$ 25.00

BALDOR®
MOTORS AND DRIVES

SERIES 12
INVERTER

OPERATING AND TECHNICAL MANUAL

BEC 912

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BALDOR

SERIES 12

AC MOTOR ADJUSTABLE SPEED DRIVE

INSTRUCTION MANUAL NO. 7201

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AC DRIVE PRODUCT

WARRANTY

BALDOR warrants that the products sold will be free from defects in material and workmanship and perform to Seller's applicable published specifications for a period of two (2) years from date of shipment from Seller's plant. Seller extends this limited warranty to each buyer of the drive for the purpose of resale and to the original purchaser for use. (Use shall be defined as installation and application of power.) The liability of Seller hereunder shall be limited to replacing or repairing, at its option, any defective units or parts thereof which are returned F.O.B. Seller's plant, Bellevue, Washington. In no event shall Seller be liable for any consequential or incidental damages.

Equipment or parts which have been subject to abuse, misuse, accident, alteration, neglect, unauthorized repair or installation are not covered by warranty. Seller shall make the final determination as to the existence and cause of any alleged defect. No liability is assumed for expendable items such as fuses. No warranty is made with respect to custom equipment or products produced to Buyer's specifications except as specifically stated in writing by Seller in the contract for such custom equipment.

This warranty is the only warranty made by Seller with respect to the goods delivered hereunder, and may be modified or amended only by a written instrument signed by a duly authorized officer of Seller and accepted by Buyer.

Warranty of any product purchased by Seller from others is limited in time and scope to any warranty given Seller by such suppliers.

Except as hereinabove provided, SELLER MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

1.0 GENERAL INFORMATION

INTRODUCTION

This manual provides installation, startup, operating and maintenance instruction for Baldor Series 12 AC Adjustable Speed Drives range in size from 5-75 HP and are designed for use with three (3) phase induction motors. They operate from three phase main power to control the speed of a three phase squirrel cage induction motor. Single phase operation is possible with a 40% derate of drive power output. If single phase power is to be used, connect power to drive terminals L1 and L2. Place a jumper between drive input terminals L2 and L3. Size this wire the same as the incoming line to L1.

RATINGS

VAC	CONSTANT TORQUE RATINGS				BALDOR CATALOG NO. -E,-EO, -ER	SIZE	VARIABLE TORQUE RATINGS	
	MAX HP	AMPS CONT	AMPS 3 SEC	AMPS 1 MIN			MAX HP	AMPS CONT.
230	15	42	84	63	ID12215-X	A	20	55
	20	54	108	71	ID12220-X	A	25	70
	40	104	208	156	ID12240-X	C	50	130
	50	130	260	195	ID12250-X	C	60	145
460	15	21	42	32	ID12415-X	A	25	35
	20	27	54	41	ID12420-X	B	30	45
	30	40	80	60	ID12430-X	B	40	55
	50	65	130	98	ID12450-X	C	60	80
	75	96	192	144	ID12475-X	C	100	125

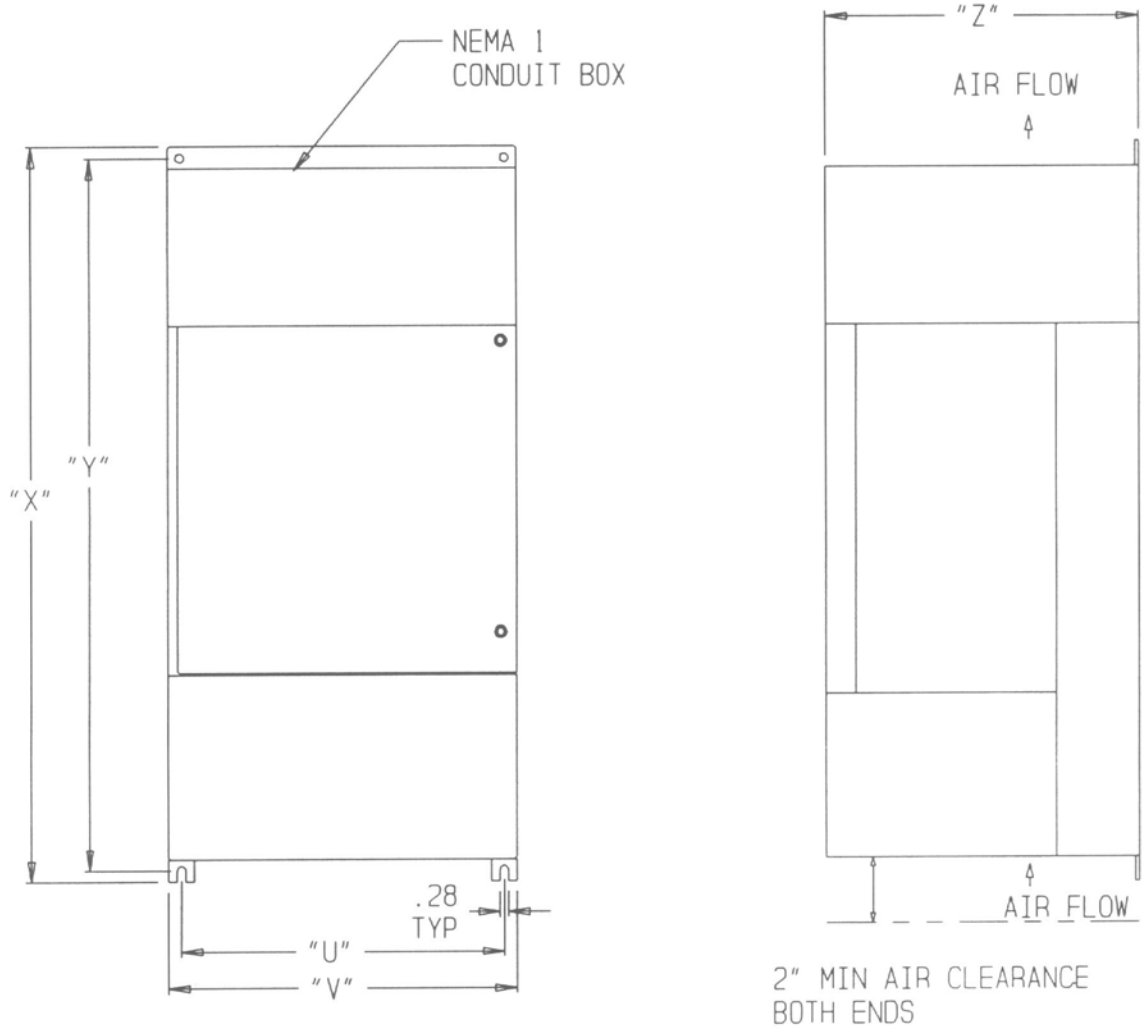
2.0 INSTALLATION AND STARTUP

Check motor nameplate and power source to make sure they match the drive nameplate and information contained in this manual. DO NOT USE THIS DRIVE ON ANY OTHER VOLTAGES OR MOTORS WITHOUT PRIOR FACTORY APPROVAL.

MOUNTING ENVELOPE AND FOOTPRINT DIMENSIONS - see Figure 1

This drive is designed for wall mounting. Mount in a clean dry area with an ambient temperature of not greater than +40 degrees C. DO NOT mount drive above transformer or other heat source. DO provide a minimum of 2" minimum clear area above and below drive to allow free flow of air over heat sink on the back of the enclosure.

FIGURE 1 provides the overall outline and mounting dimensions of the three different enclosures. NOTE, both the power and signal connections are made at the top of the drive. Provide access to the front of the drive to adjust potentiometers and observe indicators.Allow room for the hinged circuit board panel to swing open to access the power components.



SIZE	"U"	"V"	"X"	"Y"	"Z"
A	10.25 (26.0)	11.00 (28.0)	23.50 (59.7)	22.75 (57.8)	10.00 (25.4)
B	10.25 (26.0)	11.00 (28.0)	27.50 (69.9)	26.75 (69.8)	10.00 (25.4)
C	13.00 (33.0)	14.50 (36.8)	50.50 (128.3)	49.50 (125.7)	11.00 (28.0)

B-0019

DIMENSIONS IN INCHES (CM)

FIGURE 1

SAFETY WARNING

This equipment contains voltages which may be as high as 400/800 volts and rotating parts on motors and driven machines. High voltage and moving parts can cause serious or fatal injury. Only qualified personnel familiar with this equipment or this manual and any driven machinery should attempt to startup, troubleshoot or service this equipment.

OBSERVE THESE PRECAUTIONS:

1. **USE EXTREME CAUTION, DO NOT TOUCH any circuit board, power device or motor electrical connection without insuring the unit is properly grounded per instructions herein. DO NOT open cover for 2 minutes after removing AC power to allow capacitors to discharge.**

2. **BE CERTAIN that possible violent motion of the motor shaft and driven machinery due to improper control operation will not cause injury to personnel or damage to equipment. Peak torques of several times rated torque can occur during a control failure.**

3. **Motor circuit may have high voltage present whenever AC power is applied, even when motor is not rotating.**

POWER WIRING - see Figure 2

All wiring shall be in accordance with the National Electric Code and applicable local codes. External or remote motor overload protection must be provided in accordance with the National Electric Code.

This drive requires input power protection in the form of circuit breakers or fuses. Recommended sizes and types of circuit breakers, fuses and cables are provided in Appendix A of this manual.

CONNECT drive terminals L1,L2,and L3 to the load side of the customer supplied input protection device using wire specified in Appendix A. The drive may be powered with nominal 208 or 230 VAC Line -Line three phase for 230 VAC drives and 460 Line-Line for 460 VAC drives.Phase sequence of incoming line power is not important.

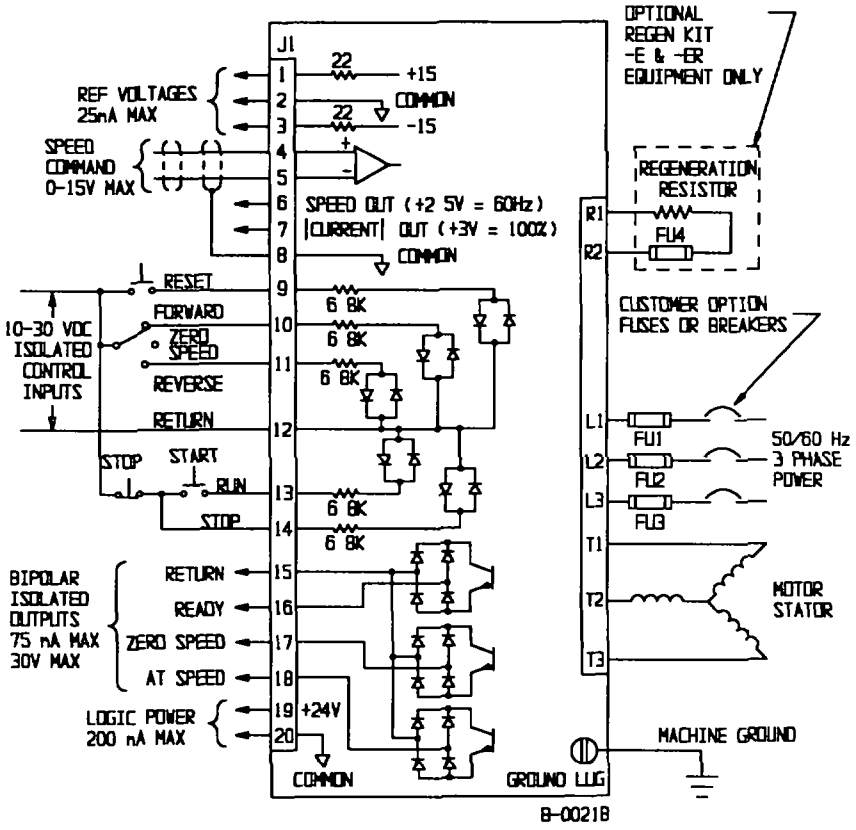
WIRE the three phase motor stator to drive terminals T1, T2 and T3 using the wire specified in Appendix A. Connect the drive to the motor either directly or indirectly through a DC rated contactor. A motor circuit contactor is recommended whenever a positive disconnection is required to prevent motor motion which could pose a hazard to personnel or equipment.

GROUND the chassis ground lug and motor frame to machine or plant ground using AWG #10 wire minimum.

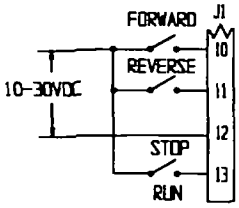
All BALDOR Series 12 Inverters are available with three (3) regenerative braking resistor options

-E	Standard built-in minimum braking torque available for stopping is 20% of motor full load torque
-ER	Braking torque available for stopping is determined by the optional user installed regenerative braking resistor
-EO	No regeneration capability is available with this option

NOTE High inertia and overhauling loads may require supplemental external regeneration resistor capacity with suitable fuse or breaker protection BALDOR supplies a number of kits for this purpose, consult factory for recommendations For -ER option drives, CONNECT regeneration resistor and associated fuse or breaker between drive terminals R1 and R2 after removing any (possibly included) built-in regeneration resistor wiring No regeneration capability is available with the -EO equipment



ALTERNATE START-STOP AND FORWARD-REVERSE CONNECTIONS



SWITCH SELECTION			DRIVE OPERATION
RUN	FORWARD	REVERSE	
OPEN	CLOSED	CLOSED	COAST TO STOP
CLOSED	CLOSED	CLOSED	FORWARD
CLOSED	CLOSED	OPEN	FORWARD
CLOSED	OPEN	CLOSED	REVERSE
CLOSED	OPEN	OPEN	REGENERATE TO ZERO SPEED

FIGURE 2

SIGNAL WIRING - WHEN USING OPERATOR PANEL

If not using operator panel proceed to **SIGNAL WIRING -BYPASSING OPERATING PANEL,** section below

BALDOR Series 12 Adjustable Speed Drives features an operator interface/display panel on the face of the drive Operator control is provided via a RUN/STOP switch, a FWD/REV switch and a rotary speed control with a digital FREQUENCY READOUT

NOTE When running the drive with the front operator panel, DO NOT USE optional remote control INPUTS TO THE J-1 connector on the control board DO USE the analog and digital outputs enumerated below and the reset input terminals on the J-1 connector See Figure 2

All customer control and signal wiring is terminated on the plug-in J-1 connector Common on this terminal strip is isolated from the power circuits and chassis All signal and control inputs are isolated from the terminal strip

ANALOG OUTPUTS - see Figure 2

The J1-6 Speed Output is available for speed monitoring or metering The output is +2 5V at 60 Hz

The J1-7 output is available for monitoring or metering load current The output is +3 0V at 100% load

LOGIC OUTPUTS - see Figure 2

The READY, ZERO SPEED, and AT SPEED outputs all indicate drive status These outputs are bipolar switches to the isolated return J1-15 Each of these switches is rated for 75 mA and 30 VDC and is normally used to drive relay coils with either positive or negative logic, depending on how the return J1-15 is connected The voltage drop across each switch is about 1 5 volts (not compatible with TTL interface)

The J1-16 READY output is closed to the J1-15 return when power is applied, no fault conditions exist and reset is not applied This output is normally closed three seconds after ac power is applied or reset is removed

The J1-17 ZERO SPEED output is connected to the J1-15 return when the drive output frequency is less than 2 Hz and the drive is ON

The J1-18 AT SPEED output is connected to the J1-15 return when the drive output frequency is not changing and the drive is ON

SIGNAL WIRING - BYPASSING OPERATOR PANEL

The operator interface display panel must be disabled to use the J1 connector inputs for external control of the drive NOTE the frequency display still functions when operator panel (FWD/REV, RUN/STOP, and rotary speed switch are disabled)

To disable the operator panel turn off switch SW2 position #4 This switch is the 8 position DIP switch located on the drive control board inside the drive behind the operators panel

Note All customer control and signal wiring is terminated on the plug-in J1 connector Common on this terminal strip is isolated from the power circuits and grounded to the chassis See Figure 2

ANALOG INPUTS

SPEED COMMAND

Standard J1-4 & 5 signal input scaling is 10V +/-2V = Max Speed This input is buffered to provide a minimum 40db of common mode isolation up to +/-15V common mode input relative to common Either input may be grounded at the signal source so long as the common mode range is not exceeded

4-20mA CURRENT LOOP INTERFACE

Turn control board SW2 #2 to "on" to change the input at J1-4 & 5 to a 4-20mA current loop interface with 4mA or less equal to zero speed and 20 mA equal to maximum speed

