

TYPE 410

PHYSIOLOGICAL MONITOR



NEW

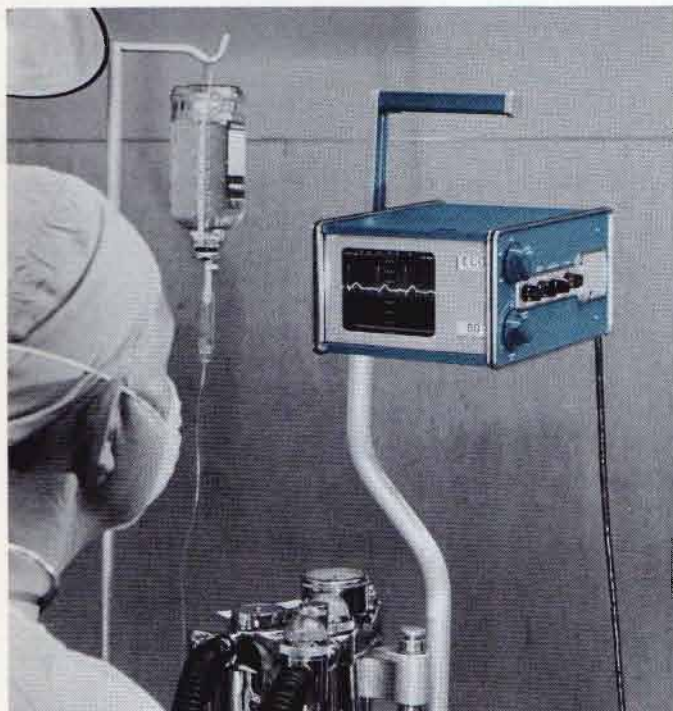
- **DISPLAYS ECG, EEG, OR PULSE WAVEFORMS**
- **SIMPLE CONTROLS**
- **SOLID-STATE RELIABILITY, QUICK TURN ON**
- **PORTABLE, BATTERY POWERED**
- **HEART RATE BEEP**
- **RAPID OVERLOAD RECOVERY**

The Type 410 is designed for patient monitoring during surgery, recovery, and intensive care. Of special use to the anesthesiologist, it displays on a cathode-ray tube waveforms of the electrocardiogram (ECG), electroencephalogram (EEG), or pulse. During surgery, the Type 410 can give early warning of a developing problem. Other applications of the Type 410 include measurements of fetal ECGs, using the high-gain input (EEG) and electrodes supplied with the Monitor.

The Monitor can be conveniently positioned (using the optional mounting fixture) at the five-foot level on the anesthesiologist's gas machine for easy viewing, then lifted off and carried with the patient to the recovery room. The 12½-pound weight and battery operation permit easy mobility and continuous operation without disconnecting leads or power.

Ease of operation, with a minimum of controls, contributes to the usability of the Type 410, as do its other features: 4-second recovery after overdrive by defibrillator or cauterizer, output for strip-chart recorder, and a cabinet finish that is durable and washable.

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ECG MEASUREMENTS

Heart rates from 35 beats/min to 180 beats/min can be directly read by observing the point on the CRT graticule scale where the second R wave occurs. A beep sound coincident with each repetition of the ECG waveform provides an audible indication of heart rate, in addition to the waveform display. Thus a sudden change in heart rate can be quickly detected, even without constant observation of the display. Loss of signal to the Monitor for 2 to 4 seconds automatically increases the rate of the beep to an alarm level, and also provides a baseline on the CRT. Bandwidth in the ECG mode is ≤ 0.1 Hz to 250 Hz $\pm 15\%$. Deflection sensitivity is 20 mm/mV, accurate within 5%. Seven commonly-used leads can be selected: I, II, III, aV_R, aV_L, aV_F and V. Silver-silver chloride non-polarizing electrodes are supplied as standard accessories. The Type 410 is also compatible with common needle electrodes and inexpensive disposable surface electrodes.

EEG MEASUREMENTS

EEG input accepts the included silver-silver chloride ECG electrodes supplied with the Monitor. Optional EEG electrodes (identical except for color coding) are also available. Bandwidth in the EEG mode is ≤ 0.1 Hz to 100 Hz $\pm 15\%$. Deflection sensitivity is 10 mm/50 μ V, accurate within 5%.

