ATOMSCOPE HF200*A*

Operating Instruction Manual

Ver. 3.1

This special purpose portable equipment is for diagnostic radiography only.
It is not designed, nor does it meet, the standards for any other use.

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Thank you for purchasing your **ATOMSCOPE HF200A** portable veterinary x-ray unit. We are confident that you will be pleased with the radiographs you make with this model. This excellent unit will give you many years of reliable service. Please read this manual completely before using your *HF200A*. We always welcome your comments and suggestions.

1.0 NOTICE FOR SAFETY OPERATION

1. Only the person who has license of radiograph (e.g. doctor, X-ray technician, etc.) can operate this equipment.

   All kinds of X-ray equipment should be operated by person who has qualification from government.

2. The following precautions must be taken to insure the proper installation;
   1) Do not install the equipment to place where is splashed.
   2) Do not install the equipment to place where is influenced by atmospheric pressure, temperature, humidity, ventilation, sunshine, dust, air containing salt or sulfur.
   3) Pay attention to circumference (e.g., inclination, vibration, shock by transportation, etc.).
   4) Do not install in warehouse of chemical products or gas occurrence place.
   5) Pay attention to hertz, voltage and current (or power consumption) of power supply.
   6) Earth the ground terminal correctly.

3. Before using the equipment, the following precautions must be taken;
   1) Check connection of switch, polarity, setting of dials, meters. And confirm the equipment works correctly.
   2) Make sure ground terminal is connected correctly.
   3) Make sure all cords are connected correctly and safely.
   4) Do not use several equipment at once to avoid incorrect diagnosis.
   5) Check surroundings of the equipment to avoid patients touch the equipment directly.
   6) Check power supply is proper.

4. During use of the equipment, the following precautions must be taken;
   1) Save total time of exposure as less as possible.
   2) Take care with the equipment and patient fully during taking X-ray.
   3) When any problem has occurred especially for patient, stop using the equipment immediately.
   4) Pay attention to patients as they never touch the equipment.

5. After use of the equipment, the following precautions must be taken;
   1) According to procedures, turn off main power after putting back switches and dials to the initial position.
   2) Remove plugs correctly (never pull only cords by force).
   3) Pay attention to location of storage.
      Do not store to place where is splashed.
      Do not store to place where is influenced by atmospheric pressure, temperature, humidity, ventilation, sunshine, dust, air containing salt or sculpture.
      Pay attention to surroundings (e.g., inclination, vibration, shock by transportation, etc.)
      Do not store in warehouse of chemical products or gas occurrence place.
   4) Concerning accessories put them back in order after cleaning up.
   5) Clean up equipment for correct work on next time.

6. If there are any troubles, do not operate by yourself. Please leave it and call your dealer for repair.

7. Never modify by yourself.

8. Maintenance
   1) Equipment and parts should be checked regularly.
   2) When use equipment after a long interval, check whether or not it works correctly and safely.

9. Operate the equipment correctly according to the Instruction Manual.

2.0 INTRODUCTION

HF200A is constant potential X-ray equipment utilizing the latest high frequency inverter. Non-effective X-ray is decreased by approximately 20% compared with conventional model (12 pulses full-wave rectified unit).
HF200A has MIKASA's latest technology, with the following special features;

1. By using HIGH FREQUENCY INVERTER, output is bigger than conventional model and X-ray tube voltage is constant.
2. Compared with conventional two pulses generator, more than 1.6 times of exposure is possible under same condition.
3. kV and mA are corrected and stable by automatic feedback circuit.
4. Focal spot size is 1.2 mm only. So, quality of X-ray image is almost the same or better than X-ray image taken by bigger stationary X-ray unit.
5. Very easy to carry by hand because of small size and lightweight.
6. By only connect to wall socket, it becomes ready to exposure.
7. kV can be set each 2 kV from 40 kV to 100 kV. kV, mAs and sec. are indicated on CONTROL PANEL in digital.
8. Setting data can be memorized by Memory storages system.
9. To stand long use, COLLIMATOR LAMP goes off immediately when exposure time is end.
10. X-ray exposure can be confirmed by buzzer, X-ray ON lamp.
11. As HF200A is using high voltage, please read this Instruction Manual carefully prior to operation.

