TOSHIBA

SERVICE MANUAL
REVERSING AUTOMATIC DOCUMENT FEEDER

AUTOMATIC DOCUMENT FEEDER

MR-3006
MR-2008



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General Precautions for Installation/Servicing/Maintenance

1. When installing the Reversing Automatic Document Feeder MR-3006/the Automatic Document Feeder MR-2008 to the Plain Paper Copier, be sure to follow the instructions described in the “Unpacking/ Setup Procedure for the MR-3006/MR-2008” booklet which comes with each MR-3006/MR-2008 unit.
2. The MR-3006/MR-2008 should be installed by an authorized/qualified person.
3. Before starting installation,servicing or maintenance work,be sure to unplug the copier first.
4. When servicing or maintaining the MR-3006/MR-2008, be careful about the rotating or operating sections such as gears, pulleys, sprockets, cams, belts, etc.
5. When parts are disassembled, reassembly is basically the reverse of disassembly unless otherwise noted in this manual or other related materials. Be careful not to assemble small parts such as screws, washers, pins, E-rings, toothed washers in the wrong places.
6. Basically, the machine should not be operated with any parts removed or disassembled.
7. Delicate parts for preventing hazardous safety problems (such as breakers, thermofuses, fuses, door switches, sensors, etc. if any) should be handled/installed/adjusted correctly.
8. Use suitable measuring instruments and tools.
9. During servicing or maintenance work, be sure to check the serial No. plate and other cautionaly labels (if any) to see if they are clean and firmly fixed. If not, take the appropriate actions.
10. The PC board must be stored in an anti-electrostatic bag and handled carefully using a wristband, because the ICs on it may be damaged due to static electricity.
11. For the recovery and disposal of used MR-3006/MR-2008, consumable parts and packing materials, it is recommended that the relevant local regulations/rules should be followed.

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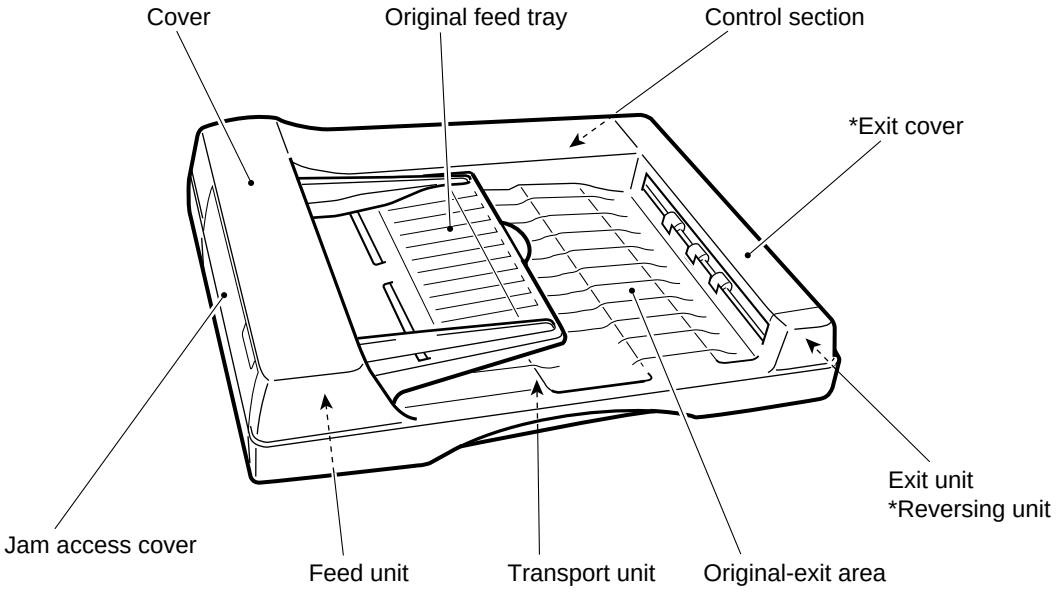
Toshiba Corporation

1. SPECIFICATIONS OF THE MR-3006/MR-2008

Model Name	MR-3006/MR-2008
Number of Originals	Up to 50 originals (A4/60~80 g/m^2 or Letter/16~22 lb.) can be set at a time.
Feeding Speed	Approx. 20 originals/minute (A4 or Letter, side feeding) when installed on the 2060 Approx. 28 originals/minute (A4 or Letter, side feeding) when installed on the 2860/2870
Acceptable Original Size	Minimum : A5-R or Statement-R, Personal check Maximum : A3 or Ledger Paper weight : 60~90 g/m^2 16~24 lb.
Power Source	Supplied from the copier
Power Consumption	60W (MR-3006) / 55W (MR-2008)
Dimensions	W597 x D494 x H120 (W23.5" x D19.4" x H4.7")...MR-3006 W597 x D494 x H120 (W23.5" x D19.4" x H4.7")...MR-2008
Weight	Approx. 9.5 Kg or 20.9 lb. ...MR-3006 Approx. 9 Kg or 19.8 lb. ...MR-2008

Specifications are subject to change without notice.

2. CONSTRUCTION OF THE MR-3006/MR-2008

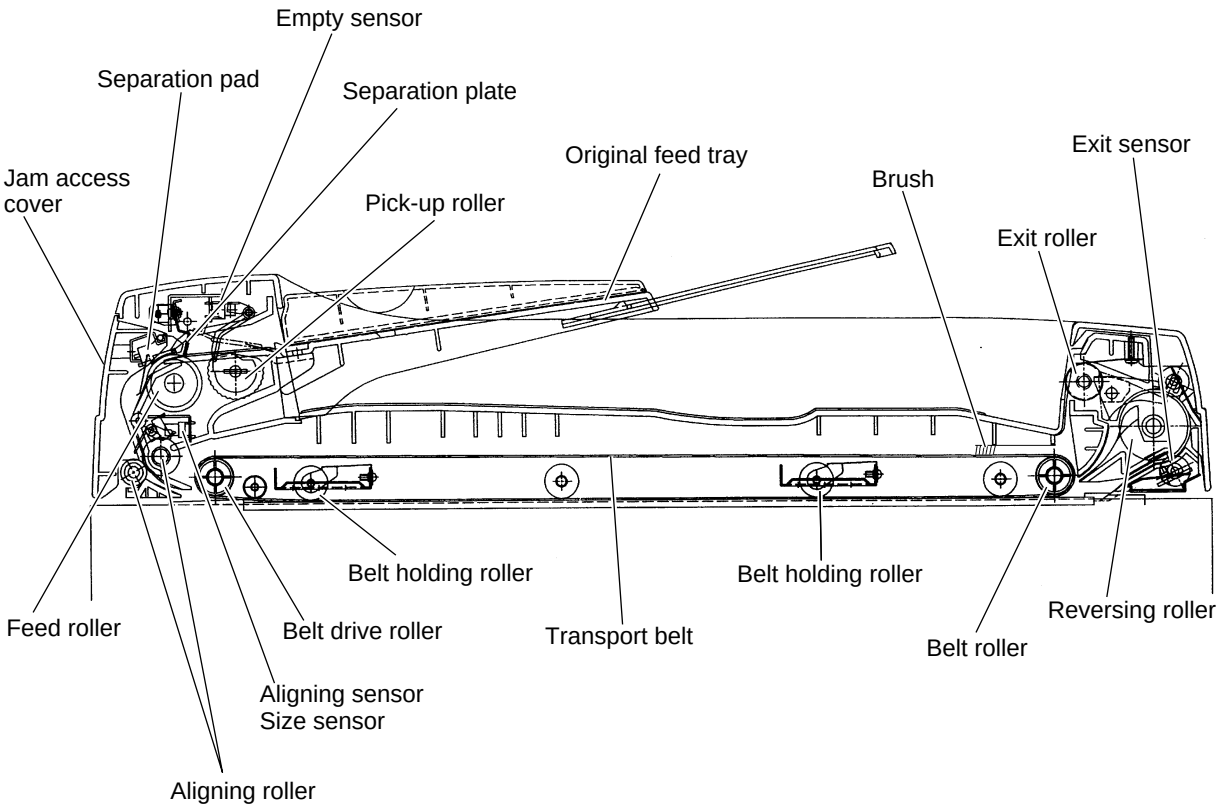


*MR-3006

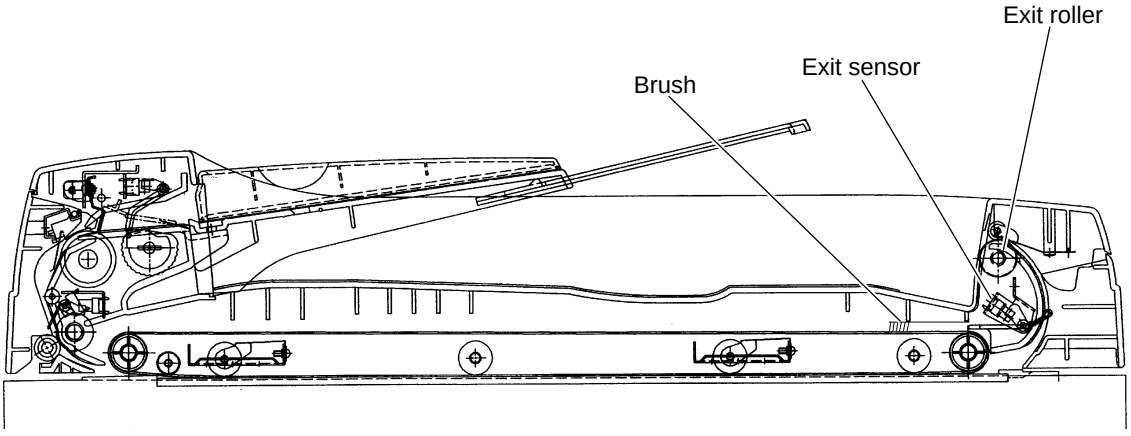
	Mechanical	Electrical
Feed unit	• Pick-up roller • Feed roller • Separation pad • Aligning roller • Jam access cover	• Drive motor • Transport clutch, *Feed clutch • Empty sensor • Aligning sensor • Size sensor • Feed-cover switch • ADF set switch
Transport unit	• Transport belt • Belt rollers • Belt holding rollers	—
Exit unit (*Reversing unit)	• *Reversing roller • Exit roller • *Exit cover	• Exit sensor • *Exit-cover switch
Tray	• Tray • Side guide • Fold-out holder	—
Control section	—	• PC board
Other	• Cover • Hinges	—

3. FRONT SECTION AND DRIVE SYSTEM DIAGRAMS

3.1 Front Section Diagram



MR-3006

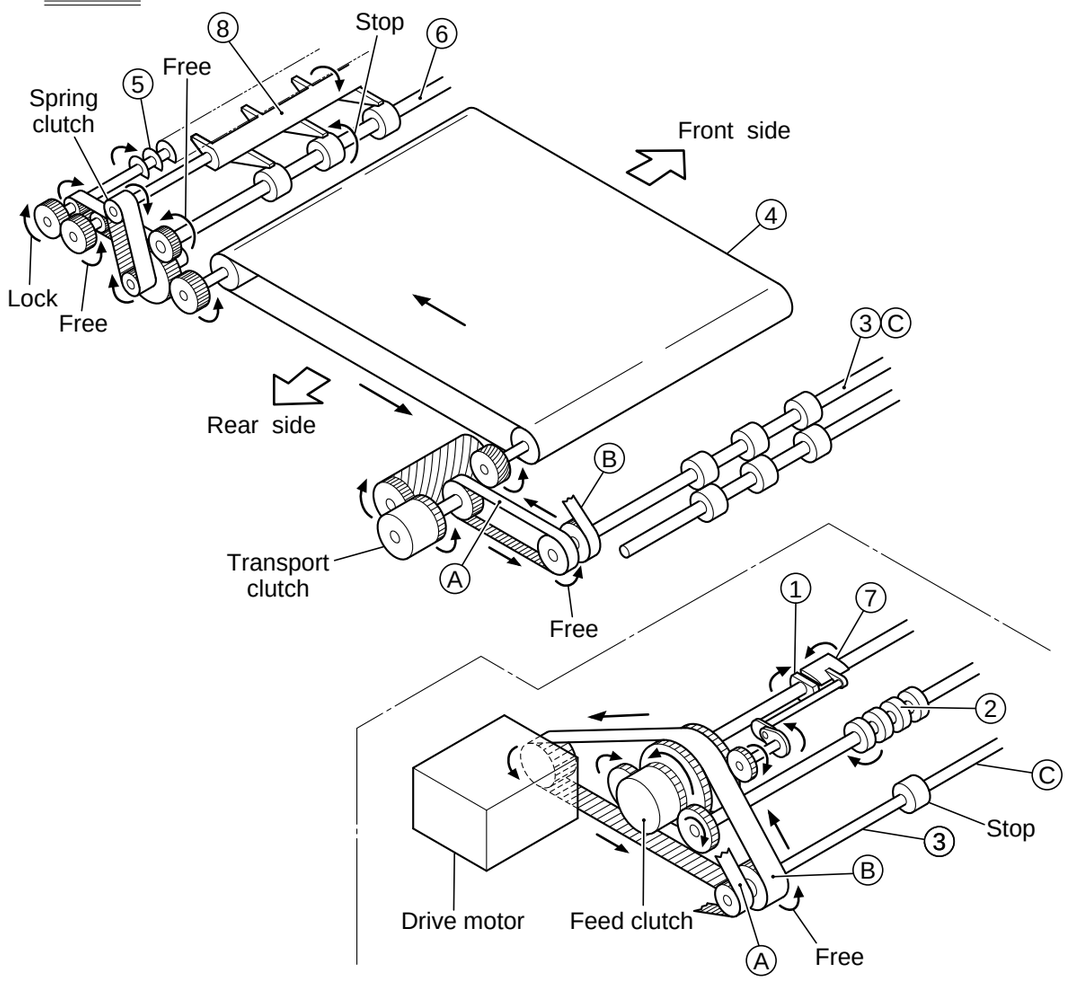


MR-2008

3.2 Drive System Diagram

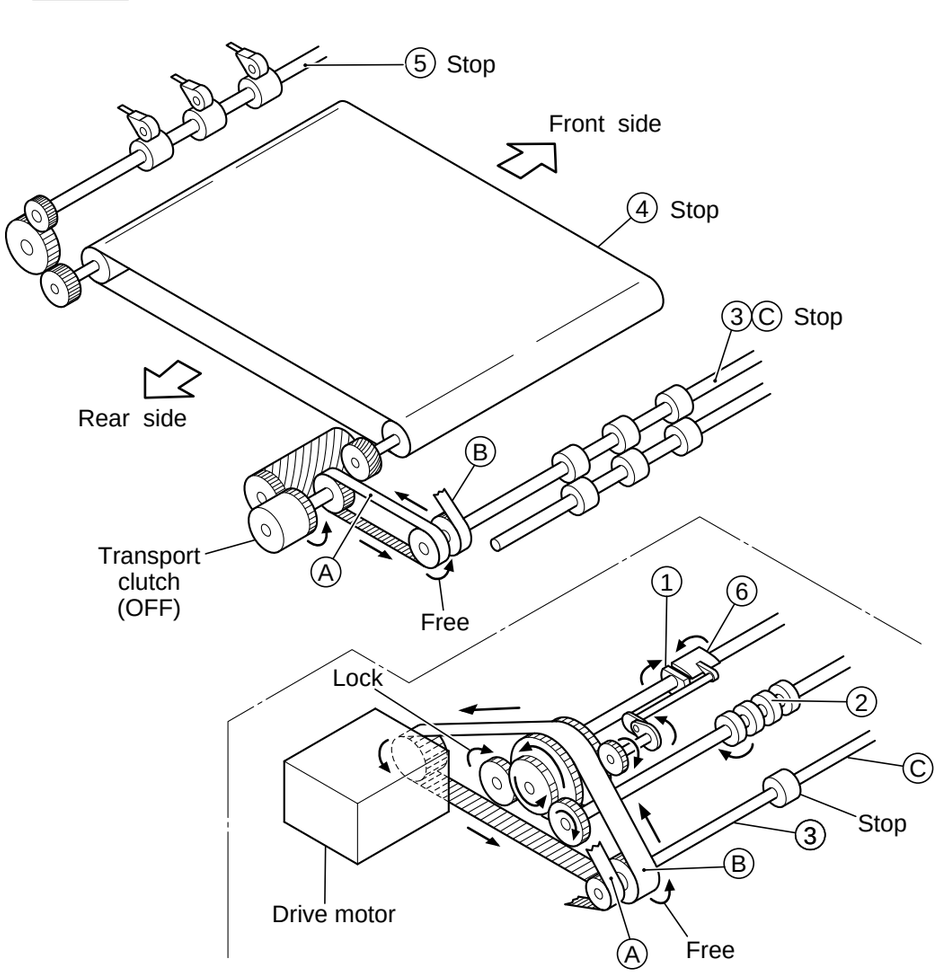
(1) Drive motor rotates clockwise (viewed from front side).

MR-3006



① Rotates in pick-up roller CCW direction. : When feed clutch is ON
② Rotates in feed roller CCW direction. : When feed clutch is ON
③ Aligning roller stops.
④ Rotates in transport belt CW direction. : When transport clutch is ON
⑤ Rotates in reversing roller CCW direction. : When transport clutch is ON
⑥ Exit roller stops.
⑦ Weight falls.
⑧ Flapper rises. : When transport clutch is ON

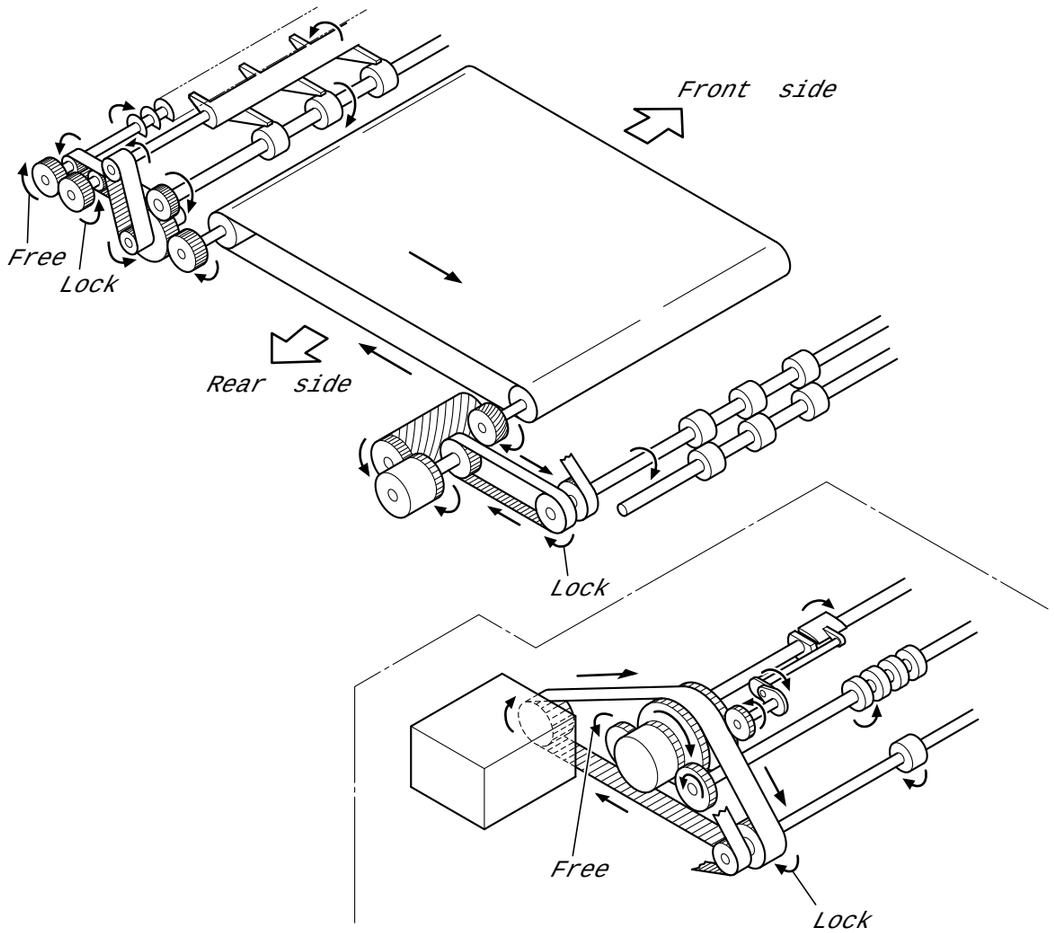
MR-2008



① Rotates in pick-up roller CCW direction.
② Rotates in feed roller CCW direction.
③ Aligning roller stops.
④ Transport belt stops.
⑤ Exit roller stops.
⑥ Weight falls.

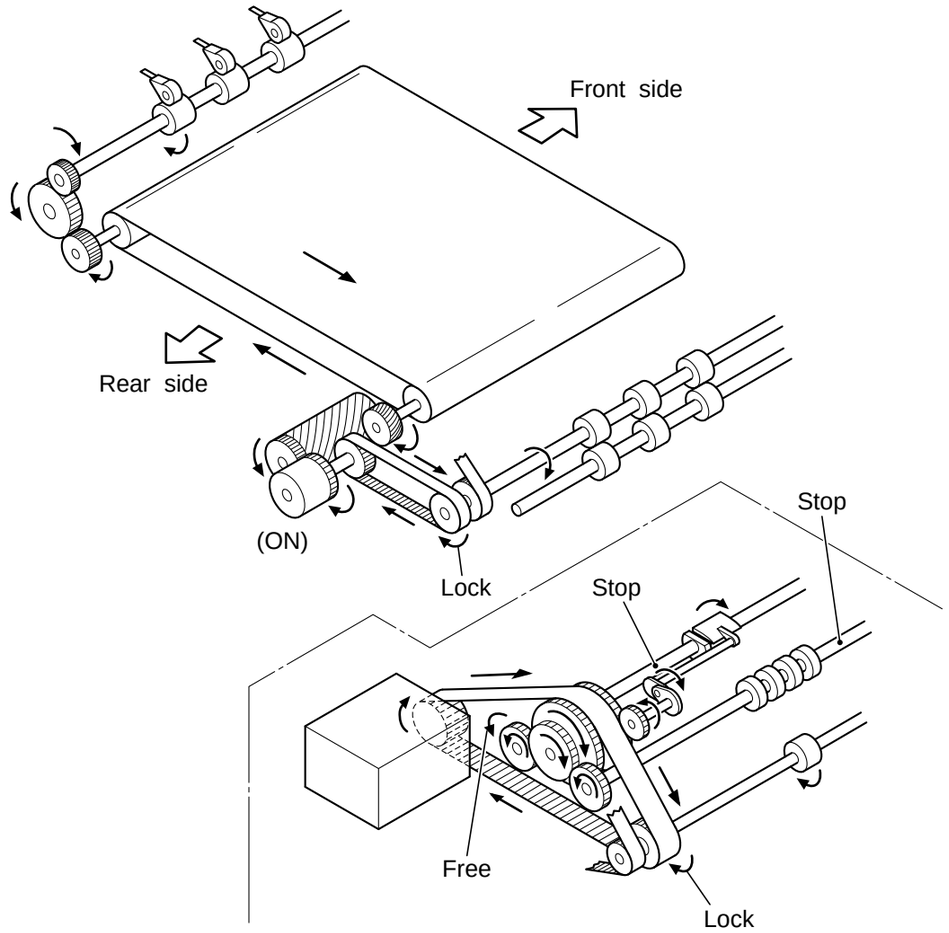
(2) Drive motor rotates counterclockwise (viewed from front side).

MR-3006



① Pick-up roller stops.
② Feed roller stops.
③ Rotates in aligning roller CCW direction.
④ Rotates in transport belt CCW direction. : When transport clutch is ON
⑤ Rotates in reversing roller CCW direction. : When transport clutch is ON
⑥ Rotates in exit roller CCW direction. : When transport clutch is ON
⑦ Weight rises.
⑧ Flapper falls. : When transport clutch is ON

MR-2008



① Pick-up roller stops.
② Feed roller stops.
③ Rotates in aligning roller CCW direction.
④ Rotates in transport belt CCW direction.
⑤ Rotates in exit roller CCW direction.
⑥ Weight rises.

4. DESCRIPTION OF DRIVE OPERATION

4.1 Original Feed and Discharge

A. Single-side original feed

Operation from original feed to discharge (start of original feed → separation → aligning → transport → stop at exposure position → copy → original discharge) is described in steps A-1 to A-8.

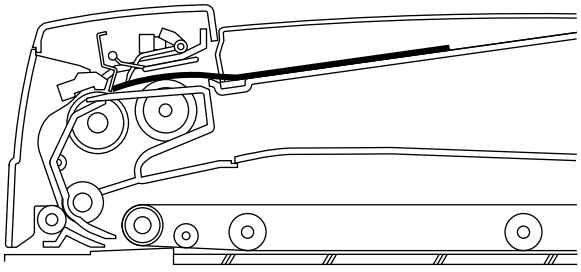
B. 2in1 original feed

Operation from original feed to discharge (start of 1st original feed → separation → aligning → transport → stop → start of 2nd original feed → separation → aligning → splicing → transport → stop at exposure position → copy → original discharge) is described in steps B-1 to B-10.

C. Dual-side original feed (MR-3006)

Operation from original feed to discharge (start of original feed → separation → aligning → transport → reversal → stop at exposure position → copy → original discharge) is described in steps C-1 to C-8.

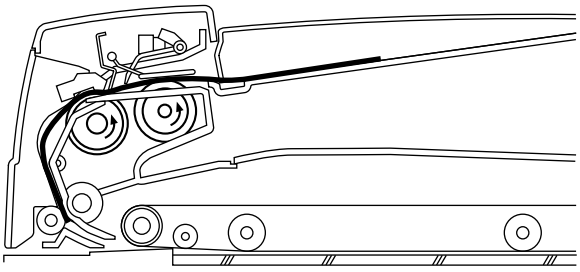
A-1 Original loading



- Drive motor : Turns OFF.
- Feed clutch : Turns OFF. (MR-3006)
- Transport clutch : Turns OFF.
- Weight : Rises.
- Pick-up roller : Stops.
- Feed roller : Stops.
- Aligning roller : Stops.
- Transport belt : Stops.

- The original is loaded.

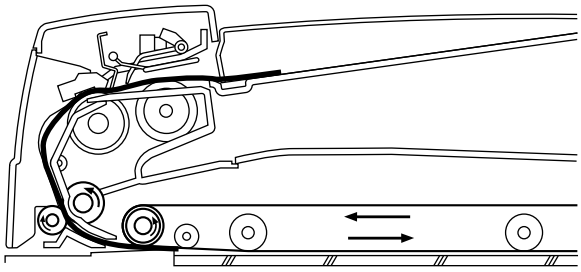
A-2 Original alignment after PRINT button ON



- Drive motor : Rotates in reverse direction.
- Feed clutch : Turns ON. (MR-3006)
- Transport clutch : Turns OFF.
- Weight : Falls.
- Pick-up roller : Rotates.
- Feed roller : Rotates.
- Aligning roller : Stops.
- Transport belt : Stops.

- The original is fed for a fixed number of pulses after the aligning sensor turns ON, and the motor stops.

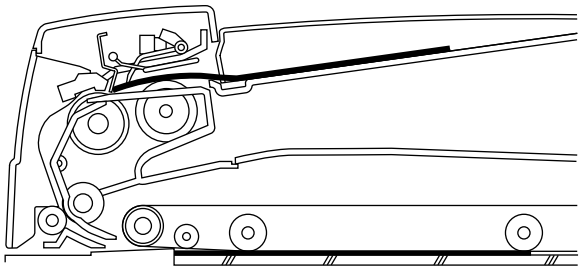
A-3 Drive motor ON = Original transport to copy glass surface



- Drive motor : Rotates in forward direction.
- Feed clutch : Turns OFF. (MR-3006)
- Transport clutch : Turns ON.
- Aligning roller : Rotates.
- Transport belt : Rotates in forward direction.

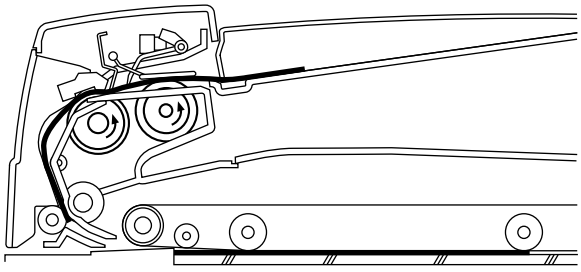
- The aligning sensor turns OFF, and the original is transported for a fixed number of pulses.

A-4 Original stop = Original feed completion



- After a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned OFF to complete original feed.

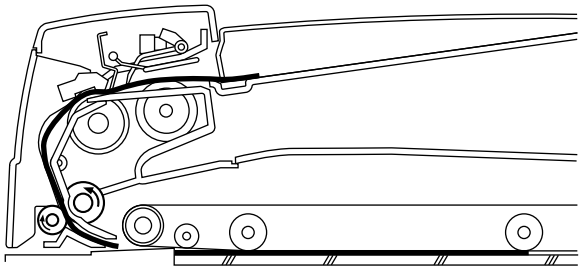
A-5 From start of advance feed of next original to original alignment (A4 original wide, letter-size original wide)



- Drive motor : Rotates in reverse direction.
- Feed clutch : Turns ON. (MR-3006)
- Transport clutch : Turns OFF.
- Weight : Falls.
- Pick-up roller : Rotates.
- Feed roller : Rotates.
- Aligning roller : Stops.
- Transport belt : Stops.

- If the original that was fed in A-4step is A4-wide or letter-size wide, the original on the tray is fed in advance to start two-step pre-feeding.
- The original is fed for a fixed number of pulses after the aligning sensor turns ON, and the motor stops.

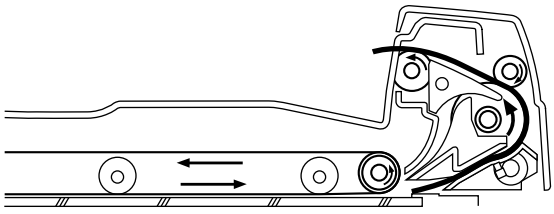
A-6 From start to completion of two-step pre-feeding (A4 original wide, letter-size original wide)



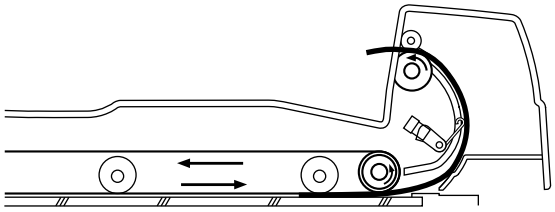
- Drive motor : Rotates in forward direction.
- Feed clutch : Turns OFF. (MR-3006)
- Transport clutch : Turns OFF.
- Weight : Rises.
- Pick-up roller : Stops.
- Feed roller : Stops.
- Aligning roller : Rotates.
- Transport belt : Stops.

- The motor is rotated in the forward direction for a fixed number of pulses, and stops.

A-7 Start of original discharge



(MR-3006)



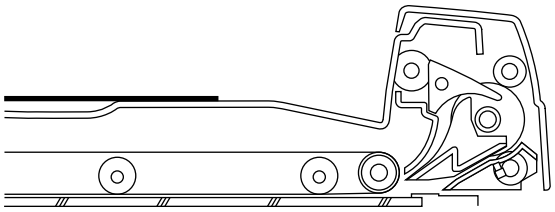
(MR-2008)

- Drive motor : Rotates in forward direction.
- Transport clutch : Turns ON.
- Transport belt : Rotates in forward direction.
- Reversing roller : Rotates. (MR-3006)
- Exit roller : Rotates.

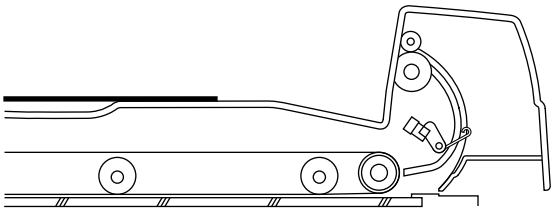
- Forward rotation of the motor lowers the flapper, and the original is discharged. (MR-3006)

- The motor rotates in the forward direction, and the original is discharged. (MR-2008)

A-8 Completion of discharge



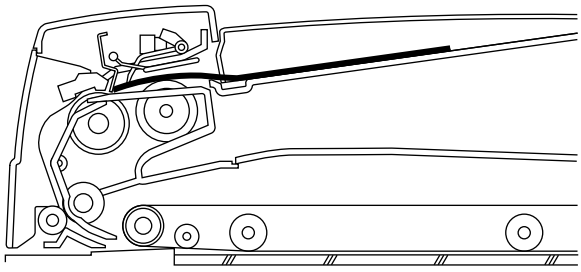
(MR-3006)



(MR-2008)

- After a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned OFF to complete original discharge.

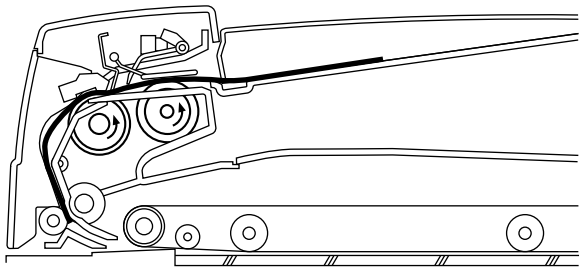
B-1 Original loading



- Drive motor : Turns OFF.
- Feed clutch : Turns OFF. (MR-3006)
- Transport clutch : Turns OFF.
- Weight : Rises.
- Pick-up roller : Stops.
- Feed roller : Stops.
- Aligning roller : Stops.
- Transport belt : Stops.

- The original is loaded.

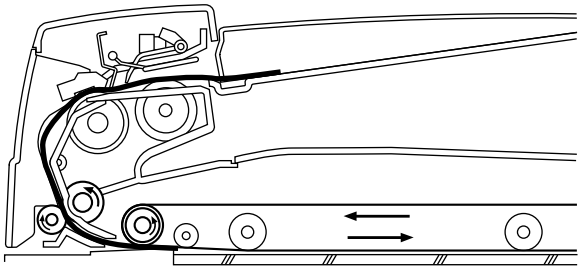
B-2 From PRINT button ON to 1st original alignment



- Drive motor : Rotates in reverse direction.
- Feed clutch : Turns ON. (MR-3006)
- Transport clutch : Turns OFF.
- Weight : Falls.
- Pick-up roller : Rotates.
- Feed roller : Rotates.
- Aligning roller : Stops.
- Transport belt : Stops.

- The original is fed for a fixed number of pulses after the aligning sensor turns ON, and the motor stops.

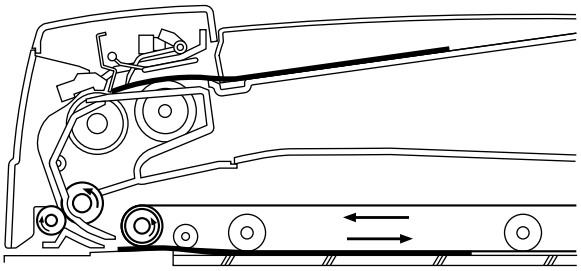
B-3 Transport of 1st original to pause position after drive motor ON



- Drive motor : Rotates in forward direction.
- Feed clutch : Turns OFF. (MR-3006)
- Transport clutch : Turns ON.
- Aligning roller : Rotates.
- Transport belt : Rotates in forward direction.

- The aligning sensor turns OFF, and the original is transported for a fixed number of pulses.

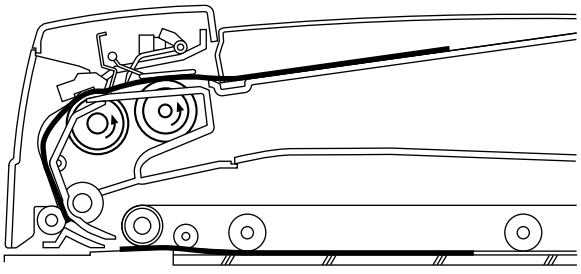
B-4 From drive motor ON to 1st original pause



- Drive motor : Rotates in forward direction.
- Feed clutch : Turns OFF. (MR-3006)
- Transport clutch : Turns ON.
- Aligning roller : Rotates.
- Transport belt : Rotates in forward direction.

- The original is fed for a fixed number of pulses after the aligning sensor turns OFF, and the motor stops.
- The trailing edge of the 1st original exits the original feed section, and is positioned on the original stopper.

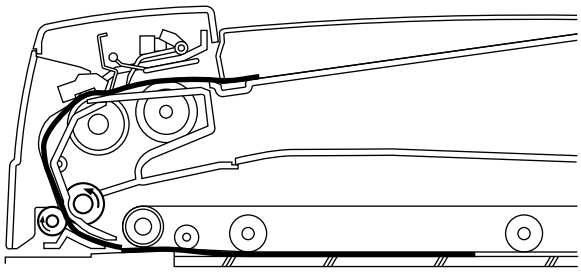
B-5 To alignment of 2nd original



- Drive motor : Rotates in reverse direction.
- Feed clutch : Turns ON. (MR-3006)
- Transport clutch : Turns OFF.
- Weight : Falls.
- Pick-up roller : Rotates.
- Feed roller : Rotates.
- Aligning roller : Stops.
- Transport belt : Stops.

- The original is fed for a fixed number of pulses after the aligning sensor turns ON, and the motor stops.

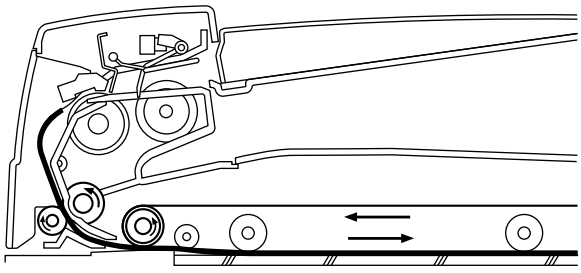
B-6 To completion of splice



- Drive motor : Rotates in forward direction.
- Feed clutch : Turns OFF. (MR-3006)
- Transport clutch : Turns OFF.
- Aligning roller : Rotates.
- Transport belt : Stops.

- The motor is rotated in the forward direction for a fixed number of pulses, and the leading edge of the 2nd original is spliced with the trailing edge of the 1st original.

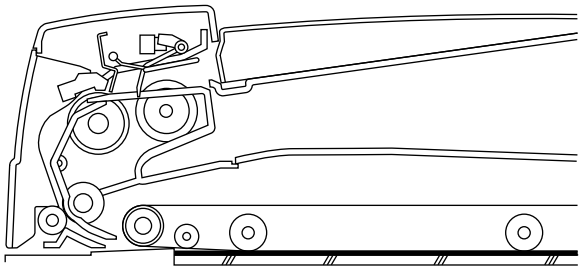
B-7 Transport to copy glass surface



- Drive motor : Rotates in forward direction.
- Feed clutch : Turns OFF. (MR-3006)
- Transport clutch : Turns ON.
- Aligning roller : Rotates.
- Transport belt : Rotates in forward direction.

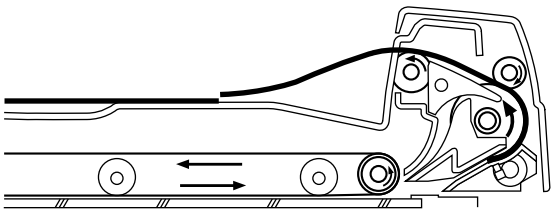
- The aligning sensor turns OFF, and the original is transported for a fixed number of pulses.

B-8 Completion of original feed

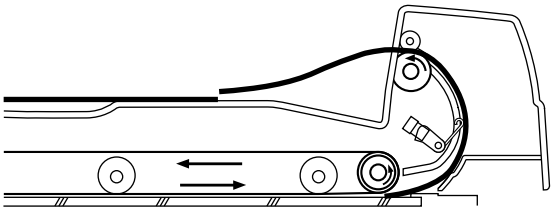


- The original is fed for a fixed number of pulses after the aligning sensor turns OFF, and the motor stops.
- After a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned OFF to complete original feed.

B-9 Discharge of original



(MR-3006)



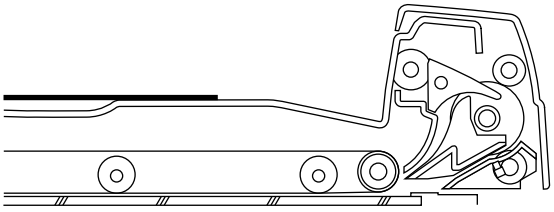
(MR-2008)

- Drive motor : Rotates in forward direction.
- Transport clutch : Turns ON.
- Transport belt : Rotates in forward direction.
- Reversing roller : Rotates. (MR-3006)
- Exit roller : Rotates.

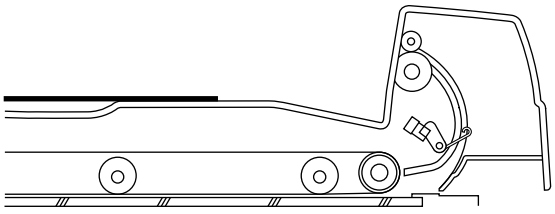
- Forward rotation of the motor lowers the flapper, and the original is discharged. (MR-3006)

- The motor rotates in the forward direction, and the original is discharged. (MR-2008)

B-10 Completion of discharge



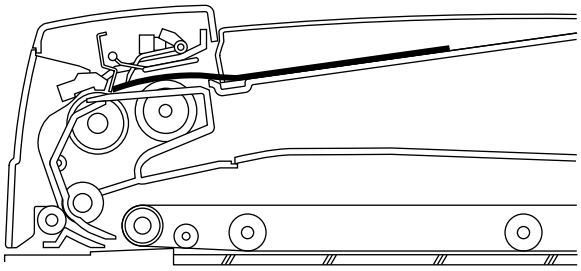
(MR-3006)



(MR-2008)

- After a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned OFF to complete original discharge.

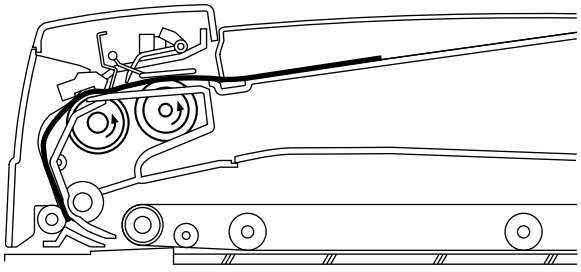
C-1 Original loading



- Drive motor : Turns OFF.
- Feed clutch : Turns OFF.
- Transport clutch : Turns OFF.
- Weight : Rises.
- Pick-up roller : Stops.
- Feed roller : Stops.
- Aligning roller : Stops.
- Transport belt : Stops.

- The original is loaded.

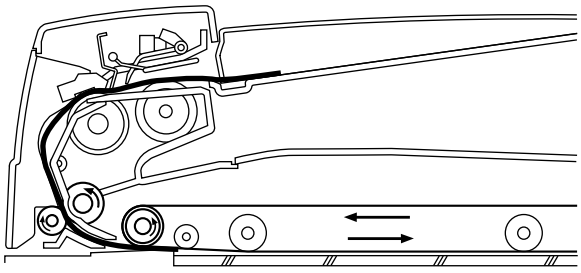
C-2 From PRINT button ON to original alignment



- Drive motor : Rotates in reverse direction.
- Feed clutch : Turns ON.
- Transport clutch : Turns OFF.
- Weight : Falls.
- Pick-up roller : Rotates.
- Feed roller : Rotates.
- Aligning roller : Stops.
- Transport belt : Stops.

- The original is fed for a fixed number of pulses after the aligning sensor turns ON, and the motor stops.

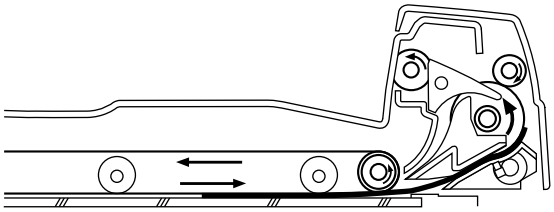
C-3 Drive motor ON = Original transport to copy glass surface



- Drive motor : Rotates in forward direction.
- Feed clutch : Turns OFF.
- Transport clutch : Turns ON.
- Aligning roller : Rotates.
- Transport belt : Rotates in forward direction.

- The original is fed out to the copy glass surface.

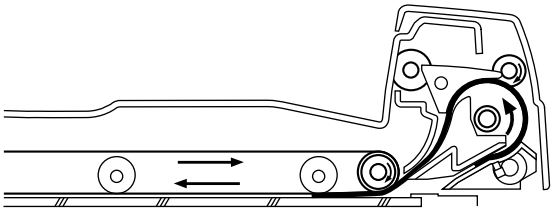
C-4 To forward rotation stop



- Drive motor : Rotates in forward direction.
- Feed clutch : Turns OFF.
- Transport clutch : Turns ON.
- Transport belt : Rotates in forward direction.
- Reversing roller : Rotates.

- The motor stops when the original has been transported by about 25 mm after the exit sensor turns ON.

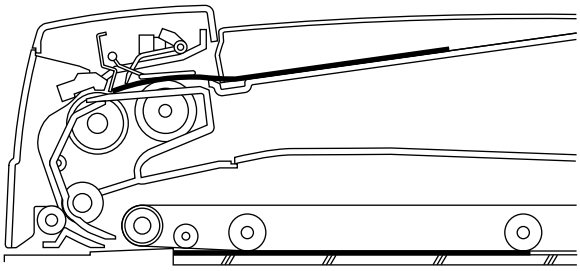
C-5 Original reversal



- Drive motor : Rotates in reverse direction.
- Feed clutch : Turns OFF.
- Transport clutch : Turns ON.
- Transport belt : Rotates in reverse direction.
- Reversing roller : Rotates.

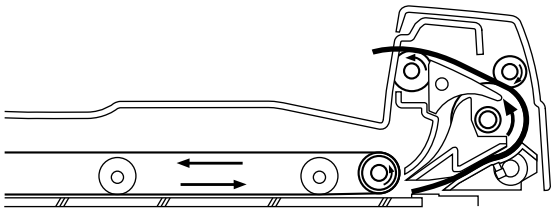
- Reverse rotation of the motor raises the flapper, and the original is reversed.
- The original is fed for fixed number of pulses and the motor stops.

C-6 Completion of original feed



- After a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned OFF to complete original feed.

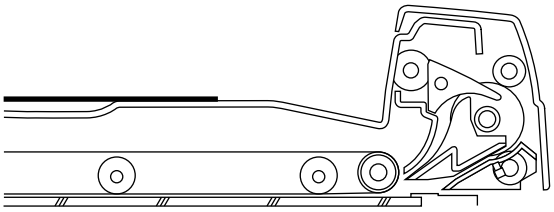
C-7 Original discharge



- Drive motor : Rotates in forward direction.
- Transport clutch : Turns ON.
- Transport belt : Rotates in forward direction.
- Reversing roller : Rotates.
- Exit roller : Rotates.

- Forward rotation of the motor lowers the flapper, and the original is discharged.

C-8 Completion of discharge



- After a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned OFF to complete original discharge.

4.2 Description of Original Feeder Operation

A. Single-side Original Feed Operation

1. When the original is placed on the original feed tray, the original is detected by the empty sensor, and the ORG-RDY signal is set.

2a. When the ORG-IN signal is received from the main unit, DF-ACT is set, and original replacement is started. When a fixed amount of time has elapsed since the feed clutch turned ON, the motor is driven in the reverse direction to start original feed. ---MR-3006

2b. When the ORG-IN signal is received from the main unit, DF-ACT is set, and original replacement is started. The motor is driven in the reverse direction to start original feed. ---MR-2008

3. After being driven for a fixed number of pulses after the leading edge of the original arrived at the aligning sensor, the motor is stopped. When the leading edge of the original arrives at the aligning roller, aligning is carried out. At the same time, the state of the size width sensor is stored to memory. When a fixed amount of time has elapsed since the motor stopped, the feed clutch is turned OFF. ---Only MR-3006

4. When a fixed amount of time has elapsed since the transport clutch turned ON, the motor is driven in the forward direction to feed the original onto the glass surface. At the same time, travel size detection is started (resumed when there is two-step pre-feeding).

5. The PRE-STP signal is set by the set timing of the PRE-STP signal.

6. When the trailing edge of the original exits the aligning sensor, the DF-ACT signal is reset, travel size detection ends, and the original size is detected together with the state of the size width sensor stored to memory in 3. and 11. When the original is an irregular size, or when the original size is different from the size of the original that passed through previously, the original size data is transmitted to the main unit.

7. The ORG-STP signal is set by the set timing of the ORG-STP signal.

8. After being driven for a fixed number of pulses after the trailing edge of the original has exited the aligning sensor, the motor is stopped, and the original is placed at the exposure position. When a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned OFF, and single-side feed ends.

9. When the fed original is A4-size (landscape) or letter-size (landscape), the DF-SGL signal is reset and the original is on the tray, the PRE-FED signal is set, and pre-feeding operation is started. Otherwise, operation starts from 14.

10a. When a fixed amount of time has elapsed since the feed clutch turned ON, the motor is driven in the reverse direction to start pre-feeding operation. ---MR-3006

10b. The motor is driven in the reverse direction to start advanced feed operation. ---MR-2008

11. The same operation as 3. is carried out, and pre-feeding operation ends.

12. The motor is driven in the forwards direction to start two-step pre-feeding operation. At the same time, travel size detection is started. After being driven for a fixed number of pulses, the motor is stopped. When a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned ON, two-step pre-feeding operation ends, and the machine stands by.

13. When the next ORG-IN signal is received, the PRE-FED signal is reset, and operation is resumed from 4. However, note that the transport clutch is turned ON at 12., so the transport clutch is not turned ON.

14. When the original feed size is not A4 (landscape) or letter (landscape), and the DF-SGL signal is set when original feed ends at 8., the DF-ACT signal is set when the next ORG-IN signal is received, and the transport clutch is turned ON.

    After a fixed amount of time has elapsed, the motor is driven in the forward direction to start pre-discharge operation. Pre-discharge operation is carried out to completely discharge the discharged original. After being driven for a fixed number of pulses, the motor is stopped. When a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned OFF, and the pre-discharge operation ends.

15a. Original replacement is started. When a fixed amount of time has elapsed since the feed clutch was turned ON, the motor is driven in the reverse direction to start the original feed operation. ---MR-3006

15b. Original replacement is started. The motor is driven in the reverse direction to start the original feed operation. ---MR-2008

16. From then on, operations from 3.are repeated.
17. When the ORG-OUT signal is received at 13. and 14., the DF-ACT signal is set, and the transport clutch is turned ON. When a fixed amount of time has elapsed, the motor is driven in the forward direction to discharge all originals being transported.
18. After being driven for a fixed number of pulses after the trailing edge of the final original has passed the exit sensor (exit inversion sensor). the motor is stopped. When a fixed amount of time has elapsed after the motor has stopped, the transport clutch is turned OFF.
19. The DF-ACT signal is reset, and the discharge of the final original ends.

B. Dual-side Original Feed Operation (MR-3006)

1. When the original is placed on the original feed tray, the original is detected by the empty sensor, and the ORG-RDY signal is set.
2. When the ORG-IN signal is received from the main unit, DF-ACT is set, and original replacement is started. When a fixed amount of time has elapsed since the feed clutch turned ON, the motor is driven in the reverse direction to start original feed.
3. After being driven for a fixed number of pulses after leading edge of the original arrives at the aligning sensor, the motor is stopped. When the leading edge of the original arrives at the aligning roller, aligning is carried out. At the same time,the state of the size width sensor is stored to memory. When a fixed amount of time has elapsed since the motor stopped, the feed clutch is turned OFF.
4. When a fixed amount of time has elapsed since the transport clutch turned ON, the motor is driven in the forward direction to fed the original onto the glass surface. At the same time, travel size detection is started.
5. When the trailing edge of the original exits the aligning sensor, travel size detection ends, and the original size is detected together with state of the size width sensor stored to memory in 3. When the original is an irregular size, or when the original size is different from the size of the original that passed through previously, the original size data is transmitted to the main unit.
6. After being driven for a fixed number of pulses after the leading edge of the final original has arrived at the exit sensor (exit inversion sensor), the motor is stopped.
7. When a fixed amount of time has elapsed after the motor has stopped, the motor is driven in the reverse direction, and inversion is started.

