INSTRUCCION MANUAL

FOR THE

A711 x SERIES (R)

OF DC "BRUSH-TYPE" SERVO
MOTOR AMPLIFIERS

REVISION B DATE: June 5, 1991

THIS IS A GENERAL PURPOSE MANUAL DESCRIBING A SERIES OF AMPLIFIERS ANV SHOULD BE USED IN CONJUNTION WITH DRAWINGS PERTAINING TO YOUR SPECIFIC AMPLIFIER.

CAUTION

THE MAINTENANCE PROCEDURES DESCRIBED IN THE MANUAL SHOULD BE ATTEMPED ONLY BY HIGHILY SKILLED TECHNICIANS USING PROPER TEST, EQUIPMENT. BEFORE STARTING, READ THE WARRANTY PROVISIONS TO PREVENT VOIDING YOUR WARRANTY.

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APPENDIX

WARRANTY PROVISION

WARRANTY -- The Seller warrants that the article delivered will he free from defects in material and workmanship under normal use and service. Seller's obligations under this warranty are limited to replacing or repairing, at its option, any of said articles which shall within one (1) year after shipment be returned to the sellers factory of origin, transportation charges prepaid, and which are, after examination, disclosed to the sellers satisfaction to be thus defective. THIS WARRANTY IS EXPRESSED IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. INCLUDING THE IMPLIED WARRANTY OF FITTNESS FOR A PARTICULAR PRUPOSE AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE SELLER'S PART AND IT NEITHER ASSUMES NOR AUTHORIZES ANY OTHER PERSON TO ASSUME FOR THE SELLER ANY OTHER LIABILITIES IN CONECTION WITH THE SALE OF THE SAID ARTICLES.

This warranty shall not apply to any of such articles which have been repaired or altered, except by seller, or which have been subject to misuse, negligence or accident. The aforementioned previsions do not extend the original warranty period of any article which has been repaired or replaced by the seller.

FOREWORD

This is a general purpose manual covering the theory and application of the A711x series of pulse width modulated, DC, brush-type servo amplifiers.

Each A711x pulse width modulated amplifier consists of a chassis which contains the following:

A) The drive module(s) which is/are made up of:
   1) Control/Drive Board
   2) Output Transistor Heatsink Assembly
   3) Optional Fault Output Board
   4) Optional Taper Current Board

B) The main chassis which is made up of:
   1) Logic Supply, ±15 VDC
   2) Main Bus Power Supply
   3) Power Ij0 Terminal Block
   4) Protective Fusing
   5) Fan(s) (UL Listed)
   6) Optional Shunt Regulator

* NOTE!!! - Some models of the A711 utilize ±12 VDC for the logic supply. Check with your factory representative to determine if the specific model you are using is supplied with a 12 VDC logic supply.

THEORY OF OPERATION

The A711x series ® of amplifiers are current feedback, pulse width modulated servo amplifiers. Referring to the schematic diagram, the input to the amplifier may be connected differentially (using J2) or single ended (using J1). The signal input is summed with a tachometer signal at the velocity loop summing junction.

The input signal and the tachometer signal are of opposite polarity and are almost equal in magnitude. The difference between the input signal and the tachometer signal is the "velocity error signal" which is amplified by the velocity error amplifier.

The output of the velocity error amplifier is connected to a peak current control potentiometer utilized to limit the current command signal. This network also provides a variable RMS current shutdown circuit for application flexibility. The frequency shaping components close a voltage feedback loop around the velocity loop amplifier to stabilize the amplifier and tachometer feedback loops.

The output of the velocity loop is a current command signal which is summed with the current feedback signal at the current error amplifier. The current feedback signal is derived from the motor current sensing circuit and is directly proportional to the motor armature current. The difference between the current feedback signal and the current command signal is the "current error signal." The current error signal is then amplified by the current error amplifier. There are frequency shaping components around the current error amplifier which. stabilize the current loop.

The output of the current error amplifier is summed with a triangle wave generator at the input of two comparator; modulators. If the output from the current error amplifier is positive then one comparator/modulator increases in duty cycle while the opposite comparator/modulator decreases in duty cycle. The technique is called three-state modulation. Signals derived from the (+) and (-) limit inhibit the modulators and disable the appropriate polarity of amplifier output current.

The output transistors are connected in two totem pole configurations to provide bipolar output to a single phase, DC, "brush type" motor. There is a Current Sensor clamped around one of the output legs of the amplifier to provide a voltage proportional to the armature current.

PROTECTIVE FEATURES

The A711x amplifiers provide many advanced safety features, These safety features help protect personnel, machinery, motors and the amplifiers themselves.

The amplifier will shut off and the red LED will be turned on if any of the following occurs:

l. Motor stator windings shorted or grounded.
2. The output leads of the amplifier are shorted together.
3. Any output lead is shorted to ground.
4. The bus power supply exceeds safe levels. High bus voltage levels can result from either high AC line or excessive motor regeneration.
5. RMS current exceeds the amplifier's rating. 6. Excessive heatsink temperature.
7. The sum of the logic supplies is less than 28 volts.
8. Low bus voltage.
9. Logic supply failure.

NOTE: The amplifier will shutdown and a red LED will illuminate under all of the above conditions. Connecting the external reset line (J1 -13) to signal common, momentarily, will reset the amplifier. The amplifier may also be reset by removal and reapplication of logic power.

CONECTORS AND TEST POINTS

Conector J1 - Signal Input/Output

Pin Number	Description
1	Auxiliary Signal Input *
2	Signal Input
3	Tachometer Signal Input
4	Tachometer/Signal Input Return
5	Current Monitor Output
6	(-) Normally Open Signal Input Limit **
7	(+) Normally Open Signal Input Limit **
8	Amplifier Disable Input Fault Output
9	Common
10	+15 Volt Output
11	Common
12	-15 Volt Output
13	Fault Reset Input
14	(-) Normally Closed Signal Input Limit **
15	(+) Normally Closed Signal Input Limit **

Note: Connect the jumper at J5 in the "A" position to use pin number two (2) above for the signal input.

Connector J2 (Also see J5)

Pin Number	Description
1	Inverted Signal Input
2	Non-Inverted Signal Input

Note: Use both inverted and Non-Inverted Signal Inputs together for Differential Signal Input. Connect the jumper at J5 in the "B" position to use these pins for the signal input.

Connector J3

Pin Number	Description
1 & 2 ("HI" position)	High Gain Velocity loops used far most controllers
3 & 4 ("LO" position)	Low Gain Velocity loops generally required when no Tachometer Input is used

* For some configurations .l1-1 and a are eased for differential input (R 105 and R106 must be added - zero ohm links).

** See "Limit Switch Input Configuration" for setup information.

CONECTORS AND TEST POINTS (Continued)

Connector J4 - Logic Supply input

Pin Number	Description
1	+ 15 VDC
2	Common
3	- 15 VDC

Connector J5 (A/B)

Pin Number	Description
1 & 2	Using J2 For The Signal Input ("B" position)
3 & 4	Using J1 For 'The Signal Input ("A" position)

Conector J7 - Used for test points,/resistance measurements

Pin Number	Description
1	Balance potentiometer wiper
2	TC potentiometer wiper
3	Velocity error/CLM potentiometer wiper
4	Signal/Signal potentiometer wiper
5	Auxiliary potentiometer wiper
6	Tachometer potentiometer wiper

Conector J8 - Output connector

Pin Number	Description
1	Violet - Output to motor armature
2	Violet - Output to motor armature
3	Not used
4	Blue - Output to motor armature
5	Blue - Output to motor armature
6	Not used
7	Negative bus input
8	Negative bus input
9	Not used
10	Positive bus input
11	Positive bus input

LIMIT SWITCH INPUT CONFIGURATION

The limit switch input on the A711x series allows the user to connect over travel limit switches to the amplifier in order to ensure that the amplifier does not drive the axis into the end of the travel.

One of the features of the limit switch inputs on the A711x amplifier is that it may be optionally configured for either a normally open limit switch or a normally closed limit switch.

Unless specified prior to shipment, the amplifier will be configured for normally open operation i.e., the inputs at Jl pin 6 & 7 will have to be pulled down to the common potential of J1 pin 9. If this is undesirable then the user can specify that all modules be setup for the~ normally closed configuration at which time a different module number will be assigned to the unit.

Optional Feature

If the unit has already been received and the application requires normally closed operation then the following procedure must be followed:

1. Remove or clip-out the resistors at Rl09 and R110. These resistors are found in the lower left hand side of the board and are usually brown or cream with one black color code stripe around the center of their body.
2. Place the input limit signals for the (-) and (+) limits at pins 14 and 15 of Jl, respectively.

The amplifier is now setup for normally closed limit switches,

POWER SUPPLY - SHUNT REGULATOR

When a motor slows down or stops (decelerates), a portion of the kinetic energy stored in the inertia of the armature is returned to the amplifier, This energy "pumps-up" the bus power supply since the rectifiers will not allow it to return to the AC line. If the bus voltage exceeds a predetermined safe operating level, the fault circuitry shuts-down the amplifier and the red LED is illuminated. If the system performance mandates operation of the amplifier under conditions which produce excessive regeneration, then it may be necessary to install an optional bus voltage shunt regulator module.

See your local representative or call Westamp directly for more information on the shunt regulation option.

