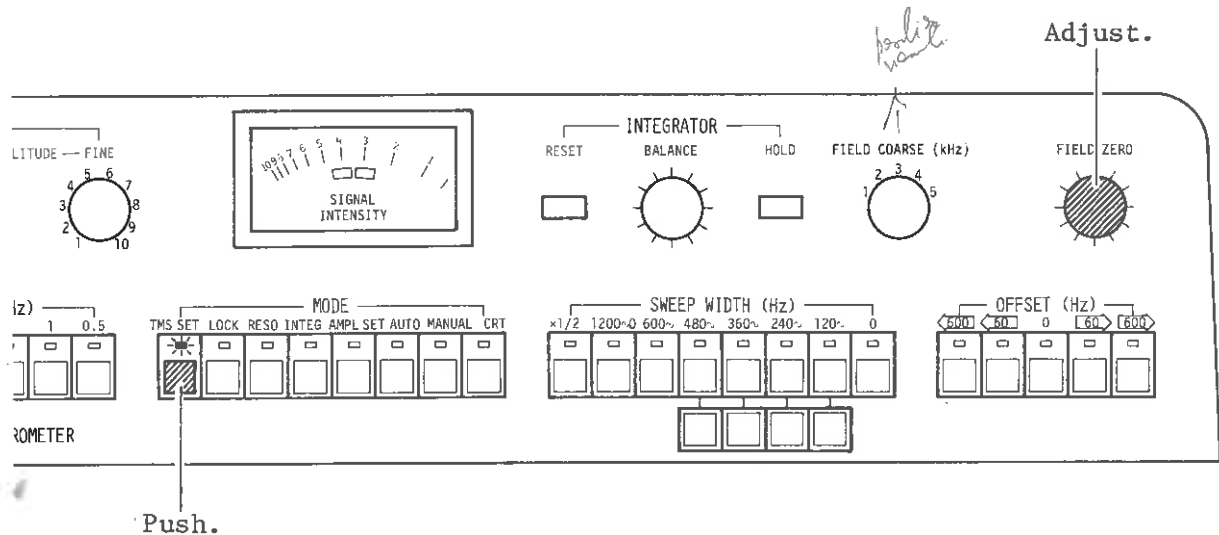


3.9 OPERATION MODES

3.9.1 TMS SET

The recorder pen is automatically set at the 0 Hz position on the chart paper as soon as the TMS SET button is pushed. Thereafter, adjust the FIELD ZERO knob so that the TMS signal is recorded at the 0 Hz position.

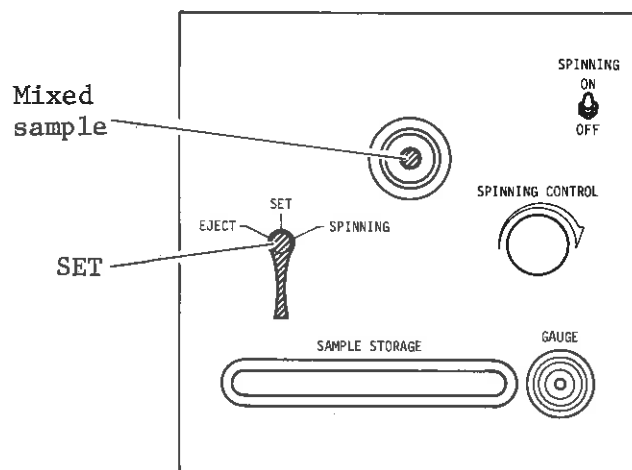
Note: Turn FIELD ZERO fully counterclockwise, and then gradually turn it clockwise. The first signal that appears will be the TMS signal.



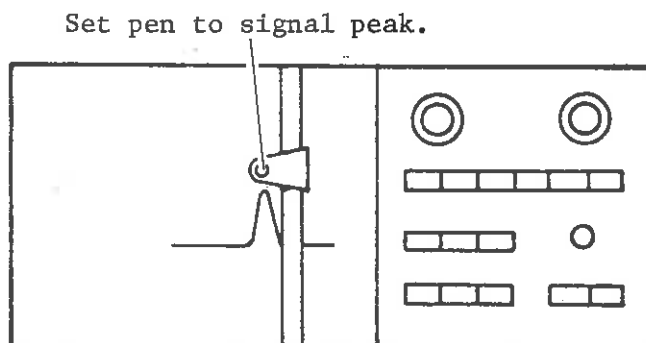
3.9.2 LOCK

The magnetic field condition can be known by pushing the LOCK key. In case operations are to be continued on the following day from the same point as the day before, leave this switch on. Thus, measurements can be resumed at the magnetic field that existed on the day before. Lock operations are performed as follows.

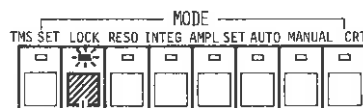
1. After inserting a sample tube of mixed sample, set the sample tube lever to the SET position so as to record the NMR signal.



2. Set the recorder pen to the lock signal peak.



3. MODE : LOCK



Push.

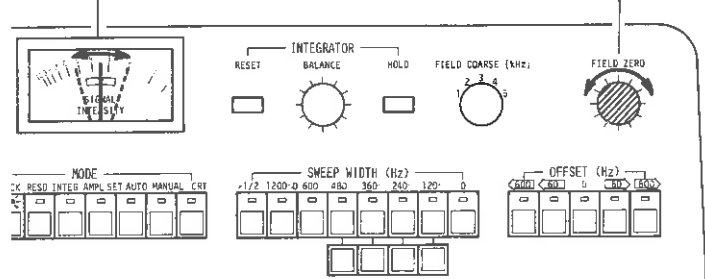
NMR lock is in effect.

4. Verify lock operation.

If the SIGNAL INTENSITY meter deflects left and right when the FIELD ZERO knob is turned left and right, lock is normal.

Deflects left and right.

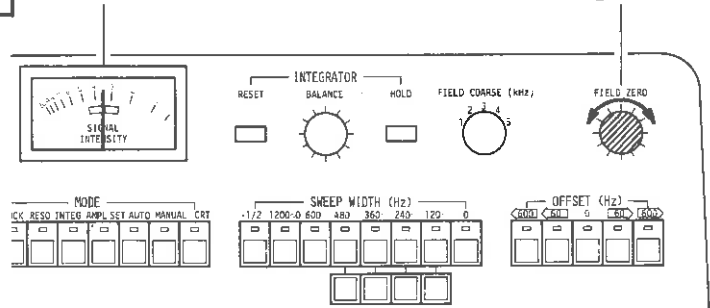
Rotate left and right.



5. Adjust FIELD ZERO until the meter indicator settles in center.

Settles in center.

Adjust.



