MINILOADER

THEORY GUIDE

TG2 -3211/3212

Miniloaders with Serial Numbers

1125 and 1127 to 1161

KODAK LIMITED

October 1989

Machines with Serial number 1125 and 1127 up to 1161

Changes to the cycle

"Cassette failed to open" operation is changed after the cam goes into reverse and when it reaches the home position.

RELAY KD is deleted and its function replaced by TIMER T10.[RELAY KD removed the short-circuit on the CAM MOTOR M7 windings when MS1 operated to ensure that the switch actuator was fully on the ramp.]

TIMER T10 provides time between MS1 operating and the CAM MOTOR REVERSE RELAY KCR de-energising the CAM MOTOR REVERSE to ensure MS1 ACTUATOR is fully on the ramp in the home position.
It also ensures that that the CAM OPENER MECHANISM is clear of the CASSETTE LATCH before the CONVEYOR reverses.

CONTACT KFC1 D-2 (111) has been added. The CONTACT was missing on the circuit. It is required when MS16 checks that NEW FILM has been loaded into the CASSETTE.

When the cams are in the home position MICROSWITCH MS1 (32) is closed

At power up FC2 (30),TIMER T12 (33) and POWER ON LAMP (38) [via MS9,MS10,MS11 and MS12] are energised.

MICROSWITCH MS1 (36)) energises RELAY KR1 (32) KR1A (34) and KR1B (35)

KR1-1 (36) enables KRM (36).

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

KR1 B-2 (79) enables CAM reset control.

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

KR1-2 (43) enables KN, KNA and "CASSETTE EMPTY" LAMP (41-45).

When the operator feeds a cassette:

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

KRM1-1 (37) holds RELAY KRM (36).

KRM-2 (41) completes the-12 volt 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-l (54) and KS-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) energises SOLENOID VALVES S1 and S2 closed.

KN-1 (15) energises CONVEYOR BELT FORWARD and carries 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.

KFC1-21 (52) energises RELAYS KFC1A, KFC1B, KFC1C and KFC1D (51-54).

KFC1A-1 (53) self-holds RELAYS KFC1A etc;

KFCIA-2 (43) de-energises RELAYS KN, KNA, and LAMP (42-45)KN-1 (15) de-energises CONVEYOR BELT FOR-' WARD.

Normal cycle **(contd.)**

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

KC1 (19) energises CAM MOTOR FORWARD

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

MICROSWITCH **MS1** operates and de-energises RELAYS KR-1 etc.

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.

PHOTOCELL FC3 (147) energises RELAY KFC3.

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

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

MICROSWITCH S5 (62) operates to check if CASSETTE LID has opened.

On a normal cycle the lid opens and KFC3A-1 (62) inhits RELAYS KRX and KRXA (62-63).

The opening cycle continues and MICROSWITCH MS3 (99) operates and energises RELAYS KR3, KR3A and KR3B.

KR3A-1 (98) self-holds RELAYS KR3 etc.

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

KR3-1 (43) inhibits CONVEYOR forward.

MICROSWITCH MS8 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 energises RELAY KFC4.

KFC4-1 (94) energises RELAYS KFC4A and KFC4B (95).

KFC4A-1 (95) self holds RELAY KFC4A.

KFC4A-2 (99) energises RELAY KR5 through KAOT-I and LINK S22KR5-1 (100) changes over to self hold RELAY KR-5 (100) and inhibit RELAY KL and TIMER T3 which prevents the injector cycle operating on a normal cycle.

KR5-2 **(105)** energises RELAY KT3A..

KT3A-I (106) self holds RELAY KT3A..

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

MICROSWITCH MS2 (73) operates and energises KR2 KR2A.KR2B, KR2C,KR2D and TIMERS T2 and T4 (73-79).

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

KR2A-2 (87) de-energises RELAY KC.

KC-I (19) de-energises 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).

KM-2 (6) energises the CASSETTE VACUUM PUMP M2 (6).

Normal cycle (contd.)

KM-3 (7) energises the MAGAZINE VACUUM PUMP M3 (7).

KPM-1 (124) self-holds RELAYS KPM and KM3 and SOLENOID VALVE S4 closed.

KPC-1 (121) 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.

KW-1 (13) and KW-2 (13) energise the WHITNEY TILT MOTOR M5 (13) into the tilt position where it is stopped by MS14 (71) opening.

TIMER T2 times out after 2 secs and KT2-1 (86) energises RELAY KC (87).

KC-l (19) energises the CAM MOTOR M7 (23) Forward

MICROSWITCH MS-7 (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 RELAY KR4 and KR4A (66-70).

KR4-2 (70 energises RELAY KW.

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

KW1l and KW-2 (13) energise WHITNEY TILT MOTOR M5 to remove the tilt which is then stopped by MS13 (70) opening .

The transport mechanism carries the FILMS to their respective destinations.

MICROSWITCH MS6 (118) operates and energise RELAY KR6 (118) .

KR6-1 (119) de-energises RELAYS KM2, KM3, KPC and KPM and SOLENOID VALVES S3 and S4 open (119-124).