LOGIC INPUTS

The following bi-polar inputs are referenced to the return J1-12

START	J1-13
START LATCH	J1-14
FWD	J1-10
REV	J1-11
RESET	J1-9

Either the internal +24VDC supply (J1-19) or an external supply of 10-30 VDC may be used for these inputs

Closing the start switch starts the drive The switch closure may be either a momentary or a maintained type If a momentary is used, the start latch input must also be used to latch in the start command Opening the start switch shuts off the drive If a momentary switch is used, both the start switch and the start latch switch must be opened to shut off the drive

The reset switch resets faults when closed The drive will be disabled for as long as the reset switch is held closed Releasing the reset switch returns the drive to its previous operating state

The FWD and REV switches can be made to function in either of two ways One way is to close the REV switch and toggle the FWD switch In this mode, forward direction corresponds to the FWD switch closed and the reverse direction corresponds to the FWD switch open The second way is to operate the switches independently in accordance with the following truth table

SWITCH		DIRECTION
FWD	REV	
OPEN	OPEN	ZERO SPEED
OPEN	CLOSED	REVERSE
CLOSED	OPEN	FORWARD
CLOSED	CLOSED	FORWARD

ANALOG OUTPUTS - see Figure 2

The J1-6 Speed Output is available for monitoring speed or metering The output is +2 5V per 60 HZ

The J1-7 Output is available for monitoring or metering load current The output is +3 0V at 100% load

LOGIC OUTPUTS - see Figure 2

The READY,ZERO SPEED,and AT SPEED outputs all indicate drive status These outputs are bipolar switches to the isolated return J1-15 Each of these switches is rated for 75mA and 30 VDC and are normally used to drive relay coils with either positive or negative logic, depending on how the return J1-15 is connected The voltage drop across each switch is about 1 5 volts and not intended for TTL interface

The J1-16 READY output is closed to the J1-15 return when power is applied, no fault conditions exist and reset is not applied This output is normally closed for three seconds after AC power is applied or reset is removed

The J1-17 ZERO SPEED output is connected to the J1-15 return when the drive frequency is less than 2 HZ and the drive is ON

The J1-18 AT SPEED output is connected to the J1-15 return when the drive output frequency is not changing and the drive is ON

3 0 DRIVE SETUP PROCEDURE

All adjustment pots are 1 turn pots mounted at the edge of the control board located behind the hinged operator display panel in the face of the drive - see Figure 3 All measurements necessary for pot adjustment may be made with the testpoints TP1-TP7 which are located adjacent to the pots on the control board To do the required adjustments use the SETUP SHEET for the drive you have The SETUP SHEETS are located in Appendix B of this manual

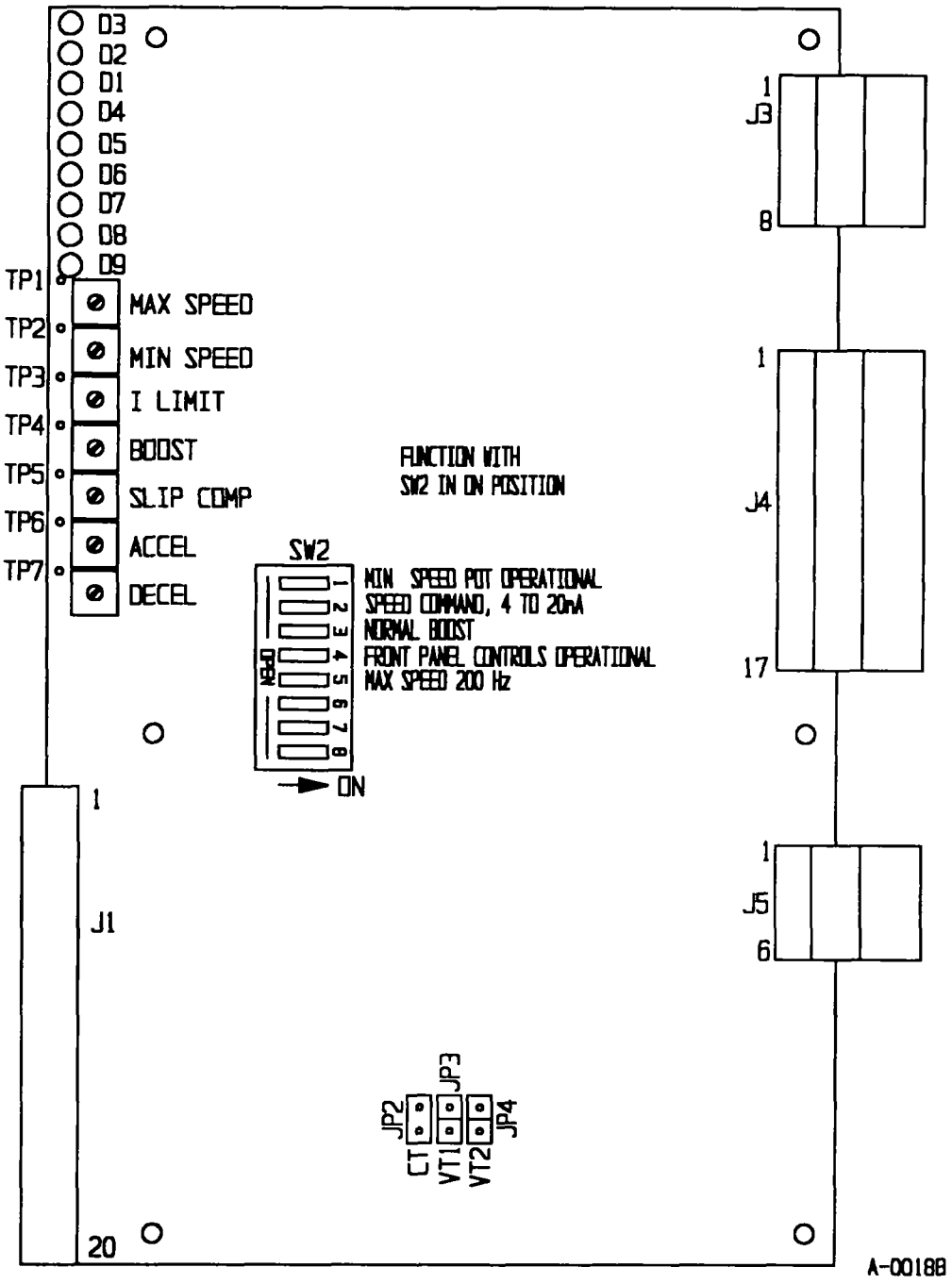

D3
D2
D1
D4
D5
D6
D7
D8
D9
TP1
TP2
TP3
TP4
TP5
TP6
TP7
MAX SPEED
MIN SPEED
I LIMIT
BOOST
SLIP COMP
ACCEL
DECEL
SW2
OPEN
1 2 3 4 5 6 7 8
ON
FUNCTION WITH
SW2 IN ON POSITION
MIN SPEED POT OPERATIONAL
SPEED COMMAND, 4 TO 20mA
NORMAL BOOST
FRONT PANEL CONTROLS OPERATIONAL
MAX SPEED 200 Hz
J1
1
20
J3
1
8
J4
1
17
J5
1
6
JP2
JP3
JP4
CT
VT1
VT2
A-00188

FIGURE 3

MAXIMUM/MINIMUM SPEED POTS

R1 MAX SPEED-Adjusts the maximum speed for the motor

R2 MIN SPEED-Adjusts the minimum speed for the motor

The MAX SPEED pot R1 and MIN SPEED pot R2 have standard factory settings of 60 Hz and zero respectively The pots are interactive, so adjusting one will affect the setting of the other Adjust the MAX SPEED pot by applying a speed command corresponding to the desired maximum speed Measure the voltage at TP5 The voltage at TP5 is proportional to speed (+1 Volt = 24 Hz = 720 RPM for a 4 pole motor) Adjust the MAX SPEED pot CCW to reduce the max speed limit, CW to increase the limit Adjust the MIN SPEED pot by applying a speed command corresponding to the desired minimum speed Adjust the pot CCW to reduce the minimum speed limit, CW to increase the limit Disabling the min speed pot can be accomplished by moving SW2 #1 to "OFF" Minimum speed then becomes zero regardless of the position of the min speed pot

CURRENT LIMIT POT

R3 I (Current) LIMIT-Sets the output current limit

The CURRENT LIMIT pot R3 adjusts the current limit from 100% to 200% of the drive continuous current rating The voltage at TP2 is proportional to the limit (3 Volts = 100%) Adjusting the pot CW increases the limit, adjusting the pot CCW decreases the limit Standard factory setting is fully CW at 200%, which corresponds to 6 volts

VOLTS/HERTZ BOOST POT

R4 BOOST-Determines the low speed voltage boost

The BOOST pot R4 adjusts the low frequency voltage boost This boost is used to compensate for resistance losses in the motor at low speeds thus increasing the low speed motor torque The voltage at TP4 indicates the boost level (7 volts = 0%, 9 volts = 100%) This pot is normally field set to give adequate torque at low speeds Care must be taken not to turn this pot too far CW giving too much boost for any particular motor Too high a boost will result in high motor currents at low speeds where the motor cooling fan is not as effective Measure the motor current at J1-7 (3 0 volts = rated current) at very low speeds Standard factory setting is fully CCW for zero boost To provide an exceptionally high range of boost, turn off SW2 #3

SLIP COMPENSATION POT

R5 SLIP COMP-Improves speed regulation for heavy inertia loads

The SLIP COMP pot R5 adjusts the amount of slip compensation proportional to load Slip Compensation slightly increases the drive output voltage and frequency to improve speed regulation under heavy loads The adjustment is application dependent and is best accomplished while running the unit with a typical load Adjusting the pot CW increases the compensation Standard factory setting is fully CCW for zero slip compensation

WARNING Too much slip compensation may cause instabilities in the drive depending on the characteristics of the load

ACCELERATION/DECELERATION POTS

R6 ACCEL-Adjusts the acceleration rate

R7 DECEL-Adjusts the deceleration rate

The ACCEL pot R6 and DECEL pot R7 set the acceleration and deceleration rates for the motor Adjusting the pots CW increases the rates, adjusting the pots CCW decreases the rates The ACCEL or DECEL pot settings may be measured at TP6 for accel or TP7 for decel while the drive is disabled (READY LED on, ON LED off) 12 VDC corresponds to the maximum rate of 90 Hz/second These pots are normally factory set for accel and decel rates of 24 Hz/second corresponding to 3 VDC at TP6 and TP7 The ramp rates may be measured by applying a step in the speed command and recording the time it takes for the motor to reach a set speed

There is a mechanical limit to how fast the motor can accelerate, depending on the motor size and load inertia For this reason when the accel or decel ramps are set too fast, the motor may not accelerate as fast as the commanded rate In these cases the motor will begin to accelerate or decelerate slower as the ramp rate is increased beyond a certain level and the rate should be decreased See Section 6 for theory of operation

WARNING SETTING THE ACCEL/DECEL RATES VERY FAST MAY CAUSE THE DRIVE TO TRIP OFF DUE TO HIGH MOTOR CURRENTS

SW2 #5 SWITCH POSITION SELECTION-OUTPUT FREQUENCY LIMITER

This drive includes user selectable protection circuit y capable of limiting the output frequency to slightly greater than 60HZ regardless of the user speed command input or maximum speed potentiometer setting This circuitry is intended as a safety feature for applications where output frequencies above 70HZ are never desired

The position of SW2#5 determines whether or not this limitation is active The switch may be placed in either the 60HZ "OFF" position or the 200HZ "ON" position Place the switch in the "OFF" position for the 60HZ frequency limit or in the "ON" position for unlimited maximum drive output frequency of 200HZ All drives are shipped from the factory with the switch in the 60HZ limit position

The Jumpers on the inverter board, 0075312, are for configuring the overload circuit to different kinds of loads There is one jumper and three possible positions in which it may be used, JP2-JP4 Never install more than one jumper on this board, as damage to the circuitry may result

With the jumper in position JP2, the drive is set up for a constant torque load and has an overload capability of 200% for 3 sec

The other two positions that this jumper can be in, JP3 or JP4, are for variable torque applications, and the drive will have no overload capability and a higher continuous rating Having two jumper position for variable torque loads allows the same control board to be used on different size power bases without changing parts on the control board

For variable torque loads, use JP3 or JP4 according to the following table

MODEL #	BALDOR MODEL # E EO ER	POWER BASE	JUMPER POSITION
712 24	N/A	0712016	JP4
712 35	N/A	0712026	JP3
712 47	N/A	0712036	JP4
712 510	12215	0712046	JP3
712 714	12220	0712066	JP3
712 1020	12240	0712076	JP4
712 1427	12250	0712086	JP3
713 12	N/A	0713006	JP4
713 24	N/A	0713016	JP4
713 35	N/A	0713026	JP4
713 47	N/A	0713036	JP4
713 510	N/A	0713046	JP3
713 714	N/A	0713066	JP4
713 1020	N/A	0713076	JP4
714-12	N/A	0714006	JP4
714-24	N/A	0714016	JP4
714-35	12415	0714026	JP4
714-47	12420	0714036	JP4
714-510	12430	0714046	JP3
714-714	12450	0714066	JP4
714-1020	12475	0714076	JP4

4 0 STATUS INDICATORS AND OUTPUTS

The following green LED indicators show drive status

ON (D8)	Lights up when drive is running A stop command to J1 connector, any fault, or a reset will cause the ON light to go out This light remains on when front panel Run-Stop switch is in the Run position
RDY (D9)	Lights when power is applied, no fault conditions exist, and reset is not applied Normally lights 2 seconds after AC power is applied or immediately after reset is removed This indicator lights whenever the READY output at J1-16 is closed

The following logic outputs indicate drive status These outputs are bipolar switches to the isolated return J1-15 Each of these switches is rated for 75 mA and 30 VDC and is normally used to drive relay coils with either positive or negative logic, depending on how the return J1-15 is connected The voltage drop across each switch is about 1 5 volts (not compatible with TTL interface)

READY (J1-16)	J1-16 is closed to the J1-15 return when power is applied, no fault conditions exist and reset is not applied This output is normally closed 3 seconds after ac power is applied or reset is removed
ZERO SPEED (J1-17)	J1-17 is closed to the J1-15 return when the drive output frequency is less than 2 Hz and the drive is ON
AT SPEED (J1-18)	J1-18 is closed to the J1-15 return when the drive output frequency is not changing and the drive is ON

5 0 PROTECTIVE FEATURES

This drive includes extensive fault monitoring circuits to insure safe reliable operation and aid in troubleshooting The following latching red LED fault indicators are supplied

Ø1 (D1)	A fault on output T1 latches and lights this indicator Fault may be excessive output current, loss of adequate transistor base drive, output short or ground fault
Ø2 (D2)	A fault on output T2 latches and lights this indicator Fault may be excessive output current, loss of adequate transistor base drive, output short or ground fault
Ø3 (D3)	A fault on output T3 latches and lights this indicator Fault may be excessive output current, loss of adequate transistor base drive, output short or ground fault
15V (D4)	Lights and latches upon low or missing +15V or -15V control logic power
OL (D5)	Lights and latches when the drive output current exceeds the drive output continuous current rating for long time periods
OV (D6)	A DC bus overvoltage lights up and latches this indicator The most common causes of bus overvoltages are excessive input volts and regenerative energy exceeding the absorption capacity of the regenerative circuitry, (too fast a rate of deceleration)
UV (D7)	A DC bus undervoltage lights up and latches this indicator The most common causes of bus undervoltages are insufficient input volts and loss of one input phase
OT (D6 & D7)	The two LED'S D6 and D7 will simultaneously light and latch when the drive thermostat opens, indicating a drive overtemperature condition

All fault latches may be reset by either removing and reapplying AC power (power-up reset) or by applying a reset input to J1-9

The following output provides fault status information at connector J1 This output is an isolated bipolar output with J1-15 as a return The switch is rated for 75 mA and 30 VDC and is normally used to drive relay coils with either positive or negative logic, depending on how the return J1-15 is connected The voltage drop across the switch is about 1 5 volts (ot compatible with TTL interface)

READY (J1-16)	J1-16 is connected to J1-15 when power is applied, no fault conditions exist and reset is not applied Normally closes 3 seconds after ac power is applied or reset is removed

