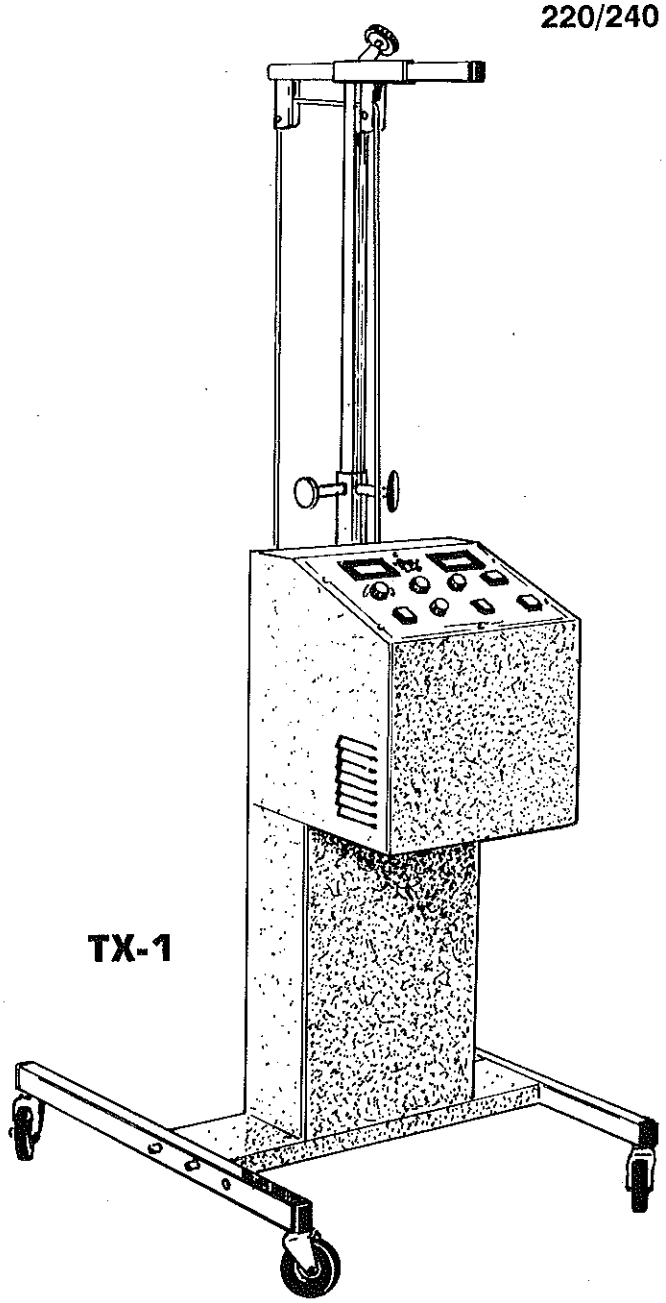
tx® TRACTION UNITS

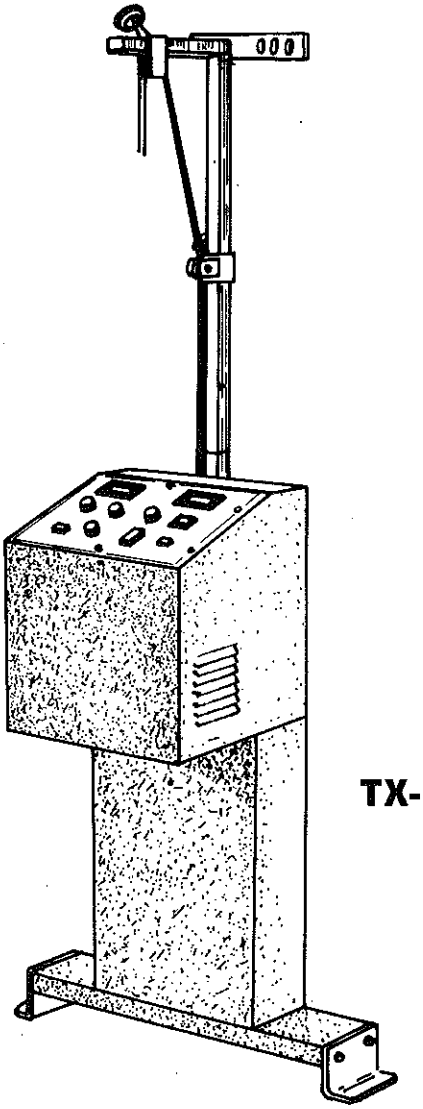
INSTRUCTIONS FOR USE AND OPERATION OF

TX-1 MOBILE TRACTION UNIT
TX-2 STATIONARY TRACTION UNIT

120 VOLT
220/240 VOLT



TX-1



TX-2

CHATTANOOGA
CORPORATION

P.N. 74120 REV. B 02/91

TABLE of CONTENTS

CHATTANOOGA CORPORATION

12 MONTH WARRANTY

Chattanooga Corporation ("Company") warrants that the tx® Traction Units, Models TX-1 and TX-2 ("Product") are free of defects in material and workmanship.

This warranty shall remain in effect for one (1) year from the date of original consumer purchase of this Product and extends to any owner of the Product during the warranty period. If this Product fails to function during the one year warranty period because of a defect in material and workmanship, Company or the selling dealer will replace or repair this Product without charge within a period of 30 days from the date on which the defective Product is returned to the Company or the dealer. Company or the dealer will ship the replacement or the repaired Product to the consumer's residence.

THIS WARRANTY DOES NOT COVER:

1. Replacement parts or labor furnished by anyone other than the Company, the dealer or an approved Company service agent.
2. Defects or damage caused by labor furnished by someone other than Company, the dealer or an approved Company service agent.
3. Any malfunction or failure in the Product while it is in the possession of the owner during the warranty period if the malfunction or failure is not caused by a defect in material and workmanship or if the malfunction or failure is caused by unreasonable use, including the failure to provide reasonable and necessary maintenance.

COMPANY SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES TO PROPERTY OR BUSINESS.

Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

TO OBTAIN SERVICE from Company or the selling dealer under this warranty, the owner must do or abide by the following:

1. A written claim must be made within the warranty period to Company or the selling dealer. If the claim is made to the Company, the written claim should be sent to: 4717 Adams Rd./P.O.Box 489, Hixson, TN 37343-0489. Phone: (800)-592-7329.
2. The Product must be returned to Company or the selling dealer by the owner.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

The Company does not authorize any person or representative to create for it any other obligation or liability in connection with the sale of the Product. Any representation or agreement not contained in the warranty shall be void and of no agreement.

FOREWORD

This manual has been prepared for the owners and operators of the TX® Traction Units, Models TX-1 and TX-2. It contains general instructions on operations, precautions, maintenance and parts information. To obtain maximum life and efficiency from your TX® Traction Unit, and to aid in its proper operation, read and understand this manual thoroughly and follow all instructions before operation. The specifications put forth in this manual were in effect at the time of publication. However, owing to Chattanooga Corporation's policy of continuous improvement, changes to these specifications may be made at any time without obligation on the part of Chattanooga Corporation. The unit you have selected may have all or only part of the features shown, depending upon the model of your choice.

PRECAUTIONARY INSTRUCTIONS

1. Read, understand and practice the Precautionary and Operating Instructions found in this manual. Know the limitations and hazards associated with the TX®Traction Unit.

2. **GROUNDING** the TX® Unit: Make certain that the unit is electrically grounded by connecting only to a grounded electrical service receptacle conforming to the applicable national and local electrical code.

3. Always tighten hand adjustment knobs securely to avoid slipping.

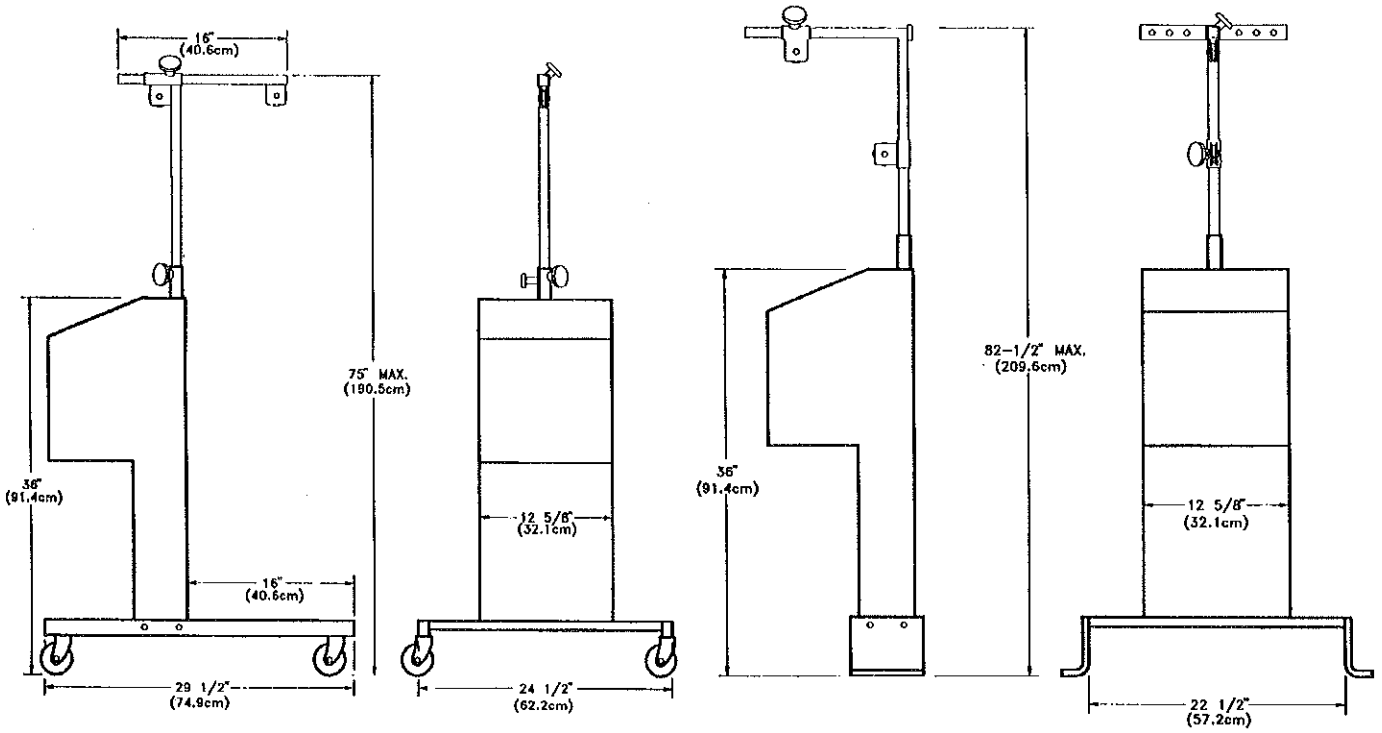
4. Follow all cautionary instructions indicated on decals located on the units.