KM2-1 and KM3-1 (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.

The CAM cycle is completed and MS1 is energised.

MS16 (112) checks PHOTOCELL FC1 to confirm that a FILM is in the CASSETTE.

NOTE: On a normal cycle KFC 1 D-2 (17 1) remains open to inhibit RELAY KF2.

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

KR1A-1 (87) de-energises RELAY KC etc.

KC-l (19) de-energises the CAM MOTOR M7.

KR1 B-l (58) energises RELAYS KNR, KNRA, KNHC and (56-60).

KNR-1 (17) energises the CONVEYOR BELT REVERSE to carry the CASSETTE back out of the MACHINE.

KNRB-1 (56) self-holds RELAYS KNR etc;

KNRA-2 (64) enables RELAY KA (65).

The returning CASSETTE interrupts PHOTOCELL FC2 and energises RELAY KFC2

KFC2-2 (64) closes to energise RELAY KA (64)

KA-1 (65) self-holds RELAY KA.

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

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

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

START SERIAL UNLOADING

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

KAOTl-1 (116) self-holds RELAYS KAOT and KAOTA through KF1 and KF2 (or KNRD-1 (117) following a failure to toad or unload cycle).

KAOT-2 (99) inhibits RELAY KR-5.

KAOT-1 (in TIMER T6 circuit) enables TIMER T6.

The machine continues the normal cycle of operations after entering the cassette until MS3 operates.

MS-3 energises RELAYS KR-3, KR3A, KR3B, TIMER T3 and ON/OFF TIMING RELAY KL 997-105).

KR3-1 and KR3-2 (87-88) de-energise RELAYS KC (87) and KCA (89).

KC-l (19) stops the CAM to allow time for the preceding film to clear the PROCESSOR ENTRY ROLLERS.

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

KFC4B-1 (103) inhibits AIR VALVE S1 on a normal cycle.

KT3A-1 self-holds RELAY KT3A

KT3A-2 (88) energises RELAY KC to re-start the CAM.

The normal cycle resumes until the CAM reaches the zero position and MS-l energises the KNR RELAYS through KR1B-1 (58).

KNRB-1 (56) self-holds KNR etc., and energises TIMER T6 via KAOT-1 (see TIMERS circuit).

The CONVEYOR reverses and carries the CASSETTE out.

TIMER T6 times out as the CASSETTE is passing through PHOTOCELL FC2.

KT6-1 (36) opening ends the cycle but it is immediately re-started because the CASSETTE is interrupting PHOTOCELL FC-2.

After the last FILM has been unloaded from the CASSETTE, PHOTOCELL FC-1 will detect that the CASSETTE is empty on the next cycle.

MS7 checks PHOTOCELL FC-1, KFClC-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-l (116) de-energises RELAYS KAOT and KAOTl (115-116) to allow the machine to return to a normal cycle.

CASSETTE EJECT

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

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.

CASSETTE EJECT (cont.)

KNR-1 (17) energizes the CONVEYOR BELT REVERSE until the CAPACITOR discharges de-energising RELAYS KNRE, KNR and the "CASSETTE EJECT" LAMP after approx. 2 secs.KNR-1 de-energises the CONVEYOR BELT MOTOR in reverse to stop the CONVEYOR BELT and complete the cycle.

INCORRECT FEEDING OF THE CASSETTE

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

KFC1-1 (52) remains open and leaves RELAYS KFC1A, KFC1B, KFC1C and KFC1D de-energised (5154).

KFClA-2 (43) remains closed keeping TIMER T1 and "CASSETTE ENTERED INCORRECTLY" LAMP energised.

TIMER Tl times out after 4 secs.

KTl-1 (43) de-energises RELAYS KN, KNA KNB and" CASSETTE ENTERED" LAMP (41-45).

KN-1 (15) de-energises the CONVEYOR BELT MOTOR M6 forward.

KTl-2 (59) energises the CONVEYOR BELT MOTOR M6 in reverse.

The normal cycle continues until completion.

DOUBLE THICKNESS ALARM

The normal cycle commences energising FC8 and CONVEYOR forward.

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

A DOUBLE FILM will take PIN I3 of PHOTOCELL FC8 CHIP TCA 965 LO energising RELAYS KFC8 and KR and TIMER T11 .

KFC8-1 self-holds KFC8 and LAMP ON in the MEMORY LINE.

KFC8-2 (139) inhibits RELAYS KFC8 (KNA-2 has closed when CONVEYOR FORWARD stopped).

KR-1 self-holds RELAY KR and TIMER T11.

KT11-1 de-energises BUZZER when T11 times out.

CASSETTE ENTERED EMPTY

The normal cycle continues until MICROSWITCH MS2 operates.

MS2 energises the KR2 RELAYS.

KR2D-1 (109) enables RELAY KF2, "FILM NOT REMOVED FROM THE CASSETTE"LAMP and ALARM BUZZER.

PHOTOCELL FC1 sees the REFLECTIVE PATCH in the bottom of the cassette because there is no FILM present.