PULSE MEASUREMENTS

Auxiliary input accepts the optional photosensitive pulse sensor. The pulse sensor, containing a light source and photo-resistor, is attached to the patient's finger. As the pulse occurs, the amount of blood in the finger changes the amount of light reaching the photo-resistor. The resulting display provides a quick indication of heart rate. A beep sounds coincident with each pulse, giving an audible as well as visible indication of the patient's heart activity. Loss of signal to the Monitor for 2 to 4 seconds automatically increases the rate of the beep to an alarm level, and provides a baseline on the CRT. Bandwidth at the Auxiliary mode input is ≤ 0.1 Hz to 250 Hz $\pm 15\%$. Deflection sensitivity is 2 mm/mV, accurate within 5%.

HIGH COMMON-MODE REJECTION

$\geq 500,000:1$ throughout bandwidth with a balanced, low-impedance source. 50,000:1 AUX; 100,000:1 ECG; 150,000:1 EEG at 60 Hz with 5-k Ω source impedance unbalance between properly-applied electrodes. High common-mode rejection, with corresponding reduction of interference is obtained under actual operating conditions.

COMMON-MODE DYNAMIC RANGE

+3 V to -3 V.

DIFFERENTIAL DYNAMIC RANGE

Monitor characteristics are valid with an input terminal DC potential difference (offset) of up to 20 mV. Typically less than 10 mV difference exists between the non-polarizable silver-silver chloride electrodes supplied with the Type 410. At least 100 mV of either polarity can be applied with no more than 5% reduction in amplifier gain.

DIFFERENTIAL INPUT RESISTANCE

2 M Ω $\pm 15\%$ in EEG and ECG mode, 20 M Ω $\pm 15\%$ in Auxiliary mode.

DRIFT

≤ 0.5 cm per hour after 10-second warm-up.

NOISE

≤ 0.1 cm in the calibrated EEG mode, input shorted.

SWEEP SPEEDS

25, 50, and 100 mm per second; accurate within 5%.

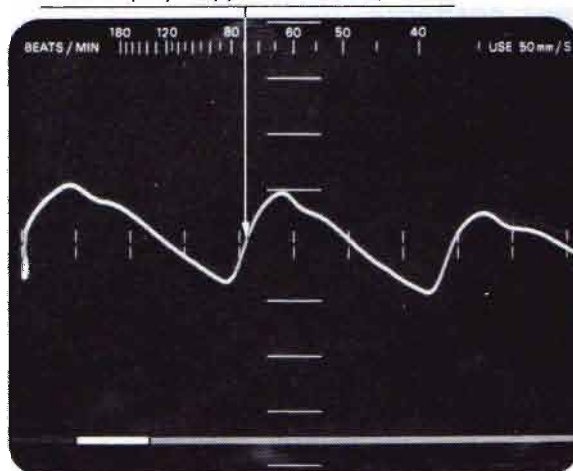
AUDIO SIGNAL

Beep sounds at heart rate, providing audible indication of normal or arrhythmic heart rate. Automatic alarm sounds if there is a loss of signal for 2 to 4 seconds. Loudness is adjustable. Using the audio output jack disconnects the internal speaker.

WAVEFORM SIZE

Vertical size of ECG, EEG, and pulse waveforms is continuously variable from $1/3$ to 3 times the height of the calibrated display.

Pulse display—approx 75 beats/minute



CRT

5-inch rectangular CRT has 8 x 10-cm viewing area. P-7 phosphor has long decay time for convenient viewing at slow sweep speeds. The external graticule has a graduated heart-rate scale at the top, a battery-condition scale at the bottom, and a vertical and horizontal center-line scale marked in centimeters.

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BATTERY OPERATION

Removable battery pack contains 10 size "C" NiCd cells, provides 8 to 12 hours operation with maximum accessory load at +20°C to +25°C. Operating time depends on temperature. Maximum time is achieved at 22°C. Internal charger provides recharge in 21 to 24 hours, operates from 90 V to 136 VAC or 180 V to 272 VAC, 48 Hz to 440 Hz, requires ≤ 7 W at 115 V, 60 Hz. Monitor can also be operated from line (with reduced charge to battery pack).