Notes (a): The meter indicator may deflect from the center with the passage of time. Re-adjust FIELD ZERO to bring it back to center. Thus, the initial magnetic field is restored.

(b): Do not proceed with lock operation when the magnetic field drift is large.

(c): Release the CHART HOLD button after completion of lock operation.

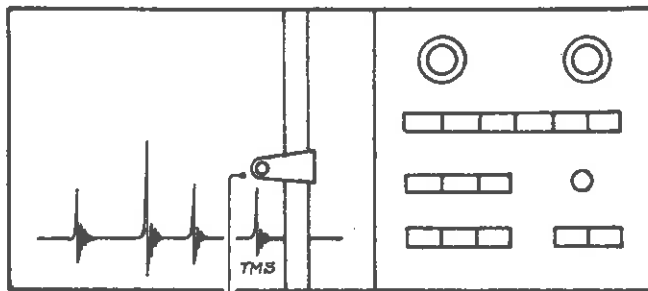
3.9.3 RESO

Use this key when adjusting resolution by the SIGNAL INTENSITY meter.

Note: The RESO key is functional only after the LOCK key has been pushed.

1. Set the sample tube lever to SPINNING and position the recorder pen at the lock signal peak (e.g., TMS).

Note: Like the TMS signal, the lock signal is a singlet.



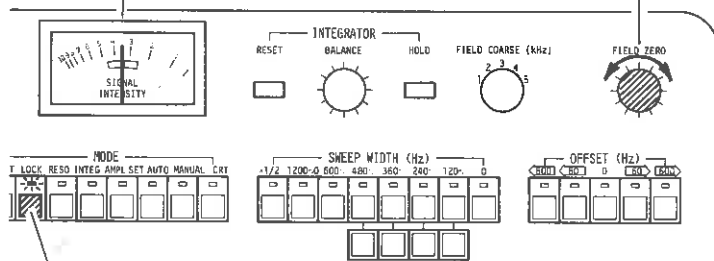
Set pen to peak.

2. MODE: LOCK

Since the meter will settle in the center within seconds, gradually turn FIELD ZERO left and right to verify that the meter deflects left and right.

Set to center.

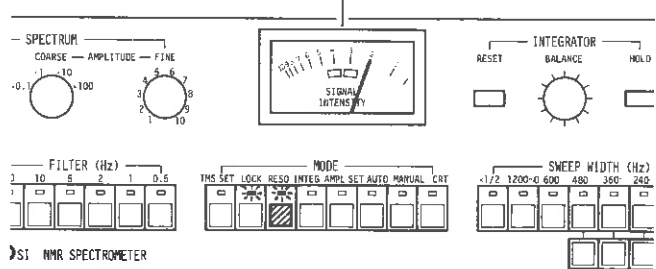
Adjust.



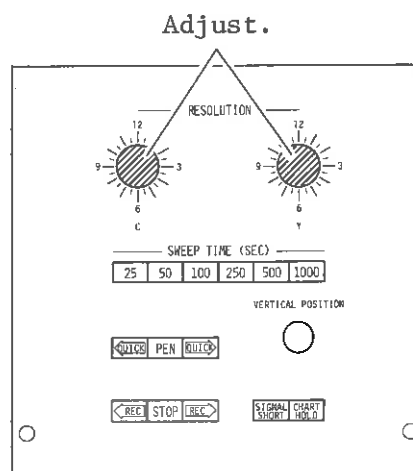
Push.

3. MODE: RESO

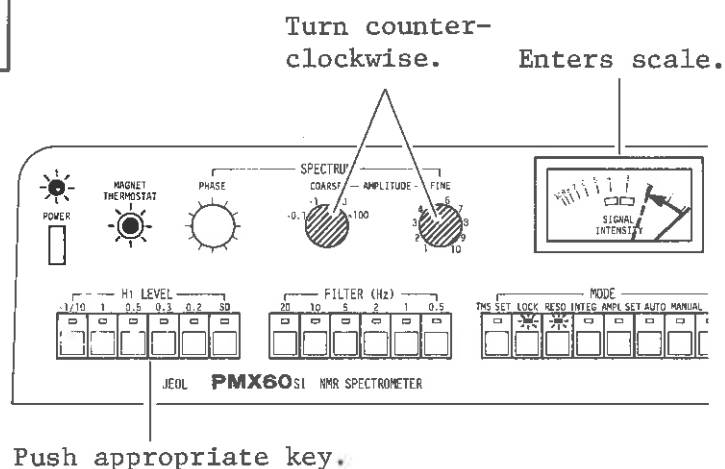
Meter deflects.



4. Adjust the RESOLUTION Y and C knobs for maximum meter deflection.



5. In case of meter over-scale, use the AMPLITUDE knobs and H₁ LEVEL keys to bring the indicator within the scale.



Notes (a): Refer to Sect. 3.4.1.

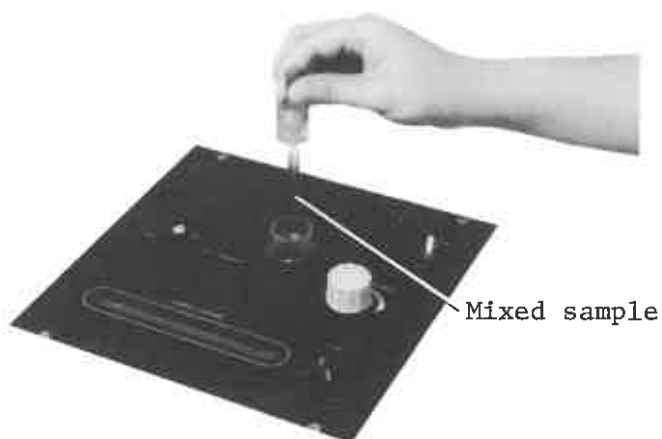
(b): RESO key may not function when signal drift is large (2 Hz/5 min or more).

3.9.4 INTEG

Use this key for NMR signal integration.