KFC1D-1 (109) energises RELAY KF1 LAMP (108-109) TIMER T11 and RELAY KR (141-142).

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

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

KT1l-l (143) energises BUZZER until. TIMER Tll times out and opens KT1l-1.

KFC1D-1 (119) remains open to prevent CASSETTE vacuum sucking thebottom of the CASSETTE.

The normal cycle is continued and the CASSETTE is loaded with a new FILM.

The "CASSETTE FAILED TO LOAD" LAMP remains on in the MEMORY circuit until the next cycle energises the CONVEYOR BELT forward and KNA-l(l08) opens to cancel it.

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

KFC3A-1 (62) energises RELAYS KRX and KRXA (62-63).

KRX-2 (63) self holds RELAYS KRX and KRXA.

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

KCR-1 (22) energises CAM MOTOR M7 in reverse until it reaches MS1.

MS1 energises KR1, KR1A and KR1B.

KR1B-1 (57) energise TIMER T5 (61) and RELAY KT5A through KCA-l(58) and KRX-1 (61).

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

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

T10-2 (89) self holds TIMER T10.

KCR-1 (22) opens 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 (60) energises RELAYS KNR, KNRA, KNRC and KNRD.

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.

KC-l (19) energises CAM MOTOR back to home position.

Energises MICROSWITCH MS-l and RELAY KR1.

KR1 B-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 and KR3B.

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

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

PHOTOCELL FC4 does not see the UPPER SCREEN REFLECTOR because it is covered by the FILM stuck to the UPPER SCREEN.

PHOTOCELL FC4 does not energise RELAY KFC4.

KFC4-1 (95) remains closed energising RELAYS KFC4A and KFC4B (95).

KFC4A-1 (95) self holds RELAYS KFC4A, etc.

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

KR5-1 (101) energises RELAYS KL and TIMER T3.

EXPOSED RLM ON UPPER SCREEN **(cont.)**

Air is injected in pulses controlled by the ON/OFF TIMER CIRCUIT KL which energises SOLENOID VALVE S1 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 so that it could be unloaded KFC4A-2 (122) de-energises 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.

KC-l (19) energises CAM MOTOR FORWARD.

The normal cycle resumes to completion.

MAGAZINE NEARLY EMPTY

PHOTOCELL FC5 detects MAGAZINE NEARLY EMPTY.

MAGAZINE **NEARLY EMPTY(cont.)**

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 self holds 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 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 the T11 TIMER.

EXPOSED FILM MAGAZINE FULL or FILM JAMMED IN TUNNEL

PHOTOCELL FC-7 detects MAGAZINE FULL/ FILM JAMMED IN TUNNEL.

If the MAGAZINE is full or there is a FILM jammed in the TUNNEL then the PHOTOCELL will be blocked and energise RELAY KFC7.

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 THE TUNNEL" LAMP on.

KR-1 self holds TIMERS T11 and RELAY KR.

FAILURE TO PICK UP EXPOSED FILM FROM THE CASSETTE

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

KT11-1 (143) keeps BUZZER energised for the duration of T11 TIMER cycle.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 KF1C-2 remains closed.

KFC1 D-l (109) changes over and energises RELAY KF1 and "FILM NOT REMOVED FROM CASSETTE" LAMP.

KF1-1 self holds RELAY KF1 and LAMP energised via KNA-1 (108) 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.

MS7 (92) energises TIMER T8 and RELAYS KR7 and KR7A through KFC1 C-2.

KR7A-2 self holds RELAYS KR7 and KR7A.

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

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

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

KC-l (19) stops the CAM to enable the FILM to be dropped back into the MAGAZINE.

KPM-1 de-energises SOLENOID VALVE to release vacuum to drop UNEXPOSED FILM back into the MAGAZINE.

KM3-1 (7) de-energises the VACUUM PUMP.

TIMER T8 (92) times out after 1 second.

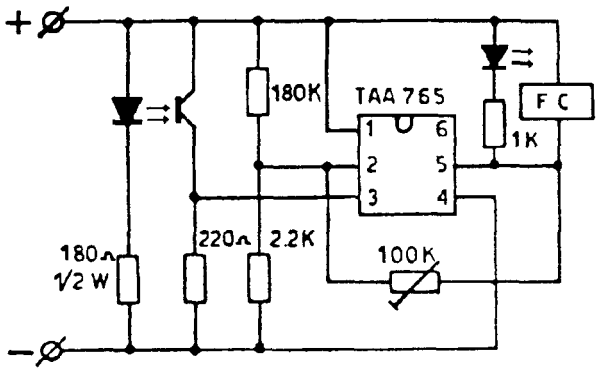
T8-2 (94) self holds TIMER T8 RELAY (92).

KT8-1 (86) energises RELAY KC.

