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Nikon
MOTOR
DRIVE

MD1

INSTRUCTION
MANUAL

NOMENCLATURE

O/C key socket

Shutter speed table

Firing speed selector knob

O/C lever

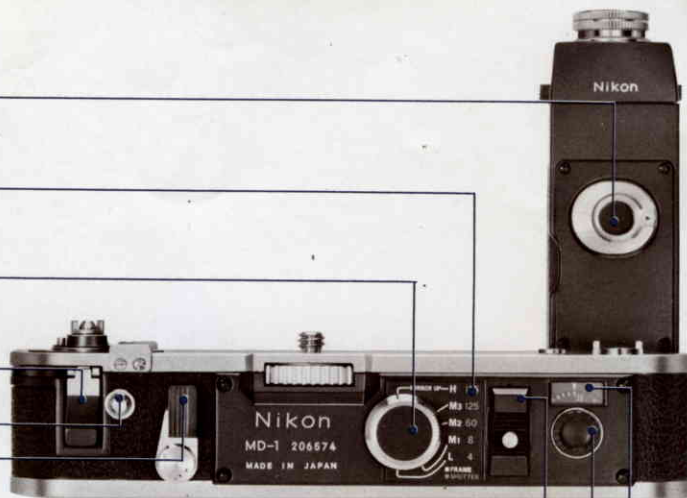
Rewind lever
lock-release

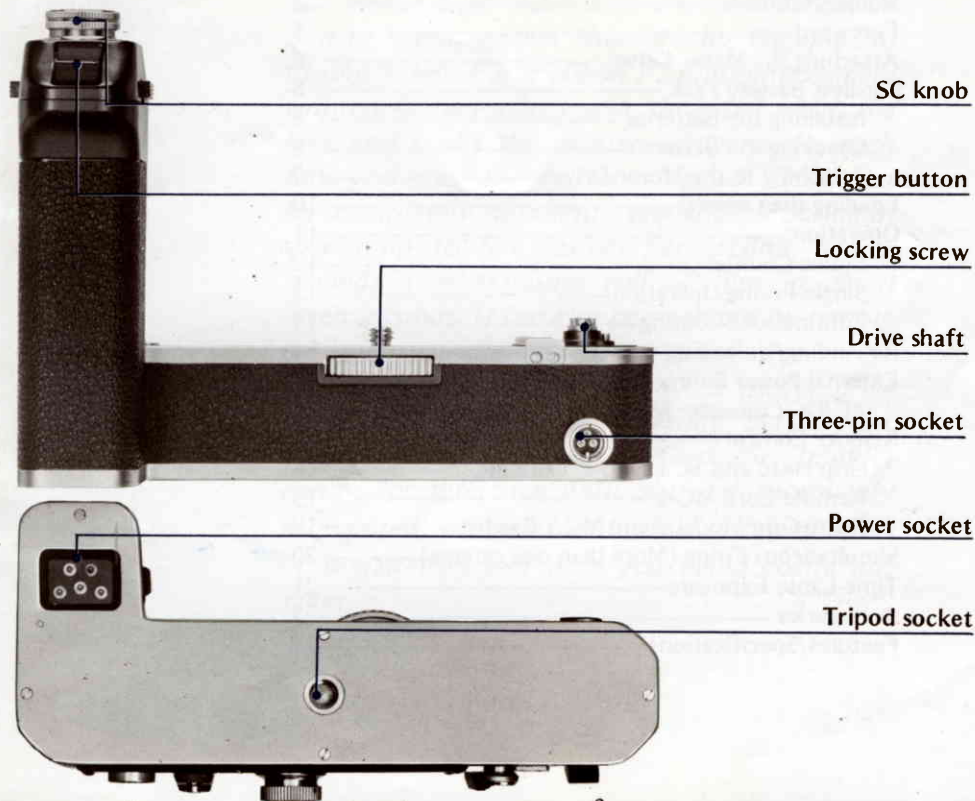
Rewind lever

"R" slide button

Frame number preset
wheel

Frame counter





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FOREWORD

The motor drive MD-1 adds a whole new dimension to 35mm system photography. Designed to fit any Nikon F2 or Nikon F2 Photomic camera without factory adjustment, the MD-1 winds the film and cocks the shutter automatically each time you press the shutter release. It can be set for completely automatic sequence shooting at speeds up to five frames per second, and it rewinds a 36-exposure roll of film in about seven seconds. It can also be operated by remote control using cables, timers or radio.