8. When the trailing edge of the original has exited the exit sensor, the ORG-FAC signal is reset. However, note that this sometimes happens after 9., 10. and 11. according to the length of the original.
9. The DF-ACT signal is reset by the reset timing of the DF-ACT signal.
10. The PRE-STP signal is reset by the set timing of the PRE-STP signal.
11. The ORG-STP signal is reset by the set timing of the ORG-STP signal.
12. After the motor starts to be driven in the reverse direction for a fixed number of pulses, the motor is stopped, and the original is placed at the exposure position. When a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned OFF, and dual-side feed ends.
13. When the next ORG-IN signal is received, the DF-ACT signal is set, and the transport clutch is turned ON. After a fixed amount of time has elapsed, the motor is driven in the forward direction, and dual-side feed starts.
14. The same operation as in 6. and 7. are carried out.
15. When the trailing edge of the original exits the exit sensor, the ORG-FAC signal is set.
16. The same operations as in 9., 10. and 11. are carried out.
17. After being driven for a fixed number of pulses after motor is driven in the reverse direction, the motor is stopped, and the original is placed at the exposure position. When a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned OFF, and dual-side original feed operation ends.
18. When the next ORG-IN signal is received, the DF-ACT signal is set, and the transport clutch is turned ON. After a fixed amount of time has elapsed, the motor is driven in the forward direction to start pre-discharge operation. Pre-discharge operation is carried out to completely discharged original. After being driven for a fixed number of pulses, the motor is stopped. When a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned OFF, and the pre-discharge operation ends.
19. Original replacement is started. When a fixed amount of time has elapsed since the feed clutch is turned ON, the motor is driven in the reverse direction to start the original feed operation.
20. From then on, operations from 3. are repeated.
21. When the ORG-OUT signal is received at 13., the DF-ACT signal is set, and the transport clutch is turned ON. When a fixed amount of time has elapsed, the motor is driven in the forward direction, and the same operation as in 14., 15.and 17. are carried out. After the front side of the original is placed, operation is started from 23.
22. When the ORG-OUT signal is received at 18., the DF-ACT signal is set, and the operation is started from 23.
23. When a fixed amount of time has elapsed after the transport clutch is turned ON, the motor is driven in the forward direction to discharge all originals being transported.
24. After being driven for a fixed number of pulses after the trailing edge of the final original has passed the exit sensor (exit inversion sensor), the motor is stopped. When a fixed amount of time has elapsed after the motor has stopped,the transport clutch is turned OFF.
25. The DF-ACT signal is reset, and the discharge of the final original ends.

C. 2in1 Original Feed Operation

1. When the original is placed on the original feed tray, the original is detected by the empty sensor, and the ORG-RDY signal is set.

2a. When the ORG-IN signal is received from the main unit, DF-ACT is set, and original replacement is started. When a fixed amount of time has elapsed since the feed clutch turned ON, the motor is driven in the reverse direction to start original feed. ---MR-3006

2b. When the ORG-IN signal is received from the main unit, DF-ACT is set, and original replacement is started. The motor is driven in the reverse direction to start original feed. ---MR-2008

3. After being driven for a number of pulses after the leading edge of the original arrives at the aligning sensor, the motor is stopped. When the leading edge of the original arrives at the aligning roller, aligning is carried out. At the same time, the state of the width sensor is stored to memory. When a fixed amount of time has elapsed since the motor stopped, the feed clutch is turned OFF.

4. When a fixed amount of time has elapsed since the transport clutch turned ON, the motor is driven in the forward direction to feed the 1st original to just before the exposure position. At the same time, travel size detection is started.

5. When the trailing edge of the 1st original exits the aligning sensor, travel size detection ends, and the original size is detected together with the state of the size width sensor stored to memory in 3 and stored to memory.

6. After being driven for a fixed number of pulses after the trailing edge of the original has exited the aligning sensor, the motor is stopped, and the 1st original is placed just before the exposure position. When a fixed amount of time has elapsed after the motor has stopped, the transport clutch is turned OFF.

7a. The PRE-FED signal is set, and the feed clutch is turned ON. When a fixed amount of time has elapsed, the motor is driven in the reverse direction to start the original feed operation of the 2nd original. ---MR-3006

7b. After the PRE-FED signal is set, the motor is driven in the reverse direction to start the original feed operation of the 2nd original. ---MR-2008

8. The same operation as 3. is carried out.

9. The motor rotates in the forward direction, and joining of the 1st and 2nd originals is stated. At the same time, the travel size detection of the 2nd original is started. After being driven for a fixed number of pulses, the motor is stopped to joining.

10. When a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned ON, and after a future fixed amount of time has elapsed, the motor is driven in the forward direction to feed the 2nd original to the glass surface.

11. The PRE-STP signal is set by the set timing of the PRE-STP signal.

12. When the trailing edge of the 2nd original exits the aligning sensor, the DF-ACT and PRE-FED signals are reset. Travel size detection also ends, and the 2nd original size is detected together with the state of the size width sensor stored to memory in 3.

    The sizes of the 1st and 2nd originals are compared, and when the larger of the two original sizes is irregular, or when the original size is different from the size of the original that passed through previously, the size data of the larger original is transmitted to the main unit.

13. The ORG-STP signal is set by the set timing of the ORG-STP signal.
14. After being drivien for a fixed number of pulses after the trailing edge of the 2nd original has exited the aligning sensor, the motor is stopped, and the original is placed at the exposure position. When a fixed amount of has elapsed since the motor stopped, the transport clutch is turned OFF, and 2 in 1 original feed operation ends.
15. When the next ORG-IN signal is received, the DF-ACT signal is set, and the transport clutch is turned ON. After a fixed amount of has elapsed, the motor is driven in the forward direction to start pre-discharge operation. Pre-discharge operation is carried out to completely discharge the discharged original. After being driven for a fixed number of pulses, the motor is stopped. When a fixed amount of time has elapsed since the motor stopped, the transport clutch is turned OFF, and the pre-discharge operation ends.

16a. Original replacement is started. When a fixed amount of time has elapsed since the feed clutch is turned ON, the motor is driven in the reverse direction to start the original feed operation. ---MR3006

16b. Original replacement is started,and the motor is driven in the reverse direction to start the original feed operation. ---MR-2008

17. From then on, operation from 3. are repeated.
18. When the ORG-OUT signal is received at 16., the DF-ACT signal is set. When a fixed amount of time has elapsed after the transport clutch is turned ON, the motor is driven in the forward direction to discharge all originals being transported.
19. After being for a fixed number of pulses after the trailing edge of the final original has passed the exit sensor (exit inversion sensor), the motor is stopped. When a fixed amount of time has elapsed after the motor has stopped, the transport clutch is turned OFF.
20. The DF-ACT signal is reset, and the discharge of the final original ends.

5. NAMES AND FUNCTIONS OF ELECTRICAL PARTS

5.1 Functions of Electrical Parts

Go to **DC Harness Connection Diagram**

MR-2008 **MR-3006**

(1) Motor

Symbol	Name	Function	Remarks
(MOT)	MOT (Drive motor)	Driving of pick-up roller, feed roller, aligning roller, transport belt, *reversing roller and exit roller	Pulse motor

*for the MR-3006 only

(2) Electromagnetic clutches

Symbol	Name	Function	Remarks
*[PASUCLU]	PASUCLU *(Feed clutch)	Transmitting of drive of pick-up roller and feed roller	Electromagnetic clutch
[DRVCLU]	DRVCLU (Transport clutch)	Transmitting of drive of transport belt, *reversing roller and exit roller	Electromagnetic clutch

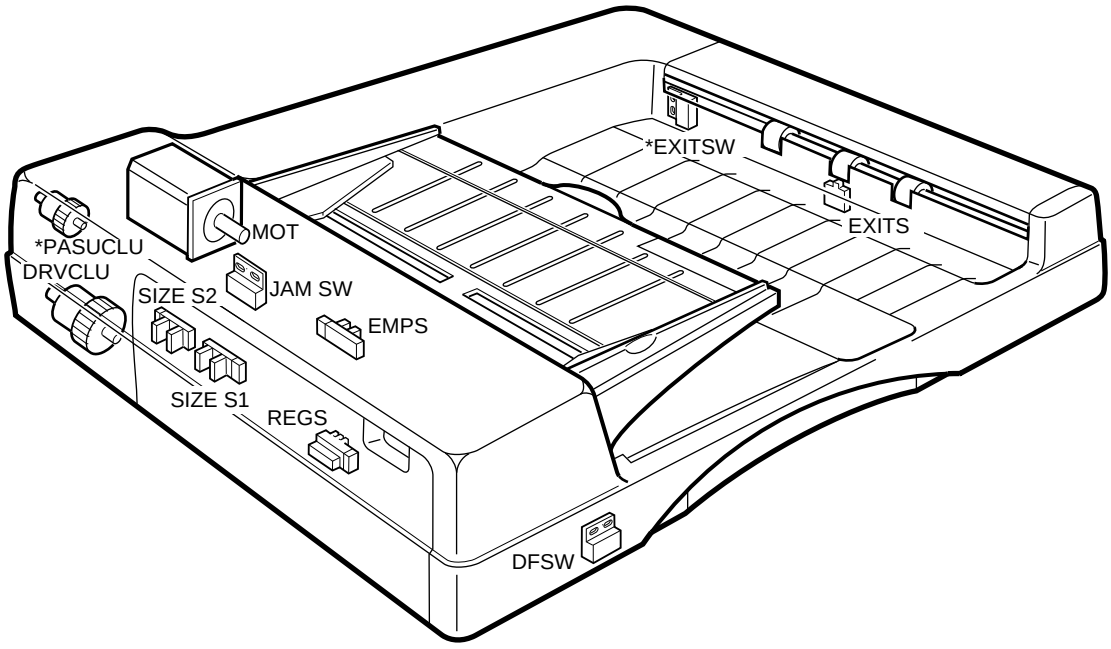
*for the MR-3006 only

(3) Sensors

Symbol	Name	Function	Remarks
(EMPS)	EMP-SNS (Empty sensor)	Original detection sensor for originals on original feed tray	Semiconductor sensor
(REGS)	REG-SNS (Aligning sensor)	Original detection sensor for aligning	Semiconductor sensor
(SIZES1)	SIZE-SNS1 (Size sensor 1)	Original width detection sensor 1	Semiconductor sensor
(SIZES2)	SIZE-SNS2 (Size sensor 2)	Original width detection sensor 2	Semiconductor sensor
(EXITS)	EXIT-SNS (Exit sensor)	Original detection sensor at exit section	Semiconductor sensor
(DFSW)	DF-SW (ADF set switch)	Detection switch for opening/closing ADF unit	Reed switch
(JAMSW)	JAM-SW (Feed-cover switch)	Detection switch for opening/closing feed unit	Reed switch
*(EXITSW)	EXIT-SW *(Exit-cover switch)	Detection switch for opening/closing exit unit	Reed switch

*for the MR-3006 only

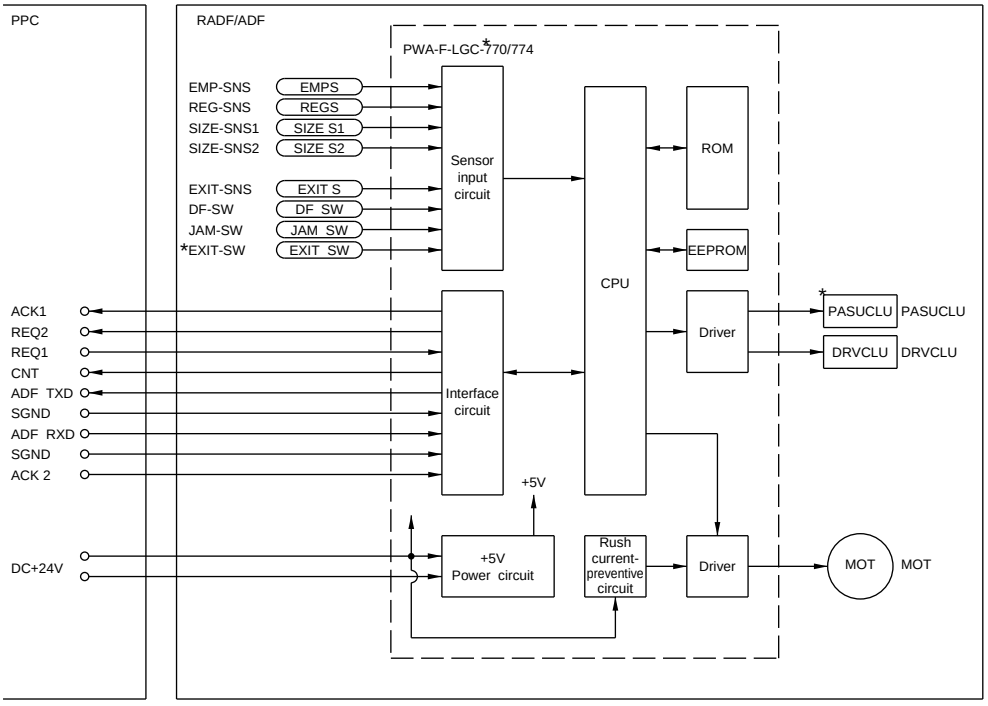
5.2 Electrical Parts Location Diagram



*PASUCLU	*Feed clutch
JAMSW	Feed-cover switch
DRVCLU	Transport clutch
MOT	Drive motor
SIZE S1	Size sensor 1
EMPS	Empty sensor
REGS	Aligning sensor
SIZE S2	Size sensor 2
DFSW	ADF set switch
EXITS	Exit sensor
*EXITSW	*Exit-cover sensor

*(for the MR-3006 only)

5.3 Block Diagram for Electrical Signals



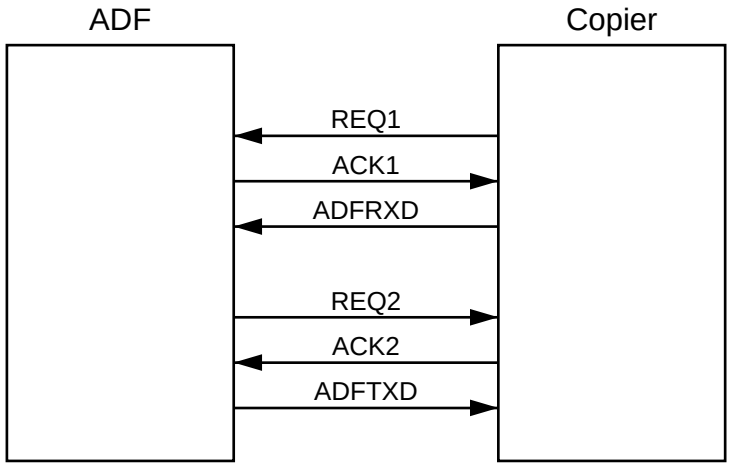
*(for the MR-3006 only)

6. DESCRIPTION OF INTERFACE SIGNALS

The sending and receiving of signals between the copier and the ADF is conducted by using the six lines as shown below:

REQ 1 ..... Communication request signal (from the copier to the ADF)
REQ 2 ..... Communication request signal (from the ADF to the copier)
ACK 1 ..... Communication request response signal (from the ADF to the copier)
ACK 2 ..... Communication request response signal (from the copier to the ADF)
ADFRXD ..... Data sent from the copier to the ADF
ADFTXD ..... Data sent from the ADF to the copier.

Since data transmission between the copier and the ADF (ADFRXD and ADFTXD) is conducted by means of serial transmission, it is not possible to check for the correct data transmission in the field.



7. ABOUT ORIGINAL JAMS AND ADF ERRORS

7.1 Type of Jam

(1) Feed unit jam : Original has not arrived at aligning sensor during pre-feeding
Original has not arrived during feed of 1st original in 2in1 feed
Original is retained at aligning sensor during feed in regular mode

(2) Transport jam : Original has not arrived at the exit sensor(exit inversion sensor)during discharge
Original has not arrived at the exit sensor(exit inversion sensor)during dual-side feed --- MR-3006

(3) Exit jam : Original is retained at the exit sensor(exit inversion sensor)during discharge
Original is retained at the exit sensor(exit inversion sensor)during dual-side feed --- MR-3006

(4) Two-original(2in1)jam in feed unit : Original has not arrived at aligning sensor during feed of 2nd original in 2in1 feed

7.2 Jam Timer

Category	Function	Pulse Value	Timer Value(sec)
Feed unit	Until aligning sensor turns ON after of pre-feeding	1318	0.96
	Until aligning sensor turns ON after start of pre-feeding of 1st original in 2in1 feed	1318	0.96
	Until aligning sensor turns ON after start of pre-feeding of 2nd original in 2in1 feed	1318	0.96
	Until aligning sensor turns OFF from start of transport by aligning roller after aligning during dual-side feed ---MR-3006	2620	1.12
	Until aligning sensor turns OFF from start of transport by aligning roller after aligning during single-side feed ---MR-2008	2620	1.85
	Until aligning sensor turns OFF from start of transport by aligning roller after aligning 1st original in 2in1 feed	2620	1.12 (MR-3006) 1.85 (MR-2008)
	Until aligning sensor turns OFF from start of original feed after joining 2nd original has ended in 2in1 feed	2433	1.1 (MR-3006) 1.8 (MR-2008) (Note 1)

Category	Function	Pulse Value	Timer Value(sec)
Transport section	Until the exit sensor (exit inversion sensor) turns ON after start of discharge --- MR-3006	3437	1.35
	Until the exit sensor (exit inversion sensor) turns ON after start of dual-side inversion --- MR-3006	3067	1.3
	Until the exit sensor (exit inversion sensor) turns ON after start of dual-side discharge --- MR-3006	3067	1.3
	Until the exit sensor (exit inversion sensor) turns ON after start of dual-side original feed --- MR-3006	3437	2.1
	Until the exit sensor (exit inversion sensor) turns ON after start of discharge --- MR-2008	3437	2.2
Exit section	Until the exit sensor (exit inversion sensor) turns OFF after exit sensor (exit inversion sensor) turns ON during discharge --- MR-3006	2699	1.1
	Until original feed ends after start of motor reverse drive in the dual-side mode --- MR-3006	2215	(Note 2)
	Until the exit sensor (exit inversion sensor) turns OFF after exit sensor (exit inversion sensor) turns ON during discharge --- MR-2008	2699	1.9

• Feed per pulse = 0.24mm/pulse

Note 1 If the aligning sensor turns ON when the original is transported for a fixed number of pulses after transporting to the exposure position after the original has been joined, the 2nd original is regarded as a 2in1 impossible size. At the same time that feed of the 2nd original is resumed, counting of the pulses is continued, and the jam is regarded as an aligning sensor retention jam when the above jam pulses are counted.

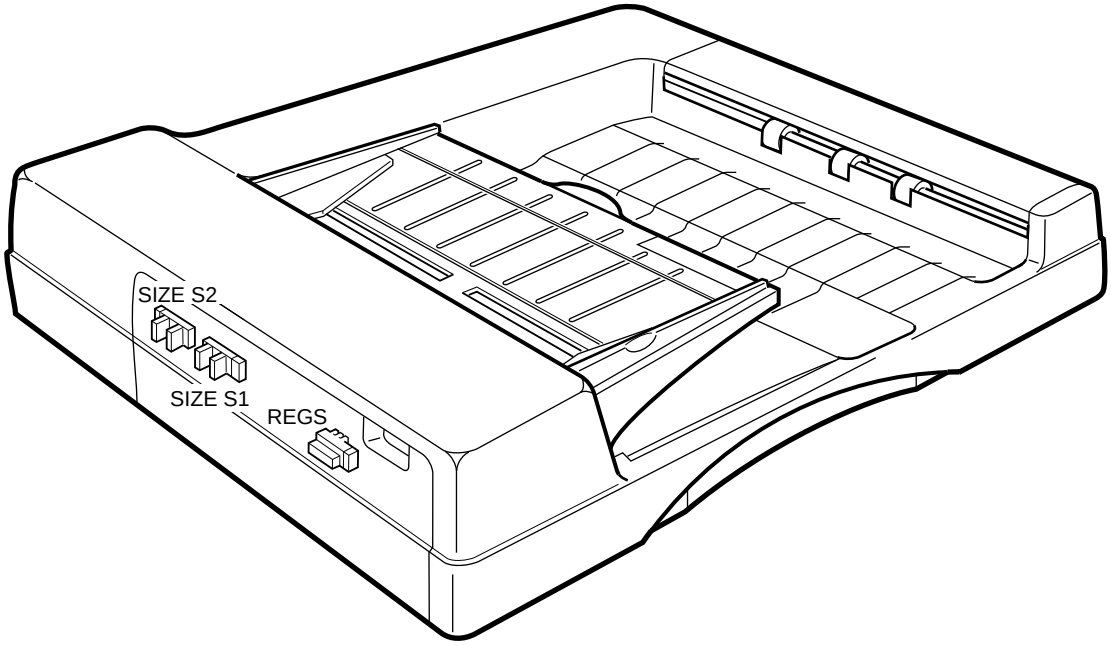
The above timer values are the times obtained by subtracting the scan time from the time from start of original feed after joining up to end of resumed of the 2nd original.

Note 2 Pulses from start of dual-side inversion to end of inversion are managed. If the exit sensor (exit inversion sensor) turns ON when the pulses is incremented, this is regarded as a exit sensor (exit inversion sensor) retention jam.

7.3 Type of Errors

(1) Poor aligning sensor adjustment.
(2) Poor exit sensor adjustment (for the MR-3006 only).
(3) Poor EEPROM initialization.

8. DETECTION OF ORIGINAL SIZES



The size of originals is determined by both the number of pulses generated until the original passes the aligning sensor and its width roughly detected by the size sensor 1.

(1) Each time the ADF feeds in an original, it detects its size and lets the copier know the lengthwise feed and widthwise directions in millimeters, respectively.

(2) Method of detecting the size of originals

The length of the original is measured by using the number of drive motor clock pulses generated from the start of original transporting (when the aligning roller starts rotating) until the aligning sensor is turned off (when the trailing edge of the original passes the sensor). Since A4 widthwise and A5 lengthwise cannot be distinguished by the length in the feed direction alone, the size sensor 1 is used roughly to know the width of the original, permitting its size to be determined (for A4 widthwise, the size sensor 1 is turned on).

Note that the size sensor 2 is used to distinguish between A4 widthwise and Letter widthwise. A4 widthwise is 210 mm and Letter widthwise is 216 mm, respectively, in the feed direction. Since the difference is only 6 mm, judgement would be difficult. So the size sensor 2 is additionally used to distinguish between A4 and Letter sizes. The size sensor 2 is turned on for A4 lengthwise which is 297 mm and off for Letter lengthwise which is 279 mm.

For U.S.A. and Canada

Size sensor 1	Size sensor 2	Range (mm)	Original size data (Feed direction)	Original size data (Widthwise direction)	Size
OFF	OFF	~129	Raw data	216	Irregular size
OFF	OFF	130~150	140	216	ST(139.7)
OFF	OFF	151~205	Raw data	216	Irregular size
OFF	OFF	206~226	216	140(139.7)	ST-R(215.9)
OFF	OFF	227~248	Raw data	140	Irregular size
OFF	OFF	249~267	257	182	B5-R(257.0)
OFF	OFF	268~269	Raw data	182	Irregular size
OFF	OFF	270~289	280	216(215.9)	LT-R(279.4)
OFF	OFF	290~307	297	210	A4-R(297.0)
OFF	OFF	308~319	Raw data	210	Irregular size
OFF	OFF	320~340	330	210	FOLIO(330.0)
OFF	OFF	341~345	Raw data	210	Irregular size
OFF	OFF	346~366	356	216(215.9)	LG(355.6)
OFF	OFF	367~	Raw data	216	Irregular size
ON	ON/OFF	~171	Raw data	257	Irregular size
ON	OFF	172~192	182	257	B5(182.0)
ON	ON/OFF	193~199	Raw data	257	Irregular size
ON	ON	200~226	210	297	A4(210.0)
ON	OFF	200~226	216	280(279.4)	LT(215.9)
ON	ON/OFF	227~345	Raw data	280	Irregular size
ON	OFF	346~366	356	258(257.2)	COMPUTER(355.6)
ON	ON/OFF	367~413	Raw data	258	Irregular size
ON	ON	414~426	420	297	A3(420.0)
ON	OFF	427~442	432	280(279.4)	LEDGER(431.8)
ON	ON/OFF	443~	Raw data	280	Irregular size

For Europe

Size sensor 1	Size sensor 2	Range (mm)	Original size data (Feed direction)	Original size data (Widthwise direction)	Size
OFF	OFF	~137	Raw data	210	Irregular size
OFF	OFF	138~158	148	210	A5(148.0)
OFF	OFF	159~199	Raw data	210	Irregular size
OFF	OFF	200~220	210	148	A5-R(210.0)
OFF	OFF	221~246	Raw data	148	Irregular size
OFF	OFF	247~267	257	182	B5-R(257.0)
OFF	OFF	268~273	Raw data	182	Irregular size
OFF	OFF	274~288	280	216(215.9)	LT-R(279.4)
OFF	OFF	289~307	297	210	A4-R(297.0)
OFF	OFF	308~319	Raw data	210	Irregular size
OFF	OFF	320~340	330	210	FOLIO(330.0)
OFF	OFF	341~345	Raw data	210	Irregular size
OFF	OFF	346~366	356	216(215.9)	LG(355.6)
OFF	OFF	367~	Raw data	216	Irregular size
ON	ON/OFF	~171	Raw data	257	Irregular size
ON	OFF	172~192	182	257	B5(182.0)
ON	ON/OFF	193~199	Raw data	257	Irregular size
ON	ON	200~226	210	297	A4(210.0)
ON	OFF	200~226	216	280(279.4)	LT(215.9)
ON	ON/OFF	227~353	Raw data	280	Irregular size
ON	OFF	354~374	364	257	B4(364.0)
ON	ON/OFF	375~413	Raw data	257	Irregular size
ON	ON	414~426	420	297	A3(420.0)
ON	OFF	427~442	432	280(279.4)	LEDGER(431.8)
ON	ON/OFF	443~	Raw data	280	Irregular size

The size sensor 2 is used only for distinguishing A4 from Letter.
(Although the sensor is also on for A3, it is ignored.)

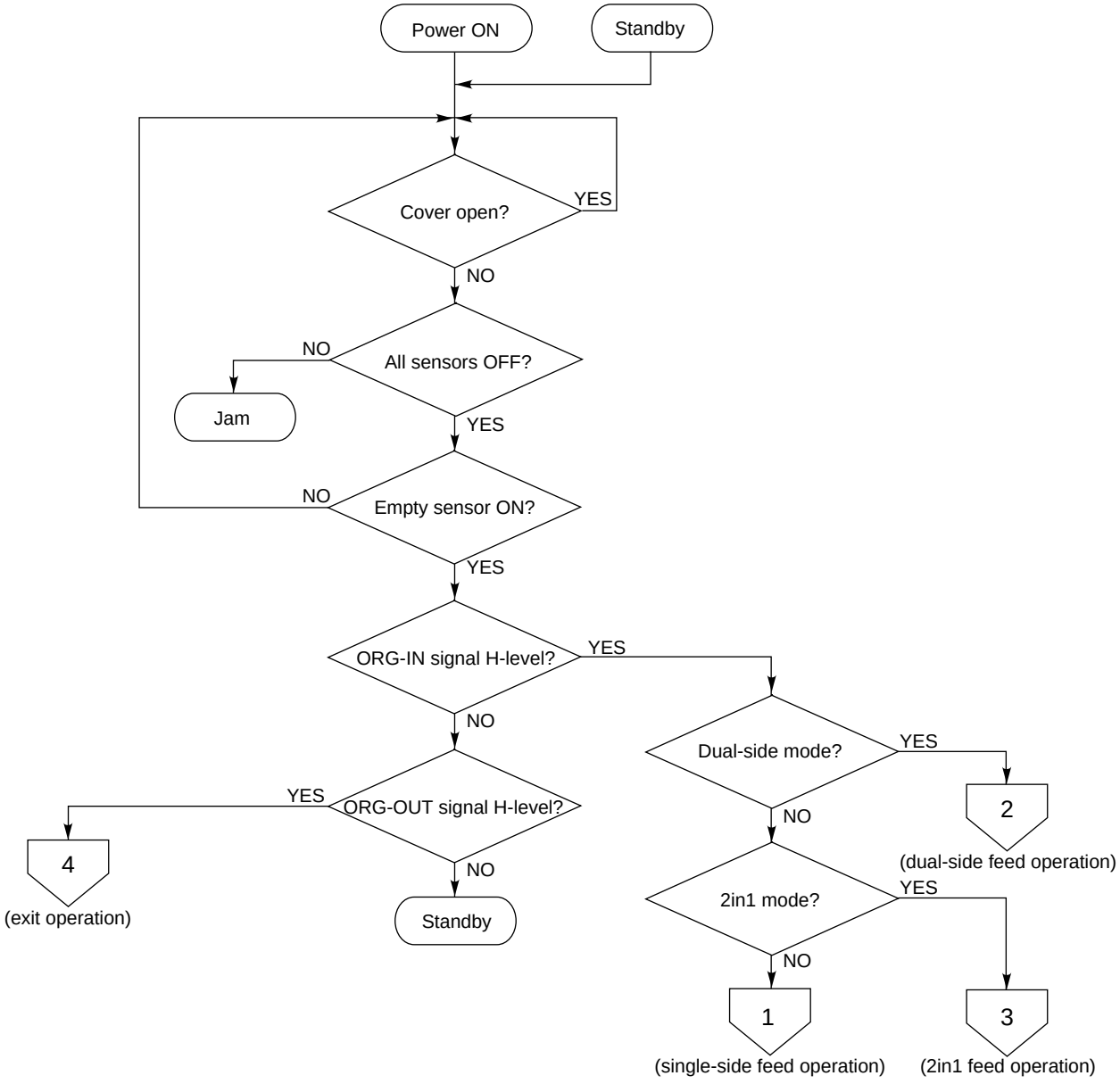
(3) Outline of operation

① Drive motor clock pulses are counted from the start of original transporting until the aligning sensor is turned off. In addition, the status of the size sensor 1 is detected for determining the original size.

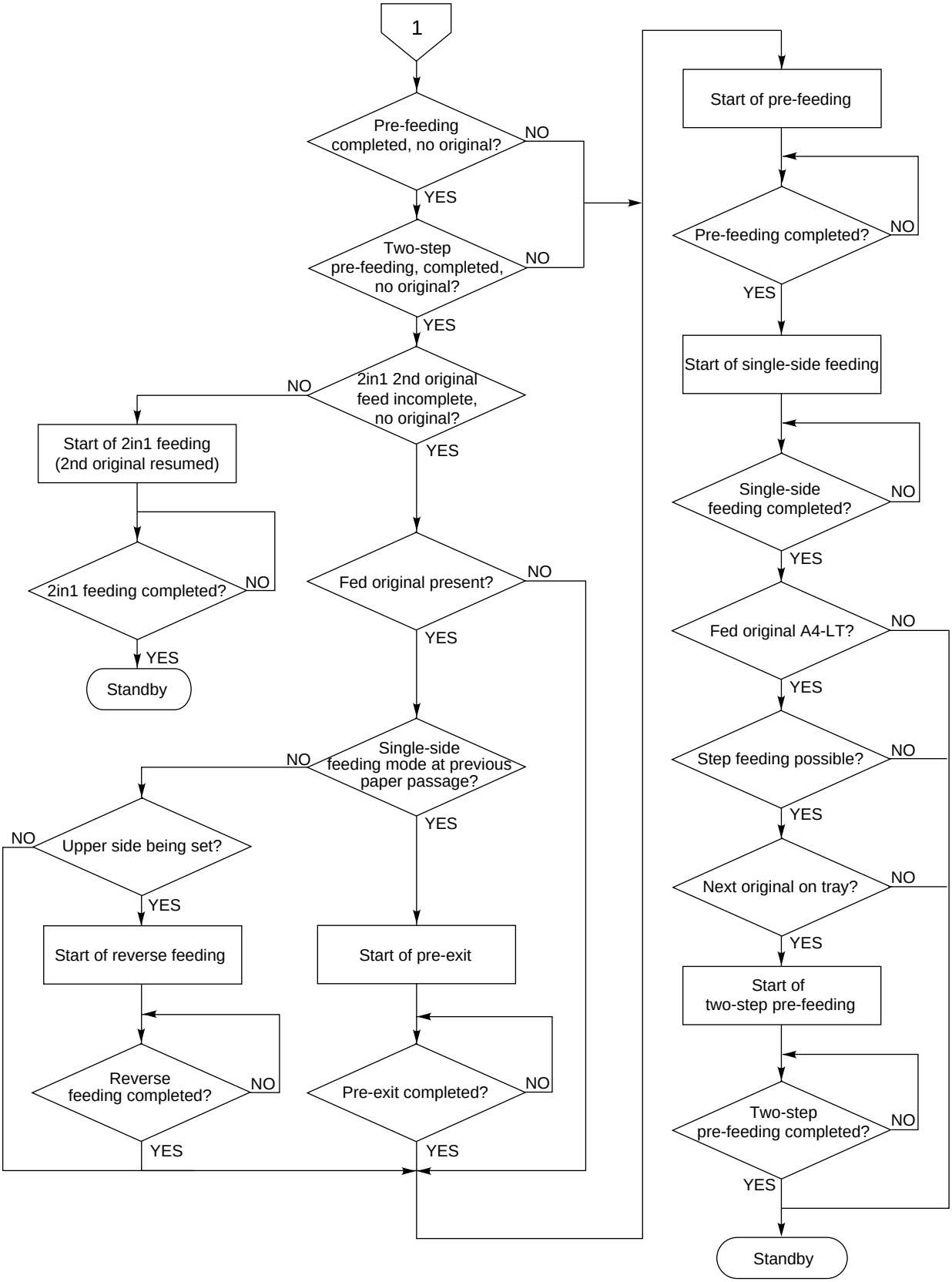
② After the original size has been determined, the size data of the feed direction and the widthwise size data created by inferring from that of the feed direction are sent out to the copier.

9. FLOW CHART

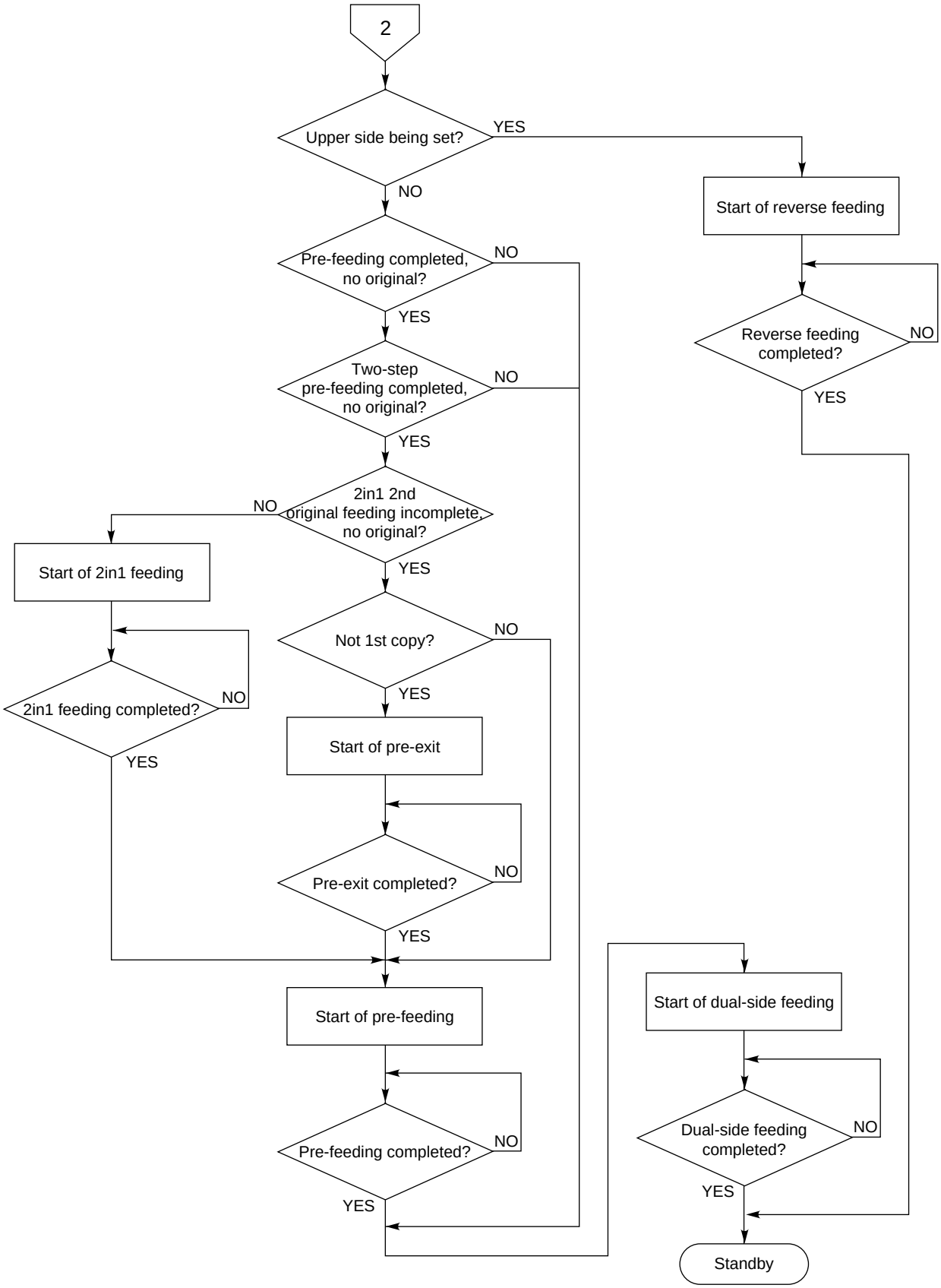
A. From Power ON to READY (MR-3006)



B. Single-side Feed Operation (MR-3006)



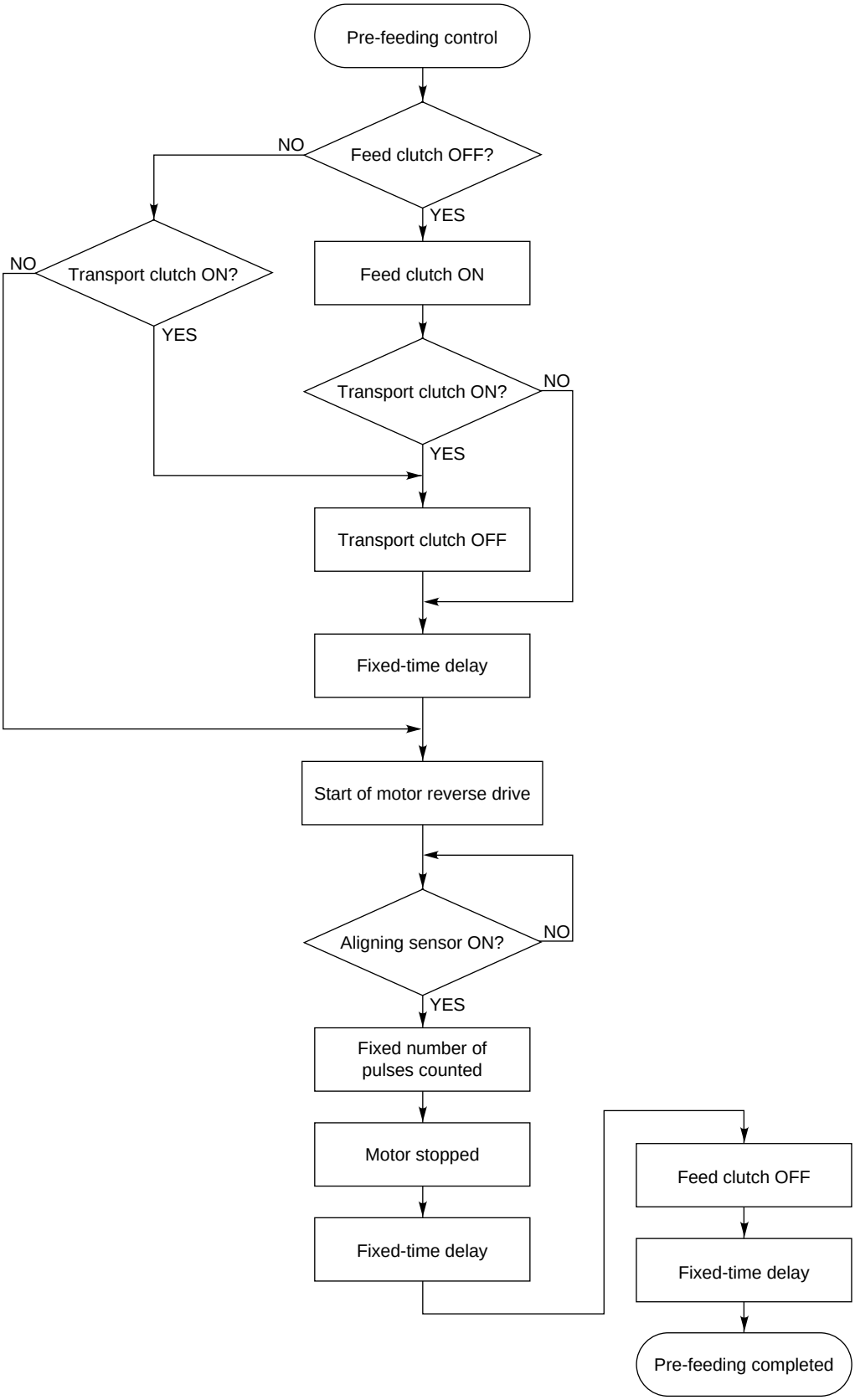
C. Dual-side Feed Operation (MR-3006)



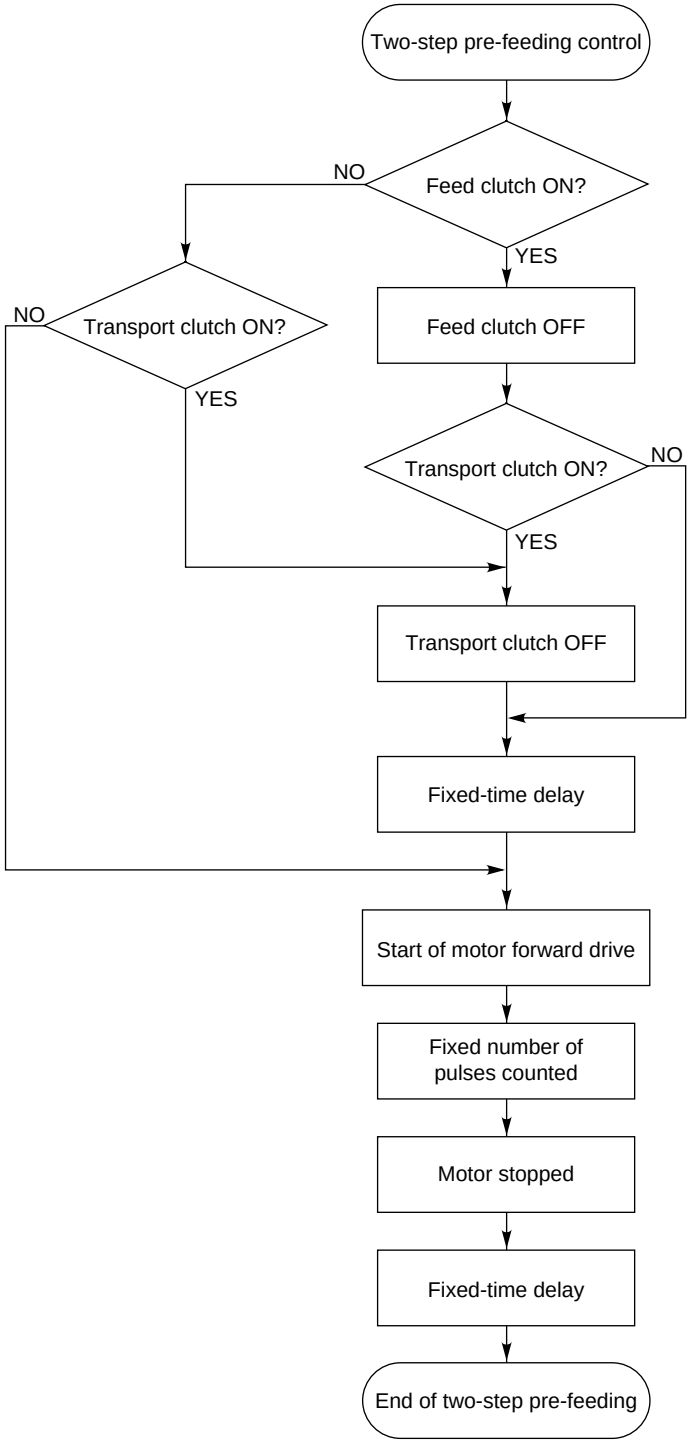
D. 2in1 Feeding Operation (MR-3006)



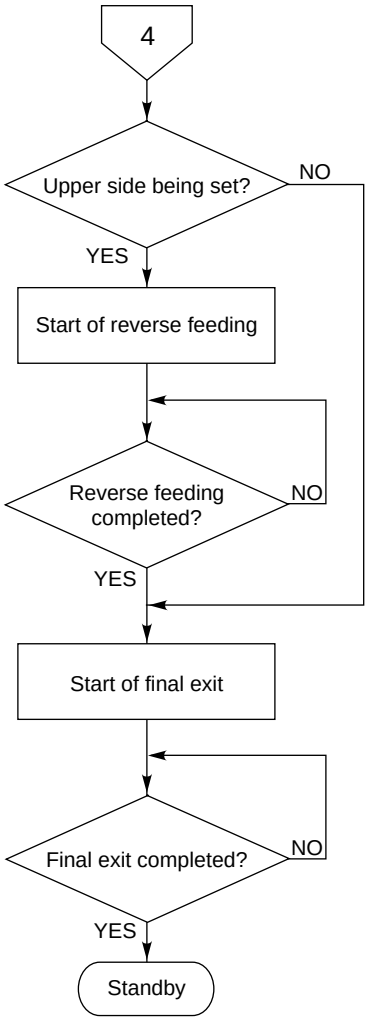
E. Pre-feeding Operation (MR-3006)



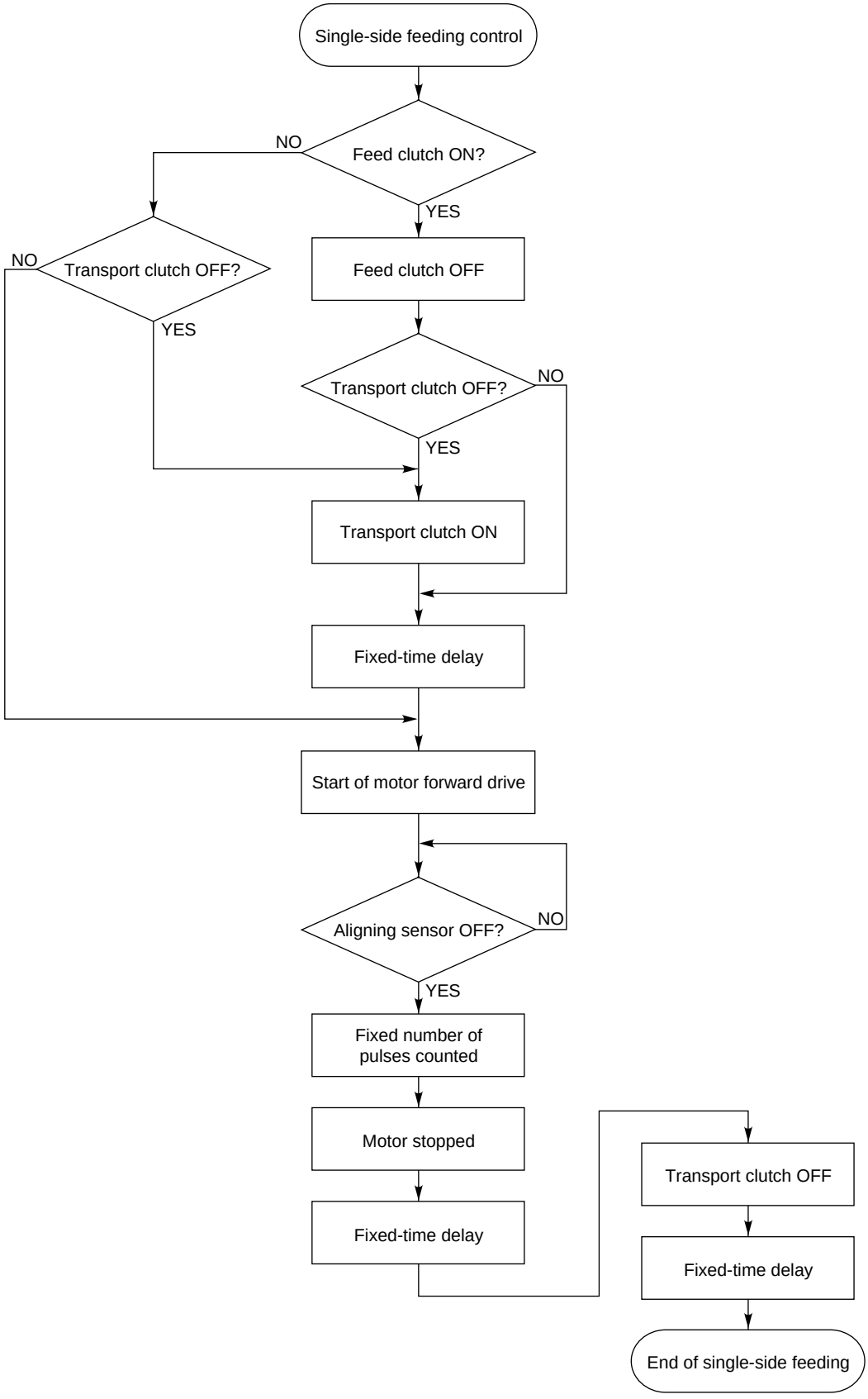
F. Two-step Pre-feeding (MR-3006)



