

Service Bulletin

Machinery Affected: *Cyber*[®], *Cyber AIT*[®], *SmartSet*[®], and *SmartSet Pro Saws*[®]

Document: SB180

Title: Replacing a *GE*[®] AF-300 E11 VFD with a *GE* AF-300 Mini VFD

Applies To: All *Cyber* and *Cyber AIT* Saws Shipped Before 15 November 2007, All *SmartSet* and *SmartSet Pro Saws* Shipped before 1 November 2007



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Item #	SB180 Rev. A
Revised	26 March 2009
Revised By	R. Tucker
Date Created	25 October 2007
Created By	R. Widder
Reviewed by	R. Tucker
Approved by	G. McNeelege
Applicability	77500-501, 60000-530
Effectivity	<i>Cyber</i> and <i>Cyber A/T</i> saws shipped before 15 November 2007, <i>SmartSet</i> and <i>SmartSet Pro</i> saws shipped before 1 November 2007

Purpose and Scope

The *Cyber*[®], *Cyber A/T*, *SmartSet*[®], and *SmartSetPro* saws use *GE*[®] AF-300 E11 VFDs (variable frequency drives) that have been discontinued. If these VFDs require replacement, they must be replaced with the new AF-300 Mini VFD.

Overview

The parts included in each kit are shown in Table 1 through Table 3. Please ensure all parts are present before starting this procedure.

Table 1: Parts for ANGLE and/or CENTERLINE VFD Replacement

Saw Model		<i>Cyber A/T</i>	<i>Cyber</i>	<i>SmartSet Pro</i> (angle)	<i>SmartSet</i>
Qty.	Part Description	SB180KIT-A	SB180KIT-J	SB180KIT-D	N/A
1	Service Bulletin	SB180A	SB180D	SB180B	N/A
1	VFD, 1hp	94001	94026	94004	N/A
1 ea	Drawing included	90507	92034	90129	N/A

Table 2: Parts for CARRIAGE VFD Replacement

Saw Model		<i>Cyber A/T</i>	<i>Cyber</i>	<i>SmartSet Pro</i>	<i>SmartSet</i>
Qty.	Part Description	SB180KIT-B	SB180KIT-K	SB180KIT-E	SB180KIT-G
1	Service Bulletin	SB180A	SB180D	SB180B	SB180C
1	VFD, 2hp	94002	94027	94005	94007
4	8-32x1/2" round head machine screw	341068	341068	341068	341068
1 ea	Drawings included	90507	92034	90129	90124

Table 3: Parts for INFEED VFD Replacement

Saw Model		<i>Cyber A/T</i>	<i>Cyber</i>	<i>SmartSet Pro</i>	<i>SmartSet</i>
Qty.	Part Description	SB180KIT-C	SB180KIT-L	SB180KIT-F	SB180KIT-H
1	Service Bulletin	SB180A	SB180D	SB180B	SB180C
1	VFD, 2hp	94003	94028	94006	94008
4	8-32x1/2" round head machine screw	341068	341068	341068	341068
1 ea	Drawings included	90507	92034	90129	90124



Before beginning the procedure, gather the supplies listed in Table 4.

Table 4: Customer-Supplied Items


Qty.	Part Description
1	Phillips screwdriver set
1	Drill
1	#29 drill bit
1	8/32 tap
1	Marker or grease pencil

If you have any questions, call MiTek Machinery Division Customer Service at 800-523-3380.

Procedure



Electrical Lockout/Tagout Procedures

WARNING	
	<p>ELECTROCUTION HAZARD!</p> <p>Verify that all power to the machine has been turned off and follow approved lockout/tagout safety procedures before performing any maintenance.</p> <p>All electrical work must performed by a qualified electrician.</p> <p>If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E for proper procedures and personal protective equipment.</p>


Before opening the main electrical enclosure, or attempting to repair or replace an electrical transmission line to the machine, lockout/tagout the machine properly. Follow your company’s approved lockout/tagout procedures which should include, but are not limited to the steps here.


1. Engage an E-stop on the machine.
2. Turn the machine’s disconnect switch to the “off” position. This is usually required to open the main electrical enclosure’s door.
3. Shut the power to the machine off at the machine’s power source which is usually an electrical service entry panel on the facility wall. One example of a locked-out power source panel is shown in Figure 1.
4. Attach a lock and tag that meets OSHA requirements for lockout/tagout to the electrical service entry panel.
5. Open the door to the enclosure in which you need access, and using a multimeter, verify that the power is off.

Figure 1: Lockout/Tagout on the Power Source Panel



Pneumatic System Lockout/Tagout Procedure

WARNING	
	<p>MOVING PARTS CAN CRUSH AND CUT.</p> <p>Always verify that power to the machine has been turned off and follow approved lockout/tagout procedures.</p> <p>Turn off the air switch before performing any maintenance on the equipment.</p>

WARNING	
	<p>HIGH PRESSURE HAZARD.</p> <p>Bleed pneumatic before performing any maintenance on the pneumatic system.</p>

Replacing the VFD

Removing the VFD

1. Disconnect all wiring from the VFD, noting how it is wired.
2. Unscrew and remove the hardware attaching the VFD. Keep the hardware for re-use.
3. Remove the VFD.

Attaching the New VFD (1-hp VFD)

1. Place the new VFD in the same location as the VFD you removed.
2. Mark the location of the VFD mounting holes on the enclosure.
3. Remove the VFD.
4. Drill holes at the marked locations using a #29 drill bit. Drill the holes from the inside of the enclosure to the outside. Cover electrical components with clean rags if there is a risk of shavings falling onto them.
5. Tap the holes to 8/32.
6. Attach the VFD using the same hardware you removed and tighten the screws.
7. Vacuum any debris out of the electrical enclosure.

CAUTION

Do not use compressed air to blow out debris in the electrical enclosure! This may force contaminants into components. NEVER use water in an electrical enclosure.

Attaching the New VFD (2-hp VFD).

1. Place the new VFD in the same location as the VFD you removed
2. Attach the VFD using the 8-32x1/2-in. screws provided in your kit.
3. Tighten the screws.
4. Vacuum any debris out of the electrical enclosure.

Connecting the VFD (Cyber A/T Saw)

Some wires with butt splices are preconnected to the VFD before shipping. If the drawing indicates you should connect a wire to that terminal, connect it to the butt splice, then crimp the splice into place as seen in Figure 3.

Figure 2: New 2hp VFD on a Cyber A/T Saw



Figure 3: Crimp Butt Splice



To connect wires to the new VFD, find the correct VFD on Drawing 90507. Connect the wires as indicated in Table 5.

Table 5: Old and New Terminal Connections, Cyber A/T Saw

Wire	Old Terminal	New Terminal
T#A/B/C-L1	R	R
T#A/B/C-L2	S	S
T#A/B/C-L3	T	T
T#B-T1	U	U
T#B-T2	V	V
T#B-T3	W	W
1T	C	C, and may also daisy chain to other VFDs
VFD Fault	B	B
Common	CM	CM
Common	11	11
+10V	12	12
REV/RAISE	REV	REV
FWD/EXTEND	FWD	FWD
RESET	X5	X3
+24 VDC	Y1	Y1
-24 VDC	CME	Y1E

Connecting the VFD (Cyber Saw)

Some wires with butt splices are preconnected to the VFD before shipping. If the drawing indicates you should connect a wire to that terminal, connect it to the butt splice, then crimp the splice into place as seen in Figure 3.