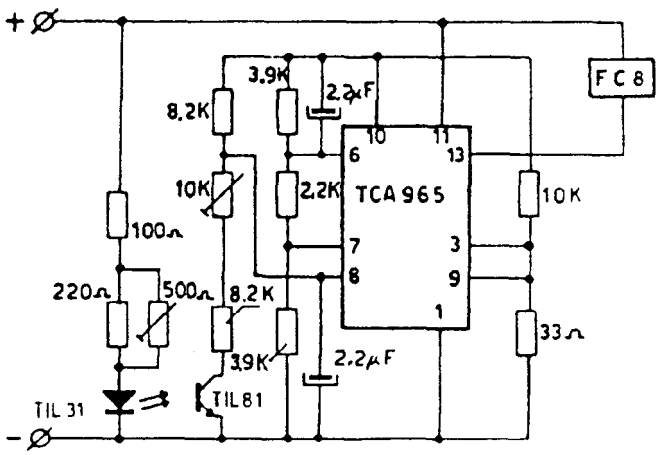
KC-l (19) restarts the CAM to complete the cycle.

At the end of the cycle MS1 6 (112) operates to check if the CASSETTE has been reloaded and energises RELAY KF2 and "CASSETTE NOT RELOADED" LAMP through KR7-2 (112-114).

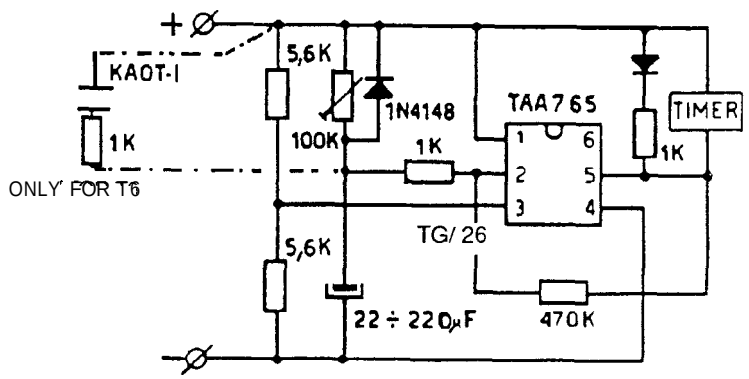
Theory Guide
Circuit Diagrams
Serial Numbers 1125 and No.1127 to 1161