To get the best results from your motor drive, read these instructions carefully before you attempt to use the unit. Keep this booklet handy for reference until you are thoroughly acquainted with the motor drive. A few minutes of preparation will help you avoid costly mistakes.

ATTACHING THE MOTOR DRIVE

The motor drive MD-1 is designed to work perfectly with any Nikon F2 or Nikon F2 Photomic camera. There is no need for factory adjustment to match camera and motor drive.

Unscrew the O/C key with a coin or similar object. Set the camera on the motor drive and tighten the knurled locking knob until the camera and motor drive fit together snugly. This links the motor drive coupling and the shutter release coupling on the camera with the drive shaft and the shutter release plunger of the motor drive. A threaded hole is provided on the back of the motor drive grip for storing the O/C key.

Note: To replace the O/C key, position it in the opening in such a way that the coupling pin on the O/C key drops into the slot. Then turn the key until the arrow lines up with "C" and screw it tight.



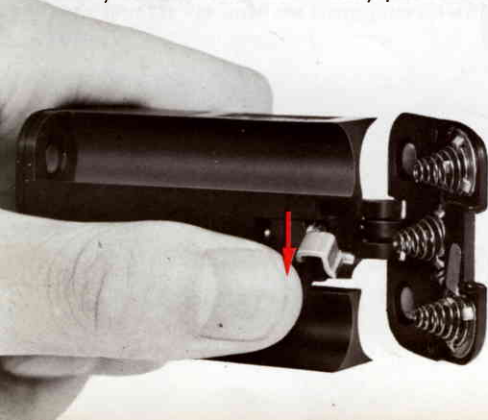


CORDLESS BATTERY PACK

The cordless battery pack MB-1 (available as an optional accessory) holds two NC battery units MN-1 or ten pen light batteries available anywhere to power the motor drive. Penlight batteries fit into two AA penlight battery units MS-1 supplied with the unit.

Installing the Batteries

To install the penlight batteries, first release the clip on the battery holder and open the cover. Then place five batteries in each holder, making sure that the positive and negative (+ and -) terminals are lined up correctly. Open the battery pack by folding out the locking screw and turning it in the direction of the arrow. Slip the two battery holders into the battery pack and snap it shut.



www.orphancameras.com

BATTERY LIFE IS DIFFICULT TO PREDICT ACCURATELY; HOWEVER, THE FOLLOWING IS A ROUGH APPROXIMATION OF THE NUMBER OF 36-EXPOSURE ROLLS OF FILM THAT CAN BE EXPOSED ON ONE SET OF FRESH BATTERIES AT INDICATED FRAMES PER SECOND. CONTINUED USE OF THE BATTERIES BEYOND THE NUMBER OF ROLLS INDICATED WILL RESULT IN A LOWER FRAMES PER SECOND FIRING RATE THAN SELECTED.

ZINC-CARBON PEN. BATT.	10 ROLLS
ALKA.-MANGANESE PEN. BATT.	20 ROLLS
NC BATT. UNITS MN-1	50 ROLLS
Alkaline-manganese penlight	
NC battery units MN-1	

Table 2 indicates the approximate number of 36-exposure rolls of film up to which the rated firing speed is

guaranteed. The inevitable slowing down of the rate that results from battery drain is still within the permissible range.

(Table 2)

Zinc-carbon penlight batteries	up to 10 rolls
Alkaline-manganese penlight batteries	up to 20 rolls
NC battery unit MN-1	up to 50 rolls

For the most reliable service, replace the NC battery units with new ones shortly before the 100th recharge.