SET - UP PROCEDURE

After placing the amplifier chassis assembly in the cabinet the following instructions should be completed to "start-up" the amplifier modules:

1. Verify that the input power voltages that will be applied to the amplifier are the correct amplitude and frequency (refer to the installation diagram).
2. Verify that the wiring concurs with the installation diagram provided with your amplifier.
3. Disconnect the J8 (or J9) connector from all but one axis on the chassis. This axis will be the first to "start-up".
4. Decouple the motor from the load it will be driving.
5. Set the user adjustable potentiometers* as follows:
    a. Turn the CLM potentiometer fully counter clockwise.
    b. Turn the TAC potentiometer to about the middle of its range.
    c. Turn the TC potentiometer to about l/4 of the way from fully counter clockwise.
    d. Turn thc SIG potentiometer fully counter clockwise.
    e. Turn the AUX potentiometer fully counter clockwise.
    f. Turn the BAL potentiometer to about the middle of its range.
6. Place the J3 jumper in the "HI" position.
7. Turn the rotary switch (S1) to the "F" position. Turn the CLM pot CW 5-10 turns.
8. Apply input power to the amplifier and check the following:
    a. If the motor "runs away" verify that there is a tachometer input signal at the amplifier input. If there is a tachometer signal input, change the polarity of the tachometer input by swapping the two leads coming from the tachometer.
    b. If the motor continues to "run away" redo steps 4 through 7 and make sure the tachometer is producing a voltage output.
    c. Turn the BAL potentiometer back and forth to verify that the motor moves as the potentiometer is moved.
    d. Turn the BAL potentiometer until motor movement ceases.
    e. Repeat steps 3 through 8 for all axes art the chassis.
9. Once all axes have been turned on go to the "Compensating The Velocity Loop" section.

*Some A711 models use single turn potentiometers, others multi turn.

COMPENSATING THE VELOCITY LOOP

Before compensating the amplifier, the instructions outlined in the "Start-Up" section should be carefully completed so that the amplifier is already running prior to completing the following steps:

1. Disconnect the J8 connector from all but one axis on the chassis. This axis will be the first to compensate.
2. Turn the SIG potentiometer 1/4 of the way from fully counter clockwise.
3. Apply a step input to Signal Input of the amplifier and observe the motor follow the step input.
4. While applying a step input to the amplifier, observe the voltage at J1 pin 5 of the amplifier (current monitor) with a scope and set the CLM potentiometer to obtain the desired output current (Scale: +/- 10 Volts at the current monitor equals the peak current rating of the amplifier).
5. Turn the amplifier off and couple the motor to the load it will be driving.
6. Turn the amplifier on and, while applying a step irtput to the amplifier, observe the TAC pin of J7 with an oscilloscope with respect to the wire loop in the upper left hand corner of the drive module. Take the following action based upon the signal observed:
    a. If large overshoots followed by under-shoots are observed, turn the rotary switch (S1) counter clockwise until there is only one overshoot followed by an under shoot.
    b. Slowly turn the TC potentiometer clockwise until the under-shoot disappears or the motor begins to oscillate. If the under-shoot disappears the loop is compensated If the motor begins to oscillate turn the rotary switch (S1) clockwise one position and retry step 6b.
7. Repeat the above steps for all axis on the chassis.

SETUP PROCEDURE USING PRESET MEASUREMENTS

The standard A711x series of amplifiers employ multi turn potentiometers for system setup. After the initial system setup has been completed, it is recommended that the settings of all potentiometers be recorded in the "amplifier setting chart" at the end of the manual's text for later use. In this manner, field service calls can be reduced or even eliminated by setting replacement boards with the recorded settings of the initial system.

RMS CURRENT ADJUSTMENT

For many applications, the rated RMS current of the amplifier surpasses the rating that the motor can safely handle. If motor protection, external to the amplifier, is not provided, it may be necessary to adjust the RMS current fault circuit on the amplifier to avoid damaging the motor.

The A711x series of amplifiers employ a unique method for adjusting the RMS current fault rating. This method will not allow an individual to set the RMS rating of the amplifier to a higher value than the setting established when the amplifier was tested by Westamp.

There are two (2) potentiometers for the RMS setting on the control board. One setting is factory set and the other is the user adjustable potentiometer. **Altering the factory set potentiometer R136 will void any applicable warranties for the amplifier.** The user adjustable potentiometer, R135, is shipped such that it can only achieve 100% of the factory setting. Therefore, it is not possible to surpass the amplifier's rated RMS value using this potentiometer.

R135 is a single turn potentiometer. Turning the potentiometer CCW reduces the RMS current fault level, linearly to zero. Mid-range of the potentiometer will allow approximately 5% of the amplifier's rated RMS current.

NOTE: R135 is not accessible from the top of the module.

TROUBLE SHOOTING

Refer to the appropriate installation drawings, board layout drawings and schematics contained in this manual and supplied with the amplifier upon shipment.

l. Examine the entire amplifier chassis for loose connections, broken wires or damaged components.
2. Verify that no external limit is being activated.
3. If a fault indicator LED is on, read over the protective features section of this manual. Determine the reason for the fault condition.

CUATION: DO NOT SIMPLY RESET THE AMPLIFIER!!!!
Permanent damage to the amplifier may result.

The following is a list of typical conditions for a fault to exist:

A) ± 15 VDC logic supply is not supplying adequate voltage (Some models are supplied with 12 VDC logic supplies).
B) High bus voltage.
C) Defective or incorrectly wired transformer.
D) Defective motor.
E) Defective or incorrectly wired inductor (if used).

The following steps provide a systematic check of each of the potential faults.

A low or defective logic supply may be the result of one of the following:

A) No 115 VAC supply for the fan and logic.
B) Blown logic supply/fan fuse.
C) Defective logic supply.
D) Excessive load on ± 15 VDC logic supply.

Check the logic supply fuse and measure the 115 VAC input. If the input voltage and the fuse are okay, but the output voltage is low, measure the load current on each of the outputs (check the model number of your specific logic supply).

Logic supply with isolation transformer mounted on PC board.	1.25 amperes maximum
Logic supply with isolation transformer mounted off PC board.	2.25 amperes maximum

If the load currents are within specification and the output voltages remain low, return the supply to the Westamp for repair. If the load currents are excessive, determine the cause by disconnecting the logic supply connectors from the amplifier modules while monitoring the load current.

TROUBLE SHOOTING
(Continued)

Problems with the bus voltage are attributabte to:

A) Incorrect transformer wiring.
B) Defective transformer.
C) Defective rectifiers.
D) High line voltage.

CAUTION: TAKE PROPER PRECAUTIONS TO AVOID ELECTRIC SHOCK WHEN TAKING VOLTAGE MEASUREMENT!!!

Measure the voltage at the input bus power supply including the transformer primary to verify that the transformer is operating properly. Make certain that all three phases of a three phase input are checked line to line. If one phase is low it can reduce the bus voltage considerably and, if the system is operated under these conditions, cause permanent damage to the rectifiers.

OVER-VOLTAGE FAULT OCCURS

The system may be producing regenerative energy that is being returned to the amplifier during the deceleration phase of motion. The fault circuitry may be protecting the amplifier by shutting it off in order to discontinue any further regeneration.

If you do not have a Shunt Regulator with your amplifier it may be necessary to add one (see the section on shunt regulation in this manual). If you do have a shunt regulator and the problem persists, it is possible that the shunt regulator is defective or the fuse has blown due to excessive regeneration.

MOTOR FAILURE

If you are experiencing erratic or unexplainable faults, although the system seems to perform well in every other aspect, it is possible that the problem is in the motor. If faults occur only occasionally or during power-up only, verify that the motor has not shorted to ground or that the windings or wires are not intermittently shorting together.

APPLICATION NOTE: The A711x series has only one LED for troubleshooting problems.
Westamp does provide an optional fault output board that will display six (6) fault LED's individually. The following is a list of the faults displayed with the optional board:
Peak current (surge)
Motor Ground
RMS current
Logic under-voltage
Bus over-voltage
Heatsink over-temperature

TROUBLE SHOOTING MULTI-AXIS SYSTEMS

Trouble shooting multi-axis systems can create some unique situations since over-voltage bus and low logic voltage faults may cause one or more axes to fault simultaneously. When one or more modules fault or random modules fault, check the shunt regulator or the logic supply as outlined previously. If they appear to be operating normally, remove each module one at a time and reapply power after each module has been removed until the module causing the fault has been removed. Replace the modules to verify that they have not been damaged.

TYPICAL INSTALLATION AND FIELD PROBLEMS

SYMPTOM	CAUSE
High bus voltage	Defective shunt regulator Wrong transformer tap Incorrect Shunt regulator High line voltage Defective transformer
Surge current faults	Motor winding is grounded Output leads are shorted
RMS current faults	Extreme duty cycle Increase in machine friction Binding or defective mechanical component Defective motor Loop compensation required
Over-temperature faults	Fan obstructed or defective Ambient temperature too high
Low logic supply fault	Overload on logic supply Low line supplying the logic supply Defective logic supply

All of the above conditions will result in the protective circuitry to shut off the output and turn on the red LED.

RESETTING THE AMPLIFIER

Momentarily changing the logical state of the input at J1 pin 13 will reset the amplifier's protective circuits. In addition, removal of power followed by a 3-5 second delay, followed by reapplication of the power will reset all circuits within the amplifier.

CAUTION: ARBITRARILY RESETTING THE AMPLIFIER WITHOUT INVESTIGATING THE REASON FOR WHICH THE FAULT OCCURRED CAN CAUSE PERMANENT AMPLIFIER AND/OR MOTOR DAMAGE. FURTHERMORE, THIS COULD VOID ANY APPLICABLE WARRANTIES FOR THE AMPLIFIER AND/OR MOTOR.