1. Insert sample tube containing mixed sample into probe.

Sample tube lever:
EJECT → SET → SPINNING



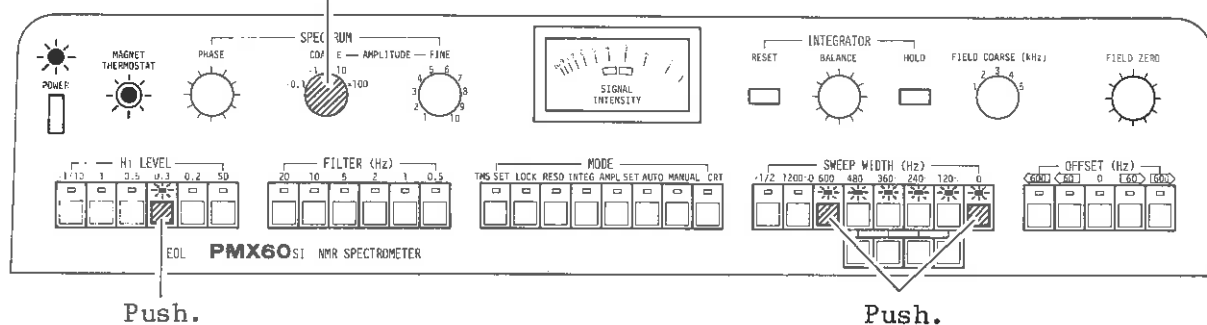
2. Setting resolution

H_1 LEVEL : 0.3
AMPLITUDE : $\times 1$ or $\times 10$
SWEEP WIDTH: 600 $\sim$ 0
SWEEP TIME : 50

Note: The following H_1 LEVEL settings are given as a criterion.

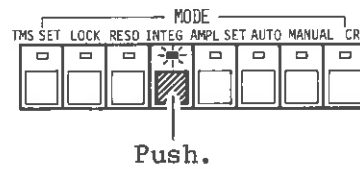
Sample concentration (%)	H_1 LEVEL settings
1 $\sim$ 5	0.5
10	0.3
20	0.2
20 or more	1 and $1/2 \times 1/10$

$\times 1$ or $\times 10$

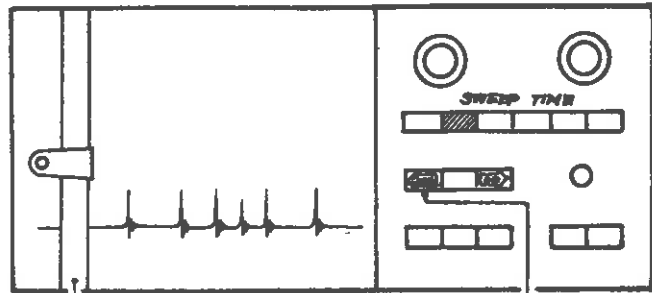


3. Record original signal on chart paper.

4. MODE: INTEG



5. Depress the **QUICK** key so as to set the pen where there is no signal.

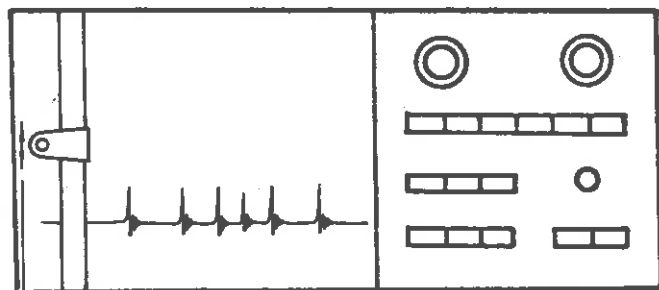


Set to far left, where no signal exists.

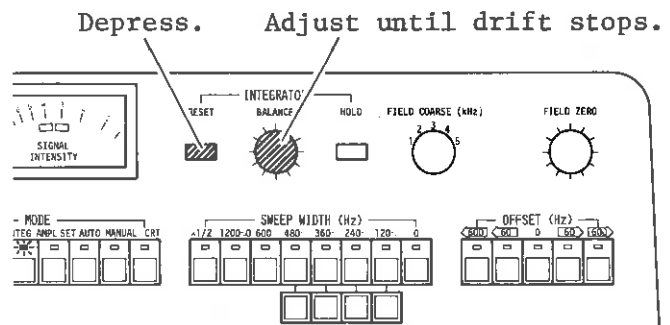
Depress.

6. Depress RESET button and adjust BALANCE knob.

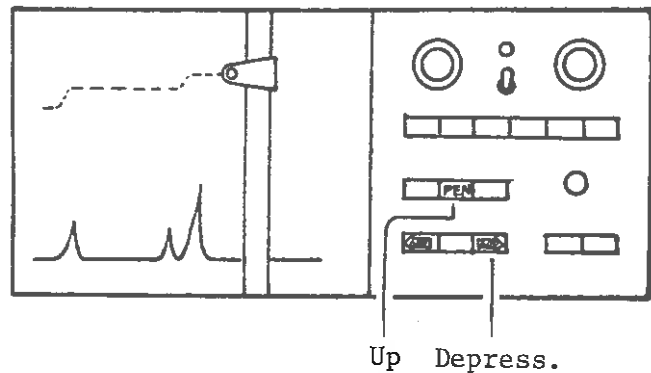
If the recorder pen drifts up or down, adjust the BALANCE knob so that the drift ceases, or is reduced to where it poses no hindrance to measurement. Repeat this operation until the drift is minimized.



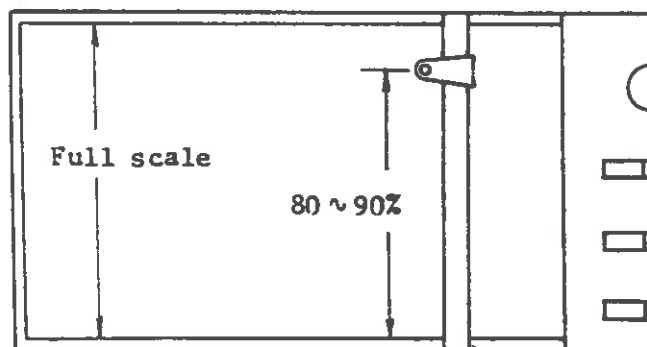
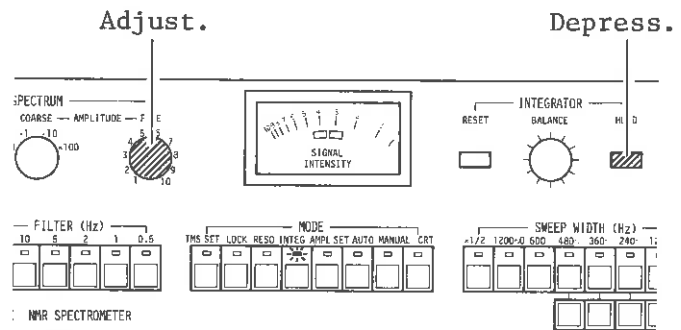
Drifts up or down.

