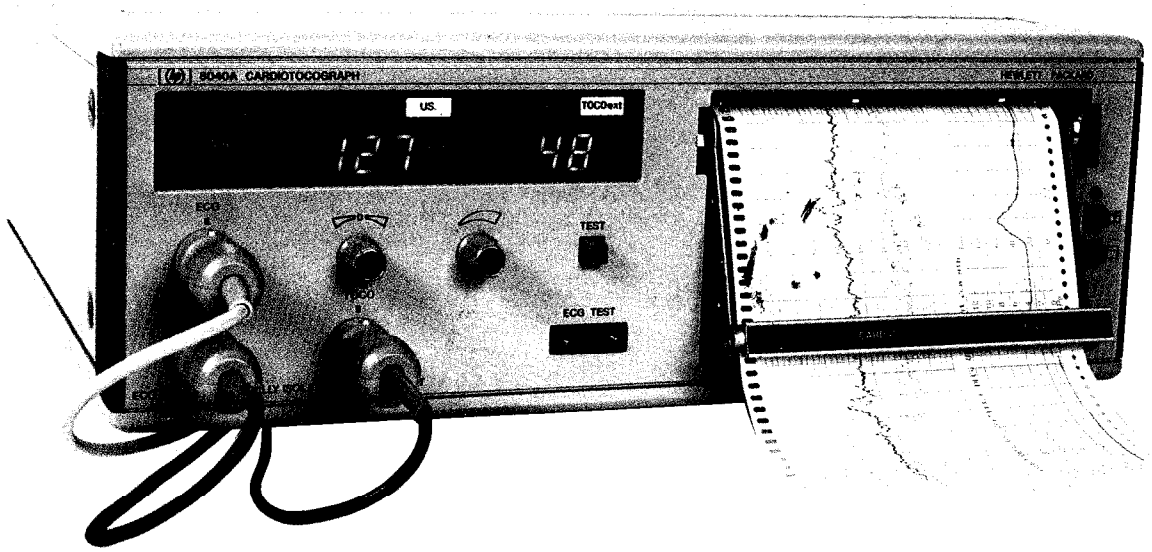
HEWLETT PACKARD

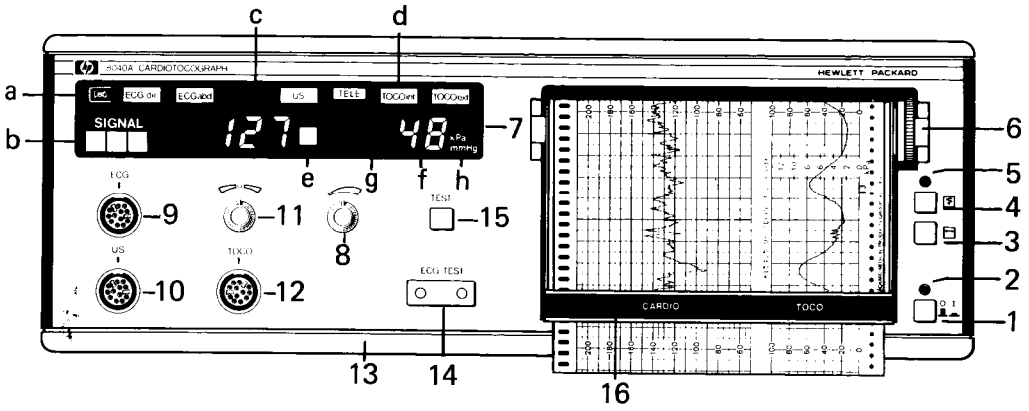
MODEL 8040A FETAL MONITOR



OPERATING GUIDE

CONTENTS

Controls and Connectors



8040A unit with dual heart rate monitoring

1. Instrument Power ON/OFF button.
2. Instrument ON light: lit when the instrument is switched on.
3. Mark button: can be pressed up to 10 times per mark sequence. Each time it is pressed, a line is drawn across both channels.
4. Recorder ON/OFF button.
5. Recorder ON light: lit when the recorder is switched on.
6. Thumbwheel: permits manual paper advance.
7. Display. Contains the following functions:
   a. indicates, when on, that the fetal heart rate logic is disabled, in order to record fetal arrhythmias. **Operative only in the Direct ECG mode.**
   b. Signal quality indicator: relates to fetal heart rate signal quality.
   c. Fetal heart rate numeric display.
   d. Selected monitoring method will light up when the transducer is plugged in. TELE lights when instrument is being used with rear panel input telemetry.
   e. Acceptance lamp: flashes when measurements of fetal heart rate are made.
   f. Uterine activity numeric display.
   g. Flashing +: indicates recorder upper limit is exceeded on TOCO channel.
   Flashing −: indicates recorder lower limit is exceeded on TOCO channel.
   h. Indicates intrauterine pressure measurement units (kPa or mm Hg).
8. control adjusts loudspeaker volume.
9. **ECG Socket: Accepts 15240A direct ECG cable:** direct ECG monitoring. Two fetal heart rates will be recorded when US transducer is connected to ⑩. (Twins application)
   Accepts 15241A Electrode Patient cable:
   – MECG monitoring providing MHR and US-FHR recordings.
   – Abdominal ECG monitoring (optional) providing MHR and FHR recordings.
   Note: The ECG modes are not electrosurgery-proof.
10. **US transducer socket only.** The measured fetal heart rate will appear in the numeric display and be recorded.
11. control sets TOCO (labor) channel baseline on recorder and numeric display.
12. TOCO Socket (brown colored) accepts any uterine activity transducer plug (same color). **(TOCO input is NOT electrically isolated for external TOCO method).**
13. Instructions, Test and Error Messages/Additional Information cards.
14. ECG test pins; see instruction card labeled "test" for operation.
15. Test button: see instruction card labeled "test" for operation.
16. Paper magazine. Recorder operates with magazine locked vertically or at 20 or 45 degrees.
    Magazine is removed by swinging to horizontal position and pulling.

Preparing the Fetal Monitor for Use

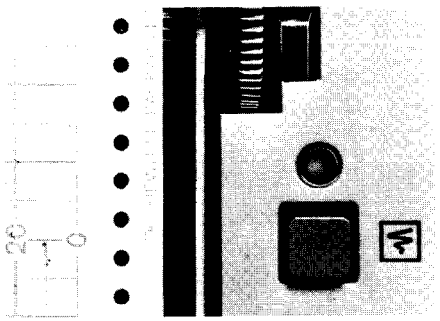
This procedure describes how to prepare your fetal monitor for use. Detailed application information for the various monitoring methods can be found by referring to the contents list at the front of this publication. Installation and patient safety information can be found on page 23.

Initial Set-up

1. Press the POWER button to turn the instrument on. (Pressing the button again will turn the instrument off). The control lamp just above it is on when the instrument is on.

   NOTE: With no patient cable or transducer connected, – – – and – – will appear on the CARDIO and TOCO displays respectively.

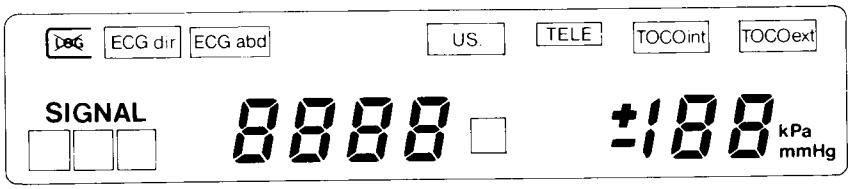
2. Switch the recorder on.
   The control lamp just above the recorder button is on when the recorder is on. Recorder annotates the time and paper speed.



Instrument Test

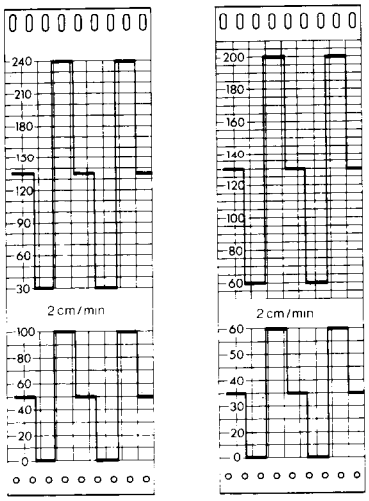
a. Without transducer connected:

When the test button is pressed, a display test and recorder test are performed: The following display should appear for four seconds, then switch off for two seconds. The cycle repeats itself as long as the test button is pressed.



The following test patterns should appear on the recorder as long as the test button is pressed.

Recorder test pattern:



b. With a transducer connected to the ECG-socket and US-socket:

- 'US' mode lamp lights up.