Customer: _____ Amplifier Model: _____
Machine: _____

AMPLIFIER SETTINGS

AXIS	**#1**	**#2**	**#3**	**#4**
Module P/N				
Potentiometer Settings from fully CCW position				
Aux Pot				
Signal pot Diferencial Input YES/NO				
Tach Pot				
Tc Pot				
Current Limit Pot				

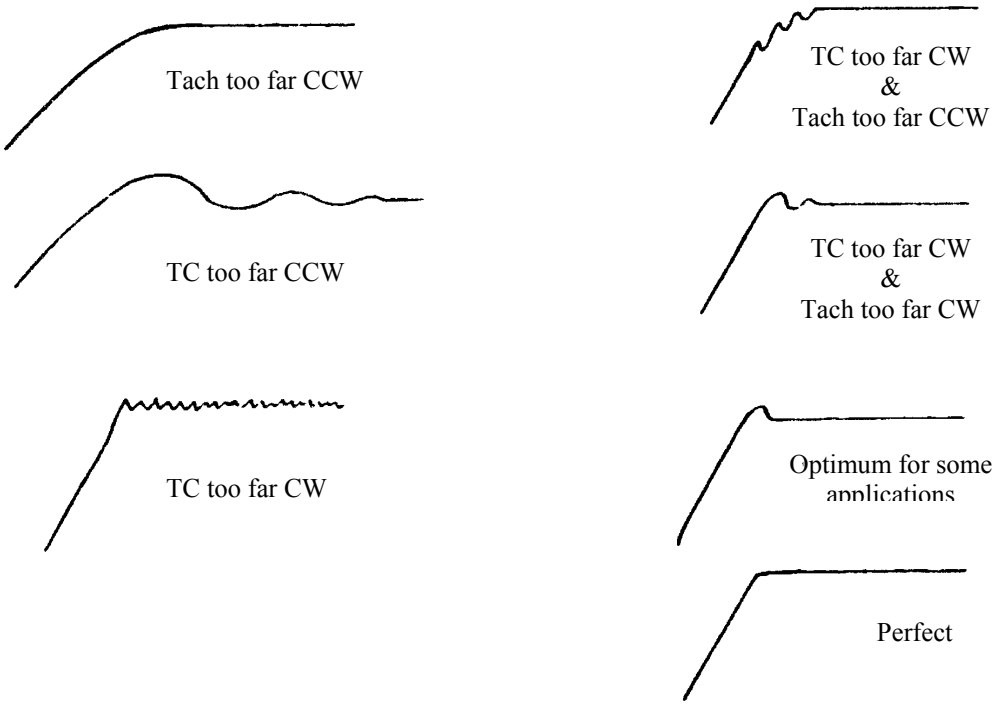
SPECIAL NOTES: Here you might want to indicate the overall # of turns of the pots. See Application Note Section on pots.

You might want to copy this page and put it with the machine DATE: _____

APPENDIX

HELPFUL HINTS:

1. Tachometer should be observed on an oscilloscope where sweep speed is set at. 1 secondes/centimeter and adjust the vertical attenuator to provide a convenient displacement in response to the signal input.
2. Small step Input commands may be provided with a DC simulator (battery box) while observing the tach response on the oscilloscope.
3. Typical pictures you will see on oscilloscope of tach profiles,



Tach Pictures

Figure 1

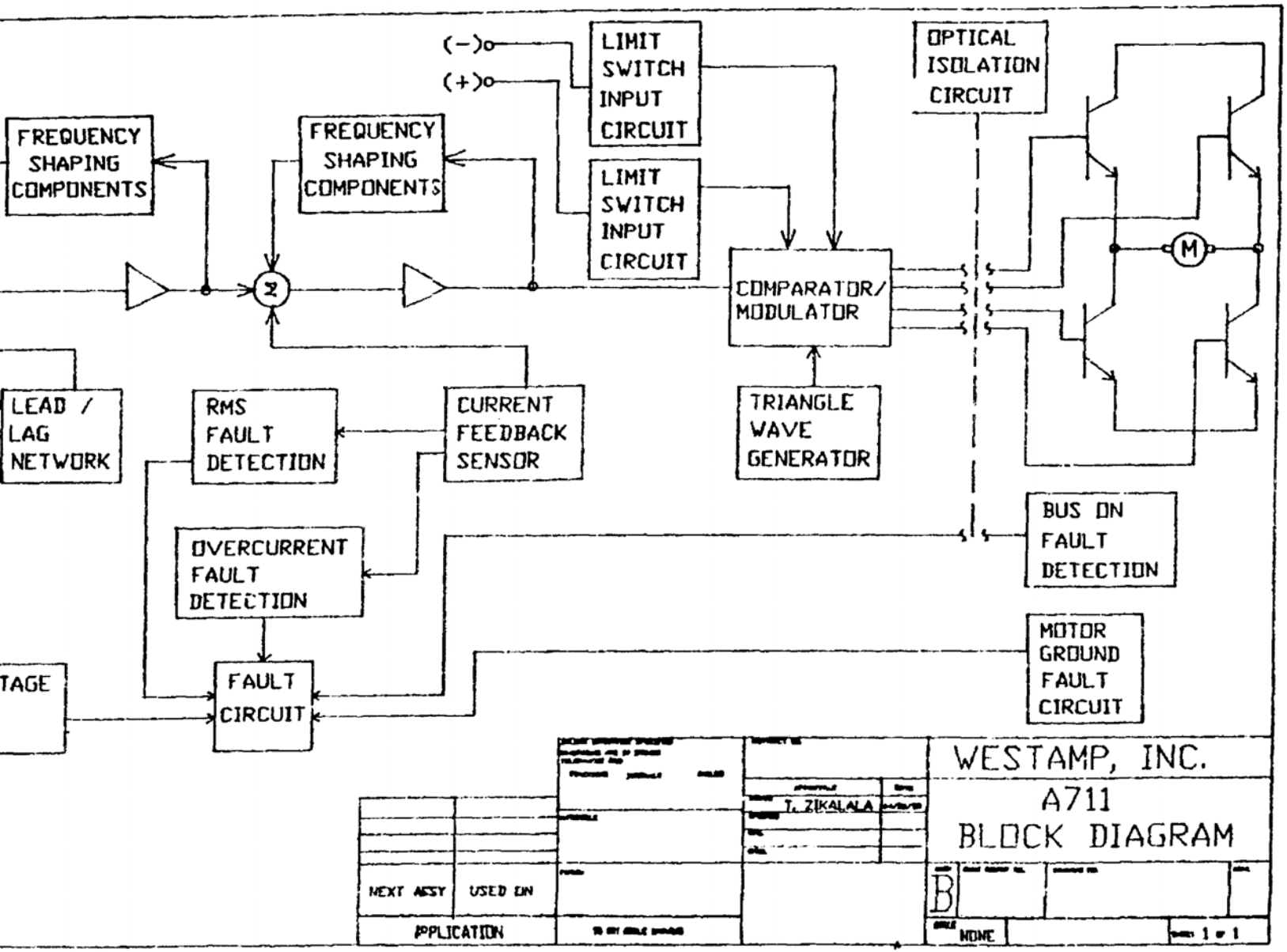
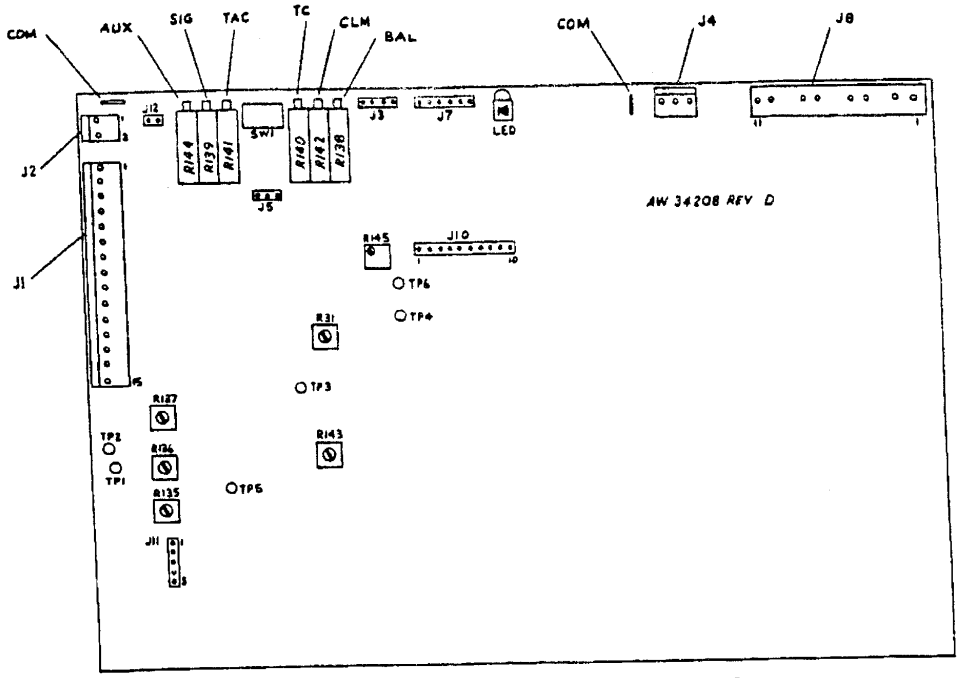
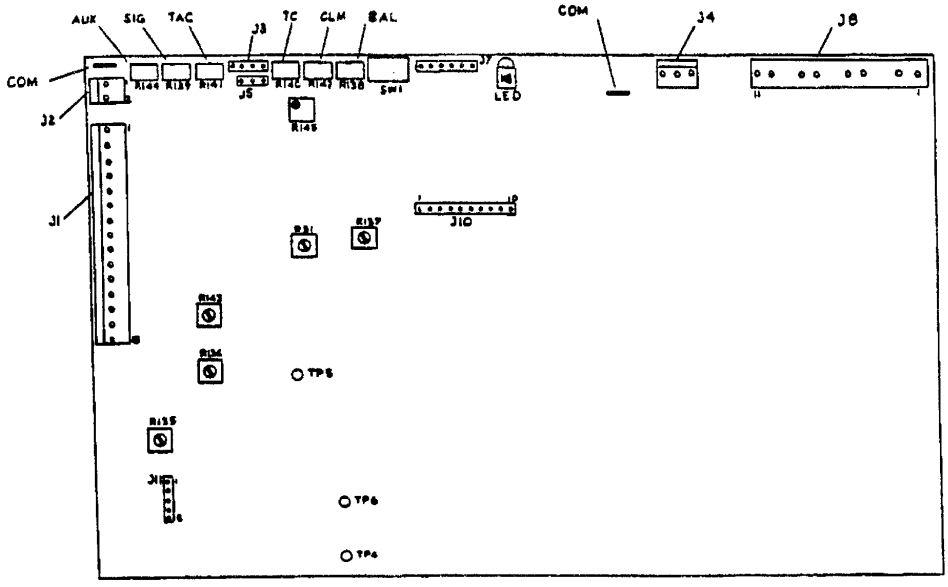