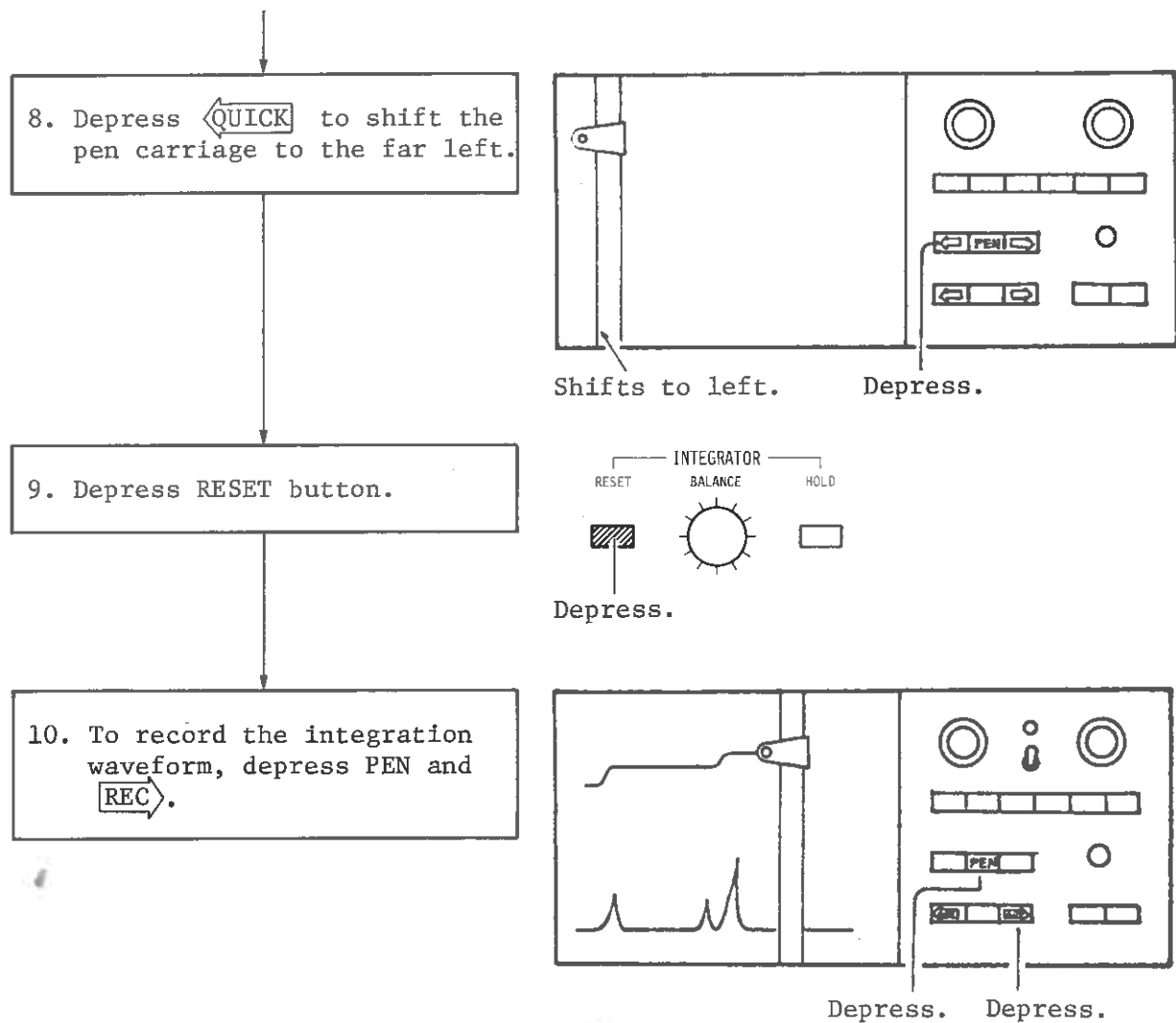


7. Release the PEN button (pops up) and depress  to perform sweep.



If the pen overscales during the sweep, adjust the AMPLITUDE FINE knob, while depressing the INTEGRATOR HOLD button, so that the pen attains 80 ~ 90% of chart paper full scale. Also use the COARSE knob if FINE adjustment does not suffice.





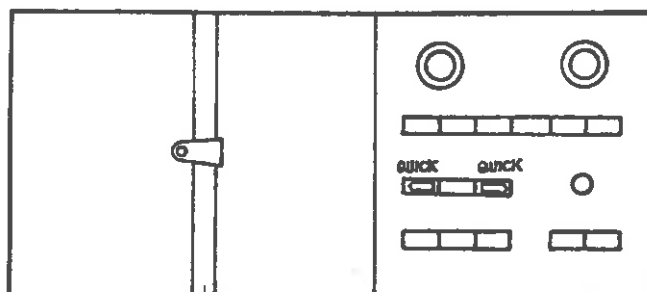
Adjust the PHASE and BALANCE knobs to correct abnormal integration waveforms.

	Phase of observation signal is abnormal. (Adjust PHASE knob.)		Normal phase and balance	Phase is normal; balance is abnormal. (Adjust BALANCE knob.)	
Observation signal					
Integration signal					

3.9.5 AMPL SET

Use this key when adjusting the AMPLITUDE knobs so that the highest peak of the obs. signal can be recorded on the chart scale.

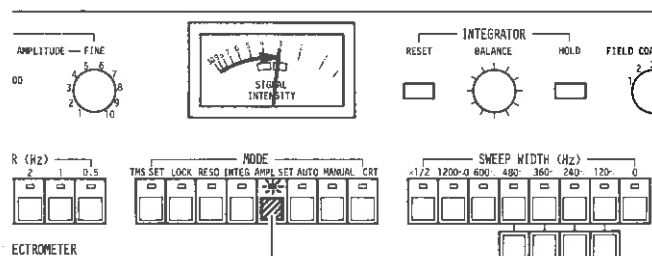
1. Use the appropriate QUICK button to bring the pen to chart center.



Center

2. SWEEP WIDTH: Set according to measurement
MODE : AMPL SET

The SIGNAL INTENSITY meter deflects about 10 seconds later.

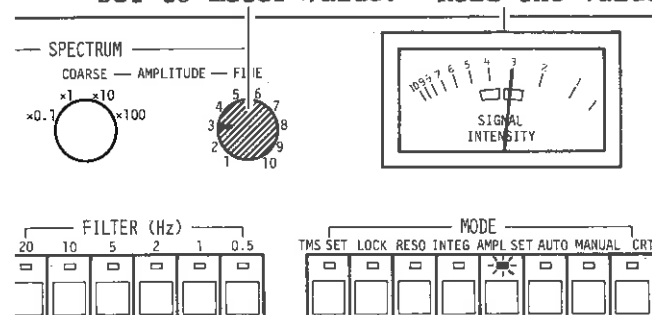


Push.

3. Since it takes 10 sec. for sweep to start, read out the meter value after 10 sec. have elapsed. Set the AMPLITUDE FINE knob according to this value.

