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MINILOADER MODEL 1

THEORY GUIDE

Miniloaders with serial numbers 1217 and up.

KODAK LTD

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INDEX to THEORY GUIDE.

Changes to the cycle on MINILOADERS with serial number 1217 and up

RELAYS KR4B and KR4C added.

Double FILM detection in one position after MS4 operates.

Contact T1A-1 added in line 50A.

"Cassette entered" light stays on during the complete cycle.

"Low film" alarm inhibited during Serial Unload.

"Cassette abort" lamp stays on in memory.

"Cassette entered incorrectly" lamp stays on in memory.

MS9 and MS10 low voltage interlocks have been replaced by S26 and S27 (high voltage interlocks).

In SERIAL MODE the "LOW FILM' ALARM is turned off automatically.

NORMAL SEQUENCE - BRIEF DESCRIPTION.

Inserting a CASSETTE with the LATCH first and uppermost interrupts PHOTOCELL FC2. With the CAM in the home position, MICROSWITCH MS1 is energized. The interruption of PHOTOCELL FC2 energizes the CONVEYOR BELT MOTOR forward.

The CONVEYOR BELT carries the CASSETTE to the END STOP where it is detected by PHOTOCELL FC1 receiving a signal from the REFLECTIVE PATCH on the CASSETTE LID.

The signal from PHOTOCELL FC1 stops the CONVEYOR BELT MOTOR with the CASSETTE in position at the END STOP. The PHOTOCELL FC1 signal also starts the CAM MOTOR forward.

The CAM forward motion starts the CASSETTE opening cycle. The CLAW releases the CASSETTE LATCH and lifts the LID

MICROSWITCH MS5 operates to check that PHOTOCELL FC3 has been interrupted by the CASSETTE LID. PHOTOCELL FC3 indicates that the CASSETTE has opened.

MICROSWITCH MS17 operates to stop the CAM with the CASSETTE open 10 mm to allow the INJECTOR to operate to try to ensure the film is released from the top screen

MICROSWITCH MS3 operates to check that there is not a FILM stuck to the UPPER SCREEN. On a normal cycle PHOTOCELL FC4 can see the REFLECTIVE PATCH on the UPPER SCREEN and the cycle will continue. A dwell period is provided on the CAM to allow this check to happen whilst the CAM is moving. If a film is stuck to the UPPER SCREEN, then the CAM is stopped to allow air to be injected in pulses to release the FILM to enable it to drop into its correct position on the LOWER SCREEN.
TIMER T3 controls this period and restarts the CAM on completion of this operation.

The CAM continues and de-activates MICROSWITCH MS3. AT this point PHOTOCELL FC1 checks that the EXPOSED FILM has been removed from the CASSETTE.

MICROSWITCH MS8 operates to check PHOTOCELL FC7 (and PHOTOCELL FC 9 if a VERTICAL INTERFACE with a PHOTOCELL is fitted), to see if a film is jammed in the CHUTE - or - the EXPOSED FILM MAGAZINE is full, according to which model it is. If a FILM is jammed or the MAGAZINE is full the vacuum will be turned off to prevent the EXPOSED FILM being picked up

The CAMS continue to rotate bringing the CASSETTE and MAGAZINE SUCKERS down onto the exposed and unexposed films

MICROSWITCH MS2 operates to stop the CAM MOTOR and start TIMERS T4 and T2. TIMER T4 provides time to pick up the exposed and unexposed films and when it times out after 1 second it starts the TILT MECHANISM which rotates the SUCKERS into the tilt position to separate the FILM.

TIMER T2 controls the tilt time between 0 and 7 seconds (adjustable) to allow time for the film to separate. TIMER T2 times out and restarts the CAM MOTOR forward.

MICROSWITCH MS7 operates to check PHOTOCELL FC1 to see if the exposed film has been picked up from the CASSETTE.

MICROSWITCH MS4 operates to energize the TILT MOTOR to remove the tilt. At the same time it stops the CAM to enable multiple film detection to be carried out by PHOTOCELL FC8 whilst the FILM is stationary. TIMER T8 controls this time and restarts the CAM when it times out.

MICROSWITCHES MS13 and MS15 de-energize the TILT MOTOR with the SUCKERS in the horizontal position.

The CAM MOTOR continues to rotate, carrying the FILMS to their respective destinations.

MICROSWITCH MS6 operates to de-energize the SOLENOID VALVES and VACUUM PUMPS to release the exposed and unexposed FILMS into the MAGAZINE or CHUTE and CASSETTE respectively.

MICROSWITCH MS16 operates to check that PHOTOCELL FC1 has detected that an unexposed FILM has been placed in the CASSETTE.

The CAMS complete the cycle and energize MICROSWITCH MS1.

The CONVEYOR BELT is energized in reverse and the cassette is ejected. The CASSETTE interrupts PHOTOCELL FC2 on the way out which energizes TIMER T6. TIMER T6 allows time for the CASSETTE to be ejected before the CONVEYOR BELT stops.

NORMAL CYCLE - IN DETAIL.

When the cams are in the home position MICROSWITCH MS1 **(33) is** closed.

At power up FC2 (30), TIMER T12 **(33)** and "POWER ON "LAMP **(38) [via** MS11 and MS12] are energised.

MICROSWITCH MS-1 **(33)** energises RELAYS KR1 **(33)** KR1A **(34)** and KR1B (35).

KR1-11(36) enables KRM (36).

Timer T12 times out to give electronics time to warm up and PHOTOCELL FC2 to operate and KT12-1 (36) enables RELAY KRM.

KR1B-2 (79) enables CAM reset control.

KR1A-1 **(87)** opens to inhibit CAM RELAY KC (87).

KR1-2 **(43)** enables KN, KNA and "CASSETTE ENTERED" LAMP **(42-45).**

When the operator feeds a cassette:

PHOTOCELL FC2 **(30)** is interrupted by the CASSETTE and KFC2-1 **(36)** energises RELAY KRM **(36).**

KRM-1 **(37)** holds RELAY KRM **(36).**

KRM-2 **(40)** completes the -12 volts line and energises **:-**

PHOTOCELLS FC1, FC3, FC4, FC5, FC6, FC7 and FC8.

RELAYS KM1 (144), KS (151) and TIMER T7 (145)

RELAYS KN, KNA and "CASSETTE ENTERED" LAMP **(42 to 45)**

CONTACTS KS-1 (54A) and K5-2 (80) inhibit BELT RETURN and RESET

KM1-1 **(5) energises** the COMPRESSOR.

TIMER T7 (145) times out after 1 sec. and KT7-1 and KT7-2 (104 - 71) open to de-energizes SOLENOID VALVES S1 and S2 closed (to give COMPRESSOR time to start).

Contacts KN (15) energise CONVEYOR BELT FORWARD and carry the CASSETTE to the END STOP.

When the CASSETTE arrives at the END STOP it interrupts PHOTOCELL FC1.

PHOTOCELL FC1 **(146) sees** the reflective patch on the LID of the CASSETTE and energises RELAY KFC1.

KFC1-1(51) energises RELAYS KFC1A, KFC1B, KFC1C. KFC1D and KFC1E (51-54).

KFC1A-1 (52) self holds RELAYS KFC1A KFC1B, KFC1C. KFC1D and KFC1E (51-54).

KFC1A-2 (43) de-energizes RELAYS KN, KNA. and "CASSETTE ENTERED INCORRECTLY" LAMP (42-45)

Contacts KN (15) de-energise CONVEYOR BELT FORWARD.