(−)
(+)
LIMIT SWITCH INPUT CIRCUIT
LIMIT SWITCH INPUT CIRCUIT
OPTICAL ISOLATION CIRCUIT
FREQUENCY SHAPING COMPONENTS
FREQUENCY SHAPING COMPONENTS
Σ
COMPARATOR/ MODULATOR
M
LEAD / LAG NETWORK
RMS FAULT DETECTION
CURRENT FEEDBACK SENSOR
TRIANGLE WAVE GENERATOR
BUS ON FAULT DETECTION
OVERCURRENT FAULT DETECTION
MOTOR GROUND FAULT CIRCUIT
FAULT CIRCUIT
WESTAMP, INC.
A711
BLOCK DIAGRAM
T. ZIKALALA
NEXT ASSY
USED ON
APPLICATION
B
NONE

Figure 2



MULTI-TURN POTENTIOMETER CONFIGURATION



SINGLE-TURN POTENTIOMETER CONFIGURATION

Figure 3

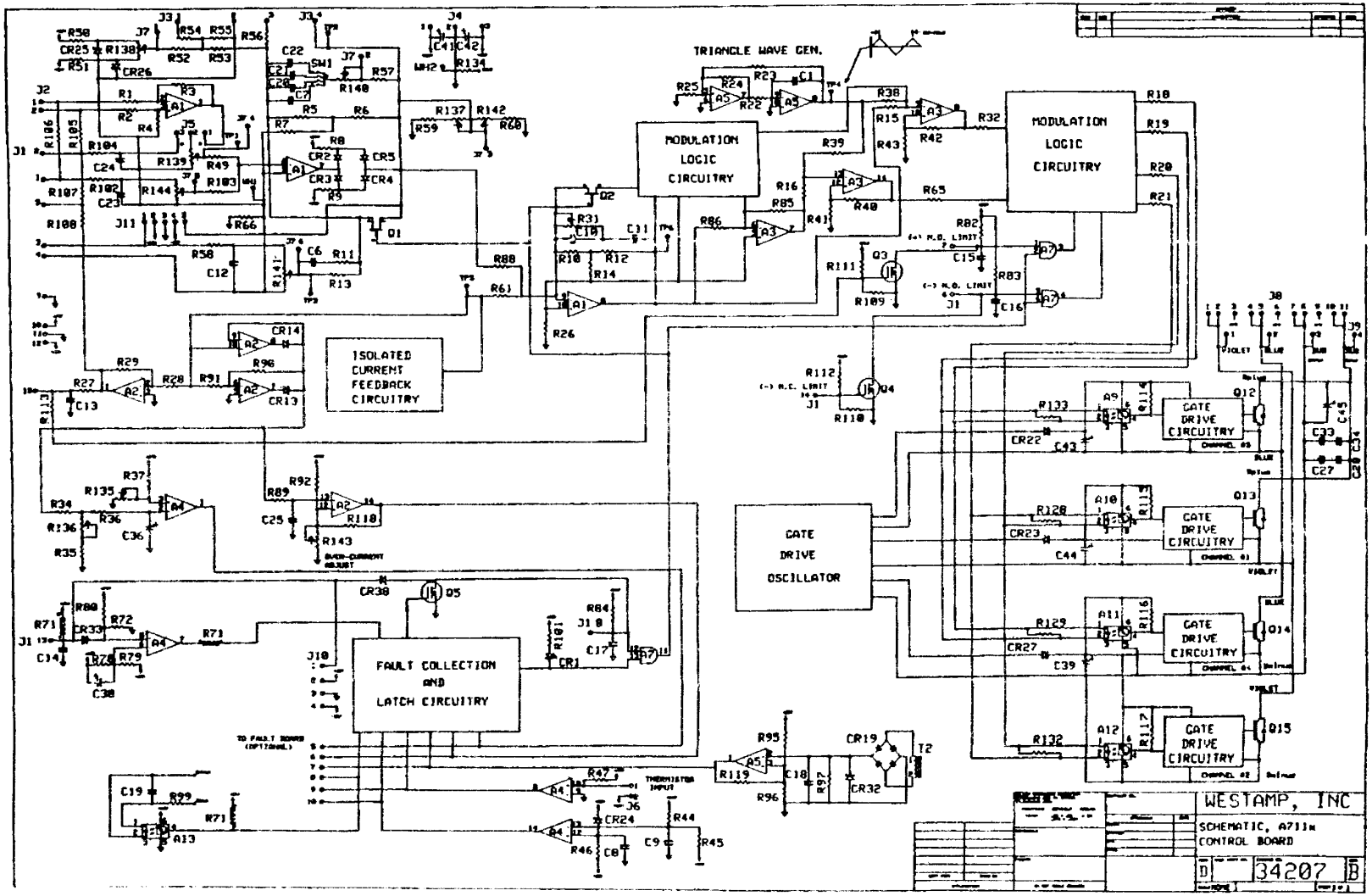

TRIANGLE WAVE GEN.
MODULATION LOGIC CIRCUITRY
MODULATION LOGIC CIRCUITRY
ISOLATED CURRENT FEEDBACK CIRCUITRY
GATE DRIVE OSCILLATOR
FAULT COLLECTION AND LATCH CIRCUITRY
GATE DRIVE CIRCUITRY
GATE DRIVE CIRCUITRY
GATE DRIVE CIRCUITRY
GATE DRIVE CIRCUITRY
WESTAMP, INC
SCHEMATIC, A711R
CONTROL BOARD
34207