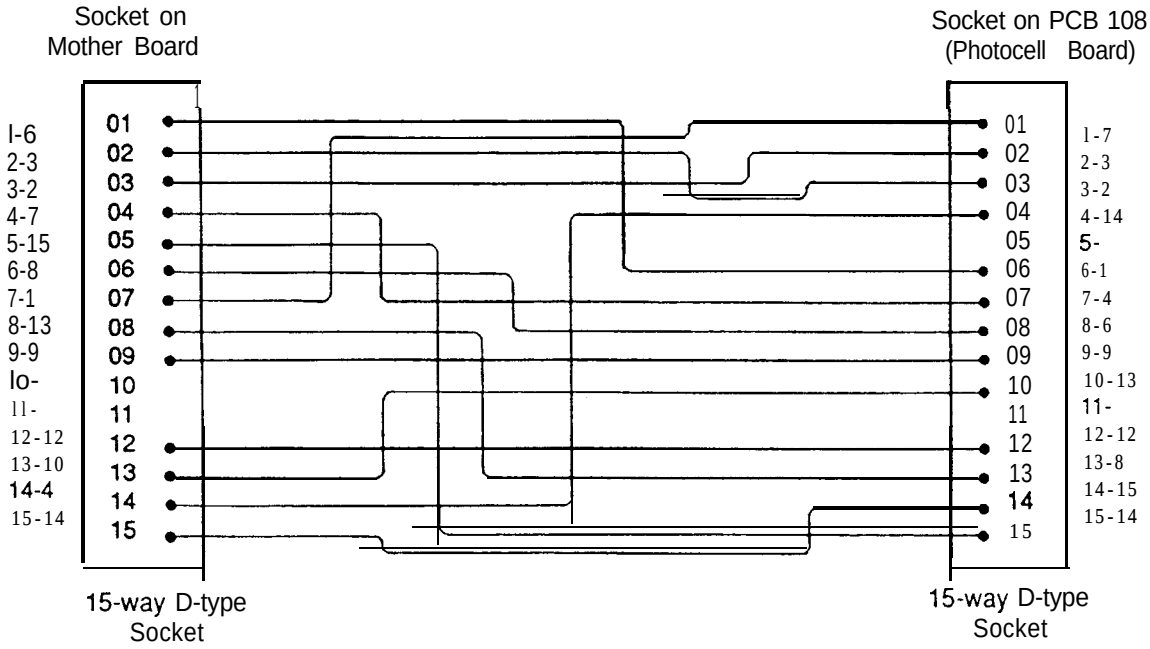
Photoamplifier



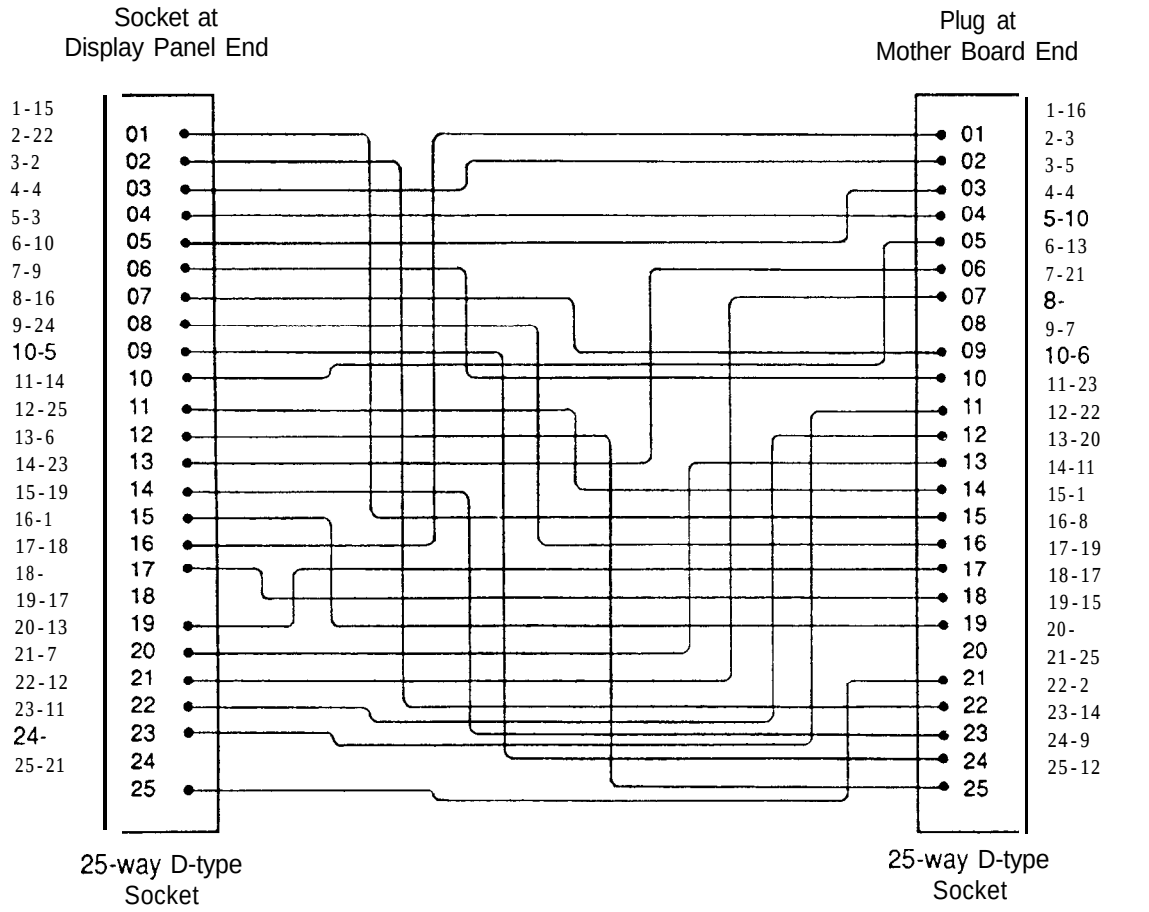
Double film detection



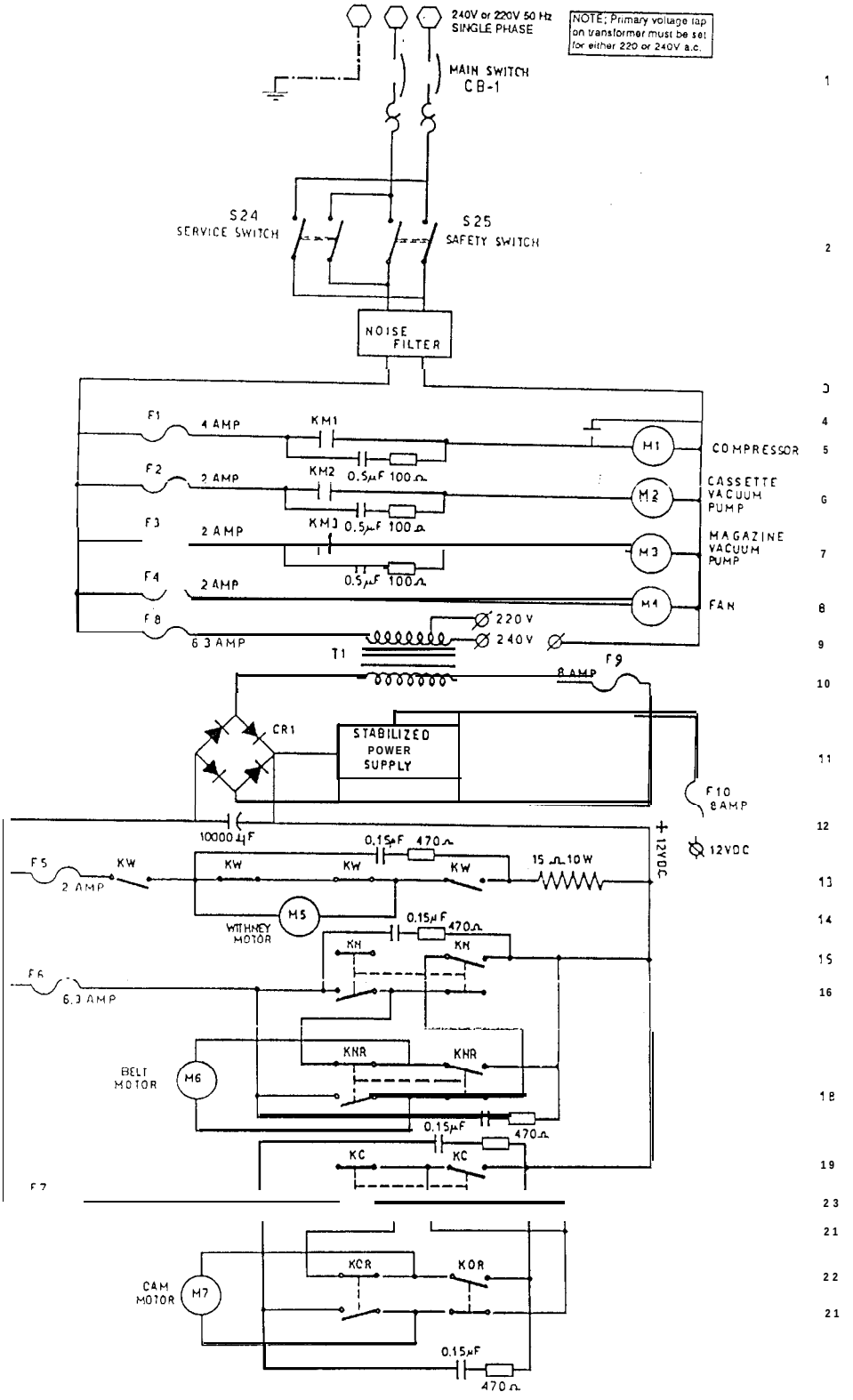
Timers



Cable from PCB 108 to
Mother **BoardPhotocell** Board



Cable from Display Panel to
Mother Board


240V or 220V 50 Hz