6 0 THEORY OF OPERATION

DRIVE CIRCUIT FUNCTIONAL DESCRIPTION -see FIGURE 4

The functional arrangement of the drive and AC motor is given in Figure 4 The voltage and frequency for the motor are generated by the three main power transistor pairs Q1, Q2 and Q3 The transistors convert DC voltage to three phase AC voltage by means of pulse width modulation (PWM) The DC bus voltage is provided by the three phase diode bridge BR1, inductor L1 and bus capacitors Input three phase AC power is supplied to bridge diode BR1 through drive terminals L1, L2 and L3 Power Supply Board, A3 is powered directly from the DC bus

Power Supply Assembly, A3 furnishes several functions

1) Controls the soft start circuit which limits charging current to the bus capacitors This prevents excessive inrush currents when AC power is applied

2) Controls the shunt regulator transistor Q4 (or Q7 on Size C) to prevent an overvoltage condition on the bus supply by dissipating regenerated energy through an external resistor NOTE Not available with the -EO equipment

3) Develops regulated control power to operate the other circuit boards in the system

4) Enables drive operation if power conditions are proper

5) Connects a safety bleed resistor across the capacitor bank when AC line power is removed

Each main power transistor pair is controlled and monitored by its associated Base Driver Assembly, A5, A6 or A7 These base drivers amplify the PWM control signals and monitor the operation of the power transistors for fault conditions In the event of an overload condition, the transistors are shut off, thereby protecting the drive against short circuits between outputs or between an output and ground

Motor currents through terminals T2 and T3 are sensed with shunt resistors and Mod-Demod assembly A4 or Hall effect devices The Mod-Demod isolates the power circuit from the control circuits and provides gain and offset trimming of the current feedback signals

Transistor base signals are produced by a three phase, PWM pattern generator The pattern generator is controlled by the input speed command, a Volts/Hertz signal and a combination current limit and slip compensation feedback

FIGURE 4
FUNCTIONAL BLOCK DIAGRAM

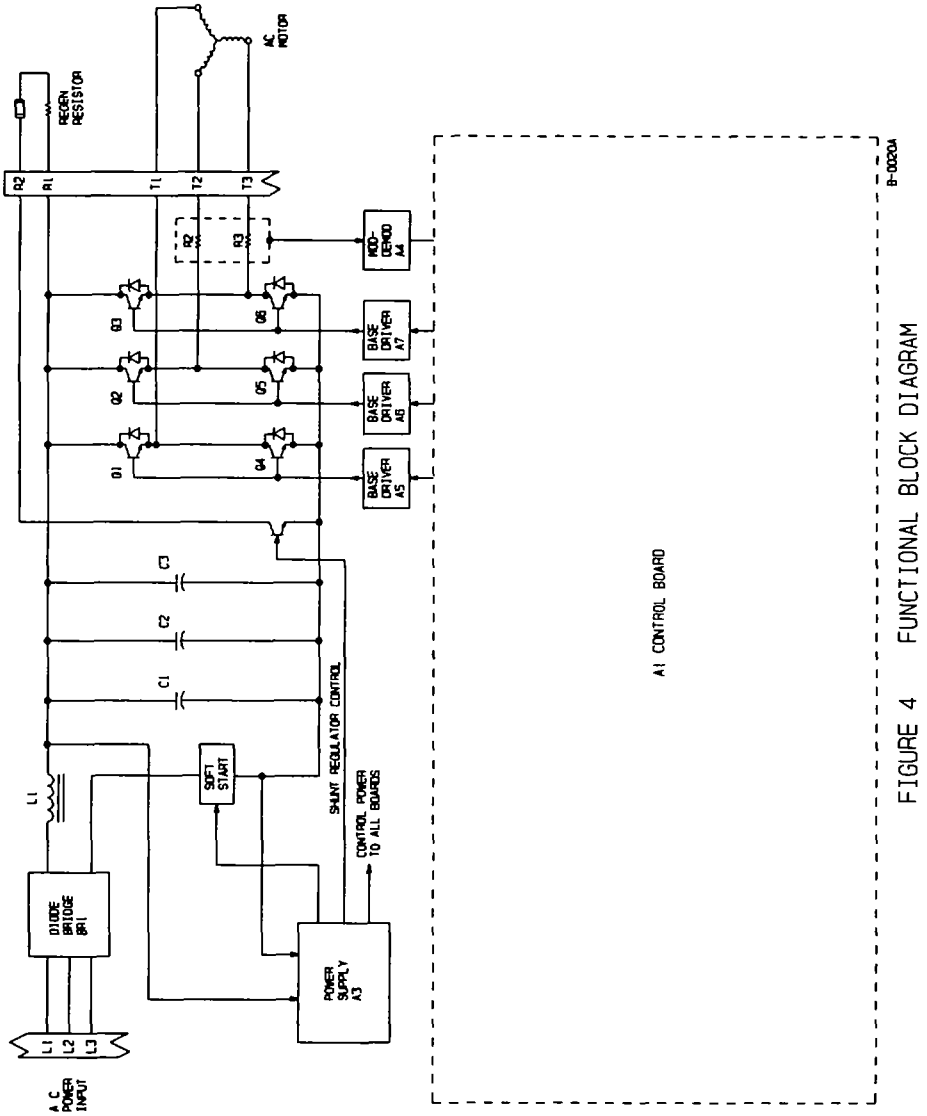


FIGURE 4 FUNCTIONAL BLOCK DIAGRAM

FIGURE 4

DRIVE COMPONENT DESCRIPTION AND OPERATION

DRIVE BUS POWER SUPPLY (Figure 4 and Drawing 7143/7148 and 7633/7634)

The drawings show the interconnection of the power components Incoming ac power, at terminals L1 through L3, is full-wave rectified by a diode bridge It is then filtered by inductor L1 and the bus capacitors The inductor reduces current ripple on the bus capacitors, and maximizes input power factor This minimizes EMI interference which might otherwise be conducted from the drive to the ac lines The capacitors store dc bus energy to provide a safe operating voltage for the power transistors by absorbing a limited amount of regenerated energy Normal bus power supply voltages range from 275 VDC @ 230 VAC / 550 VDC @ 460 VAC under heavy load at low line voltage to 350 VDC @ 230 VAC / 695 VDC @ 460 VAC with no load at high line voltage Motor regeneration will increase the dc bus voltage causing operation of the optional shunt regulator which limits the dc bus voltage below 376 VDC for 230 VAC drive / 755 VAC for 460 VAC drive

Excessive current inrush upon power application is prevented by the soft start circuit This circuit is composed of a starting resistor, fuses F1-F2 and an SCR Operation of the soft start function is supervised by the power supply The SCR is fired to bypass the charging resistor only after its voltage drop is less than 30 VDC The power supply is interlocked with the control board to prevent operation of the main output transistors until the capacitors are charged and the soft start SCR is turned on

The dc bus voltage is continuously monitored by the power supply which controls the optional shunt regulator transistor When the bus voltage approaches its peak level, the shunt transistor is turned on to draw current through the external regeneration resistor to dissipate excess regenerated energy Note this feature is not available on the -EO equipment The peak energy that can be absorbed is limited by the maximum resistor current that can be controlled by the transistor The controller will limit bus capacitor voltage to 376 VDC for the 230 VAC drive/755 VDC for the 460 VAC drive For example, a 20 ohm regeneration resistor connected to the controller will absorb 28 KW peak

POWER SUPPLY

The power supply assembly operates directly from the main dc bus derived from the full wave rectified 208-230/460 VAC line and accomplishes the following

1) Supplies a 27 kHz, 100 volts peak to peak regulated square-wave for base drive and auxiliary loads This supply is nominally rated at 100 Watts

2) Supplies a precision regulated plus and minus 15 0 VDC supply at 400 mA each

3) Supplies a regulated + 24 VDC for auxiliary relay and dc fan use This is nominally rated at 25 watts total

4) Delays power supply operation upon power application to ensure the external dc bus capacitors have charged sufficiently to start the power supply

5) Limits the internally regulated intermediate 180 VDC bus voltage and current levels on a pulse-by-pulse basis Over voltage shutdown backs up the voltage limit if a regulator transistor short occurs, thus preventing excessive output voltages

6) Provides the gate signal to an external soft start bypass SCR This signal is coordinated with ac line voltage presence, bus to line differential voltage, and bus undervoltage

7) Generates the base drive current to an optional external power transistor to shunt regulate the dc bus voltage during motor drive regeneration

8) Provides independent opto-isolated status signals for bus undervoltage, bus over voltage and shunt regulator transistor drive

9) Turns on the safety bleed transistor during absence of all ac line power to connect the dc bus capacitors to an external discharge resistor

The power supply assembly monitors the soft start resistor voltage and dc bus voltage for the following conditions

1) Soft Start Resistor Voltage over 30 VDC, which inhibits turn on of the soft start circuit and the power output circuit

2) DC Bus Voltage under 225/450 VDC, which inhibits turn-on of the soft start circuit and the power output circuit

3) DC Bus Voltage over 375/750 VDC, which turns on the optional shunt regulator transistor Q4

4) DC Bus Voltage over 385/770 VDC, which inhibits operation of the power output circuit

Conductor spacings on the power supply are sufficient to provide a voltage isolation exceeding 1000 volts between the power circuit and control circuit common This common is also connected to chassis ground

POWER OUTPUT CIRCUIT

The power output circuit consists of six Darlington power transistors connected in a three phase bridge configuration Clamping diodes are included on each transistor to provide a path for load current to return to the dc bus The transistors and their associated clamp diodes are contained in isolated mounting type power modules Output currents are sensed with two current shunt resistors (R2 and R3) or Hall effect feedback sensors The output transistors are driven and monitored by the base drivers (A5, A6 and A7) Control board A1 generates pulse width modulation (PWM) base signals for control of the transistors One transistor in each pair must always be off at any given time to avoid shorting out the bus supply and damaging the output transistors

MOD-DEMOD (230 VAC drives 5-25 HP & 460 VAC drives 5-40 HP)

The mod-demod assembly consists of two independent and identical modulator-demodulator circuits for isolating the current feedback signals from the power circuitry A carrier frequency of approximately 500 kHz modulates the voltage developed across a current sensing resistor The resulting ac signal is transformer coupled to a demodulator which recovers the original signal The offset of the amplified and isolated output is trimmed with R14 for the T3 channel and R30 for the T2 channel Gain adjustment is provided to compensate for component tolerances, (including the sensing resistor) using R15 for the T3 channel and R29 for the T2 channel These adjustments are set at the factory and do not need to be changed The mod-demod is operated from ±15 VDC supplied by the power supply A3

Conductor spacings on the mod-demod assembly are sufficient to provide a voltage isolation exceeding 1000 volts between the current sensing resistors and control circuit common This common is also connected to chassis ground

HALL CURRENT FEEDBACK BOARD (230VAC drives 40-50Hp & 460 VAC drives 50-75HP)

On drives equipped with the Hall Sensor Current Feedback Board, the current is passed though a gapped toroid and a flux proportional to current is measured using a Hall effect sensing device The sensor is located in the gap of the toroid Current variation through the toroid causes a corresponding change in the flux in the gap The change in flux in the gap is sensed by a change in the signal from the Hall sensor This signal is scaled to the appropriate Amps of phase current per volt of signal by additional circuitry on the Hall Current Feedback Board

BASE DRIVERS

A base driver assembly consists of two independent base driver circuits, one for each power transistor pair Each channel has a transformer isolated power supply, an opto-isolated base driver and collector-emitter voltage desaturation detector

The isolated ±8 VDC power supply is obtained from the 27kHz 100 volt square-wave source provided by power supply A3 The supply furnishes the current required for turning on and off the power transistors The opto-isolated base driver circuit includes base current limiting which forces the Darlington transistor to pull out of saturation when its collector current exceeds the transistor's capacity The base driver circuit also provides a high current reverse base drive for fast turn off of the power transistor The desaturation detector monitors the power transistor's collector-emitter voltage and shuts it off when this voltage exceeds a safe level This happens when an overload current begins to pull the transistor out of saturation This shutdown creates an output fault signal which is opto-isolated and sent to the control board A1 Fault monitoring circuits on the control board shut down the drive, latch the fault and turn on the corresponding LED indicator

CONTROL BOARD A1

The control board performs the following functions

1) Provides PWM outputs for the base drivers to control the output voltage and frequency of the inverter

2) Provides voltage boost for low speed, high torque applications

3) Provides slip compensation for improved speed regulation under heavy loads

4) Provides current limits

5) Provides speed command conditioning

6) Provides latching fault protection and indication for DC bus under and overvoltage, overtemperature, overload, output fault, and ± 15V control power

7) Provides bipolar opto-coupled START/STOP, RUN/JOG, and FWD/REV input circuits

8) Provides bipolar opto-coupled READY, ZERO SPEED, and AT SPEED output circuits

9) Provides an eight position switch for configuration to various applications

PWM OUTPUTS

The PWM outputs are produced by an LSI PWM pattern generator The generator produces patterns for variable voltage, variable frequency outputs Three inputs to the generator control the output speed, motor excitation and inverter switching frequency

VOLTAGE BOOST

The Volts/Hz ratio can be increased or "Boosted" at low frequencies to gain additional torque This feature is especially useful at low speeds where voltage drop due to resistance in the stator causes a significant reduction in torque The Boost is adjusted to compensate for the voltage drop, resulting in rated output torque from the motor at output frequencies as low as 3 Hz Below 3 Hz the drive can not output rated torque, even with maximum boost The boost circuit has little effect above output frequencies of 10 Hz

SLIP COMPENSATION

The slip comp circuitry senses the output current and increases the inverter voltage and frequency to maintain the set speed, thus improving speed regulation under load Slip compensation is a form of positive feedback and can become unstable if set too high or used with sympathetic loads Caution should be used when adjusting this pot

CURRENT LIMIT

The current limit circuitry limits the instantaneous output current to the current limit pot setting The current is limited by reducing or increasing the inverter output frequency as needed to reduce the current to this maximum value In cases where a very high accel or decel ramp is commanded, high motor currents may cause the current limit to go into effect and over-ride the accel or decel ramps

SPEED COMMAND CONDITIONING

The speed command is applied to J1-4 & 5 (See Figure 2) which are inputs to a differential amplifier This buffer amplifier provides common mode isolation of 40 db minimum for common mode voltages up to 15 VDC

The speed command input is scaled by the min and max speed pots The voltage at TP5 indicates the inverter output frequency (motor speed) This voltage is 2 5V per 60 Hz The max speed pot is factory set to produce 2 5V at TP5 with a 10V speed command Adjusting the max speed pot fully CW increases the voltage at TP5 to 7 5V, which corresponds to 180 Hz at the inverter output The min speed pot adjusts TP5 from 0 to 5V which corresponds to 0 to 120 Hz

ACCEL/DECEL CIRCUITRY

The Accel/Decel circuit limits the rate of change in commanded motor speed The rate adjustment is continuous from 30Hz/sec down to zero The voltage at TP1 indicates the instantaneous inverter output frequency and the Accel/Decel rates can be observed by monitoring this voltage TP1 has the same scale factor as TP5, -1 0 volt = 24 Hz

At output frequencies above 90 Hz the acceleration and deceleration ramp rates decrease in inverse proportion to the square of the output frequency This contoured ramp rate compensates for the decrease in torque capability of induction motors above base speed

Because the voltage source inverter is an open loop drive (no tachometer feedback), a commanded accel/decel rate which requires more motor torque than is available will cause the motor to fall out of synchronism with the commanded ramp In cases where the ramp rate is very fast, high motor currents will result and the drive will go into current limit or trip off due to over current In other cases the motor will just begin to accelerate or decelerate slower than commanded In these cases, the accel/decel rates should be decreased by adjusting the pot settings CCW

LATCHING FAULT PROTECTION AND INDICATION

Latching fault protection is provided on the A1 control board for the following conditions

1) Ø1, Ø2 or Ø3 - Indicates when an output phase has suffered either an excessive amount of output current or a loss of base drive to the power transistors

2) 15V - Monitors the ±15 volt control power If power dips lower than ±12 volts a fault is produced If power fails completely (±0V), no fault is indicated since the fault logic is powered by the +15 volts

3) OL - Indicates that the drive output current has exceeded the drives continuous, 60 second, or 3 second current rating

4) OV, UV - Monitors drive bus power supply for overvoltage or undervoltage Exceeding either limit produces a fault signal

3) OT - Overtemperature indicator senses when the drive thermostat opens (set for 95 degrees C)

START/STOP AND FWD/REV CIRCUITS (See Figure 2)