For example, if the AMPLITUDE FINE knob is set to 3 when the meter indication is 3, the recording can be carried out at optimum amplitude.

Set to meter value. Read the value.

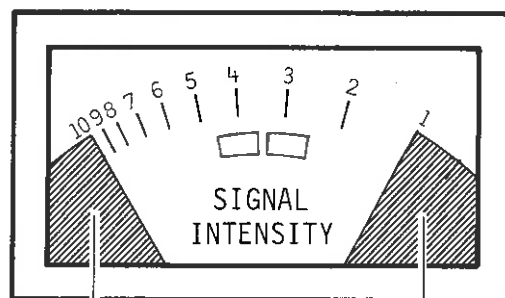


OSI NMR SPECTROMETER

Notes (a): Since sweep must be performed with the recorder pen in the center, always center the pen on the chart paper when AMPL SET is used.

(b): When the meter value is maximum, it is held as it is. Accordingly, to reset the meter, push the AMPL SET key again. The AMPL SET lamp will go out.

(c): If the meter indicator deflects beyond 10 or it overscales, reset the meter (release AMPL SET) and adjust the AMPLITUDE COARSE knob. (If the indicator is beyond 10, turn the COARSE knob clockwise; if under, turn the same knob counterclockwise.)

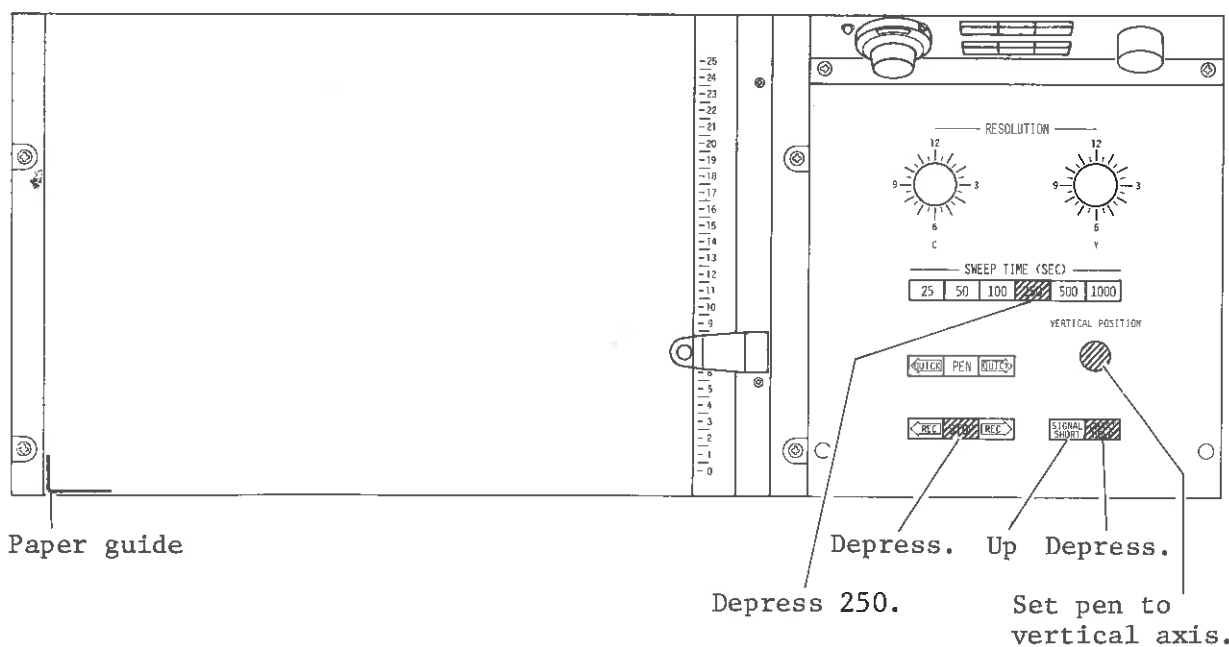
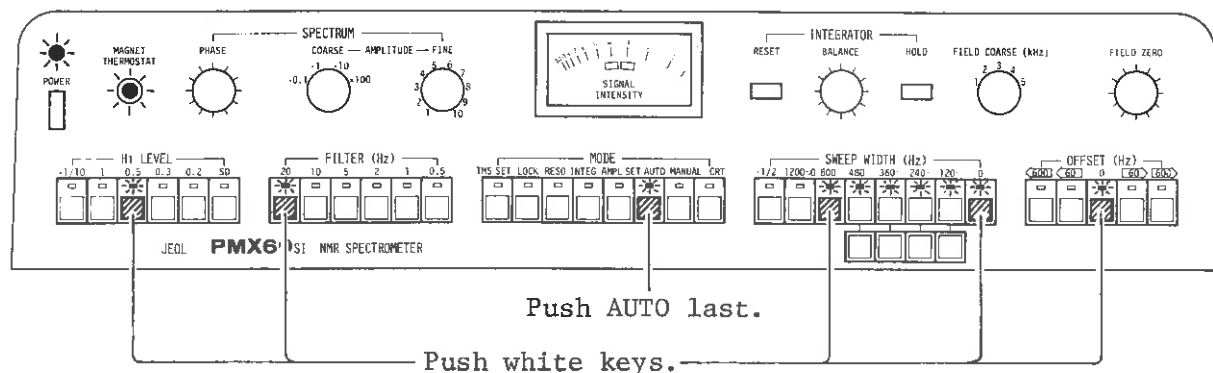


Turn the COARSE knob clockwise.

Turn the COARSE knob counter-clockwise.

3.9.6 AUTO

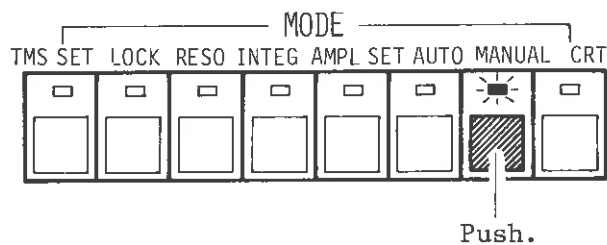
Most samples can be easily measured by pushing the white and AUTO keys. In this case, signals can be recorded under optimum conditions by merely adjusting the PHASE and AMPLITUDE knobs even when samples are exchanged. Other controls need not be adjusted.



Since sweep starts when AUTO is pushed, push this key last. Sweep will start from the paper guide side (see drawing) at the time set with the SWEEP TIME switches. In case the pen is not at this position prior to sweep start, it will rapidly return to it.