Remember that battery performance deteriorates in cold weather. Zinc-carbon batteries cease to function below about 0°C , alkaline batteries below -10° and Ni-Cd batteries below -20°

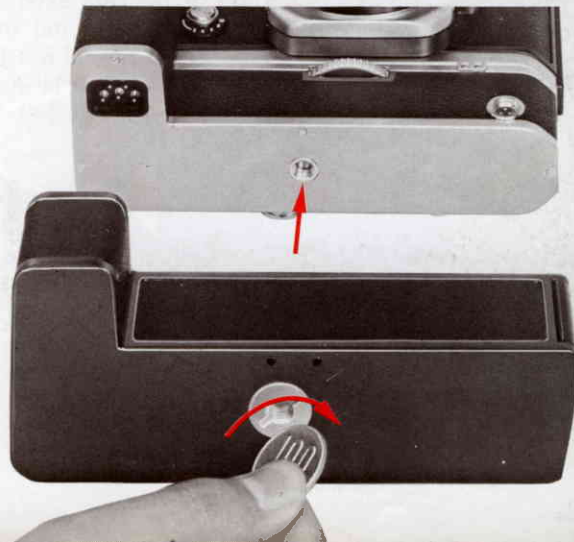
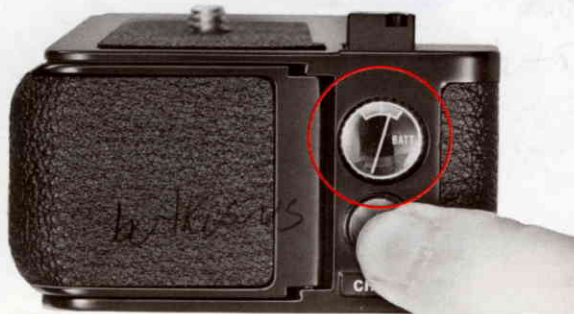
Checking the Batteries

A built-in battery checker lets you check battery condition. Press the checker button on the lower right-hand

side of battery pack and watch the indicator needle. If it swings into the green region or beyond, the batteries are still good. If not, replace all the batteries.

Attaching to the Motor Drive

The cordless battery pack fits onto the motor drive itself, making camera, motor drive and power supply one convenient unit. Place the motor drive on the pack and tighten the locking screw on the bottom of the pack with a coin or similar object until the motor drive baseplate and the pack fit together snugly.



LOADING THE CAMERA

Film loading is done in the normal way. However, always be sure to mount the motor drive on the camera before you load the film. Otherwise, light will enter the camera and fog the film when the O/C key is removed. Fold out the O/C lever and turn it to the left. The hinged camera back will spring open. For details on film loading see your camera's instruction manual.

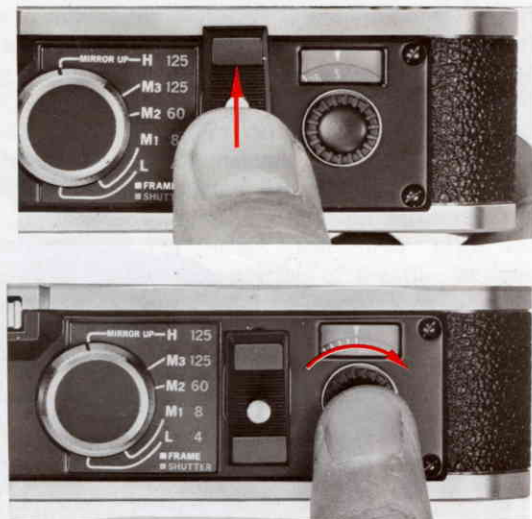
After the loading is completed, depress the locking button on the rewind slide and push the slide up until the frame counter returns to "S". Then make three "blank" exposures to dispose of the portion of the film exposed during loading, using the film-advance lever and the shutter-release button on the camera. Be careful not to reverse the above procedure since it will result in inadvertent double exposures on the first frame of film.



OPERATION

You can use the motor drive for either single-frame or continuous shooting at up to five frames per second. The SC knob on the grip has settings for either single-frame or continuous firing, plus the "L" trigger lock setting to prevent accidental exposures. The firing speed selector knob controls the speed of sequence firing. Before using the motor drive, you should set the frame counter to correspond to the number of exposures of the film loaded in the camera (or to a smaller number if you want the motor drive to stop before the entire film is exposed). This adjusts the power cut-off mechanism which prevents the film from being advanced beyond the limit of its length. It also allows you to preset the motor drive to stop after any number of frames.