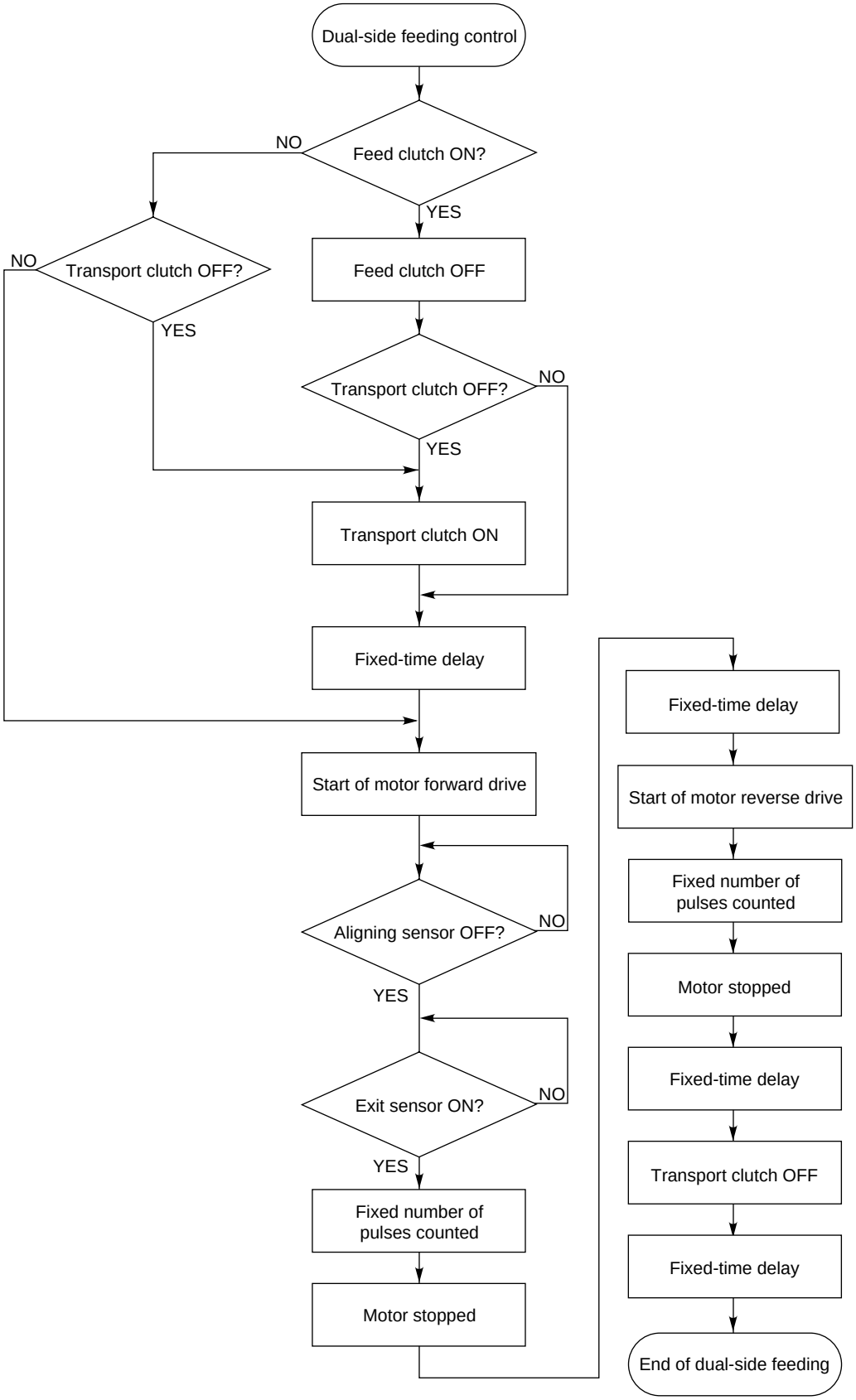
G. Exit Operation (MR-3006)



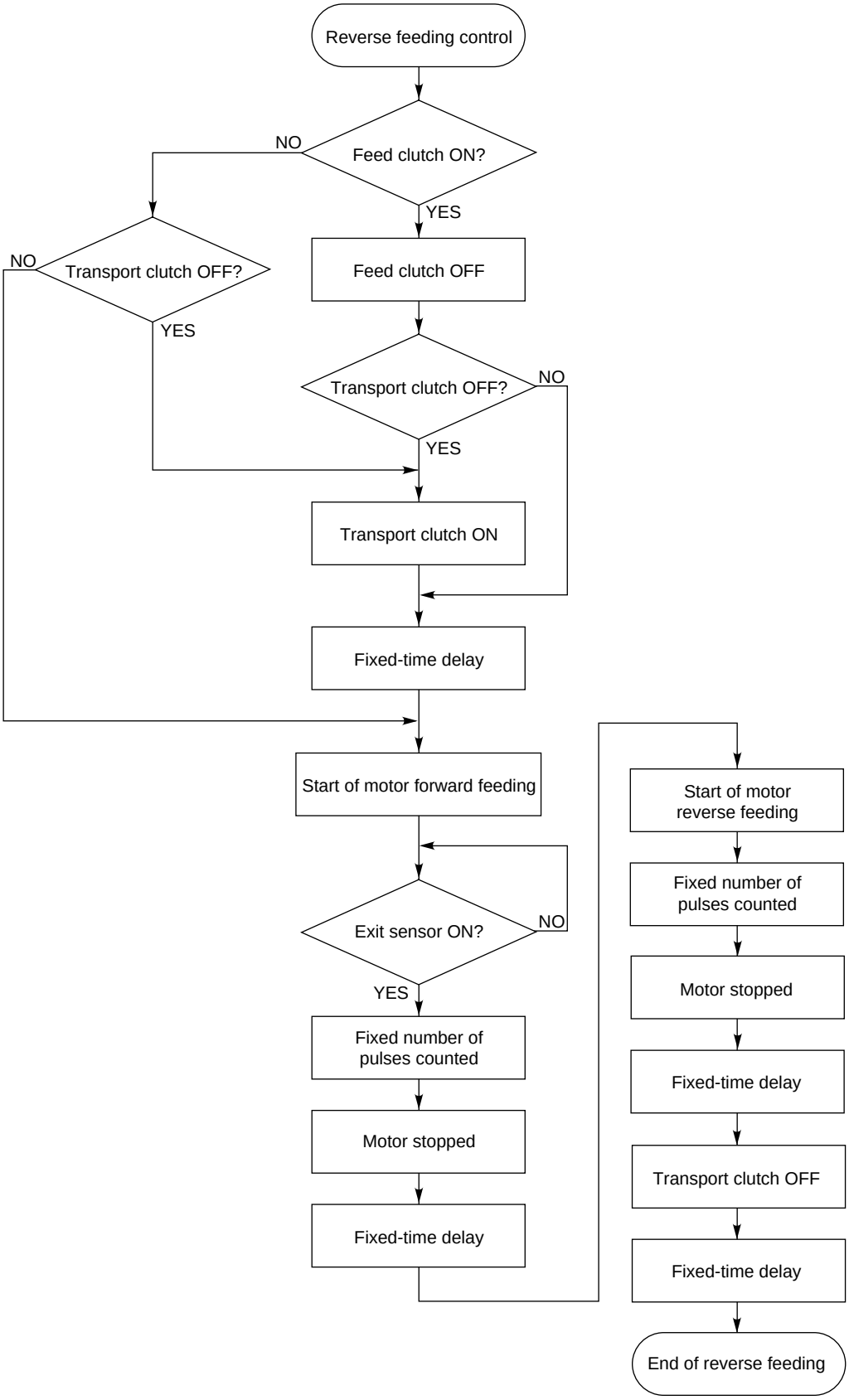
H. Single-side Feeding Control (MR-3006)



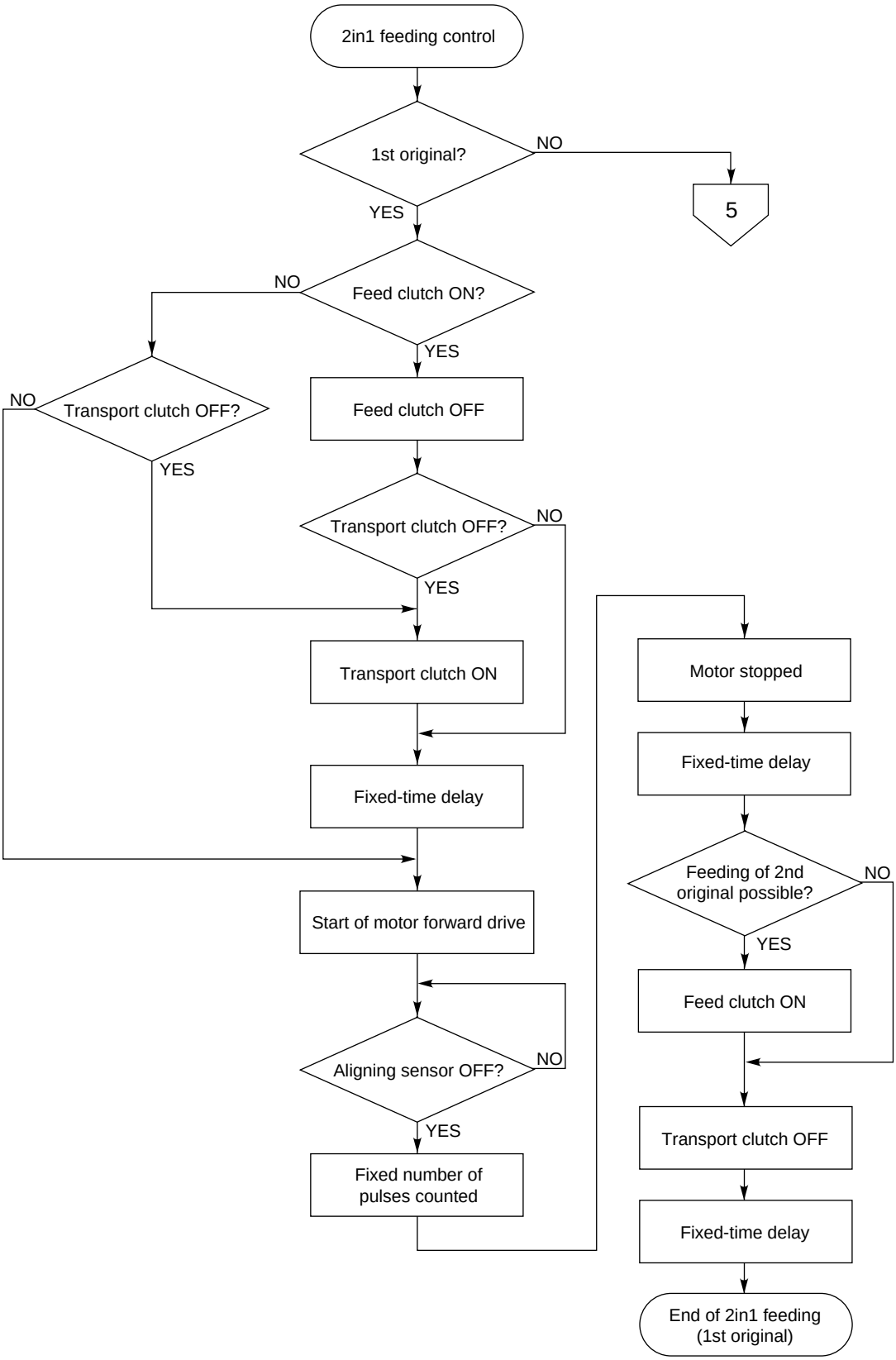
I. Dual-side Feeding Control (MR-3006)

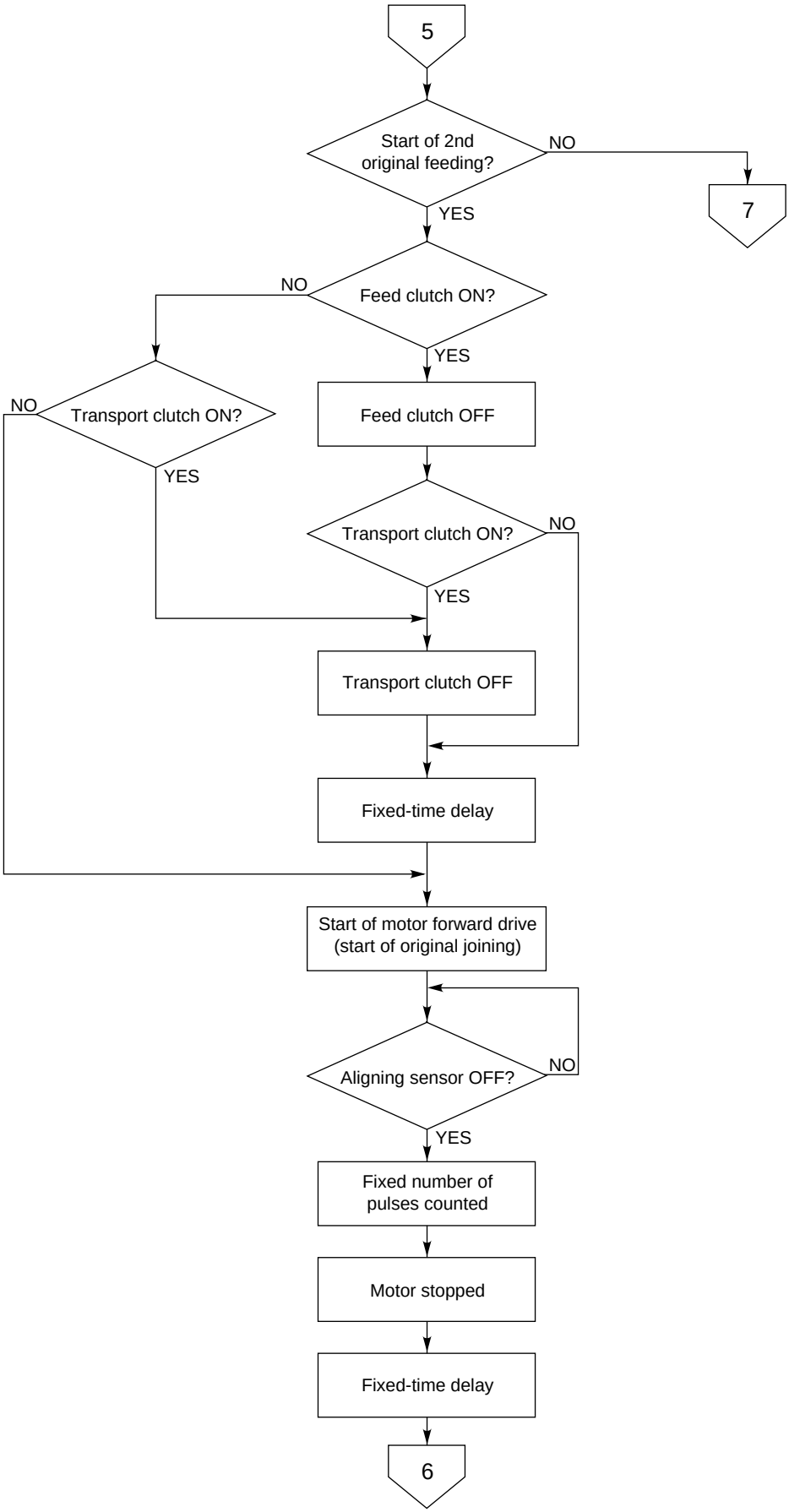


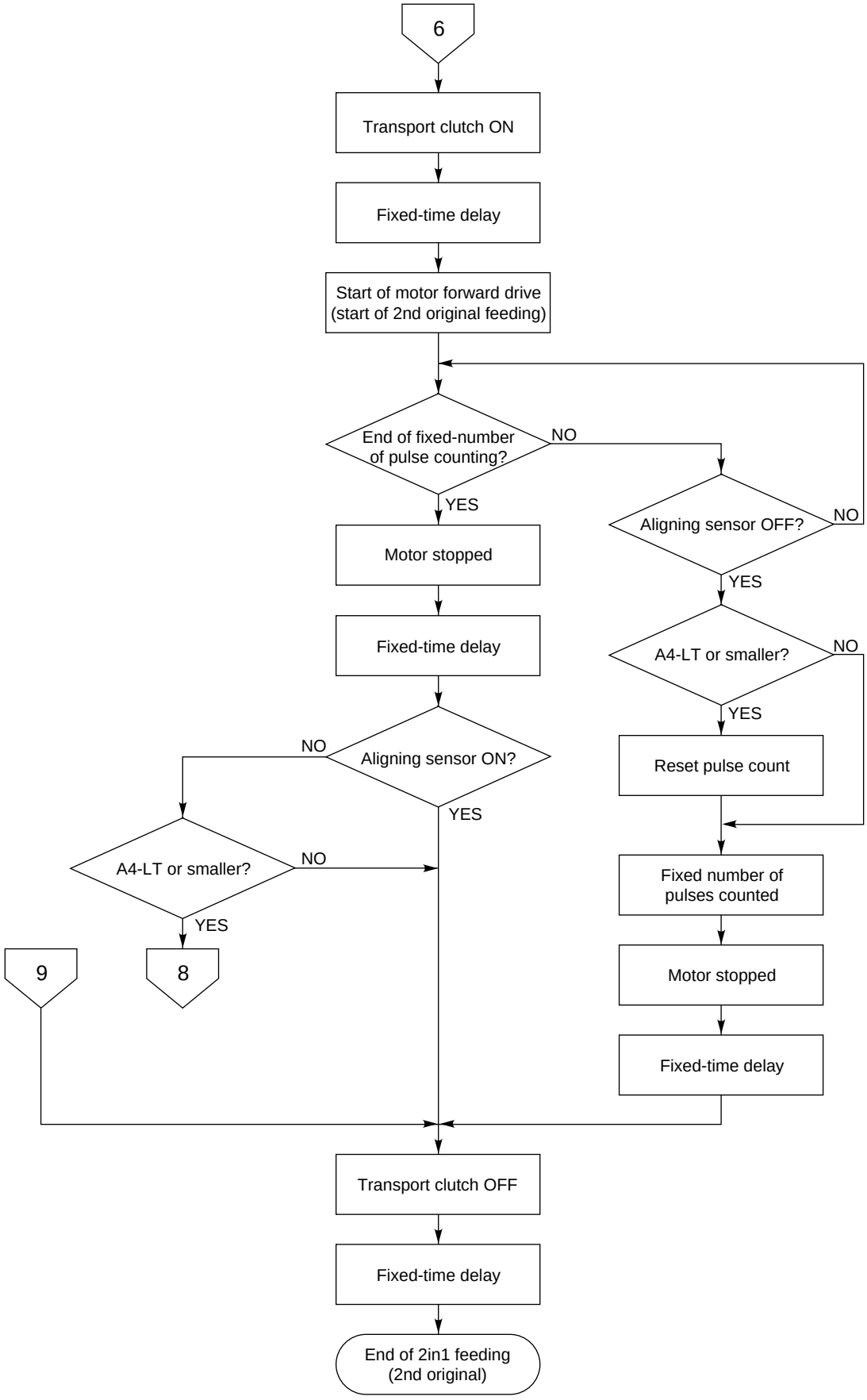
J. Reverse Feeding Control (MR-3006)

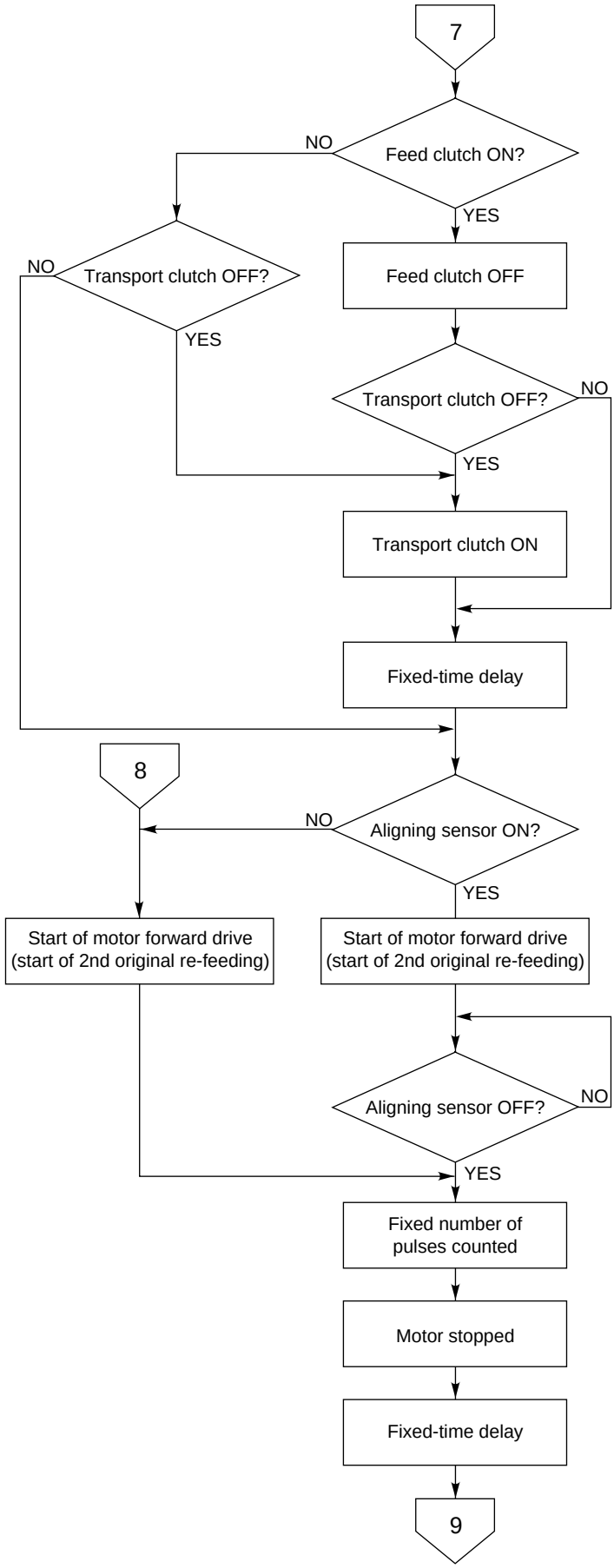


K. 2in1 Feeding Control (MR-3006)

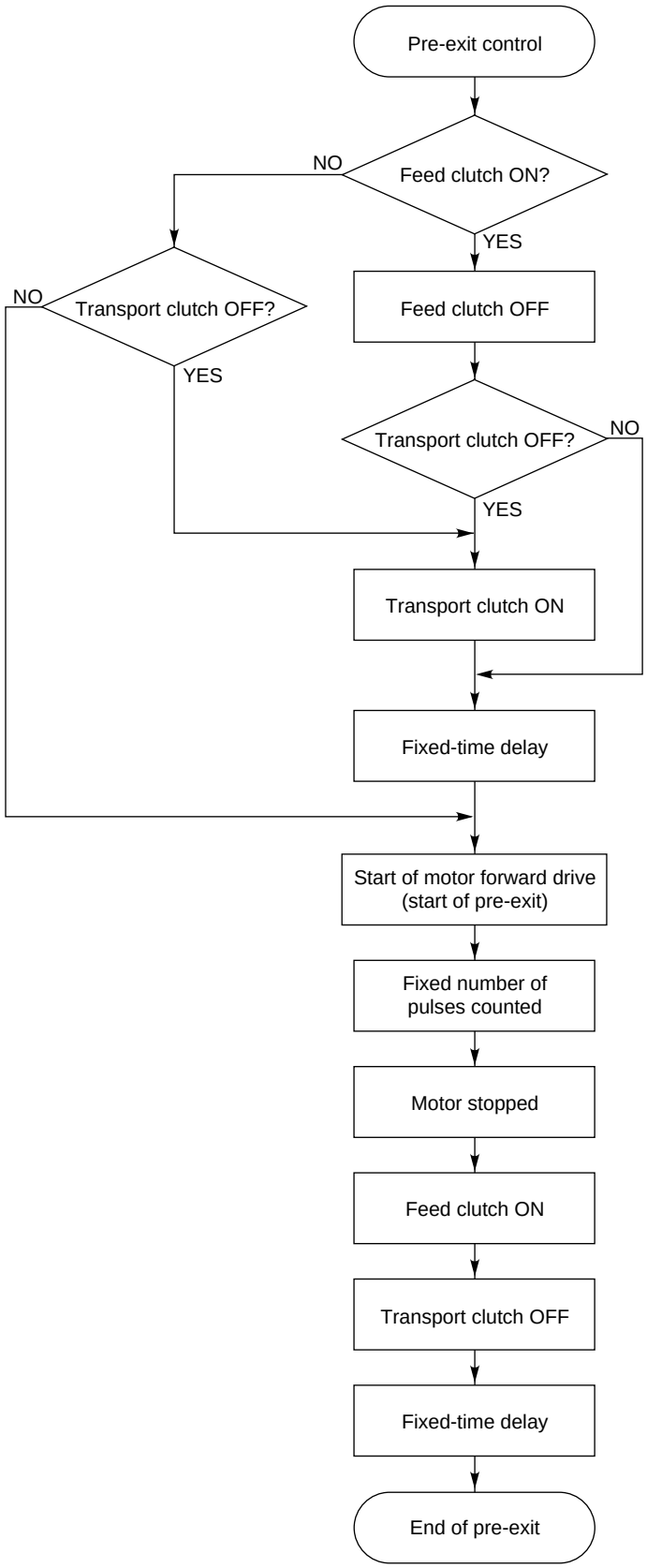



5
Start of 2nd original feeding?
NO
7
YES
Feed clutch ON?
NO
YES
Transport clutch ON?
NO
YES
Feed clutch OFF
Transport clutch ON?
NO
YES
Transport clutch OFF
Fixed-time delay
Start of motor forward drive (start of original joining)
Aligning sensor OFF?
NO
YES
Fixed number of pulses counted
Motor stopped
Fixed-time delay
6

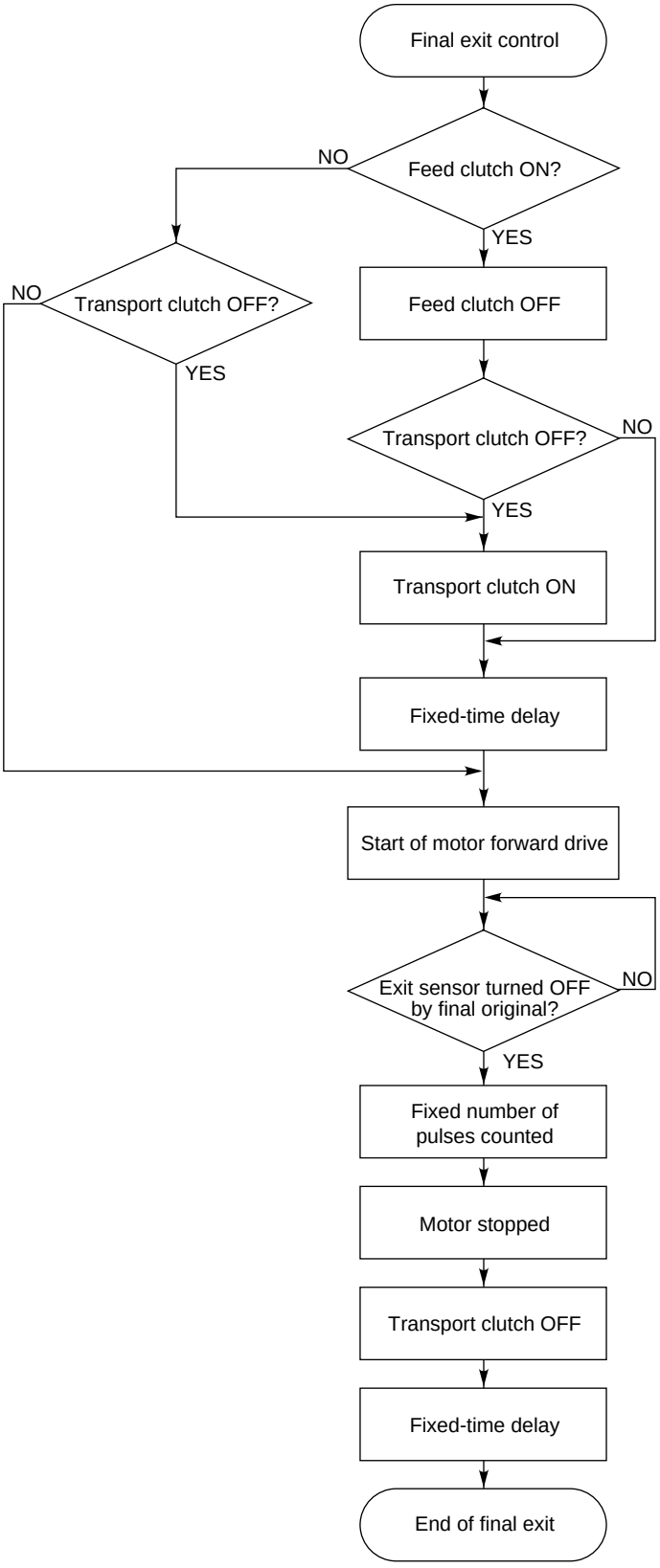

6
Transport clutch ON
Fixed-time delay
Start of motor forward drive
(start of 2nd original feeding)
End of fixed-number
of pulse counting?
NO
YES
Aligning sensor OFF?
NO
YES
Motor stopped
Fixed-time delay
A4-LT or smaller?
NO
YES
Aligning sensor ON?
NO
YES
Reset pulse count
A4-LT or smaller?
NO
YES
Fixed number of
pulses counted
9
8
Motor stopped
Fixed-time delay
Transport clutch OFF
Fixed-time delay
End of 2in1 feeding
(2nd original)


7
Feed clutch ON?
NO
YES
Feed clutch OFF
Transport clutch OFF?
NO
YES
Transport clutch OFF?
NO
YES
Transport clutch ON
Fixed-time delay
8
Aligning sensor ON?
NO
YES
Start of motor forward drive
(start of 2nd original re-feeding)
Start of motor forward drive
(start of 2nd original re-feeding)
Aligning sensor OFF?
NO
YES
Fixed number of
pulses counted
Motor stopped
Fixed-time delay
9

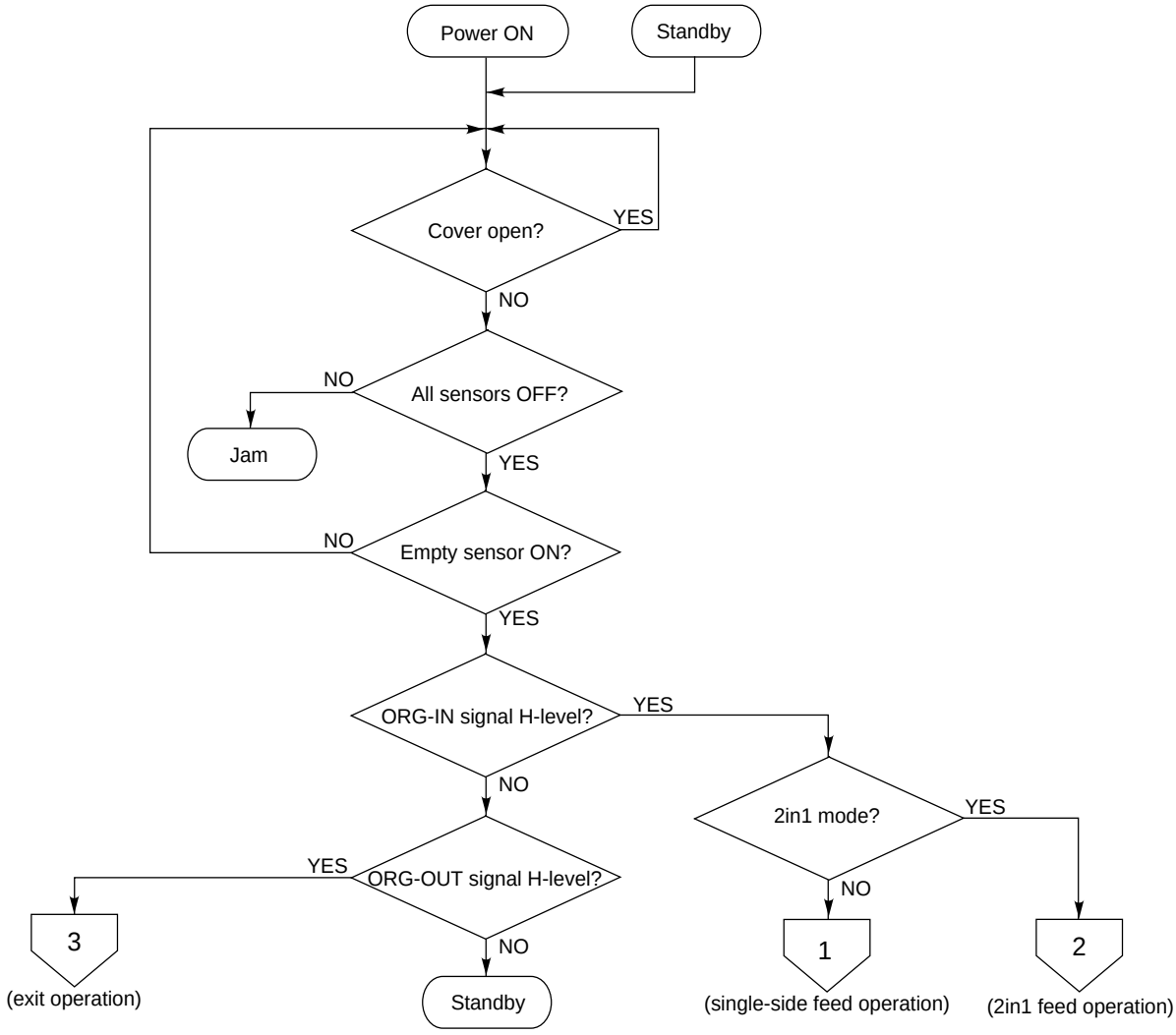
L. Pre-exit Control (MR-3006)



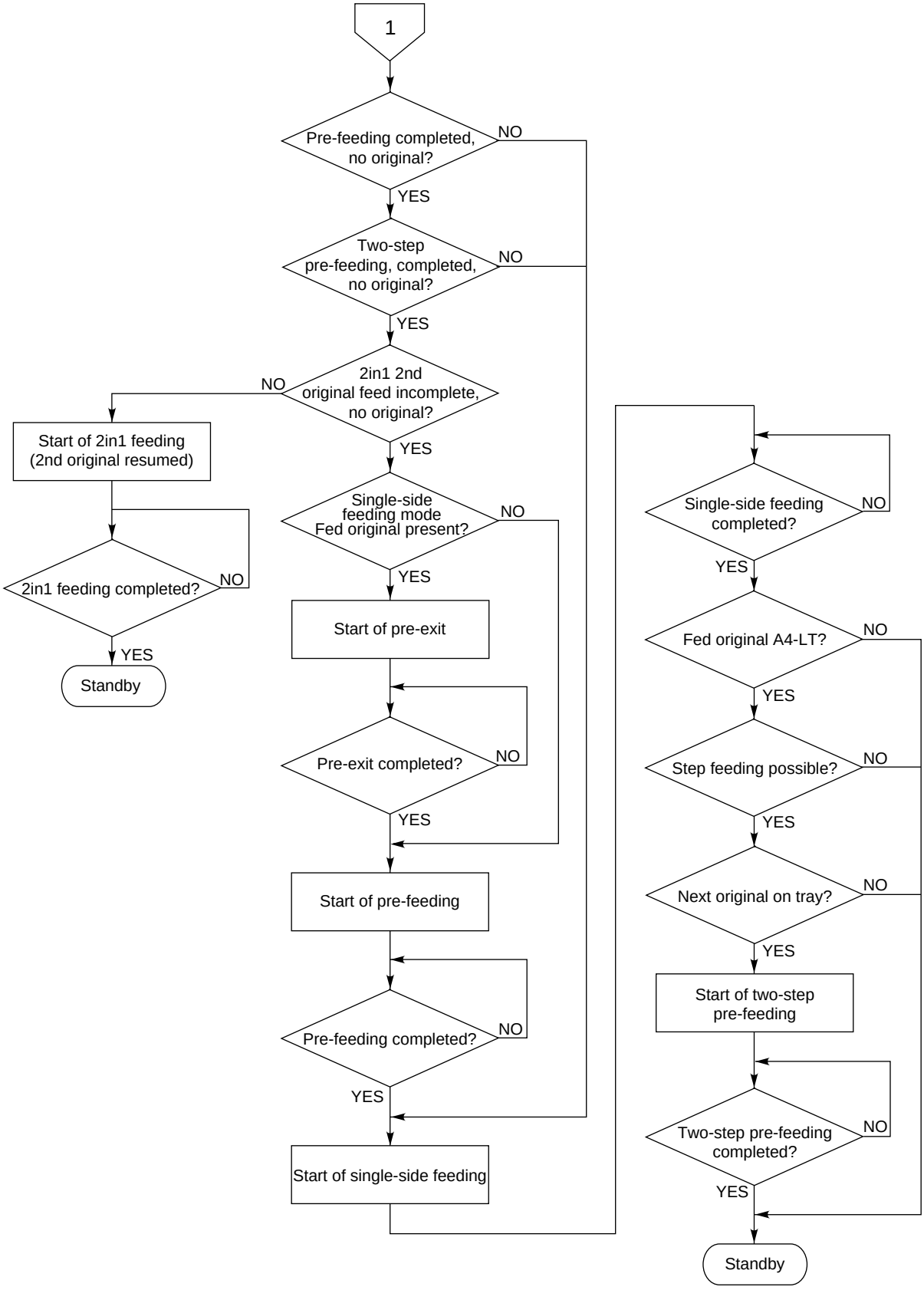
M. Final Exit Control (MR-3006)



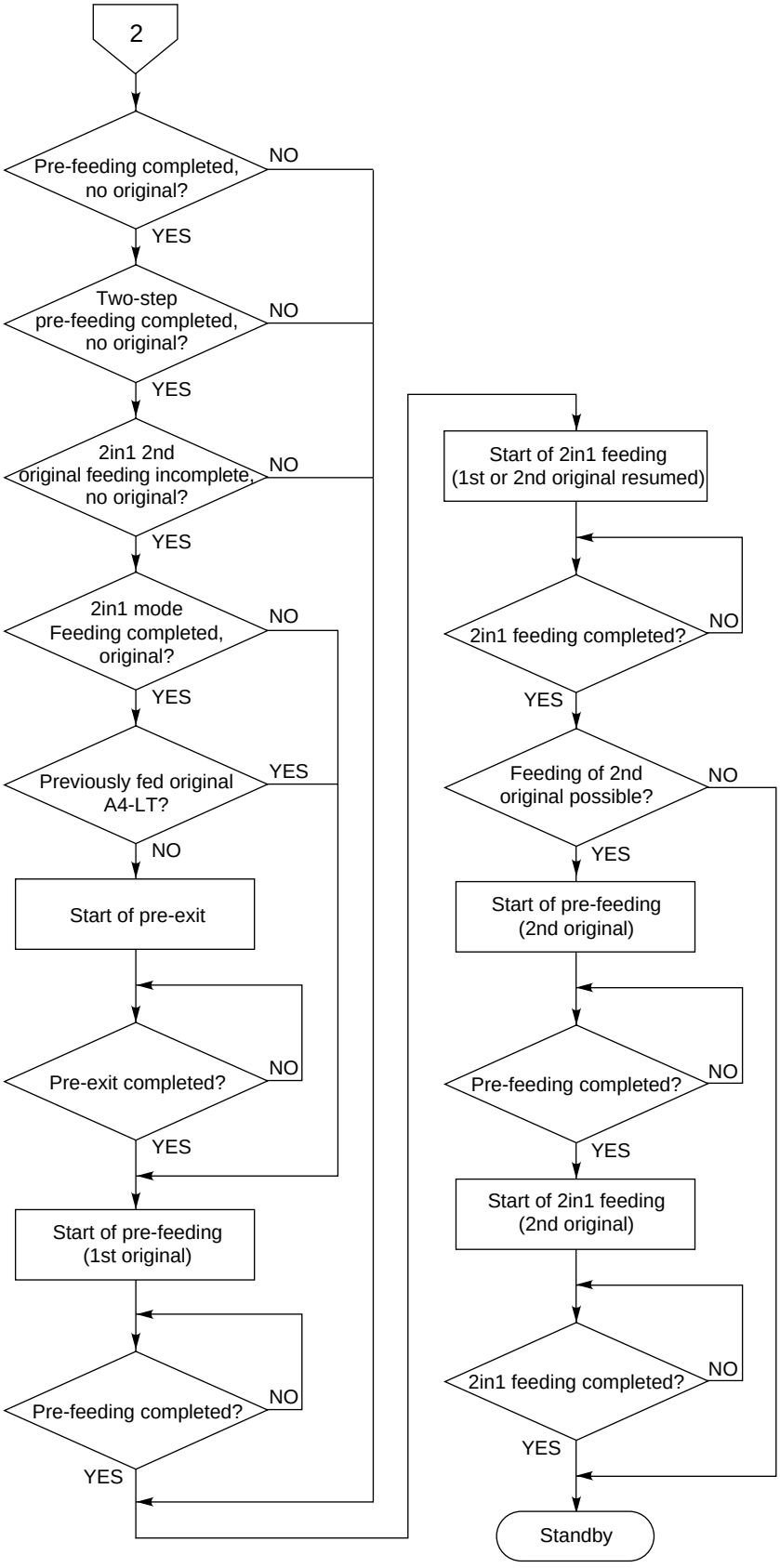
a. From Power ON to READY (MR-2008)



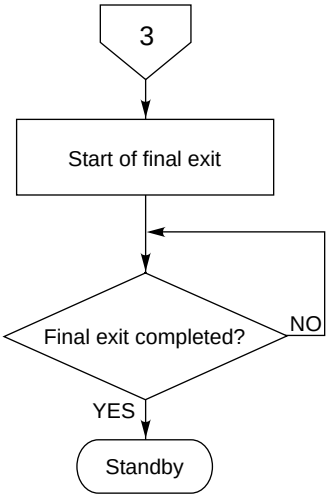
b. Single-side Feed Operation (MR-2008)



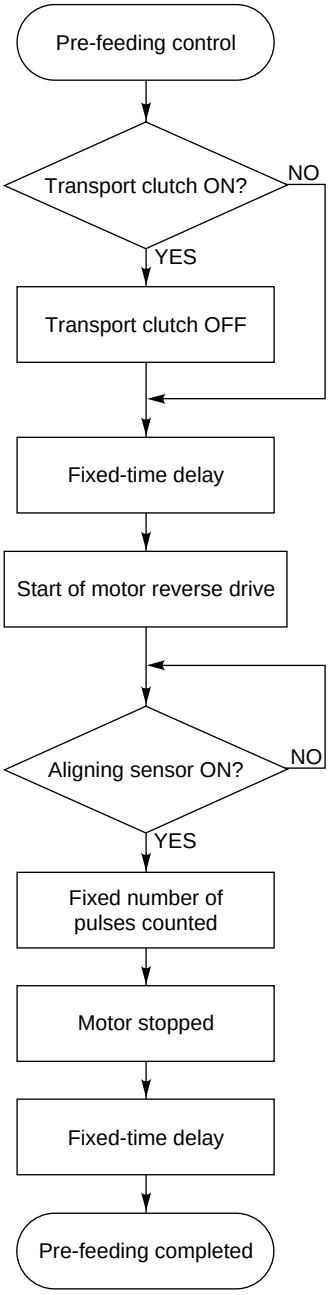
c. 2in1 Feeding Operation (MR-2008)



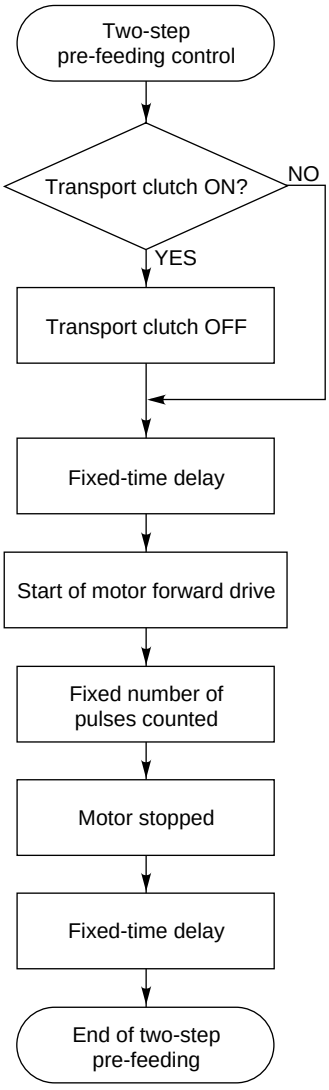
d. Exit Operation (MR-2008)



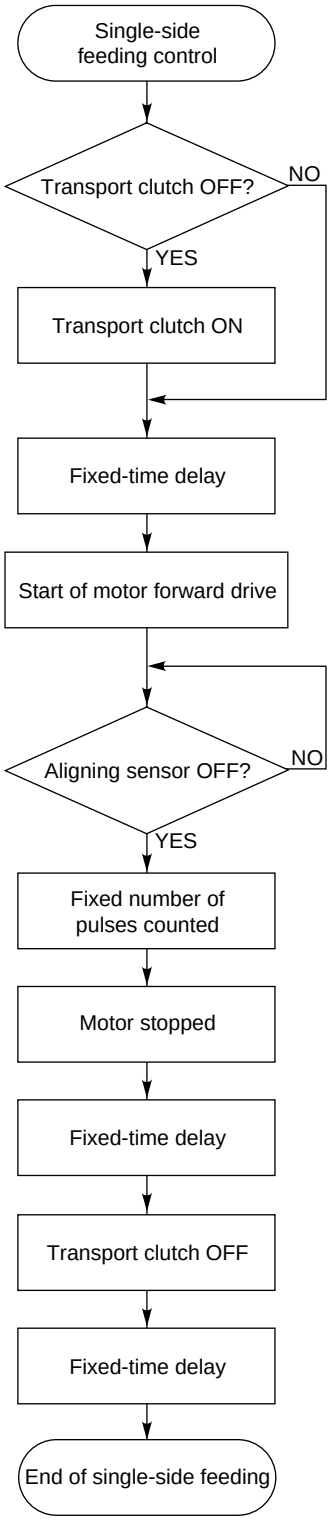
e. Pre-feeding Operation (MR-2008)



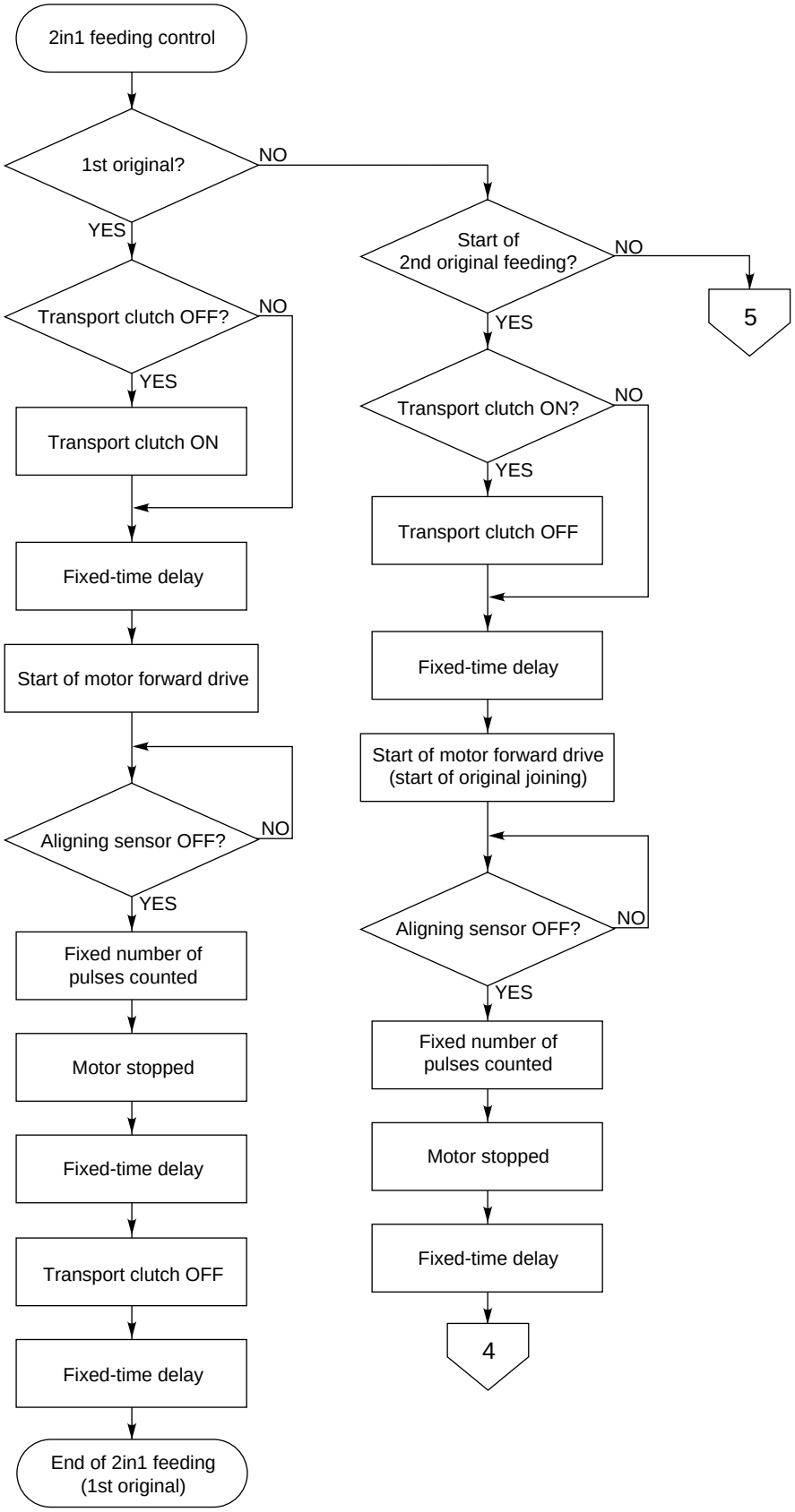
f. Two-step Pre-feeding (MR-2008)

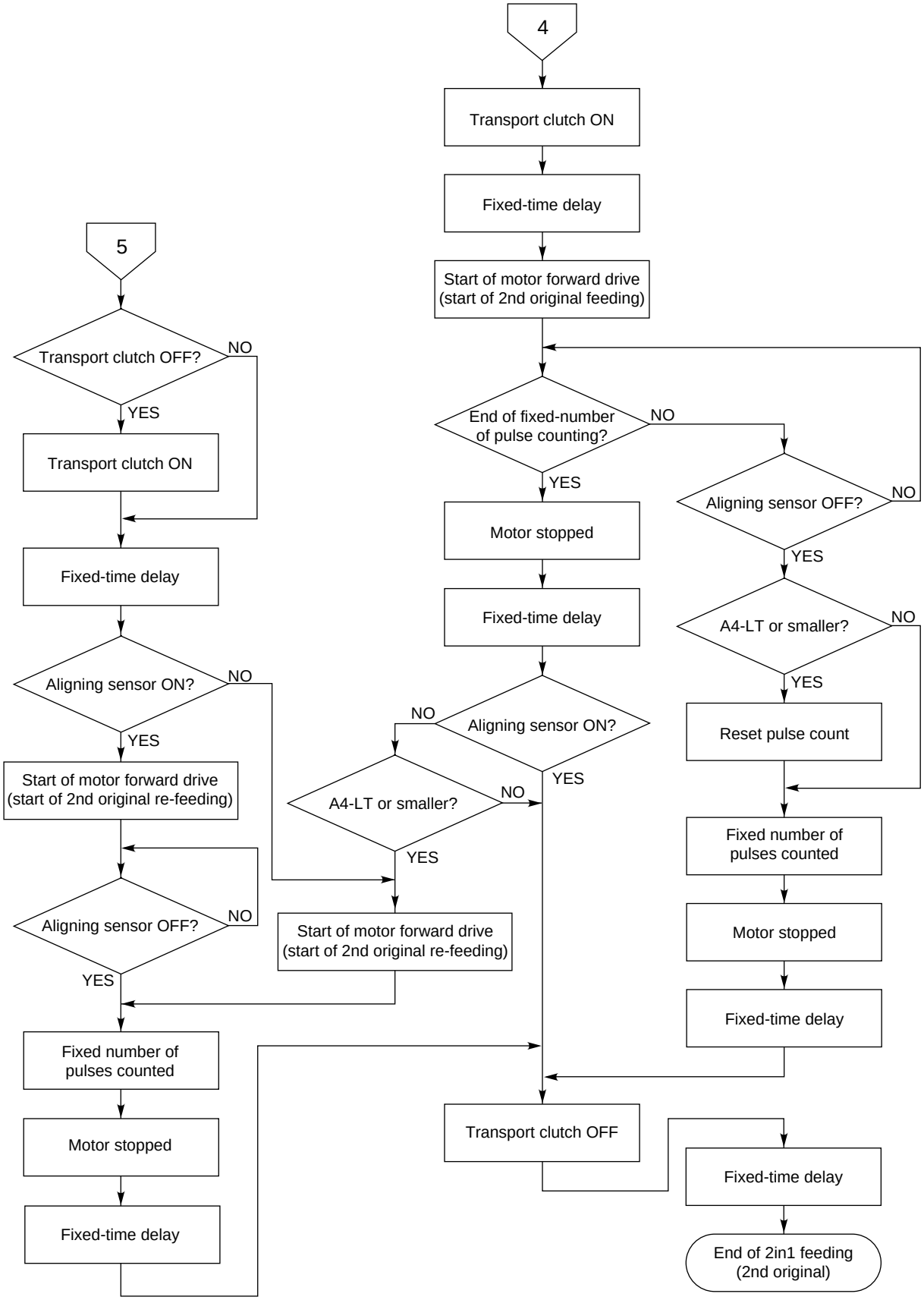


g. Single-side Feeding Control (MR-2008)