KFC1B-1 (88) energises RELAYS KC and KCA and TIMER T9 (87-89)

Contacts KC (19) energise CAM MOTOR FORWARD.

KCA-2 (87) enables self hold of RELAYS KC, KCA and TIMER T9.

MICROSWITCH MS1 (33) operates and de-energizes RELAYS KR-1, KR1A and KR1B.

KR1A-1 (87) closes to maintain RELAY KC, etc? energised after TIMER T3 has operated later in the cycle

The CLAW opens the CASSETTE LID which interrupts PHOTOCELL FC3 (147).

PHOTOCELL FC-3 (147) energises RELAY KFC3.

KFC3-1 (96A) energises RELAY KFC3A (96A).

KFC3A-2 (97) self holds RELAY KFC3A (96A).

Note: KFC1E-1 (96A) ensures that PHOTOCELL FC3 does not lock-up immediately PHOTOCELL FC2 is interrupted.

MICROSWITCH S5 (62) operates to check if CASSETTE LID has opened. On a normal cycle the lid opens and KFC3A-1 (62) inhibits RELAYS KRX KRXA and KT5A (61A-63).

The opening cycle continues and MS17 (101A) operates via MS3 and energises RELAY KR13, KL and TIMER T13.

KR13-2 (101B) self holds RELAY KR13 and TIMER T13 (101A-101B).

KR13-1 (87) opens to de-energise RELAYS KC,KCA and TIMER T9.

Contacts KC (19) de-energise the cam to stop the cycle with the CASSETTE LID just open.

KL-2 (103A) energises SOLENOID VALVE S1 open via diode to inject air to release the FILM in case it is stuck to the UPPER SCREEN.

TIMER T13 (101B) times out and T13-1 (88) closes to re-energise RELAYS KC, KCA and TIMER T9.

Contacts KC (19) restart the CAM forward.

MICROSWITCH MS17 (101A) de-energizes RELAY KL and contact KL-2 (103A) de-energizes SOLENOID VALVE SV1 to end the air injection.

The opening cycle continues and MICROSWITCH MS3 (99A) operates and energises RELAYS KR3, KR3A, KR3B and KR3C (97-99A)

KR3A-1 (98) self holds RELAYS KR3, KR3A and KR3B.

KR3-1 (87) and KR3-2 (88) open to stop CAM.

KR3B-1 (43) inhibits CONVEYOR forward.

KR3C-1 (152) changes over and energises RELAY KRO and the CAPACITOR

The CAPACITOR holds RELAY KRO energised for 0.5 SECS. after MS3 operates when the CAM de-energizes it.

KRO-1 (153) enables RELAY KRP.

KRP-1 (109) enables RELAY KF1 and "FILM NOT REMOVED FROM CASSETTE "LAMP to check that there is a FILM in the CASSETTE.

MICROSWITCH MS8 (134) operates to check FC7 to see if there is a FILM jammed in the CHUTE - or - the EXPOSED FILM MAGAZINE is full, according to which version machine it is. On a normal cycle FC7 will see its REFLECTIVE PATCH and inhibit RELAYS KFC7 and KFC7A (133 - 134).

PHOTOCELL FC4 checks to see if a FILM is on the UPPER SCREEN. PHOTOCELL FC4 looks at the REFLECTIVE PATCH on the UPPER SCREEN and with no FILM present on a normal cycle it will see the REFLECTIVE PATCH and energise RELAY KFC4 (148).

KFC4-1 (95) energises RELAYS KFC4A and KFC4B (95-96).

KFC4A-1(96) self holds RELAY KFC4A.

KFC4A-2 (99) energises RELAY KR5.

KR5-1 (100) changes over to self hold RELAY KR-5 (100) and inhibit RELAY KL which prevents the injector cycle operating on a normal cycle.

Note :- TIMER T13 is already held energised in the timed out condition by KR13-2 (101B).

KR5-2 (105) energises RELAY KT3A

KT3A-1 (106) self holds RELAY KT3A

KT3A-2 (88) maintains the CAM in motion.

MICROSWITCH MS3 operates and de-energizes RELAY KR3C.

KRC3-1 (152) changes over energising RELAY KRP (153) whilst KRO-1 remains closed until 47 Mf discharges de-energizes RELAY KRO

KRP-1 (109) checks CASSETTE has a FILM in it.

MICROSWITCH MS2 (73) operates and energises KR2, KR2A, KR2B, KR2C, and TIMERS T2 and T4 (73-79).

KR2A-1 (74) self holds RELAYS KR2 etc;?

KR2A-1 (87) de-energizes RELAY KC

Contacts KC (19) de-energise the CAM MOTOR to stop the cycle with the CASSETTE and MAGAZINE SUCKERS in contact with the exposed and unexposed FILM in the CASSETTE and MAGAZINE respectively.

Vacuum is applied to pick up the respective FILMS when;

KR2C-2 (119) energises RELAYS KPC and KM2 and SOLENOID VALVE S3 (119-121).

KR2C-1 (122) energises RELAYS KPM and KM3 and SOLENOID VALVE S4 (122-124).

KM2 (6) energises the CASSETTE VACUUM PUMP M2 (6).

KM3 (7) energises the MAGAZINE VACUUM PUMP M3 (7) .

KPM-1 (123) self holds RELAYS KPM and KM3 and SOLENOID VALVE S4 closed.

KPC-1 (120) self holds RELAYS KPC and KM2 and SOLENOID VALVE S3 closed.

TIMER T4 times out after 1 sec. to allow time for the vacuums to build up to pick up the FILMS.

KT4-1 (71) energises RELAY KW (71) via MS14.

Contacts KW (13) energise the TILT MOTOR M5 (13). During the rotation the first CAM lifts the FILM clear of the top of the stack before the second CAM rotates it into the tilt position where it is stopped by MS14 (71) opening.

TIMER T2 times out after 2 secs. and KT2-1 (86) energises RELAYS KC, KCA and TIMER T9 (87-89).

Contacts KC (19) energise the CAM MOTOR M7 (23) forward.

MICROSWITCH MS7 (92) operates to check PHOTOCELL FC1 to see that the EXPOSED FILM has been picked up from the CASSETTE. KFC1C-2 (92) remains open on a normal cycle and inhibits RELAYS KR7 and KR7A and TIMER T8 (92-94).

MICROSWITCH MS-4 (66) operates and energises RELAYS KR4, KR4A,KR4B and KR4C (64-70).

KR4C-2 (87) stops the Cam and KR4B-1 (139) enables DOUBLE-FILM detection.

KR4C-1 self-holds **RELAY** KR4C (64) and energises TIMER T8 (92) via the DIODE.

KR4-2 (70) energises RELAY KW.

KR4-1 (70) closes to maintain circuit to RELAY KW (71) via MS13 (70).

Contacts KW (13) energise TILT MOTOR M5 to remove the tilt which is then stopped by MS13 (70) opening

TIMER T8 times out and KT8-1 (86) energises RELAY KC to restart the CAM.

KT8-2 (94) self holds TIMER T8.

The transport mechanism carries the FILMS to their respective destinations.

MICROSWITCH MS6 (118) operates and energises RELAY KR6 (118) KR6-1 (119) de-energizes RELAYS KM2. KM3. KPC and KPM and SOLENOID VALVES S3 and S4 open (119-124).

KM2 and KM3 (6-7) de-energise the **VACUUM PUMPS.**

SOLENOID VALVES S3 and S4 vent the vacuum and the FILMS are released.