Frame Counter

The frame counter on the back of the motor drive shows the number of unexposed frames remaining on a roll of film. When the counter reaches zero, the motor stops automatically to prevent damage to the film. This feature also allows you to preset the exact number of frames for continuous firing in bursts.

To set the counter, first make sure that the frame counter is at "S". Then press and turn the wheel beneath the counter window until the desired number of frames appears opposite the white arrow. The numbers 20 and 36 are colored red to correspond to the number of the frames in standard rolls of film.

If you desire to reset the counter to control a known sequence duration (or for other purposes) after you have once set it at the particular number, first depress the locking button on the rewind slide and push it up until the frame counter springs back to "S". Next, cover the lens with a cap and make one "blank" exposure to prevent inadvertent double exposure on the starting frame. Then, set the frame counter to the desired number of frames. Wind the lever once again and the unit is now ready for shooting.

Be careful not to overestimate the number of frames remaining on a roll of film, since this may result in the motor pulling the film off the supply spool or damaging its perforated edges.

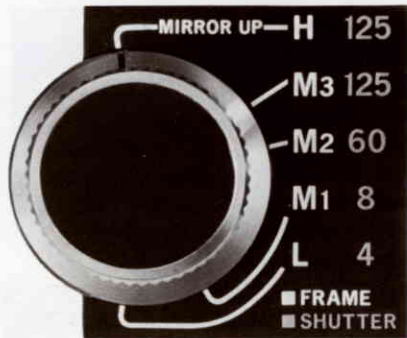
The frame counter on top of the camera continues to operate even when the motor drive is attached. If you use the counter on the motor drive to control sequence duration, check the one on the camera to find out how many exposures you have left.

Single-Frame Operation

Lift up the milled SC knob and turn it until "S" is opposite the white dot. Then select any shutter speed from 1/2000 second to B. The firing speed selector knob has no influence on the operation of the motor drive. To make an exposure, simply press the trigger button on the grip. As soon as the button is released, the motor drive automatically winds the film and cocks the shutter for the next exposure. When using shutter speeds slower than 1/60 second, be sure to keep the trigger button depressed long enough for the shutter to complete the exposure. Otherwise, exposure time may be shortened unintentionally.

Note: When you test fire an unloaded motorized camera powered by fresh NC batteries or by the AC/DC Converter MA-2, the motor drive may fire in bursts even with the SC knob set for single frame operation. This will stop as soon as film is loaded in the camera.





Continuous Shooting

Firing speed is controlled by the firing speed selector knob on the back of the motor drive. It has five settings: H (high), M3, M2 and M1 (medium) and L (low). Intermediate speeds may also be used by setting the knob between the click-stopped settings. At the H setting, the mirror of the camera must be locked up.

The table below indicates the number of frames per second which the unit will expose at each setting. However, speed also varies depending on the power source used. The table also shows the firing speeds for different power sources. At the H setting using NC battery units MN-1, for example, firing speed is five frames per second.

Firing Speed Setting	H	M3	M2	M1	L
Power Source					
Alkaline-Manganese Penlight Batteries (15V)	4 frames/sec.	3.5	3	2	1
Zinc-Carbon Penlight Batteries (15V)					
NC Battery Unit MN-1 (15V)	5	4.3	3.8	2.5	1.3
AC/DC Converter MA-2					

The range of usable shutter speeds depends on which firing speed you select. The numbers in green next to the firing speed settings indicate the lowest speed which can be used at each setting. For example, with the firing speed selector knob turned to M2, you can select any shutter speed from 1/60 to 1/2000 second. Speeds slower than those indicated should not be used.

When the selector knob is set for an intermediate speed between the marked settings, consult the range of usable shutter speeds for the next highest setting to find the correct shutter speed.