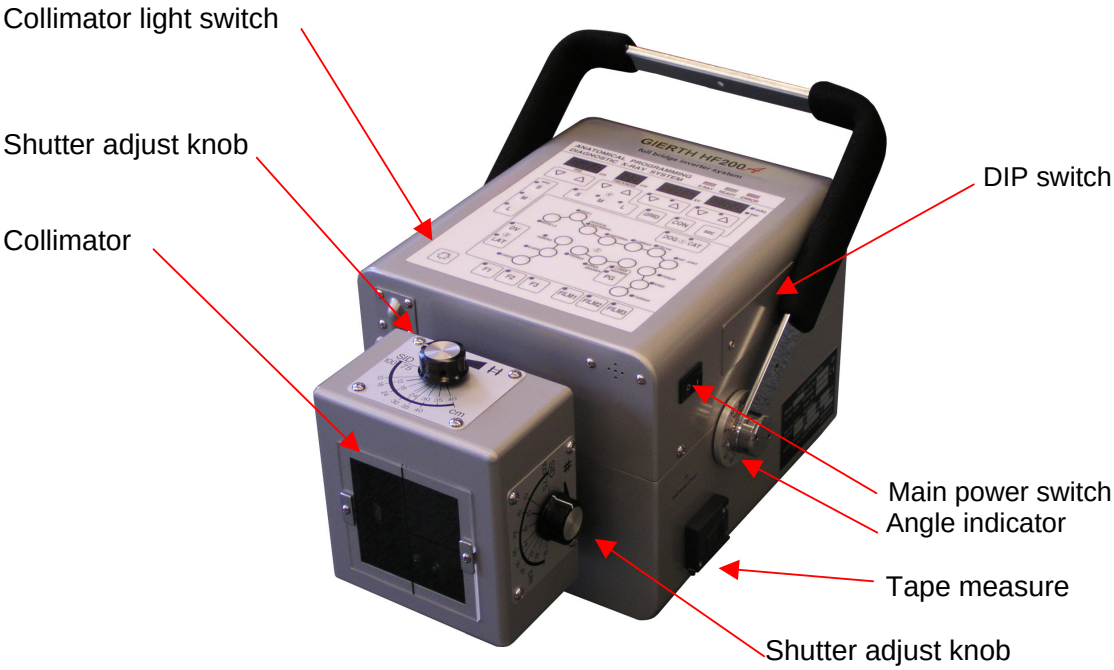
3.0 NOTES TO USERS

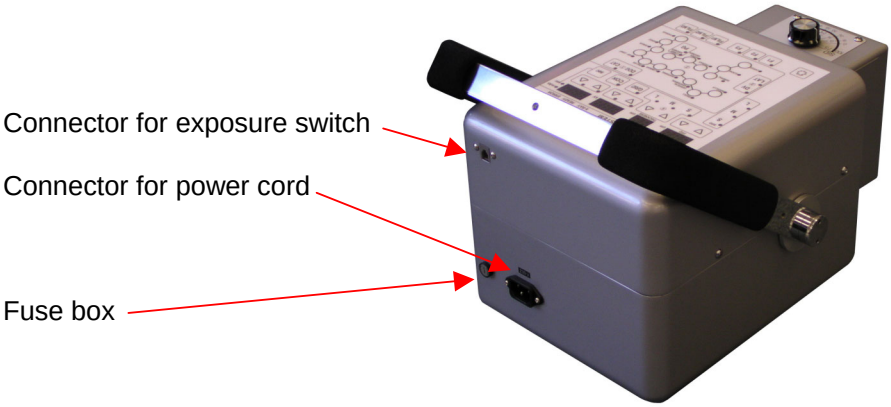
1. HF200A has been developed specially for portable X-ray equipment for radiograph. So, use only for this purpose.
2. Exclusive wall socket of 15A (Minimum) is recommended.
3. Be sure to earth the ground terminal.
4. Use at the place where X-ray is never leaked.
5. During operation, insure that operator is fully protected from radiation.
6. For obtaining good quality of X-ray film, conditions of X-ray film and developer are very important. So, take care of especially temperature and oxidation of developer.
7. It is possible to take X-ray at shorter exposure time by using RARE EARTH FILM SYSTEM.
8. Concerning other notes on operation, please refer the OPERATING PROCEDURES.