When the test button is pressed:

- 200 should appear in the fetal heart rate numeric display.
- The signal quality indicator should become green.
- The acceptance lamp flashes in time with the loudspeaker tone.
- Ultrasound tone is heard superimposed over the ECG tone.
- If the recorder is on, 200 will be recorded on the CARDIO channel.

This procedure does not test the transducer.

c. With a transducer connected to the TOCO socket:

When the test button is pressed:

- External TOCO; 50 will be added to the TOCO display.
- IUP; 50 mmHg (6.7 kPa) will be added to the TOCO display.
- If the recorder is on, the above values will be added to the value recorded on the TOCO channel.

This procedure does not test the transducer.

d. When the Direct ECG Cable/Electrode Patient Cable is connected to the ECG input and the patient cable block pins are pressed onto the ECG test pins 14, and the US transducer is connected to the US socket:

- The 'US' mode lamp is on and the fetal heart rate numeric display is blank.
- The signal quality indicator is red.
- The ECG test signal tone can be heard.
- If the recorder is on, 200 should be recorded on the CARDIO channel.

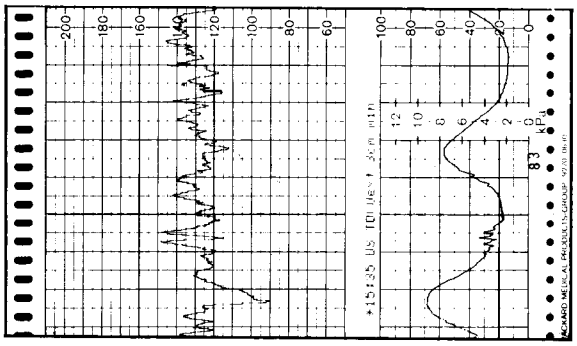
This procedure also tests the Direct ECG Cable/Electrode Patient Cable.

Recordings

1. Switch the recorder on. The control lamp just above the recorder button is on when the recorder is on.
   a. If no transducers are connected to the monitor when the recorder is switched on, the time, and pre-set recorder speed are annotated. The time is automatically annotated every 10 minutes.

   b. With transducers connected to the monitor when the recorder is switched on, the time, pre-set recorder speed, and monitoring methods being used are annotated.

   A change in the monitoring method or recorder speed during operation is immediately annotated.



   Note: The time mark (*) indicates the time shown next to it. (e. g. * 8:30)

2. The paper speed selector switch (cm/min) is located behind the paper magazine. The switch can be set as required.

3. The mark button can be pressed up to 10 times per mark sequence. For each time pressed a line is drawn across both channels. This is useful for differentiating between various events. (e. g. patient on her back, patient on her side). An optional remote event marker can be connected to the rear panel. It can be used to mark fetal movements during non-stress testing, for example.

4. The writing intensity of both pens can be independently adjusted. Removal of the paper magazine exposes two controls, **CH 1/CARDIO** and **CH 2/TOCO** which should be adjusted accordingly.

B ULTRASOUND

General Description

The ultrasound transducer detects fetal heart movements by directing a low-energy beam towards the fetal heart. The transducer contains 7 crystals which transmit an ultrasound signal and receive a reflected signal from the fetal heart when placed on the maternal abdomen. It is based on the Doppler Effect which measures frequency changes according to the movements of the heart wall or valves. Monitoring using ultrasound is recommended beginning at the 16th week of gestation for non-stress or normal routine fetal monitoring.

NOTE: Like every other external fetal heart rate method available today, ultrasound has certain limitations in obtaining an ideal recording of the fetal heart rate. These limitations include patient discomfort, fetal movement, maternal respiration and maternal heart activity. Therefore, the ultrasound method is not recommended for clinical use in the last stage of labor.

Materials required

1. Ultrasound transducer 15245A
2. Aquasonic 9301-0187
3. Belt, 1.3 m (4 1/4" ft.) long, 32 mm (1 1/4") wide 1500-0627

Transducer Placement/Operation

1. Connect the ultrasound transducer plug to the US socket. Both plug and socket are colored blue and keyed so that they will mate in one position. The — — — sign will extinguish and "US" will light up above the numerical display. Mode annotation is made.

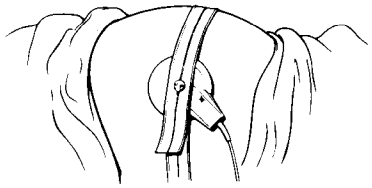
2. Define fetal position by palpation or auscultation to locate the fetal heart.

3. Arrange the belt around the patient so that the loose ends are on top of the abdomen. Apply a film of Aquasonic over the entire transducer face and place it over the fetal heart. Adjust the volume control to the desired level.

4. Once the fetal heart beat is clearly heard, keep the transducer in place and watch the signal quality indicator until it stabilizes.
   green: optimal signal
   yellow: fair to potentially poor signal (if displayed continuously you should consider repositioning the transducer)
   red: indicates signal unacceptable for processing (if displayed continuously, repositioning is necessary). No trace will be recorded.

An alternating signal condition (e. g. green, yellow, red) does not necessarily require repositioning. This may be caused by fetal movement. Wait for signal stabilization before repositioning.
In addition, the quality of the signal can also be ascertained by listening for a rhythmic sound from the loudspeaker. When the fetal heart beat has been detected, the acceptance lamp will flash and a numerical reading will be displayed.

5. Once a satisfactory position has been found, arrange the belt over the transducer. Locate the transducer knob into one of the slits on both ends of the belt.

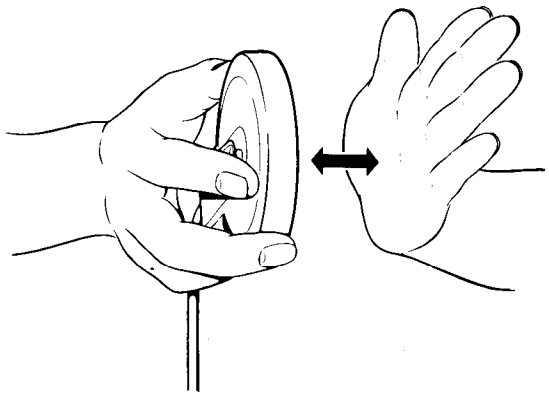


Malfunction

If you have reason to believe that the ultrasound mode is not operating properly, perform the following checks:

1. Make sure the "US" indicator is on and that mode annotation has been made.

2. With the transducer connected to the fetal monitor, press the TEST button. A few seconds later the acceptance lamp will flash in rhythm with a hollow sounding tone from the loudspeaker; 200 bpm will appear on the heart rate display. The signal quality indicator will become green.



3. The TEST button operation does not check the transducer. To do this, first ensure that the volume control is set to the middle position. Then hold the transducer in one hand and move your other hand repeatedly towards, then away from the transducer surface. A noise will be audible from the loudspeaker.
   If no noise is apparent, try another transducer.
   If these checks fail, call your hospital technician or the nearest Hewlett-Packard office giving full details of the malfunction.

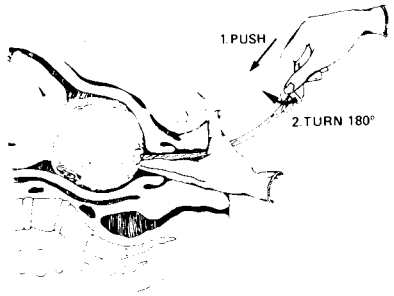
Problems, Causes and Solutions

(If an error message appears refer to section H)

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Intermittent FHR pen movements on the recorder/Erratic digital display/Erratic acceptance lamp flash	• transducer slips (loosely fastened belt) • very active fetus • maternal movement • insufficient gel applied to transducer surface	• reposition transducer until green quality indicator lights (apply more aquasonic) • tighten belt • relax patient • apply aquasonic to transducer surface
Red signal quality indicator lights continuously	• signal unacceptable for processing	• reposition transducer and wait for green quality indicator
Questionable heart rate	• recording maternal heart rate	• Check maternal pulse for coincidence with the audible signal
Burned trace	• pen heat too high • bad paper feed	• turn pen heat knob counter-clockwise (located behind paper magazine) • Check paper feed

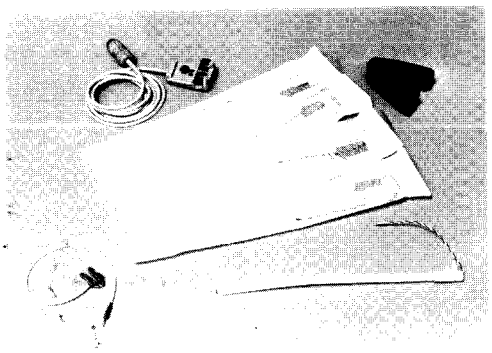
C DIRECT ECG

General Description



The Direct Fetal ECG provides the best trigger signal for measuring and recording instantaneous (beat-to-beat) fetal heart rate. In order to detect the fetal ECG, a small spiral electrode is attached to the fetal presenting part. A cervical dilation of two centimeters and a fetal station of at least minus two are necessary before the electrode can be applied. Direct fetal heart rate monitoring can be used throughout labor and delivery after the rupture of membranes.