SINGLE PHASE
NOTE; Primary voltage tap on transformer must be set for either 220 or 240V a.c.
MAIN SWITCH
CB-1
S24
SERVICE SWITCH
S25
SAFETY SWITCH
NOISE
FILTER
F1
4 AMP
KM1
M1
COMPRESSOR
F2
2 AMP
KM2
0.5μF 100Ω
M2
CASSETTE
VACUUM
PUMP
F3
2 AMP
KM3
0.5μF 100Ω
M3
MAGAZINE
VACUUM
PUMP
F4
2 AMP
0.5μF 100Ω
M4
FAN
F8
6.3 AMP
220 V
240 V
T1
F9
8 AMP
CR1
STABILIZED
POWER
SUPPLY
F10
8 AMP
10000μF
0.15μF 470Ω
+ 12VDC
12VDC
F5
2 AMP
KW
15Ω 10W
M5
WITHNEY
MOTOR
KH
F6
6.3 AMP
KHR
BELT
MOTOR
M6
KC
F7
KCR
CAM
MOTOR
M7
1
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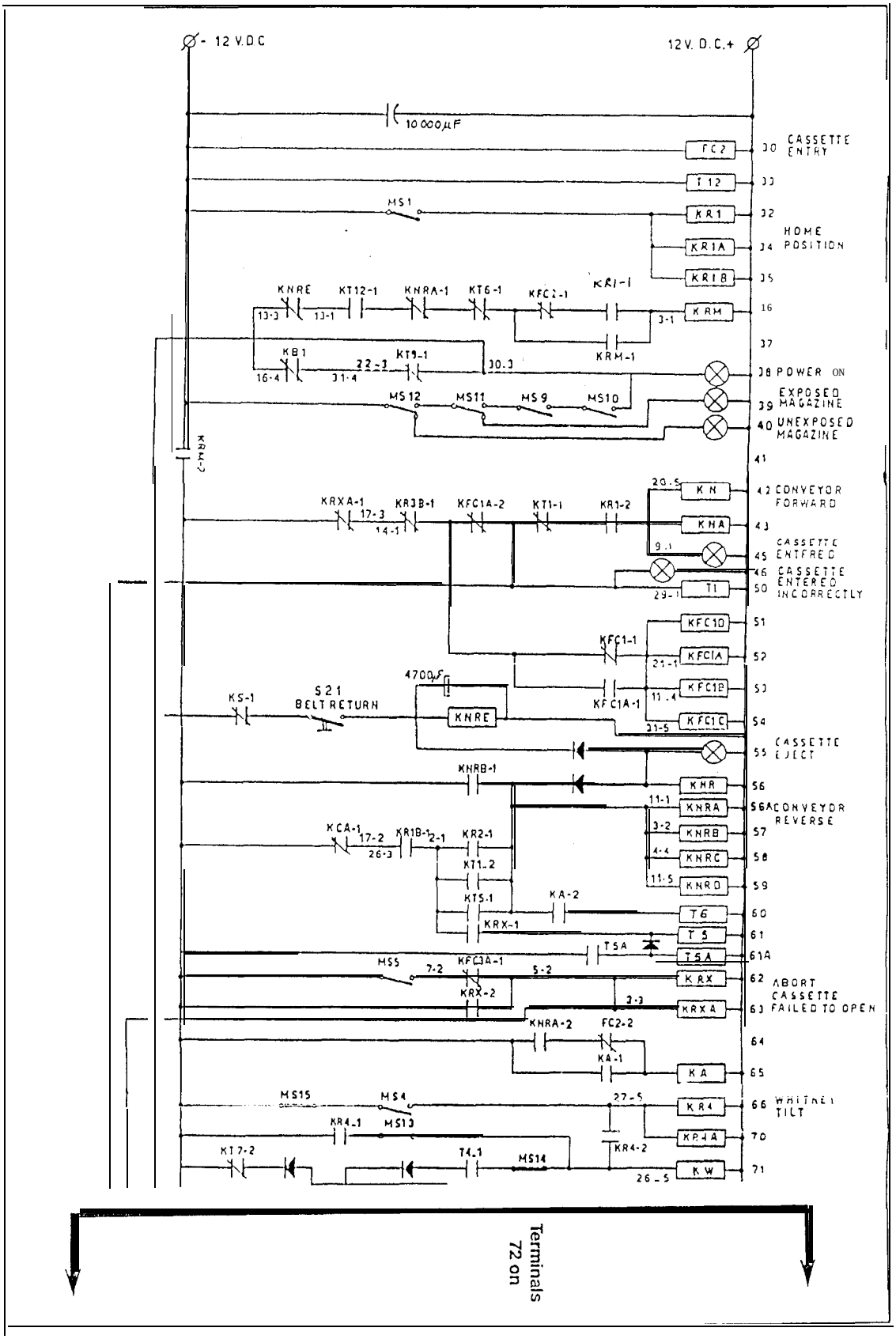