To connect wires to the new VFD, find the correct VFD on Drawing 92034. Connect the wires as indicated in Table 6.

Table 6: Old and New Terminal Connections, Cyber Saw

Wire	Old Terminal	New Terminal
T#A/B-L1	R	R
T#A/B-L2	S	S
T#A/B-L3	T	T
T#B-T1	U	U
T#B-T2	V	V
T#B-T3	W	W
1S	C	C, and may also daisy chain to other VFDs
VFD Fault	B	B
Common	SD	CM
Common	5	11
+10V	2	12
REV/UP	STR	REV
FWD/DOWN	STF	FWD

Connecting the VFD (*SmartSet Pro Saw*)

Some wires with butt splices are preconnected to the VFD before shipping. If the drawing indicates you should connect a wire to that terminal, connect it to the butt splice, then crimp the splice into place as seen in Figure 3.

To connect wires to the new VFD, find the correct VFD on Drawing 90129. Connect the wires as indicated in Table 7.

Table 7: Old and New Terminal Connections, *SmartSet Pro Saw*

Old Terminal	New Terminal
R	R
S	S
T	T
U	U
V	V
W	W
CM	CM
X1	X1
X2	X2
X3	X3
X5	—
VFD Fault	30A
1	30C, and may also daisy chain to other VFDs
REV	REV
FWD	FWD

Connecting the VFD (*SmartSet Saw*)

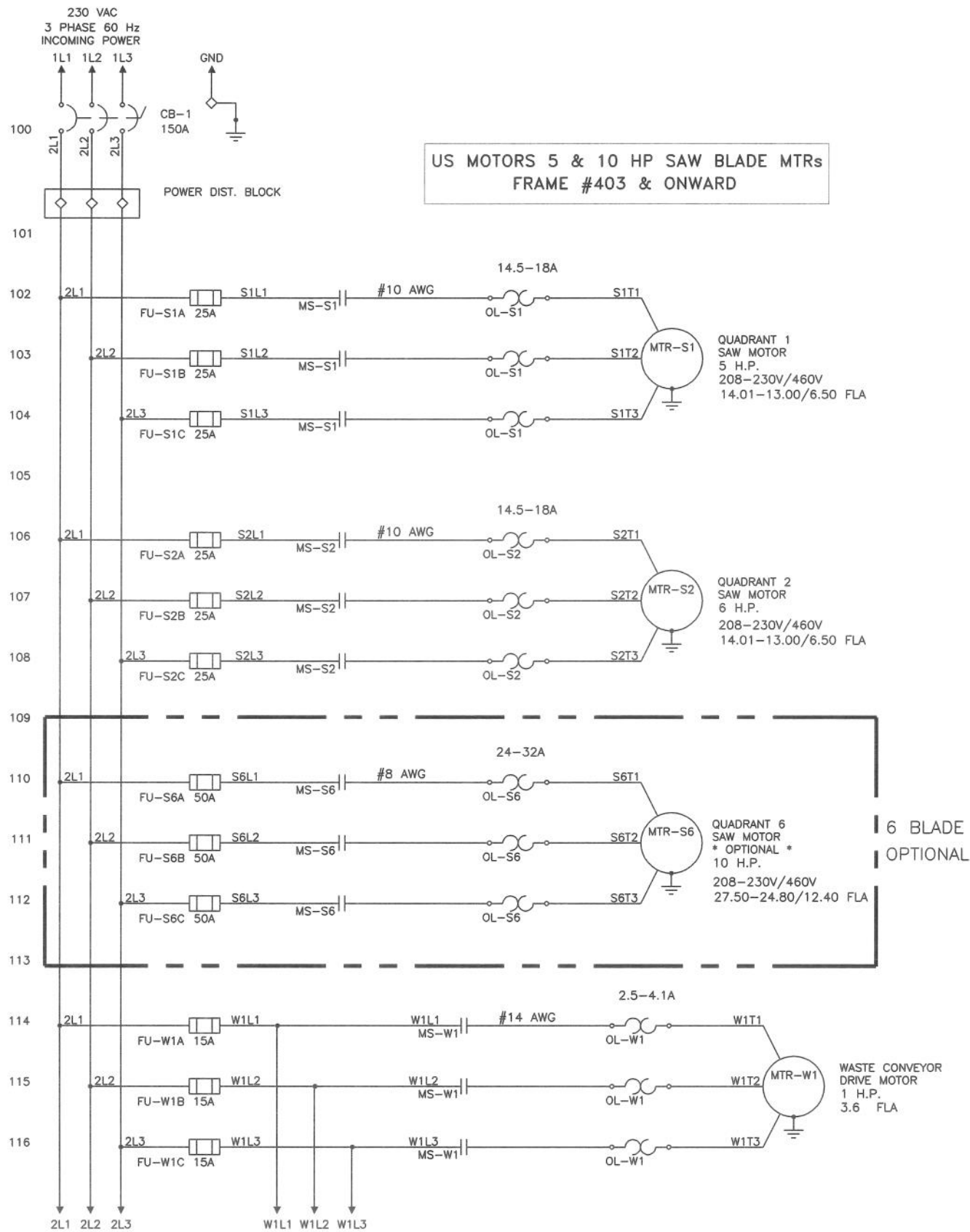
Some wires with butt splices are preconnected to the VFD before shipping. If the drawing indicates you should connect a wire to that terminal, connect it to the butt splice, then crimp the splice into place as seen in Figure 3.

To connect wires to the new VFD, find the correct VFD on Drawing 90124. Connect the wires as indicated in Table 8.

Table 8: Old and New Terminal Connections, *SmartSet Saw*

Old Terminal	New Terminal
R	R
S	S
T	T
U	U
V	V
W	W
CM	CM
REV	REV
FWD	FWD
11	11
12	12
13	13

END OF SERVICE BULLETIN



**US MOTORS 5 & 10 HP SAW BLADE MTRs
FRAME #403 & ONWARD**

LEGEND:

STATIONARY END TERMINAL	◇
CARRIAGE END TERMINAL	⊙
CONTROL PANEL TERMINAL	□
END-TO-END CABLE	---
CONTROL PANEL CABLE	----

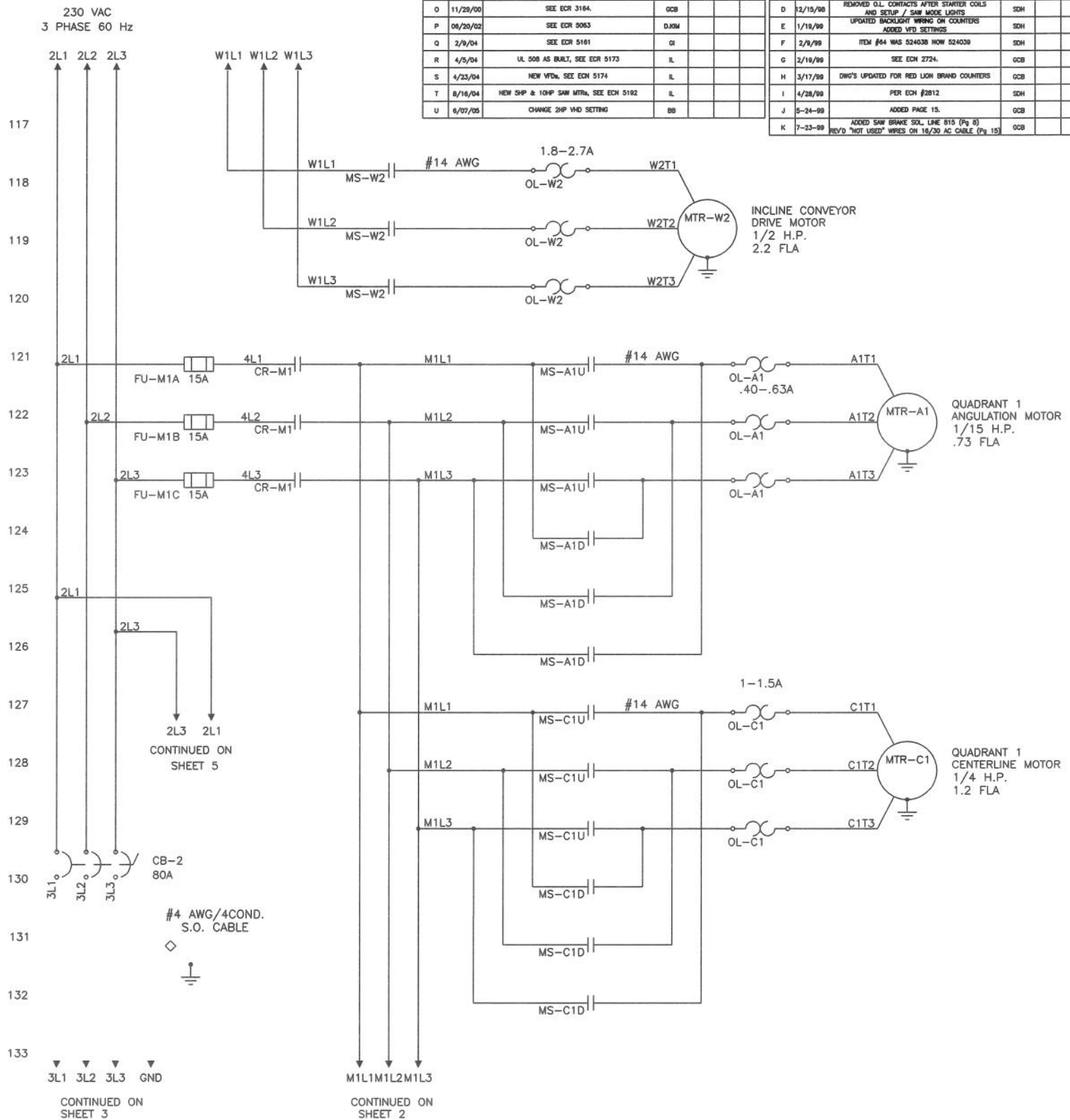
- NOTES: 1) OBSERVE FOLLOWING COLOR CODES FOR WIRING
 BLACK.....ALL AC POWER
 RED.....ALL AC CONTROL
 ORANGE.....ALL DC ZERO VOLTS
 DK BLUE....DC CONTROL
 GREEN.....GROUND
 WHITE.....NEUTRAL

- 2) RUNGS 110-112, OMIT IF BLADE 6 NOT INSTALLED

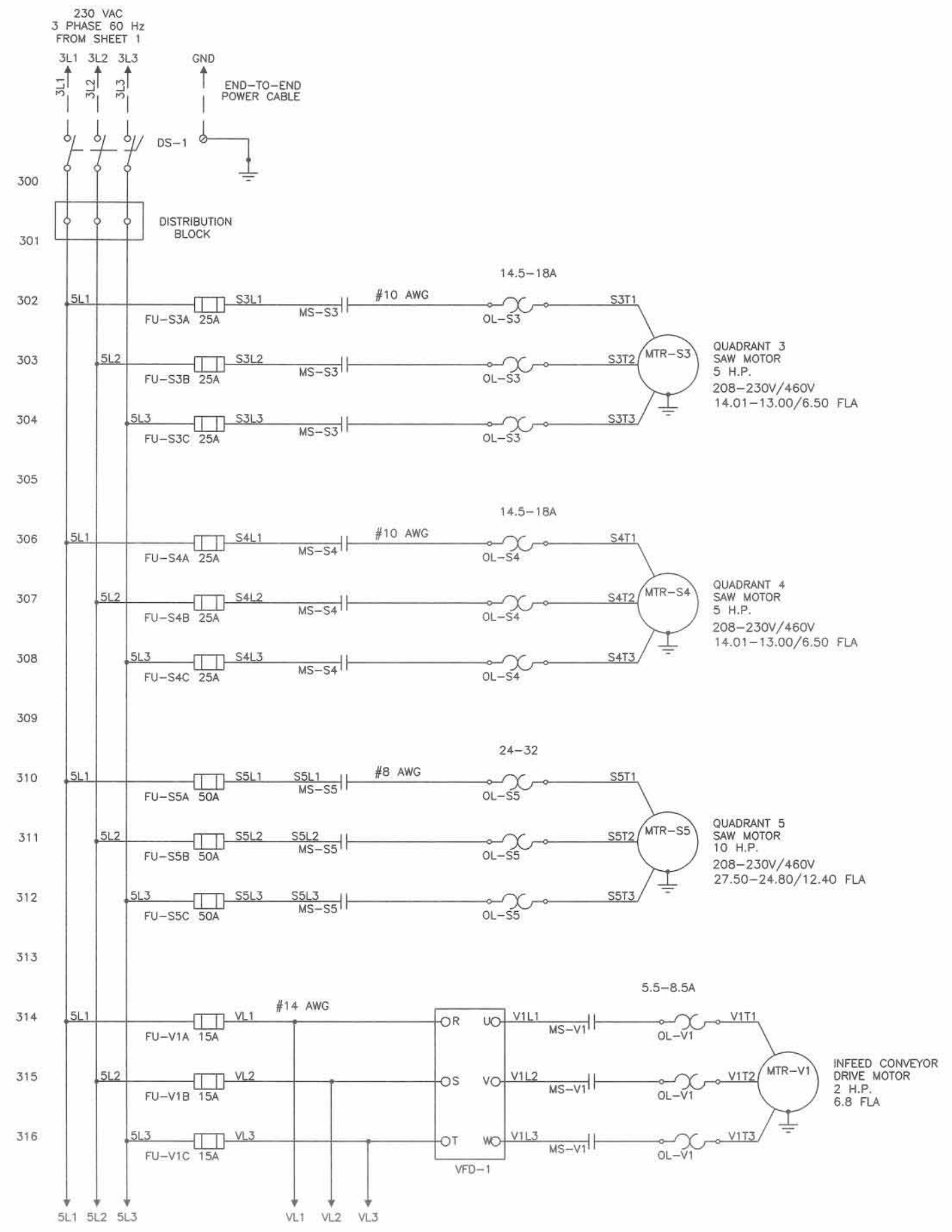
REV.	DATE	DESCRIPTION	BY	CHK'D	APP'D	DATE
V	4/14/06	ADD 518143, REMOVE 518234 SEE ECO 6093	LN			
W	10/02/07	ADD 508784 REMOVE 509724 SEE ECO 6095	WJS			