Figure 4

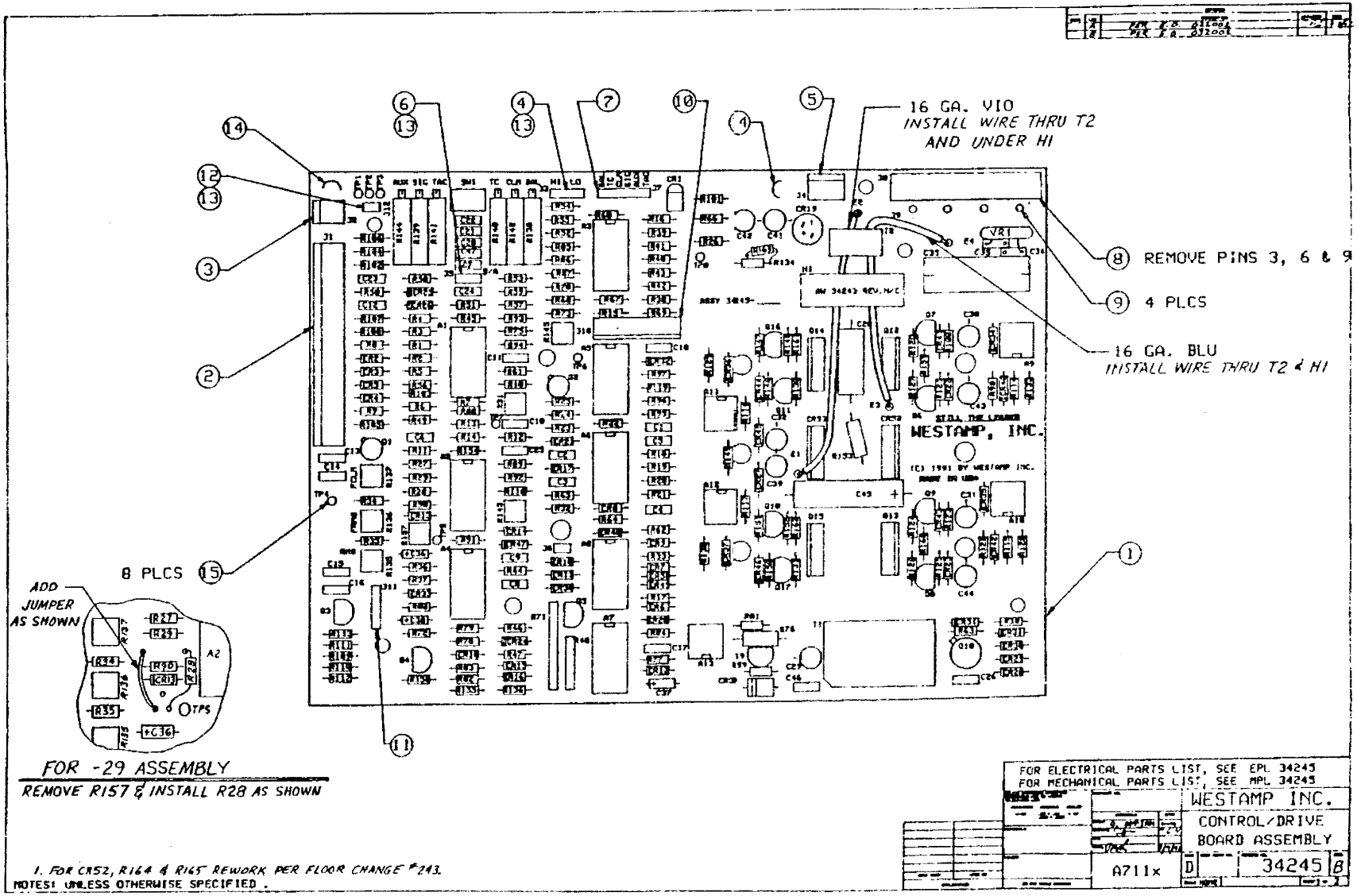
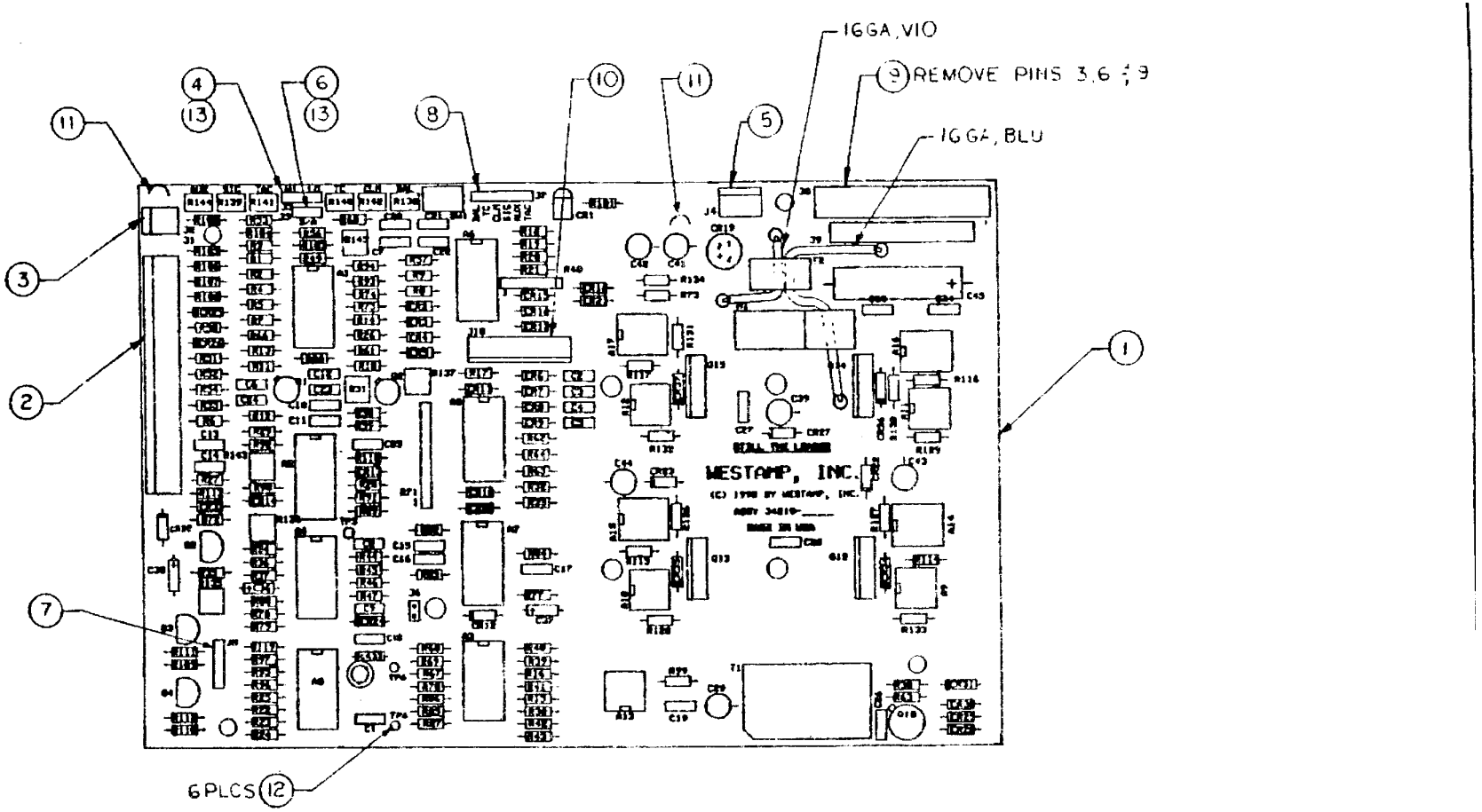

16 GA. VIO
INSTALL WIRE THRU T2
AND UNDER HI
8 REMOVE PINS 3, 6 & 9
9 4 PLCS
16 GA. BLU
INSTALL WIRE THRU T2 & HI
8 PLCS
ADD
JUMPER
AS SHOWN
FOR -29 ASSEMBLY
REMOVE R157 & INSTALL R28 AS SHOWN
1. FOR CR52, R164 & R165 REWORK PER FLOOR CHANGE #243.
NOTES: UNLESS OTHERWISE SPECIFIED.
WESTAMP, INC.
FOR ELECTRICAL PARTS LIST, SEE EPL 34245
FOR MECHANICAL PARTS LIST, SEE MPL 34245
WESTAMP INC.
CONTROL/DRIVE
BOARD ASSEMBLY
A711x
34245

Figure 5



FOR ELECTRICAL PARTS LIST SEE EPL 34210
FOR MECHANICAL PARTS LIST SEE MPL 34210

PART NO	DESCRIPTION	MATERIAL	ITEM
UNLESS OTHERWISE SPECIFIED: TOLERANCES: FRACTIONS ± 1/64 .X ± .03 .XX ± .010 ANGLES ± 2° DEBURR RADII _____ BREAK SHARP EDGES .005 - .010	CONTROL / DRIVE BOARD ASSEMBLY		WESTAMP INCORPORATED 1842 18TH STREET SANTA MONICA, CAL.
FINISH	MODEL A711x		DWG NO 34210 REV
	DRWN DA CHKD APPD		
	DATE 2-5-90 SCALE 1/1		SHEET 1 OF 1