The exposed FILM is dropped into the RECEIVING MAGAZINE or CHUTE according to which model it is.

The UNEXPOSED FILM is dropped into the CASSETTE.

MICROSWITCH MS16 (112) operates and checks PHOTOCELL FC1 to confirm that a FILM is in the CASSETTE. Note :- on a normal cycle KFC1B-2 (111) remains open to inhibit RELAY KF2.

The CAM CYCLE is completed and MS1 is energised

MS1 (32) energises RELAYS KR1, KR1A and KR1B (32-35)

KR1A-1 (87) de-energizes RELAY KC, etc.

Contacts KC (19) de-energise the CAM MOTOR M7.

KR1B-1 **(58)** energises RELAYS KNRA, KNRB, KNRC, KNRD and TIMER T5 and enables KNR (56-61).

TIMER T5 times out and KT5-1 (56) energises RELAY KNR.

Contacts KNR (17) energise the CONVEYOR BELT REVERSE to carry the CASSETTE back out of the MACHINE.

KNRB-1 **(56)** self holds RELAYS KNR etc.

KNRA-2 (106A) enables RELAYS KA, KM and TIMER T14 (106A-107)

The returning CASSETTE interrupts PHOTOCELL FC2 and energises RELAY KFC2.

KFC2-2 (106A) closes, energising RELAYS KA,KM and TIMER T14 (106A-107).

KA-1 (106B) self holds RELAY KA, etc.

KA-2 **(60)** energises TIMER T6 (60).

KM-2 (36) opens to inhibit cassette entry on the next cycle.

T6 times out and opens contact KT6-1 (36) which de-energizes RELAY KRM.

KRM-2 (41) contact opens to break the - VE line to complete the cycle.

TIMER T14 (107) is maintained energised via KM-l, T14-1 (107) and the memory circuit preventing the machine being energised for the next cycle until it has timed out.

TIMER T14 times out and T14-1 (107) de-energizes RELAY KM.

KM-2 (36) closes enabling the next cycle.

START SERIAL UNLOADING.

Pressing the START SERIAL UNLOADING BUTTON S18 energises RELAYS KAOT and KAOT1 (115-116).

KAOT1-1(116) self holds RELAYS KAOT and KAOTA through KF1 and KF2 (or KNRD-1 (117) following a "failure to load or unload "cycle)

KAOT-2 (in TIMER T6 circuit) changes TIMER T6 timout time.

KAOT1-2 (128) inhibits LOW FILM ALARM.

The machine continues the normal cycle of operations after entering the CASSETTE until the CAM reaches the zero position and MS-1 energises the KR RELAYS through KR1B-1 (58).

The CONVEYOR reverses and carries the CASSETTE out to interupt FC- 2. Instead of the normal T6 timeout of 3 seconds, the TIMER T6 times out very quickly via the 1 k resistor in the timer circuit whick has been connected by KAOT-2 (see timer circuit).

TIMER T6 times out as the CASSETTE is passing through PHOTOCELL FC2 and energises RELAY KFC2

KT6-1 (36) opening ends the cycle and de-energises RELAY KRM with the CASSETTE interrupting PHOTOCELL FC-2.

RELAY KRM de-energising resets TIMER T6 closing KT6-1 which enables the next cycle.

At the same time KFC2-2 (106A) closes to energise RELAYS KA,KM and TIMER T14 (106A-107).

KA-1 (106B) self holds RELAY KA, etc.

KM-2 (36) opens to inhibit the next cycle.

TIMER T14 is maintained energised via KM-l. T14-1 (107) and the memory circuit preventing the next cycle until it has timed out and opened T14-1 to de-energise RELAY KM and TIMER T14.

KM-2 **(36)** closes to restart the next cycle.

After the last FILM has been unloaded from the cassette PHOTOCELL FC-1 will detect the CASSETTE is empty on the next cycle. MS7 checks PHOTOCELL FC-1, KFC1C-2 (92) remains closed and energises RELAYS KR7, KR7A and TIMER T8 (92-94).

KR7-2 (112) energises RELAY KF2.

KF2-2 (116) contact opens to de-energise RELAYS KAOT and KAOTA and end the SERIAL UNLOAD cycles.

STOP SERIAL UNLOADING.

Pressing the STOP SERIAL UNLOADING BUTTON energises RELAY KG (138) KG-1 (116) de-energizes RELAYS KAOT and KAOT1 (115-116) to allow the machine to return to a normal cycle

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CASSETTE EJECT.

The CASSETTE RETURN BUTTON (54A) is inhibited during a normal cycle by KS-1 (54) and can only be used when RELAY KRM is de-energized.

To eject a CASSETTE press BELT RETURN BUTTON S21 (54) which energises KNRE, the 4700 mF CAPACITOR, RELAY KNR and "CASSETTE EJECT" LAMP (53 to **56).**

The DIODE (56) inhibits RELAYS KNRA etc.

CONTACTS KNR (17) energise the CONVEYOR BELT Reverse until the CAPACITOR discharges de-energizes RELAYS KNRE, KNR and the "CASSETTE EJECT" LAMP after approx. 2 secs.

Contacts KNR (17) de-energizes the CONVEYOR BELT MOTOR in reverse to stop the CONVEYOR BELT and complete the cycle.

INCORRECT FEEDING OF CASSETTE.

If the CASSETTE is entered incorrectly, PHOTOCELL FC1 does not see the REFLECTIVE PATCH on the top of the CASSETTE and does not energise RELAY KFC1.

KFC1-1 (51) remains open and leaves RELAYS KFC1A, KFC1B, KFC1C, KFC1D and KFC1E de-energised (51-54).

KFC1A-2 (43) remains closed energising TIMER Tl.keeping RELAY T1A, TIMER T1 and "CASSETTE ENTERED INCORRECTLY" LAMP energised.

TIMER T1 **(46)** times out taking PIN 5 lo, energising RELAY KT1A (50A).

KT1A-1 (50A) self holds RELAY KT1A and "CASSETTE ENETERD INCORRECTLY" LAMP (50) energised in the memory circuit.

TIMER T1 times out after 4 secs..

KT1-1 **(43)** de-energizes RELAYS KN, and KNA (42-43)and "CASSETTE ENTERED" LAMP (41-45).

Contacts KN (15) de-energise the CONVEYOR BELT MOTOR M6 forward KT1-2 (59) energises the CONVEYOR BELT MOTOR M6 in reverse. The normal cycle continues until completion.

MULTIPLE FILM LOAD ALARM.

The normal cycle commences energising FC8 and CONVEYOR forward

CONTACT **KNA-2 (139)** opens to inhibit RELAY KFC8

CONTACT KNA-2 (139) closes again when the CONVEYOR stops and together the FC-4 and KR4B-1 (139) inhibits RELAY KFC8 and "DOUBLE THICKNESS" LAMP and ALARM BUZZER.

Note: A double FILM will take PIN 13 of PHOTOCELL FC8CHIP TCA 965 Lo, closing FC8-1.

At the point in the cycle when MICROSWITCH MS4 operates KR4B-1 (139) will energise RELAYS KFC8, KR, "DOUBLE FILM" LAMP, BUZZER and TIMER T11. Note: A short delay controlled by a CAPACITOR in PHOTOCELL FC8 delays the PHOTOCELL looking until the tilt i s zero.

KFC8-2 self holds KFC8 and LAMP ON in the MEMORY LINE.

KR-1 (142) self holds RELAY KR and TIMER T11.

KT11-1 (143) de-energizes BUZZER when T11 times out.