REV.	DATE	DESCRIPTION	BY	CHK'D	APP'D	DATE
L	9-23-99	ADDED ITEM 59, QTY ITEM #25 WAS 184 NOW 250 QTY ITEM #26 WAS 11 NOW 16. ECR 2837.	SDH			
M	12/30/99	SEE ECR 3023.	OCB			
H	8/10/00	SEE ECR 3112.	OCB			
O	11/29/00	SEE ECR 3164.	OCB			
P	06/20/02	SEE ECR 5053	DJRM			
Q	2/9/04	SEE ECR 5161	GI			
R	4/5/04	UL 508 AS BUILT, SEE ECR 5173	IL			
S	4/23/04	NEW VFDs, SEE ECR 5174	IL			
T	8/16/04	NEW SHP & 10HP SAW MTRs, SEE ECR 5182	IL			
U	8/07/05	CHANGE 2HP VFD SETTING	BB			

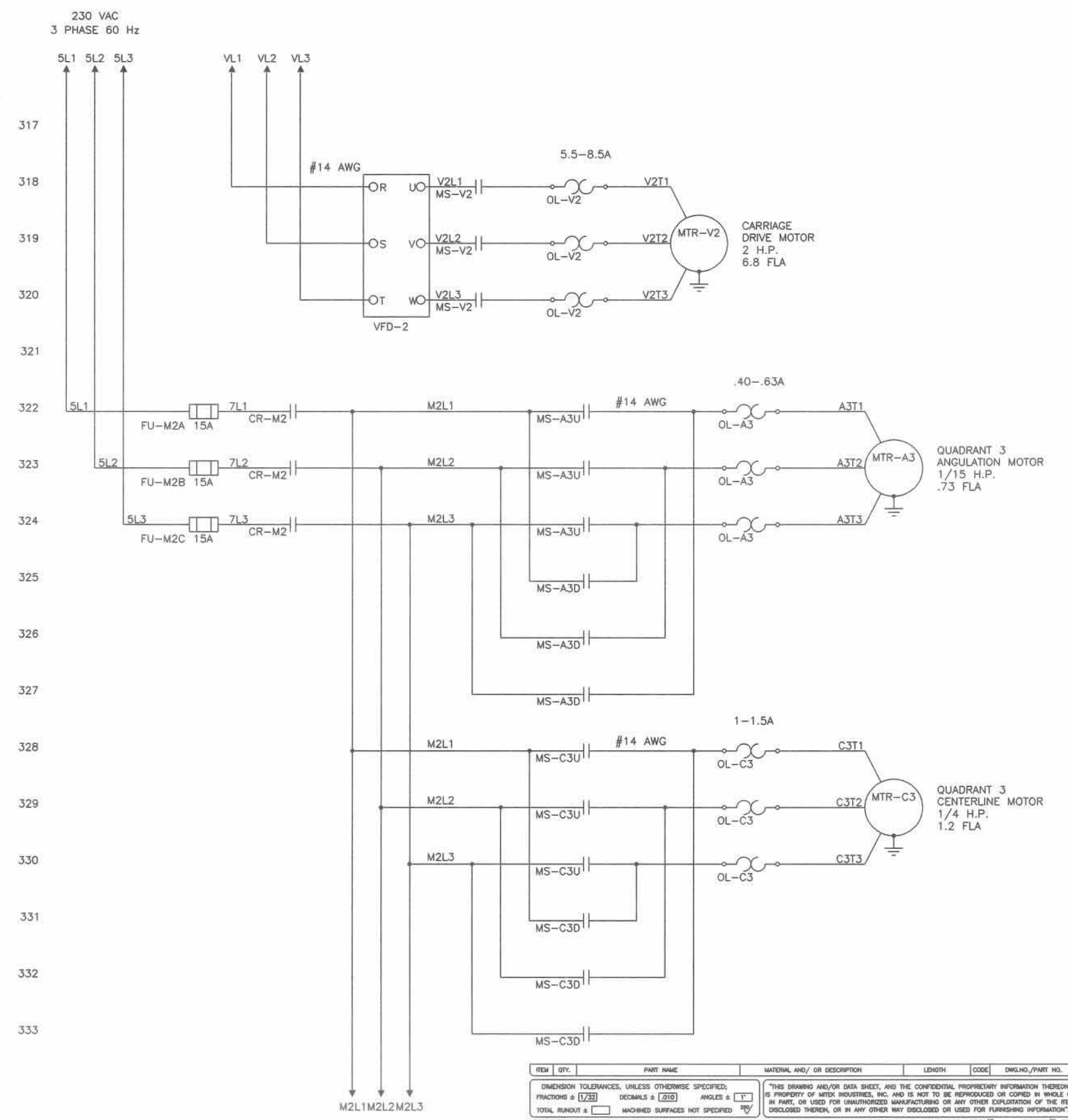
REV.	DATE	DESCRIPTION	BY	CHK'D	APP'D	DATE
A	1/26/98	INITIAL RELEASE	SDH			
B	11/9/98	MOVED CARRIAGE BRACK FROM WIRE #46 TO WIRE #77	SDH			
C	11/30/98	ITEM #84 WAS 524036 NOW 524038	SDH			
D	12/15/98	REMOVED OL CONTACTS AFTER STARTER COILS AND SETUP / SAW MODE LIGHTS	SDH			
E	1/16/99	UPDATED BACKLIGHT WIRING ON COUNTERS ADDED VFD SETTINGS	SDH			
F	2/9/99	ITEM #84 WAS 524038 NOW 524039	SDH			
G	2/18/99	SEE ECR 2724.	OCB			
H	3/17/99	DRG'S UPDATED FOR RED LICH BRAND COUNTERS	OCB			
I	4/28/99	PER ECR #2812	SDH			
J	5-24-99	ADDED PAGE 15.	OCB			
K	7-23-99	ADDED SAW BRAKE SOL. LINE 815 (Pg 8) REV'D "HOT USE" WIRES ON 16/20 AC CABLE (Pg 15)	OCB			



ITEM	QTY.	PART NAME	MATERIAL AND/OR DESCRIPTION	LENGTH	CODE	DWG. NO./PART NO.
DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED: FRACTIONS ± [1/32] DECIMALS ± [0.01] ANGLES ± [1°] TOTAL RUNOUT ± [] MACHINED SURFACES NOT SPECIFIED ± []						
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FEATURES ELECTRICAL SCHEMATIC			MiTek Industries, Inc. 4203 SHORELINE DRIVE, EARTH CITY, MO. 63045			
APPROVED	DATE	DRG. NO.	SMARTSET			
CHECKED	DATE	DRAWN	DATE	FRESH PAINT	SCALE	PAGE
VDC	11/20/07	HOSHIELD	1/26/98	X	1:1	1 of 16
90124						DASH NO. REV. W