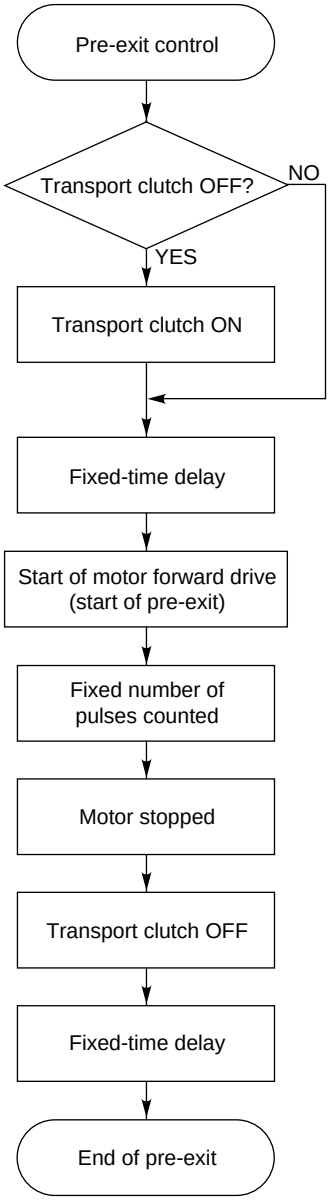


h. 2in1 Feeding Control (MR-2008)

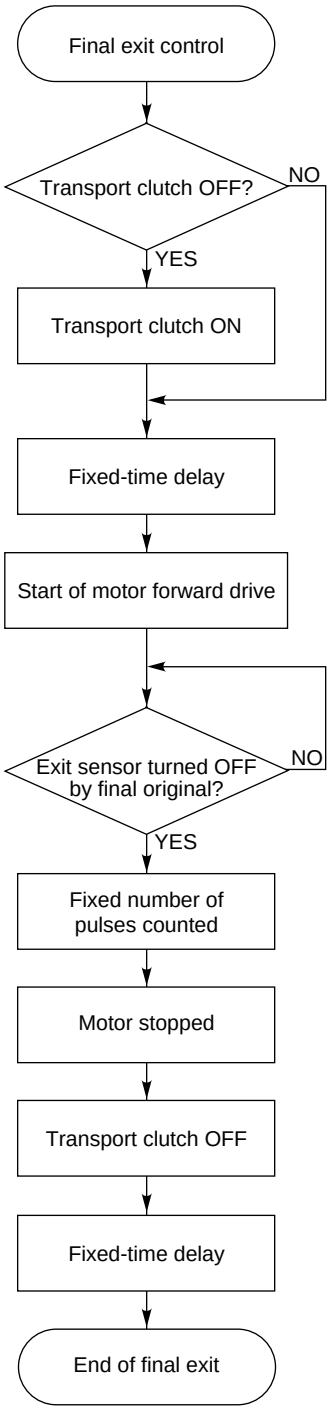



4
Transport clutch ON
Fixed-time delay
Start of motor forward drive
(start of 2nd original feeding)
End of fixed-number
of pulse counting?
NO
YES
Motor stopped
Fixed-time delay
Aligning sensor ON?
NO
YES
Start of motor forward drive
(start of 2nd original re-feeding)
A4-LT or smaller?
NO
YES
Start of motor forward drive
(start of 2nd original re-feeding)
Aligning sensor OFF?
NO
YES
Fixed number of
pulses counted
Motor stopped
Fixed-time delay
Transport clutch OFF
Fixed-time delay
End of 2in1 feeding
(2nd original)
Aligning sensor OFF?
NO
YES
A4-LT or smaller?
NO
YES
Reset pulse count
Fixed number of
pulses counted
Motor stopped
Fixed-time delay
5
Transport clutch OFF?
NO
YES
Transport clutch ON
Fixed-time delay
Aligning sensor ON?
NO
YES

i. Pre-exit Control (MR-2008)

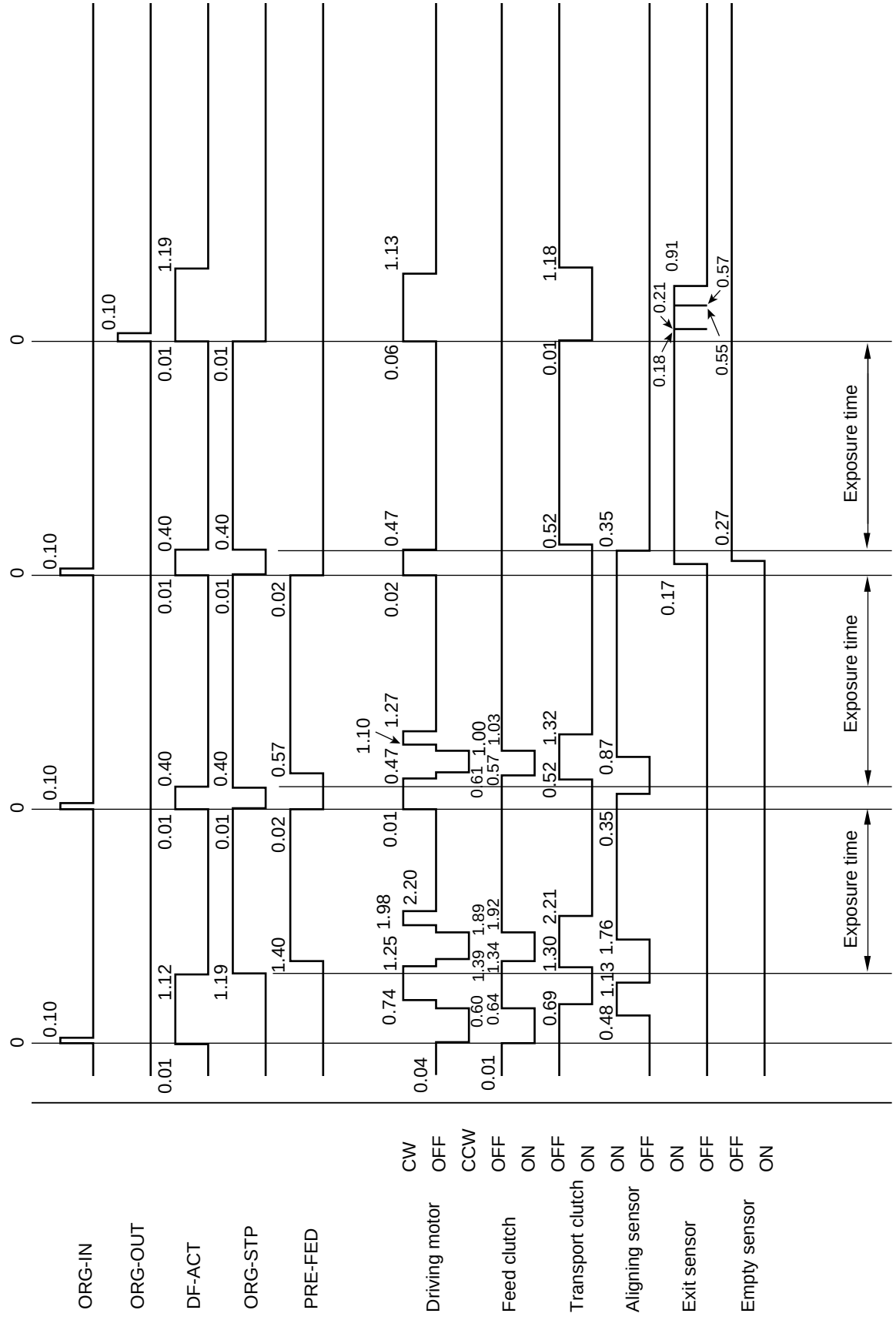


j. Final Exit Control (MR-2008)

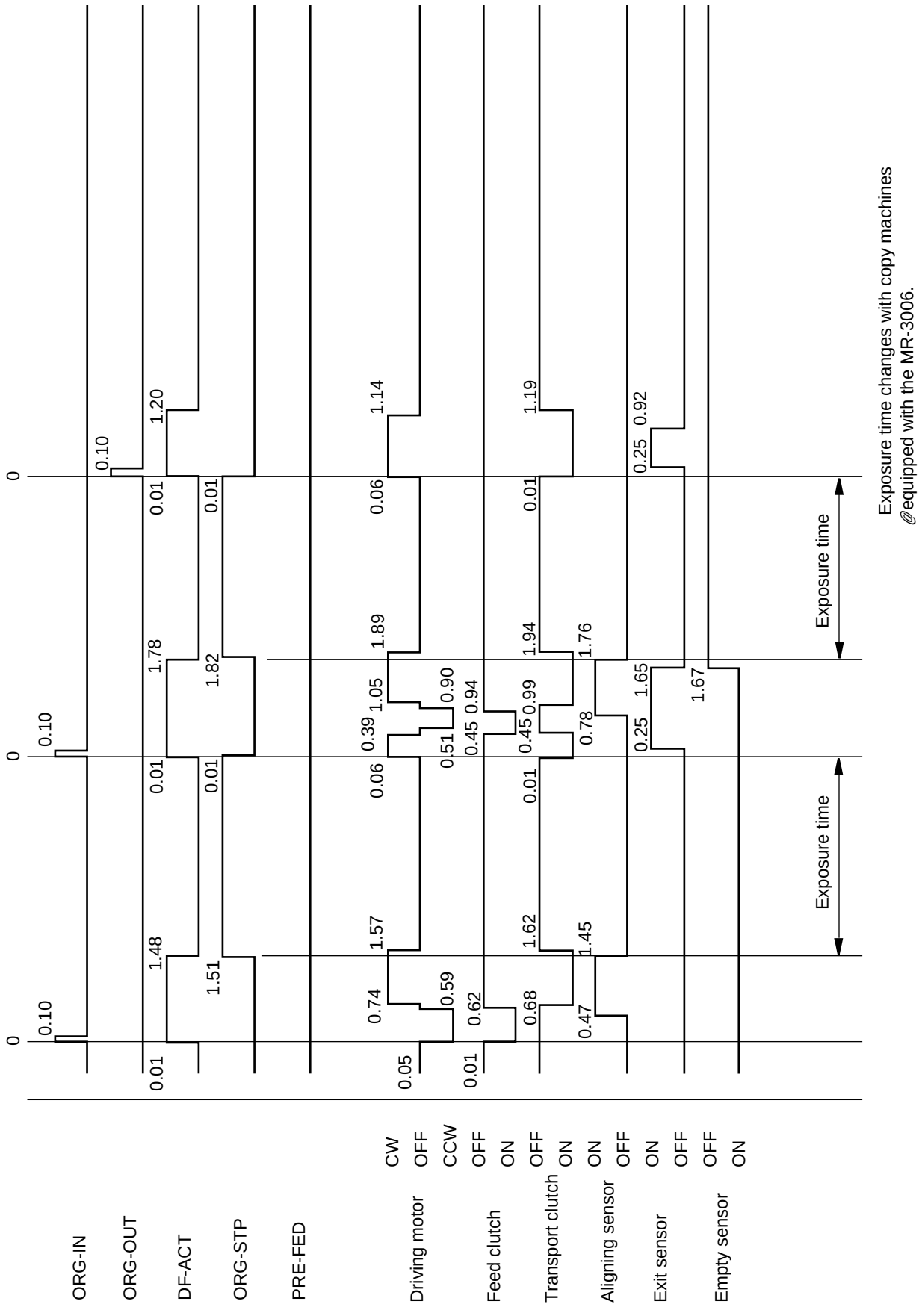


10. TIMING CHART

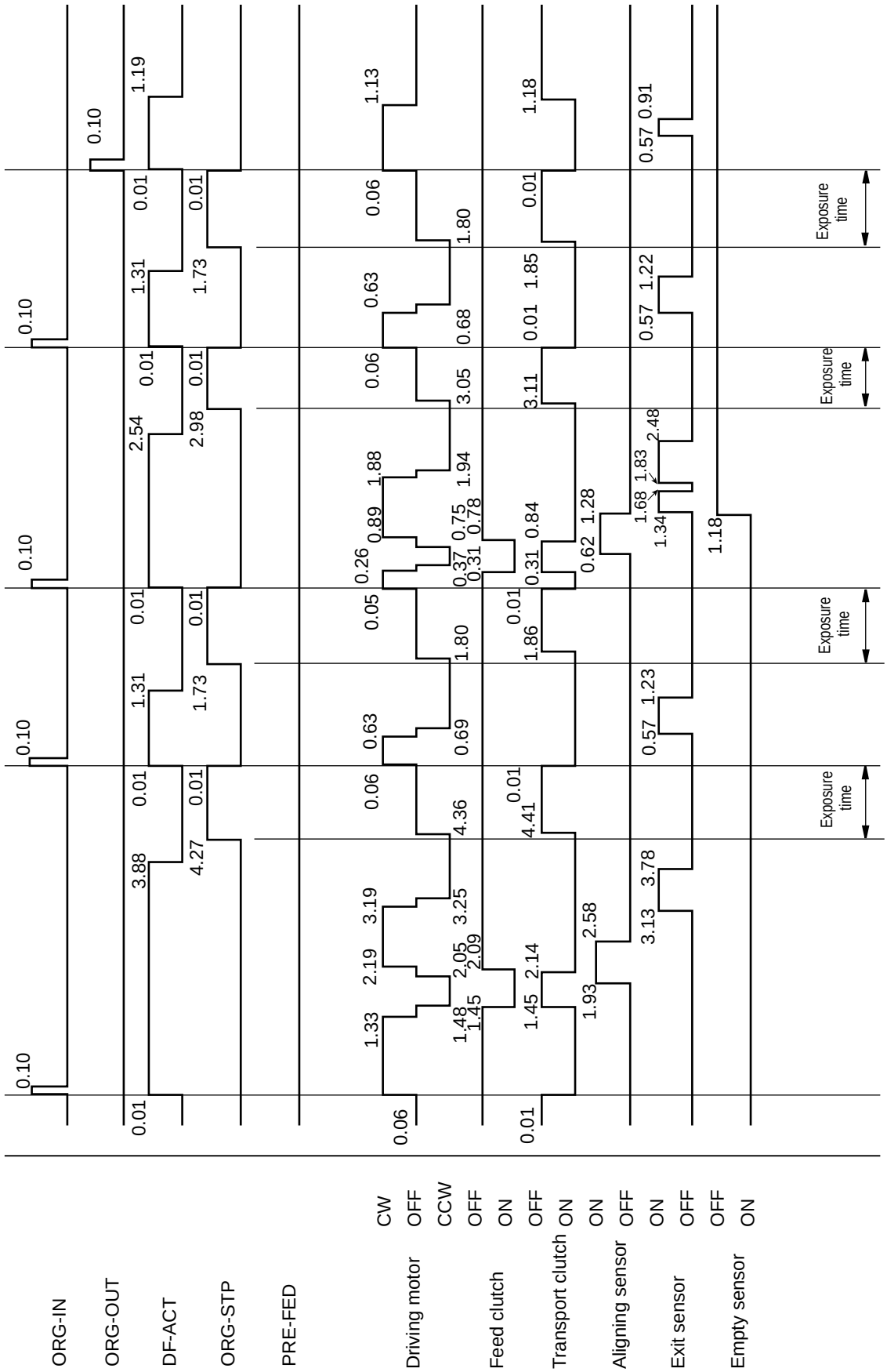
A. Three A4 single-side copying (MR-3006)



B. Two A3 single-side copying (MR-3006)

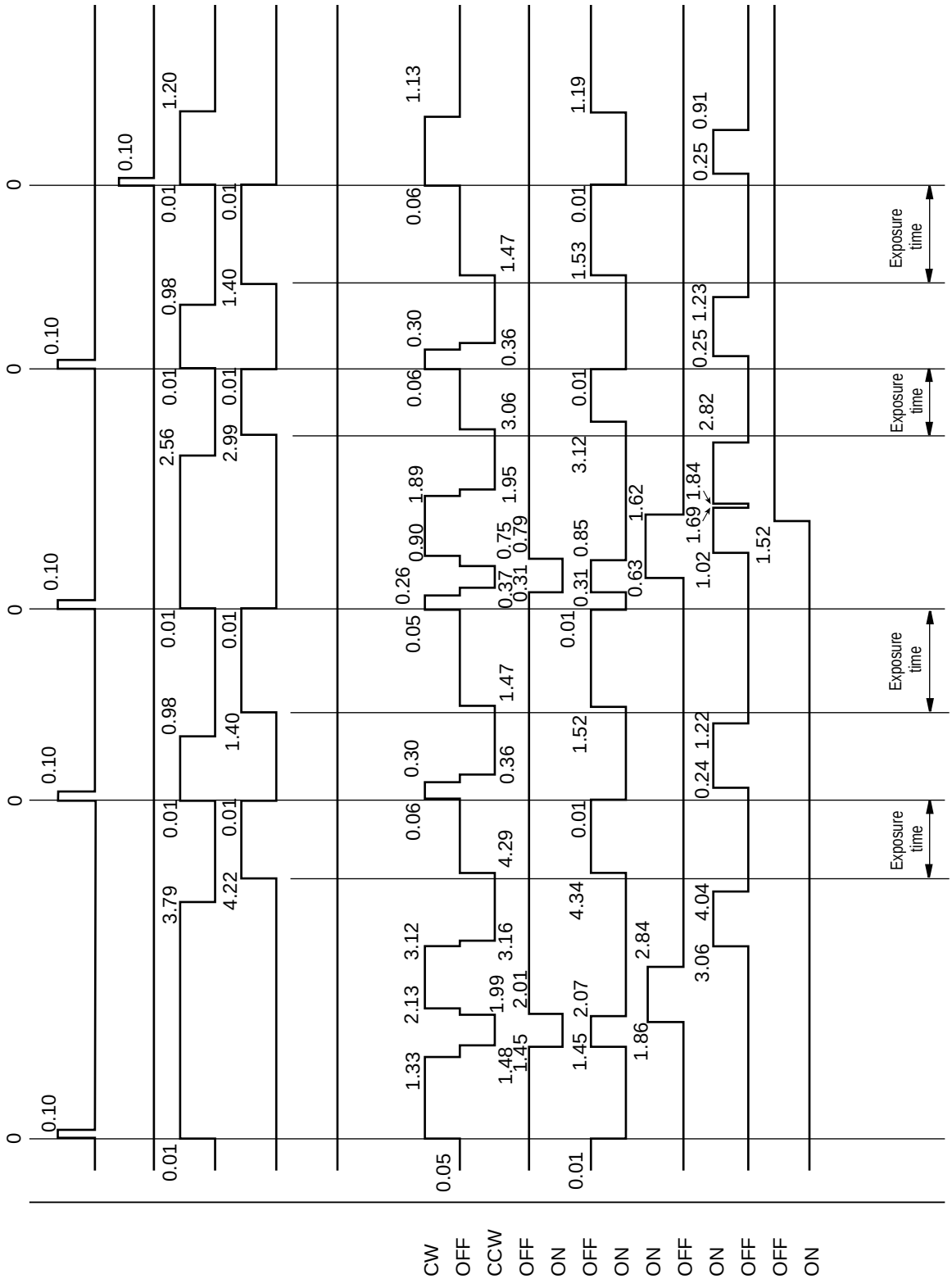


C. Two A4 duplex copying (MR-3006)



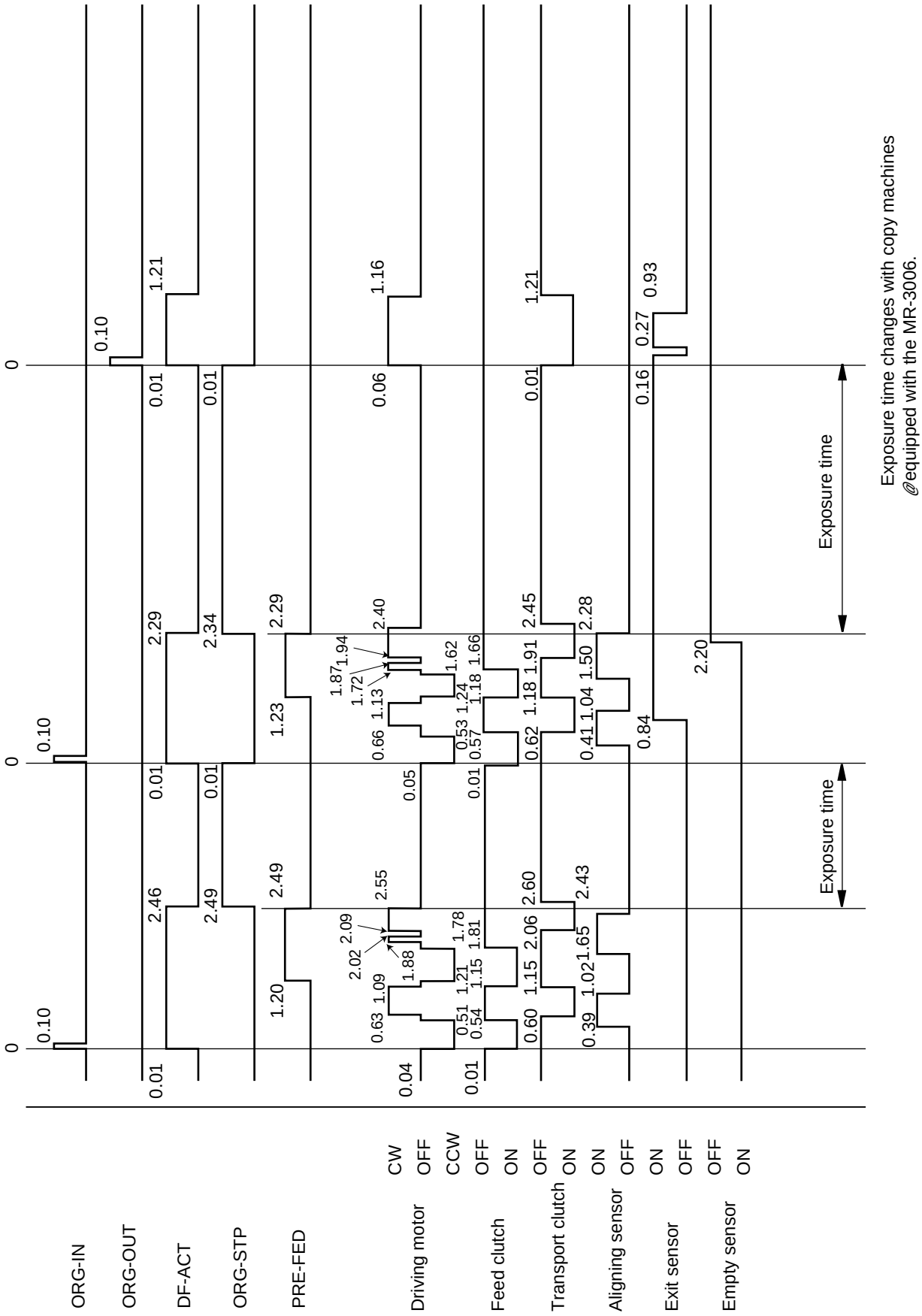
Exposure time changes with copy machines @equipped with the MR-3006.

D. Two A3 duplex copying (MR-3006)

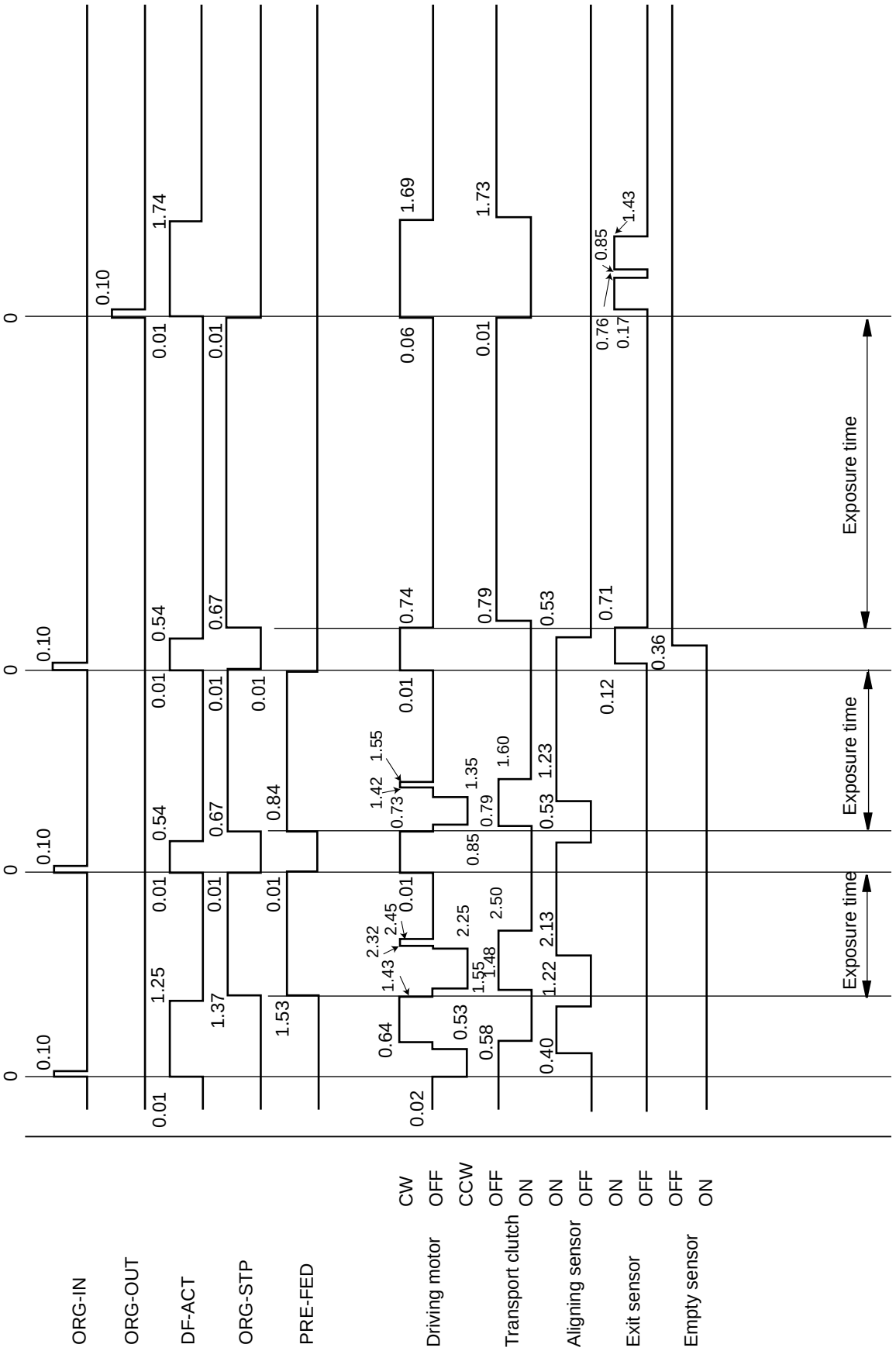


Exposure time changes with copy machines @equipped with the MR-3006.

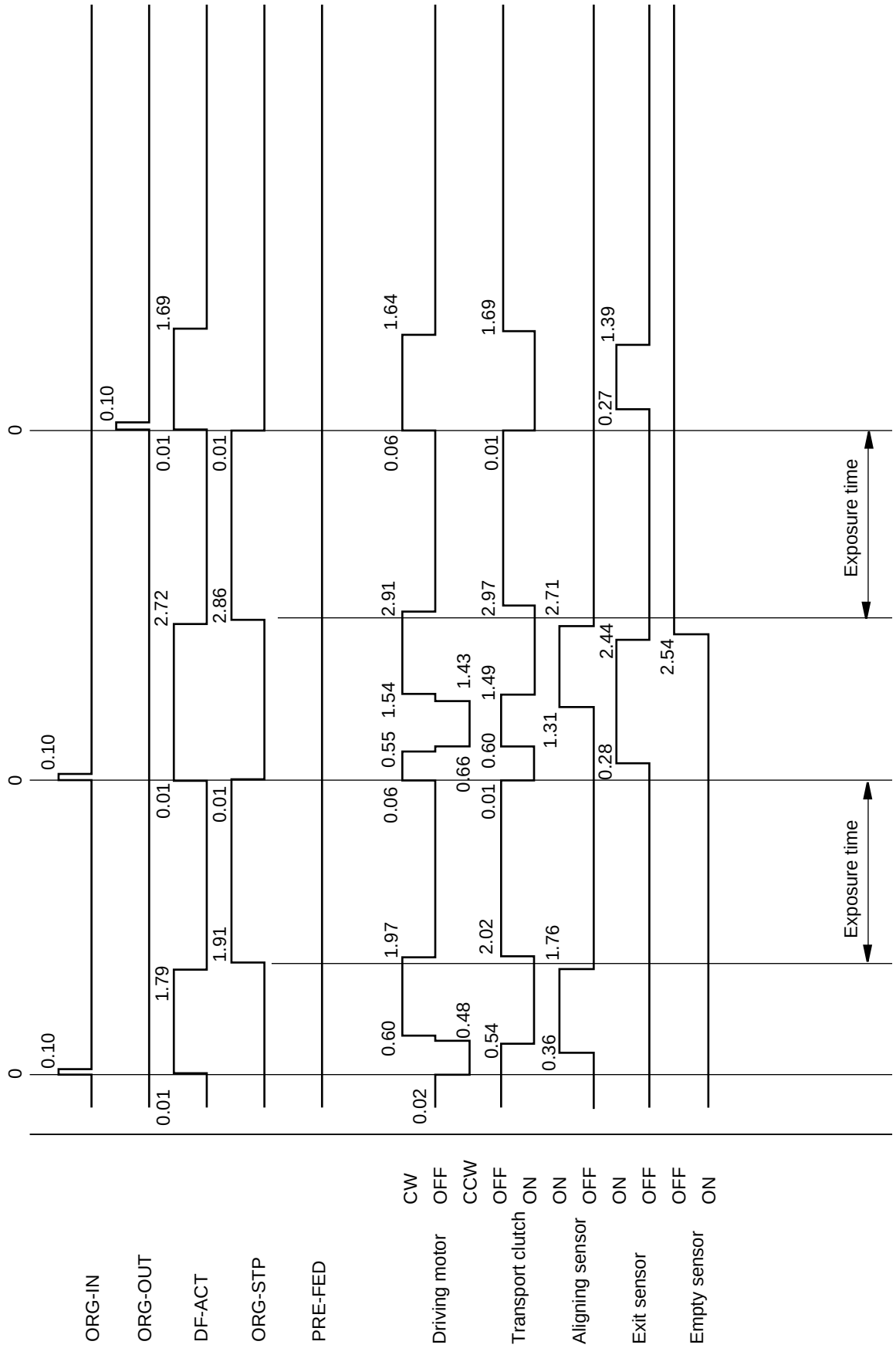
E. Four A4 “2in1” copying (MR-3006)



a. Three A4 single-side copying (MR-2008)

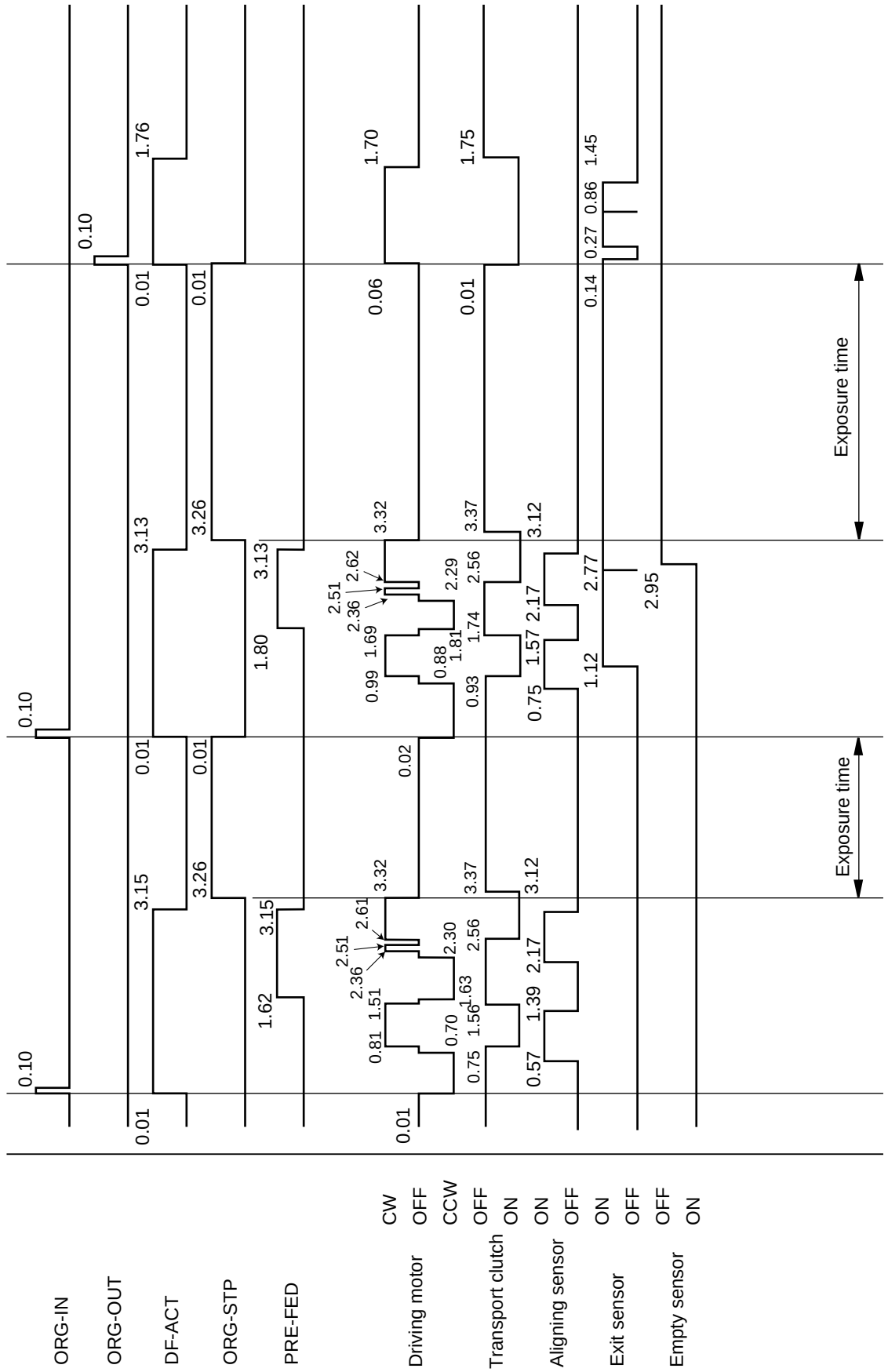


b. Two A3 single-side copying (MR-2008)



Exposure time changes with copy machines @equipped with the MR-2008.

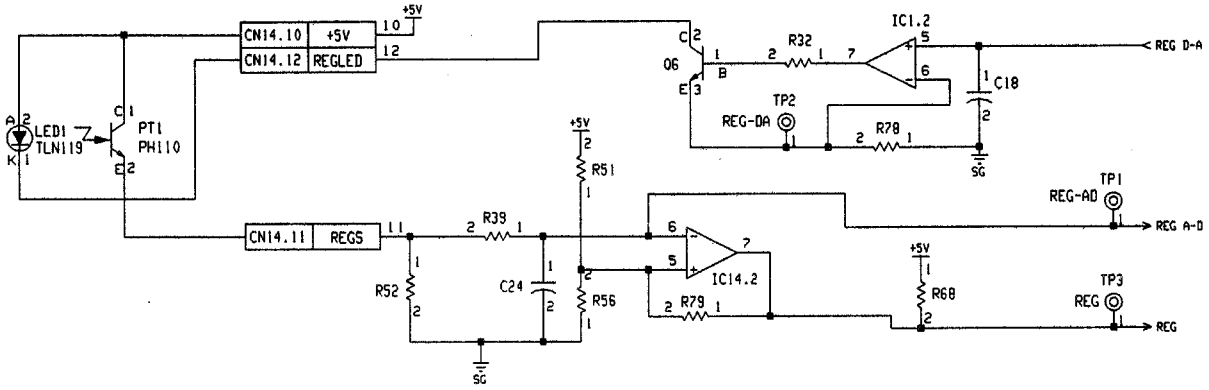
c. Four A4 “2in1” copying (MR-2008)



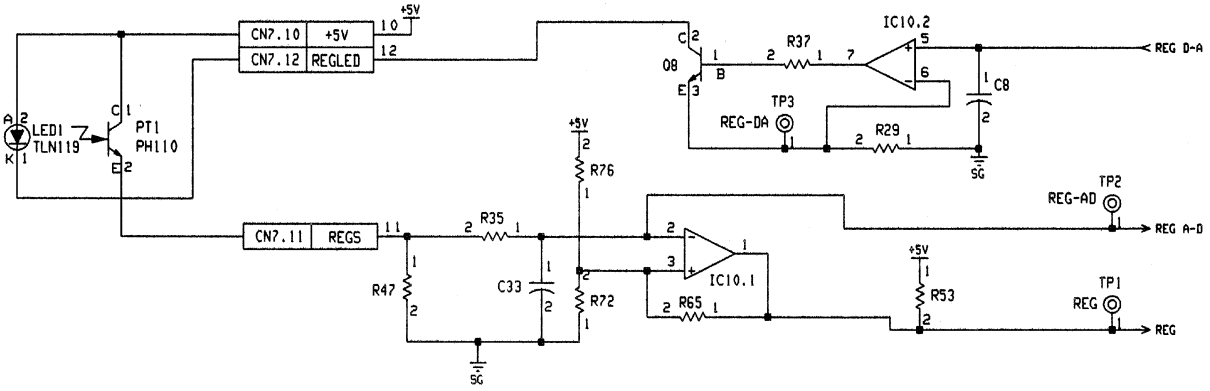
11. EXPLANATION OF CIRCUITS

It is the same as with the circuits of the MR-3006 and the MR-2008.
Part number only is difficult. So, the circuit explanation is performed only for the MR-3006.

11.1 Input Circuit for the Aligning Sensor and *Exit Sensor



MR-3006



MR-2008

Since the aligning sensor is the same input circuit as the *exit sensor (for the MR-3006 only), the explanation for the exit-sensor input circuit is omitted. Details for the aligning sensor are given below.
This is an input circuit for the aligning sensor. It consists of a voltage-current conversion circuit for adjusting the light amount of infrared LEDs and a voltage comparison circuit which compares the output voltage of phototransistors (PT1) with the reference voltage for converting the voltage to digital signals.

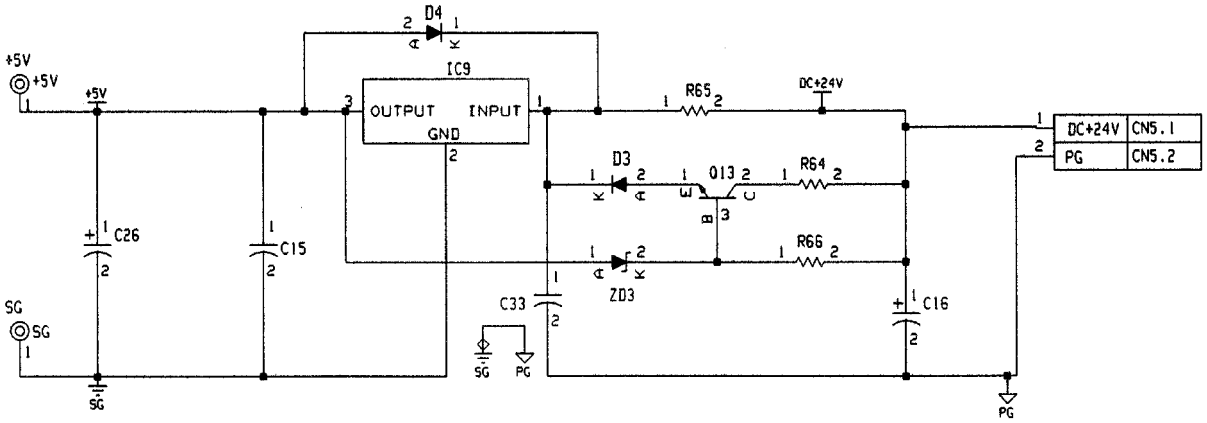
A mirror-reflective type sensor, the aligning sensor consists of a pair of light-emitting elements (infrared LEDs) whose optical axis is in the same direction as that for the light-receiving elements (PT1). On the axis extended from each element, a mirror is provided. When there is no original between each element, the ultrared light beam emitted from the LED is reflected at PT1 with a high reflectance. On the other hand, when an original is present, the light beam to the mirror and the reflected light from the mirror are shielded, causing the ultrared light entering into PT1 to become extremely small.

When much light enters into PT1 (when no original is present), optical current flowing through PT1 increases, causing the voltage at IC14-pin 6 to increase due to voltage drop by R52. IC14 is an op amp and comprises a voltage comparator circuit. It compares the reference voltage applied to pin 5 (non-inverting input terminal) and the signal voltage at pin 6 (inverting input terminal). When the voltage at pin 6 is higher, the output (IC14-pin 7) becomes L level. Conversely, when the light entering into PT1 is small (an original is present), the voltage at IC14-pin 6 becomes lower, resulting in IC14-pin 7 becoming H level. R39 and C24 comprise a noise filter.

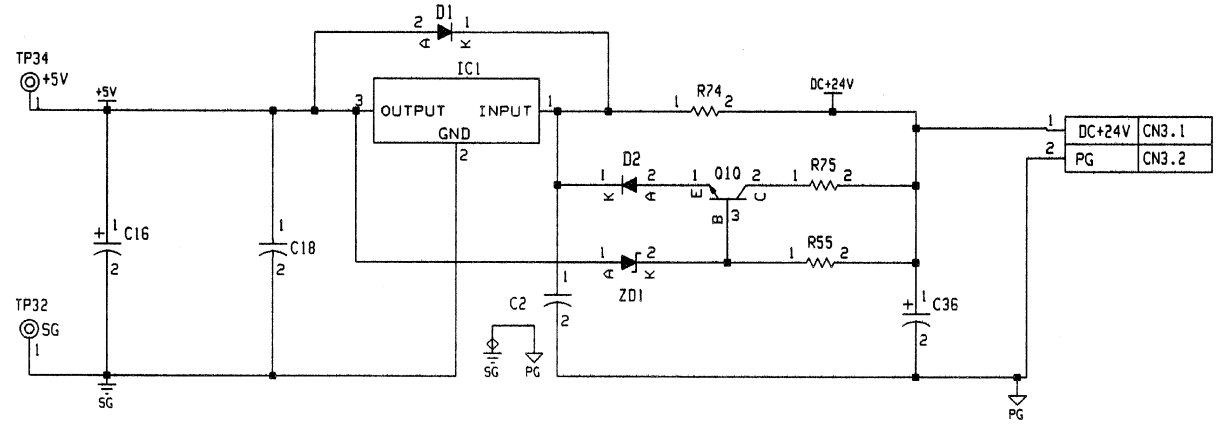
In addition, in order to restrict variance in the sensitivity of sensors, this circuit is equipped with an automatic sensitivity adjustment function. This function, by maintaining the PT1 voltage at a fixed value for all machines when no original is present, eliminates variance in the sensitivity of sensors occurring due to difference in machines. The PT1 voltage is adjusted by varying the intensity of the ultrared light emitted from the LEDs.

For automatic sensitivity adjustment, when the adjustment mode for sensor sensitivity is selected, the PT1 output voltage (analog value) is measured at the A-D input terminal of CPU. So that the PT1 output voltage becomes a preset voltage, the D-A output voltage is varied and using the voltage-current conversion circuit consisting of IC1, Q6, R78, etc., LED current is adjusted. This D-A output voltage is a value unique to each machine and is memorized in EEPROM (IC7).

11.2 +5V Power Circuit



MR-3006

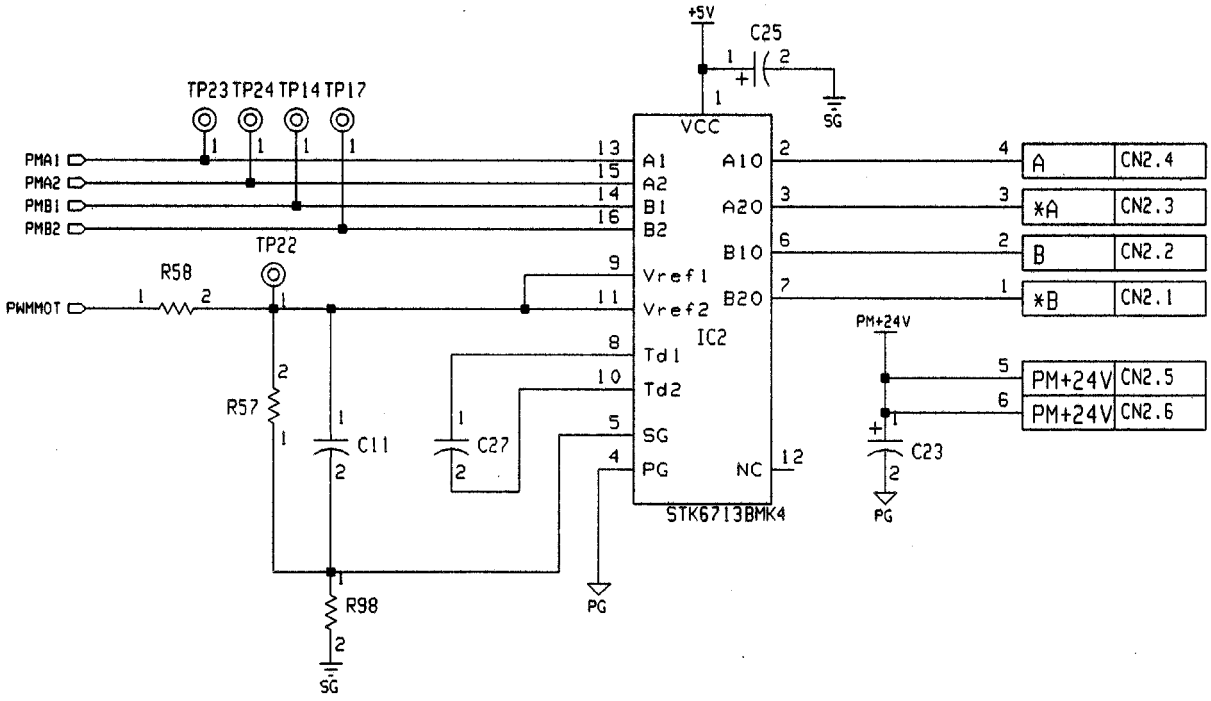


MR-2008

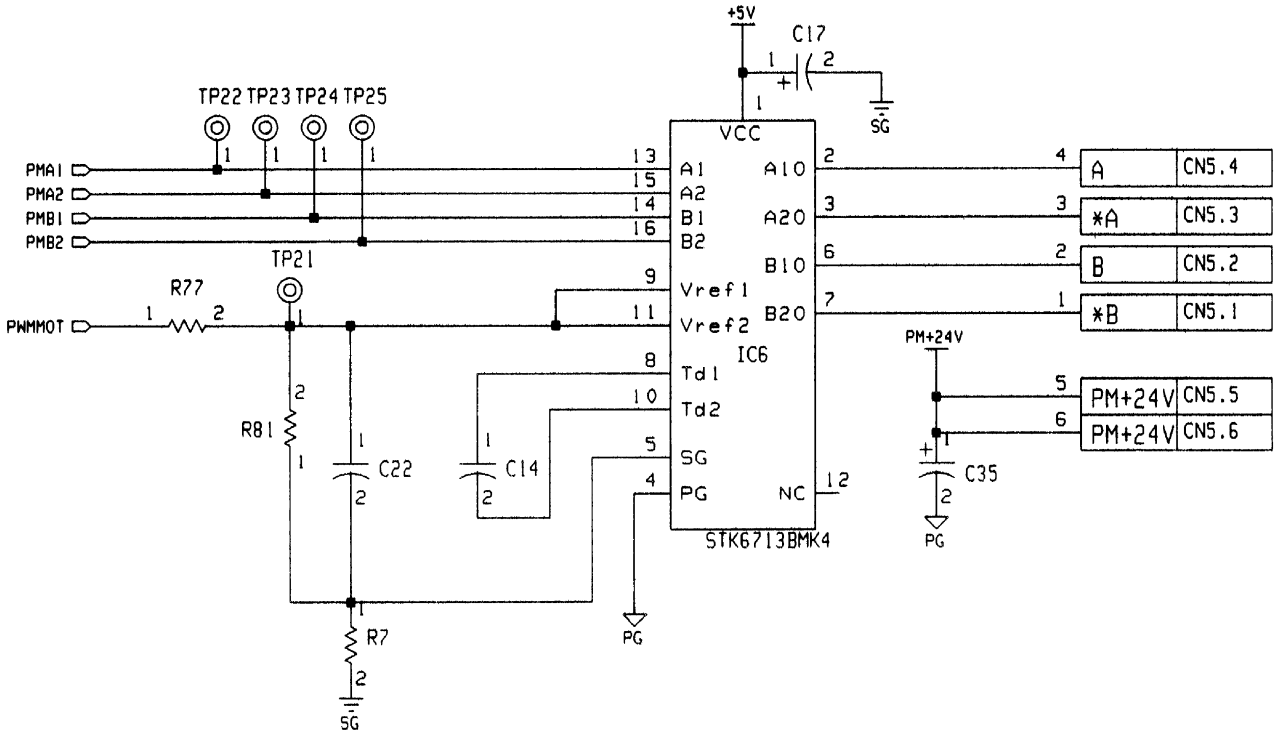
This is a circuit which generates DC +5V voltage supplied to CPUs, logic ICs, etc. DC +24V supplied from CN5 is dropped to +5V by a 3-terminal regulator IC9. In this circuit, R65 and R64 are protective resistors which compensate for the power loss occurring due to the generation of +5V. When current consumption for the +5V line is approx. 80 mA or less, the power loss is compensated for by R65 and IC9 but when the consumption current value exceeds 80 mA, the input voltage at IC9-pin 1 decreases due to voltage drop in R65. When the emitter voltage of Q13 becomes 0.6V lower than its base voltage, Q13 starts conducting and by making excess current flow through R64, shares a part of the power loss.

In this way, by varying the protective resistance value with the magnitude of consumption current, the heat caused by the power loss is distributed and dissipated.