CASSETTE FAILED TO OPEN.

MS5 (62) operates to check if **PHOTOCELL FC3** has seen that the CASSETTE has opened.

If the CASSETTE failed to open PHOTOCELL FC3 will not energise RELAY KFC3

KFC3-1 (96A) remains open therefore RELAY KFC3A remains de-energised.

KFC3A -1 (62) energises RELAYS KRX, KRXA KT5A KR and TIMER T11(61A, 62, 63, 141 and 142).).

KRX-2 (63) self holds RELAYS KRX, KRXA KT5A KR and TIMER T11.

KT5A-2 self holds RELAY KT5A.

KRXA-2 (87) changes over to de-energise RELAY KC and energise RELAY KCR through T10-1 (91).

Contacts KCR (22) energise CAM MOTOR M7 in reverse until it reaches MS1.

MS1 energises KR1, KR1A and KR1B.

KR1B **(56)** energises RELAYS KNRA, KNRB, KNRC, KNRD and TIMER T5 (61) and enables RELAY KNR.

KR1A-2 (90) energises TIMER T10 (90).

TIMER T10 times out and KT10-1 (91) de-energizes RELAY KCR.

KT10-2 (89) self holds TIMER T10.

Contacts KCR (22) open to de-energise the CAM MOTOR M7 in reverse

Note:- the timing delay of T10 ensures that the CASSETTE OPENER MECHANISM clears the CASSETTE LATCH after MS1 operates and before the CAM stops in the home position

TIMER T5 times out after 1 sec.

KT5-1 (56) energises RELAY KNR

KR-1 (142) self holds TIMER T11 and RELAY KR energised.

KT11-1 (143) energises BUZZER until TIMER T11 times out.

T5A-1 (151) energises "ABORT" LAMP.

The normal cycle continues to completion.

RESET.

The RESET BUTTON is inhibited during a normal cycle by KS-2 (80) and can only be operated when RELAY KRM is de-energised.

Pressing RESET **(80)** energises RELAY KB, "RESET" LAMP and RELAY KC through the DIODE (80-87)

KB-2 (79) self holds RELAY KB.

Contacts KC (19) energise CAM MOTOR back to home position and energises MICROSWITCH MS-1 and RELAY KR1.

KR1B-2 **(79)** opens to de-energise CAM MOTOR.

EXPOSED FILM ON UPPER SCREEN.

MS3 checks for FILM on the **UPPER SCREEN**

MS3 energises RELAYS KR3, KR3A, KR3B and KR3C.

KR3-1 and KR3-2 (87-88) de-energise RELAY KC.

Contact KC (19) de-energises CAM MOTOR M7.

PHOTOCELL FC4 does not see the **UPPER SCREEN** REFLECTIVE PATCH because it is covered by the FILM stuck to the UPPER SCREEN. PHOTOCELL FC4 does not energise RELAY FC4-1 (95) and KFC4B. KFC4-1 (95) remains closed, energising RELAYS KFC4A AND KFC4B (95 AND 96).

KFC4A-1 (96) self holds RELAYS KFC4A, etc.

KFC4-2 (99A) remains open leaving RELAY KR5 de-energised.

KR5-1 (101) energises RELAYS KL, KR13 and TIMERS T13 and T3.

Note :- TIMER T13 has already timed out and is held in this state by KR13-2 (101B).

Air is injected in pulses controlled by the ON / OFF TIMER CIRCUIT KL which energises SOLENOID VALVE SV1 open and closed through contact KL-1 (103) to release the **FILM** from the UPPER SCREEN during the timing of T3.

Because the FILM failed to drop into its correct place in the CASSETTE immediately so that it could be unloaded, KFC4A-2 (122) de-energizes SOLENOID VALVE S4 to drop the UNEXPOSED FILM back into the MAGAZINE.

TIMER T3 times out after 6 secs. and energises RELAY KT3A (105).

KT3A-2 (88) energises RELAY KC.

Contacts KC (19) energise CAM MOTOR FORWARD.

The normal cycle resumes to completion.

MAGAZINE NEARLY EMPTY.

PHOTOCELL FC5 detects MAGAZINE nearly empty.

FC5 energises RELAY KFC5 (128).

KFC5-1 **(128)** self holds RELAY KFC5, and energises "MAGAZINE NEARLY EMPTY" LAMP, RELAY KR and TIMER T11.

KR-1 (142) self holds RELAY KR and TIMER T11.

KNA-1 (108) holds LAMP on in the memory until the next cycle.

KT11-1 energises BUZZER for the duration of TIMER T11.

MAGAZINE EMPTY.

PHOTOCELL FC-6 detects MAGAZINE empty.

FC-6 energises RELAY KFC6 (130).

KFC6-2 (128) inhibits "MAGAZINE NEARLY EMPTY" LAMP.

KFC6-1 (131) self holds RELAY KFC6 and energises "MAGAZINE EMPTY" LAMP, RELAY KR and TIMER T11.

KR-1 (142) self holds RELAY KR and TIMER T11.

KNA-1 (108) holds LAMP on in the memory line until the next cycle.

KT11-1 energises the BUZZER for the duration of T11 TIMER.

EXPOSED FILM MAGAZINE FULL or FILM JAMMED IN TUNNEL.

PHOTOCELL FC-7 detects MAGAZINE FULL / FILM jammed in TUNNEL (DEPENDING ON THE MODEL).

If the MAGAZINE is full or there is a FILM jammed in the TUNNEL then the PHOTOCELL will be blocked and energise RELAYS KFC7 (133). KFC7-2 (134) enables RELAY KFC7A.

MICROSWITCH MS-8 operates to check if the MAGAZINE is full or a FILM is jammed in the tunnel.

With a full MAGAZINE or FILM jammed in the TUNNEL, RELAYS KFC7A, KR, TIMER T11 and LAMP are energised through KFC7-2.

KFC7A-1 (135) self holds RELAYS KFC7A and MAGAZINE FULL or "FILM JAMMED IN TUNNEL" LAMP on.

KR-1 (142) self holds TIMER T11 and RELAY KR.

KFC7A-2 (119) prevents exposed FILM pick up from CASSETTE.

KT11-1 (143) keeps BUZZER energised for the duration of T11 TIMER cycle.

UNLOAD FAILURE.

MS-7 operates to check if EXPOSED FILM has been picked up from the CASSETTE.

Because the FILM has remained in the CASSETTE, PHOTOCELL FC1 cannot see the REFLECTIVE PATCH on the LOWER SCREEN. Therefore contact KFC1C-2 (92) remains closed and KFC1D-1 **(108)** changes over to enable TIMER T8, RELAYS KR7, KR7A (92-94), KF1 and "FILM NOT REMOVED FROM CASSETTE" LAMP (108-109)

At the stage in the cycle that the CAM de-energises MICROSWITCH MS3, RELAY KR3C de-energises and KR3C-1 (151) energises RELAY KRP via KRO (153).

KRP-1 (109) energise RELAY KF1, and "FILM NOT REMOVED FROM THE CASSETTE" LAMP (108-109).

KF1-1 (110) self holds RELAY KF1 and LAMP energised via KNA-1 (108) and the memory circuit.

KF1-1 also energises TIMER T11 and RELAY KR.

KR-1 (142) self holds TIMER T11 and RELAY KR energised.

KT11-1 (143) energises BUZZER until TIMER T11 times out and opens KT11-1.

MS-7 operates to check if EXPOSED FILM has been picked up from the CASSETTE.