Set the SC knob at "C" and lift up the milled firing speed selector knob and turn it until the black line is opposite the desired framing speed. If you wish to fire at "H", remember also to lock up the mirror. As long as the trigger button is held down, the motor drive will continue to fire automatically. Releasing the button stops the motor drive after it has advanced the film one frame and cocked the shutter for the next exposure. During operation, the firing speed selector knob can be changed to any setting. You can also fire single shots at the "C" setting if the finger is removed quickly from the trigger button after each exposure. The usable shutter speed ranges are the same as those for continuous shooting.



Note: The camera's manual film-advance lever and shutter release button continue to function even with the motor drive mounted on the camera.

REWINDING/UNLOADING

Before unloading, rewind the film either manually or with the motor drive as follows: Press the locking button on the rewind slide and push the slide upward as far as it will go to release the film advance. The frame counter should return to "S", otherwise the motor will not start to rewind.

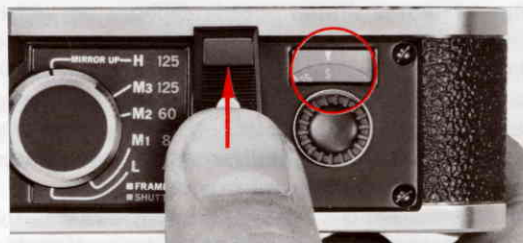
Press the locking button located to the left of the rewind lever. Hold the button down and turn the lever to the right until it stops with a click. The motor will rewind the film in about seven seconds (for a 36-exposure roll). Check the rewind knob on the camera to make sure that the film is actually being rewound. When the film leaves the take-up spool, the motor speeds up and makes a high-pitched sound. To return the rewind lever to its original position, simply turn it to the left.

To rewind the film manually, press the small button on the rewind slide, push the slide up as far as it will go. Rotate the rewind crank in the direction of the arrow just as you would to rewind the film with no motor drive attached.

Open the camera back, pull the rewind knob up and the film cartridge will drop out.

For further details on unloading, consult the instruction manual supplied with your camera.

Note: Motorized rewinding is not possible with some cassettes, since they have no key to engage the rewind shaft of the motor drive. The Nikon reloadable film cassette AM-1, available as an optional accessory, is keyed to connect with the rewind shaft.



EXTERNAL POWER SOURCES

The motor drive can be operated with an external power source in place of the cordless battery pack MB-1. A stable current of 0.4A at 15V must be supplied as high ripple voltages can damage the motor drive circuitry. To connect the motor drive to an external power source, plug one end of a suitable cord into the 3-pin socket on the motor drive and the other end into the power supply. The diagram at right may be useful in establishing a power circuit.

AC/DC Converter MA-2

The accessory AC/DC converter MA-2 lets you operate the motor drive from any standard house current from 100-240V AC. The optional connecting cord MC-2 is used to connect the motor drive to the AC/DC converter. The connector is provided with a locking screw for extra safety.

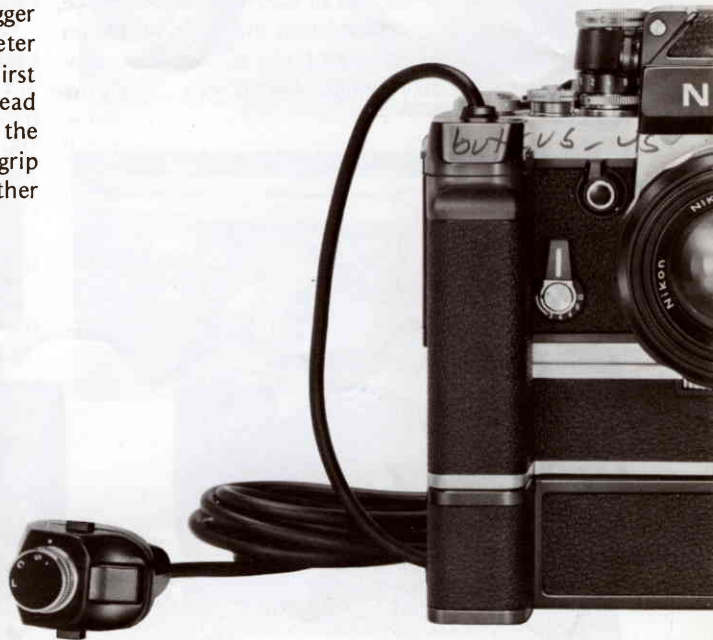


REMOTE CONTROL

The motor drive can be controlled remotely by means of the Nikon remote control accessories.