The Start/Stop circuitry can be used with either a RUN/STOP switch or START/STOP pushbuttons Figure 2 shows the connections for each configuration If START/STOP push-buttons are used, the start signal is latched in and can only be unlatched by pressing the stop pushbutton or removing power from the drive The FWD switch essentially performs the forward/reverse functions with the reverse switch closed (i e with the FWD switch closed, the drive rotates the motor "FORWARD" or CW, with the switch open, the drive rotates the motor "REVERSE" or CCW) With the reverse switch open and the FWD switch closed, the output direction is still CW, however with both switches open, the drive decelerates to zero speed CW and CCW rotation is determined by motor lead connection

7 0 TROUBLESHOOTING

WARNING

This equipment contains voltages which may be as high as 400 VDC for 230V drives, 800 VDC for 460V drives and rotating parts on motors and driven machines High voltage and moving parts can cause serious or fatal injury Only qualified personnel familiar with this manual and any driven machinery should attempt to startup or troubleshoot this equipment Observe these precautions

1 **USE EXTREME CAUTION, DO NOT TOUCH any circuit board power device or motor electrical connection without insuring unit is properly grounded and no high voltage is present DO NOT apply AC power before grounding per instructions herein DO NOT open cover for 2 minutes after removing AC power to allow capacitors to discharge ALWAYS check DC voltage between two bus bars on power transistors when opening enclosure and bleed down to 10 volts or less with resistor before servicing**

2 **BE CERTAIN that possible violent motion of motor shaft and driven machinery due to improper control operation will not cause injury to personnel or damage to equipment Peak torques of several times rated motor torque can occur during a control failure**

3 **Motor circuit may have high voltage present whenever AC power is applied even when motor is not rotating**

INSTRUMENTS

Most troubleshooting can be performed using only a digital voltmeter (DVM) with an input impedance exceeding 1 megohm

TROUBLESHOOTING GUIDE

NO READY (RDY) LIGHT AND NO RED FAULT INDICATIONS

1 Check that Reset Input J1-9 is open A RESET input at J1-9 will prevent the Ready condition

2 Check AC power connections and line fuses or breaker AC voltage must be in the range of 190 to 253 VAC (230V drives) 380 to 508 VAC (460V drives) at terminals L1- L2, L2-L3, L3-L1 to operate the drive If incoming power breaker trips or fuses are blown, remove AC power and check resistance between L1, L2 and L3 terminals with ohmmeter Low resistance may indicate either a failed diode bridge or SCR Observe WARNING precautions and replace BR1 or Q5 (SCR module)

3 Check supply voltages at control board connector J3-6 (-15 VDC) and J3-4 (+15 VDC) relative to common, J3-5 Both must be within ± 1 volt of nominal for proper operation

If ±15 VDC power supplies are failed, remove AC power, wait 2 minutes, open cover and swing out hinged plate with the control board to expose fuses A8F1, A8F2 and A3F1 Check fuses with ohmmeter and replace if necessary

WARNING

High voltage on electrolytic capacitors C1 through C6 decays slowly DO NOT TOUCH CHECK DC VOLTAGE BETWEEN THE TWO BUS BARS ON THE POWER TRANSISTORS WITH VOLTMETER and bleed with resistor to 10 volts DC or less for safe servicing DO NOT REMOVE PLUG A3P2 FROM POWER SUPPLY ASSEMBLY, A3 This will disconnect the safety bleed resistor R5 from the DC bus

Verify that fuses A8F1 and A8F2 are good, then re-apply input power while observing POWER SUPPLY ON light located on Power Supply board A3 If this LED does not turn on power, wait two minutes, then check fuse A3F1 If A3F1 is blown, replace it and start the drive again If POWER SUPPLY ON light does not turn on or if A3F1 blows a second time replace power supply assembly, A3

4 If AC power and resets are OK, switch power OFF for 10 seconds then ON to reset power supply protection circuitry Ready should light within 3 seconds

5 If Ready does not occur with above steps, replace power supply A3 after observing precautions of (2) above DO NOT remove any connectors or boards without removing power and ensuring main bus supply voltage is less than 10 volts DC

"OV" OR "UV" (OVER OR UNDERVOLTAGE) FAULT INDICATION

These latching fault indications occur when main bus supply voltage has been too high (OV) or too low (UV), even momentarily

1 Apply Reset Input to reset latch Ready will occur immediately after Reset Input is removed, if a momentary high or low bus caused the tripoff Momentary low bus voltage is usually caused by one AC line opening, high bus voltage is usually caused by regeneration of the motor with inadequate or open regeneration resistor circuit

2 If Reset doesn't clear fault, check AC voltage, which must be in range 190 to 254 VAC line-line for 230V drives, 380 to 506 VAC line-line for 460V drives

Ø1, Ø2 OR Ø3 (PHASE) FAULT INDICATION

An abrupt mechanical overload which causes the motor to stall can cause the drive to trip off If the output fault is not associated with motor stalling check the following

1 Accel or decel ramps may be set too fast for the load inertia Try turning accel or decel pots slightly CCW

2 Drive and motor may be mismatched Check that the motor size is the one identified in the setup sheet

3 The excitation to the motor may be too high Check the Volts/Hz ratio over the speed range by monitoring the output voltage and frequency Normal excitation for a 230V motor is 230V/60Hz or 3 83 Volts/Hz, for a 460V motor, the normal excitation is 7 67 Volts/Hz Some amount of over-excitation is desirable at low speeds (less than 10 Hz) Over-excitation should not exceed 200% (or double) the nominal volts/Hz at any speed The excitation is factory set for normal, however it may be necessary to adjust the excitation to obtain satisfactory operation of the motor Use the pot adjustment procedure (Page 11) to check the boost adjustment

4 If only one indicator is on, a ground fault on that output line is possible If two or three indicators are on the fault is most likely line-line Remove and reconnect AC power from the drive If the fault indication still exists after the drive is re-started, remove AC power and disconnect motor leads from the drive Re-apply power and start the drive with the motor disconnected If a fault still exists, the drive is at fault If no fault occurs, the motor is suspect

5 If no external faults exist, remove AC power, wait 2 minutes, open enclosure observing WARNING precautions, bleed capacitor DC voltage to 10 volts or less with resistor and then shunt the two transistor bus bars Remove shunt between bus bars, then measure resistance from each bus bar to output terminals T1 T2 and T3 using ohmmeter polarity to back bias power transistor diodes shown in Figure 4 Any resistance less than 500K ohms indicates fault in transistor or internal wiring Replace power transistor and its associated base driver for any outputs showing less than 500K resistance (power transistor failure usually damages its base driver) Check base drivers visually for burned components and be sure all electrical connections to base drivers are secure

6 If the fault always occurs on the same phase, try exchanging two base drivers If the fault follows the base driver, replace that base driver If the fault does not follow the base driver and always occurs on the same phase, the transistor might be faulty

7 If the faults occur randomly between the three base drivers, the control board or set up is probably at fault After checking 1-3, replace the control board

"OL" (OVERLOAD) FAULT INDICATION

1 This fault indication usually indicates that the motor current has exceeded the drive continuous rating for a long period of time Reset the drive and run under the same load conditions while reading the voltage at J1-7 to measure motor currents 3 0 VDC read at J1-7 corresponds to the drive's continuous current rating If the voltage at J1-7 exceeds 3 0 VDC, the drive is probably being overloaded and the motor load needs to be reduced

2 If the motor current is low and the fault indication occurs, the control board is at fault and should be replaced

"OT" (OVERTEMPERATURE) FAULT INDICATION

Drive heat sink may overheat due to excessive load, failed fan or clogged cooling fins If indication persists with cool heat sink check the normally closed thermal switch TS1 and its wiring

"15V" (CONTROL POWER SUPPLY) FAULT INDICATION

1 This latched fault indication will occur upon momentary reduction of ± 15 volts below allowable levels, possibly due to external load on these supplies Apply Reset Input to reset latch

2 Check ± 15 volt outputs at J1-1 & 3 to common J1-2, either voltage 20% below normal will cause the indication Check control board IC chips and resistors for possible overheating indicating fault overloading the power supply Replace power supply observing WARNING precautions if either 15 volt supply is low and no apparent fault exists on the control board

MOTOR ACCELERATES SLOWLY

1 The accel pot may be set too slow Measure the motor output frequency at connector J1-6 with a meter or oscilloscope (-1 0 VDC = 24 Hz) If the output frequency changes at the same rate as the motor accelerates, increase the ramp rate up by turning the accel pot CW

2 If the output frequency as measured at J1-6 ramps up faster than the motor speed increases, the ramp rate is too fast for the motor size and load (see Page 22 for theory of operation) In this case the voltage at J1-6 will become constant while the motor is still accelerating Turn the accel pot CCW until the motor speed follows the ramp rate measured at J1-6 This pot setting will correspond to the maximum motor acceleration rate for the given motor size and load

APPENDIX A - DRIVE INPUT PROTECTION

This control must be provided with a suitable input power protective device Use the recommended fuses or circuit breaker from the tables below Input and output wire size is based on use of 75° C rated copper conductor wire

Circuit Breaker - 3 phase, thermal magnetic Equal to GE type THQ or TEB for 230 VAC or GE type TED for 460 VAC

Fast Acting Fuses - Buss KTN on 230VAC or Buss KTS on 460VAC, or equal
Time Delay Fuses - Buss FRN on 230VAC or Buss FRS on 460VAC, or equal

CONSTANT TORQUE APPLICATION						
CATALOG NO -E - EO - ER	MAX HP	INPUT WIRE (AWG)	INPUT BREAKER	INPUT FUSES		OUTPUT WIRE (AWG)
				FAST ACTING	TIME DELAY	
ID12215-X	15	4	230V/70A	250V/90A	250V/70A	4
ID12220-X	25	3	230V/100A	250V/125A	250V/100A	3
ID12240-X	40	1	230V/150A	250V/200A	250V/150A	1
ID12250-X	50	3/0	230V/200A	250V/250A	250V/200A	3/0
ID12415-X	15	8	460V/40A	600V/60A	600V/40A	8
ID12420-X	25	8	460V/50A	600V/70A	600V/50A	8
ID12430-X	30	6	460V/70A	600V/90A	600V/70A	6
ID12450-X	50	3	460V/100A	600V/125A	600V/100A	3
ID12475-X	75	1/0	460V/150A	600V/200A	600V/150A	1/0

VARIABLE TORQUE (FAN OR PUMP) APPLICATION						
CATALOG NO -E -EO -ER	MAX HP	INPUT WIRE (AWG)	INPUT BREAKER	INPUT FUSES		OUTPUT WIRE (AWG)
				FAST ACTING	TIME DELAY	
ID14215-X	20	4	230V/80A	250V/100A	250V/80A	4
ID14220-X	25	3	230V/100A	250V/125A	250V/100A	3
ID14240-X	50	2/0	250V/225A	250V/225A	250V/175A	2/0
ID14250-X	60	3/0	230V/200A	250V/250A	250V/200A	3/0
ID14415-X	25	8	460V/50A	600V/70A	600V/50A	8
ID14420-X	30	6	460V/70A	600V/90A	600V/70A	6
ID14430-X	40	4	460V/80A	600V/100A	600V/80A	4
ID14450-X	60	2	460V/110A	600V/150A	600V/110A	2
ID14475-X	100	2/0	460V/175A	600V/225A	600V/175A	2/0

APPENDIX B - SETUP SHEETS

BALDOR CATALOG NO ID 12215-E, -EO, -ER

SU 7603 VOLTAGE SOURCE INVERTER SETUP SHEET

DRIVE PN +ID 12215-E, -EO, -ER — CONTROL BOARD PN 0075312

MOTOR 15 HP, 230 V — CURRENT SCALING 20 0 A/V

BASE FREQUENCY SETTING 60 HZ — MAXIMUM FREQ SETTING 60 HZ

FACTORY SWITCH SETTINGS FOR SHIPMENT

SW2-1 MIN SPEED POT	OFF = NOT OPERATIONAL
SW2-2 SPEED COMMAND, VOLTS OR CURRENT	OFF = 0 TO 10 VOLTS SPEED COMMAND
SW2-3 BOOST, NORMAL OR EXTRA	ON = NORMAL BOOST
SW2-4 FRONT PANEL CONTROLS	ON = OPERATIONAL
SW2-5 MAX SPEED LIMIT	OFF = 60 HZ LIMIT

FACTORY POT SETTINGS FOR SHIPMENT

Remove J1 connector, set SW2-4 to the OFF position and apply AC power to make these adjustments

CONTROL BOARD POT ADJUSTMENT	INPUT	OUTPUT	DVM READING VDC*
1 R2 MIN SPEED	= 0 0 VDC	TP2	0 0
2 R3 CURRENT LIMIT	----	TP3	- 6 0
3 R4 BOOST	----	TP4	FULLY CCW
4 R5 SLIP COMP	----	----	FULLY CCW
5 R6 ACCEL	----	TP6	3 1
6 R7 DECEL	----	TP7	3 1
Turn SW2-4 ON for this step, and hereafter			
7 R1 MAX SPEED	FRONT PANEL POT FULL CW	TP5	+ 2 5
			DISPLAY reads 60 0
8 R8 SWITCHING FREQUENCY			SEALED FOR 1 5 KHZ MAXIMUM**

* All measurements made with DVM on DC, common to J1-20 except as noted

** This pot is not user adjustable

BALDOR CATALOG NO ID 12220-E, -EO, -ER

SU 7604 VOLTAGE SOURCE INVERTER SETUP SHEET

DRIVE PN +ID 12220-E, -EO,-ER — CONTROL BOARD PN 0075312

MOTOR 20 HP, 230 V — CURRENT SCALING 26 7 A/V

BASE FREQUENCY SETTING 60 HZ — MAXIMUM FREQ SETTING 60 HZ

FACTORY SWITCH SETTINGS FOR SHIPMENT

SW2-1 MIN SPEED POT	OFF = NOT OPERATIONAL
SW2-2 SPEED COMMAND, VOLTS OR CURRENT	OFF = 0 TO 10 VOLTS SPEED COMMAND
SW2-3 BOOST, NORMAL OR EXTRA	ON = NORMAL BOOST
SW2-4 FRONT PANEL CONTROLS	ON = OPERATIONAL
SW2-5 MAX SPEED LIMIT	OFF = 60 HZ LIMIT

FACTORY POT SETTINGS FOR SHIPMENT

Remove J1 connector, set SW2-4 to the OFF position and apply AC power to make these adjustments

CONTROL BOARD POT ADJUSTMENT	INPUT	OUTPUT	DVM READING VDC*
1 R2 MIN SPEED	= 0 0 VDC	TP2	0 0
2 R3 CURRENT LIMIT	----	TP3	- 6 0
3 R4 BOOST	----	TP4	FULLY CCW
4 R5 SLIP COMP	----	----	FULLY CCW
5 R6 ACCEL	----	TP6	3 1
6 R7 DECEL	----	TP7	3 1
Turn SW2-4 ON for this step, and hereafter			
7 R1 MAX SPEED	FRONT PANEL POT FULL CW	TP5	+ 2 5
			DISPLAY reads 60 0
8 R8 SWITCHING FREQUENCY			SEALED FOR 1 5 KHZ MAXIMUM**

* All measurements made with DVM on DC, common to J1-20 except as noted

** This pot is not user adjustable

BALDOR CATALOG NO ID 12240-E, -EO, -ER

SU 7605 VOLTAGE SOURCE INVERTER SETUP SHEET REV 4/92

DRIVE PN +ID 12240-E,-EO, -ER CONTROL BOARD PN 0075314

MOTOR 40 HP, 230 V CURRENT SCALING 40 0 A/V

BASE FREQUENCY SETTING 60 HZ MAXIMUM FREQ SETTING 60 HZ

FACTORY SWITCH SETTINGS FOR SHIPMENT

SW2-1 MIN SPEED POT	OFF = NOT OPERATIONAL
SW2-2 SPEED COMMAND, VOLTS OR CURRENT SPEED COMMAND	OFF = 0 TO 10 VOLTS
SW2-3 BOOST, NORMAL OR EXTRA	ON = NORMAL BOOST
SW2-4 FRONT PANEL CONTROLS	ON = OPERATIONAL
SW2-5 MAX SPEED LIMIT	OFF = 60 HZ LIMIT

FACTORY POT SETTINGS FOR SHIPMENT

Remove J1 connector, set SW2-4 to the OFF position and apply AC power to make these adjustments