Figure 6

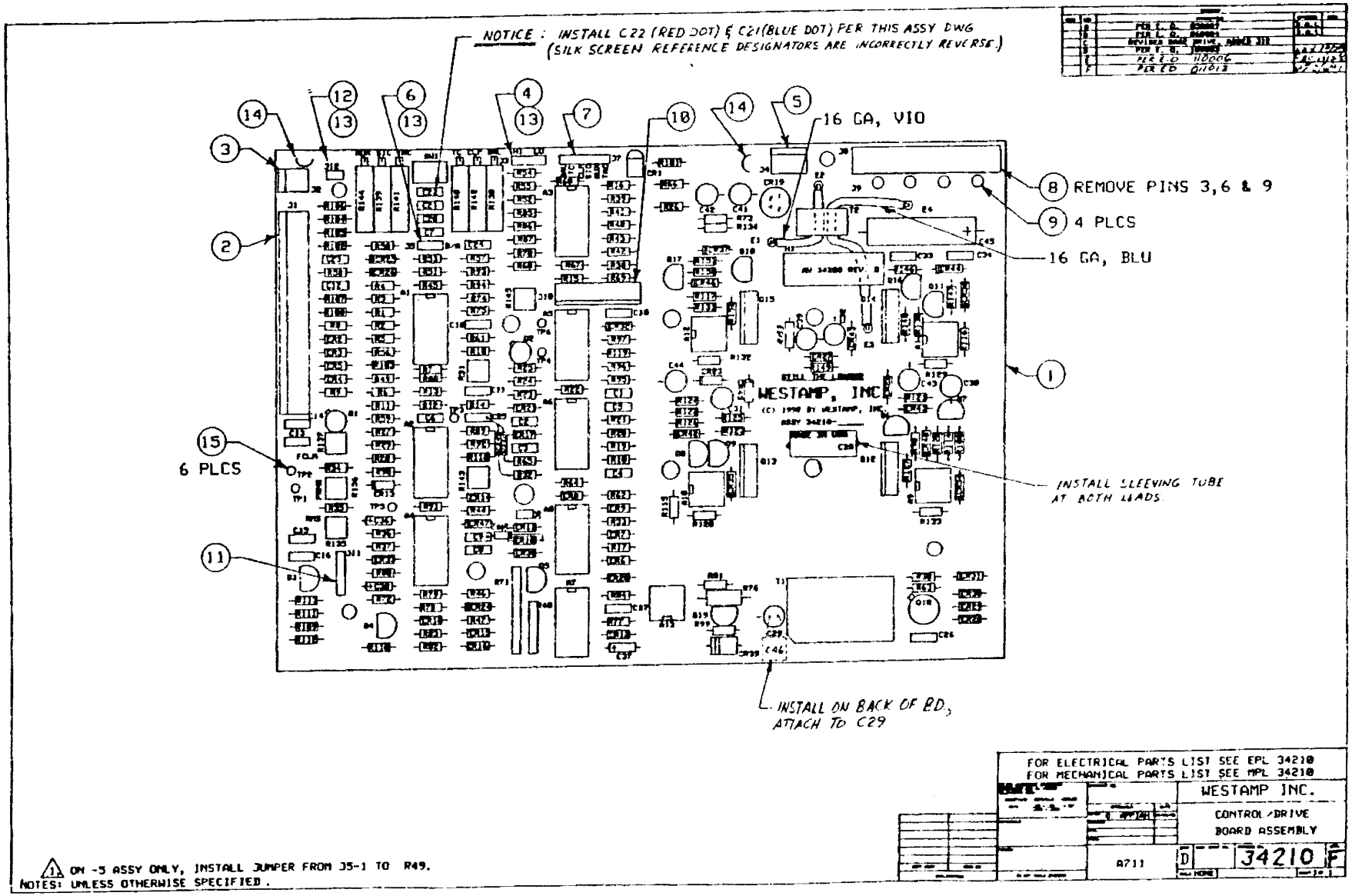

NOTICE : INSTALL C22 (RED DOT) & C21(BLUE DOT) PER THIS ASSY DWG
(SILK SCREEN REFERENCE DESIGNATORS ARE INCORRECTLY REVERSE.)
16 GA, VIO
8 REMOVE PINS 3,6 & 9
9 4 PLCS
16 GA, BLU
1
15 6 PLCS
INSTALL SLEEVING TUBE AT BOTH LEADS.
11
INSTALL ON BACK OF BD, ATTACH TO C29
WESTAMP, INC
FOR ELECTRICAL PARTS LIST SEE EPL 34210
FOR MECHANICAL PARTS LIST SEE MPL 34210
WESTAMP INC.
CONTROL / DRIVE
BOARD ASSEMBLY
A711
34210
⚠1 ON -5 ASSY ONLY, INSTALL JUMPER FROM J5-1 TO R49.
NOTES: UNLESS OTHERWISE SPECIFIED.

Figure 7

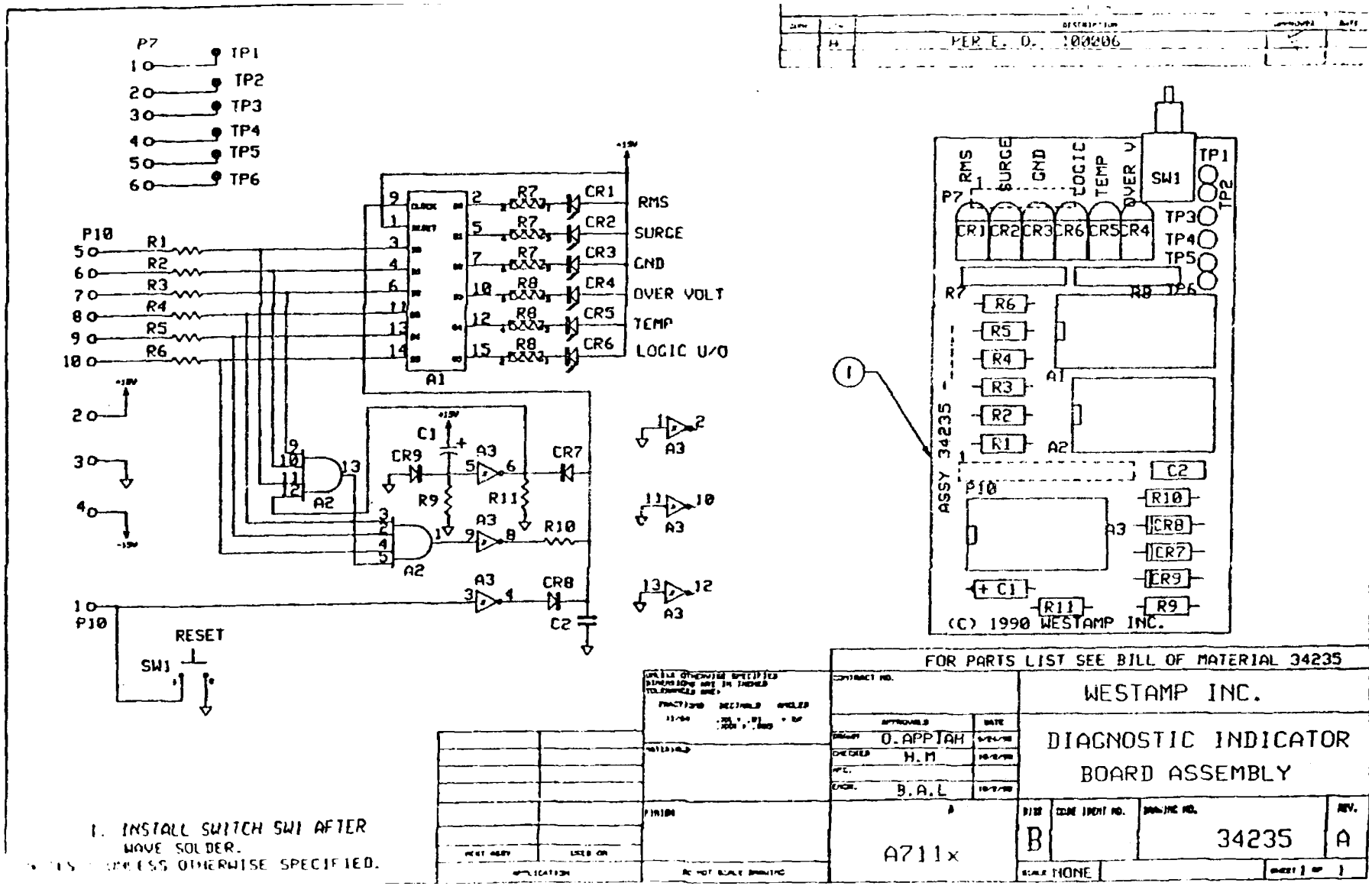

P7
TP1
TP2
TP3
TP4
TP5
TP6
P10
R1
R2
R3
R4
R5
R6
A1
A2
A3
C1
C2
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
R7
R8
R9
R10
R11
RMS
SURGE
GND
OVER VOLT
TEMP
LOGIC U/O
RESET
SW1
PER E. O. 100206
ASSY 34235
(C) 1990 WESTAMP INC.
1. INSTALL SWITCH SW1 AFTER WAVE SOLDER.
FOR PARTS LIST SEE BILL OF MATERIAL 34235
WESTAMP INC.
DIAGNOSTIC INDICATOR
BOARD ASSEMBLY
O.APPIAH
H.M
B.A.L
A711x
34235
NONE