11.3 Pulse Motor Drive Circuit



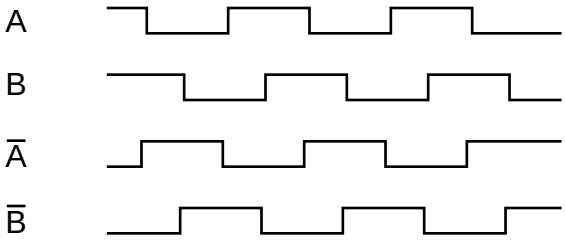
MR-3006



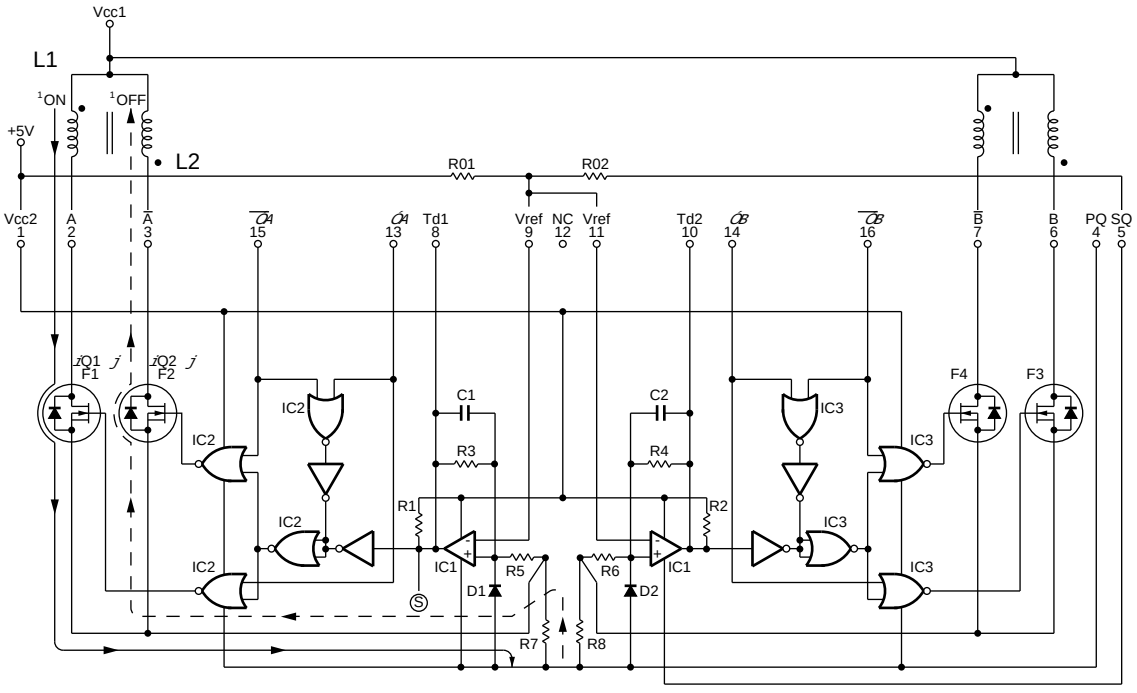
MR-2008

This circuit controls motor drive start/stop, rotation direction and motor current.
Motor rotation speed and rotation direction are controlled by outputting the following pulse motor drive excitation pattern signals from the CPU (PMA1/2, PMB1/2). The PWM signal output from the CPU (PWMMOT) is divided and integrated by R58, R57 and C11, and converted to a fixed voltage. After conversion, this fixed voltage is input to IC2 (pins 9 and 11) to set the motor current value.
Any motor current value is obtained by varying the duty of the PWM signal.

(Excitation pattern) 2-phase excitation



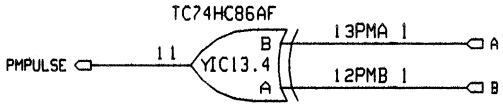
(Description of STK6713BMK4 Internal Circuit Operation)



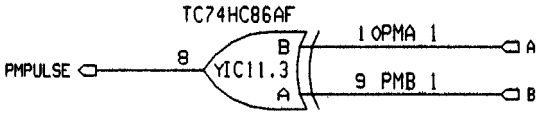
The figure above shows the equalizing circuit of the STK6713BMK4. The circuit comprises a phase driver, comparator, PWM excitation selector and current detection resistor.
When a L-level signal is input to ϕA and a H-level signal is input to $\phi\overline{A}$, Q1 turns ON. As the + terminal of IC1 (comparator) becomes L-level, the output S of IC1 becomes L-level. As current iON of the A coil passing through Q1 increases, the voltage across the terminals of source resistor R7 also increases, output Ⓢ becomes H-level from the moment that the voltage across pin 8 and R_{02} becomes equal, and Q1 is turned OFF.

The energy accumulated at coil L1 of the pulse motor is induced to L2. At this time, the current flowing to L2 is taken as i_{OFF}. The energizing time of i_{OFF} is the time up to when the voltage accumulated at capacitors C1 at both ends of R3 becomes equal to the voltage across both terminals of R_{02}. When the voltage is equal, output Ⓢ is inverted, and becomes L-level, so motor coil current i_{ON} increases to the voltage level of R_{02} again. In this way, the motor current is turned ON/OFF, that is, current chopping operation is repeatedly carried out.
The same operation is carried out for other phases.

(Motor rotation amount input circuit)



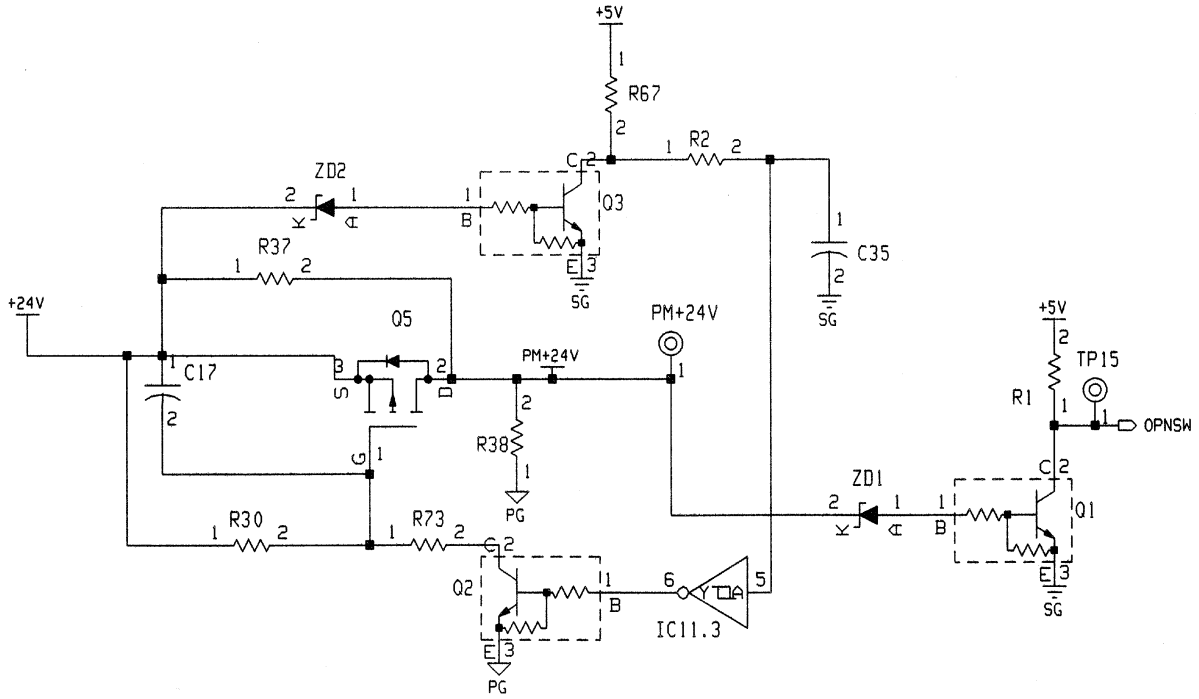
MR-3006



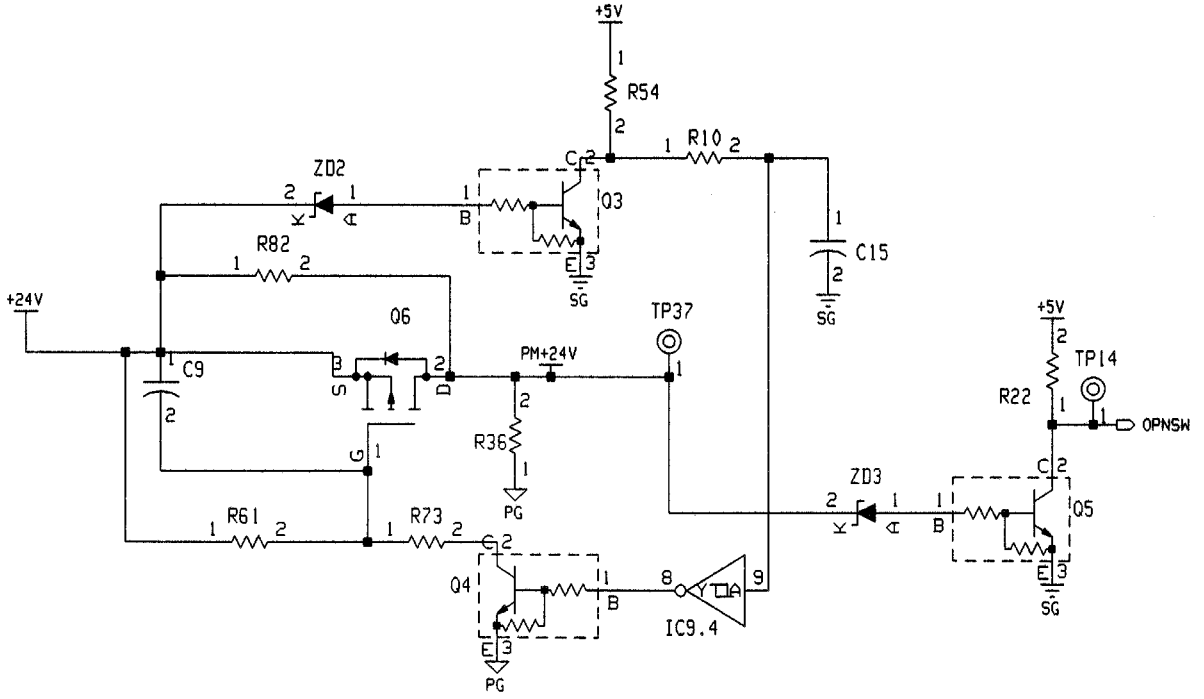
MR-2008

This circuit is for improving stop positional accuracy by counting the number of steps of the pulse motor. A pulse of cycle twice the step of the pulse motor is output from the output obtained by inputting PMA1 and PMB1 from amount the 2-phase excitation pulses to EXOR (IC13). When both edges of this pulse are detected by the CPU interrupt terminal, the number of motor steps can be counted.

11.4 Rush Current Limitation Circuit



MR-3006



MR-2008

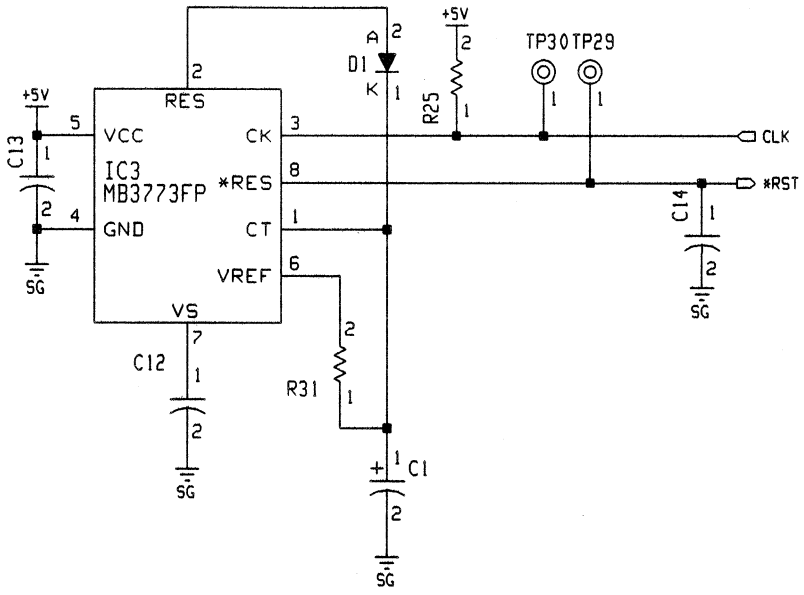
This circuit is for suppressing rush current, that flows to current regeneration capacitor C23 included in the driver motor drive circuit, to a fixed value. This circuit comprises a limiting resistor and FET Q5 that causes current to flow at steady operation.

During the times that the ZD2 cathode reaches 16 V from when the ADF open/close switch, feed cover switch and *exit cover switch (* MR-3006 only) close, base current is not supplied to Q3 causing the circuit to become OFF, and IC11 pin 5 becomes H-level. At this time, as base current is not supplied to Q2 and the circuit is OFF, Q5 becomes OFF and the current flows through R37.

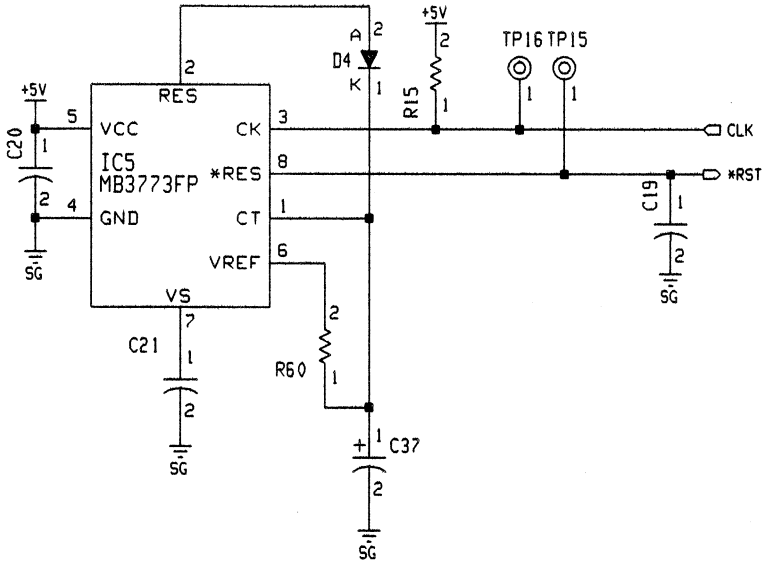
On the other hand, when the cathode of ZD2 exceeds 16 V, base current flows to Q3, and the circuit becomes ON. After a delay according to the time constant of R2 and C35, IC11 pin 5 becomes L-level. For this reason, base current is supplied to Q2, the circuit becomes ON and Q5 becomes ON. As a result, the current that had been flowing to R37 up till now, flows through Q5, and the current limitation is released.

R38 is a discharging resistor for immediately withdrawing the loaded accumulated to C23 when the ADF open/close switch, feed cover switch and *exit cover switch become open.

11.5 Reset Circuit



MR-3006



MR-2008

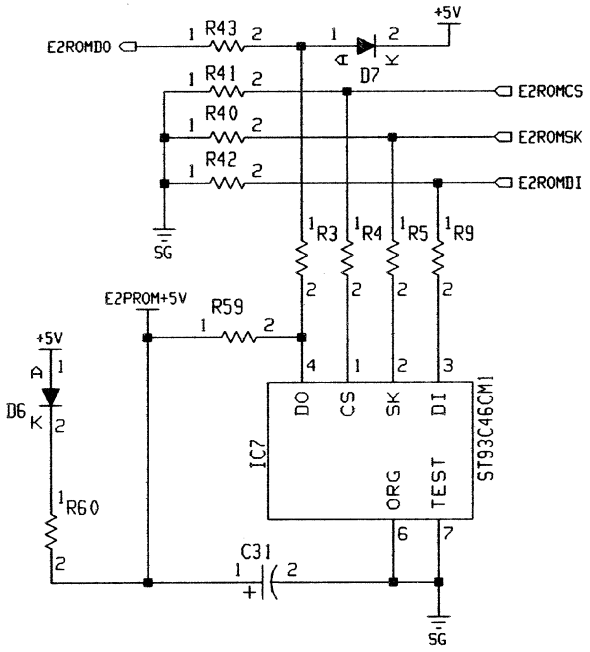
This circuit generates the CPU reset signal at instantaneous disconnection and drop in the power voltage. This circuit has a watchdog timer for analyzing CPU system operation.

After the power is turned ON, IC3 pin 8 is normally H-level. However, when a power OFF or an error causes the 5 V power supply to drop to 4.2 V or less, IC3 pin 8 becomes L-level to reset the CPU and stop system operation.

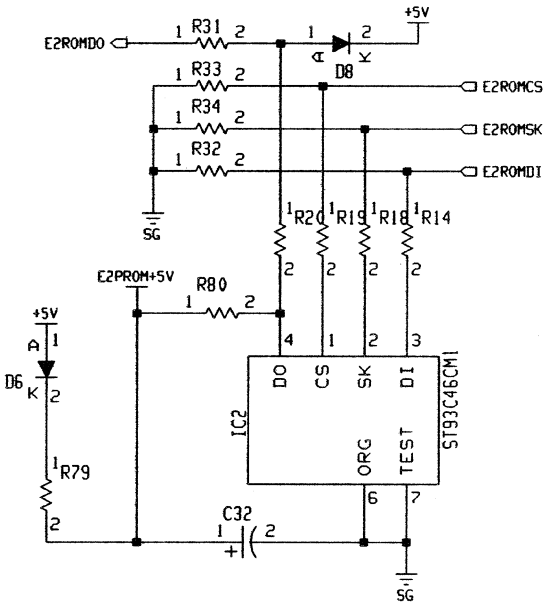
During normal operation, a clock of fixed cycle is input to IC3 pin 3 from the CPU to clear the watchdog timer built into IC3. However, if a system error causes the clock from the CPU to stop being input, IC3 pin 8 becomes L-level to reset the CPU and stop the system.

R31 is normally not mounted as it is a resistor for stopping the watchdog timer.

11.6 EEPROM Circuit



MR-3006



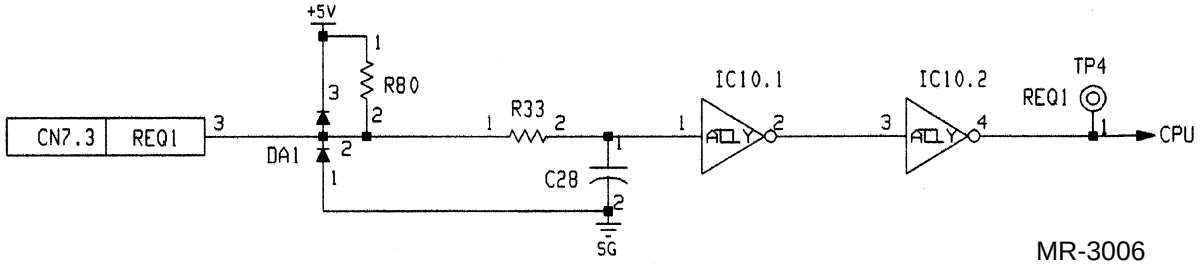
MR-2008

This circuit is the EEPROM and peripheral circuit. It is used for storing data of each of the ADFs.
This EEPROM is memory for storing adjustment values (e.g. reflective sensor sensitivity data or set position data on the copy glass) and counter values (e.g. number of discharged sheets). Data manipulation with the CPU is carried out on the 3-lead serial interface. Once data is stored to EEPROM, it is held in memory and does not disappear even if the power is turned OFF.
IC7 pin 1 is the chip select terminal, and is H-level during data manipulation.
IC7 pin 2 is the serial clock terminal. Serial data is transmitted synchronized with the clock input to this terminal.
IC7 pin 3 is the serial data input terminal, and pin 4 is the serial data output terminal.
D6, R60 and C31 comprise the circuit for holding the power of IC7 until writing ends even if something causes the power voltage to drop during writing of data.

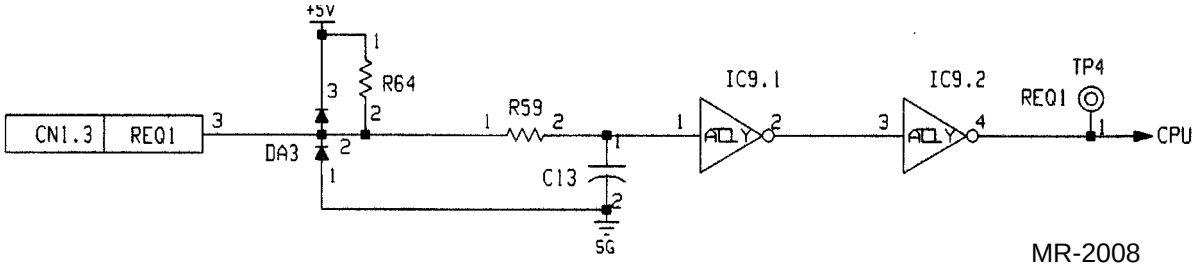
12. EXPLANATION OF I/O SIGNALS

It is the same as with the circuits of the MR-3006 and the MR-2008.
Part number only is difficult. So, the circuit explanation is performed only for the MR-3006.

12.1 REQ1, ACK2, ADFRXD Signals



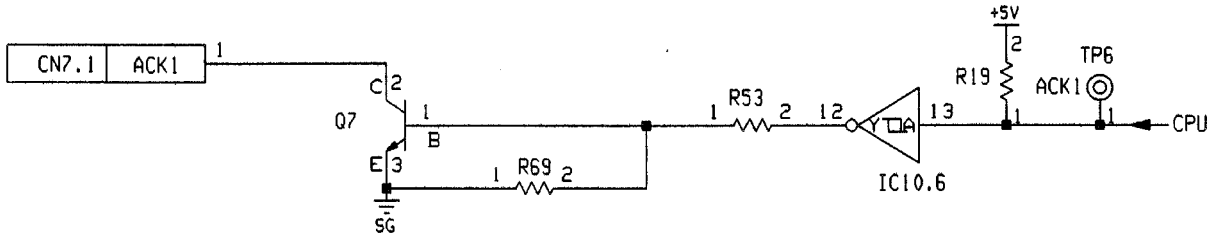
MR-3006



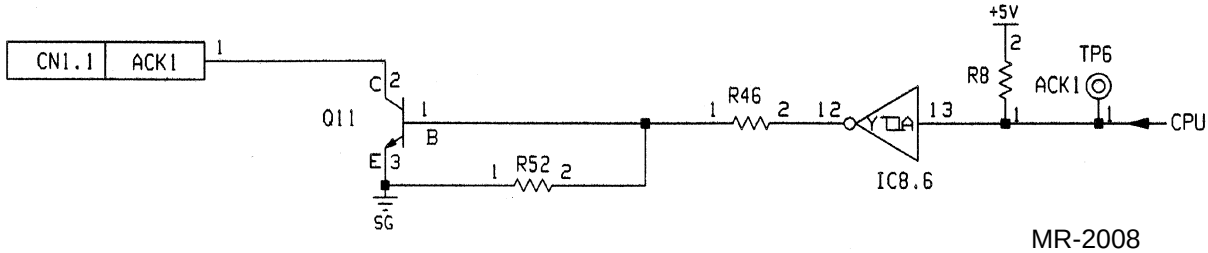
MR-2008

This is the communications input circuit for the main unit PPC. “1” indicates 5 V, and “0” indicates 0 V. Connector logic and CPU input port logic are the same.

12.2 ACK1, REQ2, ADFTXD Signals



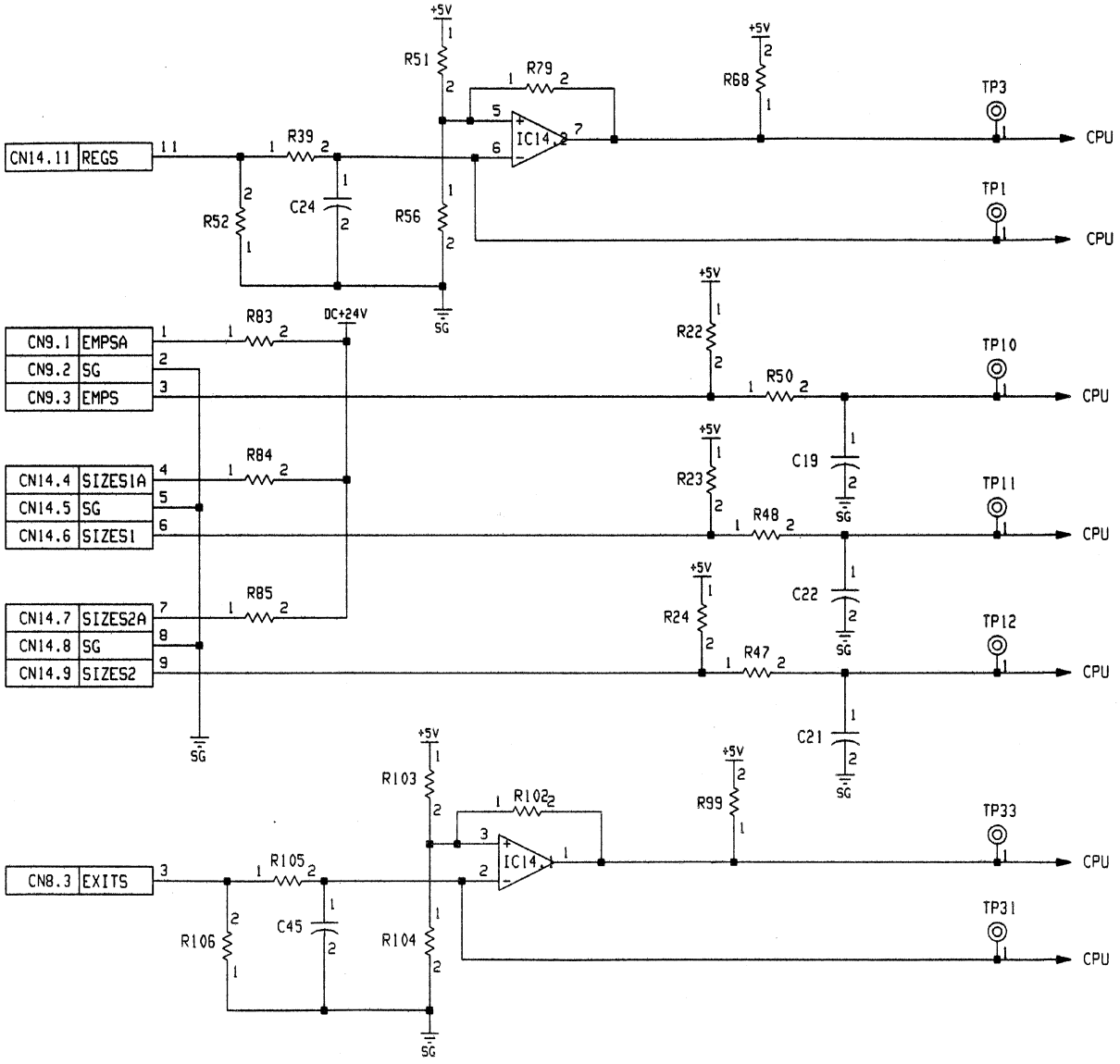
MR-3006



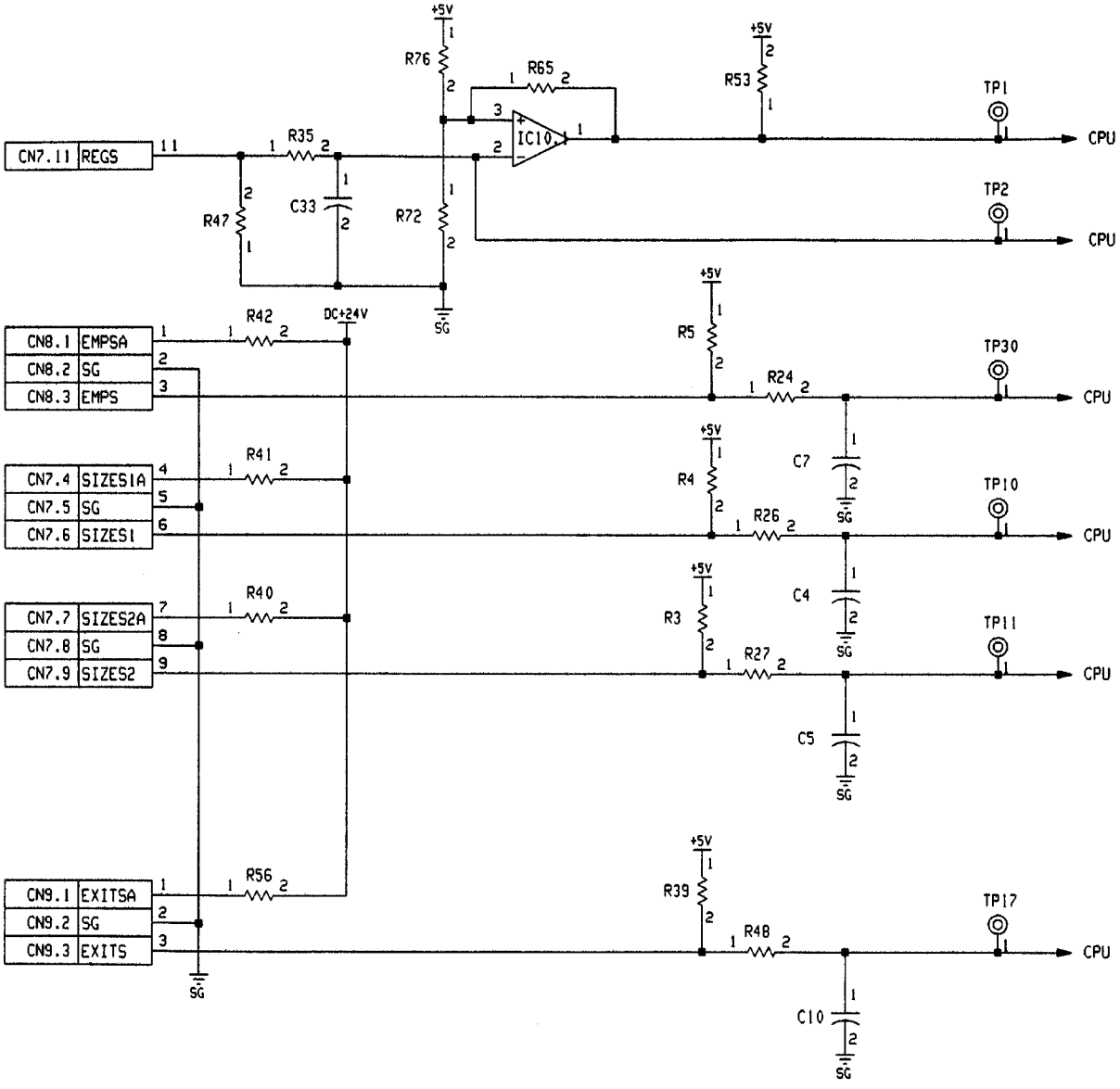
MR-2008

This is the communications input circuit for the main unit PPC. “1” indicates 5 V, and “0” indicates 0 V. Connector logic and CPU output port logic are the same.

12.3 Sensor Input Circuit



MR-3006

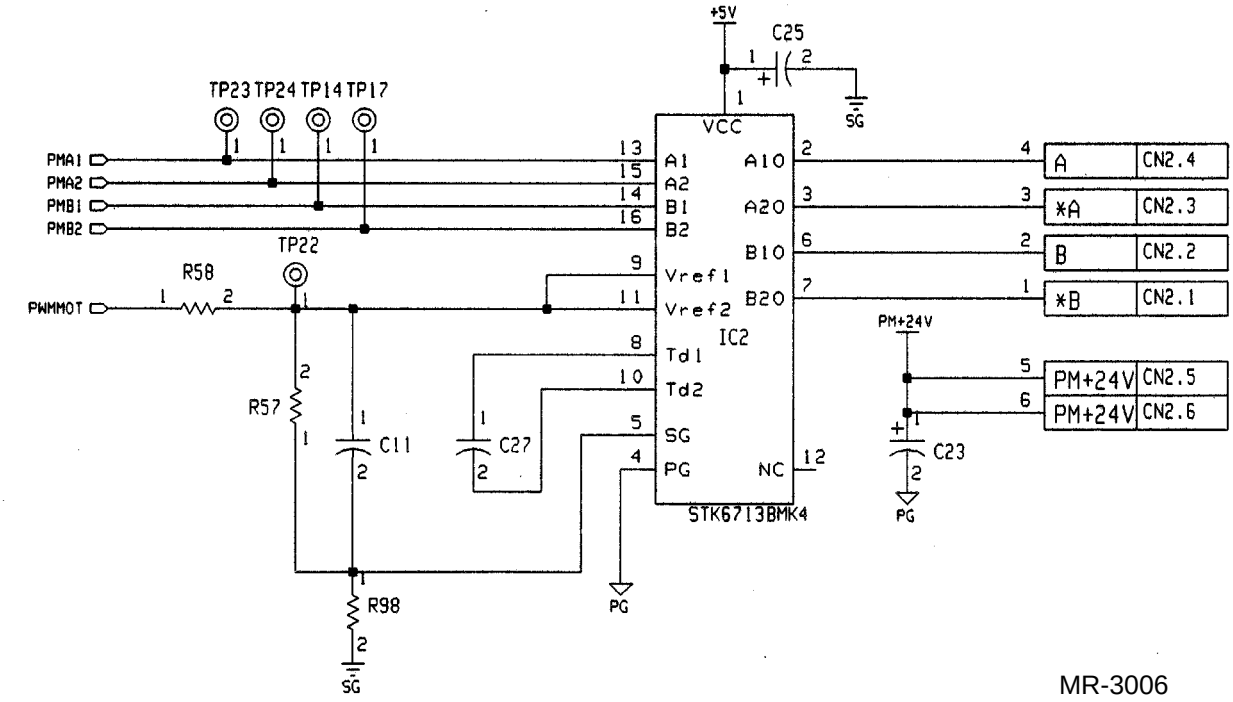


MR-2008

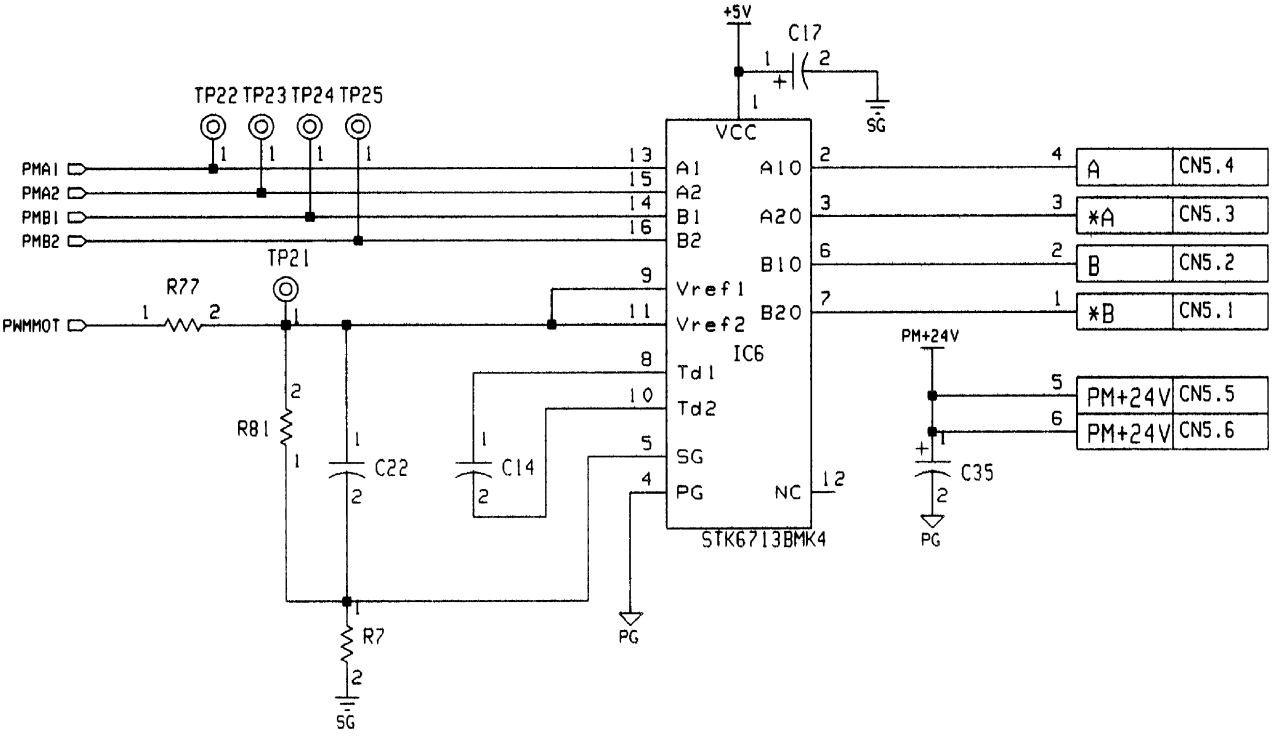
This is the input circuit from the photosensors. The following tables show the signal logic.

Sensor name	Connector level 5V (“1”)	Connector level 0V (“0”)
EMPS (empty sensor)	No original	Original detected
REGS (aligning sensor)	No original (connector voltage 2 V or more)	Original detected (connector voltage less than 2 V)
SIZES1 (size sensor 1)	Original detected	No original
SIZES2 (size sensor 2)	Original detected	No original
EXITS (exit sensor): MR-3006	No original (connector voltage 2 V or more)	Original detected (connector voltage less than 2 V)
EXITS (exit sensor): MR-2008	Original detected	No original

12.4 Pulse Motor Output Circuit



MR-3006

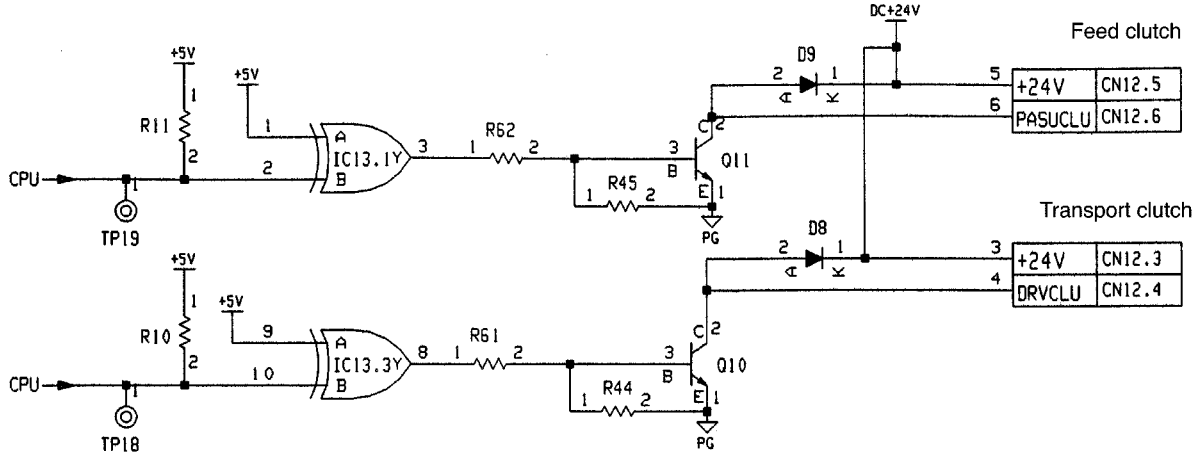


MR-2008

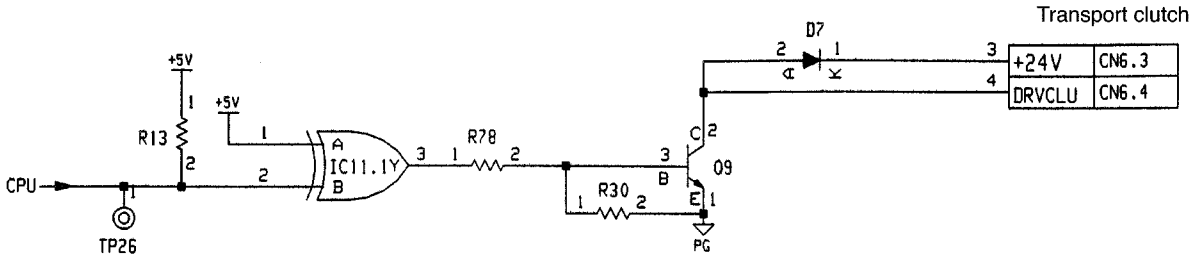
This is the pulse motor output circuit.

Motor rotation speed and rotation direction is controlled by inputting the pulse motor drive excitation pattern signals to PMA1/2 and PMB1/2. The motor current is set by inputting the PWM signal to PWMMOT.

12.5 Clutch Output Circuit



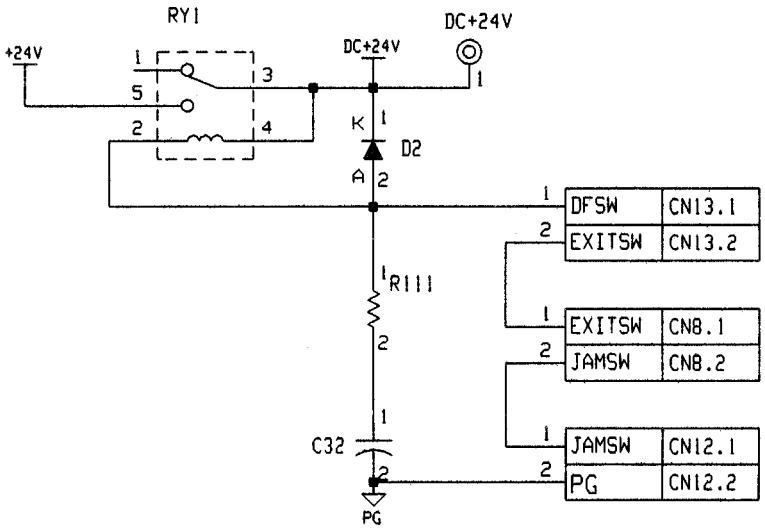
MR-3006



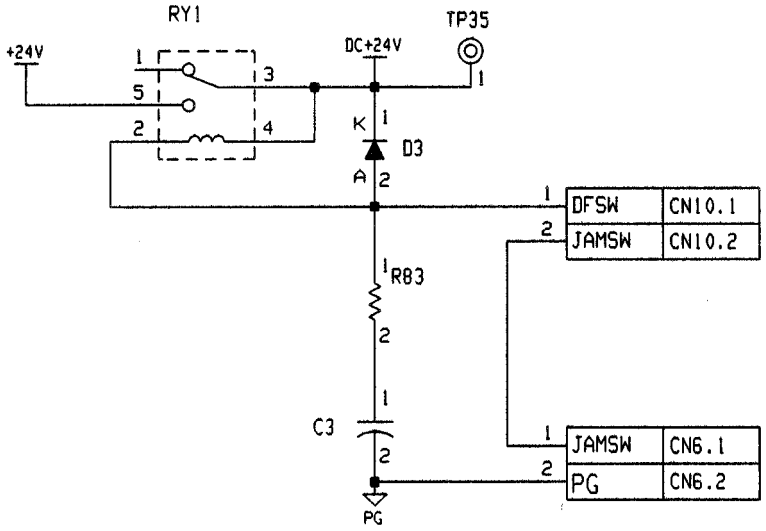
MR-2008

This is the drive circuit of the electromagnetic clutch. The clutch is turned ON when the input signal is “0” (0 V) in any case.

12.6 Open Switch Input Circuit



MR-3006



MR-2008

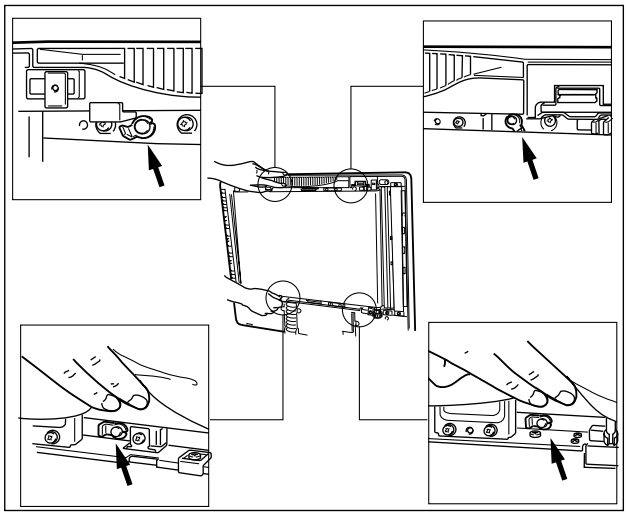
When all of the three reed switches are ON, the relay coil is excited, and +24 V power is supplied to the drive circuit.

The voltage of CN13.1 is 0 V when the three reed switches are ON, and 24 V when one of the reed switches is OFF.

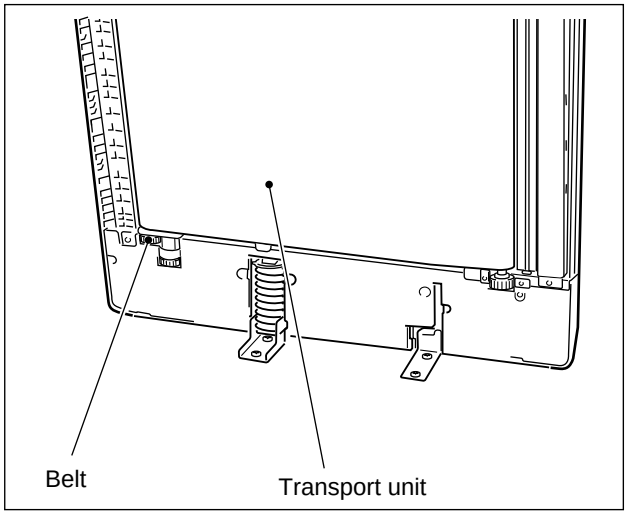
13. DISASSEMBLY AND ADJUSTMENT

13.1 Transport Unit

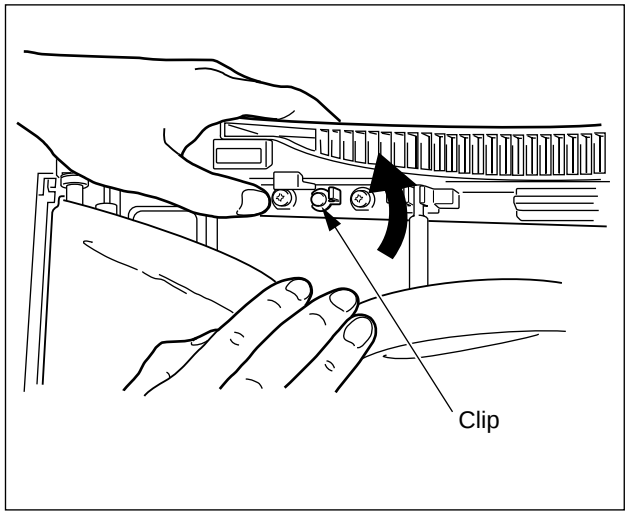
(1) Remove the four clips holding the transport unit.



(2) Pull out the upper part (front side) of the transport unit toward you to disengage the belt for driving.

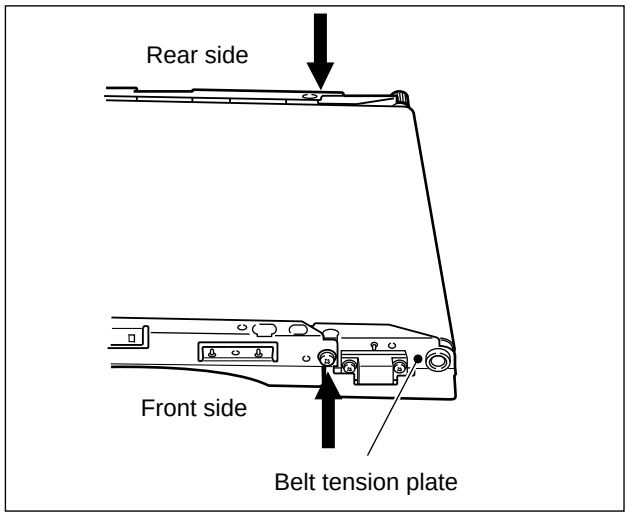


Note: After fixing the clip, move the knob section to the side of the frame.

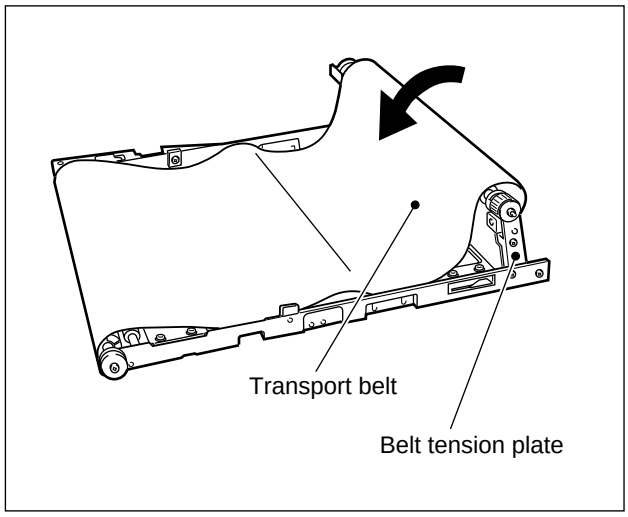


13.2 Transport Belt

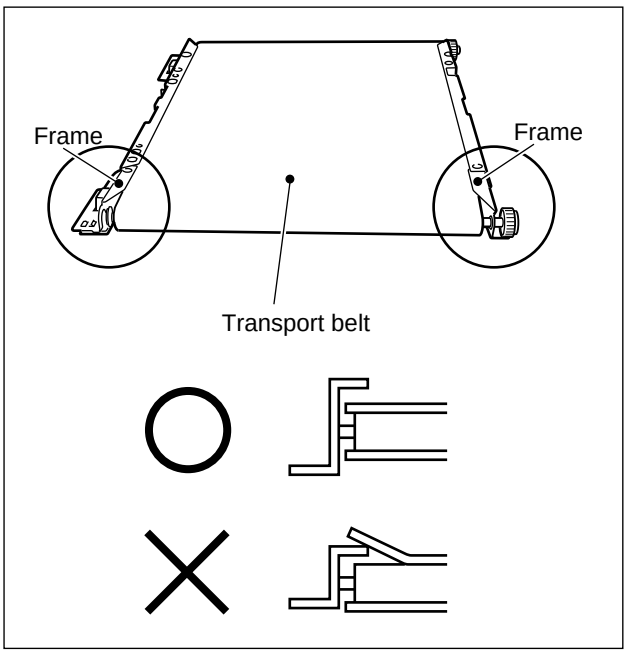
(1) Remove the transport unit.
(2) Loosen the two screws (front and rear) holding the belt tension plate.



(3) Rotate the belt tension plate toward you to loosen the transport belt.
(4) Remove the transport belt.



Note: During reassembly, the edge of the transport belt should be inside the side frame of the transport unit. After reassembly, check that the belt is not deviated to one side (should be on the center.)



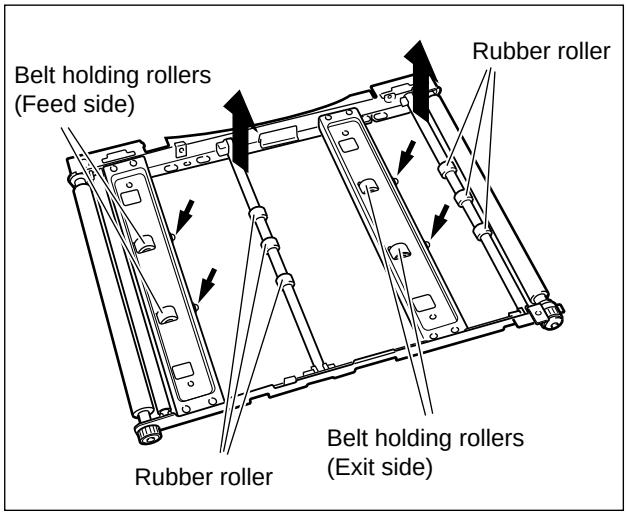
13.3 Belt Holding Roller/Brush

(1) Remove the transport belt.

Belt holding roller

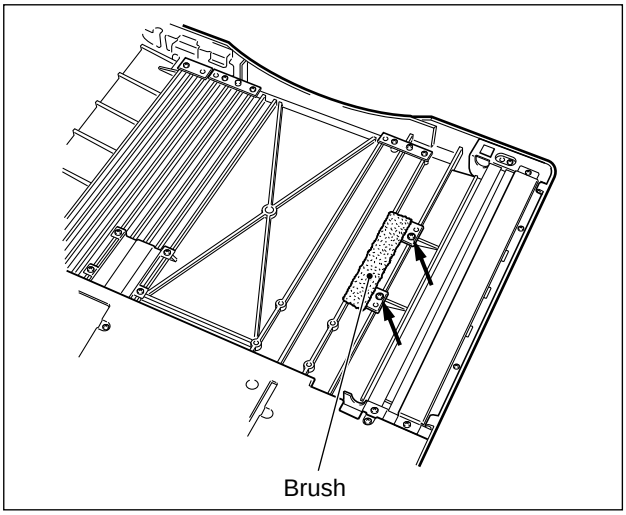
(1) Replace the belt holding roller on the feed side after removing the rubber roller on the feed side. The belt holding roller on the exit side should be replaced by having the belt tension plate inclined. (There is no need to remove the rubber roller.)