CONTROL BOARD POT ADJUSTMENT	INPUT	OUTPUT	DVM READING VDC*
1 R2 MIN SPEED	= 0 0 VDC	TP2	0 0
2 R3 CURRENT LIMIT	----	TP3	NOT USED
3 R4 BOOST	----	TP4	FULLY CCW
4 R5 SLIP COMP	----	----	FULLY CCW
5 R6 ACCEL	----	TP6	3 1
6 R7 DECEL	----	TP7	3 1
Turn SW2-4 ON for this step, and hereafter			
7 R1 MAX SPEED	FRONT PANEL POT FULL CW	TP5	+ 2 5 DISPLAY reads 60 0
8 R8 SWITCHING FREQUENCY			SEALED FOR 1 5 KHZ MAXIMUM**

* All measurements made with DVM on DC, common to J1-20 except as noted

** This pot is not user adjustable

BALDOR CATALOG NO ID 12250-E -EO, -ER

SU 7606 VOLTAGE SOURCE INVERTER SETUP SHEET REV 4/92

DRIVE PN +ID 12250-E, -EO, -ER CONTROL BOARD PN 0075314

MOTOR 50 HP, 230 V CURRENT SCALING 53 3 A/V

BASE FREQUENCY SETTING 60 HZ MAXIMUM FREQ SETTING 60 HZ

FACTORY SWITCH SETTINGS FOR SHIPMENT

SW2-1 MIN SPEED POT	OFF = NOT OPERATIONAL
SW2-2 SPEED COMMAND, VOLTS OR CURRENT SPEED COMMAND	OFF = 0 TO 10 VOLTS
SW2-3 BOOST, NORMAL OR EXTRA	ON = NORMAL BOOST
SW2-4 FRONT PANEL CONTROLS	ON = OPERATIONAL
SW2-5 MAX SPEED LIMIT	OFF = 60 HZ LIMIT

FACTORY POT SETTINGS FOR SHIPMENT

Remove J1 connector, set SW2-4 to the OFF position and apply AC power to make these adjustments

CONTROL BOARD POT ADJUSTMENT	INPUT	OUTPUT	DVM READING VDC*
1 R2 MIN SPEED	= 0 0 VDC	TP2	0 0
2 R3 CURRENT LIMIT	----	TP3	NOT USED
3 R4 BOOST	----	TP4	FULLY CCW
4 R5 SLIP COMP	----	----	FULLY CCW
5 R6 ACCEL	----	TP6	3 1
6 R7 DECEL	----	TP7	3 1
Turn SW2-4 ON for this step, and hereafter			
7 R1 MAX SPEED	FRONT PANEL POT FULL CW	TP5	+ 2 5
		DISPLAY reads	60 0
8 R8 SWITCHING FREQUENCY			SEALED FOR 1 5 KHZ MAXIMUM**

* All measurements made with DVM on DC, common to J1-20 except as noted

** This pot is not user adjustable

BALDOR CATALOG NO ID 12415-E, -EO, -ER
ID 12310-E, -EO -ER

SU 7609 VOLTAGE SOURCE INVERTER SETUP SHEET

DRIVE PN +ID 12415-E, -EO, -ER
+ID 12315-E, -EO, -ER
MOTOR 15 HP, 380Vor 460V

CONTROL BOARD PN 0075312

CURRENT SCALING 10 0 A/V

BASE FREQUENCY SETTING 60 HZ

MAXIMUM FREQ SETTING 60 HZ

FACTORY SWITCH SETTINGS FOR SHIPMENT

SW2-1 MIN SPEED POT	OFF = NOT OPERATIONAL
SW2-2 SPEED COMMAND, VOLTS OR CURRENT	OFF = 0 TO 10 VOLTS SPEED COMMAND
SW2-3 BOOST, NORMAL OR EXTRA	ON = NORMAL BOOST
SW2-4 FRONT PANEL CONTROLS	ON = OPERATIONAL
SW2-5 MAX SPEED LIMIT	OFF = 60 HZ LIMIT

FACTORY POT SETTINGS FOR SHIPMENT

Remove J1 connector, set SW2-4 to the OFF position and apply AC power to make these adjustments

CONTROL BOARD POT ADJUSTMENT	**INPUT**	**OUTPUT**	**DVM READING VDC***
1 R2 MIN SPEED	= 0 0 VDC	TP2	0 0
2 R3 CURRENT LIMIT	----	TP3	- 6 0
3 R4 BOOST	----	TP4	FULLY CCW
4 R5 SLIP COMP	----	----	FULLY CCW
5 R6 ACCEL	----	TP6	3 1
6 R7 DECEL	----	TP7	3 1
Turn SW2-4 ON for this step, and hereafter			
7 R1 MAX SPEED	FRONT PANEL POT FULL CW	TP5 DISPLAY reads60 0	+ 2 5
8 R8 SWITCHING FREQUENCY			SEALED FOR 1 5 KHZ MAXIMUM**

* All measurements made with DVM on DC, common to J1-20 except as noted
** This pot is not user adjustable

BALDOR CATALOG NO ID 12420-E, -EO, -ER
ID 12320-E -EO -ER

SU 7610 VOLTAGE SOURCE INVERTER SETUP SHEET

DRIVE PN +ID 12420-E, -EO, -ER
+ID 12320-E, -EO, -ER
CONTROL BOARD PN 0075312

MOTOR 20 HP, 380V OR 460V
CURRENT SCALING 13 3 A/V

BASE FREQUENCY SETTING 60 HZ
MAXIMUM FREQ SETTING 60 HZ

FACTORY SWITCH SETTINGS FOR SHIPMENT

SW2-1 MIN SPEED POT	OFF = NOT OPERATIONAL
SW2-2 SPEED COMMAND, VOLTS OR CURRENT	OFF = 0 TO 10 VOLTS SPEED COMMAND
SW2-3 BOOST, NORMAL OR EXTRA	ON = NORMAL BOOST
SW2-4 FRONT PANEL CONTROLS	ON = OPERATIONAL
SW2-5 MAX SPEED LIMIT	OFF = 60 HZ LIMIT

FACTORY POT SETTINGS FOR SHIPMENT

Remove J1 connector, set SW2-4 to the OFF position and apply AC power to make these adjustments

CONTROL BOARD POT ADJUSTMENT	**INPUT**	**OUTPUT**	**DVM READING VDC***
1 R2 MIN SPEED	= 0 0 VDC	TP2	0 0
2 R3 CURRENT LIMIT	----	TP3	- 6 0
3 R4 BOOST	----	TP4	FULLY CCW
4 R5 SLIP COMP	----	----	FULLY CCW
5 R6 ACCEL	----	TP6	3 1
6 R7 DECEL	----	TP7	3 1

Turn SW2-4 ON for this step, and hereafter

7 R1 MAX SPEED	FRONT PANEL POT FULL CW	TP5	+ 2 5
		DISPLAY reads	60 0
8 R8 SWITCHING FREQUENCY			SEALED FOR 1 5 KHZ MAXIMUM**

* All measurements made with DVM on DC, common to J1-20 except as noted
** This pot is not user adjustable

BALDOR CATALOG NO ID 12430-E -EO -ER
ID 12325-E -EO, -ER

SU 7611 VOLTAGE SOURCE INVERTER SETUP SHEET

DRIVE PN +ID 12430-E, -EO, -ER
+ID 12325-E, -EO, -ER
CONTROL BOARD PN 0075312

MOTOR 30 HP, 380V OR 460V
CURRENT SCALING 20 0 A/V

BASE FREQUENCY SETTING 60 HZ
MAXIMUM FREQ SETTING 60 HZ

FACTORY SWITCH SETTINGS FOR SHIPMENT

SW2-1 MIN SPEED POT	OFF = NOT OPERATIONAL
SW2-2 SPEED COMMAND, VOLTS OR CURRENT	OFF = 0 TO 10 VOLTS SPEED COMMAND
SW2-3 BOOST, NORMAL OR EXTRA	ON = NORMAL BOOST
SW2-4 FRONT PANEL CONTROLS	ON = OPERATIONAL
SW2-5 MAX SPEED LIMIT	OFF = 60 HZ LIMIT

FACTORY POT SETTINGS FOR SHIPMENT

Remove J1 connector, set SW2-4 to the OFF position and apply AC power to make these adjustments

CONTROL BOARD POT ADJUSTMENT	INPUT	OUTPUT	DVM READING VDC*
1 R2 MIN SPEED	= 0 0 VDC	TP2	0 0
2 R3 CURRENT LIMIT	----	TP3	- 6 0
3 R4 BOOST	----	TP4	FULLY CCW
4 R5 SLIP COMP	----	----	FULLY CCW
5 R6 ACCEL	----	TP6	3 1
6 R7 DECEL	----	TP7	3 1
Turn SW2-4 ON for this step, and hereafter			
7 R1 MAX SPEED	FRONT PANEL POT FULL CW	TP5	+ 2 5
			DISPLAY reads 60 0
8 R8 SWITCHING FREQUENCY			SEALED FOR 1 5 KHZ MAXIMUM**

* All measurements made with DVM on DC, common to J1-20 except as noted
** This pot is not user adjustable

BALDOR CATALOG NO ID 12450-E -EO -ER
ID 12340-E, -EO, -ER

SU 7612 VOLTAGE SOURCE INVERTER SETUP SHEET

DRIVE PN +ID 12450-E, -EO, -ER
+ID 12340-E, -EO, -ER

CONTROL BOARD PN 0075314

MOTOR 50 HP, 380V OR 460V

CURRENT SCALING 26 7 A/V

BASE FREQUENCY SETTING 60 HZ

MAXIMUM FREQ SETTING 60 HZ

FACTORY SWITCH SETTINGS FOR SHIPMENT

SW2-1 MIN SPEED POT	OFF = NOT OPERATIONAL
SW2-2 SPEED COMMAND, VOLTS OR CURRENT	OFF = 0 TO 10 VOLTS SPEED COMMAND
SW2-3 BOOST, NORMAL OR EXTRA	ON = NORMAL BOOST
SW2-4 FRONT PANEL CONTROLS	ON = OPERATIONAL
SW2-5 MAX SPEED LIMIT	OFF = 60 HZ LIMIT

FACTORY POT SETTINGS FOR SHIPMENT

Remove J1 connector, set SW2-4 to the OFF position and apply AC power to make these adjustments

CONTROL BOARD POT ADJUSTMENT	INPUT	OUTPUT	DVM READING VDC*
1 R2 MIN SPEED	= 0 0 VDC	TP2	0 0
2 R3 CURRENT LIMIT	----	TP3	- 6 0
3 R4 BOOST	----	TP4	FULLY CCW
4 R5 SLIP COMP	----	----	FULLY CCW
5 R6 ACCEL	----	TP6	3 1
6 R7 DECEL	----	TP7	3 1
Turn SW2-4 ON for this step, and hereafter			
7 R1 MAX SPEED	FRONT PANEL POT FULL CW	TP5	+ 2 5
			DISPLAY reads 60 0
8 R8 SWITCHING FREQUENCY			SEALED FOR 1 5 KHZ MAXIMUM**

* All measurements made with DVM on DC, common to J1-20 except as noted
** This pot is not user adjustable

BALDOR CATALOG NO ID 12475-E, -EO -ER
ID 12360-E, -EO -ER

SU 7613 VOLTAGE SOURCE INVERTER SETUP SHEET

DRIVE PN +ID 12475-E, -EO, -ER
+ID 12360-E, -EO, -ER
CONTROL BOARD PN 0075314

MOTOR 75 HP, 380V OR 460V
CURRENT SCALING 40 0 A/V

BASE FREQUENCY SETTING 60 HZ
MAXIMUM FREQ SETTING 60 HZ

FACTORY SWITCH SETTINGS FOR SHIPMENT

SW2-1 MIN SPEED POT	OFF = NOT OPERATIONAL
SW2-2 SPEED COMMAND, VOLTS OR CURRENT SPEED COMMAND	OFF = 0 TO 10 VOLTS
SW2-3 BOOST, NORMAL OR EXTRA	ON = NORMAL BOOST
SW2-4 FRONT PANEL CONTROLS	ON = OPERATIONAL
SW2-5 MAX SPEED LIMIT	OFF = 60 HZ LIMIT

FACTORY POT SETTINGS FOR SHIPMENT

Remove J1 connector, set SW2-4 to the OFF position and apply AC power to make these adjustments

CONTROL BOARD POT ADJUSTMENT	**INPUT**	**OUTPUT**	**DVM READING VDC***
1 R2 MIN SPEED	= 0 0 VDC	TP2	0 0
2 R3 CURRENT LIMIT	----	TP3	NOT USED
3 R4 BOOST	----	TP4	FULLY CCW
4 R5 SLIP COMP	----	----	FULLY CCW
5 R6 ACCEL	----	TP6	3 1
6 R7 DECEL	----	TP7	3 1

Turn SW2-4 ON for this step, and hereafter

7 R1 MAX SPEED	FRONT PANEL POT FULL CW	TP5	+ 2 5
			DISPLAY reads 60 0
8 R8 SWITCHING FREQUENCY			SEALED FOR 1 5 KHZ MAXIMUM**

* All measurements made with DVM on DC, common to J1-20 except as noted
** This pot is not user adjustable

APPENDIX C - INTERNAL FUSE LIST

INTERNAL FUSE LIST 230 VAC DRIVES

QTY	RATING	SWEO P/N	COMMERCIAL EQUIV	REF. DES
2	2A, 250VAC	4392000	Buss FNM 2	A8F1A 8F2
1	1 1/2A, 600VAC	4331500	Buss KTK 1 1/2 Littlefuse KLK 1 1/2	A3F1

INTERNAL FUSE LIST 460 VAC DRIVES

QTY	RATING	SWEO P/N	COMMERCIAL EQUIV	REF. DES
2	2A, 500VAC	4342000	Buss FNQ 2 Littlefuse FLQ 2	A8F1, A8F2
1	1 1/2A, 600VAC	4331500	Buss KTK 1 1/2 Littlefuse KLK 1 1/2	A3F1

APPENDIX D - RENEWAL PARTS

230 VAC DRIVES

Drive P/N	ID12215-E, -EO, - ER		ID12220-E, -EO, -ER		ID12240-E, - EO, -ER		ID12250-E, - EO, -ER	
	QTY	PART #	QTY	PART #	QTY	PART #	QTY	PART #
Power Supply	1ea	0070871	1ea	0070871	1ea	0070875	1ea	0070875
Fans/Blowers	1ea	6950010	2ea	6950010	1ea	1003035	1ea	1003035
Elect Caps	2ea	7417825	3ea	7417825	4ea	7417825	4ea	7417825
Diode Bridge	1ea	3710608	1ea	3711008	3ea	3701008	3ea	3701608
DC Link Ind	1ea	2050019	1ea	2050019	1ea	2050024	1ea	2050024
Base Drivers	3ea	0070085	3ea	0070089	3ea	0070090	3ea	0070093
Power Trans	3ea	3615005	3ea	3620005	6ea	3530005	6ea	3540005
SCR	1ea	3750608	1ea	3750908	1ea	3751608	1ea	3752512
Snubber Brd	1ea	0070841	1ea	0070841	1ea	0076351	1ea	0076351
Cur Sensor	2ea	8387!05	2ea	8387!05	1ea	0076508	1ea	0076509
MOD/DEMOD	1ea	0072001	1ea	0072001				
R1	1ea	8344027	1ea	8344027	2ea	8344050	2ea	8344050
R5	1ea	8364224	1ea	8364224	1ea	8364224	1ea	8364224
Control Board	1ea	0075312	1ea	0075312	1ea	0075312	1ea	0075312
Connector P1	1ea	6020120	1ea	6020120	1ea	6020120	1ea	6020120
Regen Trans*	1 ea	3510005	1ea	3510005	1ea	3520005	1ea	3520005
Display	1ea	0076703	1ea	0076703	1ea	0076703	1ea	0076703
Cable, Display	1ea	1076921	1ea	1076921	1ea	1076921	1ea	1076921
Knob, Display	1ea	1077341	1ea	1077341	1ea	1077341	1ea	1077341