Figure 8

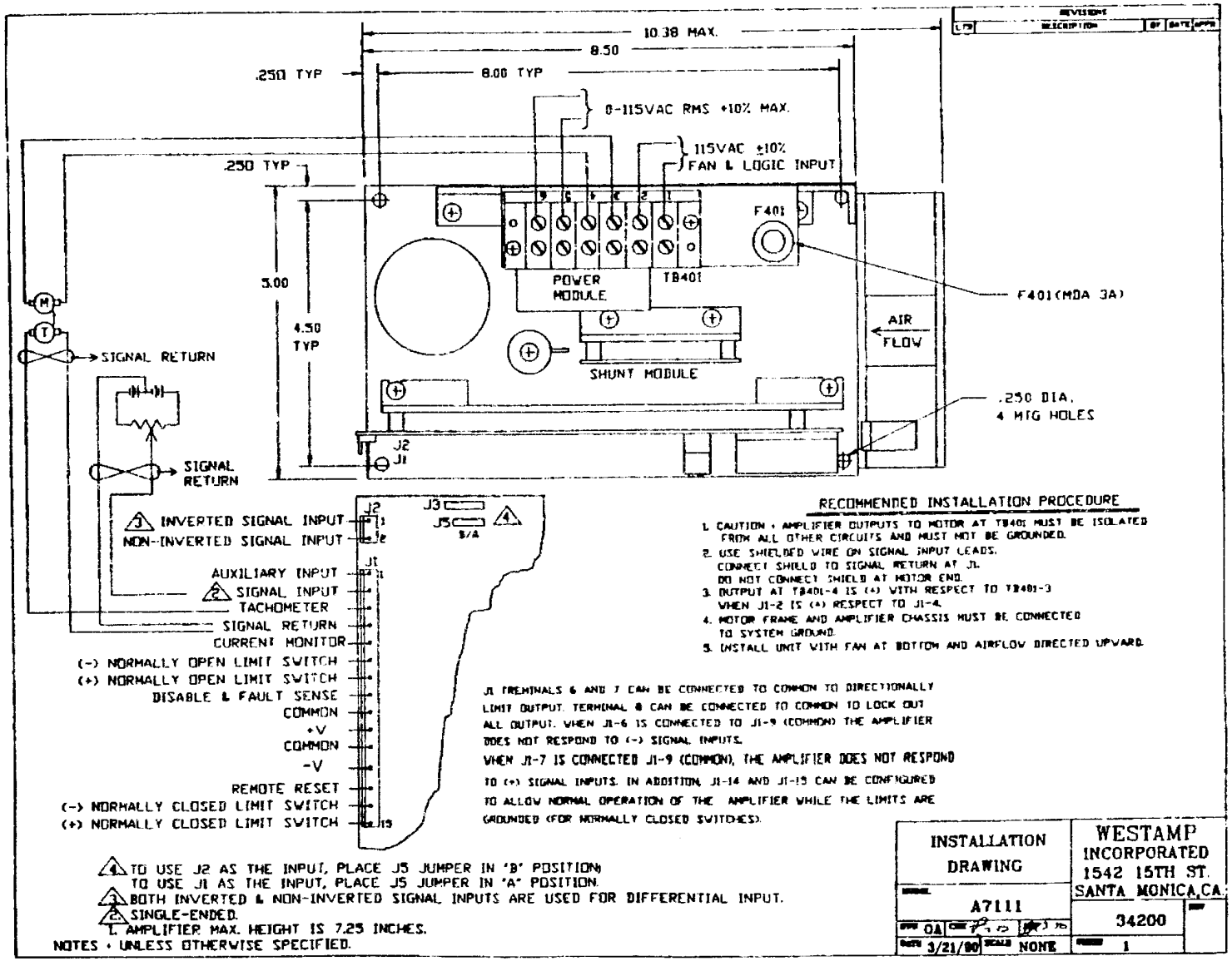

10.38 MAX.
8.50
.250 TYP
8.00 TYP
0-115VAC RMS +10% MAX.
115VAC ±10%
FAN & LOGIC INPUT
.250 TYP
5.00
4.50
TYP
F401
POWER MODULE
TB401
F401(MDA 3A)
AIR FLOW
SHUNT MODULE
.250 DIA.
4 MTG HOLES
SIGNAL RETURN
SIGNAL RETURN
J2
J1
J3
J5
3/A
INVERTED SIGNAL INPUT
NON-INVERTED SIGNAL INPUT
AUXILIARY INPUT
SIGNAL INPUT
TACHOMETER
SIGNAL RETURN
CURRENT MONITOR
(-) NORMALLY OPEN LIMIT SWITCH
(+) NORMALLY OPEN LIMIT SWITCH
DISABLE & FAULT SENSE
COMMON
+V
COMMON
-V
REMOTE RESET
(-) NORMALLY CLOSED LIMIT SWITCH
(+) NORMALLY CLOSED LIMIT SWITCH
RECOMMENDED INSTALLATION PROCEDURE
1. CAUTION - AMPLIFIER OUTPUTS TO MOTOR AT TB401 MUST BE ISOLATED FROM ALL OTHER CIRCUITS AND MUST NOT BE GROUNDED.
2. USE SHIELDED WIRE ON SIGNAL INPUT LEADS. CONNECT SHIELD TO SIGNAL RETURN AT J1. DO NOT CONNECT SHIELD AT MOTOR END.
3. OUTPUT AT TB401-4 IS (+) WITH RESPECT TO TB401-3 WHEN J1-2 IS (+) RESPECT TO J1-4.
4. MOTOR FRAME AND AMPLIFIER CHASSIS MUST BE CONNECTED TO SYSTEM GROUND.
5. INSTALL UNIT WITH FAN AT BOTTOM AND AIRFLOW DIRECTED UPWARD.
J1 TREMINALS 6 AND 7 CAN BE CONNECTED TO COMMON TO DIRECTIONALLY LIMIT OUTPUT. TERMINAL 8 CAN BE CONNECTED TO COMMON TO LOCK OUT ALL OUTPUT. WHEN J1-6 IS CONNECTED TO J1-9 (COMMON) THE AMPLIFIER DOES NOT RESPOND TO (-) SIGNAL INPUTS.
WHEN J1-7 IS CONNECTED J1-9 (COMMON), THE AMPLIFIER DOES NOT RESPOND TO (+) SIGNAL INPUTS. IN ADDITION, J1-14 AND J1-15 CAN BE CONFIGURED TO ALLOW NORMAL OPERATION OF THE AMPLIFIER WHILE THE LIMITS ARE GROUNDED (FOR NORMALLY CLOSED SWITCHES).
4 TO USE J2 AS THE INPUT, PLACE J5 JUMPER IN 'B' POSITION
TO USE J1 AS THE INPUT, PLACE J5 JUMPER IN 'A' POSITION.
3 BOTH INVERTED & NON-INVERTED SIGNAL INPUTS ARE USED FOR DIFFERENTIAL INPUT.
2 SINGLE-ENDED.
1. AMPLIFIER MAX. HEIGHT IS 7.25 INCHES.
NOTES - UNLESS OTHERWISE SPECIFIED.
INSTALLATION DRAWING
A7111
OA
3/21/90
NONE
WESTAMP INCORPORATED
1542 15TH ST.
SANTA MONICA, CA.
34200
1

Figure 9

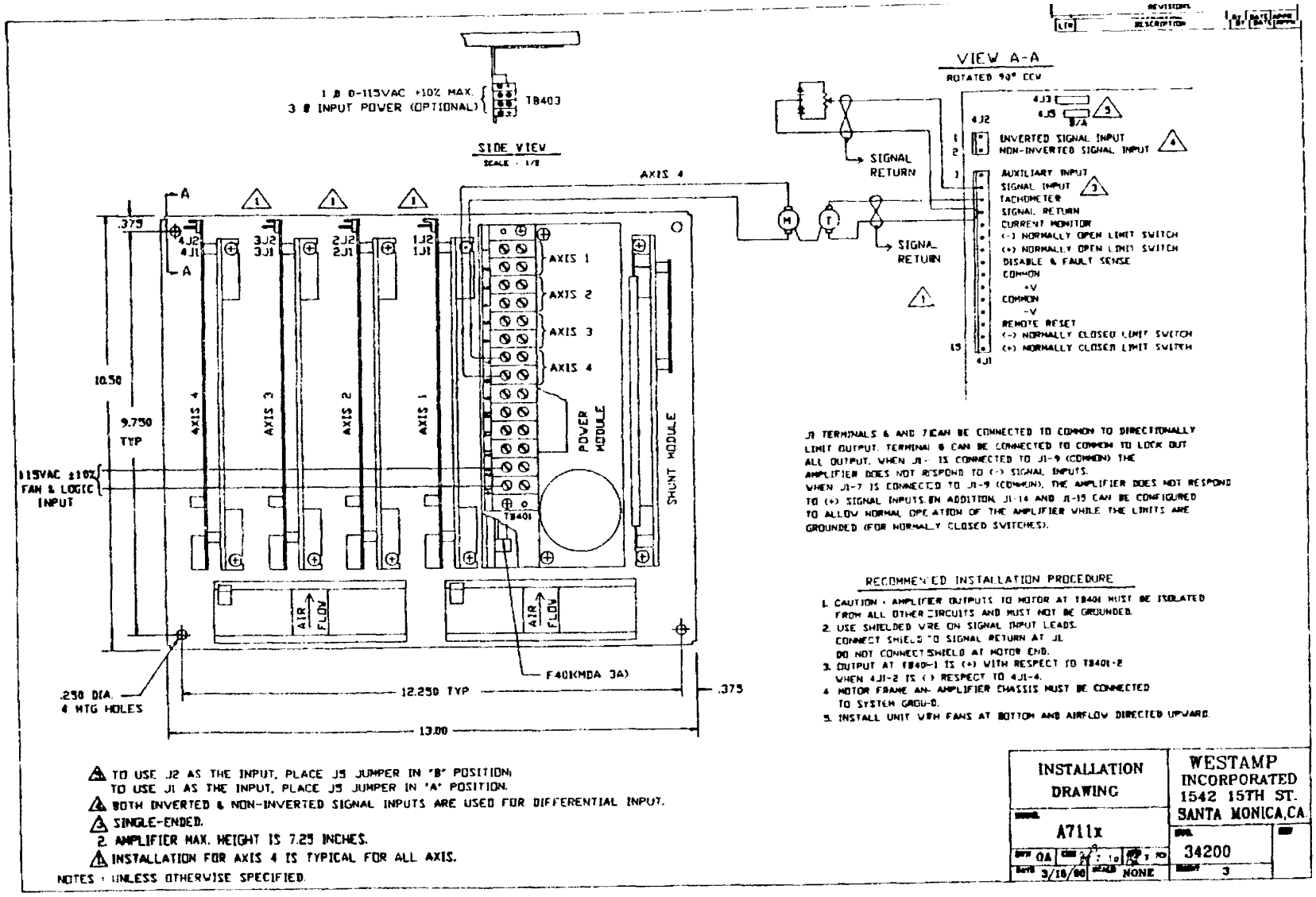
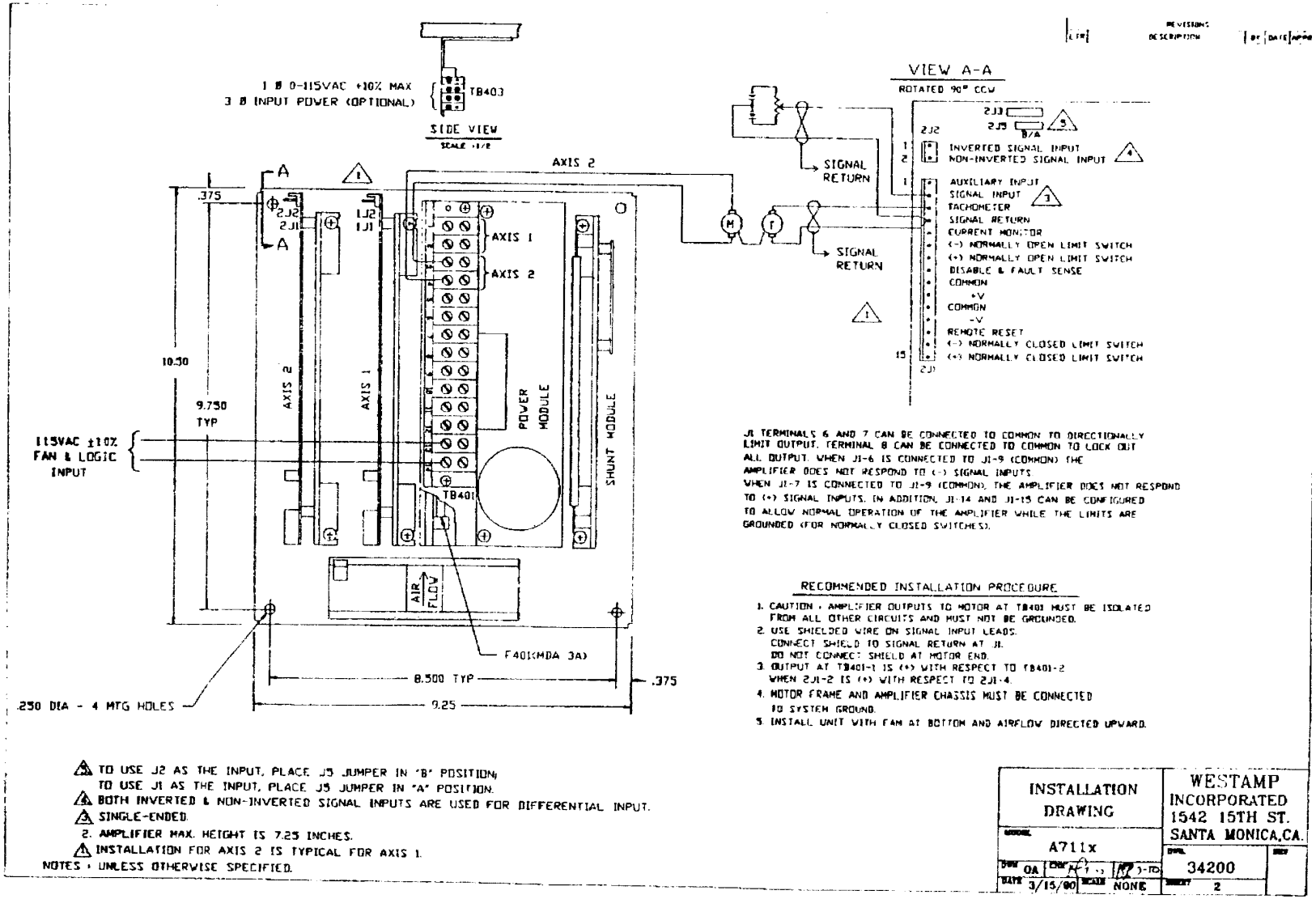