5. Federal Law restricts this device to sale by, or on the order of, a physician or licensed practioner.

6. Do not attempt to raise or lower the traction table while administering traction.

7. **DO NOT USE IN THE PRESENCE OF FLAMMABLE ANESTHETICS.**

GENERAL SPECIFICATIONS



TX-1 **TX-2**

SPECIFICATION	TX-1	TX-2
Traction Control	Digital	Digital
Traction Capacity - Pounds	0 to 200	0 to 200
Traction Capacity - Kilograms	90.8	90.8
Shipping Weight - Pounds	95	90
Shipping Weight - Kilograms	43.1	40.9
Domestic Power	120V, 60Hz, 5A	120V, 60Hz, 5A
Export Power	220/240V, 50Hz, 2.5A	220/240V, 50Hz, 2.5A

INSTALLATION PROCEDURES

Remove all packaging materials. The unit should be plugged into either a 120 Volt AC or 220/240 Volt AC outlet, depending upon the serial decal description. **DO NOT ATTEMPT TO USE DIRECT CURRENT.**

TX-1: TOOLS NEEDED FOR INSTALLATION:
(1) 9/16" Open-End Wrench - Not Furnished

1. The legs must be assembled to the unit. The long portion extends towards the rear. Refer to Figure 1.

CAUTION: If legs are installed backwards, unit will turn over when traction is applied.

INSTALLATION PROCEDURES (cont.)

TX-1 (cont.)

2. Raise one side of the unit and bolt on the leg with the long end to the rear of the unit. Repeat the procedure for the other side. Refer to Figure 1.
3. Install top adjustment bar. The top adjustment bar extends in the direction of the long end of the legs. Refer to Figure 2.

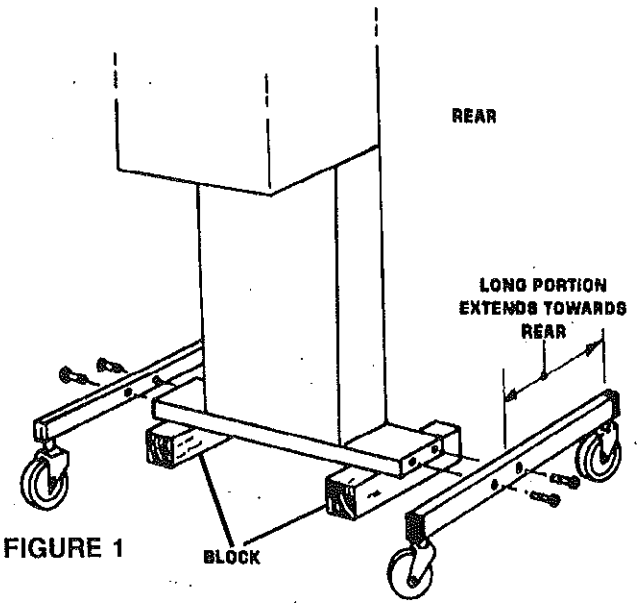


FIGURE 1

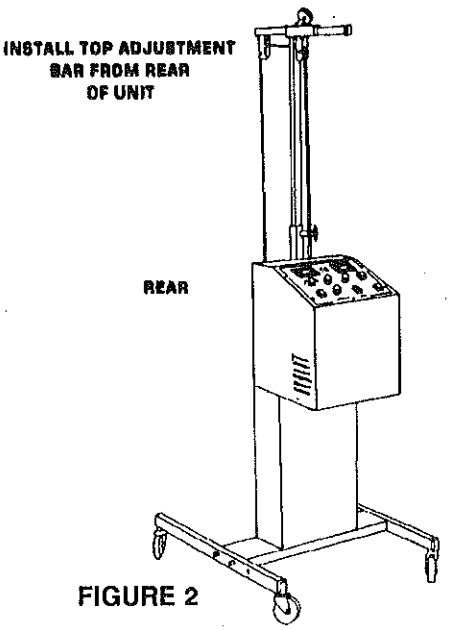


FIGURE 2

4. Feed rope through pulleys and install line clamp. Refer to Figure 3.

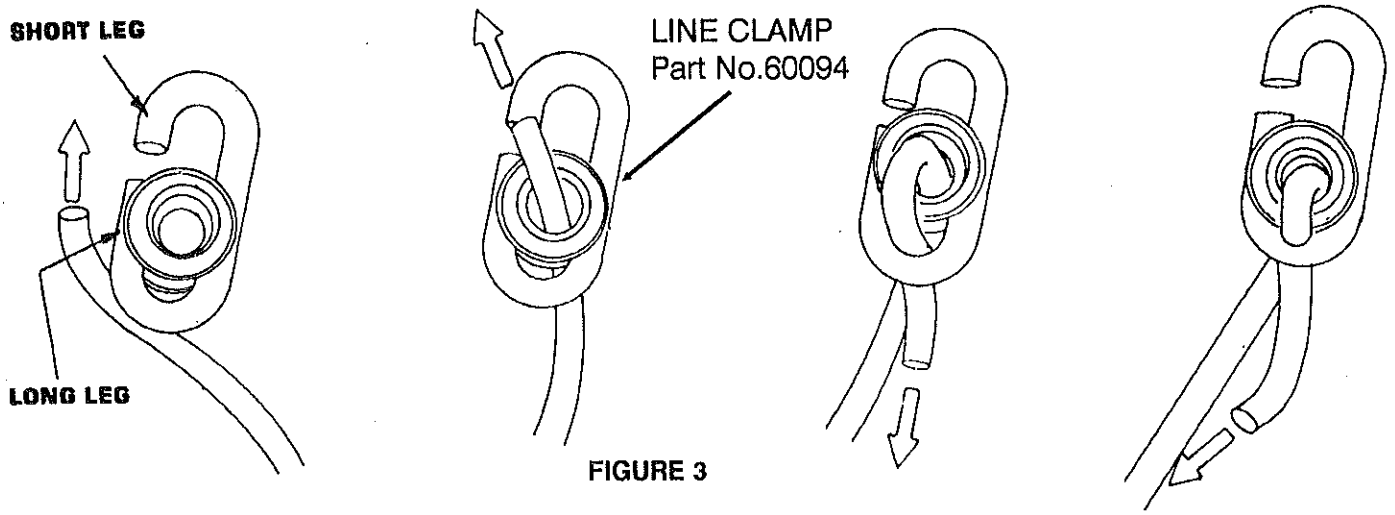


FIGURE 3

TX-2: TOOLS NEEDED FOR INSTALLATION:
(1) 7/16" Open-End Wrench - Not Furnished
(1) 9/16" Open-End Wrench - Not Furnished

1. Install floor mounting brackets supplied with unit - Refer to Figures 4 and 5.
2. Install top pulley tube assembly. Assembly has mounting plate attached for wall mounting.
3. Mounting plates attach to the floor and wall by anchor bolts in concrete or by lag screws, depending on the surface. (Anchor bolts or lag screws are not supplied with the unit.)

INSTALLATION PROCEDURES (cont.)

TX-2 (cont.)

4. Feed rope through pulleys on the top adjustment bar. Check to see that rope pulls freely.
5. Install line clamp to rope (Fig. 3).

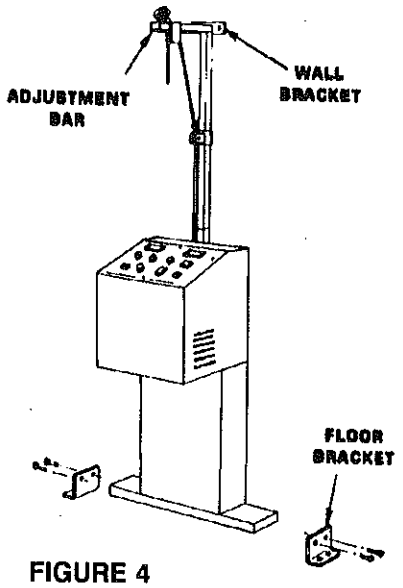


FIGURE 4

For equipment intended to be operated in the United Kingdom, 220/240V, 50Hz, the Mains lead should be fitted with a sleeved 13Amp, BS-approved mains plug, fused 5 amps,and wired as follows:

Brown: Live
Blue: Neutral
Green/Yellow: Earth

The electrical installation of the room in which the equipment is to be used should comply with the regulations for the Electrical Equipment of Buildings, published by the Institution of Electrical Engineers.

Symbols(Where applicable):

⚠ ATTENTION: Consult accompanying documents.