Note: During the replacement of the belt holding roller, never remove the side frame of the transport unit. (Do not remove the screws which are fastening the side frame except when replacing the side frame.)



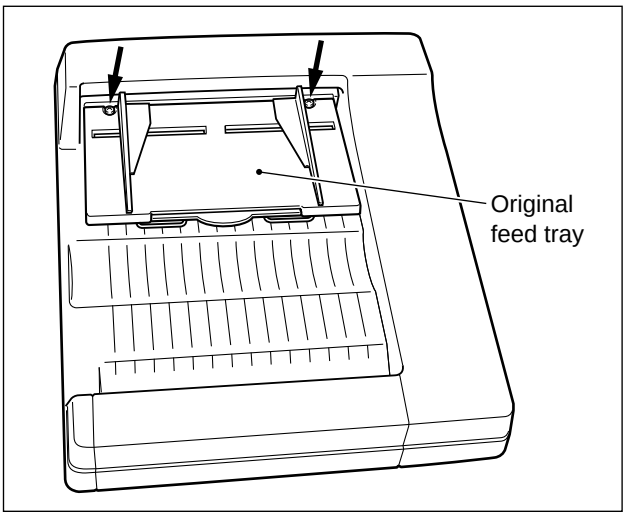
Brush

(1) Remove two screws and take out the brush holding bracket.



13.4 Original Feed Tray

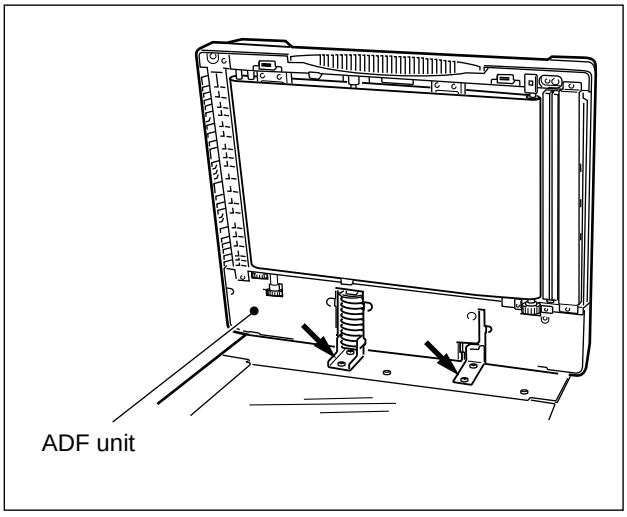
(1) Remove two M4 screws and take out the tray in an upward direction.



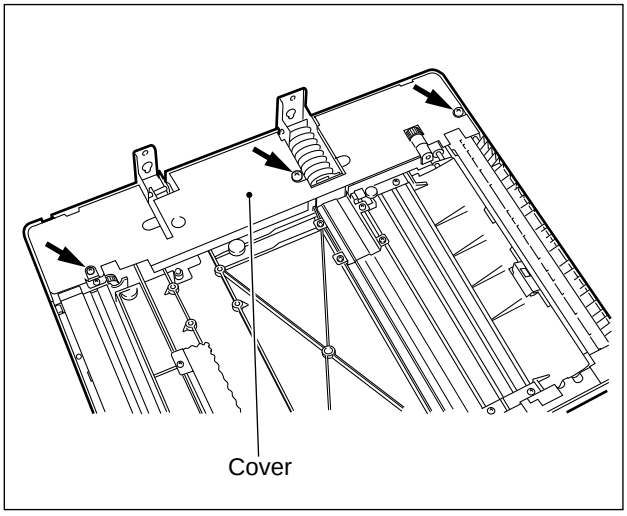
13.5 Feed Unit

(1) Remove the original feed tray.

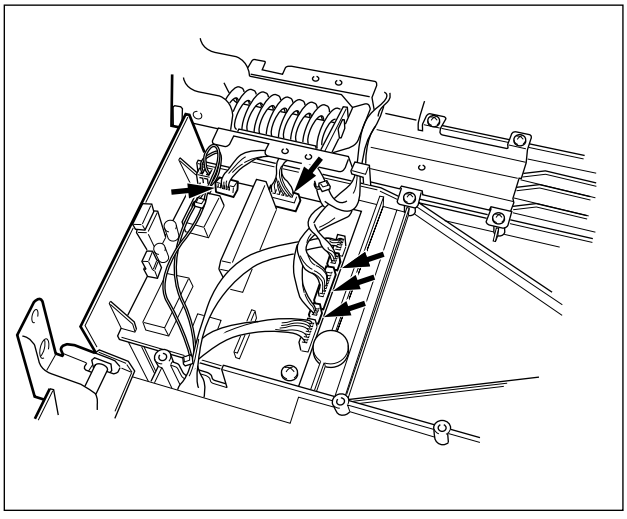
(2) Disconnect one connector at the rear and remove two screws, then move the ADF unit toward the rear to take it out in an upward direction.



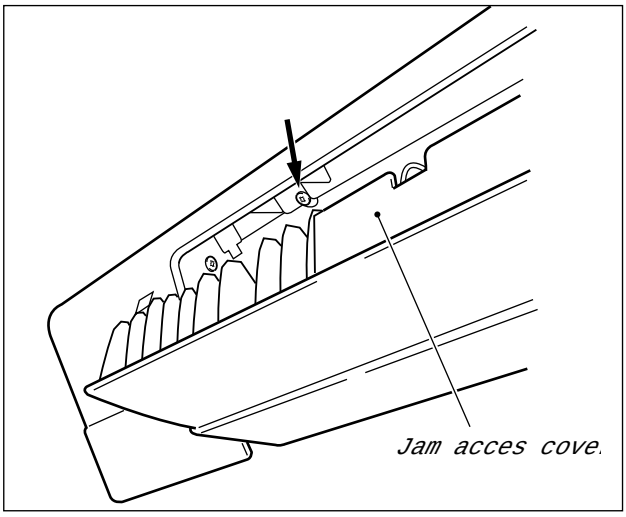
(3) Place the entire unit upside down and remove the transport unit and the cover (3 screws).
Note: (M4 × 8)



(4) Remove five connectors from the PC board.

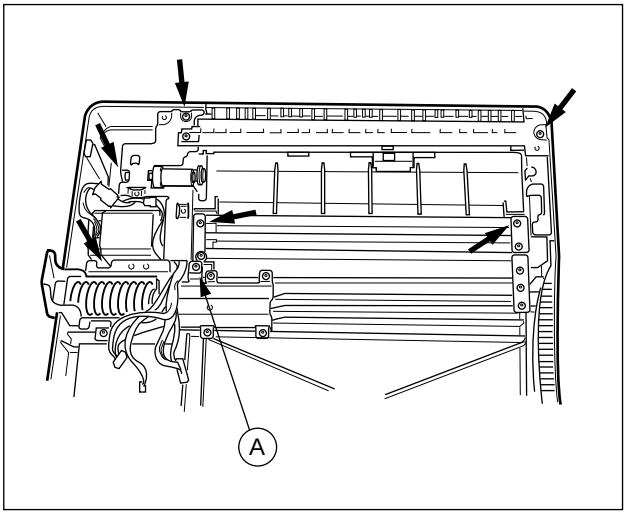


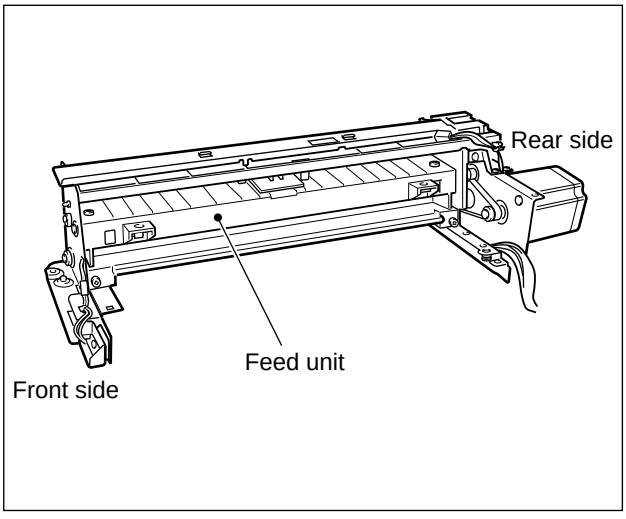
(5) Open the jam access cover and loosen the one screw.



(6) Remove seven screws and take out the feed unit.

Note: (M4 x 12) .. 6 pieces (PTBR)
(M4 x 8) .... 1 piece Ⓐ (BID)



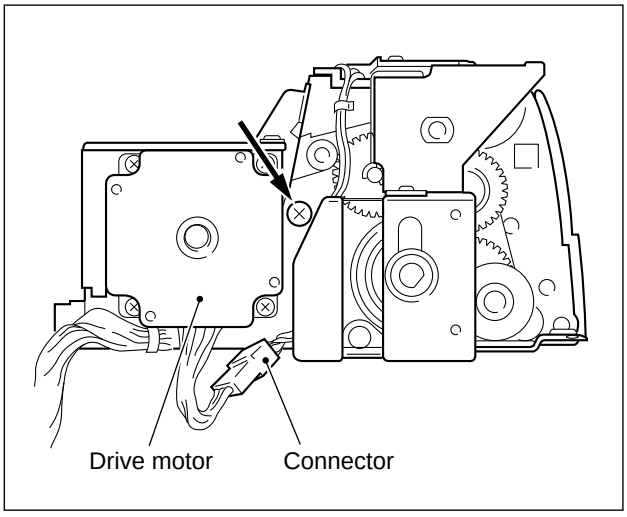


13.6 Drive Motor

(1) Loosen the one screw holding the timing belt tensioner

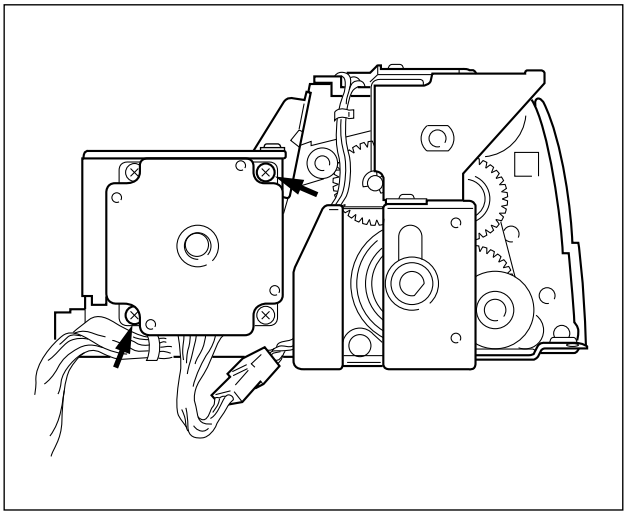
(2) Disconnect the one connector of the motor.

Note: Do not remove the spring hooked on the belt tensioner.



(3) Remove the two screws holding the motor.

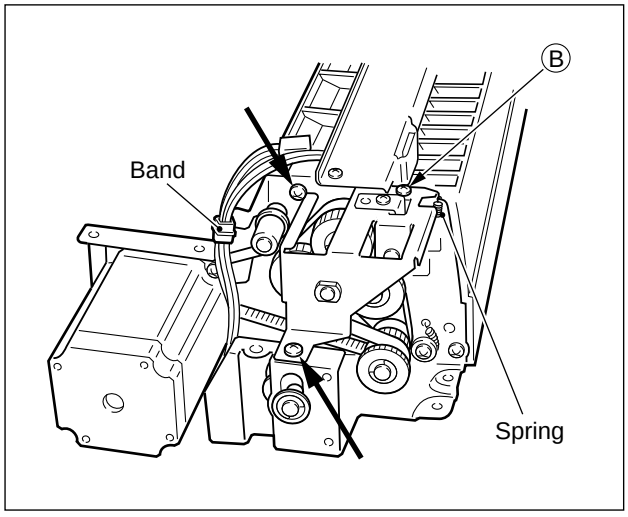
Note: Whenever reinstalling, secure the belt tensioner after all the parts.



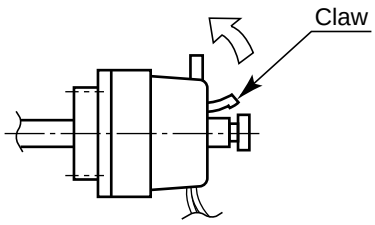
13.7 Electromagnetic Clutch (for the MR-3006 only)

(1) Remove one harness band, one spring and three screws.

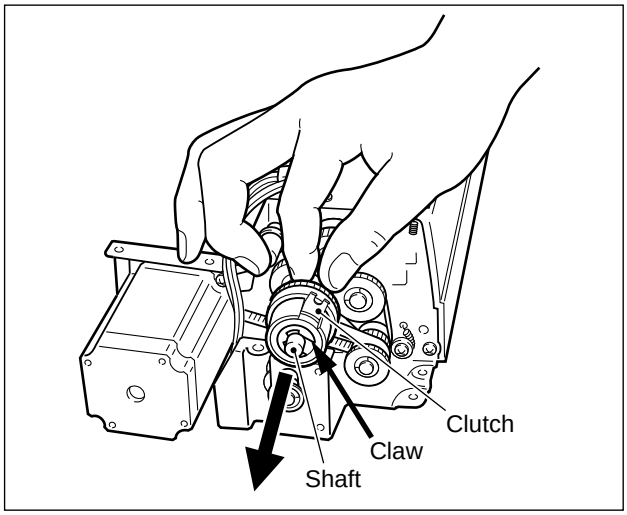
Note: One of the three screws is shorter (M3 × 4) Ⓑ.

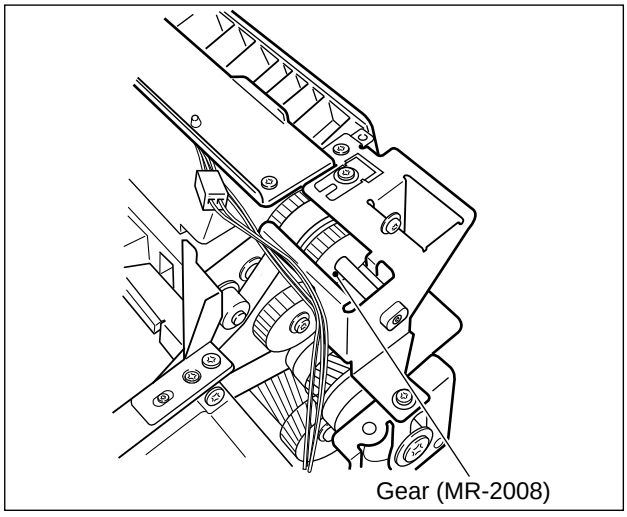


(2) Pull out the clutch with the pin in the direction of the arrow.
(3) Remove the pin and the claw, then draw the shaft.



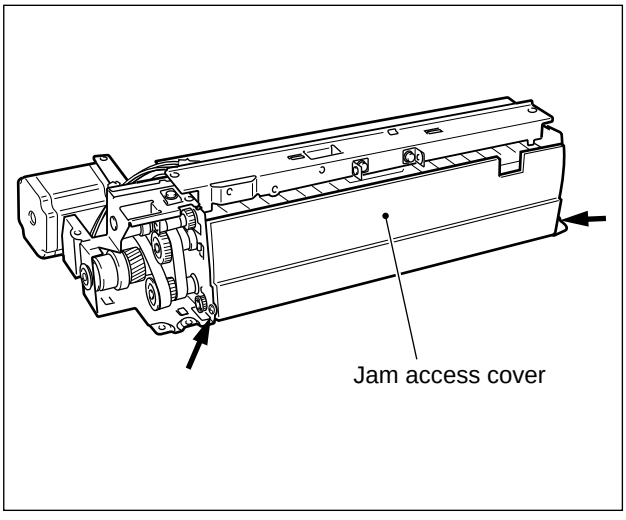
(4) When the connector is removed, the clutch can be taken out.





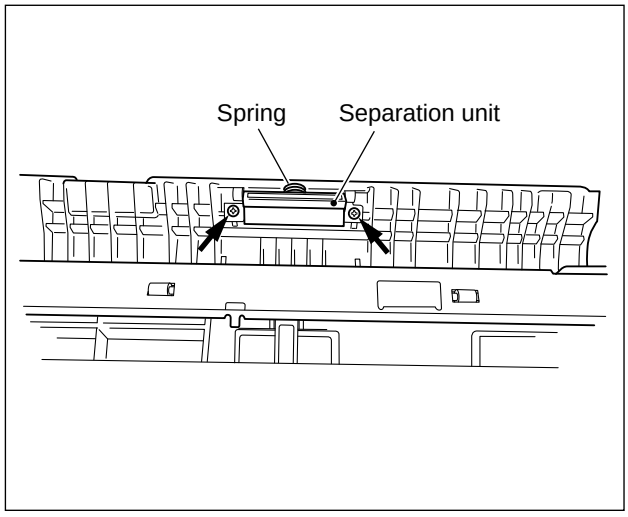
13.8 Jam Access Cover

(1) Remove the feed unit.
(2) When two shouldered screws (front and rear) are removed, the jam access cover can be taken out.



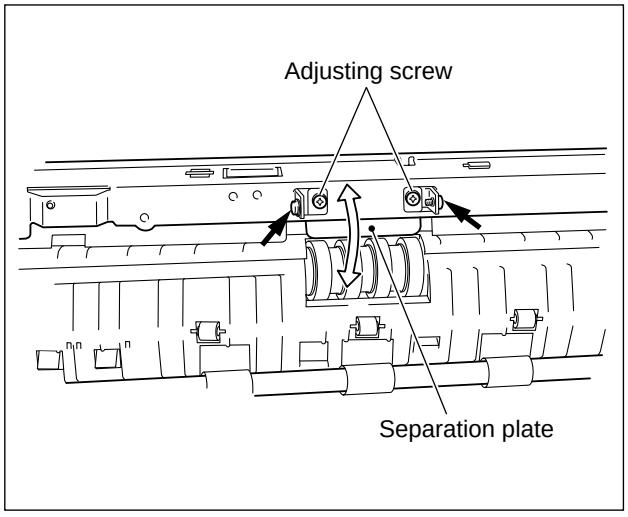
13.9 Separation Unit

(1) Open the jam access cover.
(2) Remove two screws and take out the separation unit.
(3) Draw the holder from the bracket.
(Be careful to prevent the pressure spring coming off.)



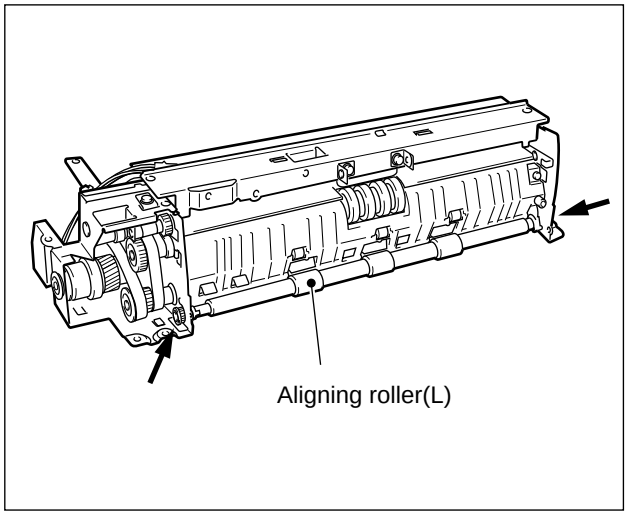
13.10 Separation Plate

(1) Remove the feed unit.
(2) Open the jam access cover.
(3) Remove two screws.



13.11 Aligning Roller (L)

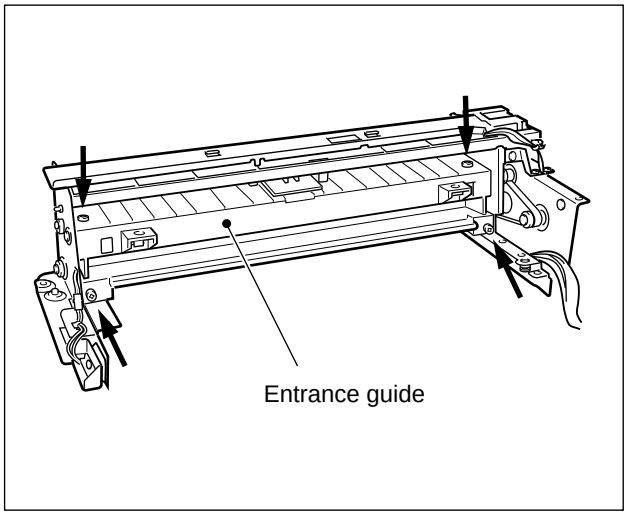
(1) Remove the feed unit.
(2) Remove the jam access cover.
(3) Remove an E-ring, bushing and coil spring from the front and rear sides.
(4) Slide the aligning roller (L) to pull it out.



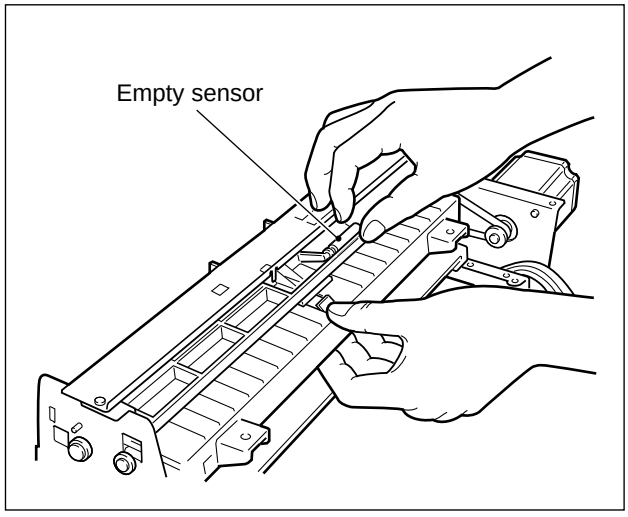
13.12 Aligning Sensor and Size Sensors 1 and 2

(1) Remove the feed unit.

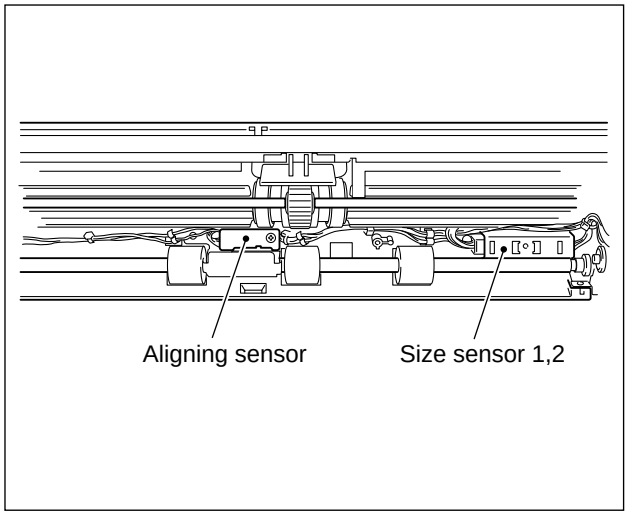
(2) Remove four screws



(3) While pushing up the empty sensor upward, pull out the guide.

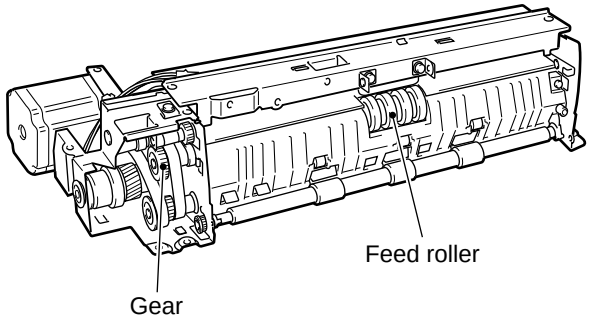


(4) Remove each screw and then disconnect the sensor from the connector.



13.13 Feed Roller

(1) Remove the feed unit.
(2) Remove the entrance guide.
(3) Remove the gear of the drive section (1 E-ring).
(4) Remove two E-rings of the frame inner side.
(5) Remove the front side E-ring holding the feed rolller, and then extract the roller.

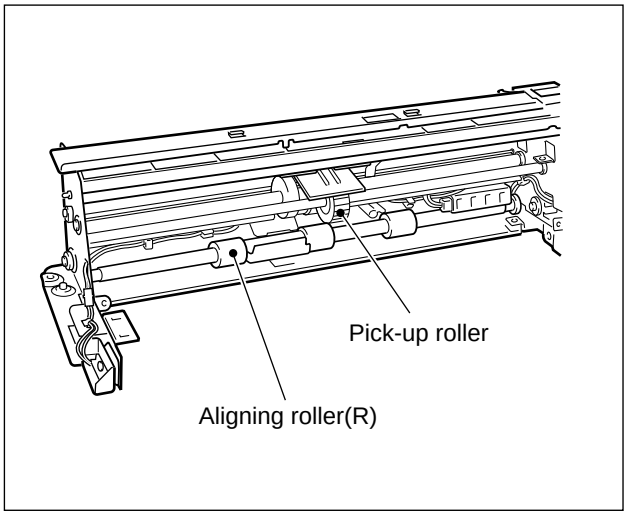


13.14 Pick-up Roller/Aligning Roller (R)

(1) Remove the feed unit.

Pick-up roller

(2) Remove the entrance guide.
(3) Remove the gear (spring clutch) of the drive section (1 pierce-ring).
(4) Remove one front side pierce-ring.
(5) Remove one pierce-ring holding the roller, and then pull out the roller.

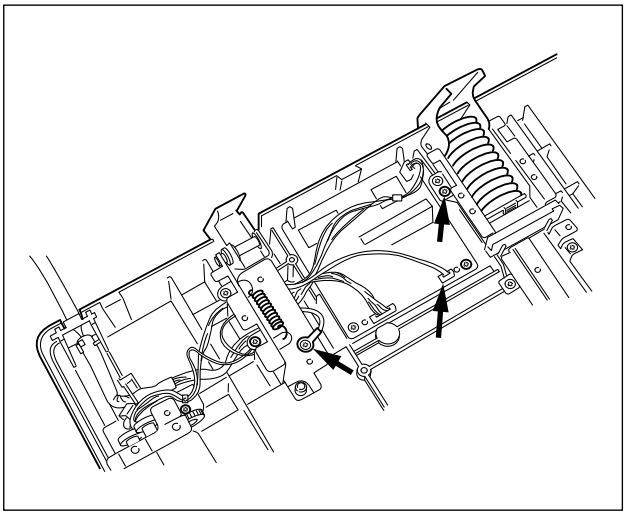


Aligning Roller (R)

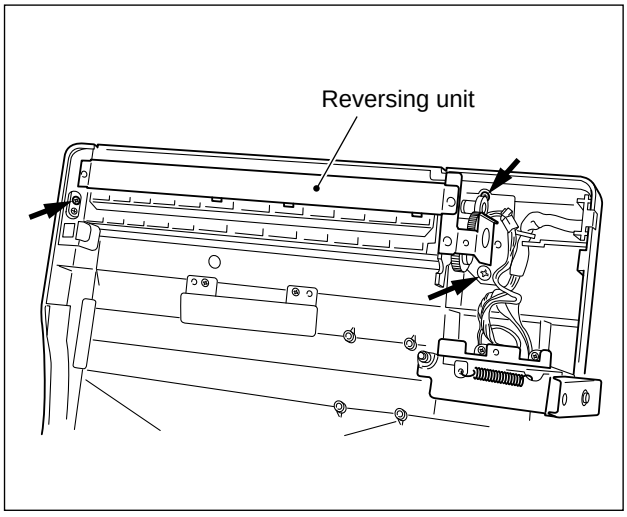
(2) Remove the entrance guide, and then the aligning sensor.
(3) Remove the pulley of the drive section (2 E-rings).
(4) Remove the bearing and two E-rings, and then extract the roller.

13.15 Reversing Unit (for the MR-3006 only)

(1) Remove the ADF unit.
(2) Remove the transport unit and the cover.
(3) Remove the connector from the PC board.
(4) Remove earth wires (at 2 places) attached in the hinge portion.

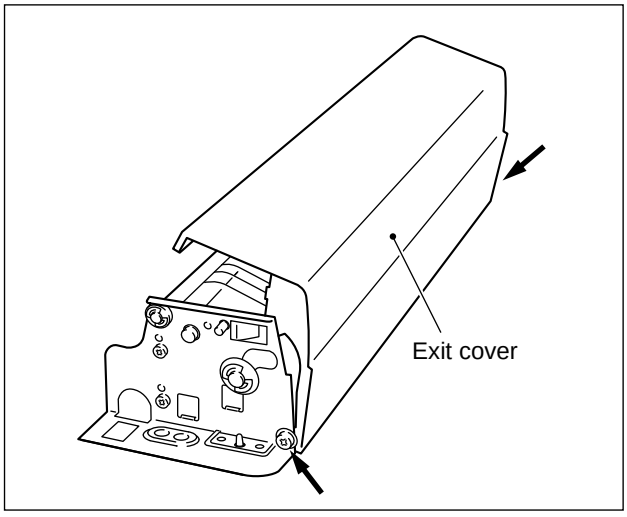


(5) When 3 screws (1 earth wire) are removed, the reversing unit can be taken out.
Note: When reinstalling, temporarily secure the reversing unit, after having mounted the transport unit, fix the reversing unit.



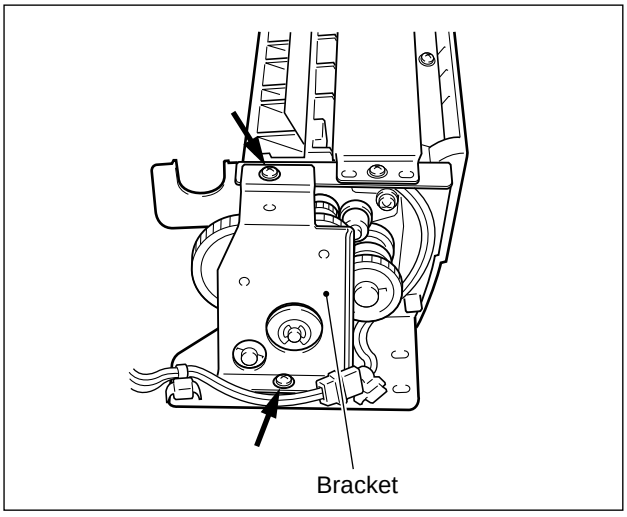
13.16 Exit Cover (for the MR-3006 only)

(1) Remove the reversing unit.
(2) Take out two screws (front and rear) and remove the cover.

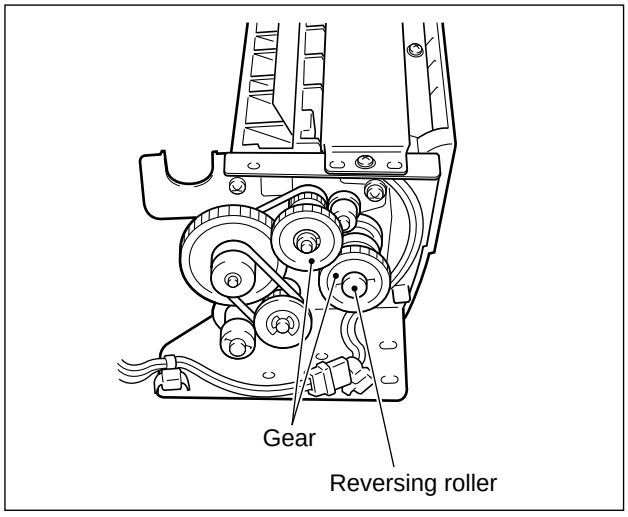


13.17 Reversing Roller (for the MR-3006 only)

(1) Remove the reversing unit.
(2) Remove the bracket of the drive section (2 screws).

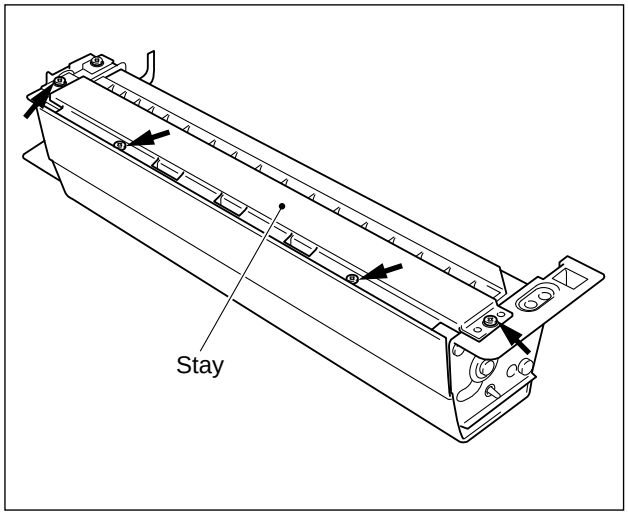


(3) Remove two idle gears (one of the two gears is fixed with the grip ring).
(4) Remove the bushing of the reversing roller front side (1 E-ring).
(5) Tilting the reversing roller, remove the rear side E-ring, and then the gear (spring clutch).
(6) Pull out the roller.

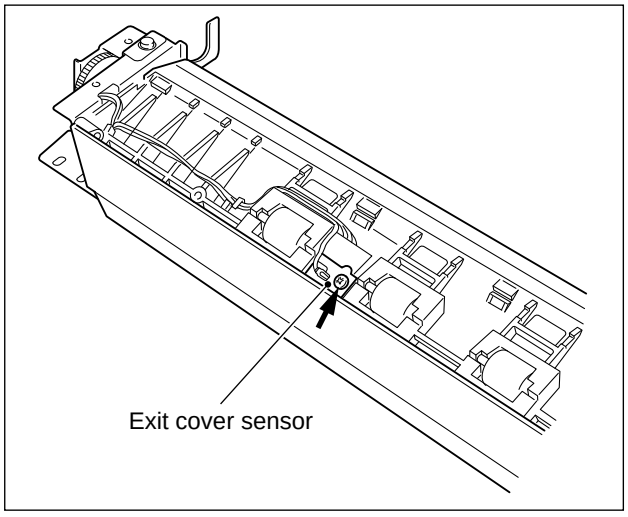


13.18 Exit Sensor (for the MR-3006 only)

(1) Remove the stay (4 screws).

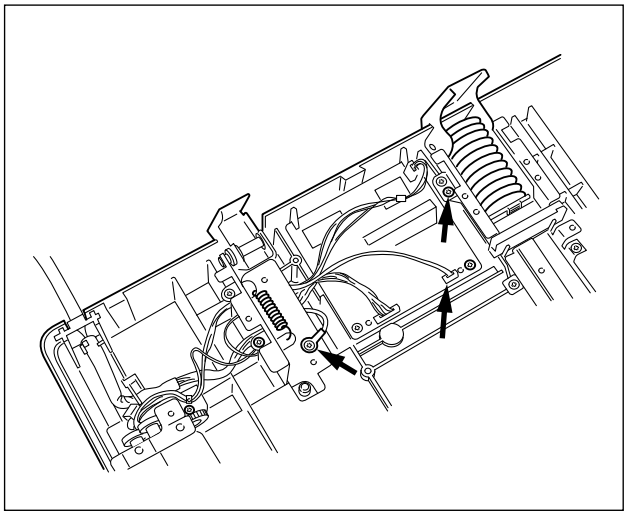


(2) Remove the sensor board from the guide (1 screw).

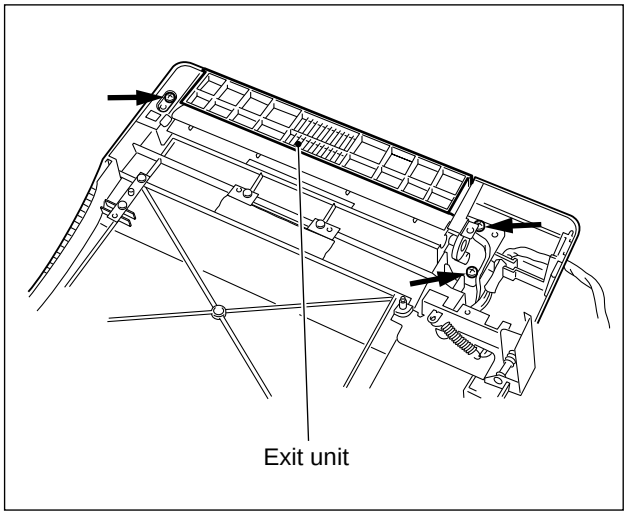


13.19 Exit Unit (for the MR-2008 only)

(1) Remove the ADF unit.
(2) Place the entire unit upside down and remove cover.
(3) Disconnect one connector and remove the earth wires (at 2 places).

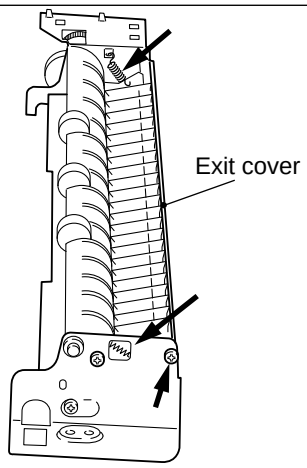


(4) Remove three screws.



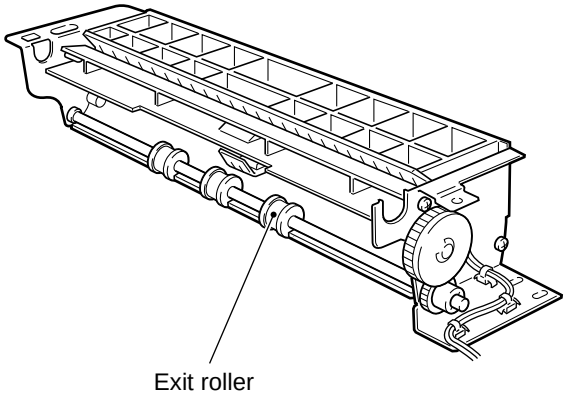
13.20 Exit Cover (for the MR-2008 only)

(1) Remove the exit unit.
(2) Remove each spring from the front and rear sides.
(3) Take out one screw (front) and remove the cover.



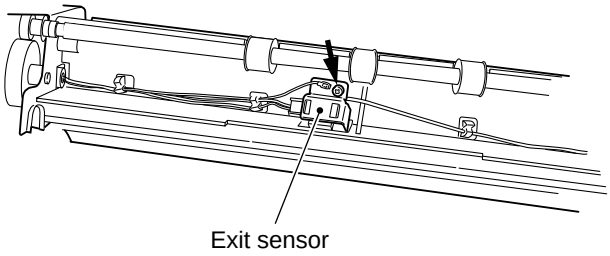
13.21 Exit Roller (for the MR-2008 only)

(1) Remove the exit unit.
(2) Remove the exit cover.
(3) Take out an E-ring and remove the gear.
(4) Remove the E-ring and the bushing.



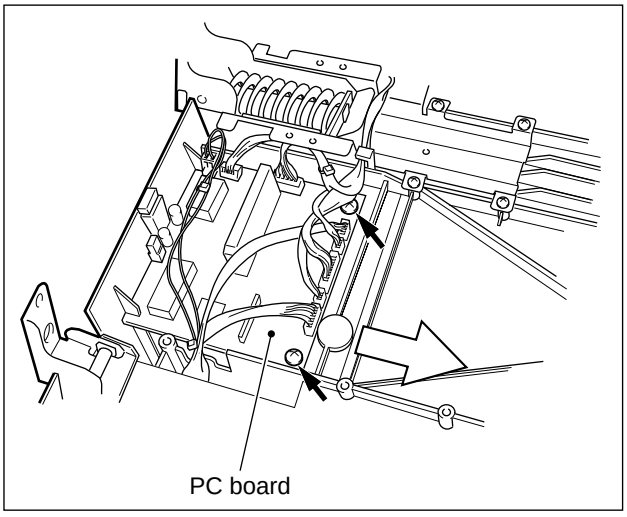
13.22 Exit Sensor (for the MR-2008 only)

(1) Remove the exit unit.
(2) Remove one screw and disconnect the sensor from the connector.



13.23 PC Board

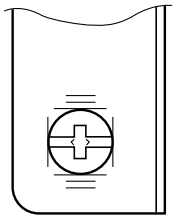
(1) Remove the ADF unit.
(2) Remove the cover.
(3) Remove the eight connectors.
(4) Remove two screws, and slide the PC board to remove it from the rear side hook portion.



13.24 Skew Adjustment

(1) Please confirm the installation as shown (RIGHT HINGE).

Note: Install the screw on the center of scale.



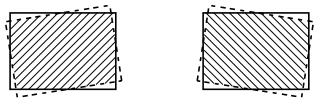
RIGHT HINGE

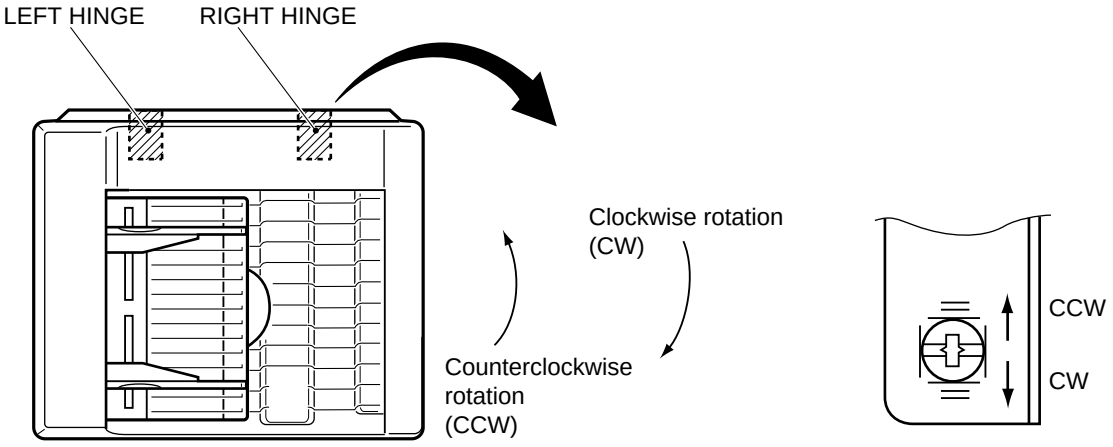
(2) Place the test original face up in the tray, press PRINT to make a copy.
Check that the copy isn't skew.

(3) If not, loosen the two screws on hinges and adjust the position of RIGHT HINGE. Repeat the procedure until the copy isn't skew.

Note: After the adjustment, tighten the two screws of LEFT and RIGHT HINGE without fail.

Image Inclination





13.25 EEPROM Initialization, Aligning Sensor Adjustment and Test Mode

(1) EEPROM initialization and aligning sensor adjustment

Whenever the logic PC board, aligning sensor or *exit sensor (*for the MR-3006 only) is replaced, it is necessary to initialize the EEPROM and adjust the sensor.

At that time, use the PPC keys (Adjustment mode: 05). If the adjustment is not performed, errors (paper jam etc.) may occur.

Refer to the Service Manual for the PPC.

(2) Test mode

The independent test modes below can be performed by pressing PPC keys (output check: 03/04). Refer to the Service Manual for the PPC.

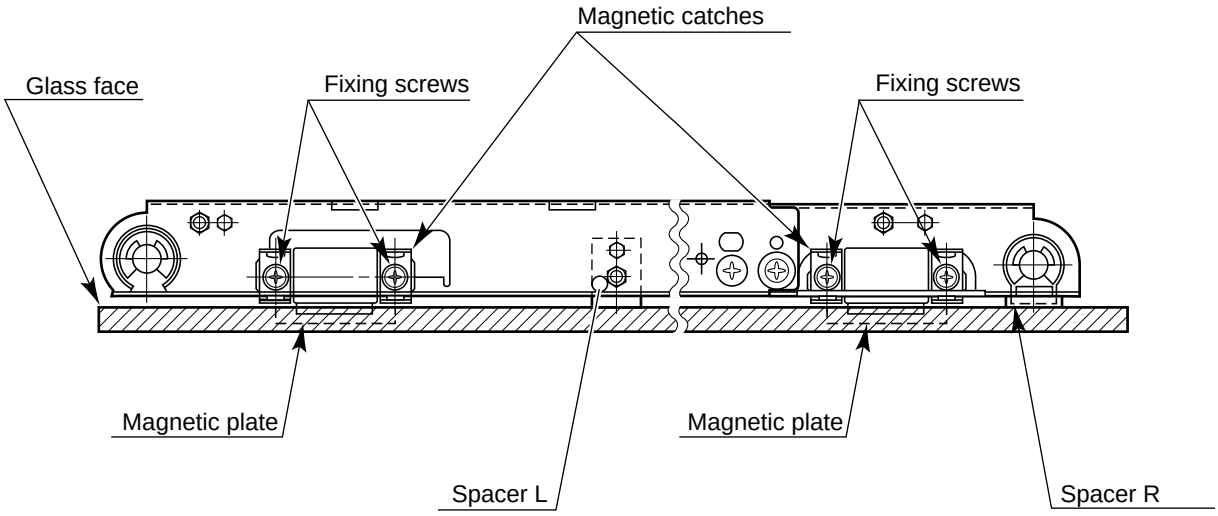
- Independent aging
- Pick-up roller rotation ---

  At the time of the pick-up roller rotation, the feed roller rotation and the weight lowering are also performed at the same time.
- Aligning roller rotation
- Transport belt rotation CW ---

  At the time of the transport belt rotation CW, the aligning roller rotation, the exit roller rotation and the weight rising are also performed at the same time.
- Transport belt rotation CCW (for the MR-3006 only)

13.26 How to Attach Magnetic Catches

Place the belt unit on the glass face, and make magnetic catches adsorb to the magnetic plate in the state where the spacers L, R and glass are in contact, and then secure the belt unit with fixing screws.
Rising of each spacer to the glass face shall be 0.5 mm or less.

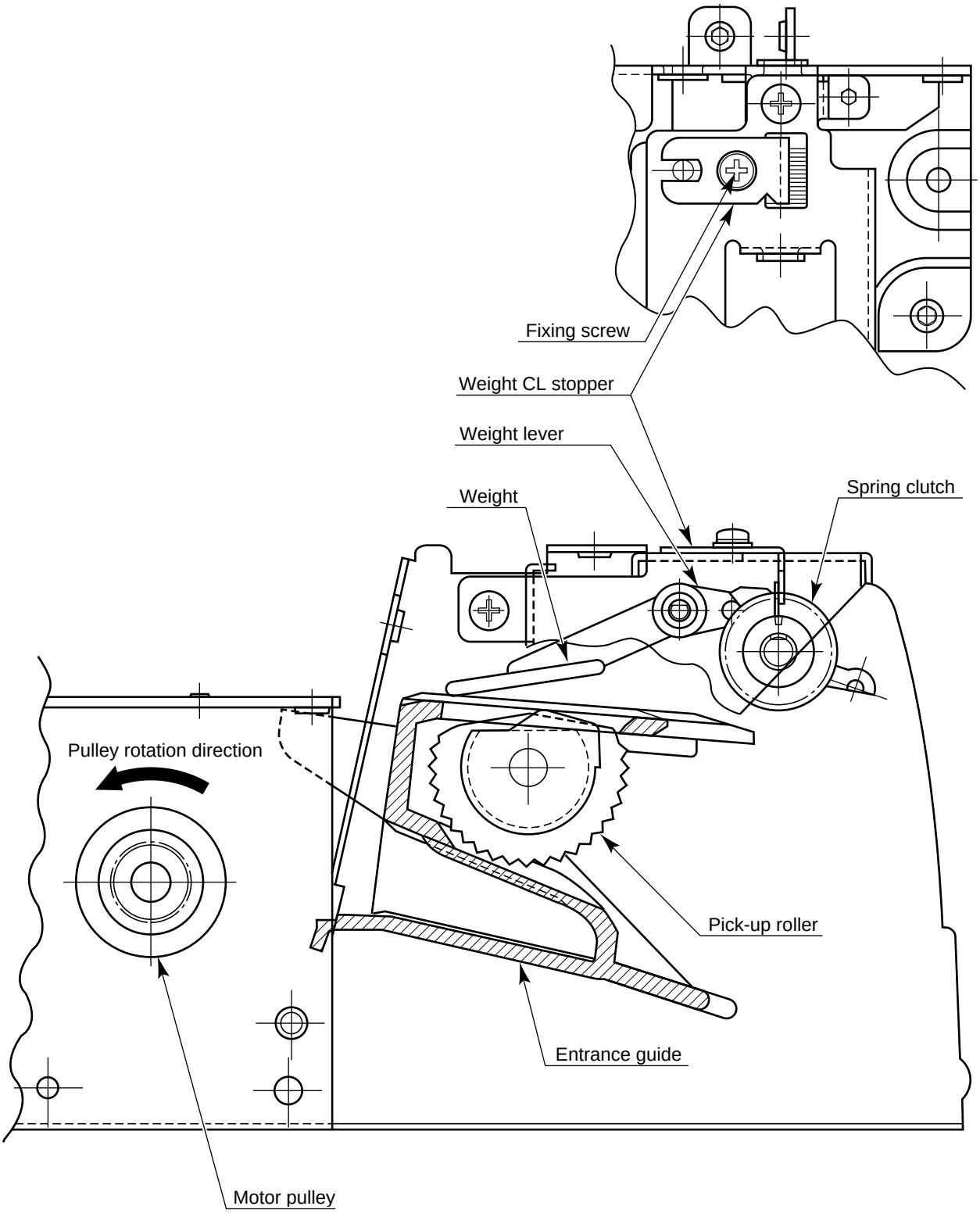


13.27 Adjustment of the Weight CL Stopper

Turn the motor pulley by hand in a counterclockwise direction as seen from the rear, and stop it in the position where the weight contacts with the entrance guide.

At that time, move the weight CL stopper to the position where the stopper contacts on the right side of the raised portion of the spring clutch, and then tighten the fixing screw.

Mark with a paint marker etc. after adjustment.



13.28 Adjustment of the Height of the Hinge

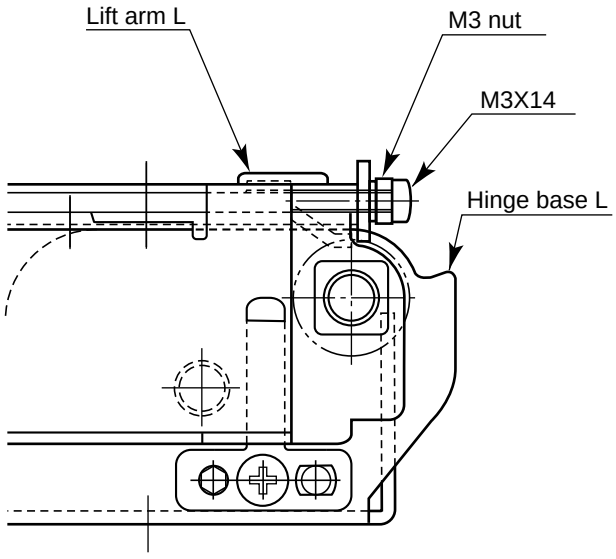
Use the hinge to adjust the gap between the glass face and the rear side spacers L, R.

As a standard of height adjustment of the hinge, the gap between the glass face and spacer becomes narrow about 0.3 mm per one screw (M3 x 14) revolution (counterclockwise).