Materials required

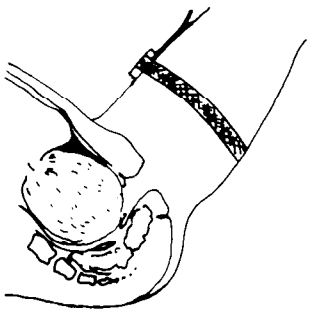


1. Belt 0.8 m (2 5/8 ft.) 1500–0630
2. Patient Cable 15240A
3. One lead cable electrode (0.3 m) . 15243A
4. Disposable spiral electrodes with application tool

   15133C Europe (double spiral) 5 each
   15133A USA (single spiral) 5 each

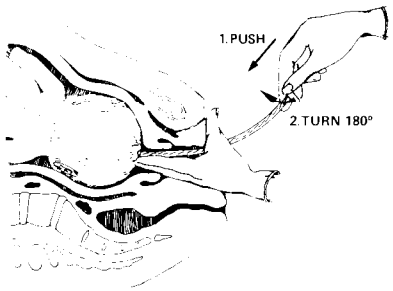
For detailed ordering information, see p. 19.

Patient Preparation

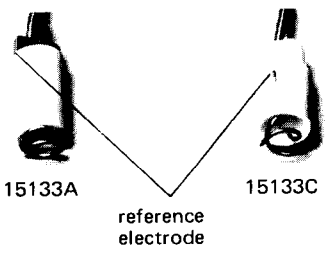


1. Prepare the patient in the same way that a normal routine vaginal examination is performed.
2. Arrange the belt around the patient's upper thigh so that the loose ends are on top.
3. Position the cable block pointing towards the abdomen and place it on the upper thigh underneath the belt.
   Note: it is **not** necessary to apply Redux creme to the leg plate.
4. Locate the brown knob on the cable block into one of the slits on both ends of the belt.

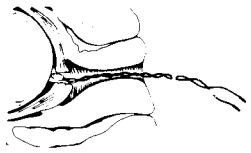
Spiral Electrode Attachment



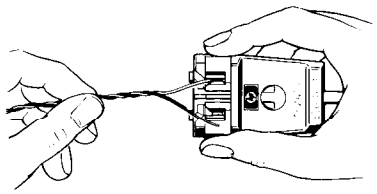
1. Remove the applicator, containing the electrode, from the sterile package.
2. Perform a sterile vaginal examination and identify the fetal presenting part. Make sure not to apply the electrode over the fontanels or the fetal face. Introduce the guide tube over the fingers and position it at a right angle to the fetal presenting part.
3. With the other hand, snap out the handle of the guide by turning it 45 degrees in a clockwise direction. Push on the handle so that contact is made with the fetal presentation, then turn another 180 degrees to implant the electrode in the fetus. **In NO circumstances should the handle be turned by more than 180 degrees.**
   For proper operation the reference electrode must be in contact with cervical or vaginal secretions.



4. Retract the applicator, taking care that the electrode wires pass freely through the tube.



5. Remove the protective wax from the spiral electrode wires and insert the wires into the clamps located on top of the patient cable block. The red or white wire from the electrode may be placed in either clamp. Polarity is automatically corrected by the instrument.

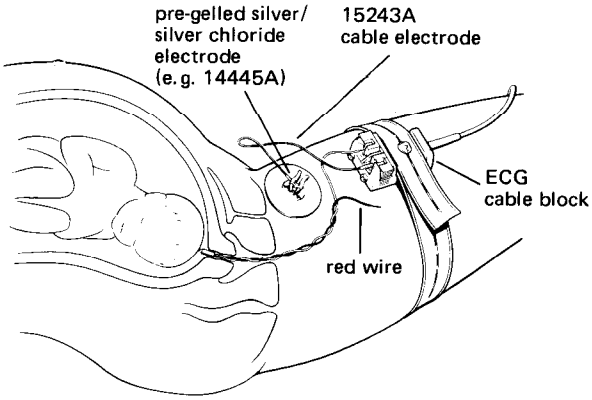


Operation

1. Connect the patient cable to the **ECG** socket. Both the plug and the socket are colored blue, and keyed so that they will only mate in one position. The – – – sign will extinguish and "ECG dir" will light up above the numerical display, mode annotation is made and the acceptance lamp will flash with a tone from the loudspeaker. The signal quality indicator should become green. Adjust the volume control to the desired level.

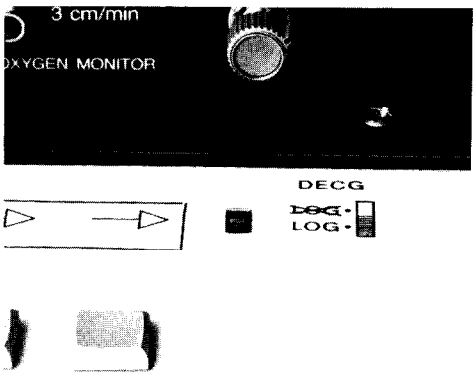
2. IMPORTANT NOTE
   Bad contact of the "reference" electrode with the mother via the electrolytic content of the cervical and vaginal secretions can cause any of the following to occur:
   - signal quality indicator continuously displays red or
   - erratic FHR trace being recorded

   If these occur, an additional cable electrode (15243A) is supplied that can be connected to a pre-gelled, disposable silver/silver chloride electrode (14445A) on the patient's upper thigh.
   Remove the **red electrode wire** from the ECG cable block. Connect the additional electrode to the clamp in place of the red lead.



3. Removal of the spiral electrode may be done with the presenting part crowning and the application site visible, or after delivery. Rotate the spiral electrode in a counter-clockwise direction. NEVER pull the electrode off.

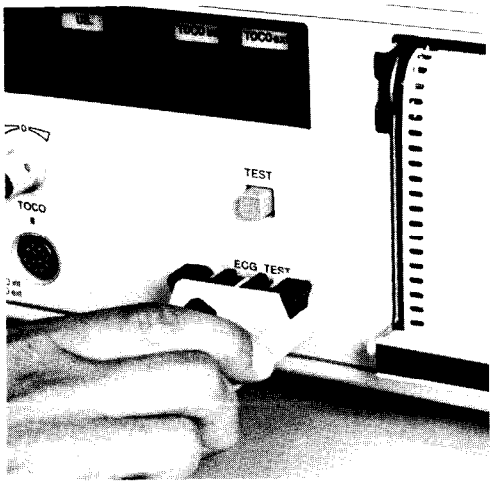
4. Fetal Arrhythmias can be recorded if the LOGIC switch is in the OFF position. This switch is located behind the paper magazine. In the OFF position, the "pen lift" logic is disabled which means that beat-to-beat heart rate changes of more than ± 28 bpm will be recorded.
   The [LOG] indicator on the front panel display will be lit when logic is switched off and DECG [noLOG] will be annotated. In the ON position, beat-to-beat heart rate changes of more than ± 28 bpm will be rejected. The LOGIC switch should always be returned to the ON position after monitoring has finished.
   The switch is operative only in the Direct ECG mode.



Malfunction

If you have reason to believe that the direct ECG mode is not operating correctly, perform the following checks:

1. Make sure the "ECG dir" indicator is on and that mode annotation has been made.
2. Remove the electrode leads from the patient cable block; hold the block to the ECG test pins.
   After approximately 4 seconds the acceptance lamp flashes in rhythm with a tone from the loudspeaker.
   The signal quality indicator should become green and 200 appears on the fetal heart rate display and recorder.



If these checks fail, first try another patient cable. Then call your hospital technician or the nearest Hewlett-Packard office giving full details of the malfunction.

Problems, Causes and Solutions

(If an error message appears refer to section H)

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Intermittent FHR pen movements on the recorder or signal quality indicator continuously displays red	• no ECG signal, signal unacceptable for processing due to poor contact between reference electrode and the mother	1. • remove red wire from clamp. Connect one lead cable electrode to the clamp instead. Place pre-gelled silver/silver chloride electrode high on the thigh. 2. • if the above does not solve the problem, use a new spiral electrode
	• fetal heart arrhythmia	• locate logic switch behind the paper magazine in the OFF position to record the arrhythmia trace
INOP appears in FHR display	• improper connection of electrode leads to patient cable block • no contact between the reference electrode and the mother • spiral electrode detachment	• check electrode lead connection • remove red wire from clamp. Follow instructions in solution 1 above. • reapply spiral electrode

General Description

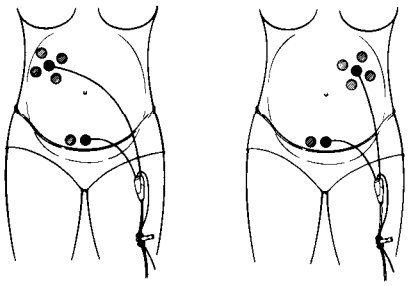
With this method, the electrodes are placed directly on the mother's abdomen. The signal quality control system of the instrument is a useful aid during electrode placement. Not all patients are ideally suited to this form of monitoring, and if the results obtained within the first ten minutes of monitoring are poor or non-existent, an alternative method should be used.