4.0 COMPONENTS

		Q'ty
1.	X-ray equipment	1 set
2.	Power cord	1 pc
3.	Hand switch & cord (exposure)	1 pc
4.	Instruction manual	1 pc

5.0 MAIN PARTS OF ATOMSCOPE HF200A

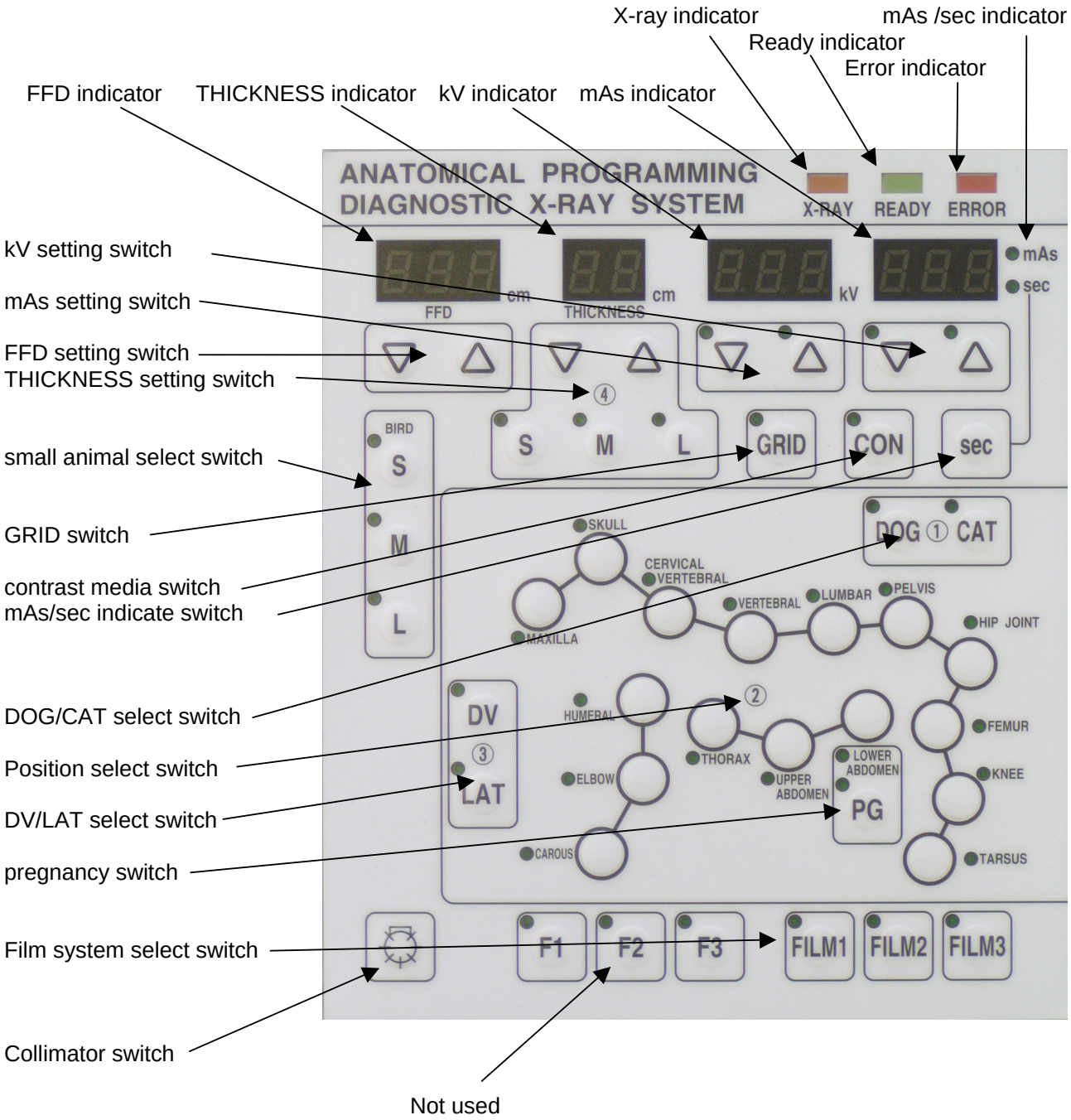




Exposure switch

Power cord

6.0 CONTROL PANEL OF ATOMSCOPE HF200A



7.0 OPERATING PROCEDURES

1. Connection
   Connect POWER CORD and EXPOSURE SWITCH CORD with main body.
   Make sure that power switch is off and there are no unusual external appearances.
   After that, connect POWER CORD PLUG to wall socket. If wall socket without ground is used, earth the ground terminal.

2. Power On
   Turn POWER SWITCH on, each indicator is turned on.

Do not repeat to turn on and off quickly in short time.
When turn on again after turn off, take interval at least 1 minute. Otherwise high frequency inverter cannot work correctly.

Initial Setting for FFD & FILM system sensitivity

Initial setting for FFD and Film system sensitivity can be set by dipswitch, which is located in the side of unit.

Before you change and initial setting, turn off the main power switch!

- FFD : *HF200A* has three dip switches, and set a suitable value for FFD each dipswitch as an initial setting.

- Film system sensitivity: *HF200A* has three dip switches, and set a suitable value for Film system each dipswitch as an initial setting.

Please refer to 12 pages.

3. Operation

   1. Turn on the main power switch on the *HF200A*.

   2. Select the FILM switches for FFD and Film system sensitivity.

   3. If you need to change the value for FFD, set the value by the ▽ Δ button for FFD.

   4. Select the animal type from the buttons of DOG, CAT, BIRD, 1, 2, or 3.