* Not required on -EO Models

APPENDIX D - RENEWAL PARTS

460 VAC DRIVES

Drive P/N	ID12415-E, -EO, - ER		ID12420 E, - EO, -ER		ID 12430-E, - EO, - ER	
	QTY	PART #	QTY	PART #	QTY	0070872
Power Supply	1ea	0070872	1ea	0070872	1ea	0070872
Fans/Blowers	1ea	6950010	1ea	6950010	1ea	6950010
Elect Caps	2ea	7417825	4ea	7417825	4ea	7417825
Diode Bridge	1ea	3710616	1ea	3710616	1ea	3710616
DC Link Ind	1ea	2050017	1ea	2050013	1ea	2050013
Base Drivers	3ea	0725223	3ea	0725216	3ea	0725216
Power Trans	3ea	3607612	3ea	3610112	3ea	3625112
SCR	1ea	3750612	1ea	3750612	1ea	3750612
Snubber Brd	1ea	0170842	1ea	0170842	1ea	0170842
Cur Sensor	2ea	8387!10	2ea	8387!05	2ea	8387!05
MOD/DEMOD	1ea	0072001	1ea	0072001	1ea	0072001
R1	1ea	8344047	1ea	8344047	1ea	8344047
R5	1ea	8364236	1ea	8364236	1ea	8364236
Control Board	1ea	0075312	1ea	0075312	1ea	0075312
Connector P1	1ea	6020120	1ea	6020120	1ea	6020120
Regen Trans *	1ea	3505010	1ea	3505010	1ea	3510010
Display	1ea	0076703	1ea	0076703	1ea	0076703
Cable, Display	1ea	1076921	1ea	1076921	1ea	1076921
Knob, Display	1ea	1077341	1ea	1077341	1ea	1077341

* Not required on -EO Models

APPENDIX D - RENEWAL PARTS

460 VAC DRIVES

Drive P/N	ID12450-E, -EO, - ER		ID12475-E, - EO, - ER	
	QTY	PART #	QTY	PART #
Power Supply	1ea	0070877	1ea	0070877
Fans/Blowers	1ea	1003035	1ea	1003035
Elect Caps	8ea	7417825	8ea	7417825
Bridge	3ea	3700816	3ea	3700816
DC Lnk Ind	1ea	2050025	1ea	2050025
Base Drivers	3ea	0725219	3ea	0725219
Power Trans	6a	3520112	6ea	3530112
SCR	1ea	3750912	1ea	3751612
Snubber Brd	1ea	0076351	1ea	0076351
Cur Sensor	1ea	0076507	1ea	0076508
MOD/DEMOD	-	-	-	-
R1	1ea	8344050	1ea	8344050
R5	1ea	8364236	1ea	8364236
Control Board	1ea	0075312	1ea	0075312
Connector P1	1ea	6020120	1ea	6020120
Regen Trans *	1ea	3520112	1ea	3520112
Display	1ea	0076703	1ea	0076703
Cable, Display	1ea	1076921	1ea	0076921
Knob, Display	1ea	1077341	1ea	1077341

* Not required on -EO Models

APPENDIX E - RECOMMENDED TIGHTENING TORQUES FOR TERMINAL BLOCKS

RECOMMENDED TIGHTENING TORQUES FOR TERMINAL BLOCKS

FOR A & B SIZE, AC SINGLE AXIS POWER BASES

(Use copper or aluminum conductors rated 75C or higher)

POWER BASE	TERM BLOCK	CUSTOMER SELECTED AWG WIRE SIZE			
PART NO	COLOR	UP TO #10 AWG	UP TO #8 AWG	UP TO #4 AWG	UP TO 2/0 AWG
0712016-XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0712026 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0712033 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0712036 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0712043 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0712046 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0713006 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0713016 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0713026 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0713036 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0713046 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0714006 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0714016 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0714026 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0714036 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0714046 XXXX	BLACK	20 IN/lb 2 3NM	25 IN/lb 2 8NM	35 IN/lb 4 0NM	
0712060 XXXX	WHITE		20 IN/lb 2 3NM	35 IN/lb 4 0NM	50 IN/lb 5 7NM
0712063 XXXX	WHITE		20 IN/lb 2 3NM	35 IN/lb 4 0NM	50 IN/lb 5 7NM
0713056 XXXX	WHITE		20 IN/lb 2 3NM	35 IN/lb 4 0NM	50 IN/lb 5 7NM
0714056 XXXX	WHITE		20 IN/lb 2 3NM	35 IN/lb 4 0NM	50 IN/lb 5 7NM

RECOMMENDED TIGHTENING TORQUES FOR TERMINAL BLOCKS

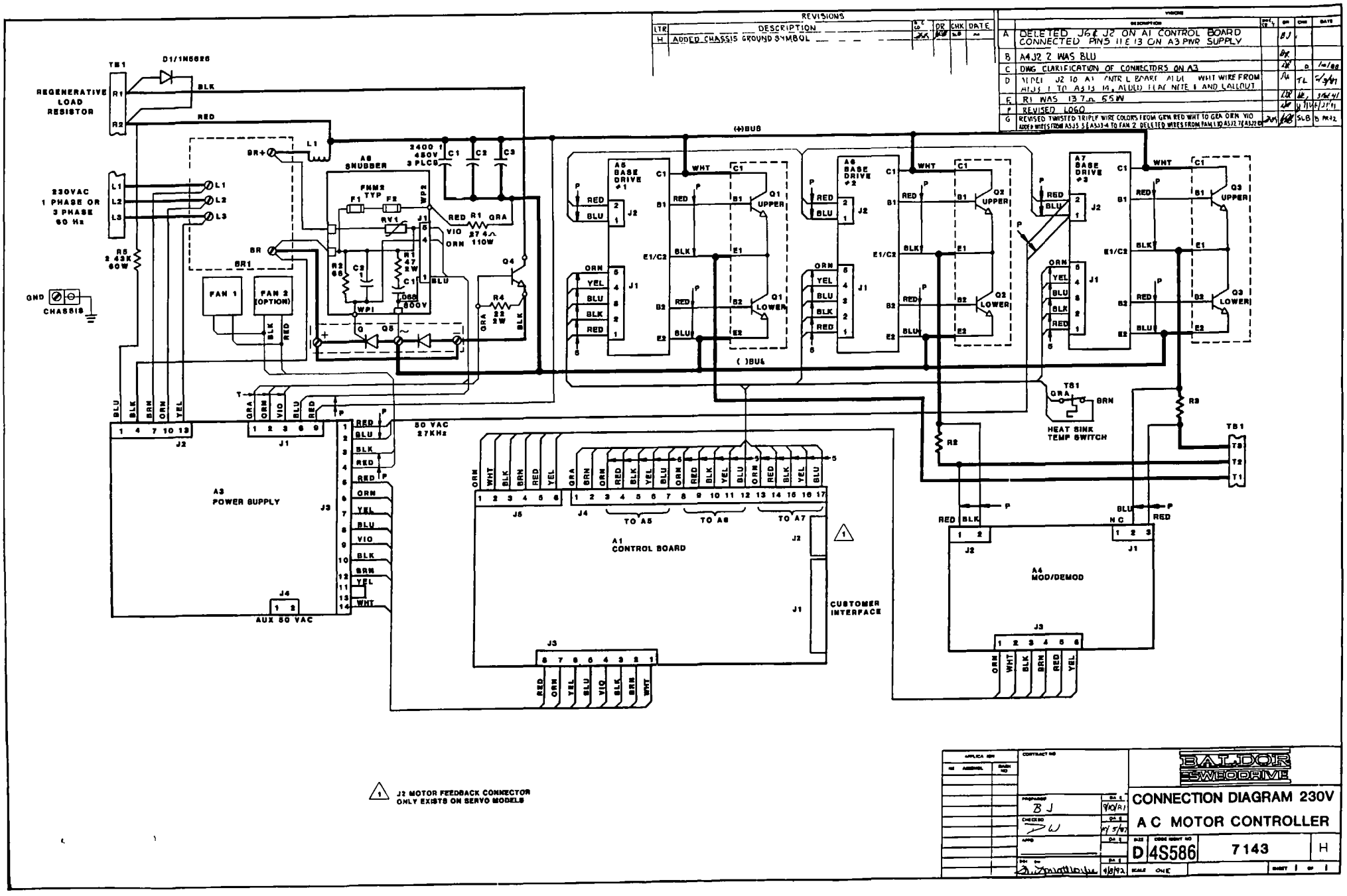
FOR C SIZE, AC SINGLE AXIS POWER BASES
(Use copper or aluminum conductors rated 75C or higher)

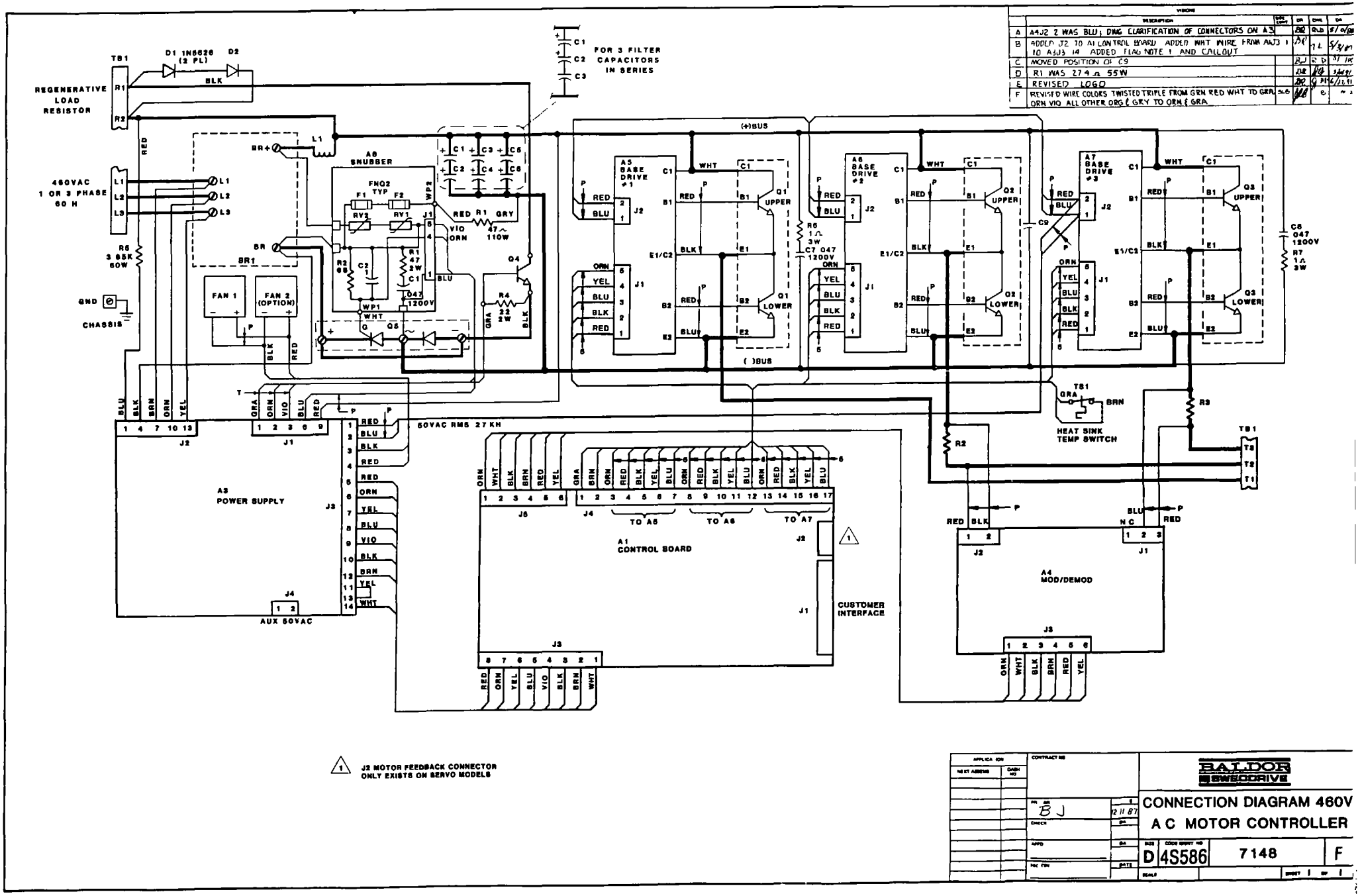
POWER BASE	TERM BLOCK	DRIVE TERMINALS AND MAXIMUM WIRE SIZE PER TERMINAL	
PART NO	COLOR	R1, R2 UP TO 2 AWG	L1-L3, T1 T3 UP TO 3/0 AWG
0712076-XXXX	GRAY	39 IN/lb 4 5NM	52 IN/lb 6NM
0712086 XXXX	GRAY	39 IN/lb 4 5NM	52 IN/lb 6NM
0713066-XXXX	GRAY	39 IN/lb 4 5NM	52 IN/lb 6NM
0713076 XXXX	GRAY	39 IN/lb 4 5NM	52 IN/lb 6NM
0714066-XXXX	GRAY	39 IN/lb 4 5NM	52 IN/lb 6NM
0714075 XXXX	GRAY	39 IN/lb 4 5NM	52 IN/lb 6NM
0714076-XXXX	GRAY	39 IN/lb 4 5NM	52 IN/lb 6NM

APPENDIX F - DRAWINGS

DRAWINGS:

Nos. 7143
7148
7149
7633
7634
7850
7851
7852

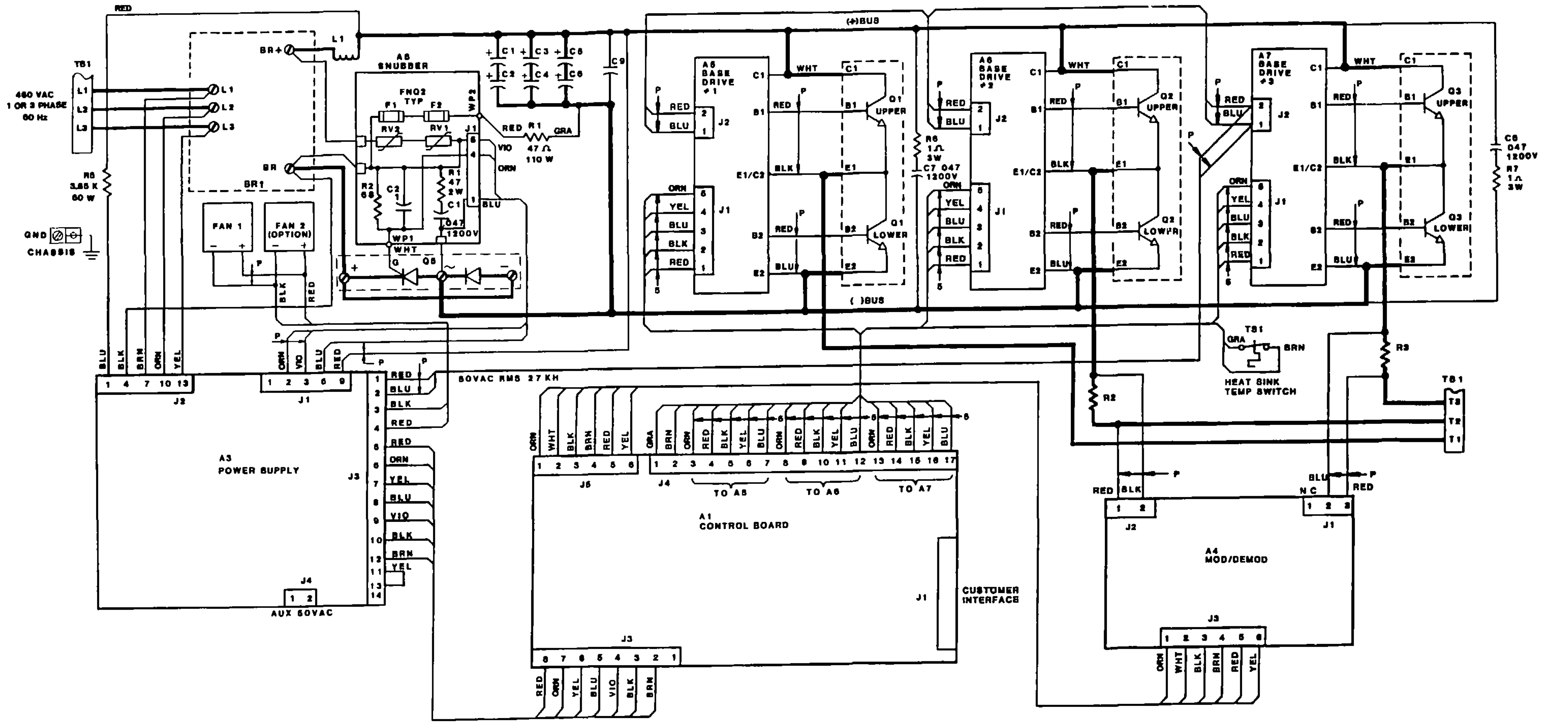

REVISIONS
LTR DESCRIPTION ECO DR CHK DATE
H ADDED CHASSIS GROUND SYMBOL
A DELETED J6 & J2 ON A1 CONTROL BOARD CONNECTED PINS 11 & 13 ON A3 PWR SUPPLY
B A4J2 2 WAS BLU
C DWG CLARIFICATION OF CONNECTORS ON A3
D MODEL J2 TO A1 CNTRL BOARD A1J1 WHT WIRE FROM A1J3 1 TO A3J3 14 & A1J1 11 PER NOTE 8 AND CALLOUT
E R1 WAS 137Ω 55W
F REVISED LOGO
G REVISED TWISTED TRIPLE WIRE COLORS FROM GRN RED WHT TO GRA ORN VIO ADDED WIRES FROM A3J3-5 & A3J3-4 TO FAN 2 DELETED WIRES FROM FAN 1 TO A3J3-7 & A3J2-6
REGENERATIVE LOAD RESISTOR
TB1
D1/1N5626
BLK
RED
230VAC 1 PHASE OR 3 PHASE 60 Hz
L1
L2
L3
R5 2.43K 60W
GND
CHASSIS
BR+
BR-
BR1
A8 SNUBBER
2400 f 450V 3 PLCS
C1
C2
C3
FMM2 TYP
F1
F2
RV1
WP2
WP1
R1 27Ω 110W
R2 68
C2 1
R3 47 2W
C1 .068 600V
Q4
R4 22 2W
Q5
FAN 1
FAN 2 (OPTION)
(+)BUS
(-)BUS
A5 BASE DRIVE #1
A6 BASE DRIVE #2
A7 BASE DRIVE #3
J2
J1
Q1 UPPER
Q1 LOWER
Q2 UPPER
Q2 LOWER
Q3 UPPER
Q3 LOWER
TS1
HEAT SINK TEMP SWITCH
R9
R8
T1
T2
T3
A3 POWER SUPPLY
J3
J4
AUX 50 VAC
50 VAC 27KHz
A1 CONTROL BOARD
J5
TO A5
TO A6
TO A7
CUSTOMER INTERFACE
A4 MOD/DEMOD
1 J2 MOTOR FEEDBACK CONNECTOR ONLY EXISTS ON SERVO MODELS
BALDOR SERVODRIVE
CONNECTION DIAGRAM 230V
A C MOTOR CONTROLLER
D 4S586
7143
H
SCALE ONE
SHEET 1 OF 1



	DESCRIPTION	DRC LEVEL	DR	CHK	DA
A	A4J2 2 WAS BLU; DWG CLARIFICATION OF CONNECTORS ON A3		BJ	RLD	5/10/88
B	ADDED J2 TO A1 CONTROL BOARD ADDED WHT WIRE FROM A4J3 1 TO A3J3 14 ADDED FLAG NOTE 1 AND CALLOUT		BJ	TL	5/4/89
C	MOVED POSITION OF C9		BJ	RLD	3/7/90
D	R1 WAS 274Ω 55W		BJ	MB	5/6/91
E	REVISED LOGO		BJ	MB	6/12/91
F	REVISED WIRE COLORS TWISTED TRIPLE FROM GRN RED WHT TO GRA ORN VIO ALL OTHER ORG & GRY TO ORN & GRA	5L6	MB		

APPLICATION / NEXT ASSEMBLY	DASH NO	CONTRACT NO	
DR BJ		2 11 87	BALDOR / SWEDODRIVE
CHECK			CONNECTION DIAGRAM 460V A C MOTOR CONTROLLER
APPD			SIZE D / CODE IDENT NO 4S586 / 7148 / F
MFG FSN		DATE	SCALE / SHEET 1 OF 1

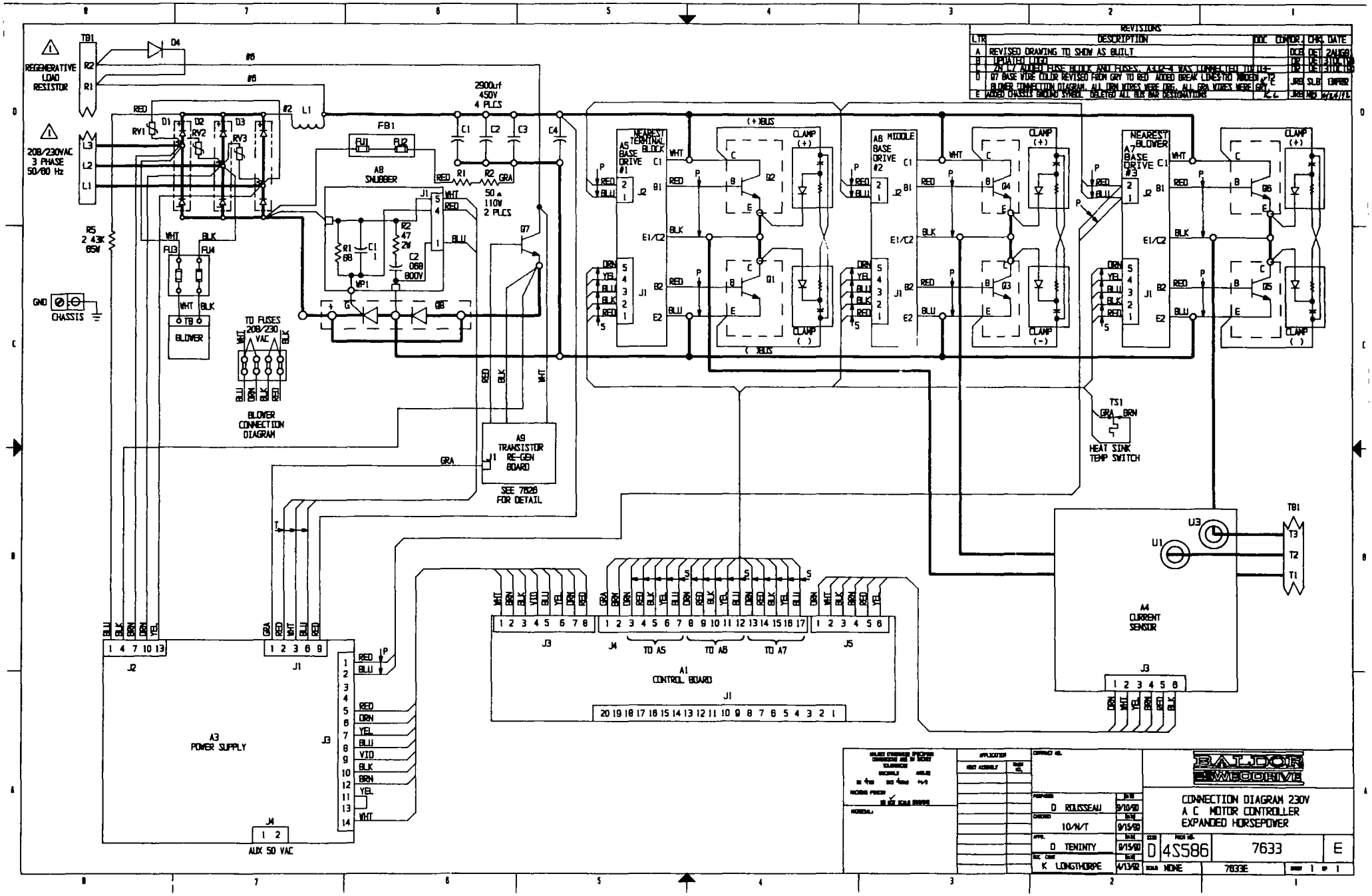
	DESCRIPTION
A	J2A4 2 WAS BLU DWG CLARIFICATION OF CONNECTORS ON A3
B	R1 WAS 27 Ω OHMS 55W
C	DELETED DETAIL VIEW OF 3 FILTER CAPS IN SERIES. REVISED A3J1 L2,3 TWISTED TRIPLE TO TWISTED PAIR (DELETED PIN1 GRN WIRE) PIN 2 WAS RED WIRE, PIN 3 WAS WHT WIRE) A6 ... J1 5 WAS WHT WIRE J1 4 WAS RED WIRE ADDED NEW LOGO ALL GRA WIRES WERE ... ALL ORN WIRES WERE ORG, BLUE ...

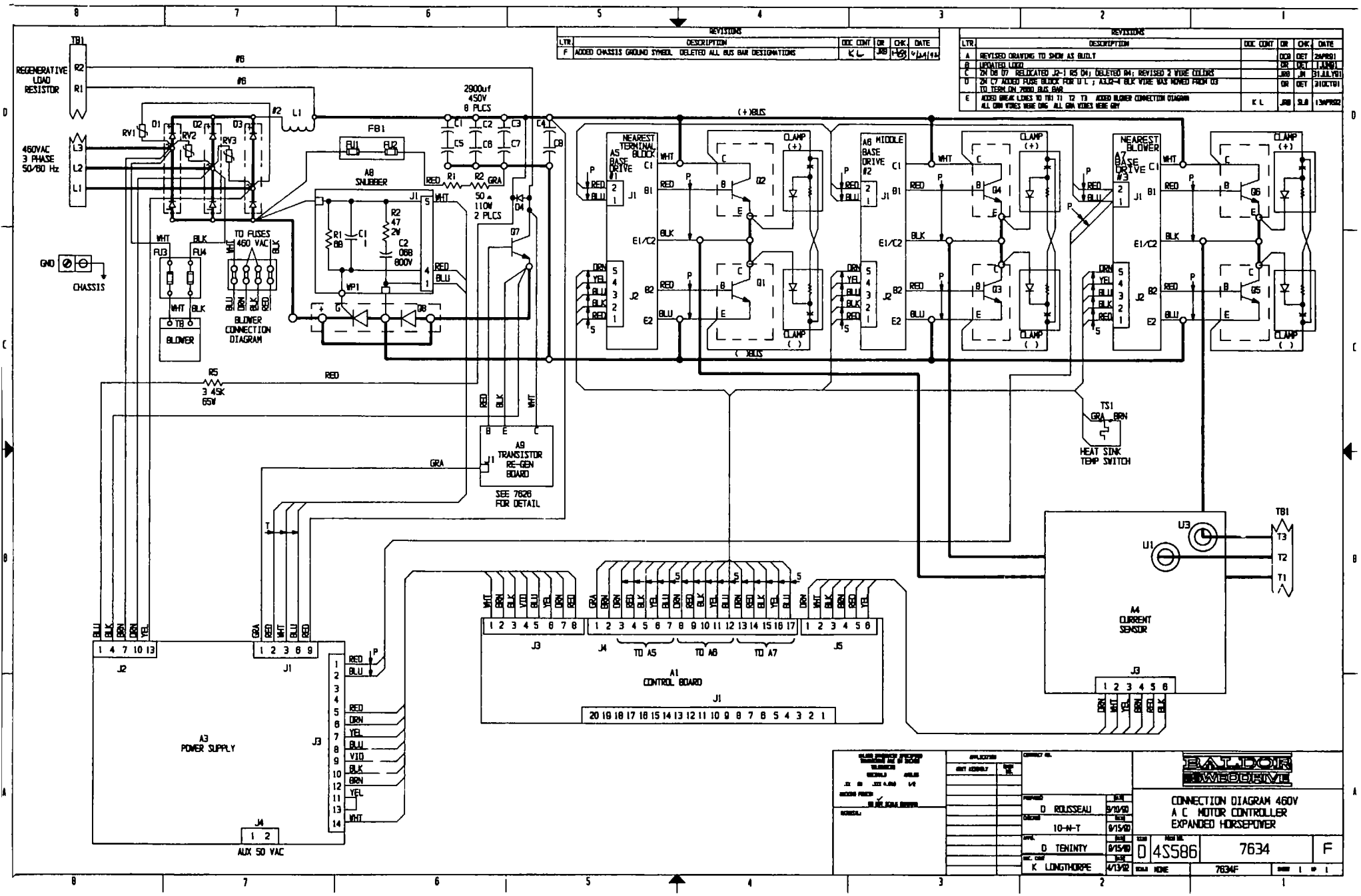


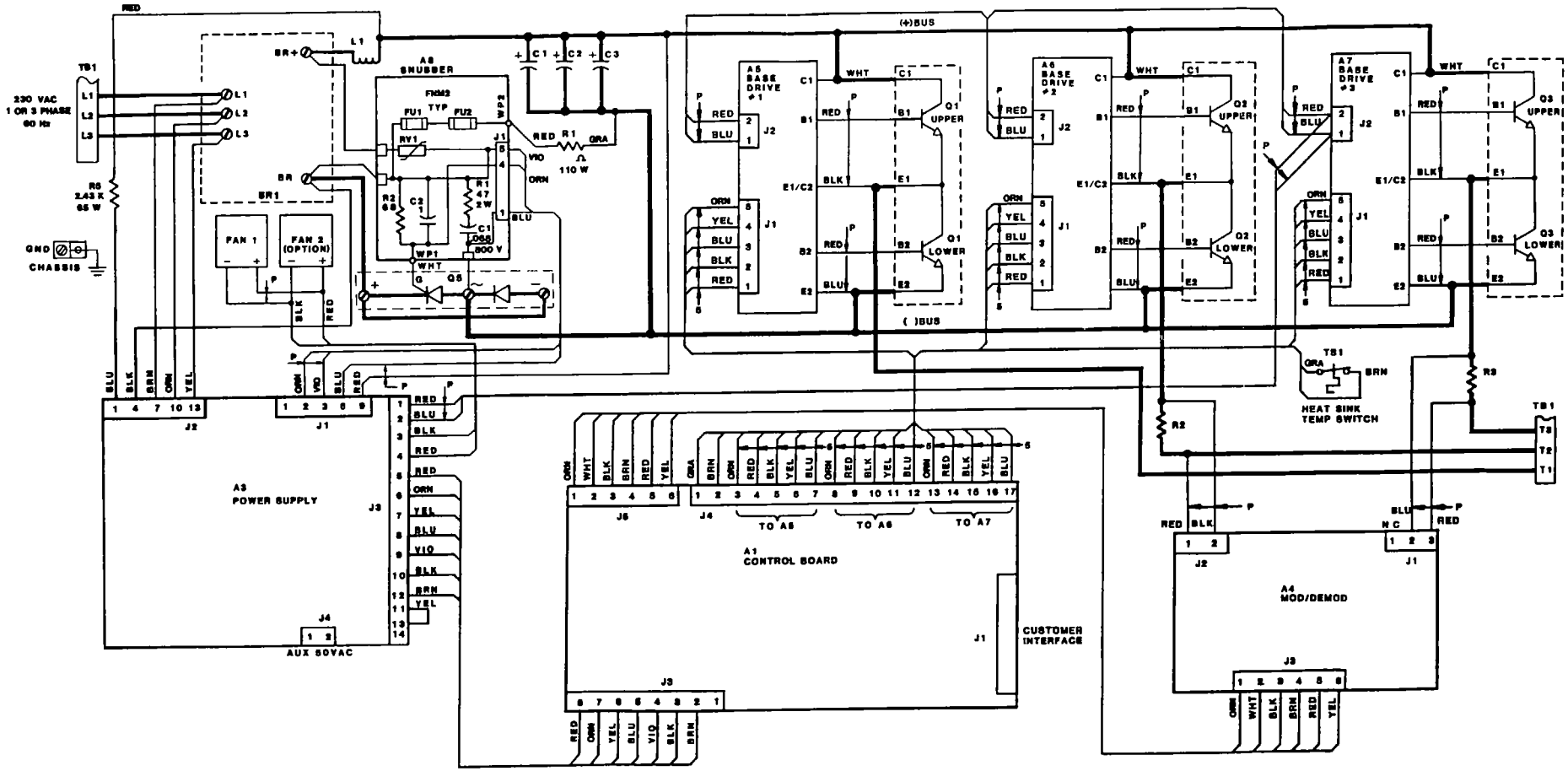
BALDOR SWEODRIVE

CONNECTION DIAGRAM 460V
AC MOTOR CONTROLLER
(WITHOUT REGEN)