Grip Head and SC Remote Cord MC-1

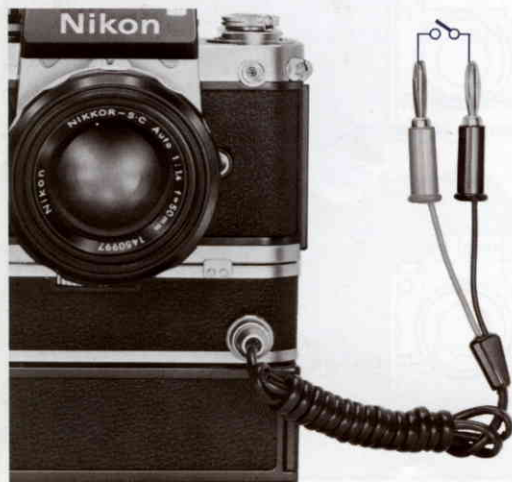
The grip head containing the SC knob and trigger button can be detached from the motor drive and used to trigger the unit by remote control. An accessory 3-meter (10 feet) SC cord MC-1 is used for this purpose. First press the release buttons on either side of the grip head and lift to remove. Then connect the 4-pin plug on the SC cord to the socket on the motor drive where the grip head normally fits. The grip head should fit the other end of the cord.



Remote Cord MC-4

The motor drive can also be triggered remotely by means of the accessory MC-4 cord. One end fits the socket on the motor drive, and the other has red and black plugs for connecting the motor drive with a remote switch, timer, or wireless receiver. The connector is provided with a locking screw for extra safety.

Insert the connector on the MC-4 cord into the motor drive socket. Using a length of cable and an on-off switch, you can establish a triggering circuit with the switch



replacing the trigger button. The cable can be extended to any length, so long as circuit resistance does not exceed 100 ohms. However, for long-distance operation, radio control offers greater convenience.

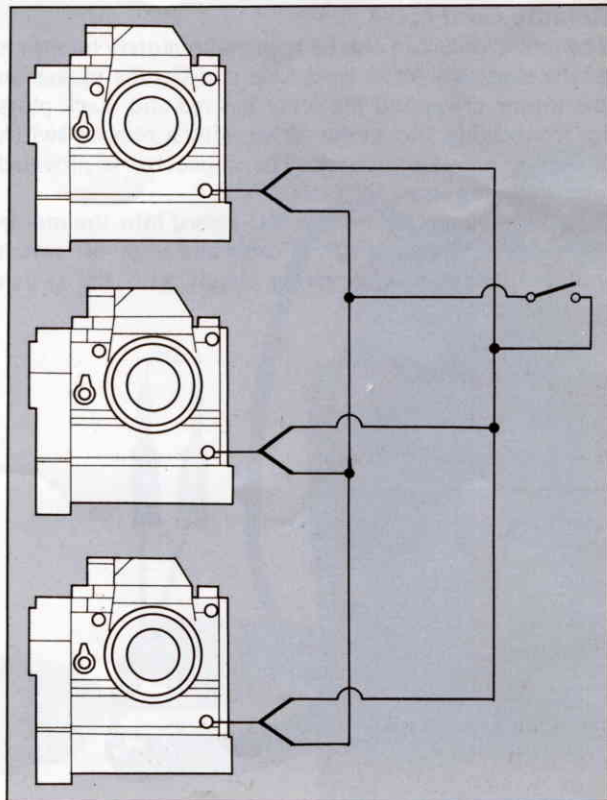
Pistol Grip Model 2 and MC-3 Cord

The pistol grip provides comfortable support for fingertip operation for the motorized Nikon F2 and Nikon F2 Photomic. It attaches to the tripod socket on the camera or on long lenses. The accessory coiled cord MC-3 connects the trigger of the pistol grip to the motor drive.