   5. In case that you select the buttons of DOG or CAT, you can select the body parts buttons that you will take X-ray film.

   6. If you select the buttons of BIRD, 1, 2, or 3 you cannot select the button for the body parts.

   7. Select the photography direction DV or LAD. (This switch can use only dog or cat)

   8. Select the animal size from the button of S, M, or L.

   9. If you select DOG or CAT, measure the thickness and set the value by ▽ Δ button for THICKNESS.

10. If you don't use a grid then press the button for GRID lamp turn OFF.

11. If you use contrast medium then press the button of CONT.

12. If you check pregnancy, press the button of PG. (This button can be used only when you select the body parts at LOWER ABDOMEN)

13. Adjustment of Radiation Field
    After pressing COLLIMATOR SWITCH, collimator is lit for approx. 45 sec.
    Adjust radiation field to position of radiograph by two knobs for adjustment of opening.

13. When you press the 1st stage of exposure switch, the green light (READY) on the control panel will be illuminated after about 2.5 seconds and goes on the ready sound.

14. Make sure that the animal is still quiet, and then press the 2nd stage of exposure switch.

15. X-ray is generated at the same time when buzzer sounds and yellow light (X-RAY) is illuminated.

NOTE: The EXPOSURE SWITCH is two stages. When only the center button (the first-stage) is pressed, the filament of the X-ray tube started to be pre-heated; After pre-heated time (2.5 sec), READY indicator goes on.
When additional pressure is applied to include the outer button, the X-ray exposure is made. If it is possible to press the two buttons simultaneously, and when this is done, there is a 2.5 sec delay before the X-ray is emitted.