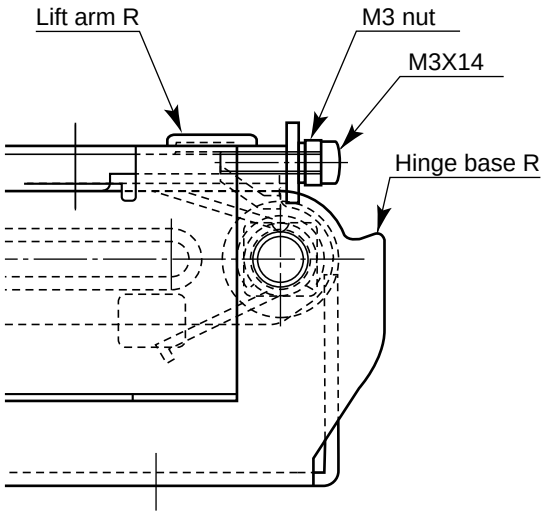
There should be a 0 ~ 0.5 mm clearance between the glass face and the spacer.

Adjust the hinges L and R in the same way.

Lastly, fix the screw with the M3 nut.



Hinge L

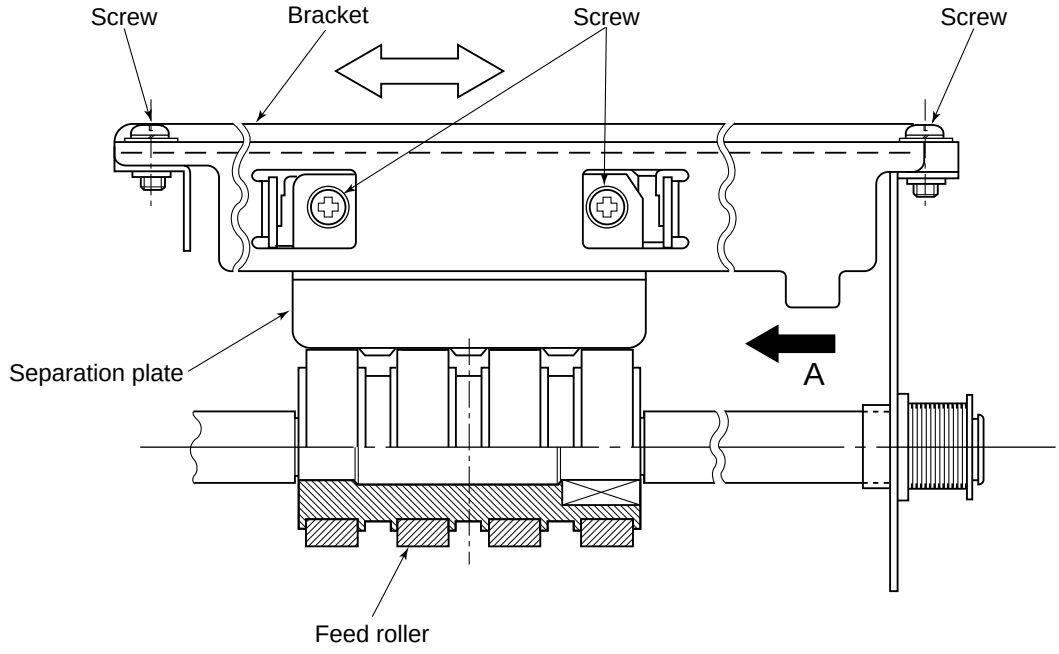


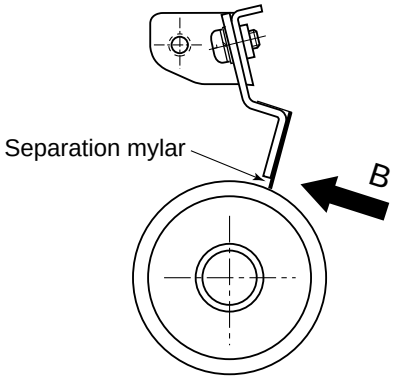
Hinge R

13.29 Adjustment of the Separation Area

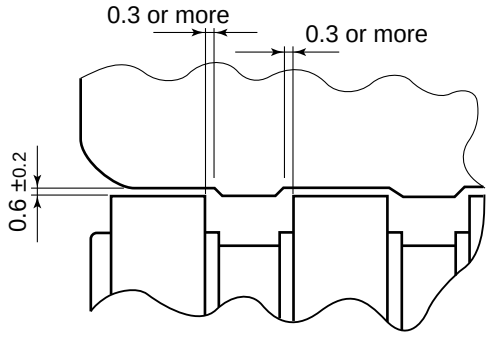
When the separation plate is attached using the thickness gage, there should be a 0.6±0.2mm clearance between the separation mylar and the rubber of the feed roller (the difference by the side of the front and rear is 0.2mm or less).

Adjust the gap between the separation mylar and the feed roller in the thrust direction by sliding the bracket to right and left so that the gap becomes 0.3mm or more (see the view from B).





View from "A"

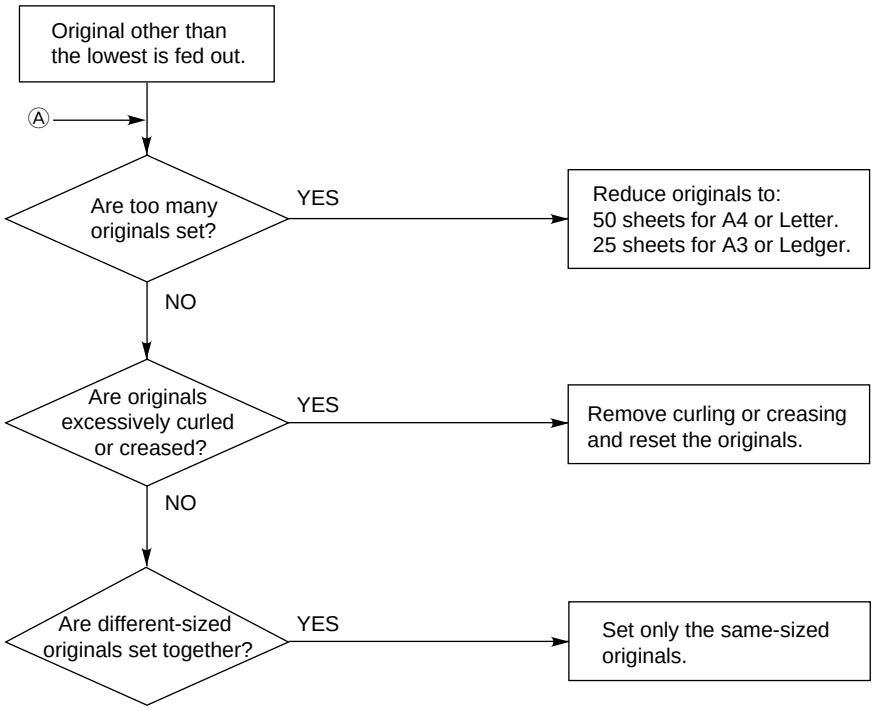


View from "B"(detailed drawing)

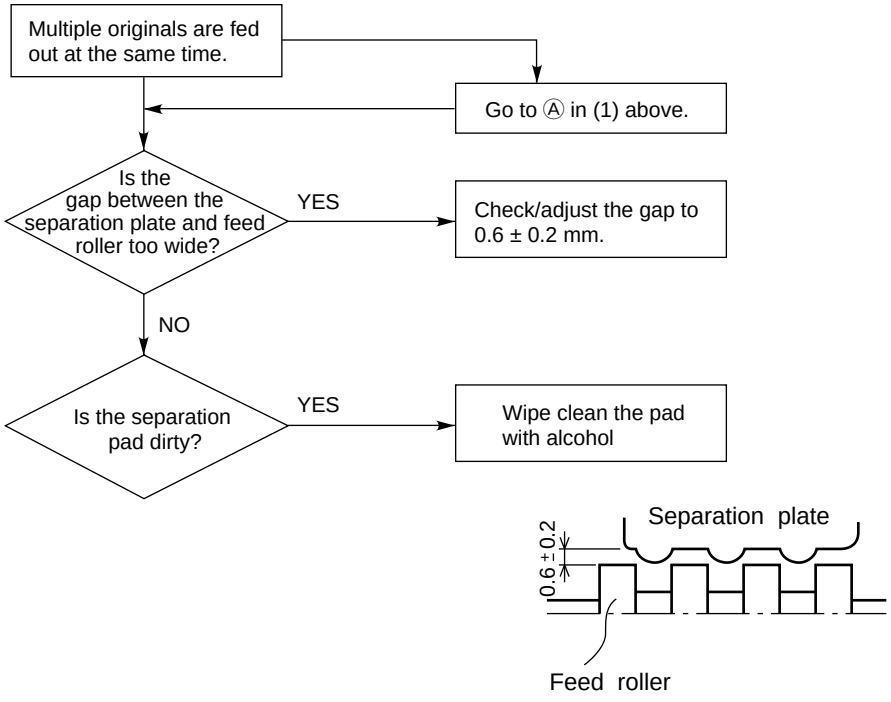
14. TROUBLESHOOTING OF THE RADF

14.1 Mechanical Troubleshooting

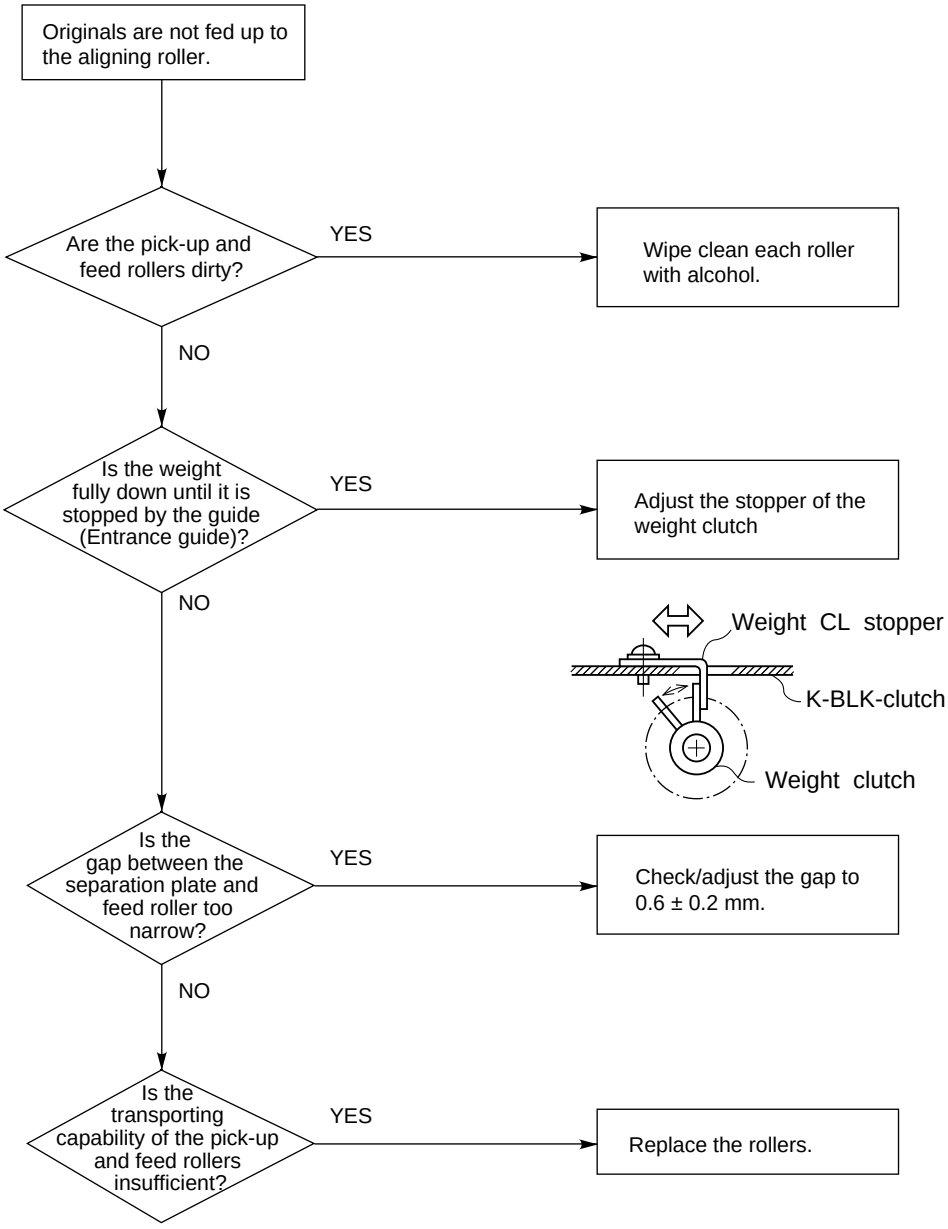
(1)



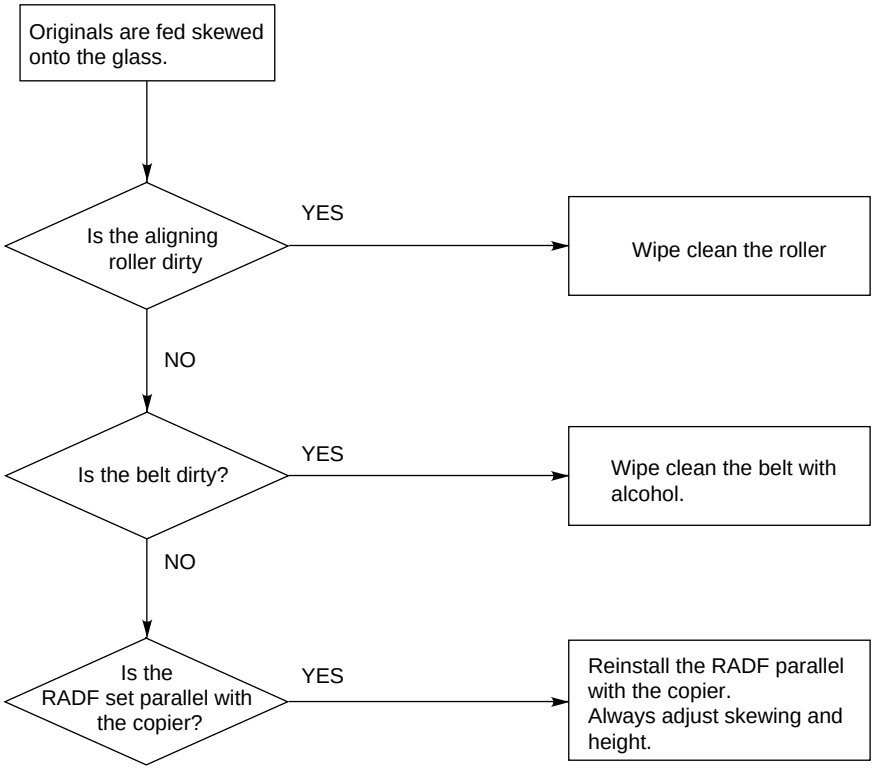
(2)



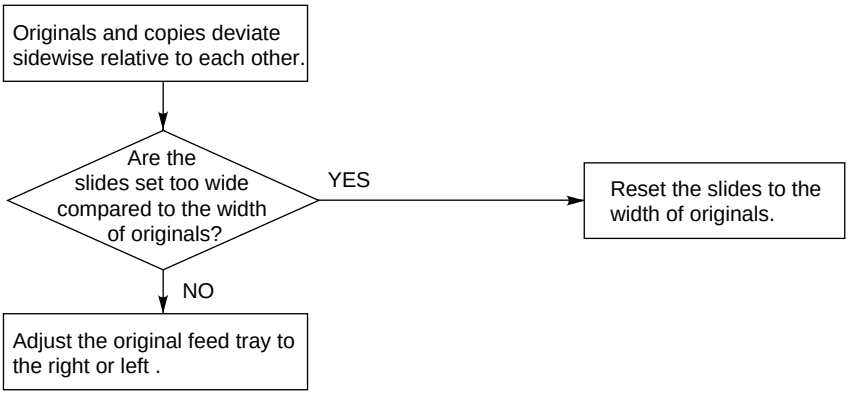
(3)


Originals are not fed up to the aligning roller.
Are the pick-up and feed rollers dirty?
YES
Wipe clean each roller with alcohol.
NO
Is the weight fully down until it is stopped by the guide (Entrance guide)?
YES
Adjust the stopper of the weight clutch
NO
Weight CL stopper
K-BLK-clutch
Weight clutch
Is the gap between the separation plate and feed roller too narrow?
YES
Check/adjust the gap to 0.6 ± 0.2 mm.
NO
Is the transporting capability of the pick-up and feed rollers insufficient?
YES
Replace the rollers.

(4)

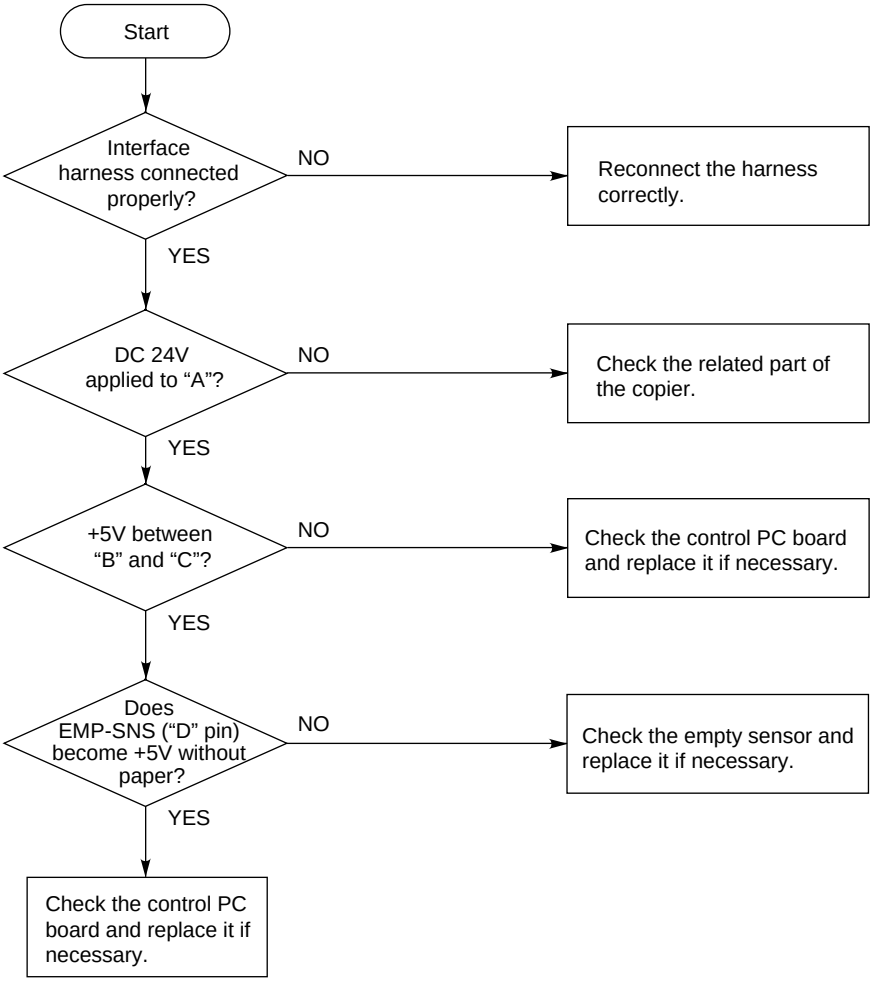

Originals are fed skewed onto the glass.
Is the aligning roller dirty
YES
Wipe clean the roller
NO
Is the belt dirty?
YES
Wipe clean the belt with alcohol.
NO
Is the RADF set parallel with the copier?
YES
Reinstall the RADF parallel with the copier.
Always adjust skewing and height.

(5)


Originals and copies deviate sidewise relative to each other.
Are the slides set too wide compared to the width of originals?
YES
Reset the slides to the width of originals.
NO
Adjust the original feed tray to the right or left .

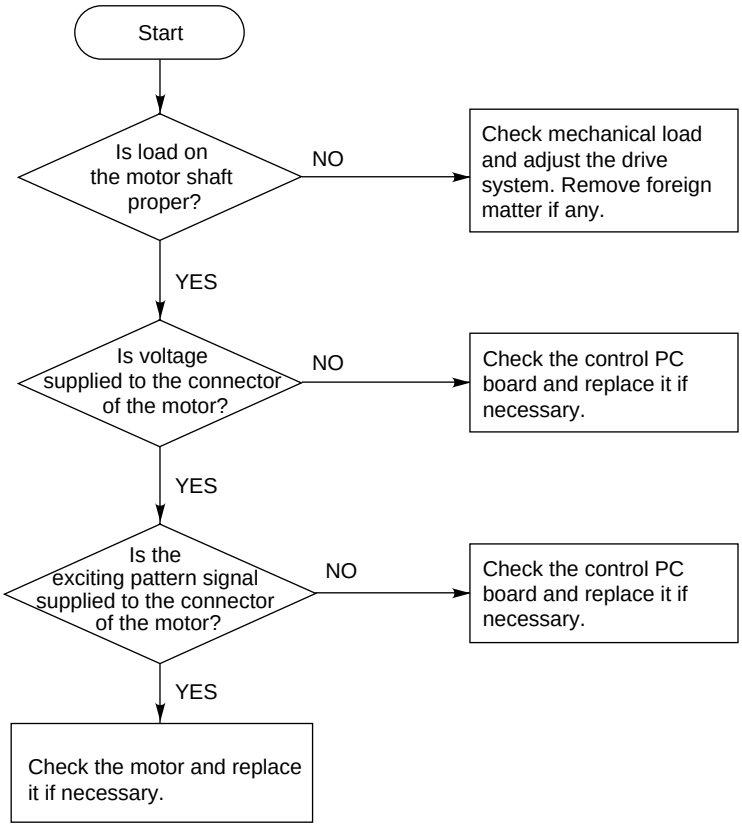
14.2 Electrical Troubleshooting

(1) The ADF does not operate (excluding when the jam access and ADF covers are open).

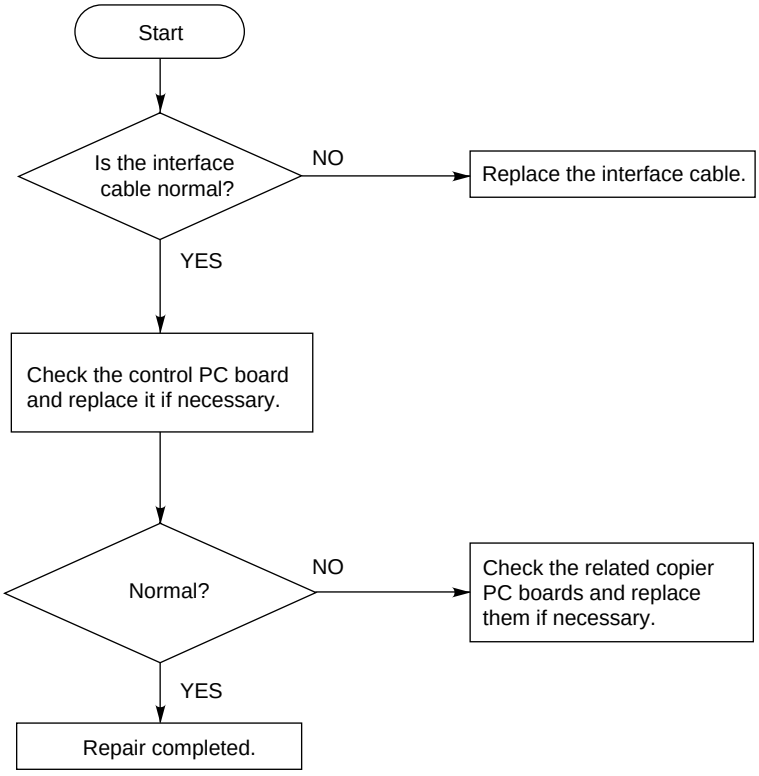


	“A”	“B”	“C”	“D”
MR-3006	CN5	TP(+5V)	TP(SG)	CN9-3
MR-2008	CN3	TP34	TP32	CN8-3

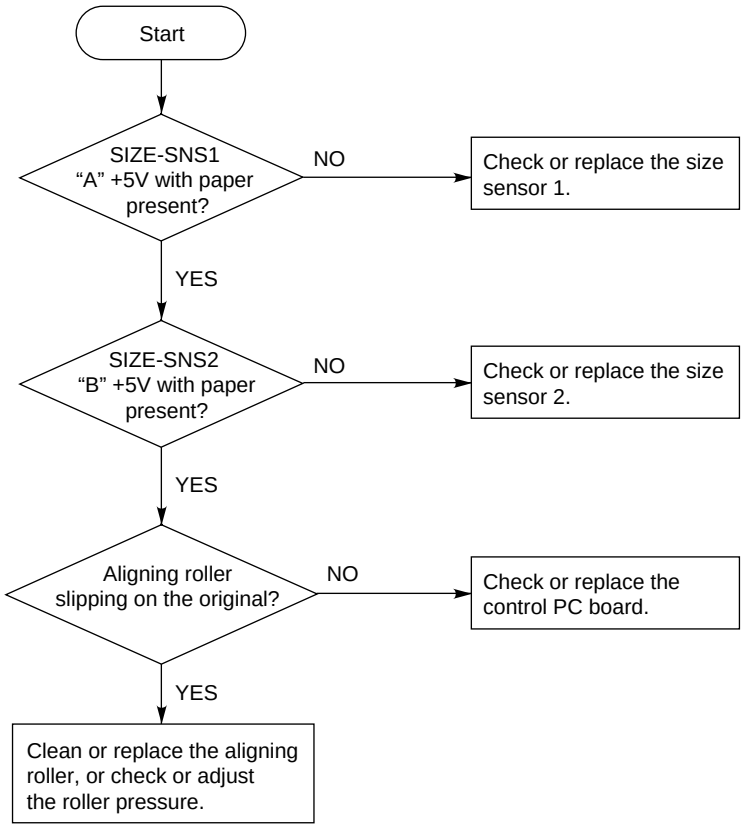
(2) Motor fault



(3) Communication error

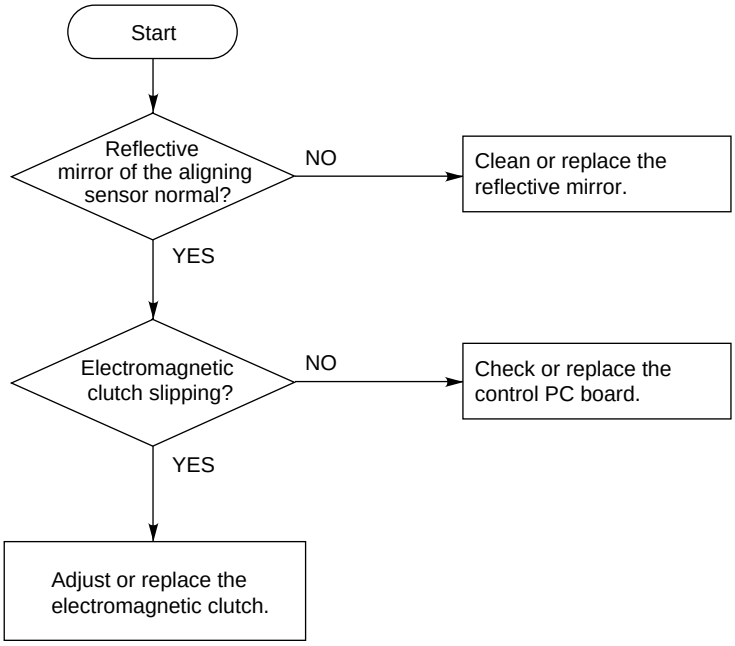


(4) Size detection failure

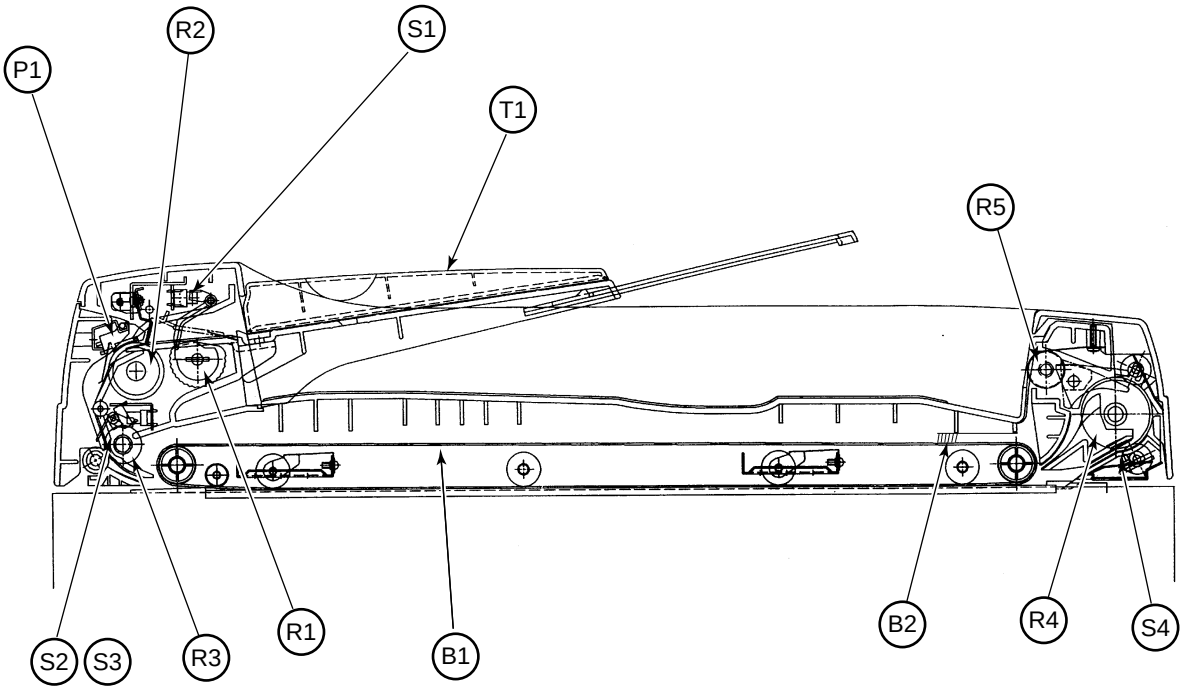


	"A"	"B"
MR-3006	CN14-6	CN14-9
MR-2008	CN7-6	CN7-9

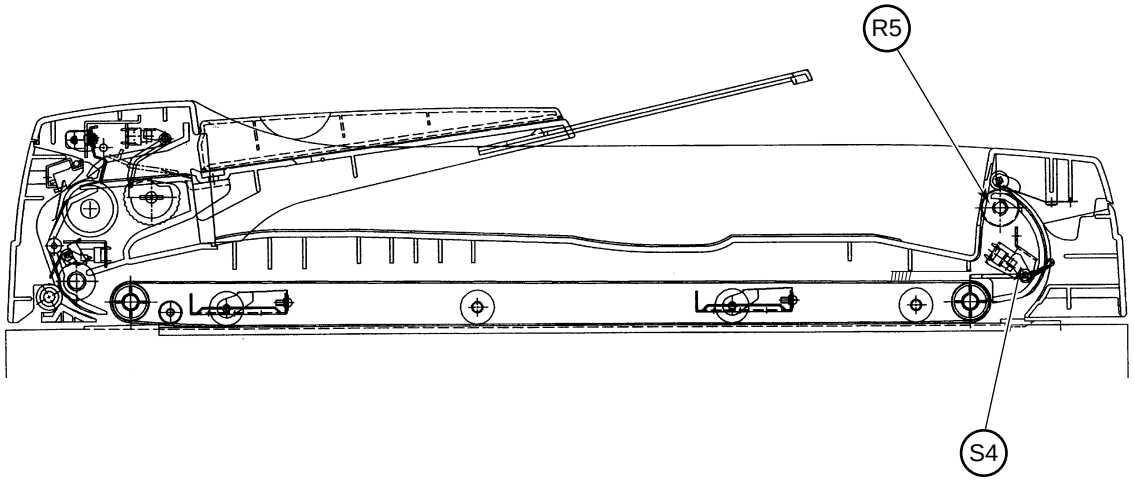
(5) Original's pre-feed stop position failure



14.3 Periodic Maintenance



MR-3006



MR-2008

	Parts to check	450K	150K	*Page, item No.
(R1)	Pick-up roller		C1	P1, I40
(R2)	Feed roller		C1	P1, I38
(R3)	Aligning roller		C1	P1, I41
(R4)	Reversing roller		C1	P3, I12
(R5)	Exit roller		C1	P3, I14. P4, I11
(P1)	Separation pad	Replace	C1	P1, I32
(B1)	Transport belt		C1	P5, I24
(B2)	Brush		C2	P7, I1
(S1)	Empty sensor		C3	P1, I9
(S2)	Size sensor		C3	P1, I9
(S3)	Aligning sensor		C3	P1, I12
(S4)	Exit sensor		C3	P3, I10. P4, I9

Notes: K=1,000 copies

C1: Cleaning (Isopropylalcohol)

C2: Cleaning (Cloth)

C3: Cleaning (Cotton swap)

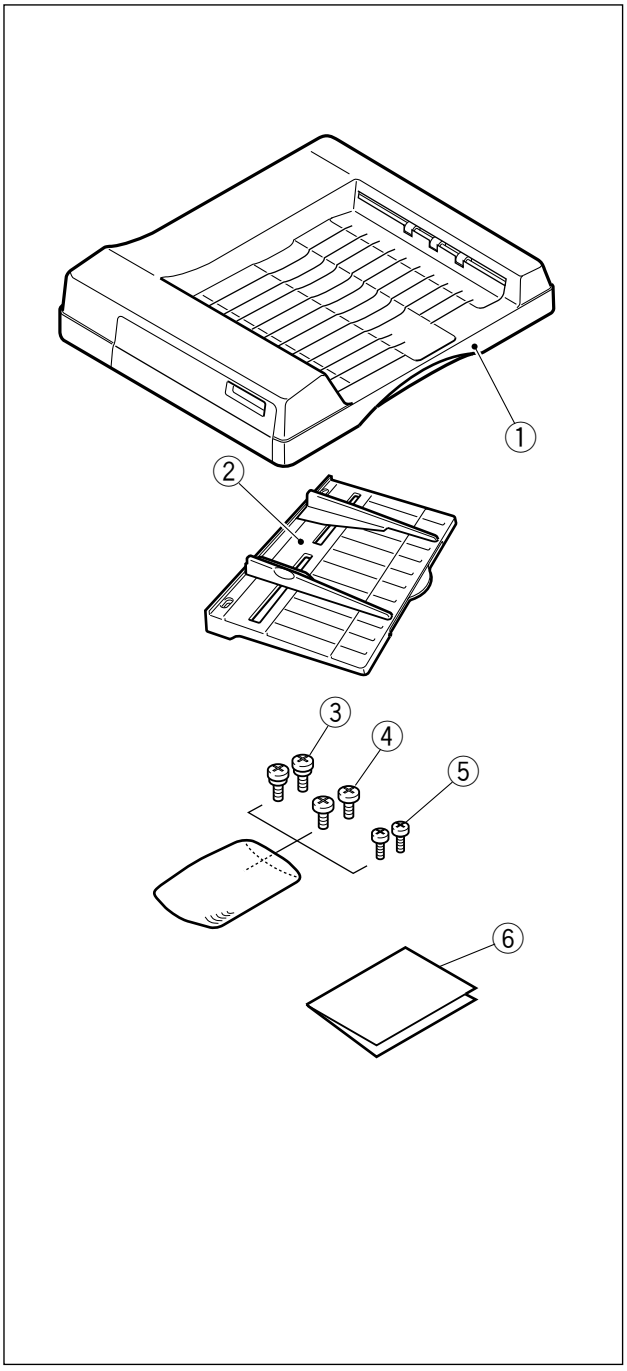
*Refer to SERVICE PARTS LIST MR-3006/2008.

15. UNPACKING AND SETUP ADJUSTMENT

A. Unpacking

Open the carton and take out the accessory package and other packing materials.
The following parts are included in the accessory package:

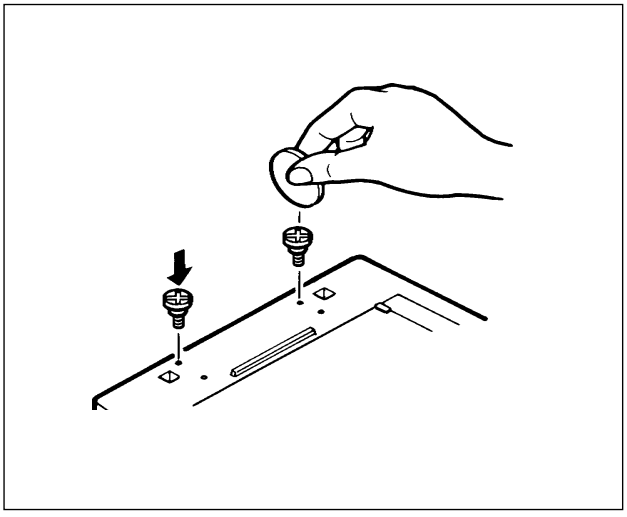
① Automatic document feeder ..... 1 pc.
② Original feed tray ..... 1 pc.
③ Hinges ..... 2 pcs.
④ Screws for fastening the hinges (M4×10) ..... 2 pcs.
⑤ Screws for fastening the original feed tray(M4×8) ..... 2 pcs.
⑥ Setup instruction ..... 1 pc.



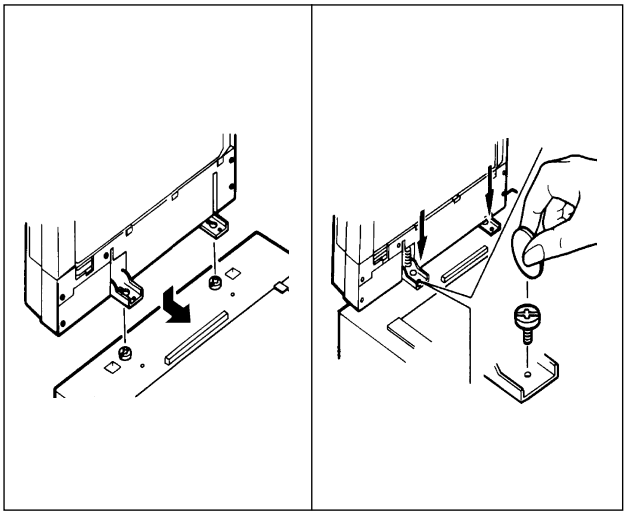
B. Setup Procedure

Note: Be sure to turn off and unplug the copier.

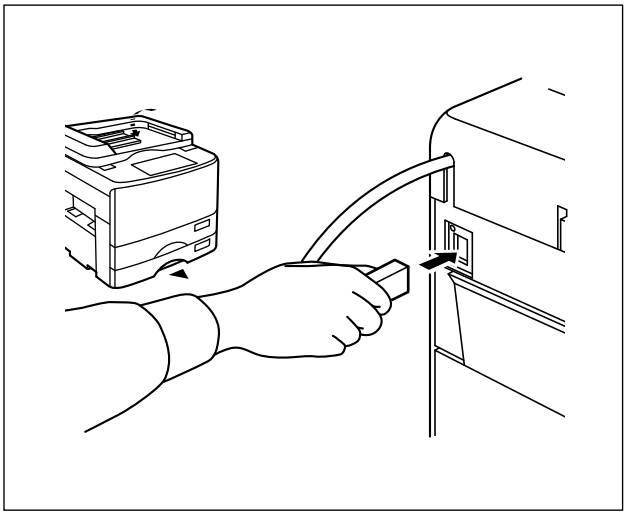
1. Install the two hinge screws supplied in the holes on the rear side of the top cover.



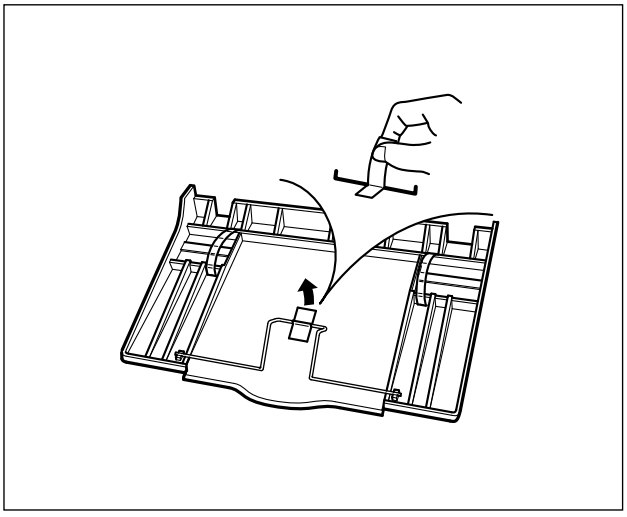
2. Holding the ADF and aligning the holes in the ADF bracket with the two hinges, place the ADF slowly onto the top cover. Then move the ADF forward (toward the front) and fasten it with the two screws (M4×10) supplied.



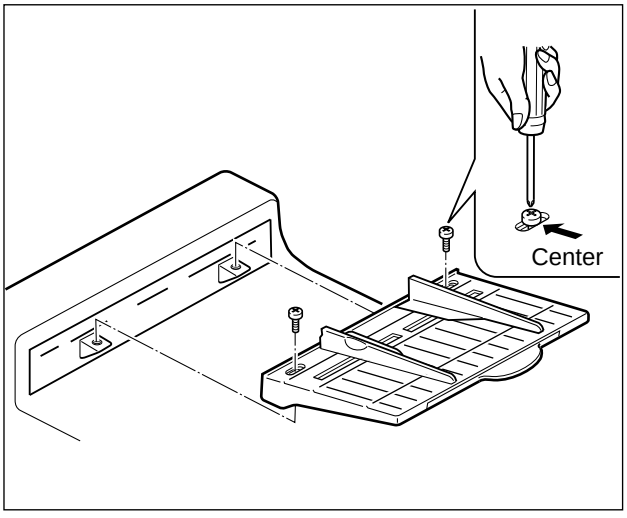
3. Connect the ADF's connector to the connector section marked "ADF".



4. Remove the tape holding the original exit aligning bar on the reverse side of the original feed tray.



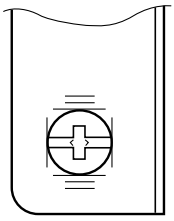
5. Install the original feed tray to the ADF with the screws for fastening the original feed tray and move it so that the screws are in the center of the tray holes, then tighten the screws temporarily.



6. Adjustment of skew (image inclination)

(1) Please confirm the installation as shown (RIGHT HINGE).

Note: Install the screw on the center of scale.



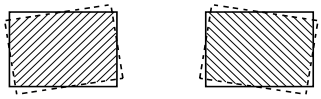
RIGHT HINGE

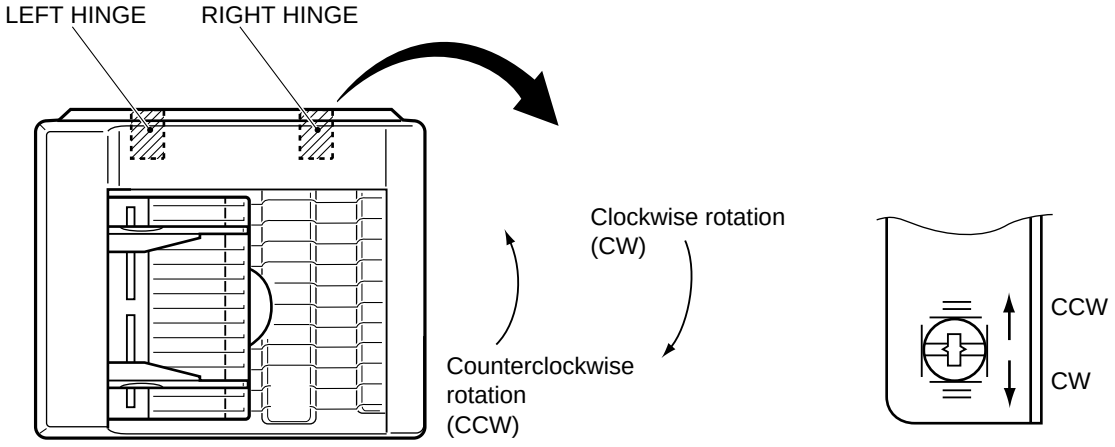
(2) Place the test original face up in the tray, press PRINT to make a copy.
Check that the copy isn't skew.

(3) If not, loosen the two screws on hinges and adjust the position of RIGHT HINGE. Repeat the procedure until the copy isn't skew.

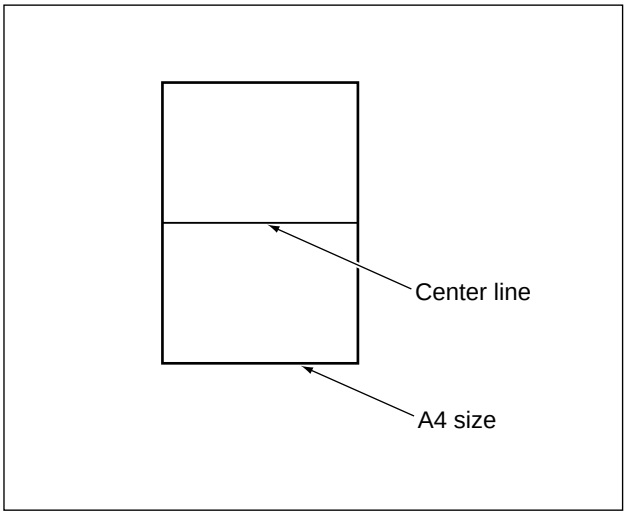
Note: After the adjustment, tighten the two screws of LEFT and RIGHT HINGE without fail.

Image Inclination

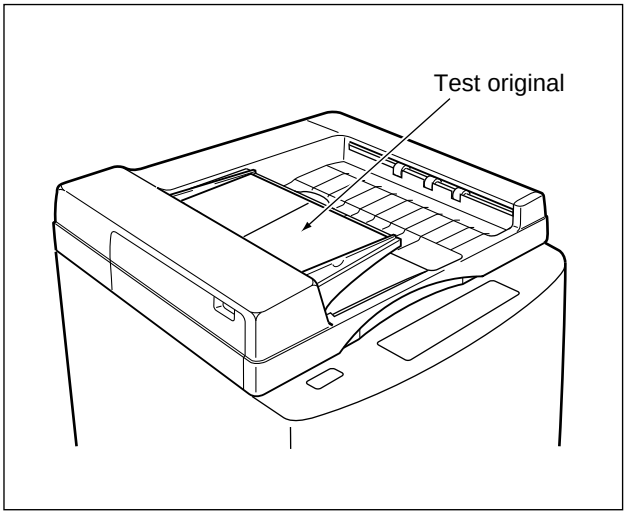




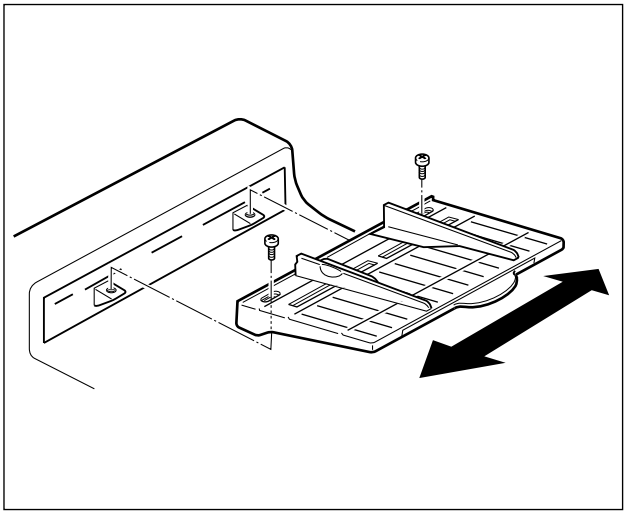
7. Make a test original as shown: First draw a center line on an A4 sized copy paper.



8. Place the test original on the original feed tray with the center line side facing upward and align the side guides to the sides of the original.



9. Press the PRINT key to make a copy. Fold the copy in half and check that the center line is in the center of the copy: If it is not, adjust the original feed tray until the center line is copied in the center. After adjustment, tighten the two screws securely to fasten the original feed tray.



C. Leading-edge Position Adjustment for ADF

If the original fed from the ADF has not stopped in the preset position, make adjustment using the following procedure:

1. While pressing the “0” and “5” keys on the copier’s control panel simultaneously, turn on the power switch.
2. After confirming that “AJ” is shown on the display, key in “8” and “4” and press the PRINT key.
3. To make the original stop at a position nearer to the feed side of the ADF, key in a number smaller than the one shown now and press the INTERRUPT key. If you want to stop the original at a position nearer to the exit side of the ADF, key in a number larger than the one shown now and press the INTERRUPT key.
   1 step: Approx. 1 mm adjustable Allowable input values: 0 ~ 15
4. With an original set on the original feed tray, if you press the ENERGY SAVER key, an original is fed in and copied.
5. After adjustment is completed, press the “0” and “9” keys simultaneously to go into the normal copy mode.

D. Leading-edge Position Adjustment for ADF (at the Time of Reversing)

If the original fed from the ADF has not stopped in the preset position after reversing, make adjustment using the following procedure:

1. While pressing the “0” and “5” keys on the copier’s control panel simultaneously, turn on the power switch.
2. After confirming that “AJ” is shown on the display, key in “8” and “5” and press the PRINT key.
3. To make the original stop at a position nearer to the feed side of the ADF, key in a number smaller than the one shown now and press the INTERRUPT key. If you want to stop the original at a position nearer to the exit side of the ADF, key in a number larger than the one shown now and press the INTERRUPT key.
   1 step: Approx. 2 mm adjustable Allowable input values: 0 ~ 15
4. With an original set on the original feed tray, if you press the ENERGY SAVER key, an original is fed in and copied.
5. After adjustment is completed, press the “0” and “9” keys simultaneously to go into the normal copy mode.

E. Adjustment for Gap between Originals in 2 in 1 Mode

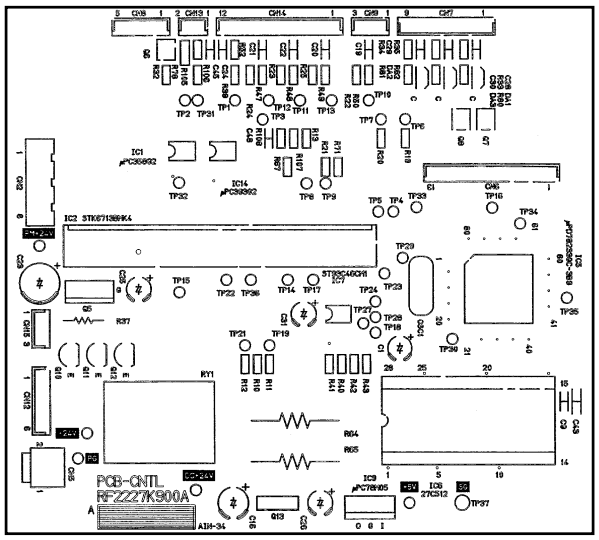
In the 2 in 1 mode, to adjust the gap between the two originals fed from the ADF, use the following procedure (adjustment procedure):

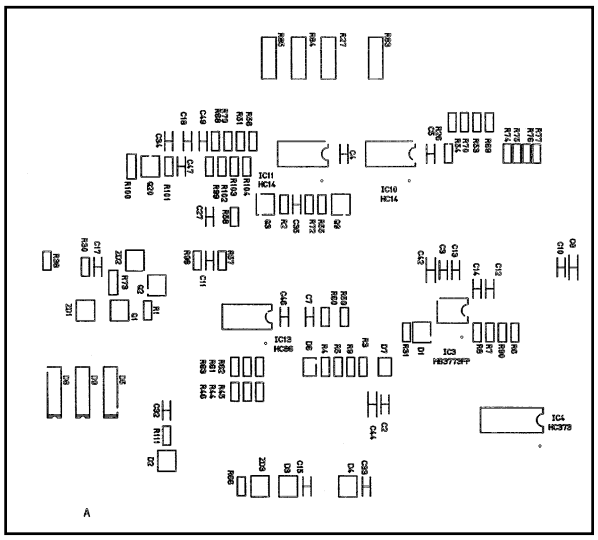
1. While pressing the “0” and “5” keys simultaneously, turn on the power switch.
2. After confirming that “AJ” is shown on the display, key in “8” and “7” and press the PRINT key.
3. To make the gap between the originals, key in a number smaller than the one shown now. If you want to increase the gap, key in a number larger than the one shown now. Then press the INTERRUPT key.
   1 step: Approx. 1 mm Allowable input value: 0 ~ 15
4. After setting an original on the original feed tray, if you press the ENERGY SAVER key, the original is fed in and copied.
5. After adjustment is completed, press the “0” and “9” keys simultaneously to go into the normal copy mode.