3.9.7 MANUAL

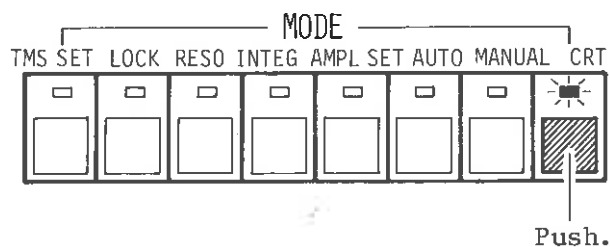
By pushing the MANUAL operation key, all settings can be made as desired.



3.9.8 CRT

Push this key to observe signals on the oscilloscope. It can be used with either AUTO or MANUAL.

Note: Refer to 3.4.1.



3.10 NMR LOCK (INTERNAL LOCK)

1. Inserting sample tube into probe.

Sample tube lever:

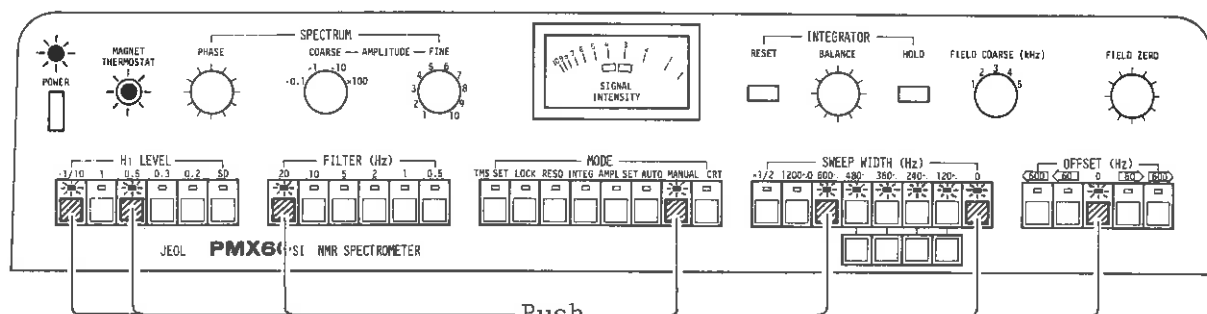
EJECT → SET → SPINNING

Note: To achieve a stable NMR lock, TMS of at least 5% must be mixed with the sample.



2. Setting the spectrometer

H₁ LEVEL : 0.5 and 1/10
 FILTER : 20
 MODE : MANUAL
 SWEEP WIDTH : 600 ~ 0
 OFFSET : 0
 INT/NORMAL/SD : NORMAL
 FREQ. OFFSET : 0



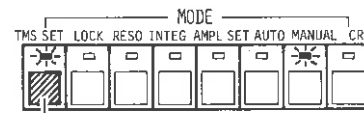
Push.

Depress.



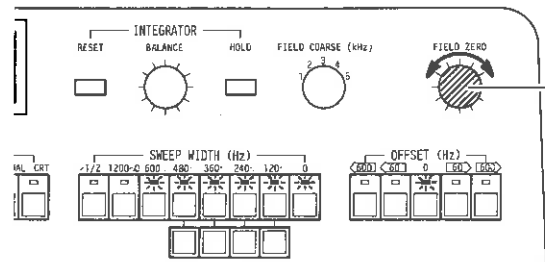
Depress.

3. MODE: TMS SET

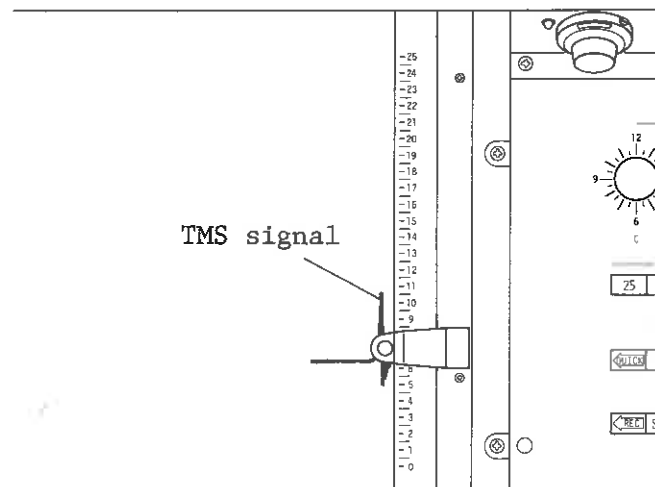


Push.

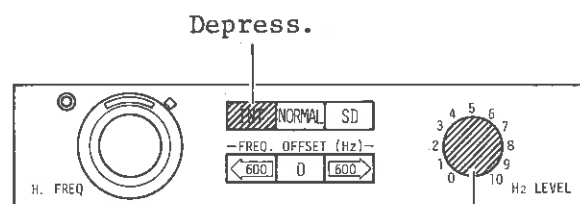
4. Adjust FIELD ZERO in order to obtain a TMS signal at the pen position.



Adjust.



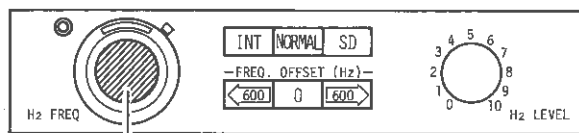
5. INT/NORMAL/SD: INT
H₂ LEVEL : 5 ~ 6



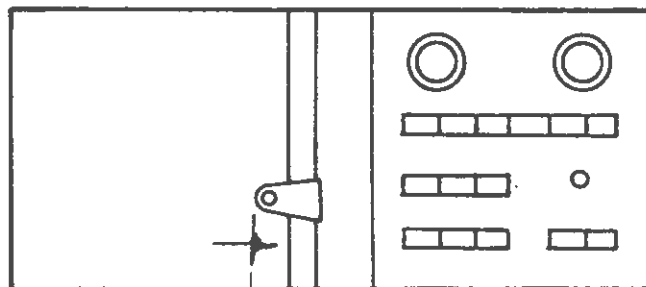
Depress.

5 ~ 6

6. Adjust the H₂ FREQ knob (9 - 50) so as to obtain a zero beat where the TMS signal is observed.



Adjust to 9-50.

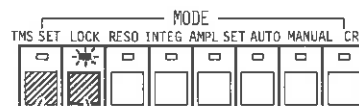


Zero beat

TMS signal

7. MODE: Release TMS SET.

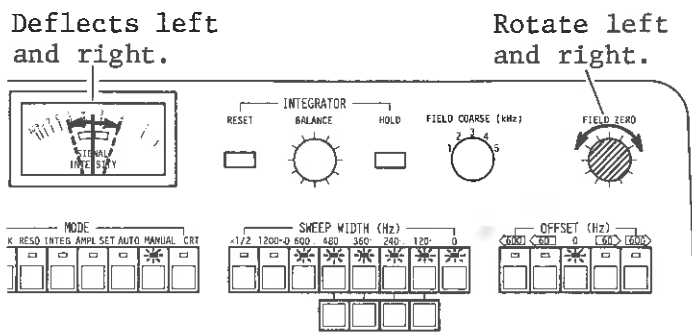
MODE: LOCK



Push to release.

