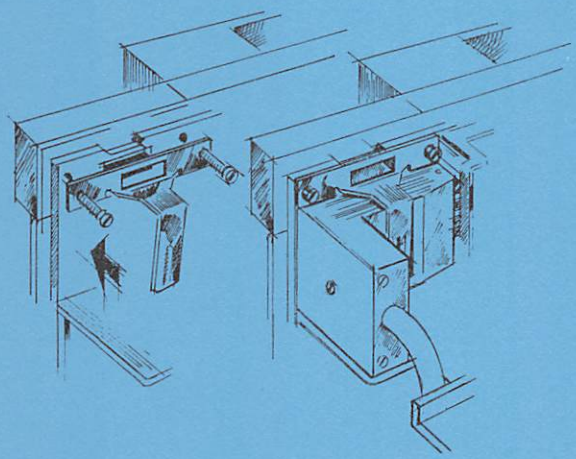


Fig.2A

Fig.2B

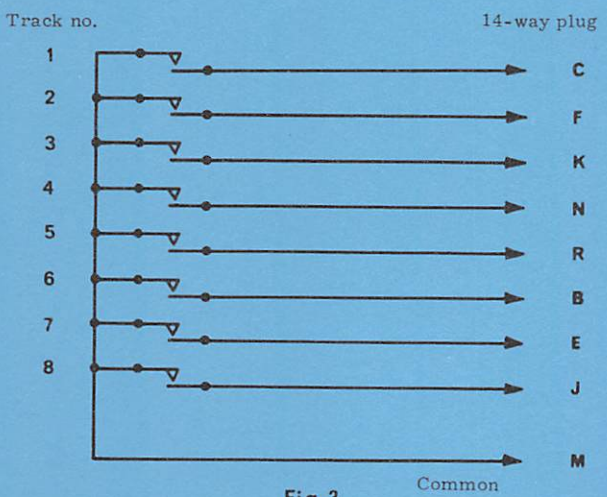


Fig.3

Note: Readjustment is necessary after adjusting of pin for rocking fork in accordance with 8.4.6.

DESCRIPTION

Check-back contact unit 34/2800 is an eight-channel double wire contact system designed for use in punch control systems for GNT AUTOMATIC Tape and Card Punch Model 34.

The movement of the contact wires is controlled by 8 spring-steel levers, which automatically engage the punch needles in the model 34, when the unit is plugged in. (Fig. 1)

SPECIFICATION

Contact Material:

Gold-plated silver-copper alloy.

Contact Configuration:

Double wire contacts type A, i.e. make contact with a common contact bail.

Contact Loading:

Max. 48 V, 100 mA resistive.

INSTALLATION (See Fig. 2)

The holding bracket 34/2845 should first be mounted. In model 34 with mains-switch, remove the push-button unit by pressing the button and disconnect the lower end of the stem from the micro-switch unit.

Unscrew the two fixing screws for the left-hand tape guide, place the bracket, insert and tighten the screws again.

It is then very easy to plug-in the contact unit by pushing it along the underside of the frame until it comes to a dead stop and at the same time is clipped in position by the bracket.

ADJUSTMENT

The contact unit is preadjusted at the factory but: A READJUSTMENT MUST BE CARRIED OUT AFTER INSTALLATION IN THE PUNCH.

The adjustment is carried out by moving the contact bail by means of the two adjusting screws at the bottom of the case.

The recommended position of the bail is defined as the setting (which gives the contacts a 35 to 39% duty cycle) with the punch running in the continous mode.

An easy way of checking this is to use an ordinary universal-meter with built-in batteries for resistance measurements. Use the Ω x 1 setting, but read the 0-100 DC scale.

Make arrangement which allow you to select punching in one channel at a time (our test equipment model 3480 may be used). Connect your meter to the corresponding check-back contact (see diagram, Fig. 3), start model 34 in continuous mode (bottom up, no tape). The meter reading will then directly show duty cycle in percentage. Check first ch. 1 and ch. 8 and adjust them to read approx. 37%. Control the other channels, which now should give readings within the above mentioned limits.