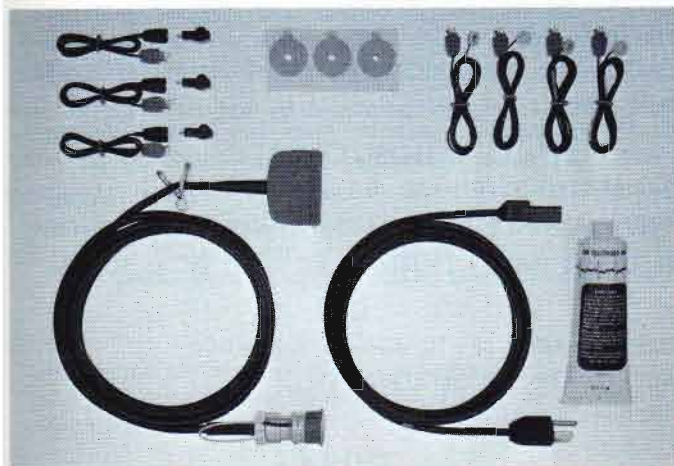
CLEANING

Monitor and accessories can be damp wiped with mild soap and water.



DIMENSIONS AND WEIGHTS

Height	5 $\frac{3}{8}$ in	13.7 cm
Width without handle	8 $\frac{1}{2}$ in	21.6 cm
Width with handle	9 $\frac{1}{8}$ in	23.2 cm
Depth without handle	10 $\frac{3}{4}$ in	27.4 cm
Depth with handle	12 $\frac{7}{8}$ in	32.7 cm
Weight without accessories	12 $\frac{1}{2}$ lb	5.6 kg
Domestic shipping weight	≈ 20 lb	≈ 11.4 kg
Export packed weight	≈ 30 lb	≈ 13.6 kg



INCLUDED STANDARD ACCESSORIES

Power cable assembly (161-0037-00); patient cable assembly (012-0120-00); electrode LA black (012-0121-00); electrode

LL red (012-0121-02); electrode RL green (012-0121-05); electrode RA white (012-0121-09); package adhesive electrode rings (006-1099-00); tube electrode paste (006-1098-00), three 3-cable electrode adapter kits (012-0122-00), two instruction manuals (070-0658-00).

OPTIONAL ACCESSORIES

MOUNTING STAND

Mounts Type 410 at the five-foot level, permits swivelling and tipping the Monitor for convenient viewing. Hardware supplied with the fixture attaches to gas machine, bed, flat or round surface up to 1 $\frac{1}{2}$ inch diameter. Order 016-0110-00

MOUNTING CUP

Mounts Type 410 to flat surface, permits tipping the Monitor for convenient viewing. Mounting screws not included; Order 407-0393-01

CHEST ELECTRODE

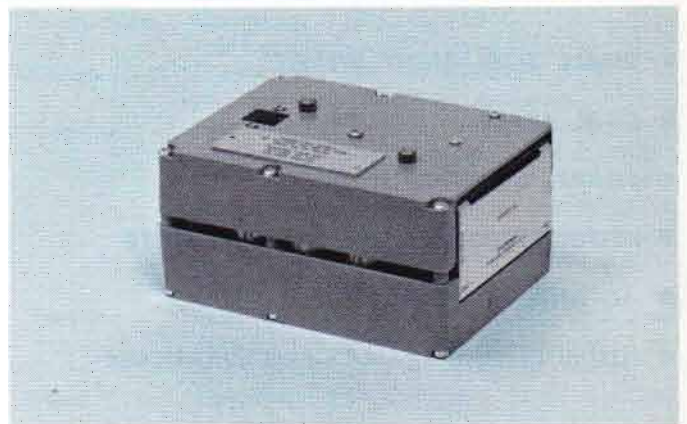
Brown color code. Order 012-0121-01

EKG ELECTRODE

Yellow color code, 2 required Order 012-0121-04 (each)

PULSE SENSOR ASSEMBLY

Photoresistive sensor for pulse measurements, used with Type 410 Auxiliary input. Order 015-0104-00



BATTERY PACK

Extra battery pack, in addition to the one supplied with the Type 410, allows one pack to charge while the other is powering the Monitor. Pack contains 10 size "C" NiCd cells and battery charger. Order 016-0107-00

Please refer to Terms and Shipment, General Information page.