Materials required

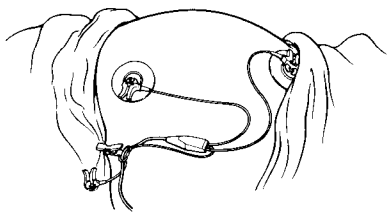
1. Electrode Patient cable 15241A
2. Pre-gelled silver/silver chloride electrodes. 14445A
3. 2 Suction cup electrodes 15174-60001

Operation

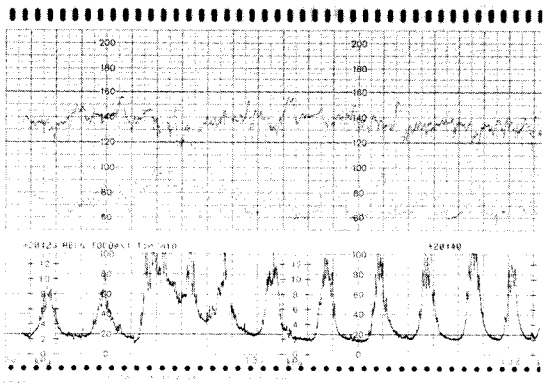
1. Connect the Electrode Patient Cable to the **ECG** socket. "Abd ECG" will light up above the INOP display.
2. Using an alcohol swab, clean the skin over the pubic symphysis and on the patient's upper right abdomen. Rub a little REDUX creme into the cleaned areas and squeezing the bulb of each of the suction cup electrodes, place one electrode over each of the cleaned areas. Connect the two yellow clips of the patient cable to these two electrodes.
   The INOP sign is extinguished. Observe the signal quality indicator lamps: if the green or yellow lamp is not lit after a few seconds, reposition the electrodes as shown on the right. When the optimum signal is obtained, the green lamp will light.



3. For long-term monitoring, replace the suction cup electrodes with the pre-gelled Ag/AgCl electrodes. Fasten the cable to the patient's clothing.



4. The fetal heart rate is shown on the numerical display and the fetal ECG trigger tone is heard from the loudspeaker.
5. If the recorder is on, the fetal heart rate (darker trace) is recorded in alternation with the maternal heart rate (lighter trace).
   The following annotation is made: "time of day, AECG, TOCO ext. or TOCO int., recorder speed".



D ABDOMINAL ECG

Malfunction, Cable Test

If you have reason to believe that the abdominal ECG mode is not operating correctly, perform the following checks:

1. Make sure that the "Abd ECG" indicator is on and that mode annotation has been made.
2. Connect the two yellow clips of the cable to the "ECG" test pins on the front of the instrument. A few seconds later, the acceptance lamp flashes in rhythm with the tone from the loudspeaker. "200" bpm should be observed on the numerical display and 200 bpm (darker trace) and 65 bpm (lighter trace) should be recorded alternately.

If these checks fail, first try another patient cable 15241A. Then, if necessary, call your hospital technician or the nearest Hewlett-Packard office giving full details of the malfunction.

Problems, Causes and Solutions

PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Err 04	• cable is connected to wrong socket	• make sure that 15241A patient cable is connected to ECG socket.
Err 05	• abdominal ECG option is not installed and ultrasound transducer is not connected to US socket	• use the ultrasound method provided.
REC6 01	• maternal ECG signal is too small in comparison with the fetal ECG signal. • maternal ECG signal is buried in noise (muscle potential).	• reposition the upper electrode for a better MECG signal • use a third electrode, connecting it to the shorter lead with green clip. • if neither of above solution helps, use the ultrasound method.
Numeric display is blank and signal quality lamp is continuously red.	• no fetal signal detected (noise)	• use a third electrode, connecting it to the shorter lead with green clip. If this does not help use the ultra-sound method.
INOP is displayed continuously	• electrodes have bad contact with the skin/cable clips • break in the patient cable	• check contacts • perform cable test, if necessary, use another 15241A patient cable.

Monitoring the Fetal Heart Rate and the Maternal Heart Rate

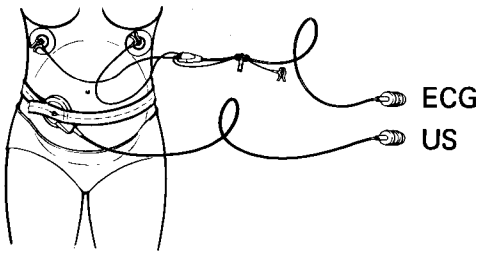
In combination with Ultrasound monitoring of FHR the 15241A patient cable can be used to monitor the maternal ECG signal. The calculated maternal heart rate (MHR) is recorded on the chart paper in alternation with the ultrasound FHR trace.

Materials required

1. Ultrasound transducer 15245A
2. Aquasonic 9301-0187
3. Belt, 1.3 m (4 ¼ ft) long, 32 mm (1 ¼") wide 1500-0627
4. Electrode patient cable 15241A
5. Pregelled silver/silver-chloride electrodes 14445A

Operation

1. First connect the ultrasound transducer 15245A to the **US** socket. The ——— sign will extinguish and "US" will light up above the numerical display.



2. Then connect the electrode patient cable 15241A to the **ECG** socket. The "US" mode display is retained as the fetal heart rate is being monitored by ultrasound.

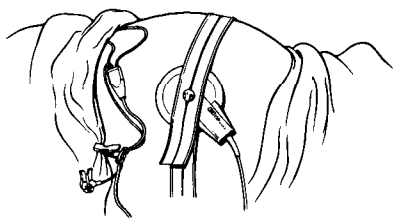
3. Define the fetal position by palpation.

4. Arrange the belt around the patient so that the loose ends are on top of the abdomen. Apply a film of Aquasonic over the entire ultrasound transducer surface and place the transducer over the fetal heart. Adjust the volume control to the desired level.

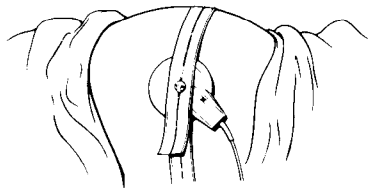
5. Once the optimum monitoring position has been located, arrange the belt over the transducer. Fit the transducer knob into one of the slits at either end of the belt so that it sits comfortably. The instrument display shows the ultrasound fetal heart rate.

6. Apply the two pregelled ECG electrodes as high as possible on the two midclavicular lines. Then connect the two yellow clips of the electrode patient cable to the electrodes.

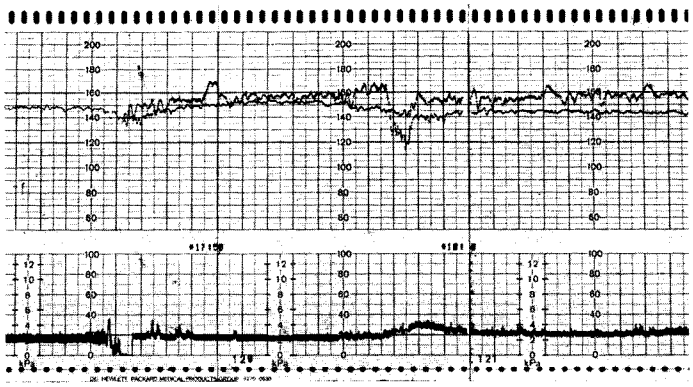
7. Once the maternal ECG trigger tone and the fetal ultrasound tone are heard over the loudspeaker, fasten the patient cable to the patient's clothing using the gray plastic clip.



5. Once a satisfactory differentiation of the two FHRs is made, arrange the belt over the ultrasound transducer. Fit the transducer knob into one of the slits at either end of the belt so that it sits comfortably.



6. The heart rate of the second fetus (ultrasound, darker trace) is recorded in alternation with the heart rate of the first fetus (DECG, lighter trace) in channel 1.
   The following are annotated: time of day, DECG/US, TOCO ext. (or TOCO int.), recording speed.