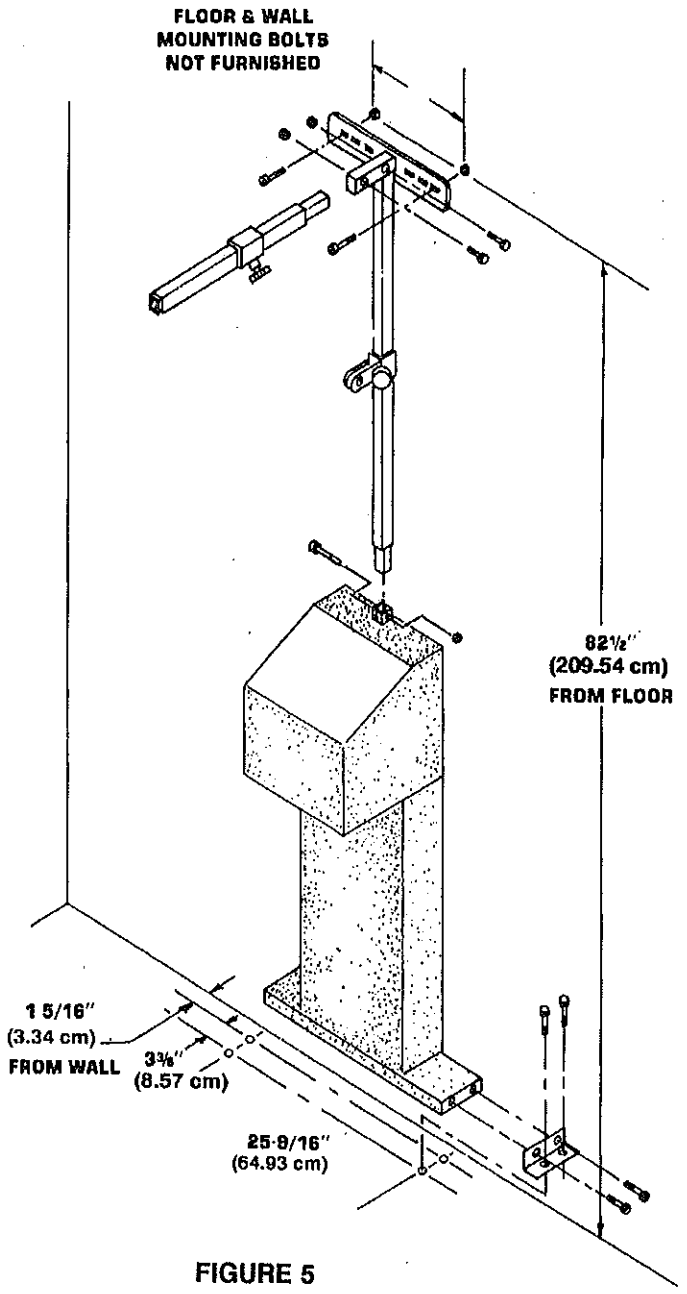
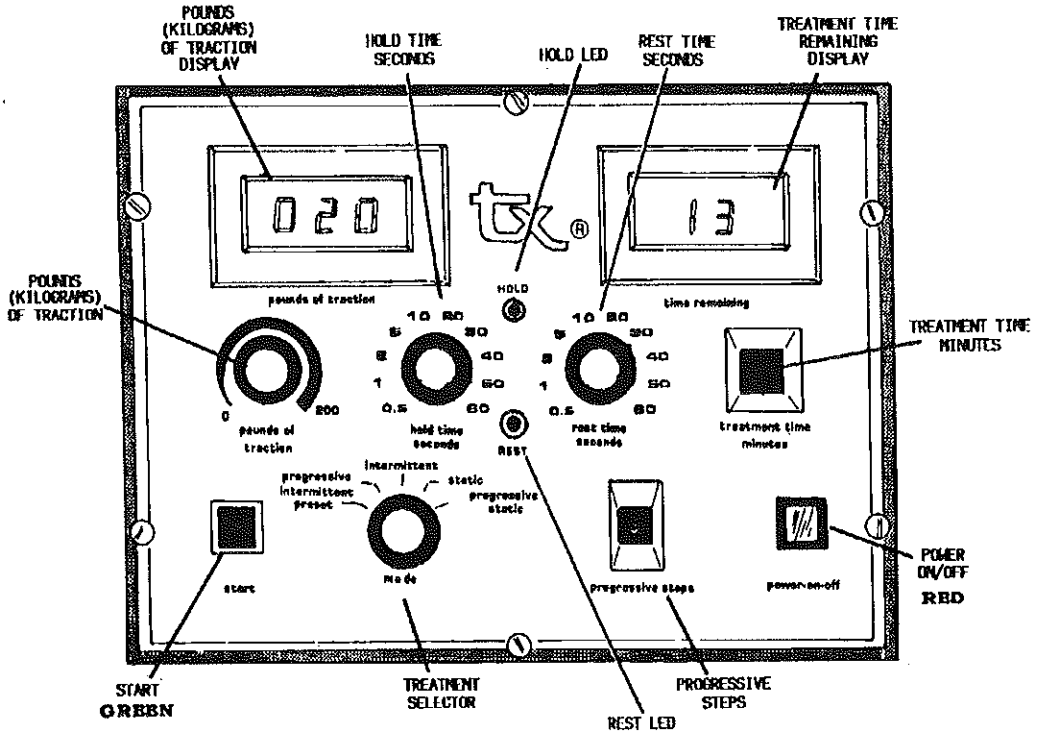


FIGURE 5

TYPE B Equipment: " An adequate degree of protection against electric shock is provided particularly regarding allowable leakage currents and reliability of the protective earth connection."

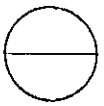
OPERATING CONTROLS



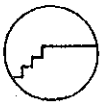
POWER ON/OFF: Push button in to connect Mains Power. Button should illuminate.
START: Starts unit in selected mode of treatment. Illuminated during treatment.
TREATMENT SELECTOR: Four modes of treatment plus one Preset mode:

PROGRESSIVE INTERMITTENT

INTERMITTENT



STATIC



PROGRESSIVE STATIC

* Preset: Used to set Pounds(Kgs.) before traction is applied

PROGRESSIVE STEPS: Allows prescribed traction pull to be obtained in up to ten(10) progressive steps.
POUNDS(KILOGRAMS) of TRACTION: 0 to 200 Pounds(0 to 90 Kg) of traction.
POUNDS(KILOGRAMS) of TRACTION (digital readout): Displays Preset or actual pull.
HOLD TIME SECONDS: Hold time selection from 0.5 to 60 seconds.
REST TIME SECONDS: Rest time selection is also from 0.5 to 60 seconds.
TREATMENT TIME MINUTES: Selector switch programs treatment time from one(1) to ninety-nine(99) minutes.
TIME REMAINING(digital readout): Regressive display of remaining treatment time(minutes).
HOLD LED: Illuminated when unit is in Hold mode.
REST LED: Illuminated when unit is in Rest mode.

OPERATING PROCEDURES

The following procedures are applicable to both Models, the TX-1 and the TX-2.

To begin operation of the unit, use the following procedures:

1. Pull the traction rope out of the unit until the **GREEN** mark shows.

2 Secure the appropriate attachment to the patient before proceding with the traction set-up. Make sure patient is comfortable with fit. If a Chattanooga Pelvic Belt is used, it should be applied over bare skin.

3. Check to see that adjustment knobs on vertical(upright) and horizontal bar are tightened securely.

4. Release clamp and pull rope, **REMOVING ALL SLACK.**
This is **VERY IMPORTANT**, because the rope has a limited distance of travel.

5. **Give the patient control cord to the patient (pressing the Red Button will stop traction cycle and buzzer will sound at a 4Hz rate).**

6. Press the Power ON button.

7. Turn Selector switch to Preset.

8. Set the desired amount of traction - 5 to 200 pounds(2.27 to 90 Kgs). Traction must be set above 5 pounds(2.27 Kgs.)

NOTE: At 0 lbs(0 Kgs) setting, incidental readings may be displayed of 1 to 2 lbs.(up to 1 Kg). This is normal and does not affect the 0 lbs.(0 Kg) of traction set.

9. Set the desired HOLD TIME - 0.5 to 60 seconds.

10. Set the desired REST TIME - 0.5 to 60 seconds.

11. Set desired TREATMENT TIME - 0 to 99 minutes.

12. Set number of steps if PROGRESSIVE traction is to be used. **NOTE:** The incremental pounds increase for each successive step must be greater than 5 pounds(2.27 Kgs.).

13. Turn SELECTOR switch to the MODE of traction to be used.

14. Push the START switch. Test patient switch operation by pressing and noting that buzzer sounds at 4Hz rate and traction releases. Press START switch to continue treatment.

15. Watch the unit for three or four cycles and re-adjust halter or belts if required.

16. The TX® unit will automatically stop and buzzer will sound at a 1Hz rate at the end of treatment time.

NOTE: If for any reason the unit should be stopped, DO NOT ATTEMPT TO RESTART FOR 20 SECONDS.

MAINTENANCE

The TX-1 and TX-2 Traction Units require very little maintenance to keep them operating efficiently. The accompanying table should be wiped clean with a damp cloth.
Periodically check for Traction cord fraying, or wear of power cord. If replacement of the Traction cord is necessary, the procedure is as follows:

A) Remove back panel from unit.
B) Un-tie old Traction cord from cylinder.
C) Feed new cord through opening in top of cabinet and tie securely to cylinder.

If unit is located in an area where it is subjected to extreme amounts of moisture or humidity, the pulleys should be lubricated periodically with a light oil. It is recommended that all TX-1 and TX-2 Traction units be re-calibrated annually by an authorized servicing dealer or at the factory. It is also recommended after replacement or repair of any major component.
If some problem should occur with these units, contact the factory at (800)592-7329.

TROUBLE SHOOTING

PROBLEM	POSSSIBLE CAUSE
1. Unit is dead. No lights, compressor not running.	Unit not properly plugged in. Fuse(2 ea.) blown.
2. Panel indicators illuminated, compressor not running.	Control panel defective. Compressor defective. Patient switch defective.
3. Unit will not pull or indicate beyond a specific lbs/Kgs. level, usually 30-50 lbs. (13-1/2 to 22-1/2 Kgs.)	Compressor. Compressor hose. Air leak.
4. Hold and/or Rest times inaccurate.	Panel out of calibration or defective.
5. Unit is not smooth on take-up or release.	Cylinder sticking or rope binding.
6. Pull incorrect.	Panel out of calibration - perform short form calibration. Panel defective. Rope binding or off pulley. Rope not fully extended.
7. In the intermittent mode, unit will pull up, release, then won't pull up again.	Panel out of calibration - perform short form calibration. Panel defective. Check zero adjust.
8. Pounds/Kilograms of treatment or Time display not illuminating.	Panel defective.
9. ON-OFF switch lights, panel displays off.	Panel defective(check voltage regulator 5V).

SHORT-FORM CALIBRATION ADJUSTMENT PROCEDURES

NOTE: The Short-Form calibration addresses only the adjustments for applied traction and displayed traction. For all other adjustments, refer to the complete calibration procedure on pages 11, 12 and 13.

A. Plug unit into proper power receptacle. Press POWER switch to ON; set FUNCTION switch to PRESET; set TRACTION control knob fully counterclockwise; POUNDS (KILOGRAMS) OF TRACTION meter should indicate zero(0). If not, remove lens cover on POUNDS(KILOGRAMS) METER (it simply un-snaps), and turn trimmer in POUNDS (KILOGRAMS) METER - marked R1 ZERO - carefully, until meter indicates a stable zero. **DO NOT ADJUST TRIMMER MARKED R2 GAIN**. Replace lens cover.

B. Set POUNDS(KILOS) OF TRACTION knob fully clockwise. POUNDS(KILOGRAMS) METER should indicate 200 pounds(or 90 kilograms). If not, locate REFERENCE CAL. (R-33) on the P.C. Board diagram, page 14. Adjust R-33 until meter reads 200 lbs.(90 Kgs.).

C. Return POUNDS(KILOGRAMS) OF TRACTION knob fully counterclockwise. POUNDS (KILOS) METER should indicate zero(0). If not, re-check step A above. Set FUNCTION switch to STATIC; meter should indicate zero(0). If not, proceed to step D.

D. Locate TRANSDUCER ZERO ADJUST (R8) on the P.C. Board diagram(page 14). Rotate TRANSDUCER ZERO ADJUST clockwise for some reading on the POUNDS (KILOGRAMS) METER, then very slowly rotate counterclockwise. **STOP AS SOON AS POUNDS (KILOGRAMS) METER reads ZERO and do not adjust any further.**

E. TRANSDUCER SPAN ADJUST(R12) should require calibration **only** when parts are replaced during maintenance procedures. Always use an accurately known weight - approximately 50 pounds or 22-1/2 kilograms - when adjusting span.