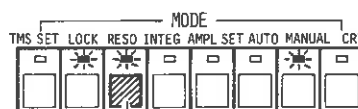
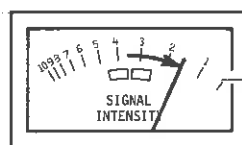
Note: Lock is temporarily released at the TMS position, that is, where the zero beat appears.

8. Verifying NMR lock
If the SIGNAL INTENSITY meter deflects left and right when the FIELD ZERO knob is turned slightly left and right, lock is normal.



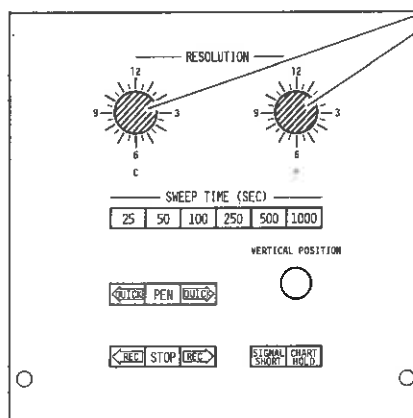
9. Adjusting resolution under internal lock conditions.

- a. MODE : RESO
- b. RESOLUTION Y, C: Adjust.
(Alternately adjust Y and C until deflection of SIGNAL INTENSITY meter is maximum.)



Push.

Alternately adjust.



Note: NMR lock is not functional when the TMS concentration in the sample is low and resolution cannot be adjusted.

3.11 SPIN DECOUPLING

1. Inserting sample tube

Sample tube lever:

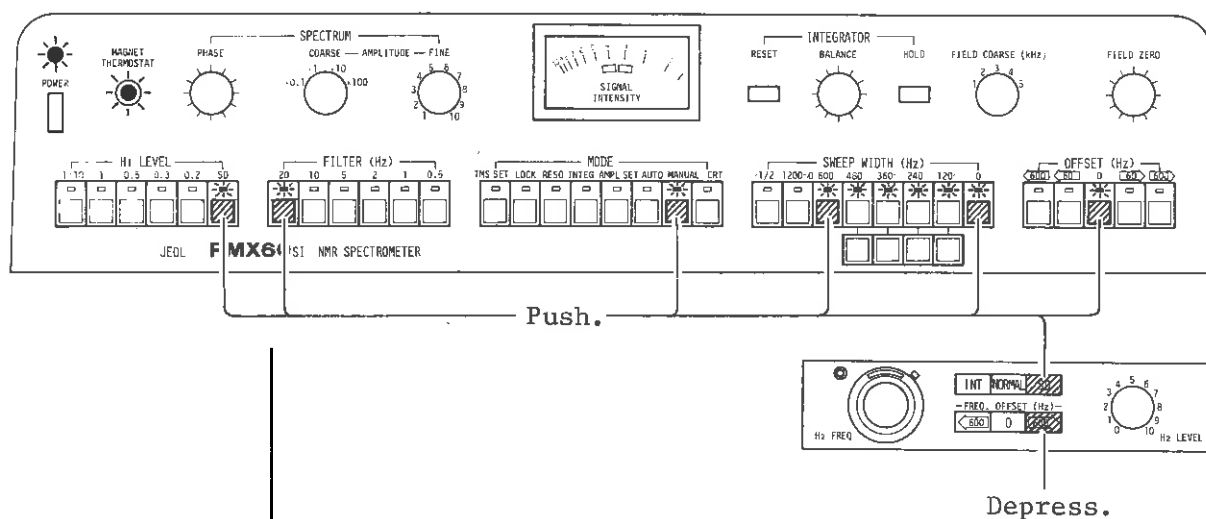
EJECT → SET → SPINNING

Sample: Crotonaldehyde (Optional),
Part No. 427000220

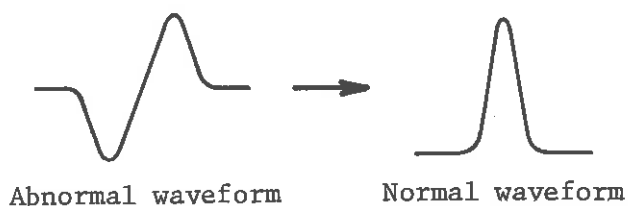
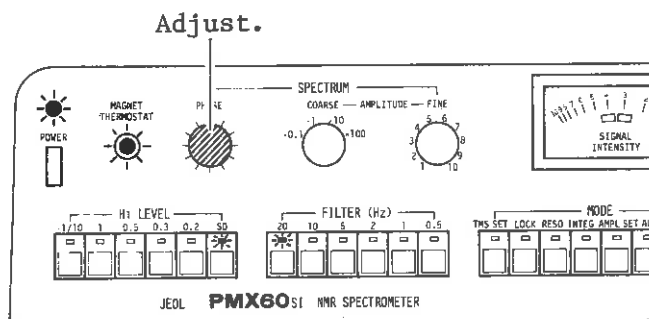


2. Setting spectrometer

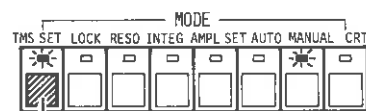
H₁ LEVEL : SD
 FILTER : 20
 MODE : MANUAL
 SWEEP WIDTH : 600 ~ 0
 OFFSET : 0
 INT/NORMAL/SD : SD
 FREQ. OFFSET : 600



3. Adjust PHASE in order to record a normal waveform.

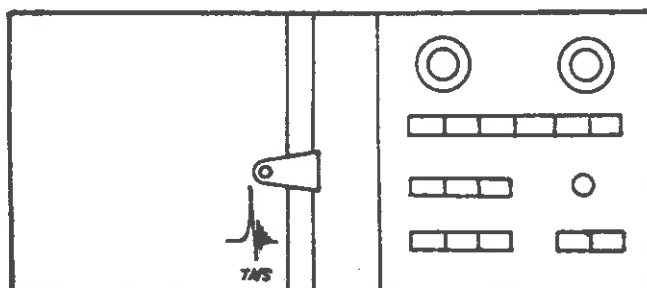
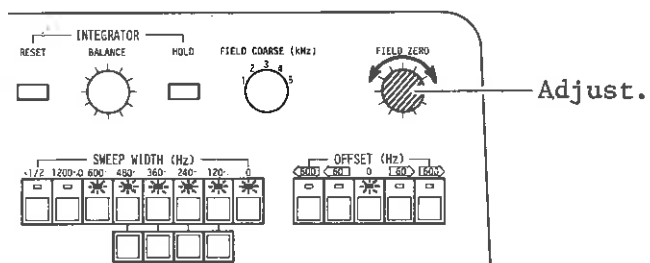