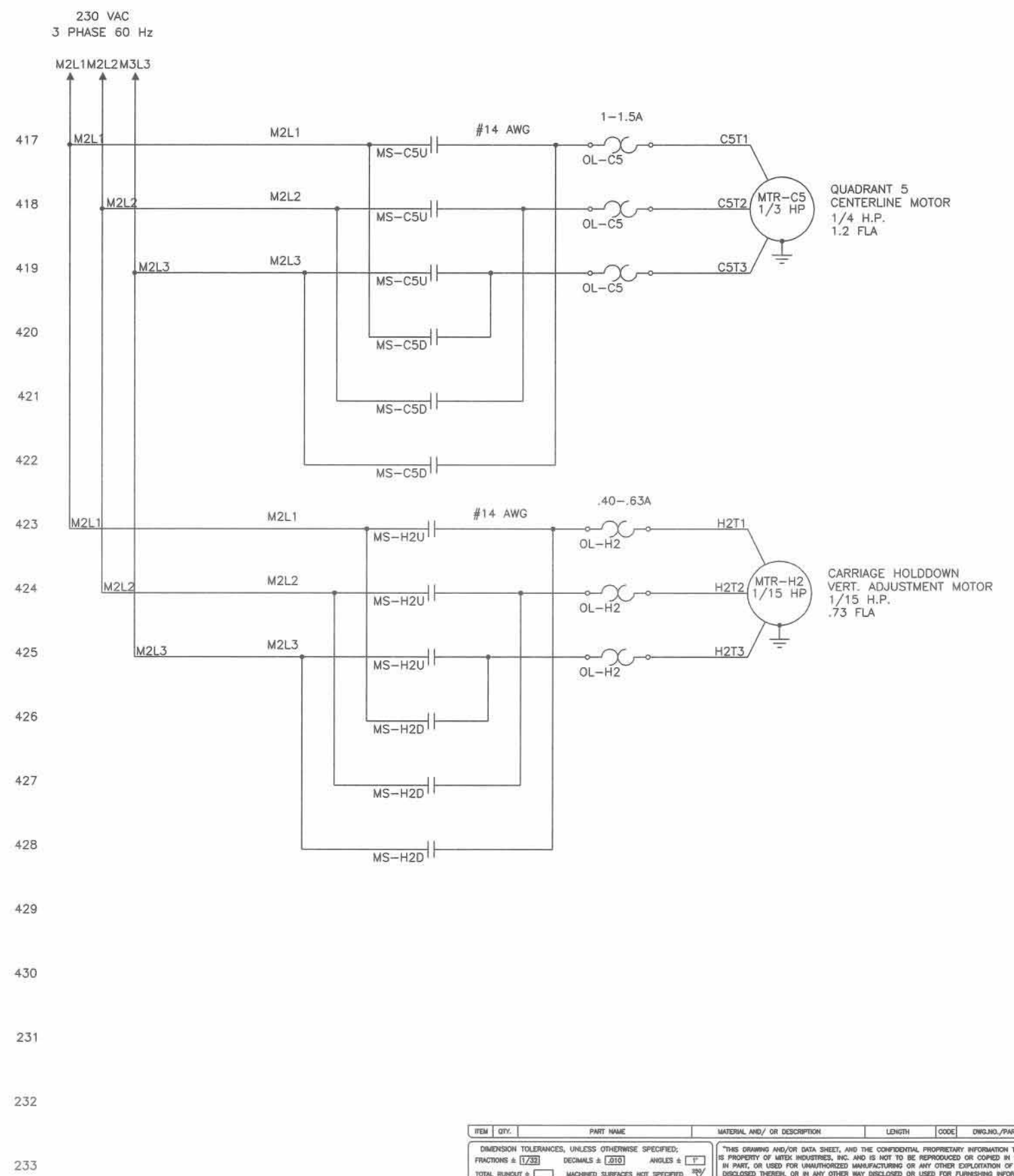
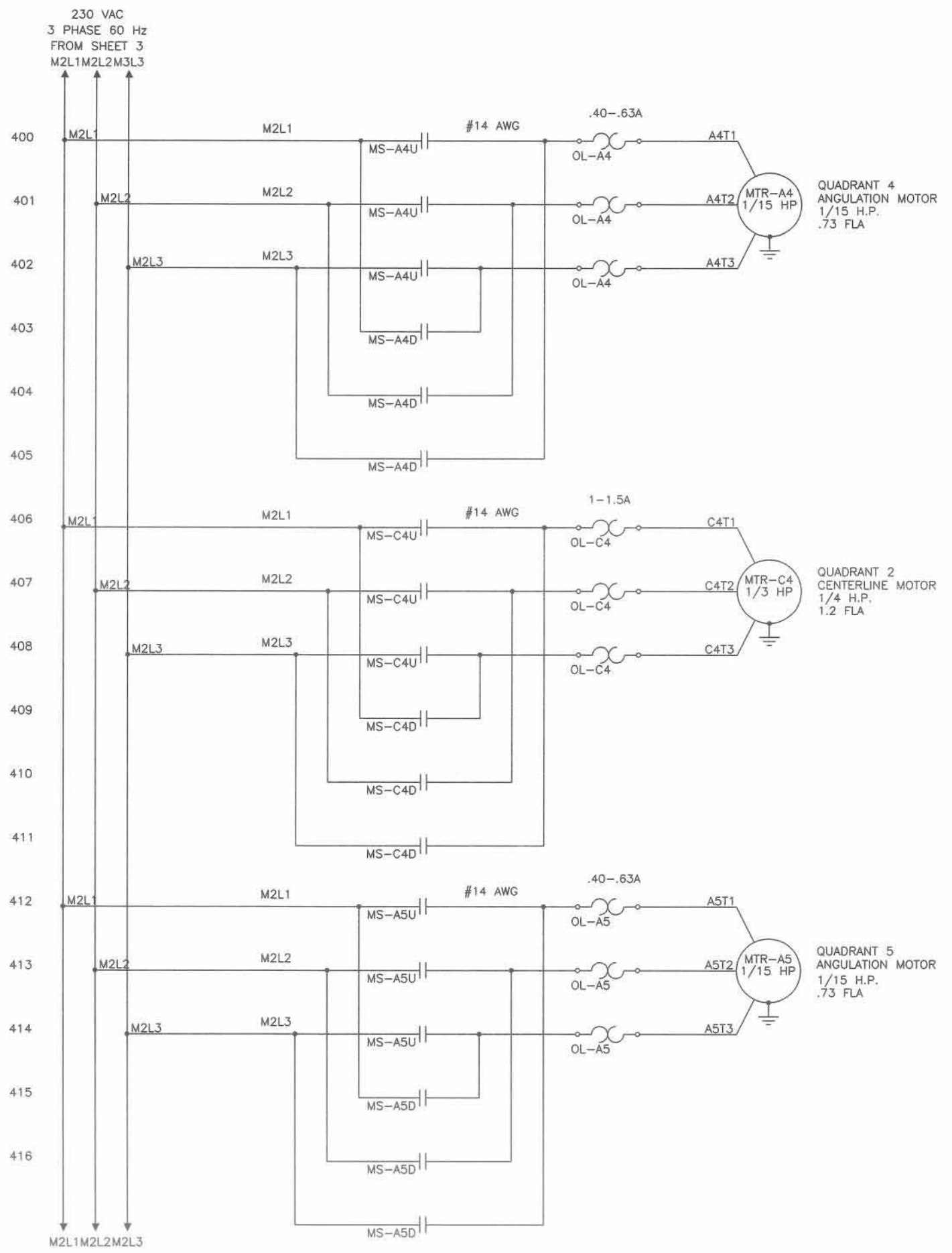