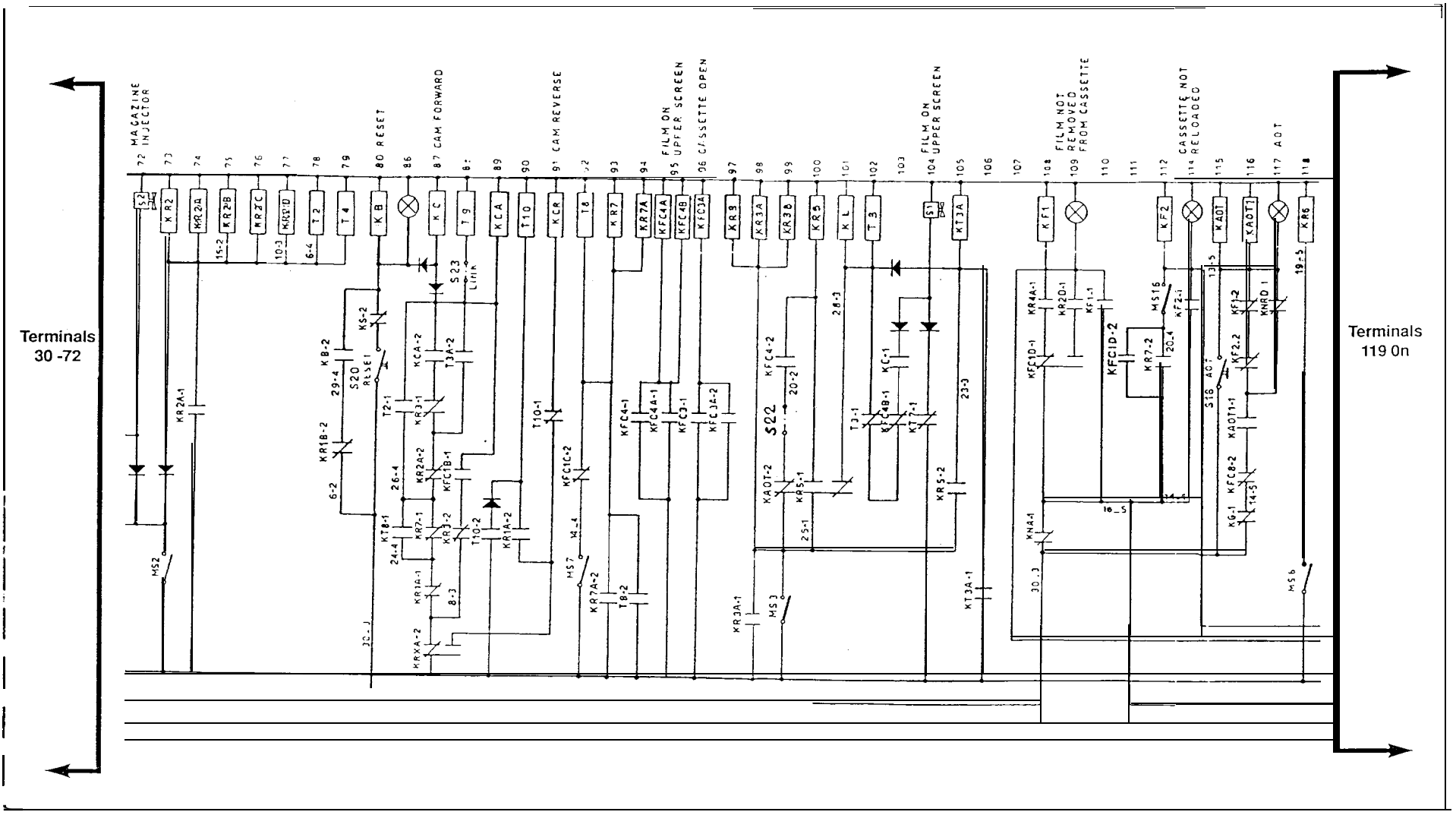
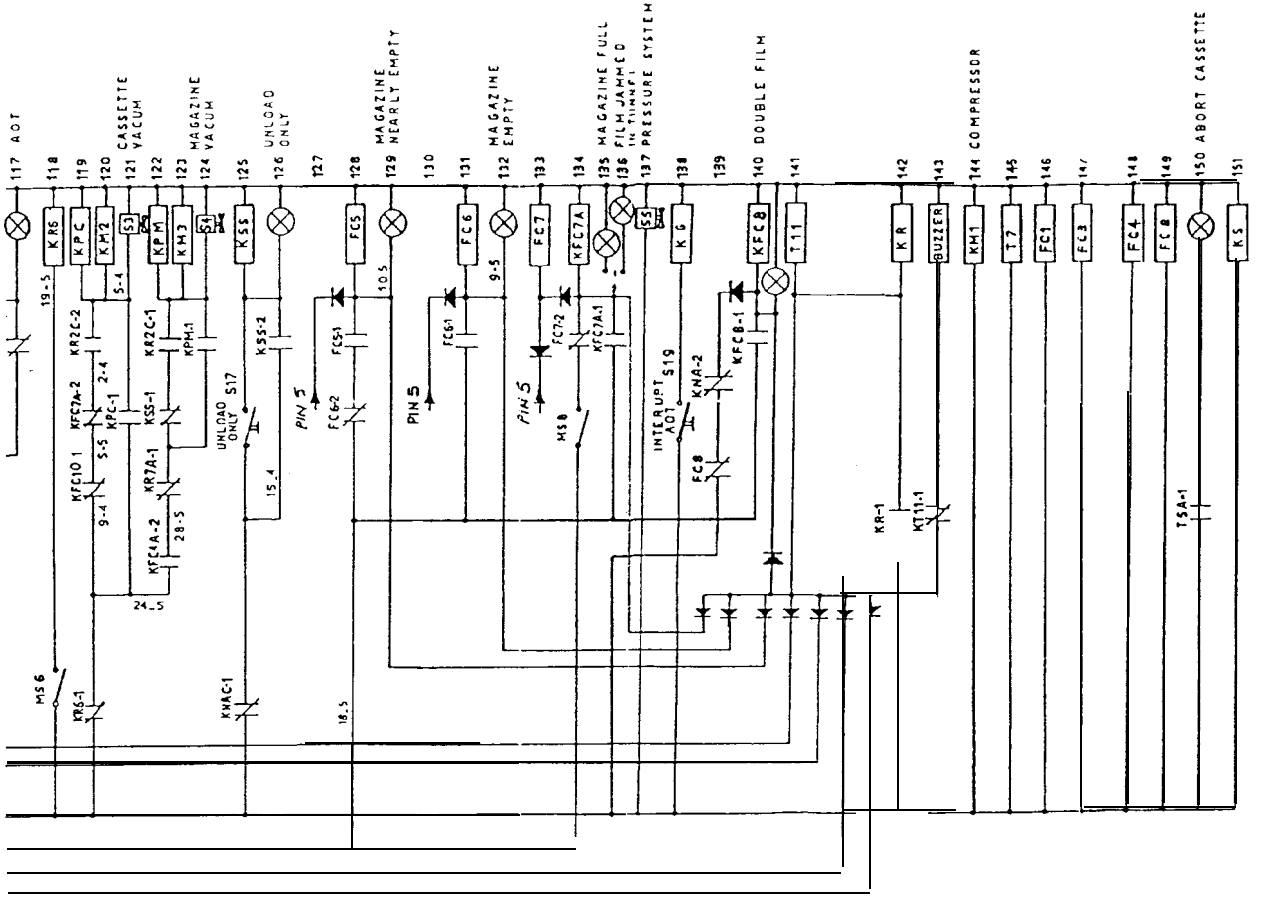


Circuit Diagram No 2.1
Serial No.s 1125 and 1127 to 1161



Circuit Diagram No 2.2
Serial No.s 1125 and 1127 to 1161

Terminals
30-118



Circuit Diagram 2.3
Serial No.s 1125 and 1127 to 1161