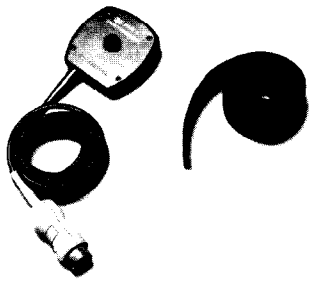
PROBLEM	POSSIBLE CAUSE	POSSIBLE SOLUTION
Err 04	• patient cable or ultrasound transducer connected to wrong socket	• connect patient cable to ECG socket and ultrasound transducer to US socket
Erratic recording or no recording at all of DECG	• bad contact between electrodes and patient cable clamps • bad contact between fetal scalp electrode and mother due to lack of vaginal secretion	• remove wax from the electrode wires before connecting to patient cable clamps, clean patient cable clamps
	• break in electrode wire	• if the red electrode wire is broken, replace it with the 15243A cable electrode (see section C page 9). If this does not solve the problem, use another spiral electrode
	• fetal arrhythmia?	• switch LOG off to record arrhythmia. Remove the paper magazine to access the logic switch
	• patient cable is defective	• verify by performing instrument test (see relevant section). If necessary, use another patient cable
Ultrasound FHR of second fetus is suspiciously brady-cardic	• ultrasound transducer might be detecting the maternal vessels	• check maternal pulse to verify. If this is the cause, reposition the transducer to provide clear detection of the fetal heart rate

General Description

A relative measurement of uterine activity is made by placing a pressure sensitive transducer on the maternal abdomen. External labor monitoring can be used both antepartum and intrapartum.

Materials required

1. Toco Transducer 15248A
2. Belt 1.3 m (4 1/4 ft.) long, 60 mm (2 2/5") wide 1500–0642



Transducer Placement/Operation

1. Connect the labor transducer plug to the **TOCO** socket. Both plug and socket are colored brown, and keyed so that they will mate in one position. The – – sign will extinguish and "TOCO ext" will light up above the numerical display. Mode annotation is made. Adjust the control marked ⌐0¬ for a toco reading of zero.

2. Arrange the belt around the patient so that the loose ends are on top of the abdomen.

3. Place the transducer on the fundus where the contractions are strongest.

4. Arrange the belt over the transducer and locate the transducer knob into one of the slits on both ends of the belt. Adjust the belt tightness for a pressure reading of 20. Ensure that the adjustment is made between contractions. If + or – indicator lamps flash, this may be due to improper zeroing.

NOTE: The pressure reading displayed is proportional to mechanical force applied to the transducer pick-up button. Multiplying this reading by 10 gives the equivalent force in grams. Hence setting the tension to 20 provides a force of 200 grams which helps overcome abdominal muscle artifact.

Malfunction

If you have reason to believe that the **TOCO** mode is not operating correctly, perform the following checks:

1. Check for a reaction on the recorder and numerical display by slowly turning the ⌐0¬ control.

2. With the transducer connected to the fetal monitor, press the TEST button. The numerical value of the **TOCO** display will be increased by 50 ± 2. For example: 24 becomes 74 ± 2 or – 24 becomes + 26 ± 2.

3. However, the TEST button operation does not check the transducer. To do this gently apply a pressure to the pick-up button of the transducer and look for an increase on the display and recorder. If no deflection is apparent try another transducer.

If these checks fail, call your hospital technician or the nearest Hewlett-Packard office giving full details of the malfunction.

Problems, Causes and Solutions

(If an error message appears refer to section H)

The following problems may arise during monitoring:
- Labor trace quality deteriorates
- Respiration superimposed on labor trace

These may be caused by:
- Incorrect belt tension
- Change in maternal position

To eliminate the problems, reposition the transducer on the fundus and adjust belt tension for a reading of 20 between contractions.

General Description

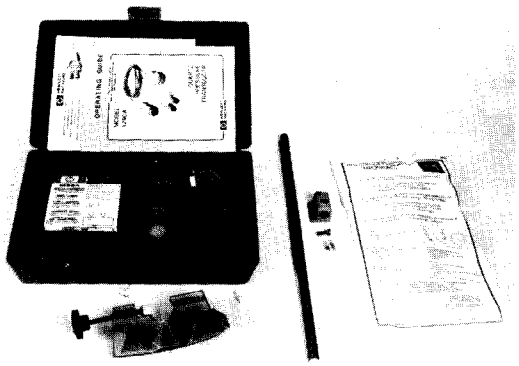
Intrauterine pressure monitoring may be used after rupture of the membranes. Once this has occured, a thin flexible polyethylene catheter is inserted through the cervix into the lower uterine segment. The catheter lies between the presenting part of the fetus and the wall of the uterus. Once the catheter is in place it is filled with a sterile fluid and any increase in pressure is then transmitted through the fluid column to a pressure transducer attached to the fetal monitor.

Materials required

1. Pressure transducer 1290A Option 005 and holder 1292A, or 1290C* option J05 and holder 1292C
2. Internal labor kit 15246-60001, including:
   - Mounting hardware for direct mounting on 8040A
   - 14099C disposable intrauterine kit.
3. Sterile water
4. Carpenters level

For detailed ordering information, see p. 30.

*Note: Both the 1290A and 1290C are available for use with the 8040A but each monitor is internally configured to be used with either one or the other. Using the incorrect transducer will cause an Err 03 message on your monitor.



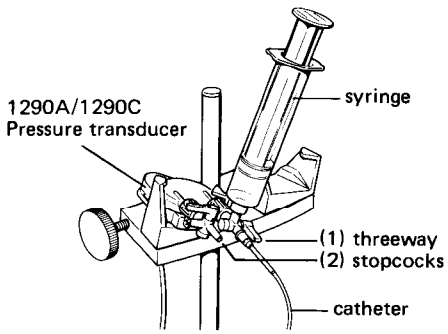
Preparing the Pressure Transducer

1. Sterilize the transducer (1290A or 1290C) if necessary. Follow the specific instructions given under the title **Sterilization.**

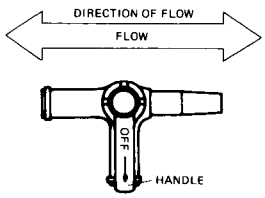
CAUTION: Do not autoclave the transducer, use only a cold chemical or gas sterilization process.

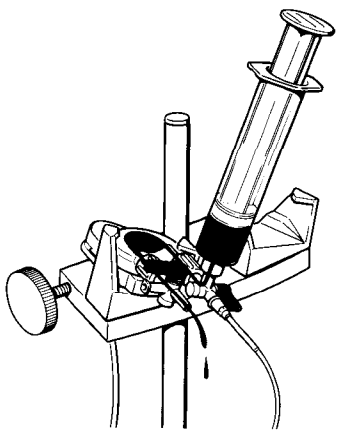
2. Use a drop of sterile water or saline between the dome membrane and the transducer diaphragm to displace the air between the two surfaces.
3. Attach the dome to the transducer and lock properly.
4. Open the pressure kit (14099C) and fill the syringe with sterile distilled water.
5. Fit the syringe and threeway stopcocks to the transducer. One stopcock is used to connect the syringe and the catheter to the dome (1). Flow is closed in the direction of the "OFF" arrow (see diagram).
   The other stopcock is used to open or close the transducer to air (2).
6. Set the stopcock so that the syringe is open to the transducer and open the other stopcock so that the transducer is open to air (see diagram).
7. Gently press the syringe plunger to allow the sterile liquid to flow slowly through the dome until it flows out of the transducer. Ensure that the open end of the transducer is pointing away from the fetal monitor so that the fluid does not flow into the instrument.

CAUTION: Excessive purging pressure may distort and damage the transducer diaphragm. The disposable dome can be connected to the plumbing system, filled and flushed without being attached to the transducer, but it should not be pressurized since this would cause the membrane to distend and accumulate excess fluid.



1290A/1290C
Pressure transducer and plumbing





Filling the dome

H ERROR MESSAGES

ERROR MESSAGE	POSSIBLE CAUSE	REMEDY/USER ACTION
Err 01	• the FHR monitoring method corresponding to the transducer plugged in is not installed in the instrument	• use one of the methods indicated above the instrument's FHR display
Err 02	• the uterine activity monitoring method corresponding to the transducer plugged in is not installed in the instrument	• use one of the methods indicated above the instrument's TOCO display
Err 03	• the sensitivity of the intrauterine pressure transducer plugged in does not correspond to the internal setting	• use the type of transducer for which the instrument has been configured
Err 04	• transducer/patient cable connected to the wrong socket	• connect ultrasound transducer to US socket and electrode patient cable to ECG socket
Err 05	• ultrasound transducer is not yet connected	• connect ultrasound transducer to the US socket
AECG 01	• AECG mode Poor signal; either the maternal signal is too small compared with the fetal signal or it is distorted by muscle artifact	• use 3rd electrode (green clip) • reposition the electrodes • use the ultrasound method instead, if neither of the above solutions help
An error code greater than 9 indicates a technical problem in the instrument. Call an authorized technician or HP's nearest service office.		