MS7 (92) energises TIMER T8 and RELAYS KR7 and KR7A through KFC1C-2 (92-94).

KR7A-2 (93) self holds RELAYS KR7 and KR7A.

KR7-1 (87) opens to de-energise RELAY KC (87).

KR7A-1 (122) opens to de-energise RELAYS KPM and KM3 and SOLENOID

VALVE S4 to release vacuum to drop UNEXPOSED FILM back into the MAGAZINE.

Contacts KC (19) stop the CAM to enable the FILM to be dropped back into the MAGAZINE.

KR7-2 **(112) enables** RELAY KF2 and "CASSETTE NOT RELOADED" LAMP.

KM3 (7) de-energizes the VACUUM PUMP.

TIMER T8 (92) times out after 1 second.

KT8-2 (94) self holds TIMER **T8 RELAY (92).**

KT8-1 (86) energises RELAY KC.

Contacts KC (19) restart the CAM to complete the cycle.

At the end of the cycle MS16 (112) operates to check if the CASSETTE has been reloaded and energises RELAY KF2 and "CASSETTE NOT RELOADED" LAMP through KR7-2 (112 - 114)

MICROSWITCH AND SWITCH CONTACT LOCATOR.

MICROSWITCH	LINE	PURPOSE
MS 1	33	CAM HOME POSITION
MS 2	73	STOPS CAM TO PICK UP FILM
MS 3	99A	FILM ON UPPER SCREEN? - FC 4
MS 4	66	RETURNS TILT MOTOR + PAUSE FOR FC 8
MS 5	62	CASSETTE LID OPEN? - FC 3
MS 6	118	VENTS VACUUM TO DROP FILMS
MS 7	92	FILM PICKED UP FROM CASS? - FC 1
MS 8	134	FILM JAM IN TUNNEL or MAG FULL - FC7
MS 11	39	RECEIVING MAGAZINE PRESENT - SA ONLY
MS 12	39	UNEXPOSED FILM MAGAZINE PRESENT
MS 13	70	STOPS TILT MOTOR IN HORIZONTAL POSN.
MS 14	71	STOPS TILT MOTOR IN TILT POSITION'
MS 15	66	PREVENTS TILT MOTOR CYCLING - STEP BY STEP MODE.
MS 16	112	CASSETTE RELOADED? - FC 1
MS 17	101A	STOPS CAM FOR FIRST INJECTOR PAUSE

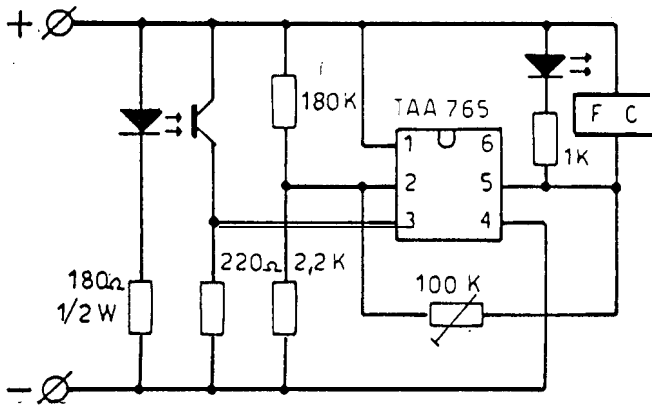
SWITCHES	LINE	PURPOSE
CB 1	1	MAIN CIRCUIT BREAKER
S 16		CAM JOG SWITCH
s 17	125	UNLOAD ONLY
S 18	115	SERIAL MODE START
s 19	138	SERIAL INTERUPT
s 20	80	RESET
s 21	54A	CASSETTE EJECT
S 23	88	TIMER T 9 INHIBIT
S 24	2	KEY SWITCH
S 25	1A	LID INTERLOCK SWITCH
S 26	2	FRONT DOOR INTERLOCK
S 27	2A	RECEIVING MAGAZINE INTERLOCK - SA

RELAY, PHOTOCELL AND **TIMEX,** CONTACT AND COIL LOCATOR.

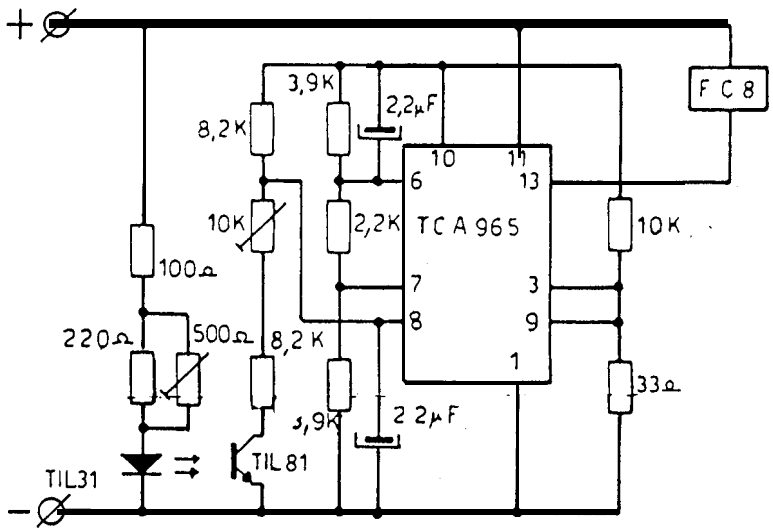
RELAYS	CIRCUIT DRAWING LINE NUMBER COIL	-1	-2	CO	PCB
FC1	146	51			101A/B
FC2	30	36	106A		101A/B
FC3	147	96A			102A
FC4	148	95	99A		102A
FC5	128	128			105B
FC6	131	131	128		105B
FC7	133		134		105B
FC8	149	139(-1 OR -2)			105B
KA	106A	106B	60		101A/B
KAOT	115	IN T6 TIMER			101A/B
KA0T1	116	38	128		105B
KB	80	to	79		104A
KC	87	(-1 -4 LINES 19, 20)			106B
KCA	89	58	87		103A
KCR	91	(-1 to -4 LINES 22, 23)			106B
KF1	108	110	116		105B
KF2	112	114	116		105B
KFC1A	52	52	43		101A/B
KFC1B	53	88	111		103A
KFC1C	54		92		104A
KFC1D	51	108,109 & 119			105B
KFC1E	53A	96A(-1 OR-2)			102A
KFC3A	96A	62	97		102A
KFC4A	95	96	122		105B
KFC4B	96	103			102A
KFC7A	134	135	119		105B
KFC8	140		116&140		105B
KG	138	116			107A/B
KL	101	103	103A		102A
KM	106B	107	36		101A/B
KM1	144	5	**		106B
KM2	120	6	**		106B
KM3		7			106B
KN	123	(-1 TO -4 LINES*;5 ,16)			106B
KNA	43	108	139		105B
KNB	NOT ON CIRCUIT DRAWING				108A
KNR	56	(-1 to -4 LINES 17, 18)			106B
KNRA	56A		106A		101A/B
KNRB	57	56			102A
KNRC	58	125			104A
KNRD	59	117(-1 OR -2)			105B
KNRE	54A	36 (-1 or-2)			106B
KPC	119	120			104A
KPM	122	123			104A
KR	142	142			107A/B

RELAY, PHOTOCELL AND TIMER, CONTACT AND COIL LOCATOR cont.