Before taking any exposure, do not depress and hold the first-stage of the EXPOSURE SWITCH for times exceeding 30 seconds. The first-stage is used only for a few seconds that are required for the animal to be still.

It is not good practice to hold down the first-stage for any reasons other than the time it takes the animal to become still, which should be just a few seconds. Exceeding the 30 second time period affects the life of the X-ray tube. This is an extremely important precaution to be followed to insure proper life of the tube.

8. After each exposure, release the exposure buttons. The HF200A is now ready for the next exposure.

Error lamp will blink if the exposure switch is released before the set exposure time.
Turn off the MAIN POWER SWITCH, wait 1 minutes, then start procedures over again.

Operation Note: To insure maximum life of x-ray tube and to avoid interruption of operation, do not exceed duty cycle of 1:60.

9. When you are finished using the HF200A, turn off the main power switch. All of the indicators on the control panel will turn off after several seconds.

8.0 ERROR INDICATION

HF200A has follows kinds of error indications that show unit worked incorrectly, and X-ray cannot be generated.

1. ERROR LAMP is blinking.

* The exposure switch is released before the set exposure time.
Turn off the MAIN POWER SWITCH, wait 1 minutes, then start procedures over again.

2. ERROR LAMP is lit.

* If above situation happened, release EXPOSURE SWITCH button. They mean unusual situation is occurred on circuit. So, turn off POWER SWITCH and restart the same procedure from the beginning again after 3 minutes interval.

Do not open the unit by yourselves, ask your dealers for necessary check and repair or repair if the above situations still happen after restart!

9.0 SPECIFICATIONS

Rating

Power Requirement:	AC, Single phase, 230V, 50/60Hz
Apparent resistance of supply mains	0.1 ohm
Protection against electrical shock	Type B, Class I
Mode of operation	Continuous operation with intermittent loading
Duty cycle	1 : 60 (1 sec. On, 60 sec. Off)
Degree of protection against the ingress of water	Splash-proof equipment (IEC Publication 529)
Degree of safety of application	Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide
Fuse	30A @ 250V

X-ray Generator

Output range	30 to 60kVDC@ 40mA (0.6 –80mAs) 62 to 70kVDC@ 35mA (0.6 –70mAs) 72 to 80kVDC@ 30mA (0.6 –60mAs) 82 to 100kVDC@ 25mA (0.6 –50mAs)
mAs rang	0.6 - 80 mAs.
Electric power	2.5 kW@ 100kVDC, 25mA
Maximum deviation from fixed factors	Tube potential ±10% Tube current ±20% Exposure time ±10%+1 msec
Leakage technique factors	0.41 mA @ 100kV 0.41 mA is a maximum rated continuous Current for 25 mA with duty cycle 1:60
Inherent filtration	2.2 mm Al equivalent
Total filtration	2.7 mm Al equivalent (with collimator)

X-ray Tube

Manufacturer	TOSHIBA
Type	D-124S
Focal Spot	1.2 mm
Anode heat storage	20 kHU

Collimator (Beam Limiting Device)

Manufacturer	Mikasa X-ray Co., Ltd.
Type	R-200V
Filtration	0.5mmAl

Dimension and weight	290mm (W) x 400mm (L) x 230mm (H) 16.0kgs

Environmental conditions for transport and storage

Ambient temperature range	10～40℃
Relative humidity range (including condensation)	30%～85%
Atmospheric pressure range	700hPa～1060hPa

Warm up procedure

It is imperative that this equipment should follow this warm up procedure after transport or storage under -30℃. The equipment should be operated only after 12 hours of warm up storage at 10～40℃. No exposure should be made during this warm up period.