Installation and Patient Safety

The instrument fulfils safety requirements according to IEC 601-1 and UL 544. (ECG, IUP class CF; all other class B).
The environment where the 8040A will be used should be reasonably free from vibration, dust, corrosive or explosive gases, extremes of temperature, humidity, etc. For a cabinet mounted installation, allow sufficient room at the front for operation and sufficient room at the rear for servicing with the cabinet access door open.

The 8040A operates within specifications at ambient temperatures between 0°C and 55°C. Ambient temperatures which exceed these limits could affect the accuracy of the instrument and cause damage to the components and circuits. Allow at least two inches (5 cm) clearance around the instrument for proper air circulation.

Power Source Requirements

The 8040A can be operated from an ac source of 115 or 230 volts (+ 10 % – 22 %) 50 Hz or 60 Hz. Before connecting power, ensure that the Voltage Selector switch on the instrument's rear panel is set to the correct position. Correct fuse values are shown on the rear panel.

Grounding the 8040A

To protect hospital personnel and the patient, the cabinet must be grounded. Accordingly, the 8040A is equipped with a 3-wire power cable which grounds the instrument to the power line ground when plugged into an appropriate 3-wire receptacle. If a 3-wire receptacle is not available, consult the hospital electrician. Do not use a 3-wire to 2-wire adapter with this instrument.

The following instructions, if conscientiously followed, will guarantee maximum patient safety:
Internal examinations of the heart or the brain require special safety measures, as in these examinations, leakage currents can flow from the electrical equipment through the heart or the brain.

Currents which are considered to be perfectly harmless in general cardiological examinations can prove hazardous in intracardiac examinations. To limit the leakage current, which could flow over the patient to the protective grounding conductor, to just a few microamperes, Hewlett-Packard's monitoring equipment is provided with isolated patient inputs.

Protection class I instruments are already included in the equipotential grounding system of the room by way of the protective grounding contacts in the power plug. However, for internal examinations of the heart or the brain, the instruments must have a second connection to the equipotential grounding system. One end of the equipotential grounding cable is connected to the equipotential grounding terminal on the instrument rear panel and the other end to one point of the equipotential grounding system. The equipotential grounding system assumes the safety function of the protective grounding conductor, if ever there is a break in the protective grounding system.

Examinations of the heart (or brain) should only be carried out in medically used rooms incorporating an equipotential grounding system.

Check each time before use that the instrument is in perfect working order.

The patient cable must be positioned so that it does not come into contact with any other electrical equipment or with the bedframe. The cable connecting the patient to the instrument must be free of electrolyte.

Make sure that during operation, the instrument is free of condensation. Condensation can form when equipment is moved from one building to another, thus being exposed to moisture and differences in temperature.
DANGER: Possible explosion hazard if used in the presence of flammable anesthetics.

J ADDITIONAL INFORMATION

Care and Cleaning

The Monitor is chemically resistant to most common hospital cleaning solutions and non-caustic detergents. Note: Many cleaning agents must be diluted before use. Follow the manufacturer's directions carefully to avoid damaging the Monitor.

Avoid using alcohol-based, ammonia-based or acetone-based cleaners, which may damage the Monitor. Other strong cleaners such as Providine®, Lysol® and Mikroklene® are not recommended since they may stain the instrument.

Keep the outside surfaces of your Monitor clean and free of dust and dirt. Clean with soap and water. Do not allow any liquid to enter the instrument case and avoid pouring liquid on the instrument while cleaning. Never use an abrasive material such as steel wool or metal polish. The front panel display surfaces of the Monitor are more sensitive to rough handling, scratches and breakage than the other outside surfaces of the instrument. Be careful, especially when cleaning the display surfaces.

Care and Cleaning of the Pressure Transducer

For troublefree operation take particular care of your transducer. Protect the transducer from unnecessary shocks. Do not excessively flex its cable.

External Cleaning

Clean the exterior of the transducer with a mild detergent dissolved in sterile water.
CAUTION: Do not immerse the connector into any fluid.

Internal Cleaning

In preparation for cleaning, remove the pressure dome to expose the diaphragm in the top of the tansducer body.
CAUTION: THE PRESSURE DIAPHRAGM IS FRAGILE, DO NOT SCRUB OR POLISH THE DIAPHRAGM, AND AVOID STRIKING OR SCRATCHING IT AT ANY TIME. DO NOT USE SOLVENTS SUCH AS ACETONE TO CLEAN ADHESIVE FROM THE DOME, FITTINGS OR PLASTIC OUTER SHELL. DO NOT USE ULTRASONIC CLEANING PROCESSES, WHICH MAY FRACTURE INTERNAL WIRING AND RENDER THE TRANSDUCER INOPERATIVE.

To clean the diaphragm, gently swab with a cotton ball, using hydrogen peroxide or sterile water to remove obvious contamination. Replace the dome after cleaning to protect the diaphragm.

Care and Cleaning of the Ultrasound and Labor Transducers

For troublefree operation take particular care of your transducer. Protect the transducer from unnecessary shocks and do not excessively flex its cable.

Periodically clean the transducer using a cloth or paper towel dampened with a soap and water solution (max. temperature 45°C, or 113°F). Rub soiled areas until clean. On no account should cleaning fluids containing chlorinated hydrocarbons, creosol or pyridine be used as these damage plastic surfaces. Wipe the transducer with a clean, dry cloth to remove any remaining moisture. Examine the cable for damage. Soiled belts can be washed in a solution of soap and water. The temperature of the solution should not exceed 60°C (140°F).
CAUTION: Do not immerse the electrical connector of the transducer in cleaning fluid.

Direct ECG Patient Cable Block

For troublefree operation take particular care of your patient cable. Keep the terminal block clean and free from moisture. Clean with a water dampened cloth or paper towel.

Non-disposable Electrodes (15130A)

Sterilize non-disposable electrodes by gas sterilization with ethylene oxide.

Suction Cup Electrodes (15174-60001)

IMPORTANT – Clean electrolyte from electrode after use. An electrode that is dirty or covered with dried electrolyte will produce unsatisfactory ECG recordings. To clean electrode:
1. Detach (pull) rubber bulb from metal cup.
2. Wash bulb and cup in warm water; be sure to remove residue of electrolyte that was drawn into bulb.
3. Dry bulb and cup thoroughly before reconnecting.

Sterilization

Materials and processes for transducer sterilization must be used with caution to prevent injury to patients and staff members, and damage to the transducer.

CAUTION: DO NOT AUTOCLAVE THE TRANSDUCER, BUT USE ONLY A COLD CHEMICAL OR GAS STERILIZATION PROCESS.

Cold Chemical Sterilization

The sterilant used should be at room temperature.
1. Remove obvious contamination using the cleaning procedure given and see the table on page 20 to choose a sterilant.
2. Sterilization can be performed in two ways:

CAUTION: SYRINGE SHOULD BE 10CC OR LARGER. DO NOT IMMERSE ELECTRICAL CONNECTOR IN LIQUIDS.

a. If only the interior of the fittings and the pressure chamber are to be sterilized, attach two one-way stopcocks to retain the sterilant. Draw several cc of sterilant into a 10cc or larger syringe having a Luer fitting, and attach the syringe to one of the transducer stopcocks. Holding the transducer so the other stopcock points upward, gently inject the sterilant into the transducer pressure chamber. When the sterilant wells up into the outlet stopcock, close the inlet stopcock and then the outlet stopcock. Let the sterilant remain in the transducer for the recommended sterilization period. Then thoroughly rinse the interior of the transducer with sterile water or saline solution.

b. If the whole unit is to be sterilized, immerse the transducer, including the dome, fittings and retaining rings, but not the electrical connector, into the sterilant for the recommended sterilizing period. Be sure that the sterilant enters the pressure chamber if the dome is not removed. Then rinse all transducer parts except the electrical connector with sterile water or saline.

Gas Sterilization

For more complete asepsis, use gas sterilization.

1. Remove obvious contamination using the cleaning procedure given. To inhibit the formation of toxic ethylene glycol when ethylene oxide gas is used as the sterilant, the transducer should be completely dry inside and out.

2. Follow the operating instructions provided by the manufacturer of the gas sterilizer; see the table on page 20 for materials.

CAUTION:

A. FOR GASES OTHER THAN 12-88 ETHYLENE OXIDE/FREON MIXTURE, CONSULT GAS MANUFACTURER FOR COMPATIBILITY WITH MATERIALS GIVEN IN THE TABLE.