NOTES: 4) RUNGS 310-312, OMIT IF BLADE 5 NOT INSTALLED



CONTINUED ON SHEET 4

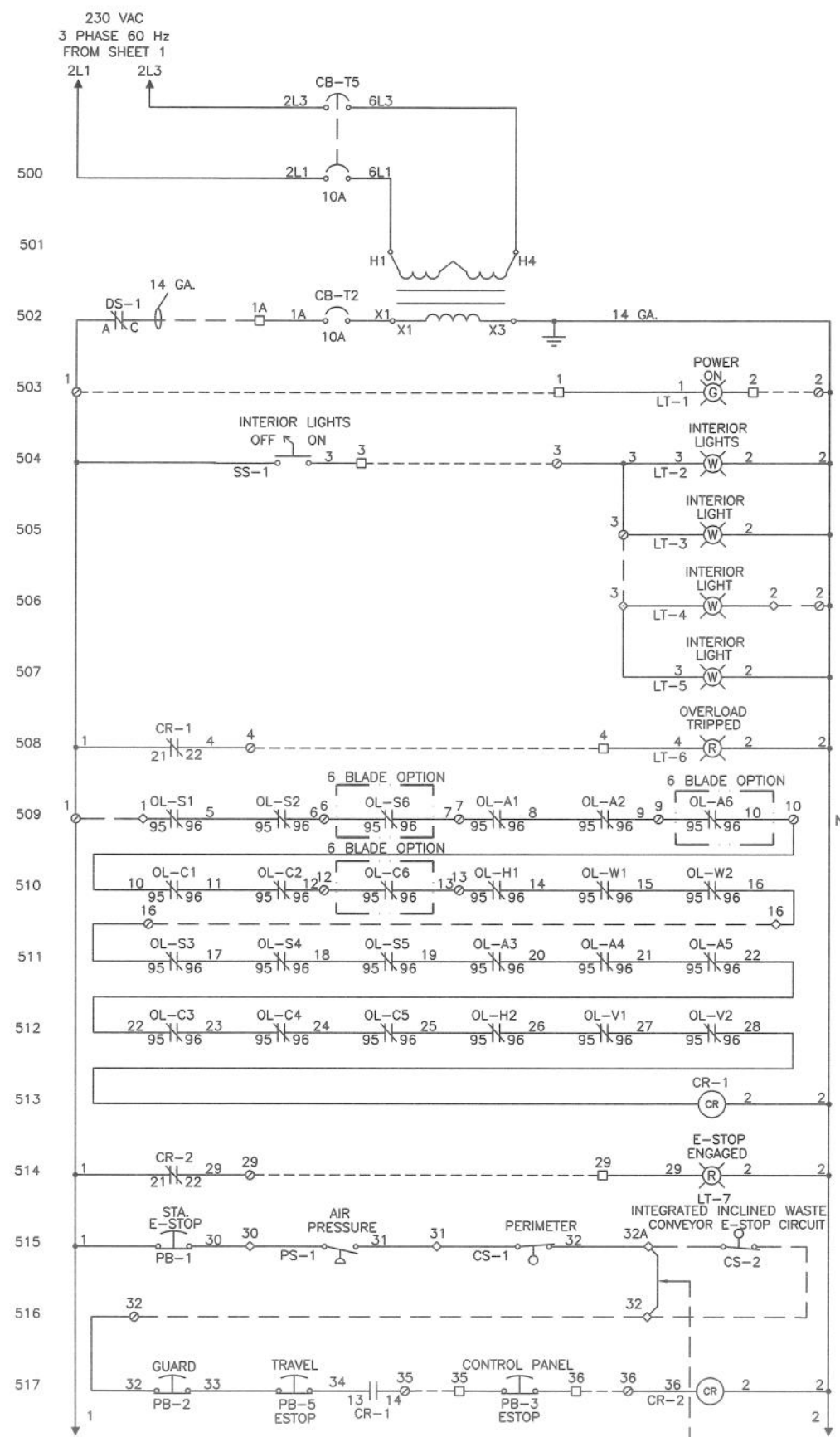
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DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED: FRACTIONS ± $\frac{1}{32}$ DECIMALS ± $\frac{.010}{10}$ ANGLES ± 1° TOTAL RUNOUT ± $\frac{1}{16}$ MACHINED SURFACES NOT SPECIFIED $\frac{.010}{10}$						
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FEATURES ELECTRICAL SCHEMATIC			MiTek Industries, Inc. 4203 SHORELINE DRIVE, EARTH CITY, MO. 63045			
APPROVED	DATE	DRW.	SCALE	PAGE	DASH NO. REV.	
<i>[Signature]</i>	1/28/99	HOSHIELD	X	3 of 16	90124 W	



KEY	NO. OF HOLES	DIA.	DEPTH	DIA.	DEPTH	REMARKS
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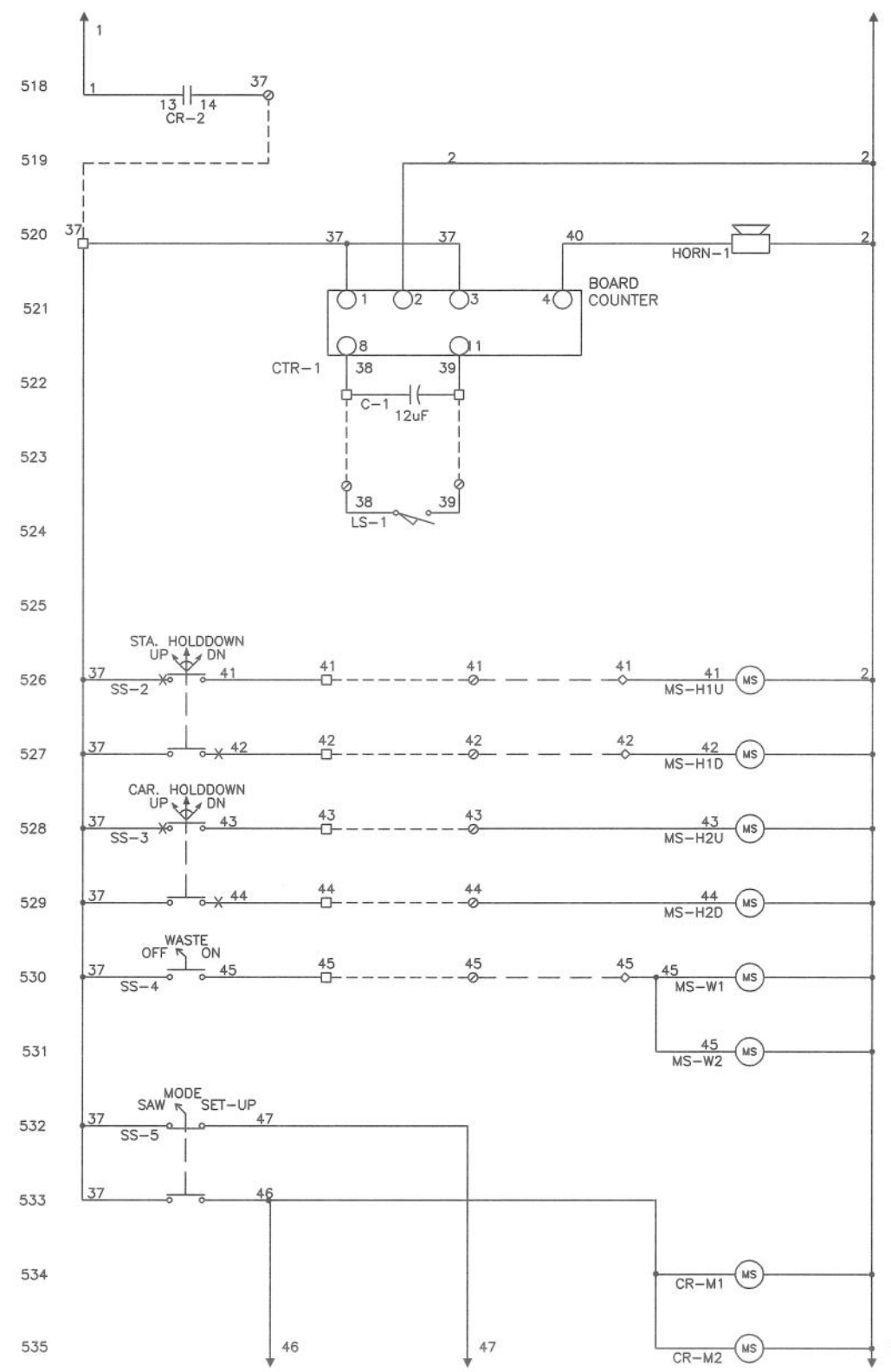
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FEATURES ELECTRICAL SCHEMATIC			<small>THIS DRAWING AND/OR DATA SHEET, AND THE CONFIDENTIAL PROPRIETARY INFORMATION THEREON, IS PROPERTY OF MITEK INDUSTRIES, INC. AND IS NOT TO BE REPRODUCED OR COPIED IN WHOLE OR IN PART, OR USED FOR UNAUTHORIZED MANUFACTURING OR ANY OTHER EXPLOITATION OF THE ITEM DISCLOSED THEREIN, OR IN ANY OTHER WAY DISCLOSED OR USED FOR FURNISHING INFORMATION.</small>			
APPROVED <i>[Signature]</i>		DATE 4/3/2017	SMARTSET			
CHECKED VOL	DATE 1/22/17	DRAWN HOSHIEL	DATE 1/28/16	SCALE NONE	PAGE 4 OF 16	DASH NO. REV. 90124 W