CALIBRATION PROCEDURE

Equipment needed:

1. Digital voltmeter: 3-1/2 digit.
2. Frequency Counter: 100Hz to 20KHz range with minimum 1 volt sensitivity.
3. Pneumatic Traction Test Stand (factory calibration only).
4. Test Weight: approximately 50 pounds(22-1/2 kilograms).
5. Oscilloscope: general purpose.

NOTE: A calibration check-sheet has been provided on page 15 for recording/logging each calibration step.

PRE-CALIBRATION SET-UP:

Adjust the following controls to the designated positions before applying power to the unit under test.

P.C. Board Adjustments: (See page 14 for location)

(If the unit has been previously calibrated, skip this section and go directly to the Front Panel Control Pre-Set-Up, below.)

P.C.Board Designation	Description	Position
R65	Treatment Time Clock	N/A
R38	Hold Time Calibrate	N/A
R36	Rest Time Calibrate	N/A
R33	Reference Calibrate	CW
R30	Steps Zero Adjust	CCW
R28	Steps Span Adjust	CCW
R8	Transducer Zero Adjust	N/A
R12	Transducer Span Adjust	CCW
R72	Buzzer Volume Control	CW

Front Panel Controls:

Control	Position
Traction Control	Minimum (full CCW)
Hold Time Control	5 Seconds
Rest Time Control	5 Seconds
Treatment Time Control	99 Minutes
Start Switch	N/A
Mode Switch	Preset
Progressive Steps	10 Steps
Power	OFF

Traction Meter Adjustments:

Gain	N/A
Zero	N/A

CALIBRATION PROCEDURE(cont.)

1. **TREATMENT TIME CLOCK CALIBRATION:** Attach frequency counter to TP1(pin #8 of U15) and adjust R65 until counter reads 273 Hz +/- 10 Hz.

2. **HOLD TIME CALIBRATION:** Attach frequency counter to TP2(pin #2 of U9) and with HOLD TIME CONTROL set at 5 seconds, adjust R38 until counter reads 1638 Hz +/- 10 Hz. Check frequency at all 10 HOLD times as per table below.

3. **REST TIME CALIBRATION:** Attach frequency counter to TP3(pin#9 of U9) and with REST TIME CONTROL set at 5 seconds, adjust R36 until counter reads 1638 Hz +/- 10 Hz. Check frequency at all 10 REST times as per table below.

HOLD/REST TIME - Frequency Table:

TIME	FREQUENCY -Hz		
Seconds	Minimum	Nominal	Maximum
.5	15384	16384	17384
1	8029	8192	8325
2	4014	4096	4178
5	1628	1638	1648
10	803	819	835
20	402	410	418
30	267	273	279
40	200	204	208
50	161	164	167
60	134	137	140

4. **REFERENCE CALIBRATION:** With MODE switch set in PRESET position, and TRACTION Control set at minimum, gently pry Red lens off TRACTION meter and adjust meter Zero for 000 indication on the meter. Next, attach DVM (set on VDC range) to unit, positive lead to TP4(pin #7 of U2) and negative lead to TP5(circuit common at pin #4 of J1). Set TRACTION Control to maximum(fully CW) and adjust R33 until DVM reads 2.00 volts. Then adjust GAIN on TRACTION meter for a full scale reading of 200 for the "Pounds" readout and 90 for the "Kilograms" readout.

5. **TRANSDUCER ZERO ADJUSTMENT:** Place MODE switch in STATIC and turn TRACTION Control to minimum(full CCW), then adjust R8 clockwise to get an indication on the TRACTION meter and carefully adjust R8 counterclockwise until the TRACTION meter just reads 000. DO NOT turn past this point as it will cause the Zero setting to go negative but will not give a negative indication on the TRACTION meter.

6. **TRACTION SPAN ADJUSTMENT:** Preset the TRACTION control for 50 pounds(22-1/2 KG). Select STATIC with the MODE switch and place a 50 lb.(22-1/2Kg) on traction rope with the cylinder completely extended. Select INTERMITTENT with the MODE switch and set HOLD and REST times for 5 seconds. Set unit to cycle and see that the weight is lifted just clear of the floor during each HOLD cycle. If necessary to adjust span control, turn R12 clockwise to increase pull or counterclockwise to reduce pull.

7. **STEPS ZERO ADJUSTMENT:** With a clip lead or a shorting jumper, connect the two terminals on TJ1(pin #8 and pin #16 of RN1). This will force the output of the D/A resistor network to be zero. Put the STEPS switch on the ONE STEP setting and put the MODE switch into PROGRESSIVE mode. Attach DVM(200mv DC range) to unit, positive lead to TP6(emitter of Q1) and the negative lead to TP5(pin#4 of U6). Adjust R30 until DVM gives a positive indication and then, turn R30 in the opposite direction to obtain a Zero indication on the DVM. DO NOT go past this point because there will be no negative indication. Remove clip lead or shorting jumper.

8. **STEPS SPAN ADJUSTMENT:** Select PRESET mode and set TRACTION control at 100 pounds(45 Kilograms) and set STEPS switch for one step. Attach DVM(on 2 VDC range) to unit, positive lead to TP4(pin #7 of U2) and negative lead to TP5(pin #4 of U6). DO NOT hit START switch. Record DVM reading(should be 1.0 volt). Change MODE switch to PROGRESSIVE INTERMITTENT and adjust R28 until DVM reads less than the voltage recorded, then gradually adjust R28 until DVM reads the same as the recorded voltage. DO NOT adjust past this point as the voltage will not increase any further. Change STEPS switch to 10 steps and verify that voltage reading on the DVM is 1/10th of the recorded voltage. If this is not the case, re-check the STEPS ZERO ADJUSTMENT and the STEPS SPAN ADJUSTMENT.

NOTE: This adjustment is based on the assumption that the STEPS counter has been reset to Zero and the voltage coming out of the D/A converter (RN1) is that required for one step(approx. 150 mv). To assure this condition, it may be necessary to turn the panel OFF for 20 seconds then turn it ON to assure a Power-On reset.

This completes the Calibration Procedure.

FUNCTIONAL CHECKS:

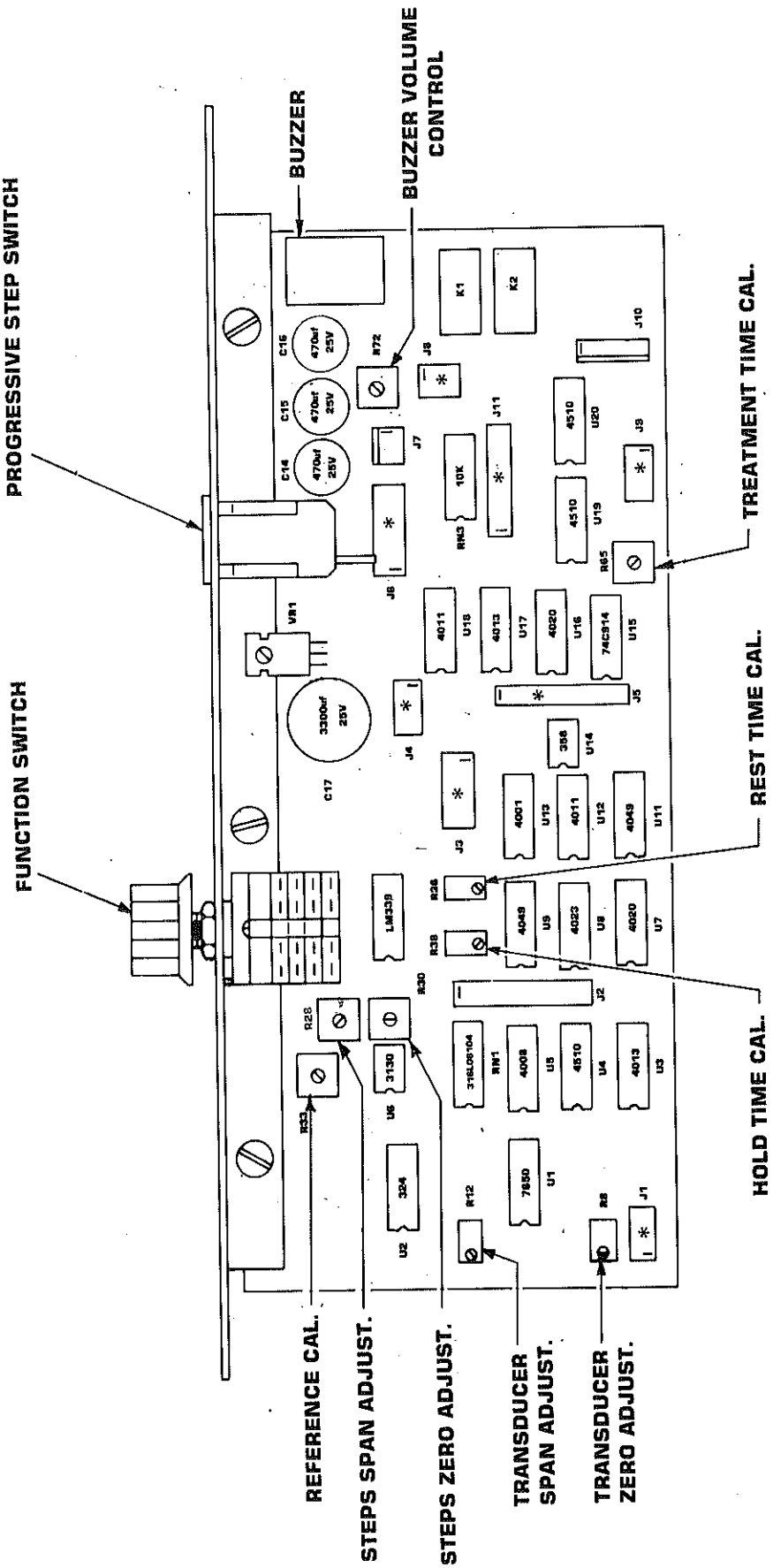
1. Check unit for proper operation in all MODES of treatment:
   - -Progressive Intermittent
   - -Intermittent
   - -Static
   - -Progressive Static

2. Check HOLD and REST times with a stopwatch. (5 seconds position is adequate)

3. Check digit switches on TREATMENT TIMER for proper operation, and check to see that TREATMENT TIMER stops unit at the end of the treatment and enables end of treatment alarm.