GNT AUTOMATIC A/S 6, Telefonvej . DK-2860 Copenhagen, Soeborg Denmark . Phone (01) 69 51 88 . Cables: Nortelmatic

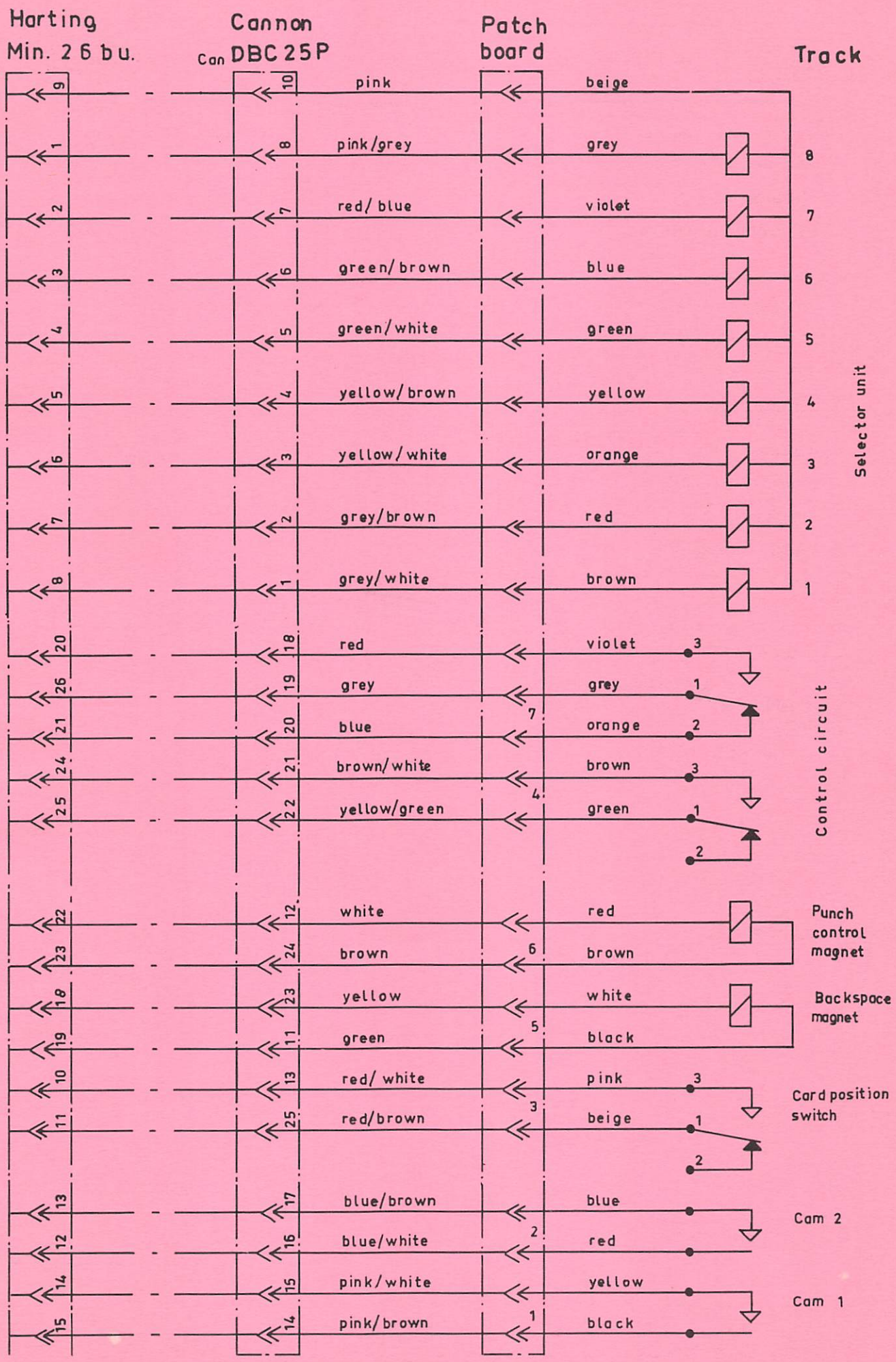


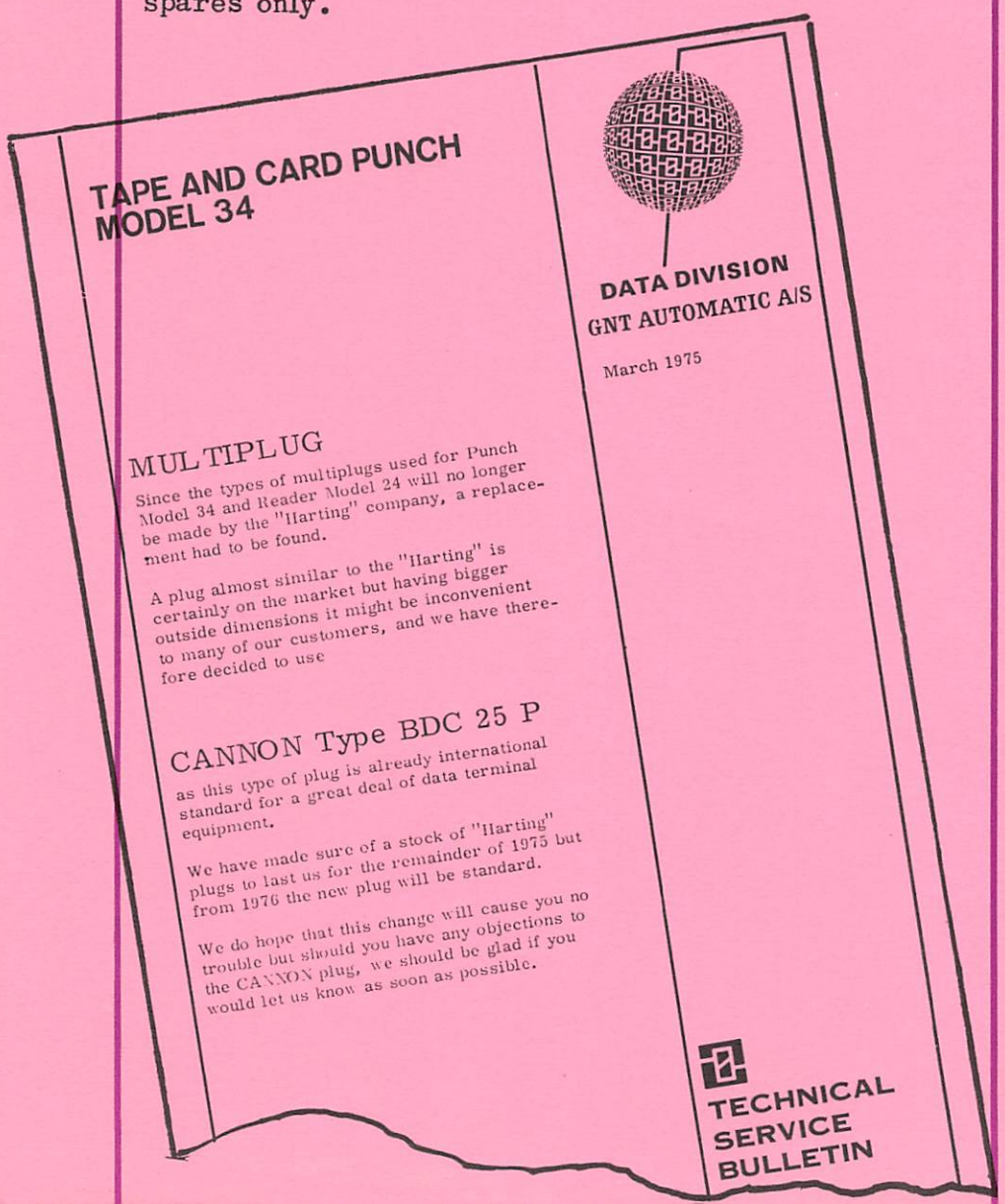
Diagram for punch mechanism

TAPE AND CARD PUNCH MODEL 34
Introduction of Cannon Plug Type BDC 25 P

A previous Technical Service Bulletin from March 1975 explained why the above plug would replace the previously used "Harting" plug on the control cable. See copy below.

The pin/signal relationships have also been changed, so the diagram shown on the reverse side of this service bulletin should be studied before making connection to a punch with Cannon plug.

We have been able to extend our stock of Harting plugs to last us through 1976. However, from January 1977 the new plug will be standard. A small supply of Harting plugs will be kept for spares only.



TAPE AND CARD PUNCH
MODEL 34

DATA DIVISION
GNT AUTOMATIC A/S

March 1975

MULTIPLUG

Since the types of multiplugs used for Punch Model 34 and Reader Model 24 will no longer be made by the "Harting" company, a replacement had to be found.

A plug almost similar to the "Harting" is certainly on the market but having bigger outside dimensions it might be inconvenient to many of our customers, and we have therefore decided to use

CANNON Type BDC 25 P

as this type of plug is already international standard for a great deal of data terminal equipment.

We have made sure of a stock of "Harting" plugs to last us for the remainder of 1975 but from 1976 the new plug will be standard.

We do hope that this change will cause you no trouble but should you have any objections to the CANNON plug, we should be glad if you would let us know as soon as possible.

TECHNICAL SERVICE BULLETIN

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JANUARY 1977

TECHNICAL SERVICE BULLETIN