B. TO MINIMIZE RESIDUAL ETHYLENE OXIDE IN THE PLASTIC WHILE PROVIDING ADEQUATE STERILIZATION, STERILIZE FOR ONLY 1 HOUR AT 127°F (53°C).

C. THE STERILIZER TEMPERATURE MUST NOT EXCEED 130°F (54.5°C); PLASTICS IN THE TRANSDUCER MAY DEFORM OR MELT ABOVE THIS TEMPERATURE.

D. PRESSURE MUST NOT INCREASE OR DECREASE FASTER THAN 14 PSI (1 kg/cm^2) IN 2 MINUTES' ALLOW 4 MINUTES FOR EVACUATION TO −26 INCHES OF MERCURY (−12.7 PSI, −650 mmHg, OR −0,9 kg/cm^2) OF VACUUM, OR TO RETURN TO AMBIENT PRESSURE.

WARNING

TO AVOID CHEMICAL BURNS AND TOXIC EFFECTS, ADEQUATELY AERATE TRANSDUCERS THAT HAVE BEEN STERILIZED WITH ETHYLENE OXIDE GAS. SOME AUTHORITIES RECOMMENDED THAT STERILIZED MATERIALS BE AERATED FOR AT LEAST 14 DAYS AT ABOUT 100°F (37°C). TO SPEED UP AERATION, INCUBATING THE STERILIZED MATERIAL FOR 24 HOURS AT 124°F (51°C) HAS BEEN RECOMMENDED. THE AERATOR SHOULD HAVE BACTERIAL FILTERS AND OUTDOOR VENTING.

Sterilization cont'd

PROCESS	EQUIPMENT AND MATERIAL
Cold Chemical Sterilization	Use a sterilant that your hospital or institution has found to be effective for cold chemical sterilization of operating room equipment (exception: see CAUTION), and that is non-injurious to the materials listed in the CAUTION.
Gas	1. Gas Sterilizer manufactured by American Sterilizer Company, 2424 West 23rd Street, Erie, Pennsylvania 16506 (Manufacturer's Federal Supply Code 02964). 2. Ethylene Oxide/Freon Mixture 12-88 (12 % Ethylene, 88 % Freon 11). Manufactured by Pennsylvania Engineering Company, 1119 North Howard, Philadelphia, Pennsylvania 19123 (Manufacturer's Federal Supply Code 46384).

CAUTION
FOR STERILIZING UNITS AND AGENTS OTHER THAN THOSE RECOMMENDED, CONSULT THE MANUFACTURER FOR COMPATIBILITY WITH THE FOLLOWING TRANSDUCER MATERIALS. DO NOT USE QUATERNARY CATIONIC DETERGENTS SUCH AS ZEPHIRAN, WHICH WILL CLOUD THE DOME.

GENERIC NAME	TRADE NAMES	TRANSDUCER COMPONENTS
ABS (Acrylonitrile-Butadiene-Styrene)	Lustran, Cycolac	Outer body shell
Nylon	—	Dome retaining ring
Acrylic	Acrylite, Plexiglas, Lucite	Early Transducer domes
Polycarbonate resin	Lexan, Merlon	Dome and dome retaining ring
Polyvinyl chloride (Vinyl, PVC)	Geon, Plaskon	Cable sheath
3000 Series Stainless Steel		Diaphragm and housing

Sterile Membrane Transducer Dome

The Hewlett-Packard disposable Transducer Dome eliminates the possibility of cross-contamination due to reuse of a transducer or dome which is not completely sterilized. HP disposable domes feature a sterile interface between the fluid column and the pressure transducer. Fluid pressure is transferred through the thin, sealed membrane interface of the dome to the diaphragm of the transducer. Since the fluid does not come into contact with the transducer diaphragm, there is no need to sterilize the transducer body after use. Each HP dome is individually leak tested and sealed with protective caps. It is then packaged in a plastic-wrapped container and sterilized.

Ordering Information

The basic 8040A fetal monitor includes:

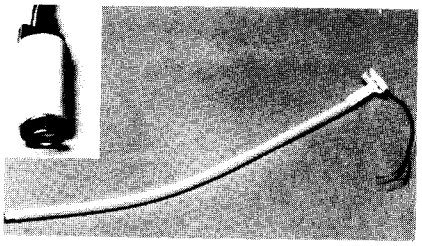
Fetal heart rate (FHR) monitoring:
- Ultrasound
- Direct ECG

Uterine activity monitoring:
- External toco

All the necessary transducers and accessories for these methods are supplied with the instrument.

The following accessories and supplies can be ordered:

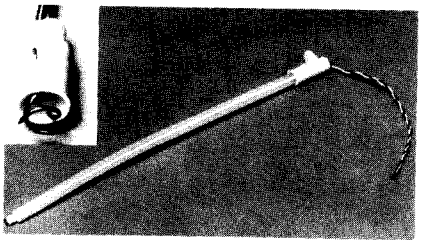
Electrodes



15133A Supplied to USA

Disposable fetal scalp electrode; single spiral; driven by inner drive tube; ETO sterilized

Packaging: one case of 50 electrodes
Shelf life: 12 months



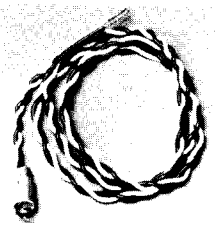
15133C Europe only

Disposable fetal scalp electrode; double spiral; driven by inner tube; gamma sterilized

Packaging: one case of 25 electrodes
Shelf life: 24 months

15126A Disposable fetal scalp electrode; clamp type; gamma sterilized

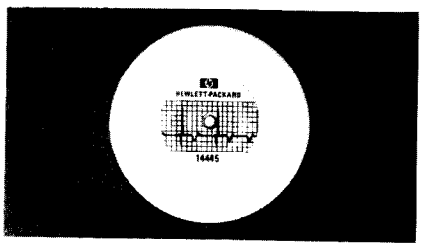
Packaging: one case of 10 electrodes
Shelf life: 24 months
Use with: applicator tool 15131A



15130A Europe only

Disposable fetal; scalp electrode; double spiral; not sterilized

Packaging: one box of 3 electrodes
Use with: applicator tool 15131A



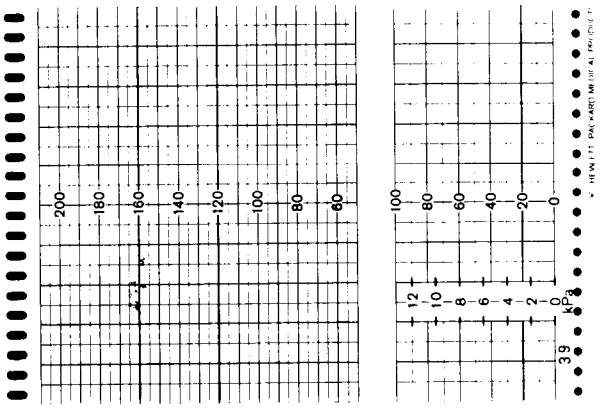
14445A Disposable adult monitoring electrode; pre-gelled W/Redux; white Foam; AG/AGCL; Bacteriostatic; OD = 57 mm (2–1/4"), low profile

Packaging: one case of 200 electrodes, individually packed
Shelf life: 18 months

J ADDITIONAL INFORMATION

Chart Paper

9270-0630-001
9270-0630-100 Europe only

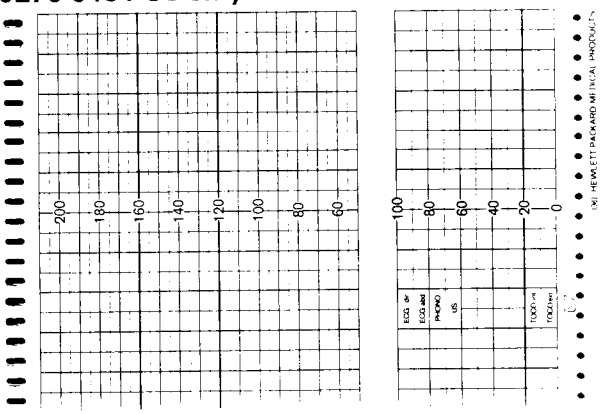


2 channel chem/thermal paper; green grid; European KPA scale; 0—100 div (labor) 50—210 div (fetal heart); pack of 150 numbered pages; page length = 100 mm, width = 151 mm.