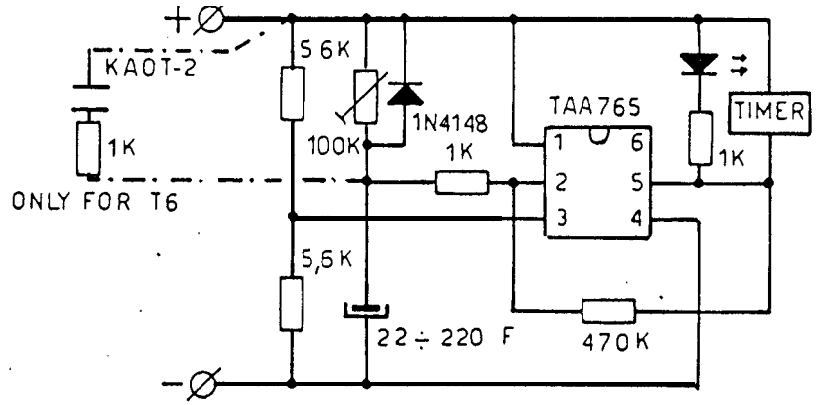
RELAYS	CIRCUIT DRAWING LINE NUMBER COIL	-1	-2	CO	PCB
KR1	33	36	43		101A/B
KR1A	142	87	90		103A
KR1B	35	58	79		102A
K2R	73	58			102A
KR2A	74	74 & 87			103A
KR2B	75	NO CONTACTS			104A
KR2C	76	122	119		104A
KR3	97	87	88		103A
KR3A	98	98			102A
KR3B	99	43			101A/B/B
KR3C	99A	152,153			105A/B
KR4	66	70	70		105A/B
KR4A	70	108			105A/B
KR4B	65	139			105A/B
KR4C	64	65	87		104A
KR5	100	100,101	105		102A
KR6	118	119			105A/B
KR7	93	87	112		104A
KR7A	94	122	93		104A
KR13	101A	87	101B		103A
KRO	152	153			105B
KRP	153	109			105B
KRM	36	37	40		101A/B
KRX	62	60	63		102A
KRXA	63	43	87,88		103A
KS	151	54A	80		107A/B
KSS	125	122	126		104A
KT1A	50A	50A			107A/B
KT3A	105	106	88		103A
KT5A	61A	150	61A		107A/B
KW	71	(-1 TO -4 ALL LINE 13)			106B
T1	46	43	59		101A/B
T2	78	86			103A
T3	102	102			102A
T4	79	71			103A
T5	61	56			102A
T6	60	36			101A/B
T7	145	104	71		104A
T8	92	86	94		104A
T9	88	38			103A
T10	90	91	89		103A
T11	141	143			107A/B
T12	32	36			101A/B
T13	101B	88			103A
T14	107	107			101A/B