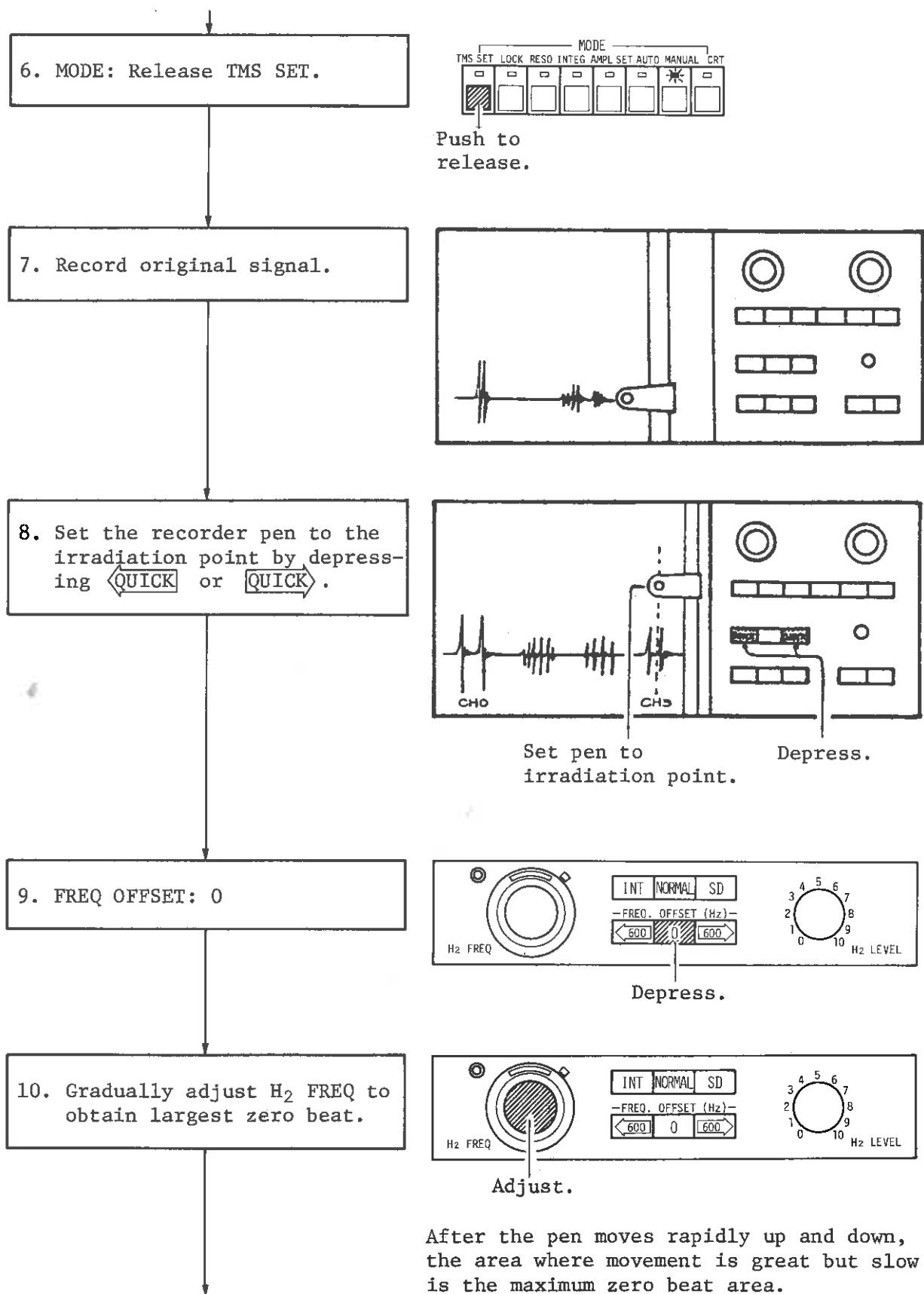
4. MODE: TMS SET



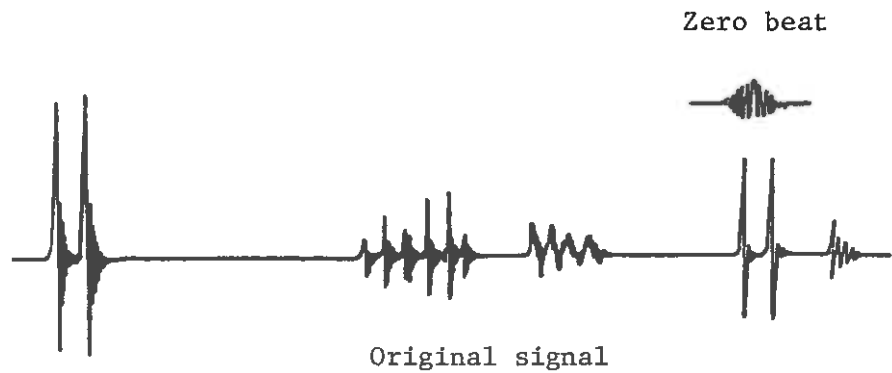
Push.

5. To observe the TMS signal at the pen position, adjust FIELD ZERO.





The record waveform of zero beat is shown below.



11. Record the decoupled signal.

Decoupled signal



Note: If a completely decoupled signal was not obtained, adjust H_2 FREQ until decoupling is complete.

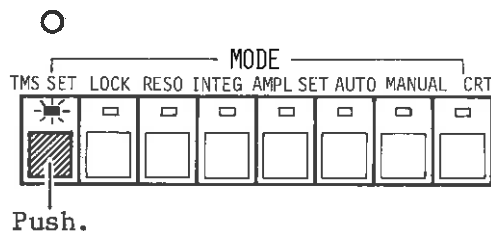
3.12 AUTOMATIC TMS SETTINGS

In case TMS is to be replaced with a different standard sample following automatic TMS setting, TMS signal-position shift is detected, the required magnetic field shift is calculated, and TMS is automatically set.

MODE : TMS SET

Note: Make the MANUAL lamp go out in the case of automatic TMS setting. If the said lamp lights up, operation will not be automatic TMS.

The recorder pen is automatically set to the 0 Hz position on the chart paper when TMS SET is pushed. At the same time, the sweep for detecting position-shifts starts.



The sweep stops as soon as TMS is detected. The upper TMS SET lamp will also light up, indicating that the TMS SET mode has been set.