SIMULTANEOUS FIRING (More than one camera)

Two or more cameras may be fired in unison, either in single frame or continuous operation. Connect each camera with a motor drive, cordless battery pack and MC-4 remote cord. Then connect the red and black plugs on the remote cords to a single switch to trigger the motor drives together as shown in the illustration at right.



TIME-LAPSE EXPOSURE

You can trigger the motor drive for time-lapse or delayed exposures by connecting an intervalometer or similar device in the trigger circuit in place of the on-off switch. In this case there will be slight time delay between the moment the trigger circuit is closed and the shutter is released.

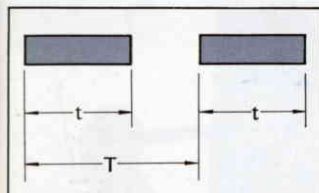
Mirror locked up 30 ~ 50 ms

Mirror operating 50 ~ 70 ms

Note: The range of time delay slightly varies depending on the power source and voltage.

The illustrations below show how to obtain correct timing interval.

When the SC knob is in the C position, the on-off switch opens and closes the trigger circuit as shown below.



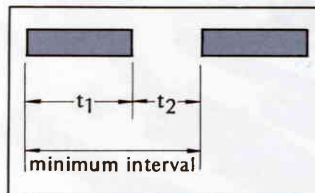
■ = time of closing the trigger circuit
(0.05 sec. \leq t \leq 0.10 sec.)
T = desired interval

The minimum possible time interval depends on the position of the firing speed selector knob. The table below gives the minimum interval for each setting.

Firing Speed Setting	H	M3	M2	M1	L
Power Source					
NC & AC/DC	0.23(sec.)	0.26	0.3	0.4	0.8
Penlight	0.26	0.3	0.35	0.6	1.1

At the H setting the mirror must be locked up. Shutter speeds slower than the ones indicated on the back of the motor drive are unusable.

With the SC knob set at S, the trigger circuit is opened and closed as shown below. The motor drive will begin to make exposures at a predetermined interval. Any shutter speed can be used, regardless of the position of the firing speed selector knob.



■ = time of closing the trigger circuit
t₁ = time for completion of exposure sequence
t₂ = 0.25 sec. (Increases as battery voltage decreases)

For exposures longer than one second, use the B setting. At this setting, exposure time is almost equal to the time required to close the trigger circuit (t₁).

ACCESSORIES

SC Remote Cord MC-1

Connects the motor drive to the grip head when the latter is removed for remote control. Length: 3m (10 feet).

Connecting Cord MC-2

Connects the motor drive to the AC/DC converter MA-2. Length: 3m (10 feet)

Coiled Cord for Pistol Grip MC-3

Connects the trigger of the pistol grip to the motor drive.

Remote Cord MC-4

Connects the motor drive to a remote switch, timer or radio control unit.

NC Battery Unit MN-1

Each unit supplies a 7.5V output when fully charged. Two are required to power the motor drive.

Quick Charger MH-1

Recharges NC battery unit MN-1 in three hours.

AC/DC Converter MA-2

Adapts the motor drive to any standard house current.



FEATURES/SPECIFICATIONS

- Can be used with any Nikon F2 or F2 Photomic camera without factory adjustment
- Choice of single-frame operation or continuous firing at speeds from 1 to 5 frames per second
- Can be used at any shutter speed for single-frame operation, speeds from 1/4 to 1/2000 second for continuous firing. Slowest usable shutter speed for each setting indicated on the back of the unit.
- Automatic-resetting subtractive type frame counter graduated from S to 40. Also used to preset the number of exposures for continuous firing in bursts. The motor stops automatically when the preset number of frames has been exposed
- Automatic motorized rewinding in about 7 seconds. Manual rewinding also possible
- Cordless battery pack holds 10 AA penlite batteries or two NC battery units. MD-1 can also be powered by AC current or other DC power sources within 10–15V range.
- Built-in relay for remote control by wire or radio
- Safety lock on the grip head prevents accidental exposure
- Dimensions approx. 147 x 110 x 77mm
- Weight approx. 470g