1 Ø 0-115VAC +10% MAX.
3 Ø INPUT POWER (OPTIONAL)
TB403
SIDE VIEW
SCALE - 1/8
VIEW A-A
ROTATED 90° CCW
SIGNAL RETURN
AXIS 4
AXIS 1
AXIS 2
AXIS 3
AXIS 4
POWER MODULE
SHUNT MODULE
115VAC ±10%
FAN & LOGIC
INPUT
TB401
AIR FLOW
F40KMDA 3A)
.250 DIA.
4 MTG HOLES
12.250 TYP
13.00
.375
10.50
9.750
TYP
INVERTED SIGNAL INPUT
NON-INVERTED SIGNAL INPUT
AUXILIARY INPUT
SIGNAL INPUT
TACHOMETER
SIGNAL RETURN
CURRENT MONITOR
(-) NORMALLY OPEN LIMIT SWITCH
(+) NORMALLY OPEN LIMIT SWITCH
DISABLE & FAULT SENSE
COMMON
+V
COMMON
-V
REMOTE RESET
(-) NORMALLY CLOSED LIMIT SWITCH
(+) NORMALLY CLOSED LIMIT SWITCH
J1 TERMINALS 6 AND 7 CAN BE CONNECTED TO COMMON TO DIRECTIONALLY LIMIT OUTPUT. TERMINAL 8 CAN BE CONNECTED TO COMMON TO LOCK OUT ALL OUTPUT. WHEN J1-6 IS CONNECTED TO J1-9 (COMMON) THE AMPLIFIER DOES NOT RESPOND TO (-) SIGNAL INPUTS. WHEN J1-7 IS CONNECTED TO J1-9 (COMMON), THE AMPLIFIER DOES NOT RESPOND TO (+) SIGNAL INPUTS. IN ADDITION, J1-14 AND J1-15 CAN BE CONFIGURED TO ALLOW NORMAL OPERATION OF THE AMPLIFIER WHILE THE LIMITS ARE GROUNDED (FOR NORMALLY CLOSED SWITCHES).
RECOMMENDED INSTALLATION PROCEDURE
1. CAUTION - AMPLIFIER OUTPUTS TO MOTOR AT TB40 MUST BE ISOLATED FROM ALL OTHER CIRCUITS AND MUST NOT BE GROUNDED.
2. USE SHIELDED WIRE ON SIGNAL INPUT LEADS. CONNECT SHIELD TO SIGNAL RETURN AT J1. DO NOT CONNECT SHIELD AT MOTOR END.
3. OUTPUT AT TB40-1 IS (+) WITH RESPECT TO TB401-2 WHEN 4J1-2 IS (-) RESPECT TO 4J1-4.
4. MOTOR FRAME AND AMPLIFIER CHASSIS MUST BE CONNECTED TO SYSTEM GROUND.
5. INSTALL UNIT WITH FANS AT BOTTOM AND AIRFLOW DIRECTED UPWARD.
TO USE J2 AS THE INPUT, PLACE J3 JUMPER IN "B" POSITION. TO USE J1 AS THE INPUT, PLACE J3 JUMPER IN "A" POSITION.
BOTH INVERTED & NON-INVERTED SIGNAL INPUTS ARE USED FOR DIFFERENTIAL INPUT.
SINGLE-ENDED.
2. AMPLIFIER MAX. HEIGHT IS 7.25 INCHES.
INSTALLATION FOR AXIS 4 IS TYPICAL FOR ALL AXIS.
NOTES : UNLESS OTHERWISE SPECIFIED.
INSTALLATION DRAWING
A711x
DWG 34200
WESTAMP INCORPORATED
1542 15TH ST.
SANTA MONICA, CA.
DATE 3/16/00
SCALE NONE
SHEET 3

Figure 10


1 Ø 0-115VAC +10% MAX
3 Ø INPUT POWER (OPTIONAL)
TB403
SIDE VIEW
VIEW A-A
ROTATED 90° CCW
AXIS 2
AXIS 1
SIGNAL RETURN
SIGNAL RETURN
INVERTED SIGNAL INPUT
NON-INVERTED SIGNAL INPUT
AUXILIARY INPUT
SIGNAL INPUT
TACHOMETER
SIGNAL RETURN
CURRENT MONITOR
(-) NORMALLY OPEN LIMIT SWITCH
(+) NORMALLY OPEN LIMIT SWITCH
DISABLE & FAULT SENSE
COMMON
+V
COMMON
-V
REMOTE RESET
(-) NORMALLY CLOSED LIMIT SWITCH
(+) NORMALLY CLOSED LIMIT SWITCH
.375
10.50
9.750 TYP
AXIS 2
AXIS 1
POWER MODULE
SHUNT MODULE
115VAC ±10% FAN & LOGIC INPUT
TB401
AIR FLOW
F401(MDA 3A)
8.500 TYP
.375
.250 DIA - 4 MTG HOLES
9.25
J1 TERMINALS 6 AND 7 CAN BE CONNECTED TO COMMON TO DIRECTIONALLY LIMIT OUTPUT. TERMINAL 8 CAN BE CONNECTED TO COMMON TO LOCK OUT ALL OUTPUT. WHEN J1-6 IS CONNECTED TO J1-9 (COMMON) THE AMPLIFIER DOES NOT RESPOND TO (-) SIGNAL INPUTS.
WHEN J1-7 IS CONNECTED TO J1-9 (COMMON), THE AMPLIFIER DOES NOT RESPOND TO (+) SIGNAL INPUTS. IN ADDITION, J1-14 AND J1-15 CAN BE CONFIGURED TO ALLOW NORMAL OPERATION OF THE AMPLIFIER WHILE THE LIMITS ARE GROUNDED (FOR NORMALLY CLOSED SWITCHES).
RECOMMENDED INSTALLATION PROCEDURE
1. CAUTION - AMPLIFIER OUTPUTS TO MOTOR AT TB401 MUST BE ISOLATED FROM ALL OTHER CIRCUITS AND MUST NOT BE GROUNDED.
2. USE SHIELDED WIRE ON SIGNAL INPUT LEADS. CONNECT SHIELD TO SIGNAL RETURN AT J1. DO NOT CONNECT SHIELD AT MOTOR END.
3. OUTPUT AT TB401-1 IS (+) WITH RESPECT TO TB401-2 WHEN J1-2 IS (+) WITH RESPECT TO J1-4.
4. MOTOR FRAME AND AMPLIFIER CHASSIS MUST BE CONNECTED TO SYSTEM GROUND.
5. INSTALL UNIT WITH FAN AT BOTTOM AND AIRFLOW DIRECTED UPWARD.
⚠ TO USE J2 AS THE INPUT, PLACE J5 JUMPER IN "B" POSITION; TO USE J1 AS THE INPUT, PLACE J5 JUMPER IN "A" POSITION.
⚠ BOTH INVERTED & NON-INVERTED SIGNAL INPUTS ARE USED FOR DIFFERENTIAL INPUT.
⚠ SINGLE-ENDED.
2. AMPLIFIER MAX. HEIGHT IS 7.25 INCHES.
⚠ INSTALLATION FOR AXIS 2 IS TYPICAL FOR AXIS 1.
NOTES : UNLESS OTHERWISE SPECIFIED.
INSTALLATION DRAWING
A711x
DWN OA
DATE 3/15/90
SCALE NONE
WESTAMP INCORPORATED
1542 15TH ST.
SANTA MONICA,CA.
DWG 34200
SHEET 2