9270-0630-001: Packaging: one pack

9270-0630-100: Packaging: one case of 100 packs

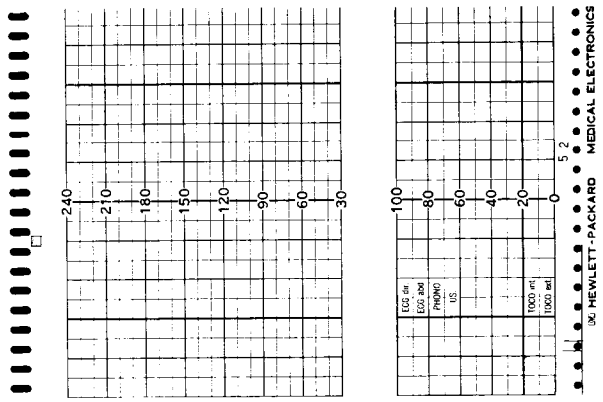
9270-0484 US only



2 channel chem/thermal paper; green grid; 0—100 divisions (labor) 50—210 divisions (fetal heart); pack of 150 numbered pages; page length = 100 mm; width = 151 mm.

Packaging: one case of 40 packs

9270-0485 US only



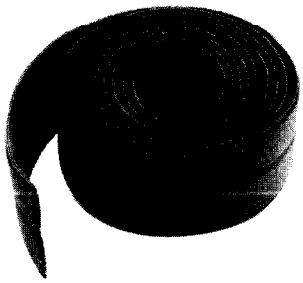
2-channel chem/thermal paper; red grid; 0—100 divisions (labor) 30—240 div (fetal heart); pack of 150 numbered pages; page length = 100 mm; width = 151 mm.

Packaging: one case of 40 packs

Belts

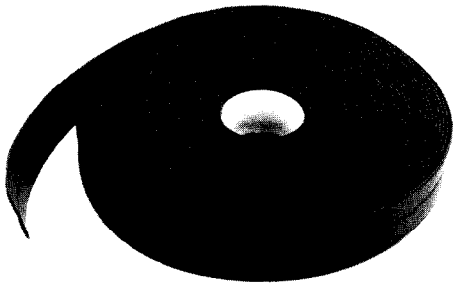
1500-0627/-0642/-0628/-0643/-0630

Reusable labor and ultrasound transducer belt; brown breathable elastic; washable; with reinforced openings every 32 mm (1 1/4 "); does not require the use of transducer buckle; width = 32 mm (1 1/4 ") or 60 mm (2 1/2 ").



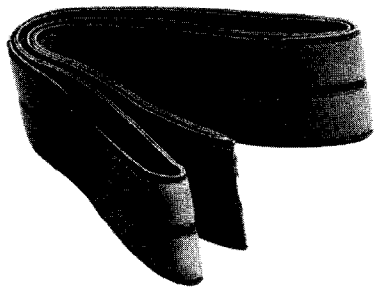
1500–0627 Abdominal belt
Width: 32 mm (1 1/4 ")
Length: 1.3 m (4 1/4 ft)
Packaging: one bag of 5 belts

1500–0642 Abdominal belt
Width: 60 mm (2 1/2 ")
Length: 1.3 m (4 1/4 ft)

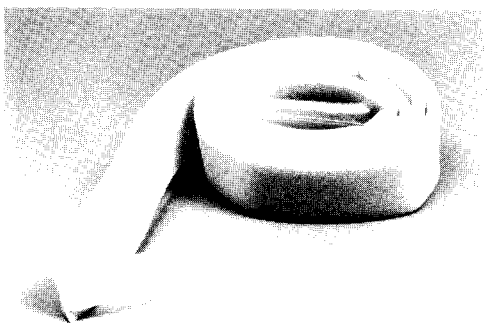


1500–0628: Abdominal belt
Width: 32 mm (1 1/4 ")
Length: 15 m (50 ft)
Packaging: one roll

1500–0643 Abdominal belt
Width: 60 mm (2 1/2 ")
Length: 15 m (50 ft)
Packaging: one roll



1500–0630 Leg belt
Length: 0.8 m (2 5/8 ft)
Packaging: one bag of 5 belts



14328A Disposable ultrasound and toco transducer belt; white soft jersey; backed with velcro fastener;
width = 51 mm (2");
length = 1.4 m (55")
(needs belt guide 15155-43101)

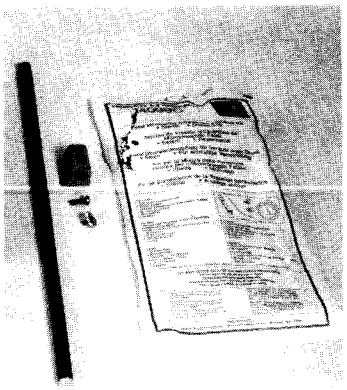
Packaging: one case of 5 bags; each bag contains 10 belts

Intrauterine Pressure

– 1290A Option 005 pressure transducer (40 microvolt/volt/mmHg) or

– 1290C Option J05 pressure transducer (5 microvolt/volt/mmHg)

When the 1290A is ordered as 8040A option K01, the internal labor kit and 1292A holder are included.
When the 1290C is ordered as 8040A option K04, the internal labor kit and 1292C holder are included.

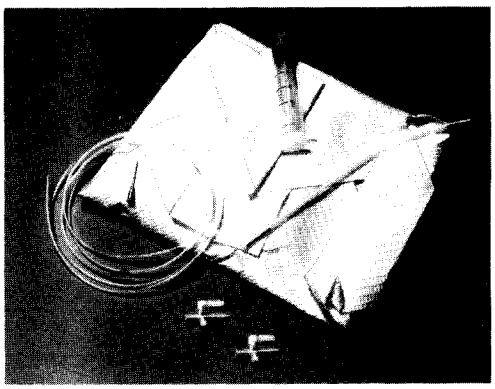


Internal labor kit includes the following mounting hardware for direct mounting on 8040A plus five disposable kits:

1. knurled screw	0515-0122	Mounting hardware kit 15246-60002
2. screw	0515-0562	
3. holder support	15246-22301	
4. support pole	15137-64701	
5. disposable intrauterine pressure kit	14099C	

Your monitor is internally configured for use with either the 1290A or the 1290C transducer. You must always use the correct transducer for your monitor.

Disposable intrauterine pressure kit



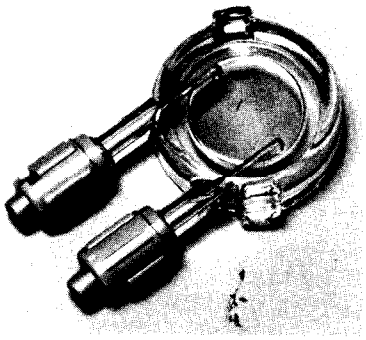
14099C Intrauterine pressure kit for fetal monitoring includes catheter, needle adapter, 20 cc syringe, insertion guide, 2 stopcocks, CSR drape; ETO sterilized

Packaging: one case of 20 kits

Shelf life: 24 months

Pressure monitoring domes

1295A-020/1295A-100



Disposable pressure transducer dome; for use with HP 1290 transducer; ETO sterilized.

Shelf life: 24 months

1295A-020:

Packaging: one box of 20 domes

1295A-100:

Packaging: one case contains 5 boxes, each box contains 20 domes

Gels

9310-0187-012
9310-0187-072

Aquasonic transmission gel for use with ultrasonic transducer. Water soluble, easy patient clean-up; 235 gm (8 Oz.) bottle

Shelf life: 24 months

9301-0187-012:

Packaging: one box of 12 bottles

9301-0187-072:

Packaging: one case contains 6 boxes, each box contains 12 bottles

HEWLETT-PACKARD STATEMENT OF WARRANTY FOR NON-CONSUMER PRODUCTS

WARRANTY

Hewlett-Packard (HP) products are warranted against defects in materials and workmanship. The warranty period for each product will be provided on request at the time of sale and is specified in documentation supplied with the product. During the warranty period, HP will, at its option, either repair or replace products which prove to be defective.

Within HP service travel areas, warranty service for products installed by HP and certain other products designated by HP will be performed at Buyer's facility at no charge. Outside HP service travel areas, warranty service will be performed at Buyer's facility upon HP's prior agreement and Buyer shall pay HP's round trip travel expenses. In all other cases, products must be returned to a service facility designated by HP.

Buyer shall prepay shipping charges for products returned to HP for warranty service and HP shall pay for return of the products to Buyer. However, Buyer shall pay all shipping charges, duties and taxes for products returned to HP from another country.

LIMITATION OF WARRANTY

The foregoing warranty shall not apply to defects resulting from:
1. Improper or inadequate maintenance by Buyer;
2. Buyer-supplied software or interfacing;
3. Unauthorized modification or misuse;
4. Operation outside of the environmental specifications for the product; or
5. Improper site preparation or maintenance.

No other warranty is expressed or implied. HP specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.

EXCLUSIVE REMEDIES

The remedies provided herein are Buyer's sole and exclusive remedies. HP shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort or any other legal theory.

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