4. Check operation of PATIENT SWITCH and make sure that the Patient Switch Alarm is triggered when PATIENT SWITCH is operated. TREATMENT TIMER should also stop timing when PATIENT SWITCH is triggered and the traction should ramp down to zero.

P.C. BOARD ARRANGEMENT



NOTE: THE CONNECTORS WITH THIS SYMBOL (*)
ARE ON SOLDER SIDE OF P.C. BOARD.

CALIBRATION CHECK SHEET

Calibrated By:_____

120 Volt or 220/240 Volt:

Date:_____

Unit Serial Number:_____

OK:

Pre-Calibration Set-Up

CALIBRATION:

1. Treatment Time Clock(273 Hz)
2. Hold Timer (1638 Hz @ 5 sec.)
3. Rest Timer (1638 Hz @ 5 sec.)
4. Reference Calibration (2.00 volts)
5. Transducer Zero Adjustment
6. Traction Span Adjustment (100 lbs./45 Kg.)
7. Steps Zero Adjustment
8. Steps Span Adjustment

FUNCTIONAL CHECKS

Treatment Mode:

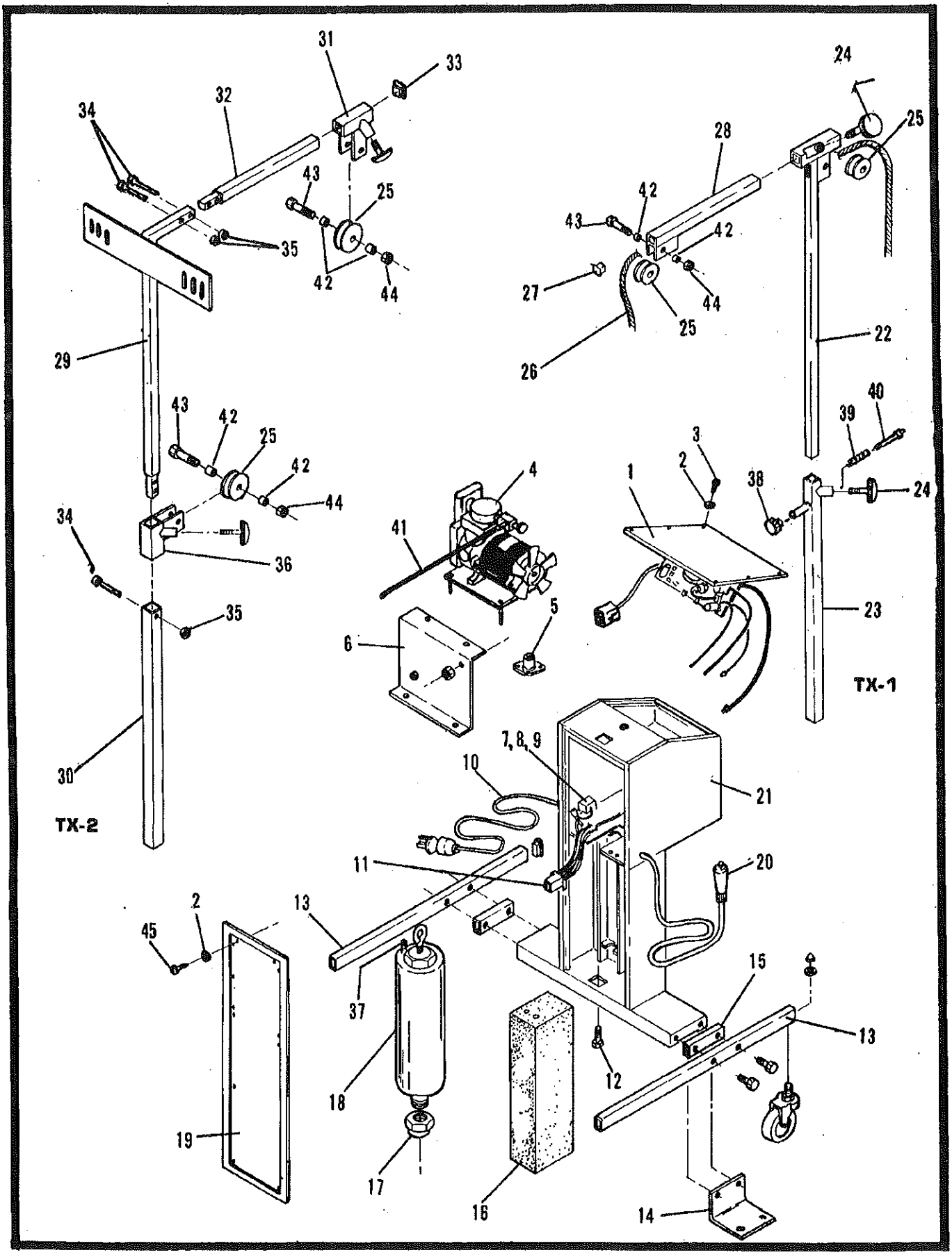
1. PROGRESSIVE INTERMITTENT
2. INTERMITTENT
3. STATIC
4. PROGRESSIVE STATIC

HOLD and REST TIMER CHECK

TREATMENT TIMER OPERATION

PATIENT SWITCH OPERATION

PARTS DRAWING - MODELS TX-1 and TX-2



PARTS LIST - MODELS TX-1 and TX-2

ITEM	PART NO.	DESCRIPTION	QTY.
1.	70217	CONTROL PANEL (120 volt, Pounds)	1
	73261	CONTROL PANEL (220/240 volt, Kilograms)	1
2.	60079	WASHER	6
3.	61661	SCREW	6
4.	63066	COMPRESSOR, w/Plate (120 volt)	1
	63063	COMPRESSOR, w/Plate (220/240 volt)	1
5.	60660	COMPRESSOR MOUNT COLLAR	4
	60748	MOTOR MOUNTS #106PD-3	4
6.	22874	COMPRESSOR COVER	1
7.	72732	FUSE CARRIER (120 volt)	1
8.	72734	FUSE HOLDER (120 volt)	1
9.	60087	FUSE, 5 Amp, Slo-Blo (F1)	1
10.	60149	CORD SET, 120 volt	1
	60662	CORD SET, 220/240 volt	1
11.	71098	WIRING HARNESS, 120 volt	1
	73516	WIRING HARNESS, 220/240 volt	1
12.	60839	SCREW, 1/2-13 X 3/4	1
13.	22908	LEG ASSEMBLY w/CASTERS (TX-1)	2
	21259	3" CASTER	4
	60634	BRAKE KIT	4
	21747	CAP NUT	4
	21402	WASHER	4
	22884	LEGS	2
	60830	SCREWS	4
	60009	PLASTIC PLUG	4
14.	63031	FLOOR MOUNTING BRACKET (TX-2)	2
15.	60936	SHIM(Includes Hardware)(Optional)(Set)	1
16.	60114	MUFFLER	1
17.	60732	1" LOCKNUT	1
18.	60664	CYLINDER	1
19.	22917	PANEL BACK, TX STND. w/MOLDING	1
20.	60081	PATIENT CORD	1
21.	22907	CABINET	1
22.	22911	UPPER VERTICAL TUBE(TX-1)(w/Hardware)	1
23.	22910	LOWER VERTICAL TUBE(TX-1)(w/Hardware)	1
24.	60313	LOCKING KNOB	2
25.	60310	PULLEY	1
26.	60093	ROPE	1
27.	60699	PLUG	1
28.	22912	HORIZONTAL BAR(TX-1)(w/Hardware)	1

PARTS LIST - MODELS TX-1 and TX-2(cont.)

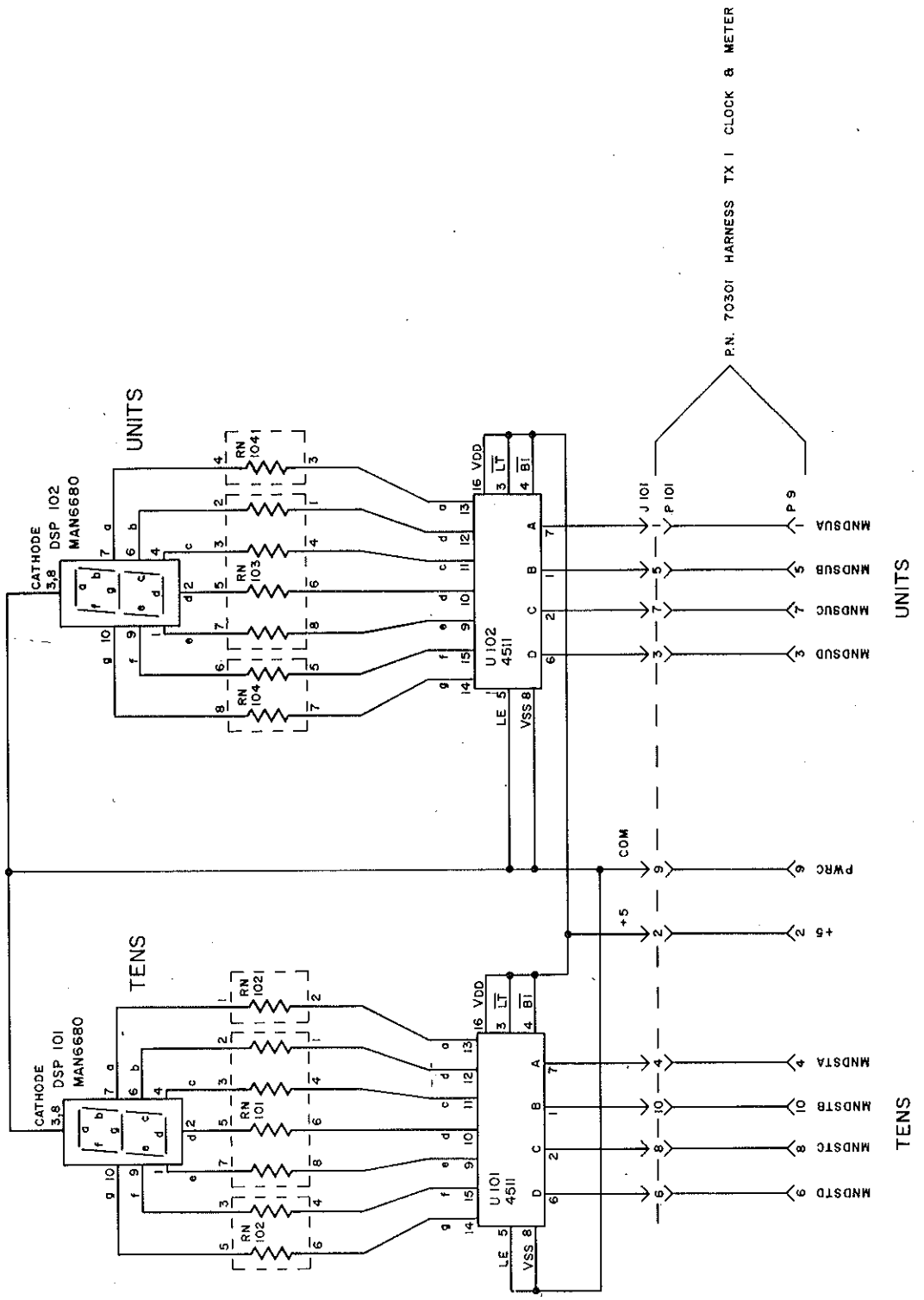
ITEM	PART NO.	DESCRIPTION	QTY.
29.	63036	UPPER VERTICAL TUBE(TX-2)	1
30.	63033	LOWER VERTICAL TUBE(TX-2)	1
31.	60309	UPPER PULLEY ASSEMBLY(TX-2)	1
	60404	PULLEY BRACKET	1
	60310	PULLEY	1
	60313	LOCKING KNOB	2
	61937	BUSHINGS	2
	60312	SHOULDER BOLT	1
	63985	LOCKNUT	1
32.	63042	HORIZONTAL BAR(TX-2)	1
33.	60850	PLASTIC PLUG	1
34.	60822	SCREW	2
35.	70208	LOCKNUT	2
36.	63049	SLIDE PULLEY ASSEMBLY(TX-2)(Includes hardware)	1
	63047	PULLEY BRACKET	1
	60313	LOCKING KNOB	1
37.	60101	FITTING, Cylinder	1
38.	60737	KNOB, PLUNGER	1
39.	60371	SPRING, Plated	1
40.	60370	PLUNGER	1
41.	60700	Hose Compressor	
42.	61937	BUSHING(per unit)	2
43.	60312	SHOULDER BOLT(per unit)	1
44.	63985	LOCKNUT(per unit)	1
45.	61671	SCREW, #10 X 5/8	8
46.	60094	LINE CLAMP(see page 5, Figure 3)	1