MiTek Industries, Inc.
 4203 SHORELINE DRIVE, EARTH CITY, MO. 63045



NOTE:
OMIT OL-6S,
OL-6A, OL-6C
FOR 5 BLADED
SAW

NOTE:
REMOVE E-STOP CIRCUIT JUMPER IF
OPTIONAL INTEGRATED INCLINED
WASTE CONVEYOR IS PRESENT



NOTES: 6) RUNGS 509-513, IF BLADES 5 OR 6
ARE NOT INSTALLED, OMIT OVERLOAD
CONTACTS AND FOLLOWING WIRE.
EXAMPLE: IF OL-A6 IS OMITTED,
OMIT WIRE 10, AND CONNECT WIRE 9
DIRECTLY TO OL-C1.

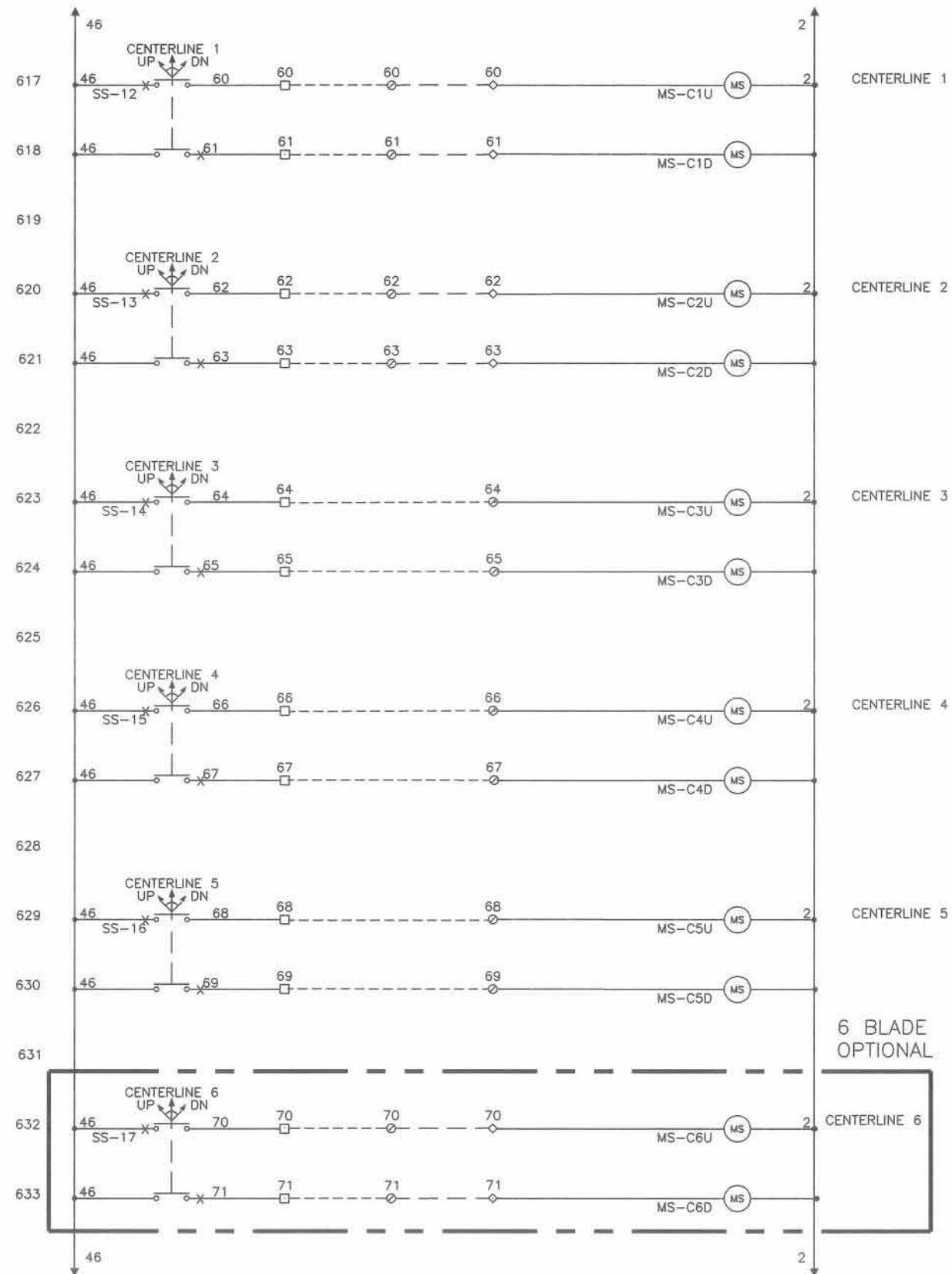
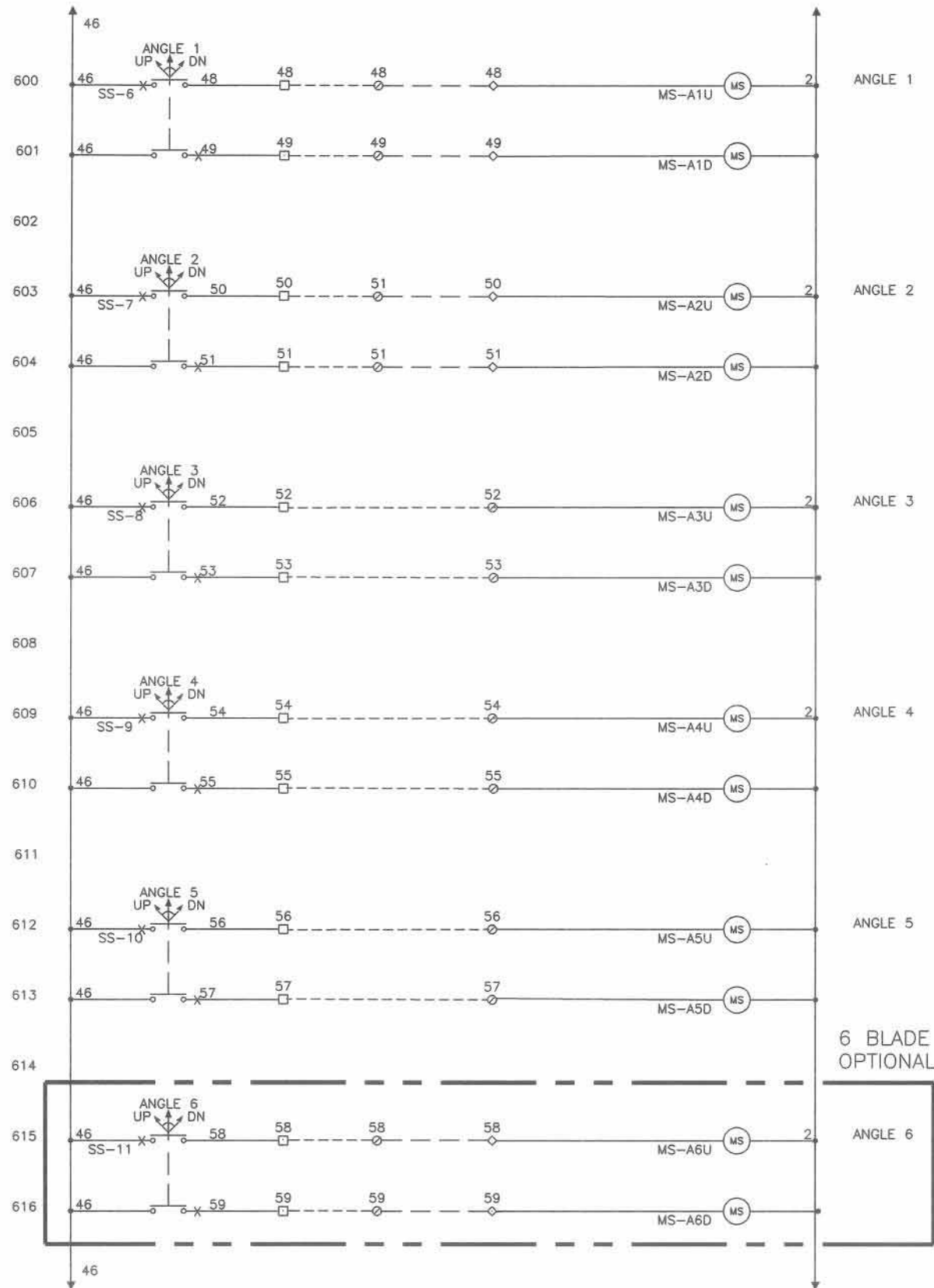
CONTINUED ON SHEET 6 CONTINUED ON SHEET 8