Cooling procedure

It is imperative that this equipment should follow this cooling procedure after transport or storage above 70℃. The equipment should be operated only after 12 hours of cooling storage at 10～40℃. No exposure should be made during this cooling period.

10.0 Setup of the Film speed and FFD

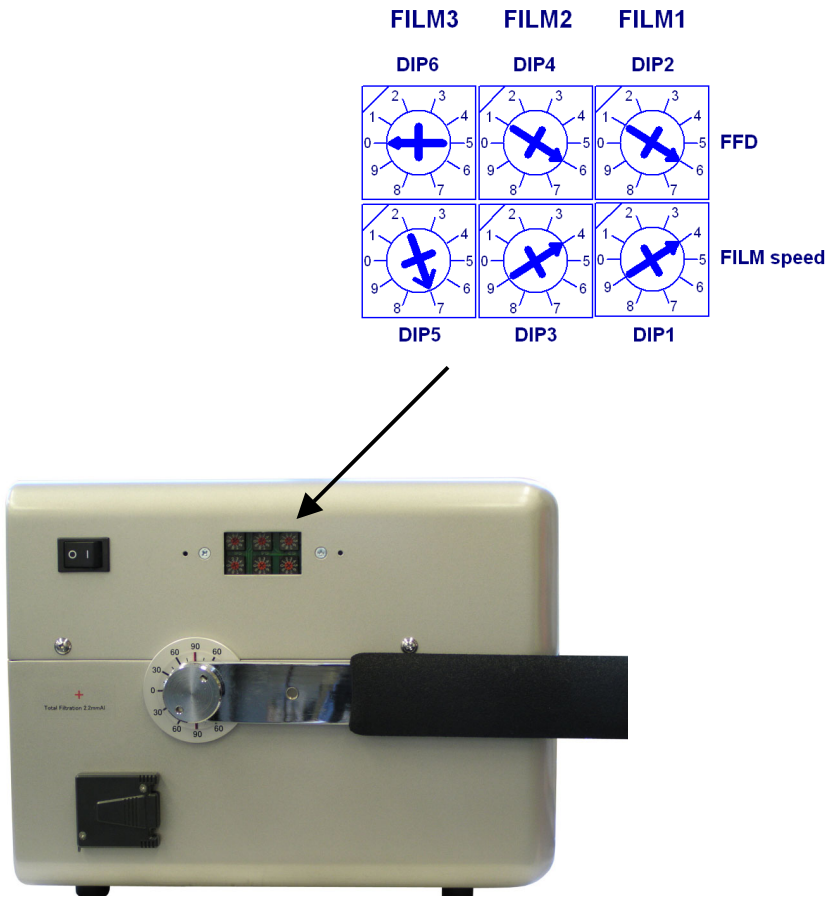
Initial Setting for DIP switch.