NOT SHOWN:

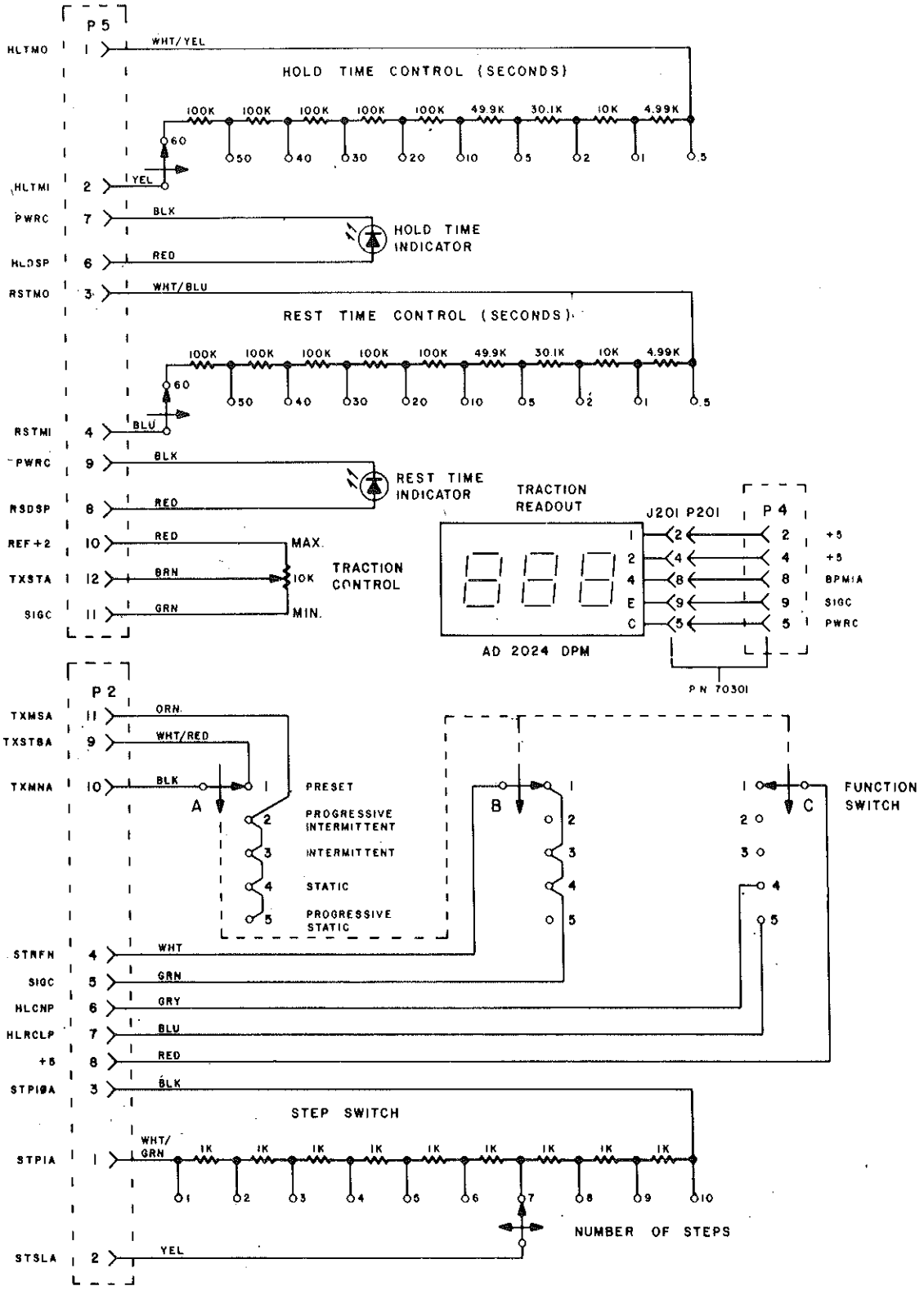
70147	TRANSFORMER(120volt)	1
70745	TRANSFORMER(220/240 volt)	1
70095	FUSE, F2 3/10 A Slo-Blo(120 volt)	
71766	FUSE, F2, 250ma, Anti-Surge(220/240 volt)	2

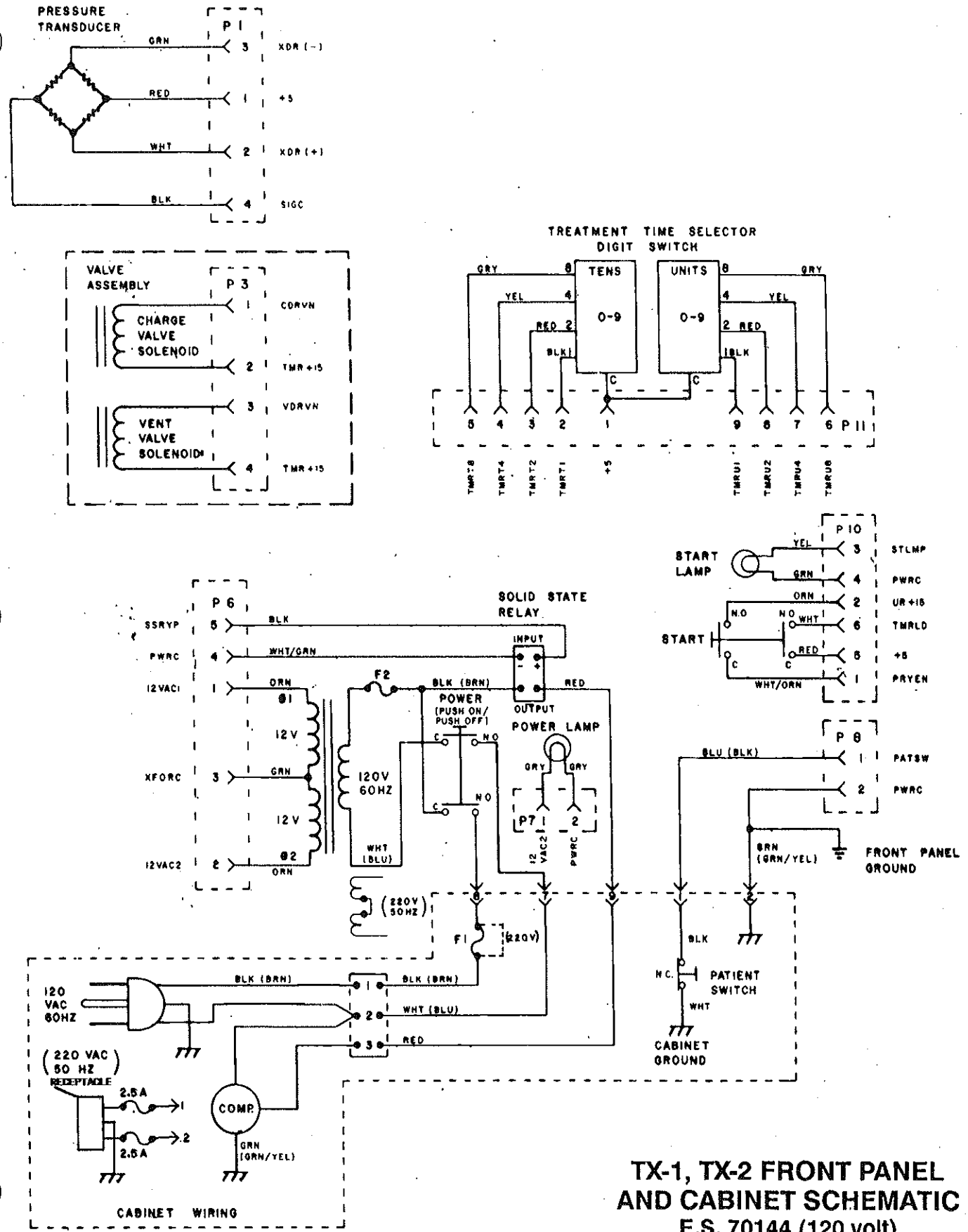
For 220/240 volt units:

63255	RECEPTACLE, Double Fuse Type	1
73426	FUSE CARRIER	2
71932	FUSE, 2.5A, Anti-Surge	2



TX-1, TX-2
CLOCK ASSEMBLY
E.S. 70084


P 5
HLTMO
1
WHT/YEL
HOLD TIME CONTROL (SECONDS)
100K
100K
100K
100K
100K
49.9K
30.1K
10K
4.99K
60
50
40
30
20
10
5
2
1
.5
YEL
HLTMI
2
PWRC
7
BLK
HOLD TIME INDICATOR
HLDSP
6
RED
RSTMO
3
WHT/BLU
REST TIME CONTROL (SECONDS)
BLU
RSTMI
4
PWRC
9
BLK
REST TIME INDICATOR
RSDSP
8
RED
REF+2
10
RED
MAX.
10K
TRACTION CONTROL
TXSTA
12
BRN
SIGC
11
GRN
MIN.
TRACTION READOUT
J201 P201
P 4
AD 2024 DPM
+5
+5
BPM1A
SIGC
PWRC
P N 70301
P 2
TXMSA
11
ORN.
TXSTBA
9
WHT/RED
TXMNA
10
BLK
A
PRESET
PROGRESSIVE INTERMITTENT
INTERMITTENT
STATIC
PROGRESSIVE STATIC
B
C
FUNCTION SWITCH
STRFN
4
WHT
SIGC
5
GRN
HLCNP
6
GRY
HLRCLP
7
BLU
+5
8
RED
STPIBA
3
BLK
STEP SWITCH
STPIA
1
WHT/GRN
1K
NUMBER OF STEPS
STSLA
2
YEL

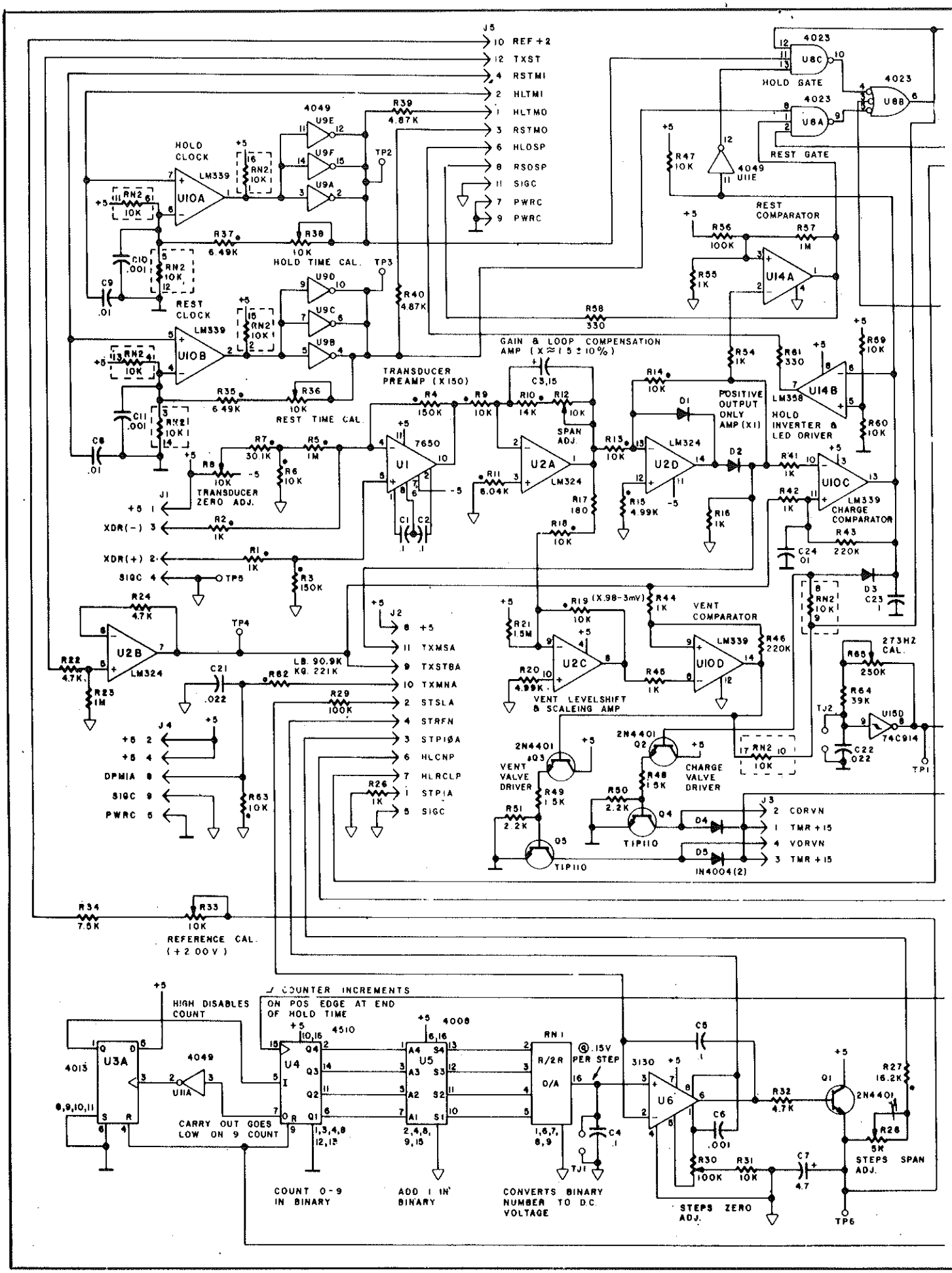


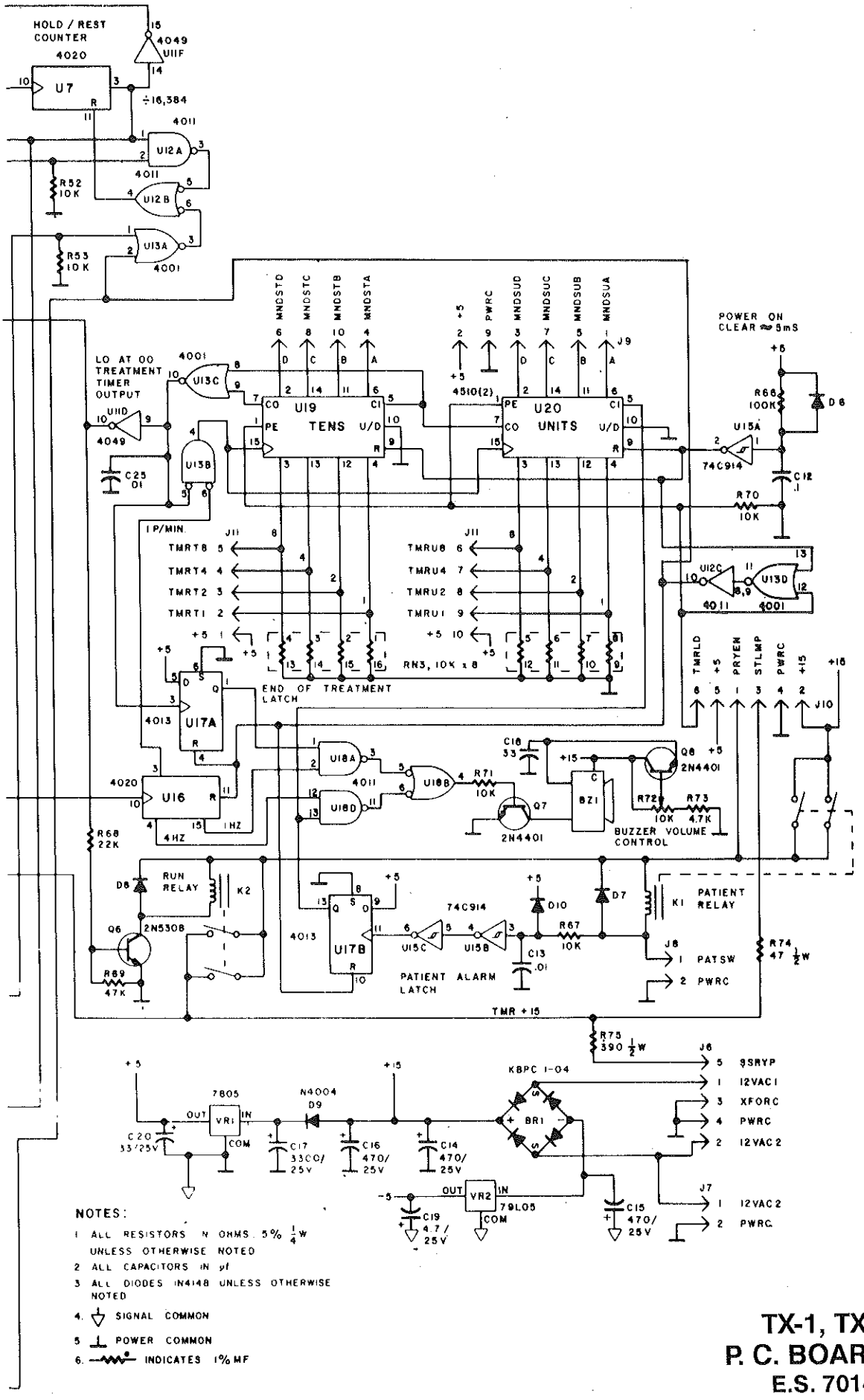
TX-1, TX-2 FRONT PANEL AND CABINET SCHEMATIC

E.S. 70144 (120 volt)

E.S. 73270 (220/240 volt)