16. PC BOARD ASSEMBLIES

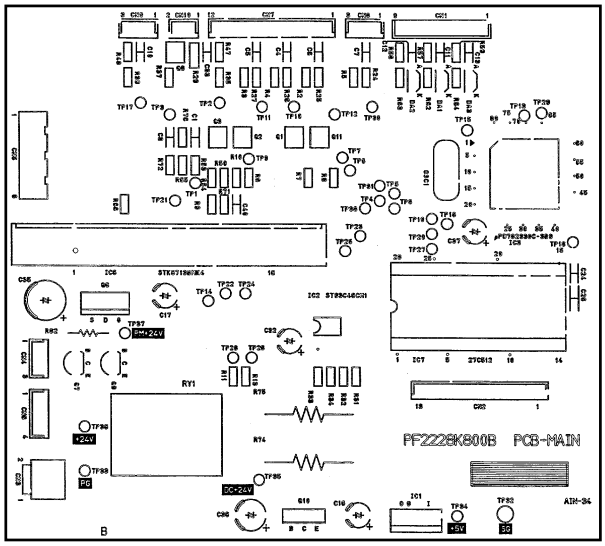
16.1 PWA-F-LGC (PWA-F-LGC-770: MR-3006/PWA-F-LGC-774: MR-2008)

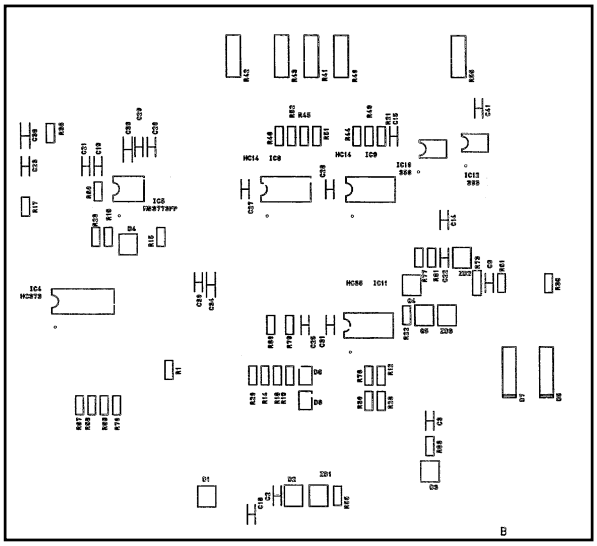
MR-3006



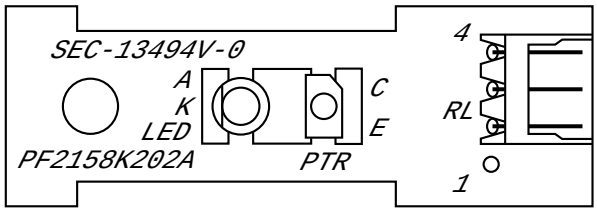


MR-2008

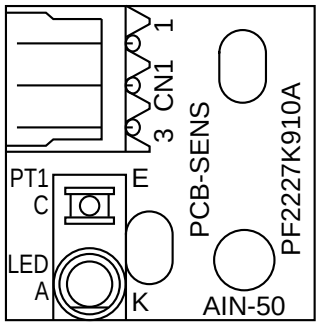




16.2 PWA-F-RGS-770

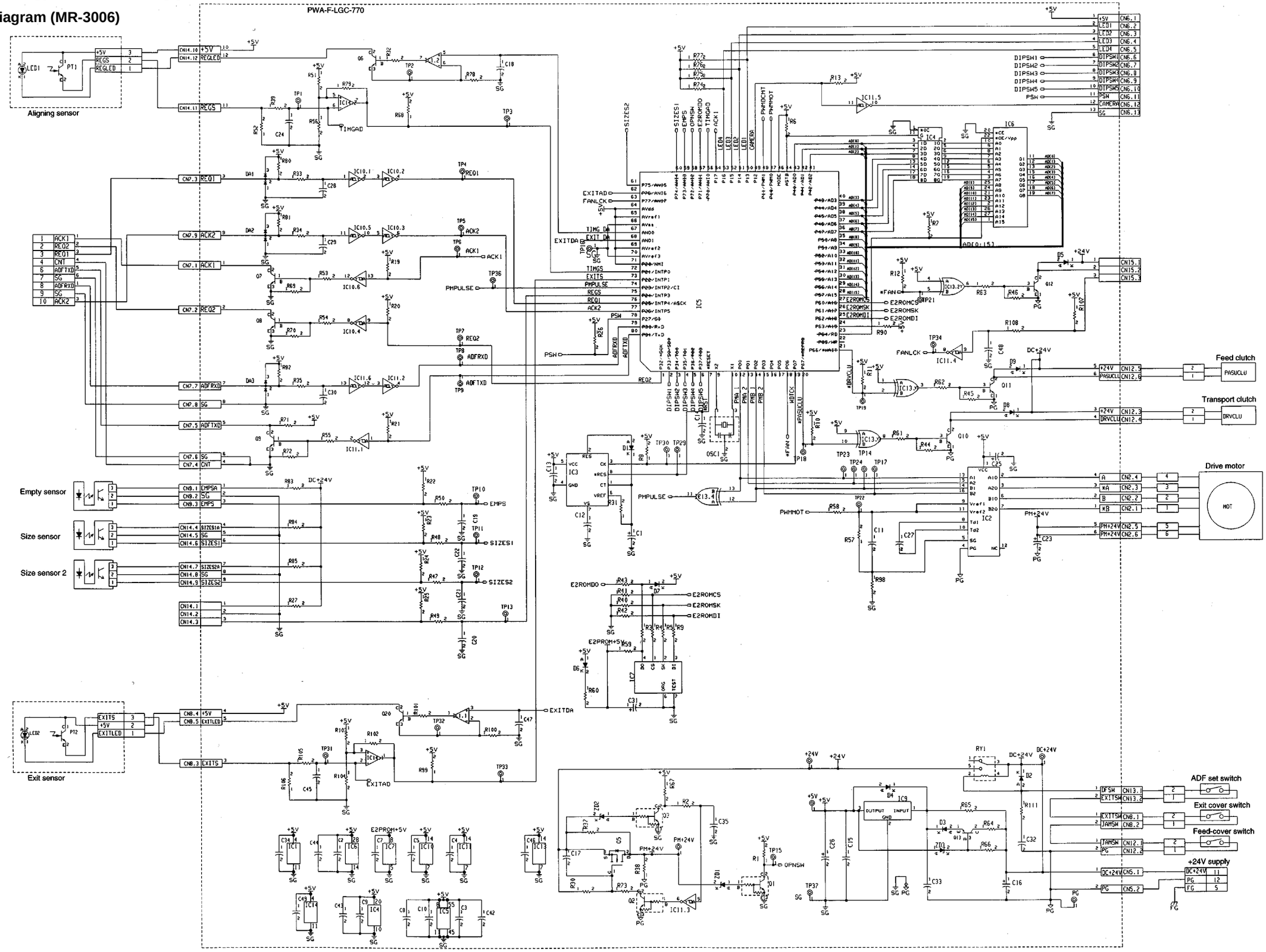


16.3 PWA-F-SEN-770 (MR-3006)

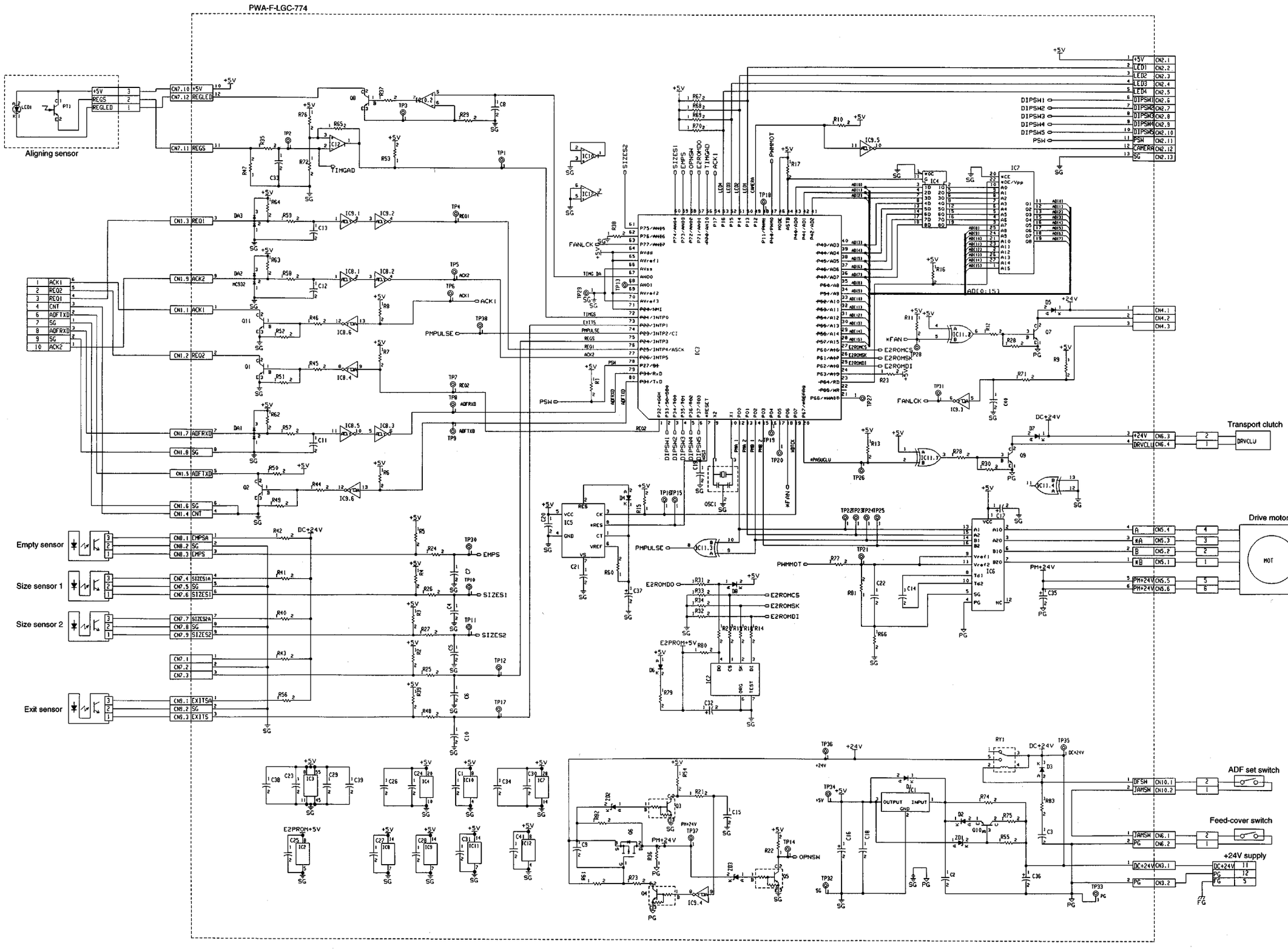


17. CIRCUIT DIAGRAMS/WIRE HARNESS

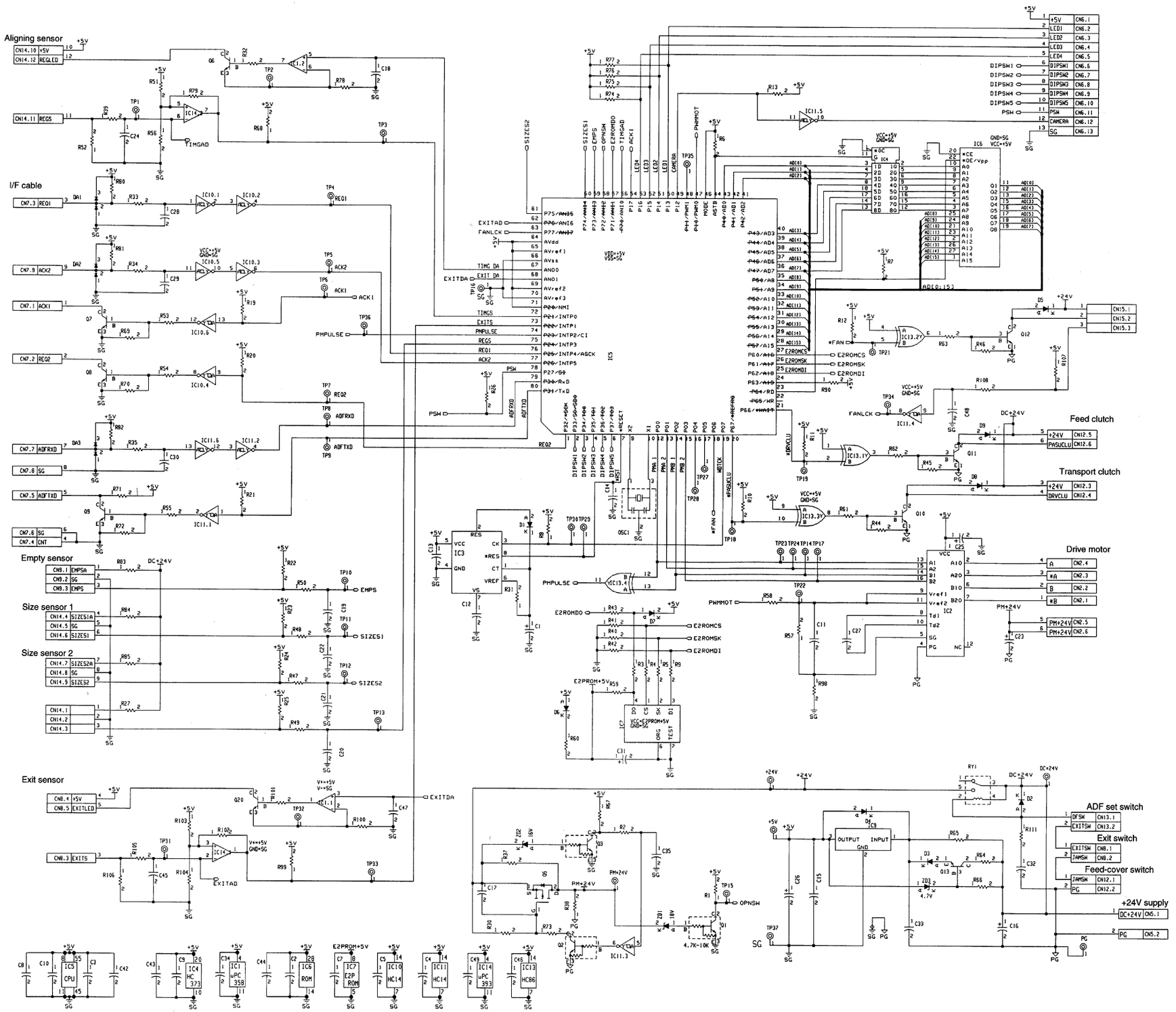
17.1 General Circuit Diagram (MR-3006)



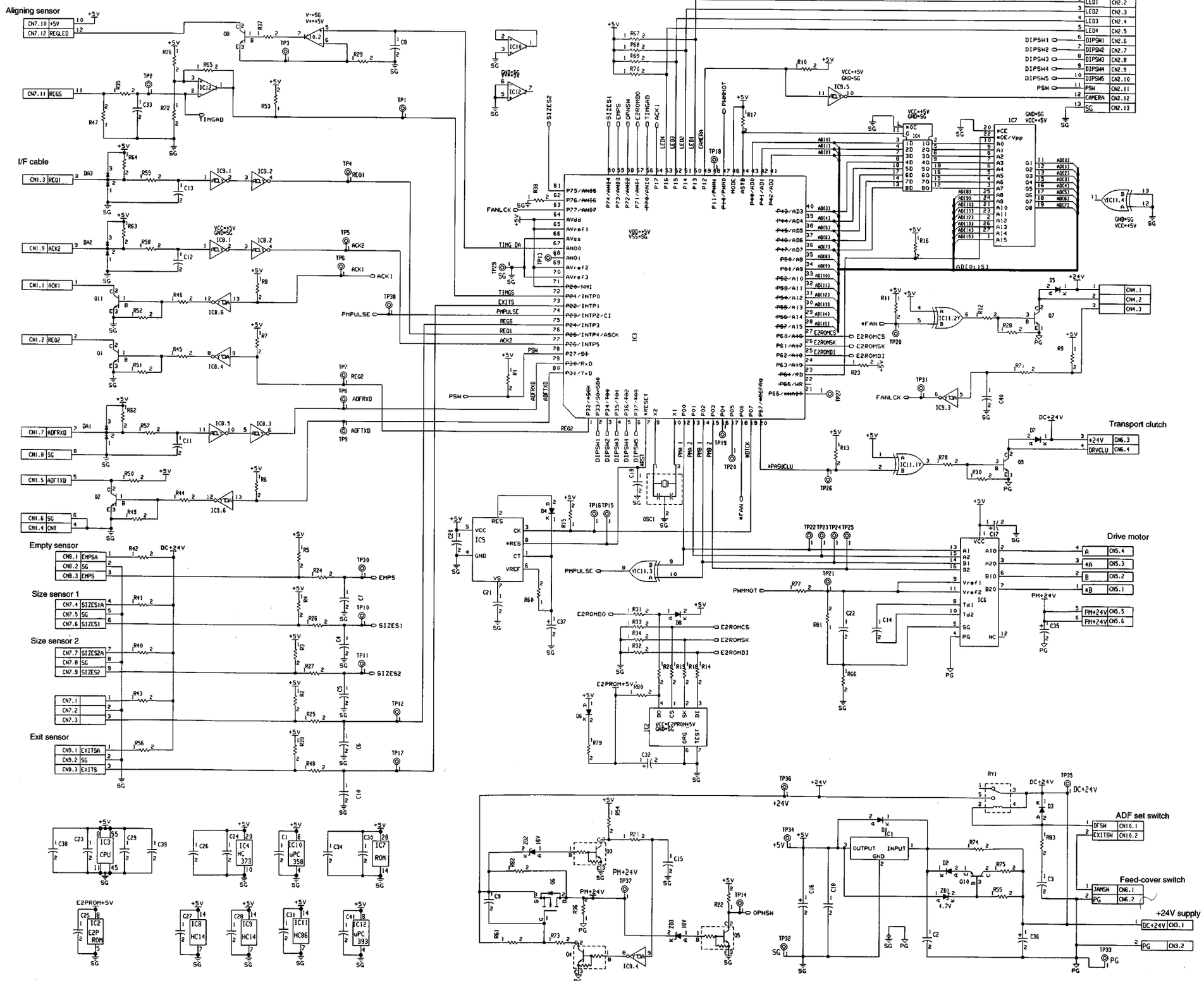
17.2 General Circuit Diagram (MR-2008)



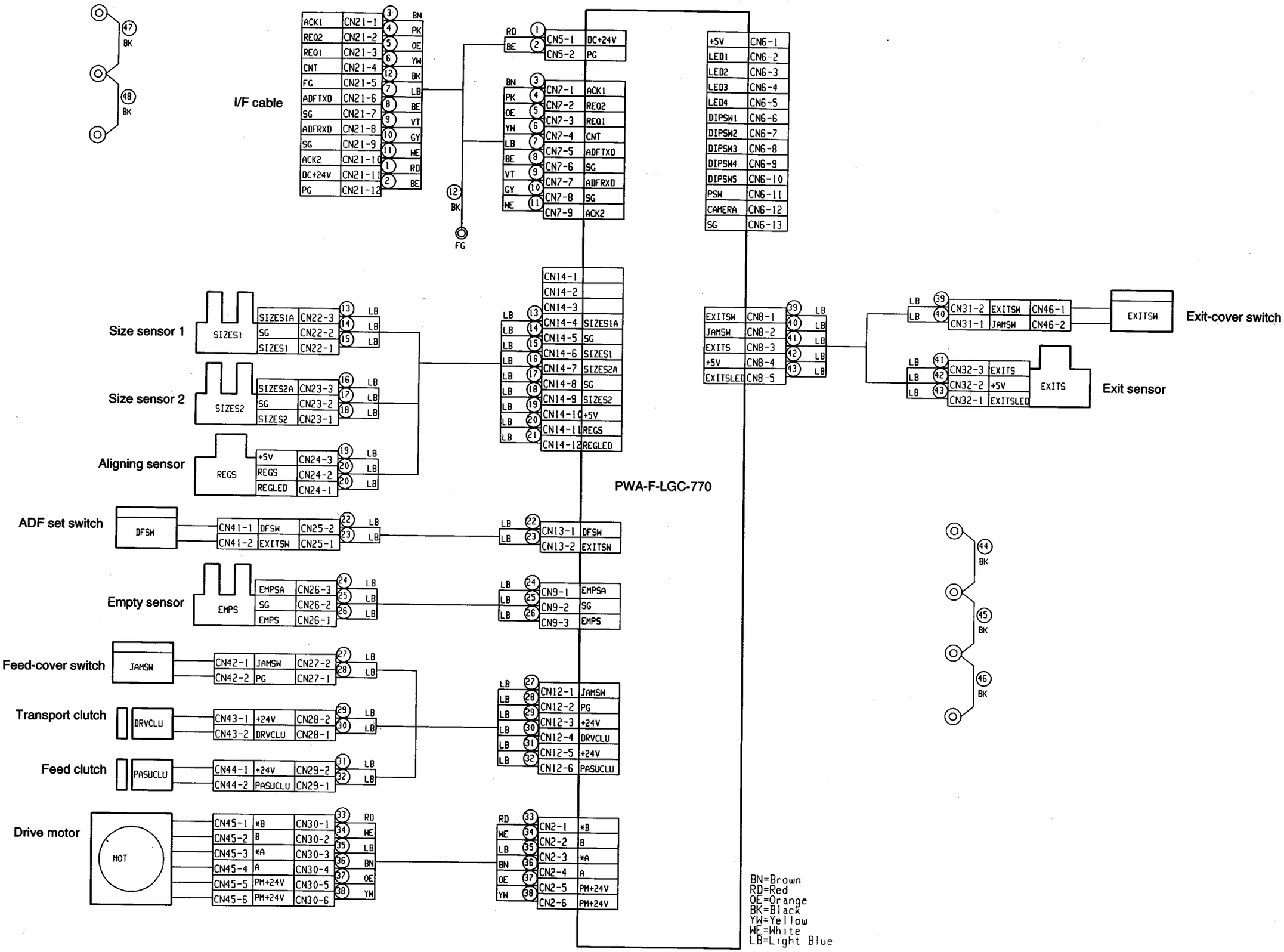
17.3 Control PC Board Circuit (PWA-F-LGC-770)...MR-3006



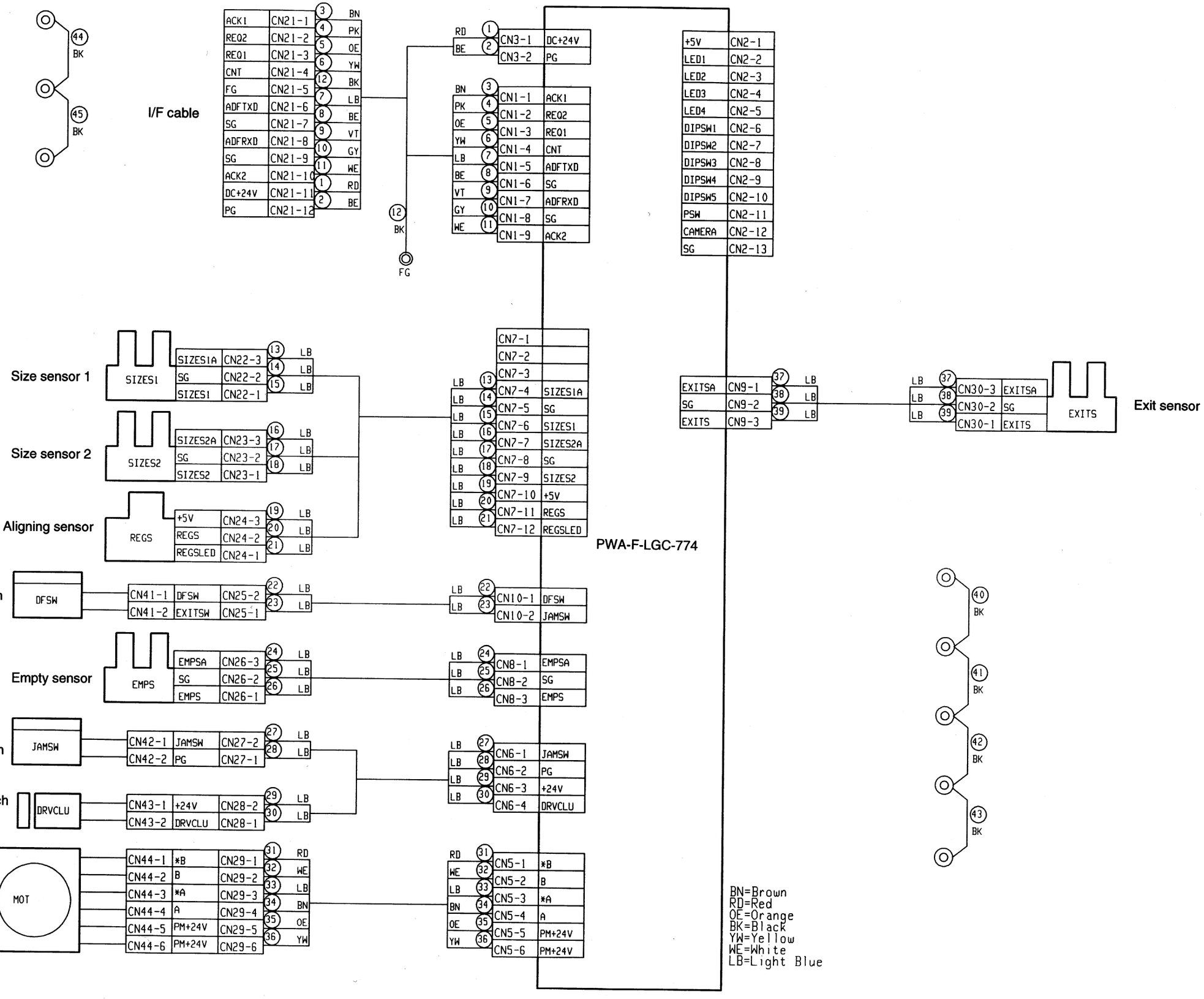
17.4 Control PC Board Circuit (PWA-F-LGC-774)...MR-2008



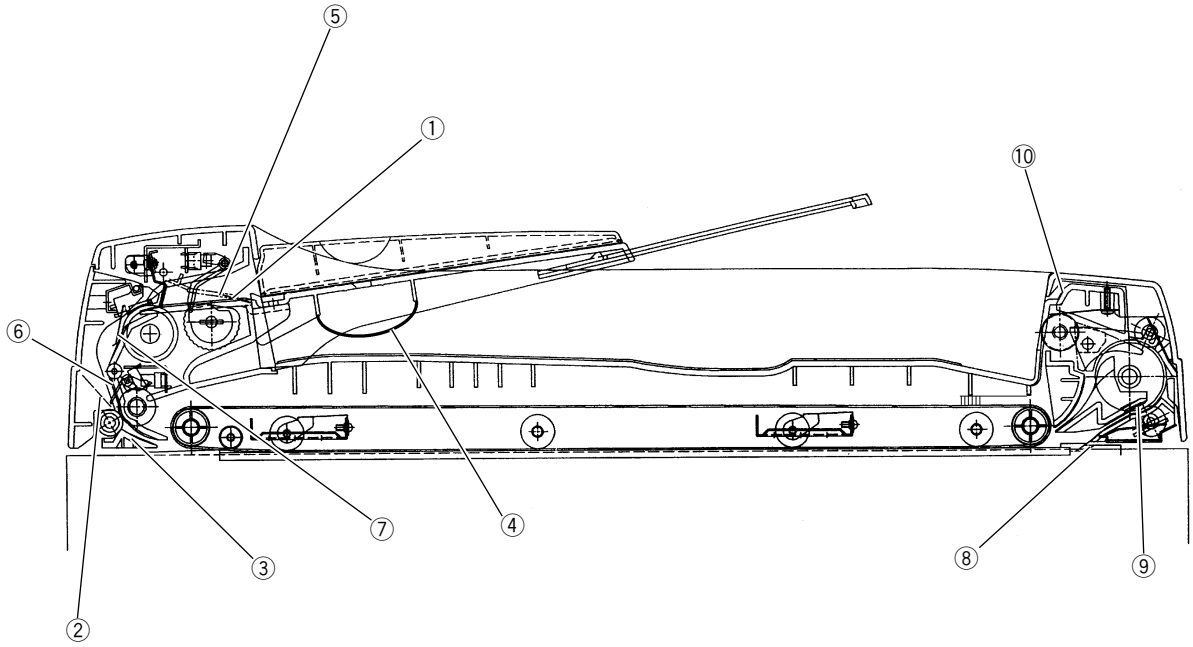
17.5 Harness Connection...MR-3006



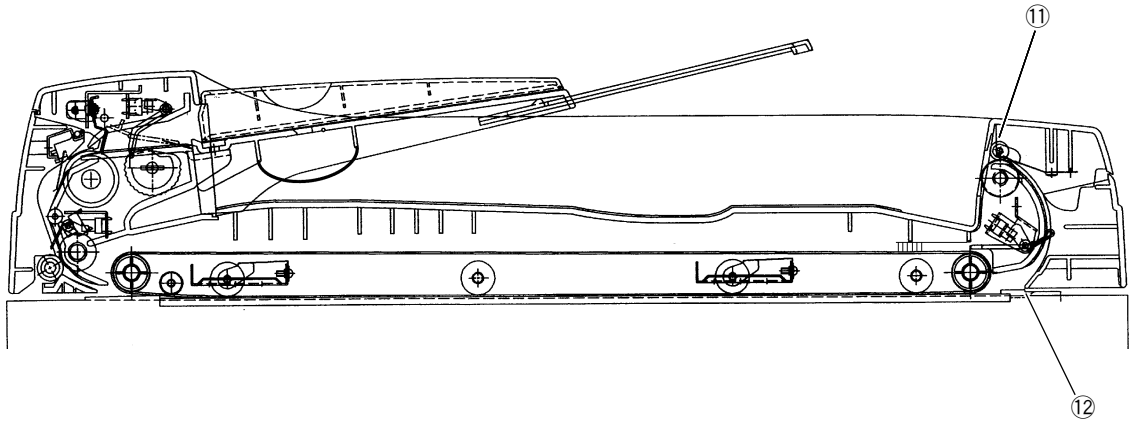
17.6 Harness Connection...MR-2008



18. AFFIXING POSITION FOR MYLAR SHEETS



MR-3006

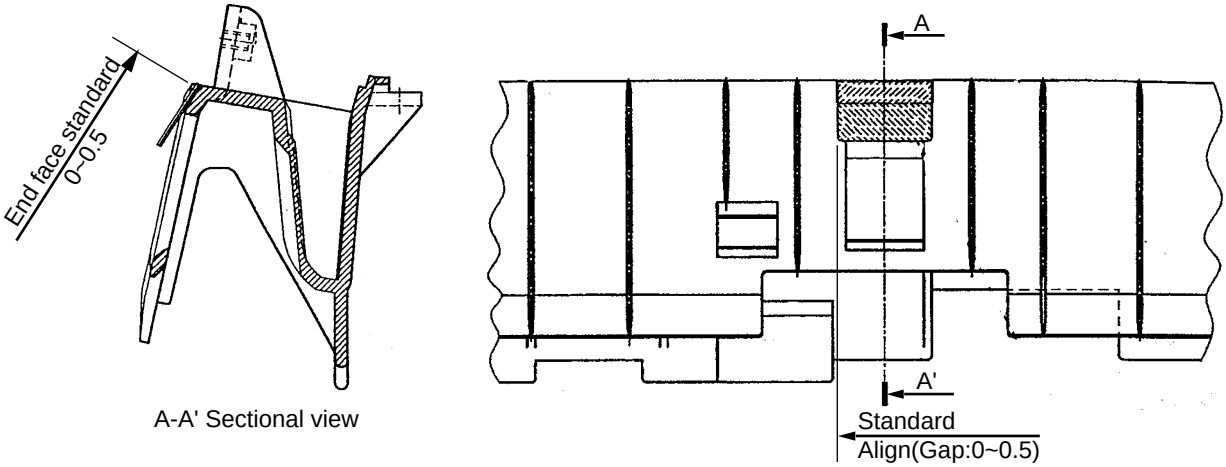


MR-2008

①~⑦ : MR-3006/MR-2008
⑧~⑩ : MR-3006
⑪, ⑫ : MR-2008

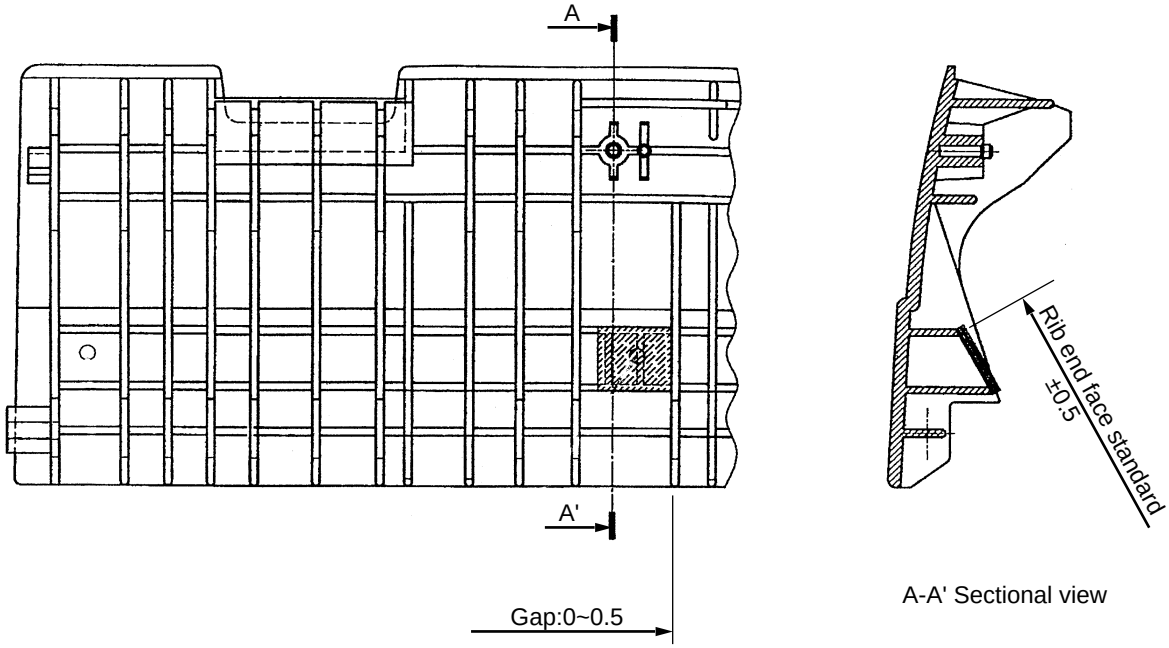
Note: Before affixing mylar sheets, clean the affixing surfaces.

① Jump mylar



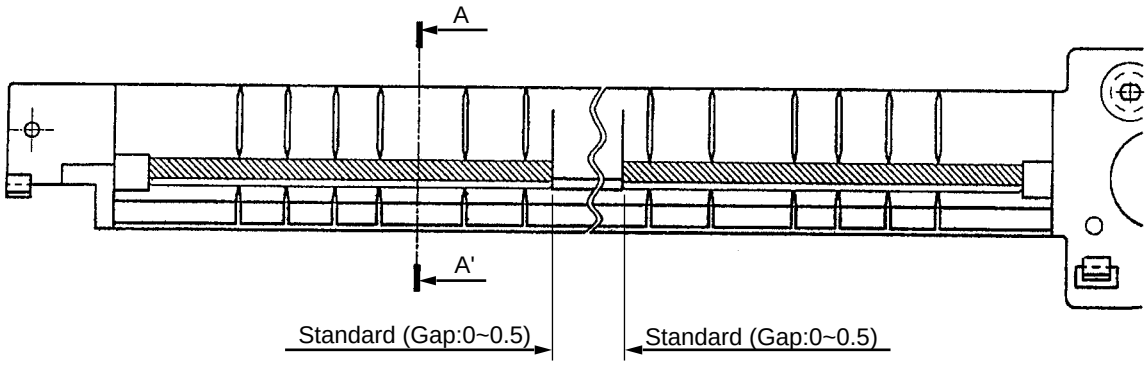
A-A' Sectional view

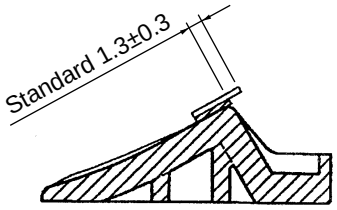
② Mirror sheel



A-A' Sectional view

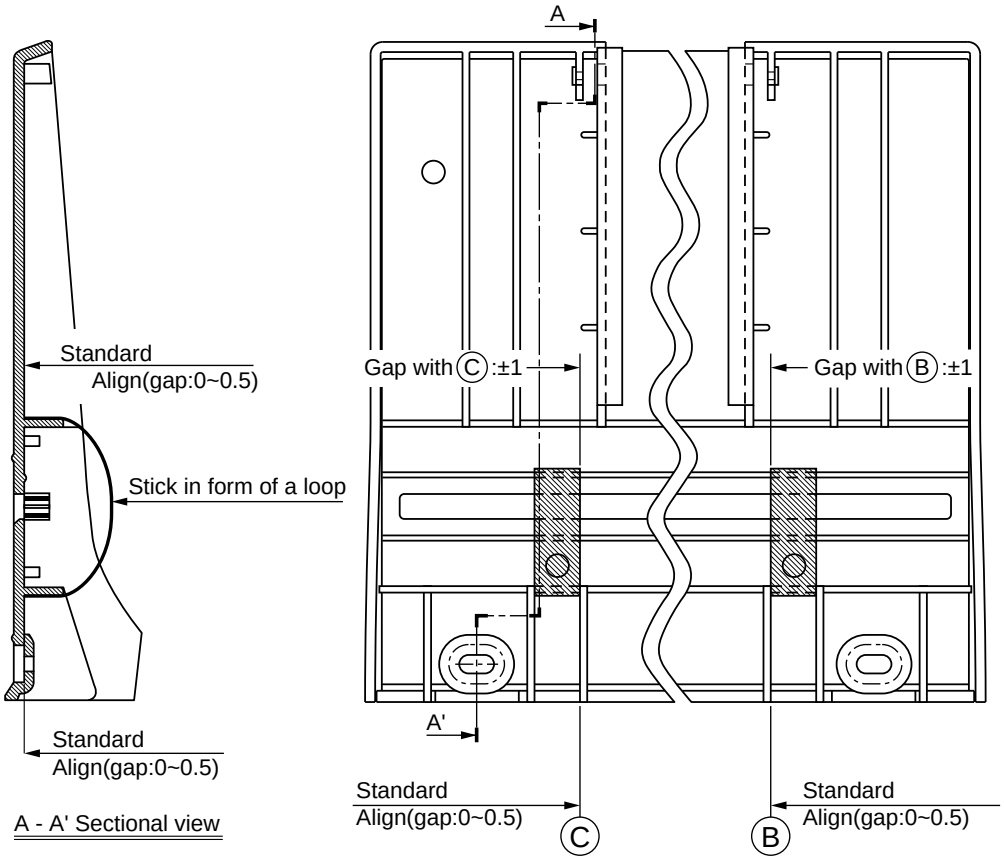
③ Guide mylar (1)



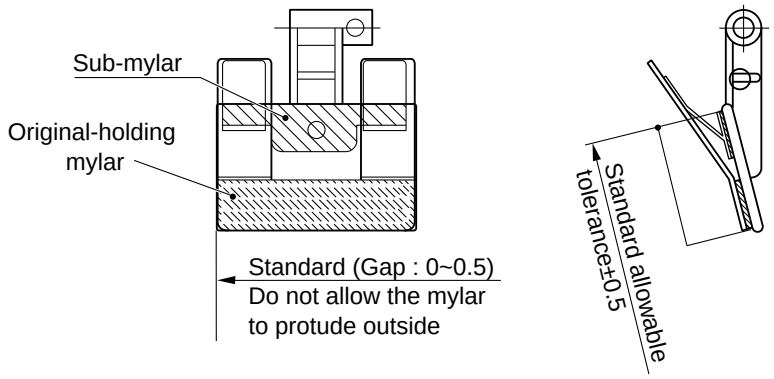


A-A' Sectional view (S=2/1)

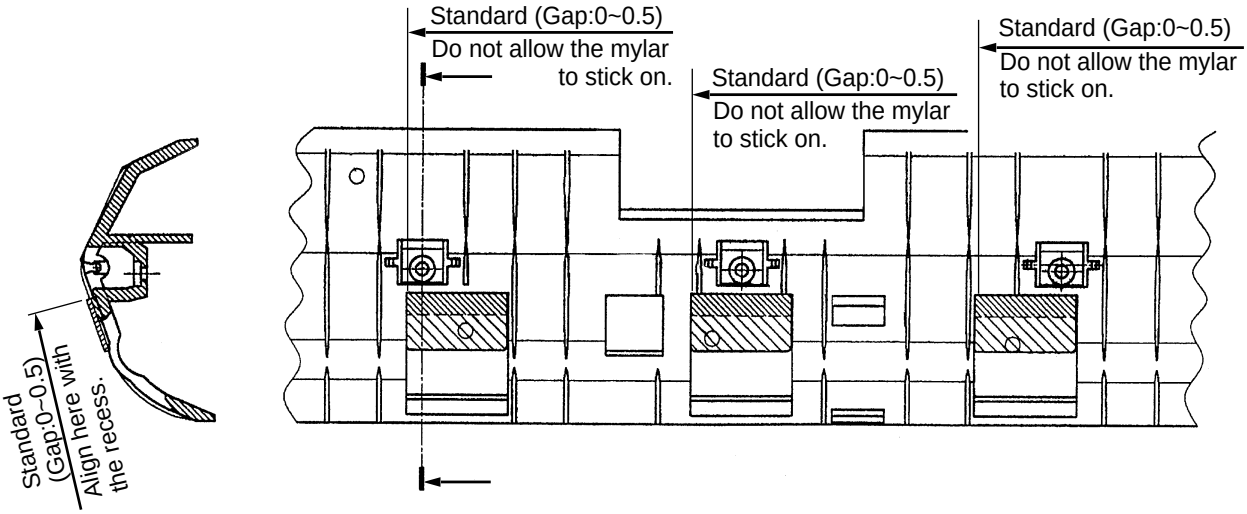
④ Tray mylar



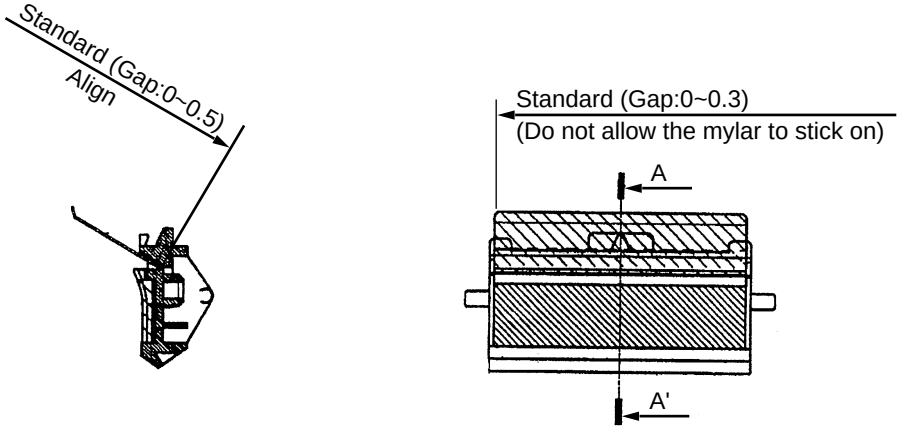
⑤ Original-holding mylar / sub-mylar



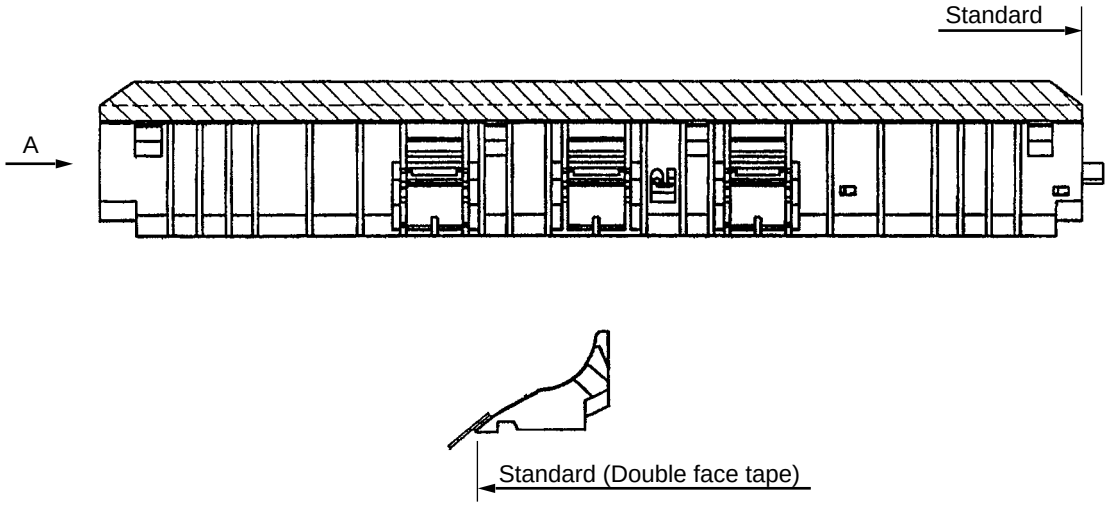
⑥ Guide mylar (2)



⑦ Aligning mylar

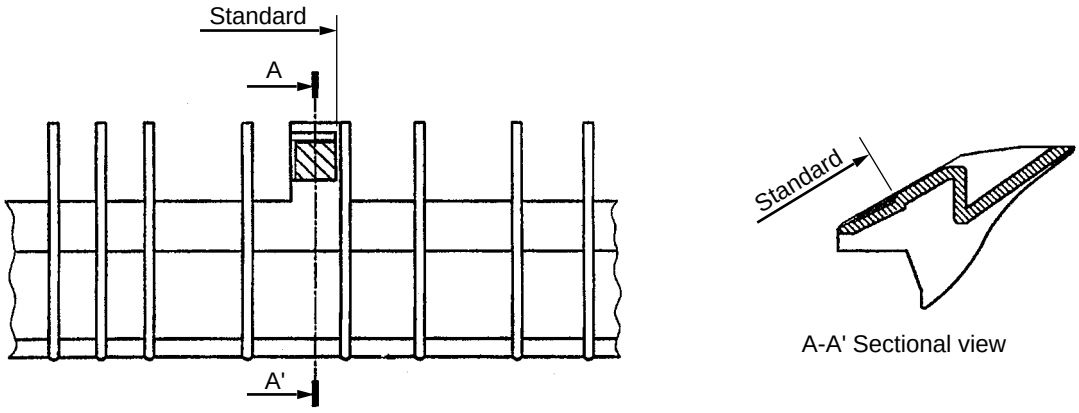


⑧ Pick-up mylar (MR-3006)



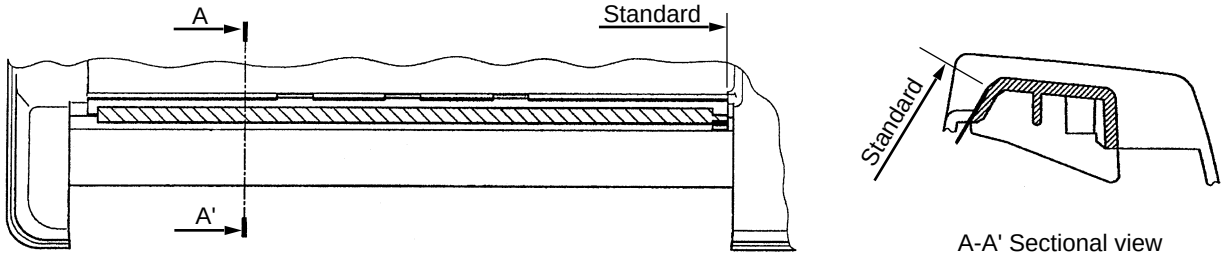
Arrow A

⑨ Reversing mirror sheel (MR-3006)



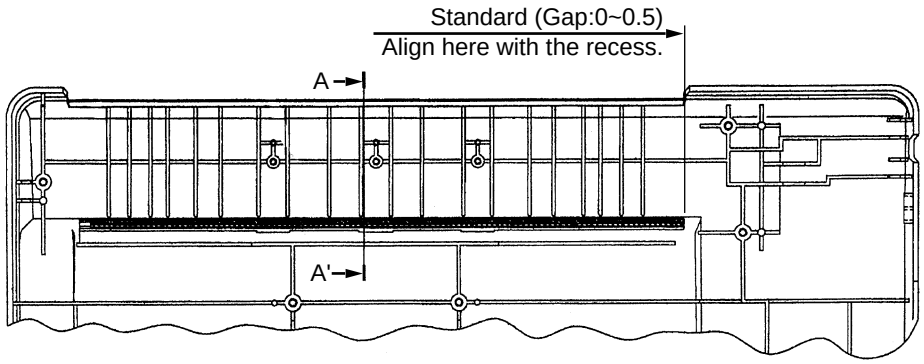
A-A' Sectional view

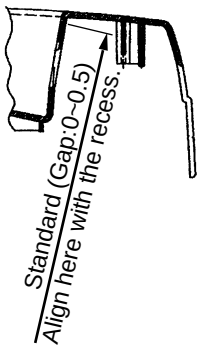
⑩ Discharge brush (MR-3006)



A-A' Sectional view

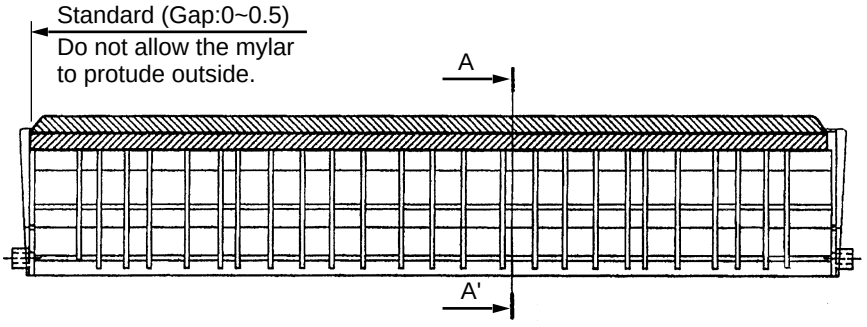
⑪ Discharge brush (MR-2008)

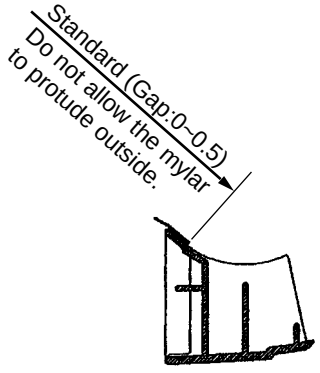




A-A' Sectional view

⑫ Pick-up mylar (MR-2008)





A-A' Sectional view