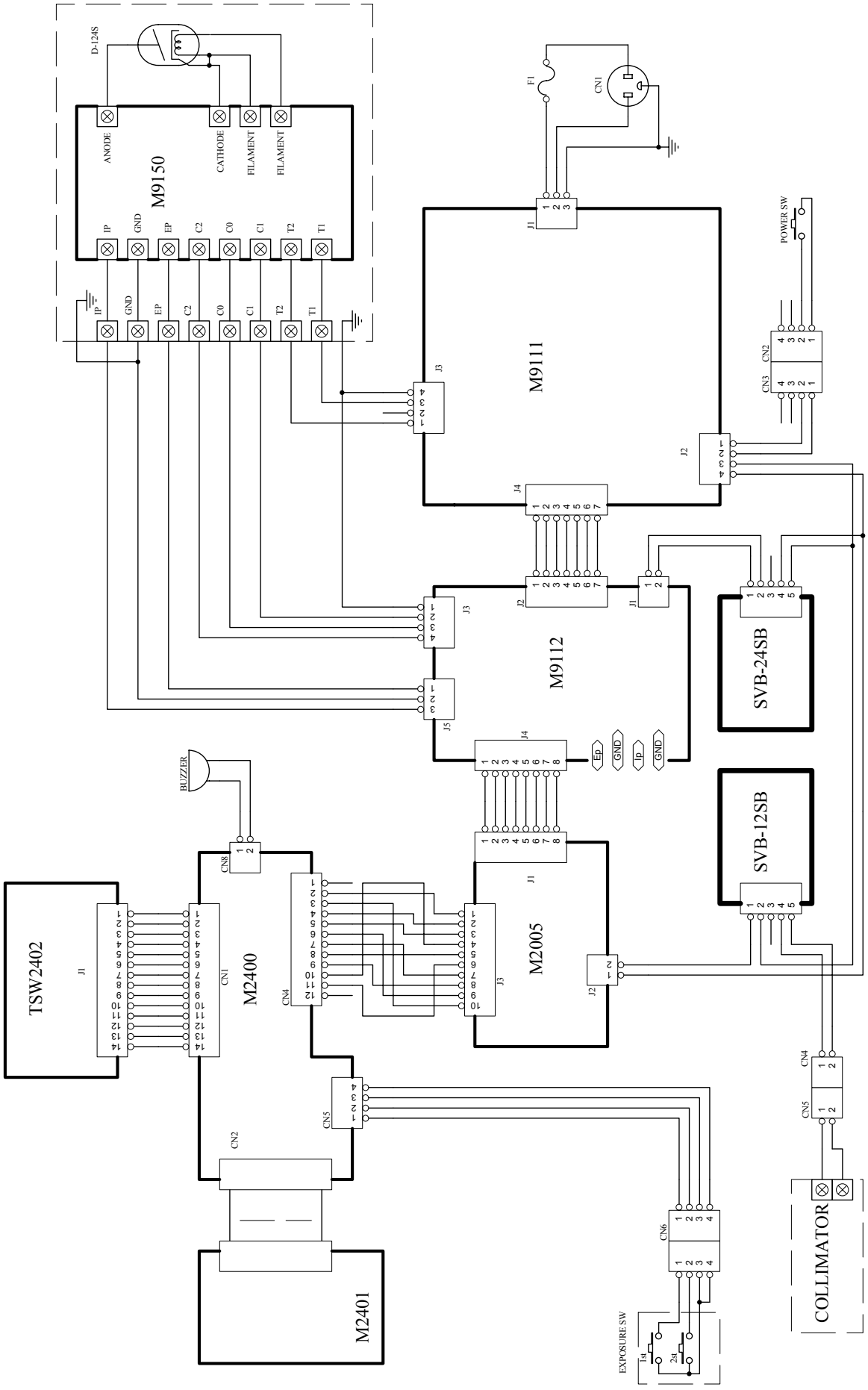
	FILM 1	FILM 2	FILM 3
DIP 1	4		
DIP 2	6		
DIP 3		4	
DIP 4		6	
DIP 5			7
DIP 6			0

FFD: DIP switch 2, 4, 6
Film speed: DIP switch 1, 3, 5

Film speed parameter

DIP switch	FFD	Film speed	
9	95		x2.01
8	90		x1.75
7	85	200	x1.52
6	80		x1.30
5	75		x1.15
4	70	400	x1.00
3	65		x0.85
2	60		x0.72
1	55		x0.61
0	50		x0.52




D-124S
ANODE
CATHODE
FILAMENT
FILAMENT
M9150
IP
GND
EP
C2
C0
C1
T2
T1
F1
CN1
J1
M9111
J3
J2
J4
POWER SW
CN2
CN3
M9112
J5
SVB-24SB
SVB-12SB
BUZZER
CN8
TSW2402
M2400
CN4
M2005
CN5
CN6
M2401
EXPOSURE SW
1st
2st
COLLIMATOR