PHOTOAMPLIFIER

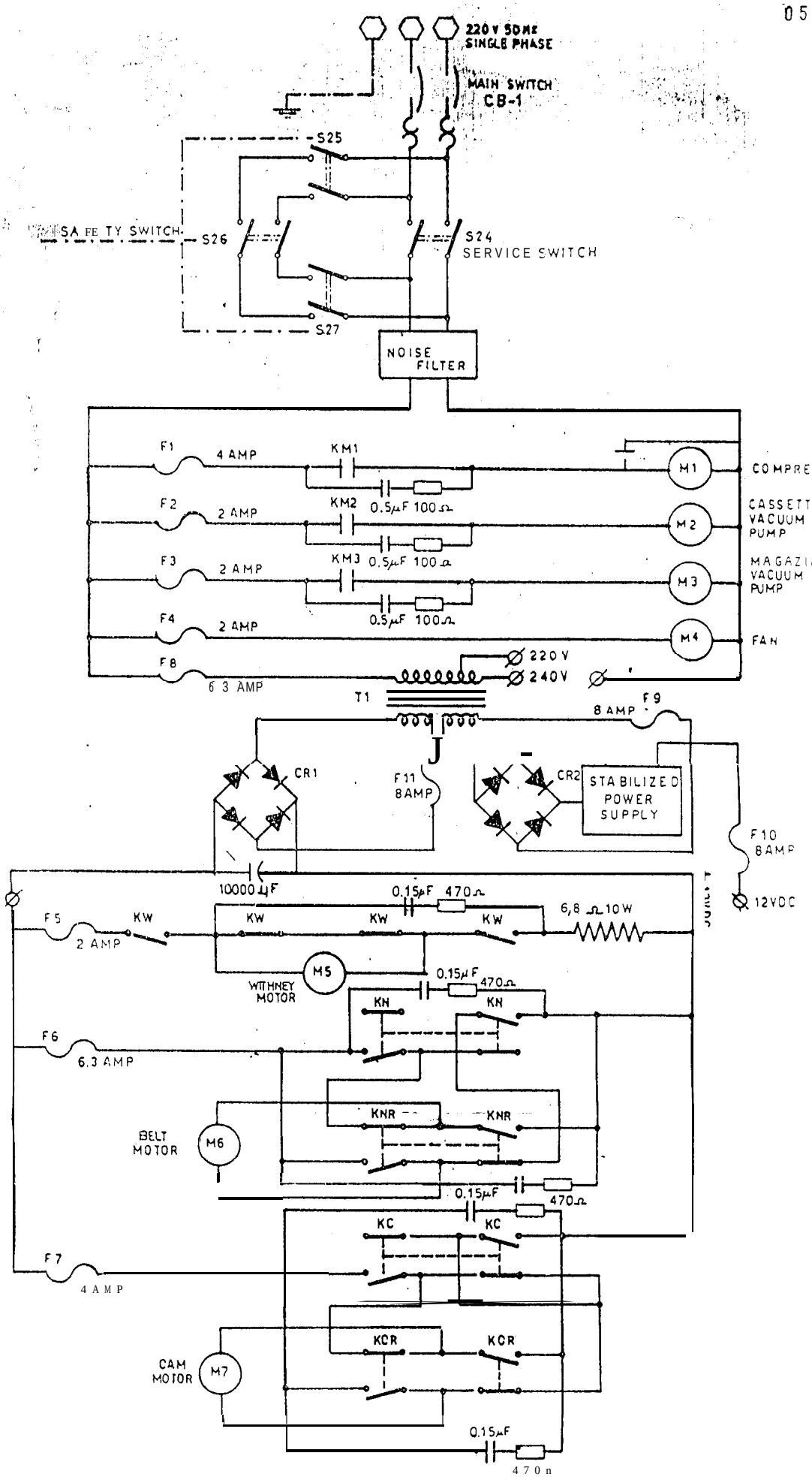


DOUBLE FILM DETECTION



TIMERS

05 FEB 1990



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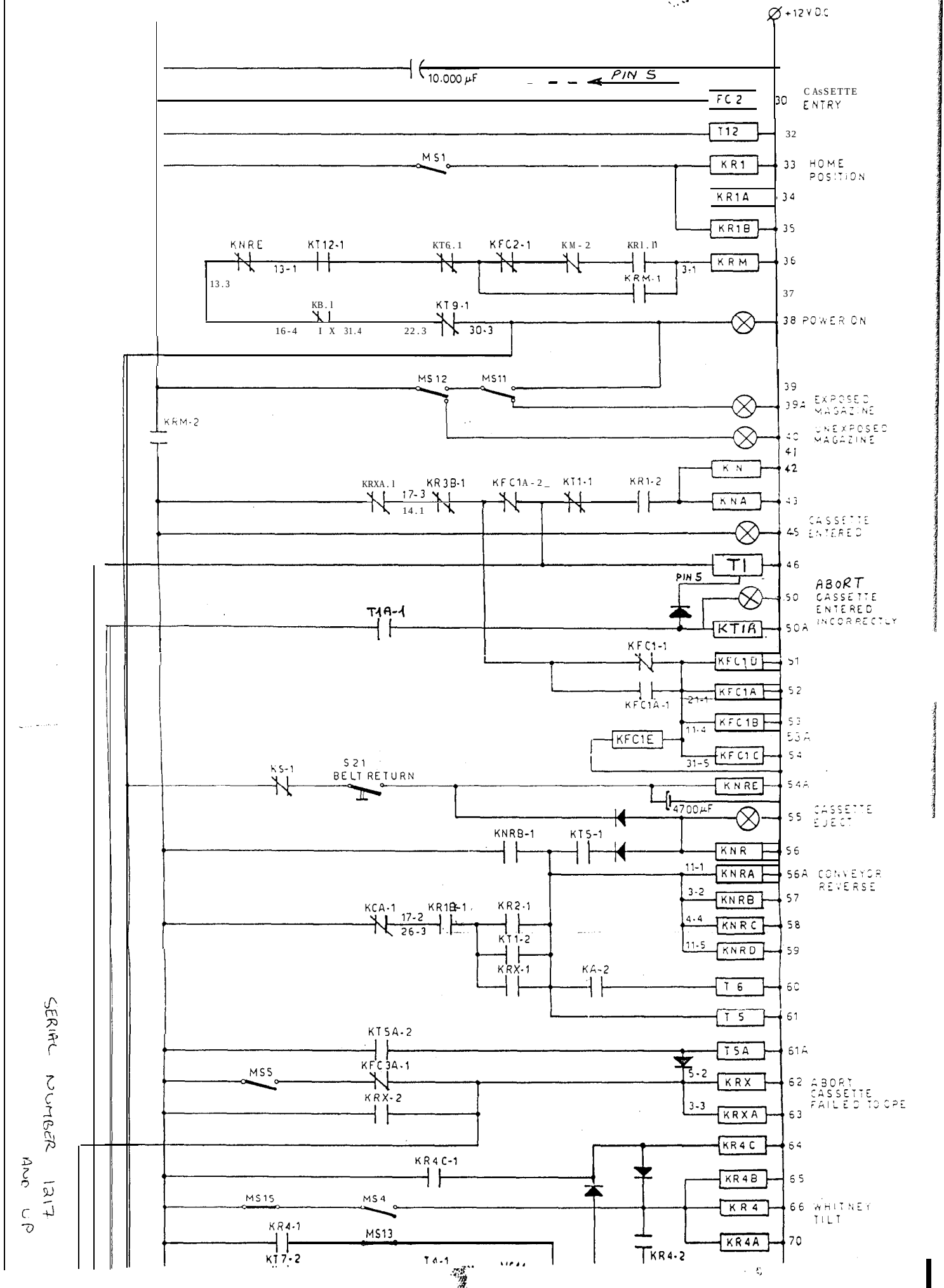
ELECTRIC DIAGRAM
SEM. 1990

MOD. 1217



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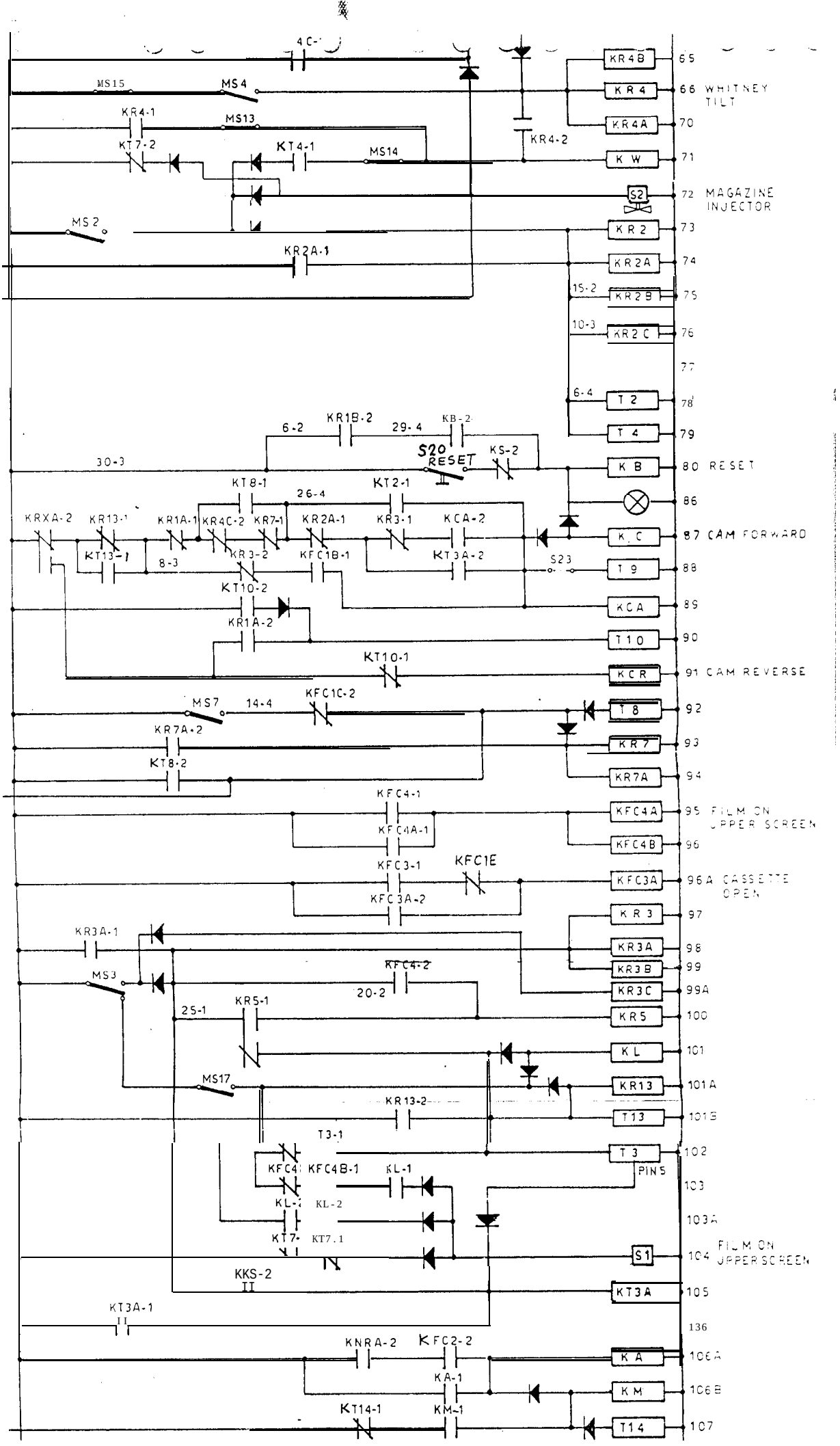