NOTE: ITEMS IN PARENTHESIS ARE FOR 220/240V UNITS


J5
10 REF+2
12 TXST
4 RSTMI
2 HLTMI
1 HLTMO
3 RSTMO
6 HLOSP
8 RSOSP
11 SIGC
7 PWRC
9 PWRC
HOLD CLOCK
REST CLOCK
LM339
U10A
U10B
4049
U9E
U9F
U9A
U9D
U9C
U9B
RN2 10K
R39 4.87K
R37 6.49K
R38 10K
HOLD TIME CAL.
R40 4.87K
R35 6.49K
R36 10K
REST TIME CAL.
C10 .001
C9 .01
C11 .001
C8 .01
TP2
TP3
4023
U8C
HOLD GATE
U8B
U8A
REST GATE
U11E
R47 10K
REST COMPARATOR
R56 100K
R57 1M
R55 1K
U14A
R58 330
GAIN & LOOP COMPENSATION AMP (X≈15±10%)
TRANSDUCER PREAMP (X150)
R4 150K
R9 10K
C3,15
R10 14K
R12 10K
SPAN ADJ.
U1
7650
U2A
LM324
R7 30.1K
R5 1M
R8 10K
TRANSDUCER ZERO ADJ.
R6 10K
C1
C2
R11 6.04K
R17 180
R18 10K
R14 10K
D1
POSITIVE OUTPUT ONLY AMP (X1)
U2D
R13 10K
R15 4.99K
R16 1K
D2
R54 1K
R61 330
U14B
LM358
HOLD INVERTER & LED DRIVER
R59 10K
R60 10K
R41 1K
U10C
LM339
CHARGE COMPARATOR
R42 1K
R43 220K
C24 01
D3
C23 1
J1
+5 1
XDR(-) 3
R2 1K
XDR(+) 2
R1 1K
SIGC 4
TP5
R3 150K
R24 4.7K
U2B
LM324
R22 4.7K
R23 1M
TP4
LB. 90.9K
KG. 221K
C21 .022
R62
R29 100K
J2
8 +5
11 TXMSA
9 TXSTBA
10 TXMNA
2 STSLA
4 STRFN
3 STPIØA
6 HLCNP
7 HLRCLP
1 STPIA
5 SIGC
R26 1K
J4
+5 2
+5 4
DPMIA 8
SIGC 9
PWRC 5
R63 10K
R19 (X.98-3mV)
R44 1K
VENT COMPARATOR
R21 1.5M
U2C
R20 4.99K
R45 1K
U10D
LM339
R46 220K
VENT LEVELSHIFT & SCALEING AMP
R65 250K
273HZ CAL.
R64 39K
TJ2
U15D
74C914
C22 .022
TP1
2N4401
Q3
VENT VALVE DRIVER
R49 1.5K
R51 2.2K
Q5
TIP110
2N4401
Q2
CHARGE VALVE DRIVER
R48 1.5K
R50 2.2K
Q4
TIP110
D4
D5
IN4004(2)
J3
2 CORVN
1 TMR+15
4 VORVN
3 TMR+15
R34 7.5K
R33 10K
REFERENCE CAL. (+2.00V)
COUNTER INCREMENTS ON POS EDGE AT END OF HOLD TIME
HIGH DISABLES COUNT
4013
U3A
4049
U11A
CARRY OUT GOES LOW ON 9 COUNT
4510
U4
COUNT 0-9 IN BINARY
4008
U5
ADD 1 IN BINARY
RN1
R/2R D/A
@.15V PER STEP
CONVERTS BINARY NUMBER TO D.C. VOLTAGE
3130
U6
C5 .1
C6 .001
C4 .1
R32 4.7K
Q1
2N4401
R27 16.2K
R28 5K
STEPS SPAN ADJ.
R30 100K
R31 10K
C7 4.7
STEPS ZERO ADJ.
TP6

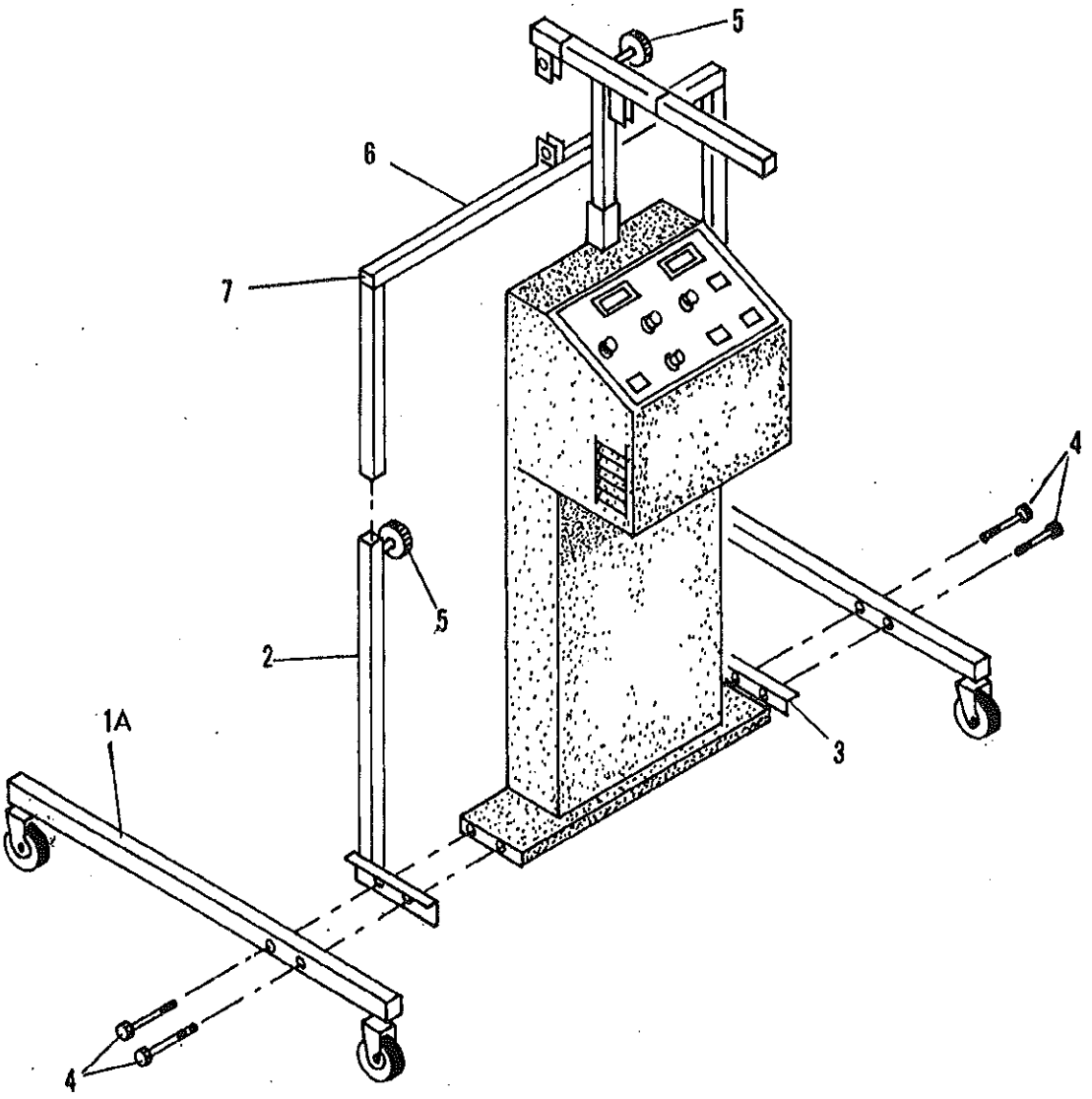


NOTES:

1. ALL RESISTORS IN OHMS 5% 1/4W UNLESS OTHERWISE NOTED
2. ALL CAPACITORS IN μf
3. ALL DIODES IN4148 UNLESS OTHERWISE NOTED
4. ▽ SIGNAL COMMON
5. ⊥ POWER COMMON
6. —∿— INDICATES 1% MF

TX-1, TX-2
P. C. BOARD B-1
E.S. 70146

TXL-17 ACCESSORY STAND
(18" to 30" HEIGHT BED FRAMES)



Ref.	Part No.	Description	Qty.
1A	22908	Leg Assembly(TX-1)(w/Casters)	2
2	61964	Lower Tube Assembly(Left)	1
3	61965	Lower Tube Assembly(Right)	1
4	60831	Bolt	4
5	60313	Knob	2
6	61966	Top Frame Assembly	1
	63964	Pulley Bracket	1
	60310	Pulley	1
	61937	Bushing	2
	60312	Shoulder Bolt	1
	63985	Locknut	1
	63964	Screw	1
	21387	Washer	2
	63983	Nut	1
7	60697	Plug	4

REMOVAL & REPLACEMENT OF CONTROL PANEL

Should it be necessary to change the TX® Series Control Panel, use the following procedure:

1. Make sure the unit is dis-connected from its power source.
2. Remove screws from the front panel.
3. Remove back panel.
4. Remove the two exhaust hoses from the foam muffler, the large air line from the cylinder fitting, and the small air line from the compressor(Figures 1 and 2).
5. Dis-connect the Control Panel Power Plug (Figure 3).
6. Remove the Control Panel from the unit.
7. To re-install, reverse procedure.
8. Perform short-form calibration procedure.

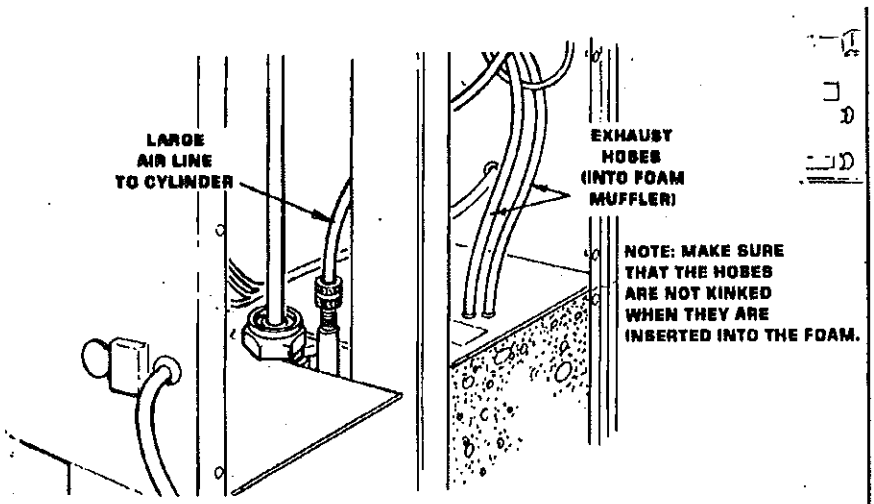


FIGURE 1

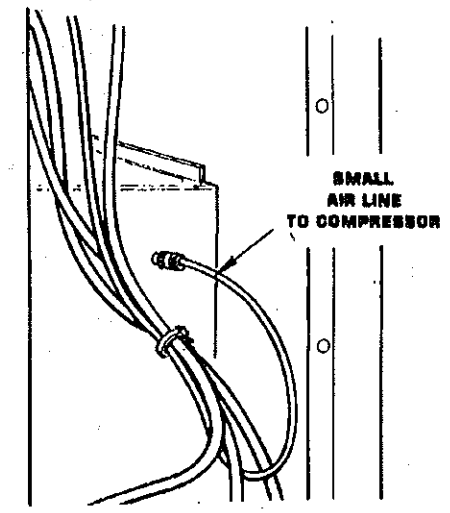


FIGURE 2

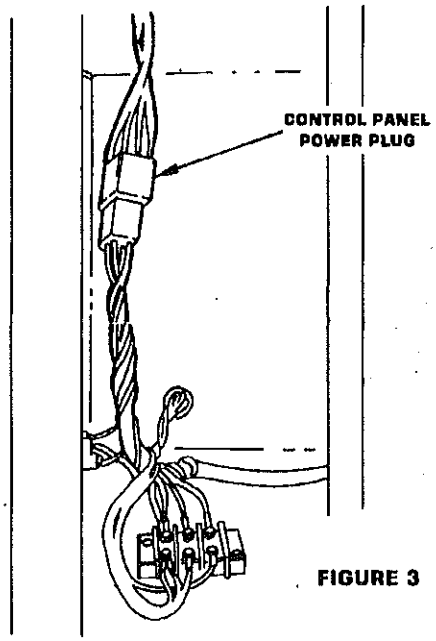


FIGURE 3

PANEL DESIGNATIONS