D 4S586 7149 C


REVISIONS
LTR DESCRIPTION DOC CONTR. CHK DATE
A REVISED DRAWING TO SHOW AS BUILT DCB DET 2AUG88
B UPDATED LOGO DCB DET 31OCT89
C ADDED FUSE BLOCK AND FUSES, A3J2-4 WAS JUMPED TO J1-8 DCB DET 31OCT89
D 07 BASE WIRE COLOR REVISED FROM GRY TO RED ADDED BREAK LINES TO HIDDEN LINE JRS SLB 12MAR92
BLOWER CONNECTION DIAGRAM, ALL BRN WIRES WERE ORG, ALL GRA WIRES WERE GRY
E ADDED CHASSIS GROUND SYMBOL, DELETED ALL BLK BAR DESIGNATIONS JRS MD 9/14/95
REGENERATIVE LOAD RESISTOR
208/230VAC 3 PHASE 50/60 Hz
L3
L2
L1
TB1
R2
R1
D4
#6
#6
#2
L1
RED
D1
D2
D3
RV1
RV2
RV3
FB1
FU1
FU2
2900uf 450V 4 PLCS
C1
C2
C3
C4
A8 SNUBBER
R1
R2
GRA
50Ω 110W 2 PLCS
J1
WHT
RED
BLU
R1 68
C1 1
R2 47 2W
C2 068 800V
WP1
Q7
R5 2.43K 85W
WHT
BLK
FU3
FU4
GND
CHASSIS
TB
BLOWER
TO FUSES 208/230 VAC
BLU
BRN
BLK
RED
BLOWER CONNECTION DIAGRAM
A9 TRANSISTOR RE-GEN BOARD
SEE 7826 FOR DETAIL
GRA
A5 NEAREST TERMINAL BLOCK BASE DRIVE #1
A6 MIDDLE BASE DRIVE #2
A7 NEAREST BLOWER BASE DRIVE #3
(+)BUS
(-)BUS
CLAMP (+)
CLAMP (-)
C
B
E
Q4
Q1
Q3
Q5
J2
B1
B2
E1/C2
E2
DRN
YEL
BLK
P
S
TS1
GRA
BRN
HEAT SINK TEMP SWITCH
U3
U1
T3
T2
T1
A4 CURRENT SENSOR
J3
1 2 3 4 5 6
DRN
WHT
YEL
BRN
RED
BLK
A3 POWER SUPPLY
J2
1 4 7 10 13
J1
1 2 3 8 9
J3
1 2 3 4 5 6 7 8 9 10 11 12 13 14
VIO
J4
1 2
AUX 50 VAC
J3
1 2 3 4 5 6 7 8
J4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
TO A5
TO A6
TO A7
J5
1 2 3 4 5 6
A1 CONTROL BOARD
J1
20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
BALDOR ELECTRIC
D ROUSSEAU 9/10/90
10/N/T 9/15/90
D TENINTY 9/15/90
K LONGTHORPE 4/13/92
CONNECTION DIAGRAM 230V
A C MOTOR CONTROLLER
EXPANDED HORSEPOWER
D 4S586
7633
E
NONE
7633E


REVISIONS
LTR | DESCRIPTION | DOC CONT | DR | CHK | DATE
F | ADDED CHASSIS GROUND SYMBOL. DELETED ALL BUS BAR DESIGNATIONS | K L | JRB | HJG | 9/24/98
REVISIONS
LTR | DESCRIPTION | DOC CONT | DR | CHK | DATE
A | REVISED DRAWING TO SHOW AS BUILT | | DCB | DET | 26APR91
B | UPDATED LOGO | | DR | DET | 7JAN91
C | 2M D8 D7 RELOCATED J2-1 R5 D4; DELETED D4; REVISED 2 WIRE COLORS | | JRB | JH | 31JUL91
D | 2M C7 ADDED FUSE BLOCK FOR U L ; A10J2-4 BLK WIRE WAS MOVED FROM C8 TO TERM ON 7800D BUS BAR | | DR | DET | 31OCT91
E | ADDED BREAK LINES TO TB1 T1 T2 T3 ADDED BLOWER CONNECTION DIAGRAM ALL GRN WIRES WERE ORG ALL GRA WIRES WERE GRY | K L | JRB | SLB | 13MAR92
REGENERATIVE LOAD RESISTOR
460VAC 3 PHASE 50/60 Hz
CHASSIS
BLOWER CONNECTION DIAGRAM
TO FUSES 460 VAC
BLOWER
A8 SNUBBER
FB1
2900uf 450V 8 PLCS
50 ea 110W 2 PLCS
(+)BUS
(-)BUS
NEAREST TERMINAL BLOCK A5 BASE DRIVE #1
A6 MIDDLE BASE DRIVE #2
NEAREST BLOWER A7 BASE DRIVE #3
CLAMP (+)
CLAMP (-)
R5 3.45K 65W
A9 TRANSISTOR RE-GEN BOARD
SEE 7626 FOR DETAIL
TS1 HEAT SINK TEMP SWITCH
A4 CURRENT SENSOR
A3 POWER SUPPLY
A1 CONTROL BOARD
TO A5
TO A6
TO A7
AUX 50 VAC
D ROUSSEAU 9/10/90
10-N-T 9/15/90
D TENINTY 9/15/90
K LONGTHORPE 4/13/92
BALDOR SUPERDRIVE
CONNECTION DIAGRAM 460V
A C MOTOR CONTROLLER
EXPANDED HORSEPOWER
D 4S586 7634 F
SCALE NONE 7634F



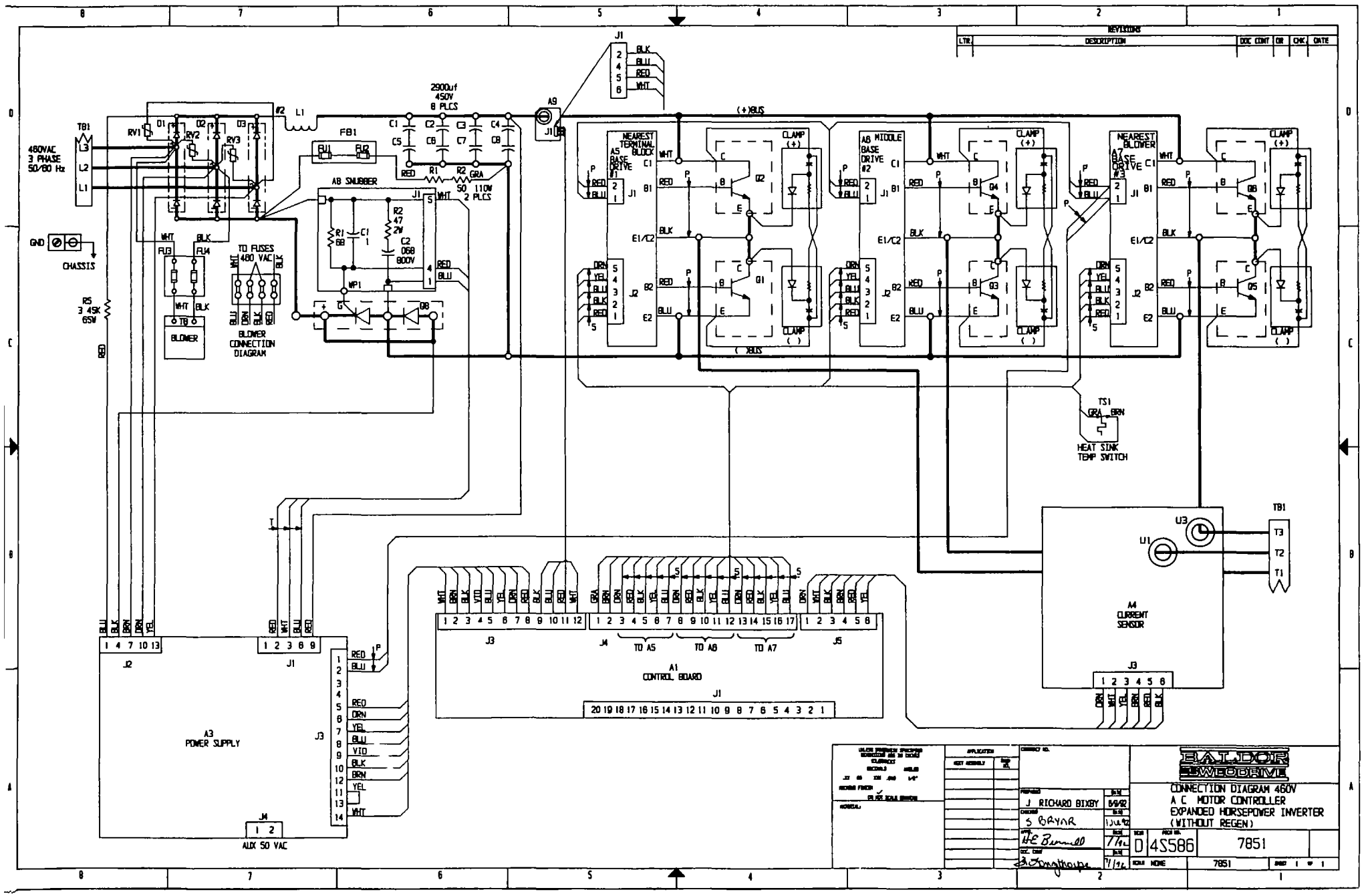
BALDOR SWEODRIVE

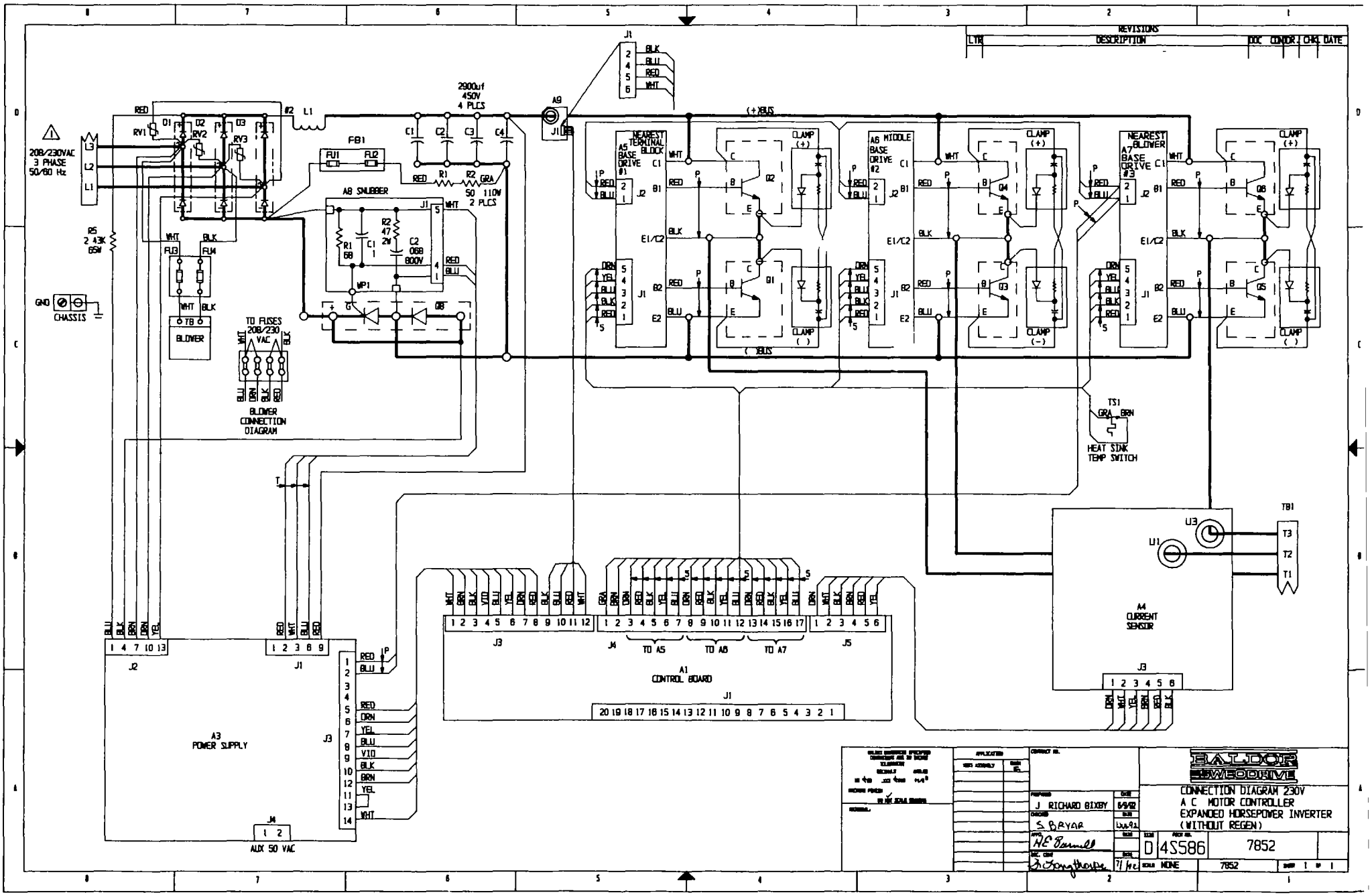
CONNECTION DIAGRAM 230V
AC MOTOR CONTROLLER
(WITHOUT REGEN)

SIZE	DRAWING NO	REV
D	4S586	7850

SCALE NONE

SHEET 1 OF 1


REVISIONS
LTR
DESCRIPTION
DOC CONT
DR
CHK
DATE
480VAC
3 PHASE
50/60 Hz
L1
L2
L3
TB1
RV1
RV2
RV3
D1
D2
D3
#2 L1
FB1
2900uf
450V
8 PLCS
C1
C2
C3
C4
C5
C6
C7
C8
R1
R2
GRA
50 110W
2 PLCS
A9
J1
BLK
BLU
RED
WHT
(+)BUS
( )BUS
NEAREST TERMINAL BLOCK BASE DRIVE #1
A5 MIDDLE BASE DRIVE #2
NEAREST BLOWER BASE DRIVE #3
CLAMP (+)
CLAMP ( )
Q1
Q2
Q3
Q4
Q5
Q6
AB SNUBBER
R1 68
C1 1
R2 47 2W
C2 068 800V
WP1
D8
GND
CHASSIS
R5 3 45K 65W
FU3
FU4
TO FUSES 480 VAC
TB
BLOWER
BLOWER CONNECTION DIAGRAM
TS1
GRA BRN
HEAT SINK TEMP SWITCH
U1
U3
T3
T2
T1
A4 CURRENT SENSOR
J3
J2
J1
A3 POWER SUPPLY
J4
AUX 50 VAC
A1 CONTROL BOARD
J3
J4
J5
TO A5
TO A6
TO A7
J1
20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
BALDOR SUPERDRIVE
CONNECTION DIAGRAM 460V
A C MOTOR CONTROLLER
EXPANDED HORSEPOWER INVERTER
(WITHOUT REGEN)
J RICHARD BIXBY
S BRYAR
D
4S586
7851
NONE
7851


REVISIONS
LTR DESCRIPTION DOC CONTR CHK DATE
208/230VAC 3 PHASE 50/60 Hz
L3
L2
L1
GND
CHASSIS
RV1
RV2
RV3
D1
D2
D3
#2 L1
FB1
FU1
FU2
FU3
FU4
R5 2.43K 65W
TB
BLOWER
TO FUSES 208/230 VAC
BLOWER CONNECTION DIAGRAM
2900uf 450V 4 PLCS
C1
C2
C3
C4
R1 R2 GRA 50 110W 2 PLCS
A8 SNUBBER
R1 68
C1 1
R2 47 2W
C2 068 800V
MP1
Q8
A9
J1
(+)BUS
(-)BUS
A5 NEAREST TERMINAL BLOCK BASE DRIVE #1
A6 MIDDLE BASE DRIVE #2
A7 NEAREST BLOWER BASE DRIVE #3
CLAMP (+)
CLAMP (-)
CLAMP ( )
Q1
Q2
Q3
Q4
Q5
Q6
TS1
HEAT SINK TEMP SWITCH
A4 CURRENT SENSOR
TB1
T3
T2
T1
U3
U1
A1 CONTROL BOARD
J3
J4
J5
TO A5
TO A6
TO A7
A3 POWER SUPPLY
AUX 50 VAC
J2
J1
J4
J3
J1
J3
BALDOR
SWEODRIVE
CONNECTION DIAGRAM 230V
A C MOTOR CONTROLLER
EXPANDED HORSEPOWER INVERTER
(WITHOUT REGEN)
J RICHARD BIXBY
6/4/92
D 4S586
7852
NONE
7852