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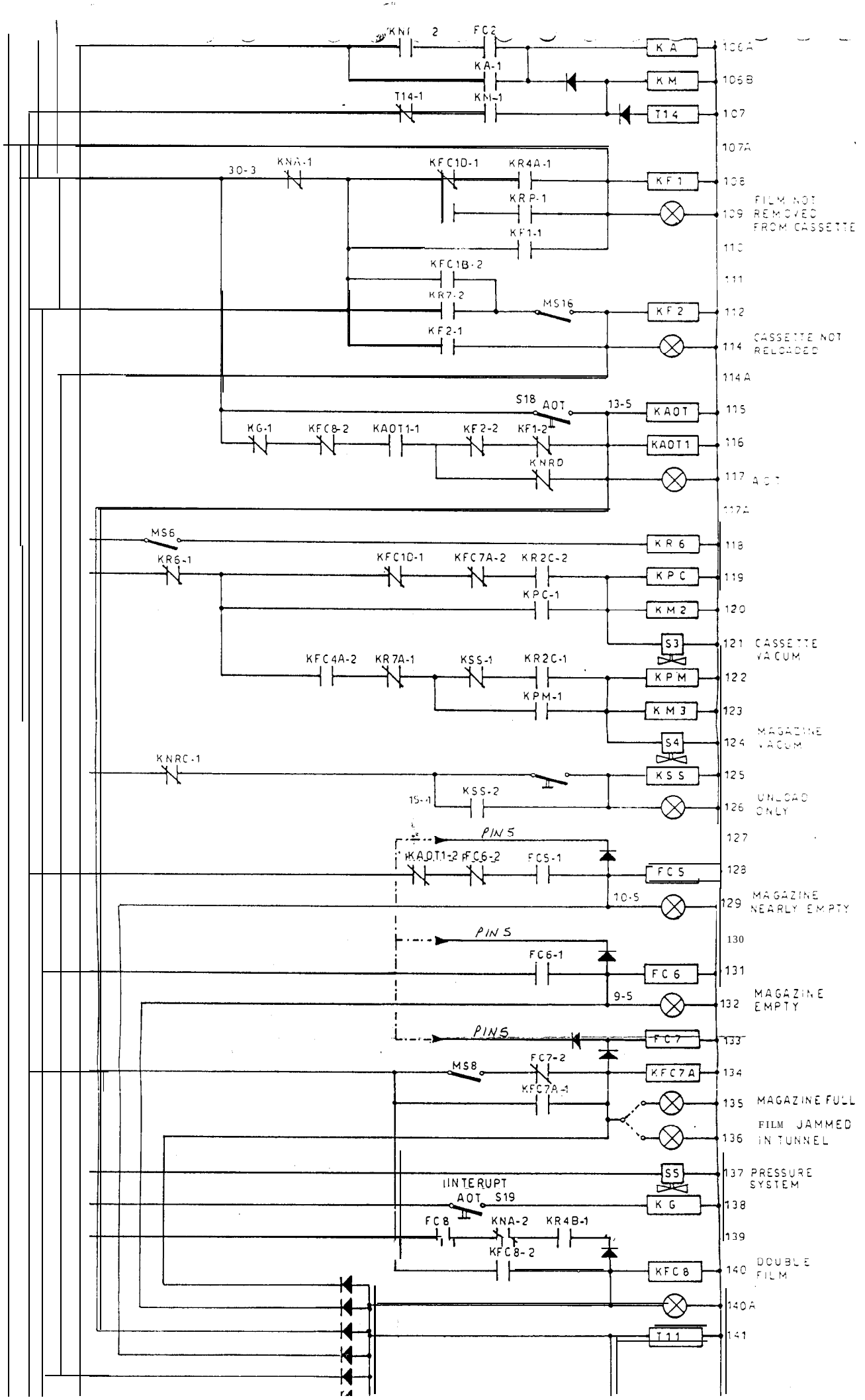

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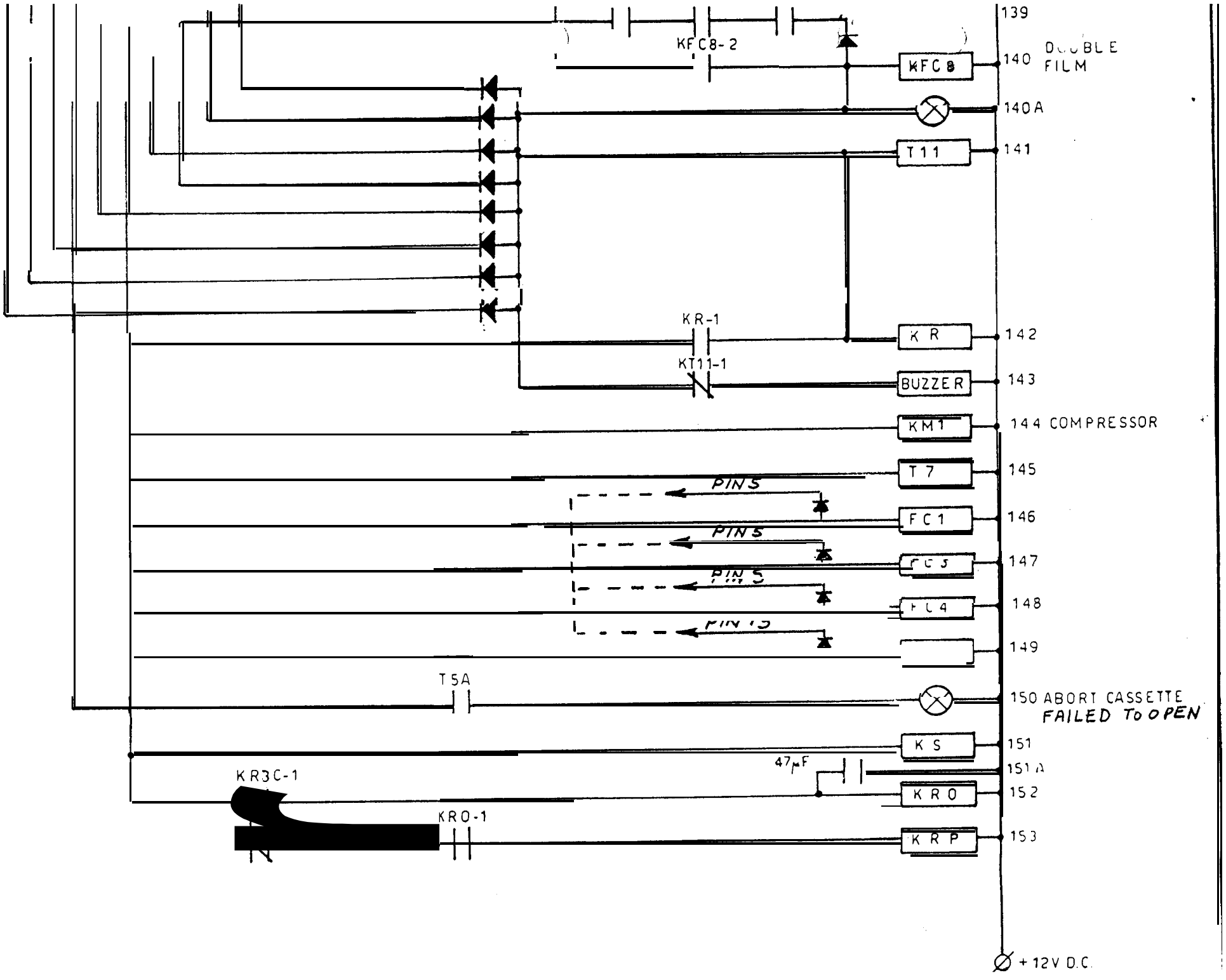
139
KFC8-2
KFC8
140 DOUBLE FILM
140A
T11
141
KR-1
KR
142
KT11-1
BUZZER
143
KM1
144 COMPRESSOR
T7
145
PINS
FC1
146
PINS
147
PINS
148
PINS
149
T5A
150 ABORT CASSETTE FAILED To OPEN
KS
151
47μF
151A
KR3C-1
KRO
152
KRO-1
KRP
153
+12V D.C.