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ITEM	QTY.	PART NAME	MATERIAL AND/OR DESCRIPTION	LENGTH	CODE	DIWG. NO./PART NO.
<small>DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED: FRACTIONS ± [1/32] DECIMALS ± [0.10] ANGLES ± [1°] TOTAL RUNOUT ± [] MACHINED SURFACES NOT SPECIFIED [25]</small>						
ELECTRICAL SCHEMATIC			MiTek Industries, Inc. <small>4203 SHORELINE DRIVE, EARTH CITY, MO. 63048</small>			
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SMARTSET						DASH NO. REV. 90124 W

FROM SHEET 5

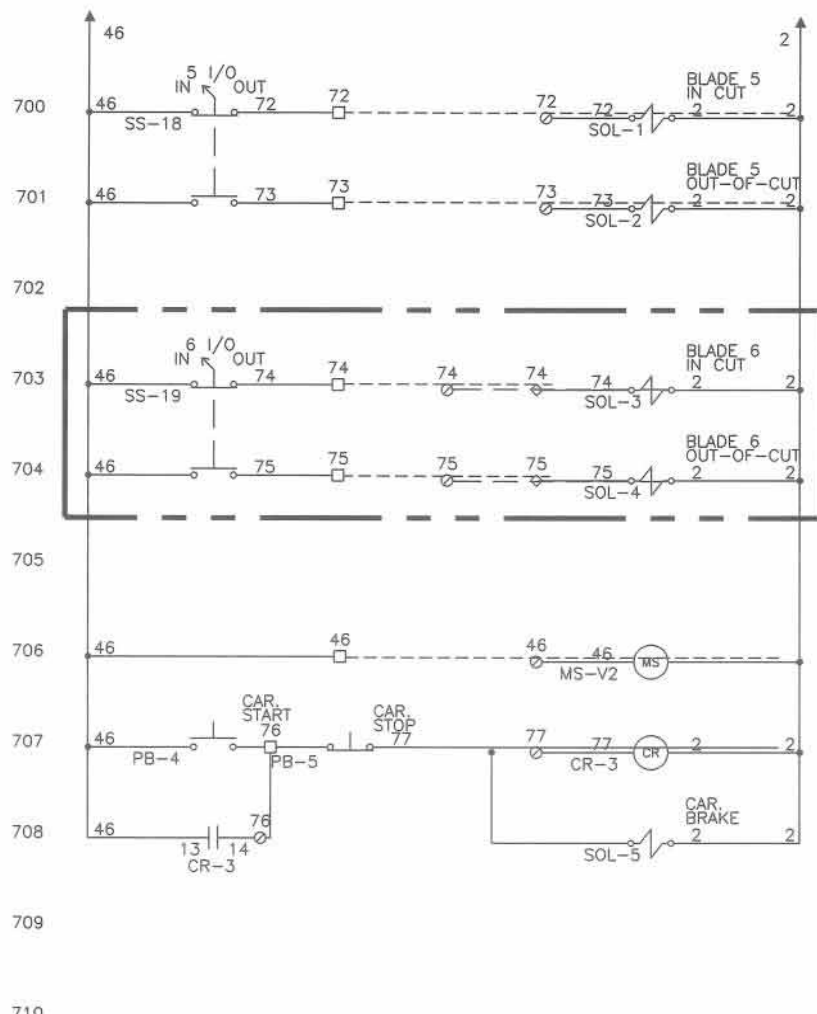


NOTES: 7) RUNGS 612-616 AND 629-633 OMIT IF BLADES 5 AND/OR 6 ARE NOT INSTALLED

CONTINUED ON SHEET 7

ITEM	QTY.	PART NAME	MATERIAL AND/OR DESCRIPTION	LENGTH	CODE	DWG. NO./PART NO.
DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED: FRACTIONS ± 1/32 DECIMALS ± .010 ANGLES ± 1° TOTAL RUNOUT ± .005 MACHINED SURFACES NOT SPECIFIED ± .005						
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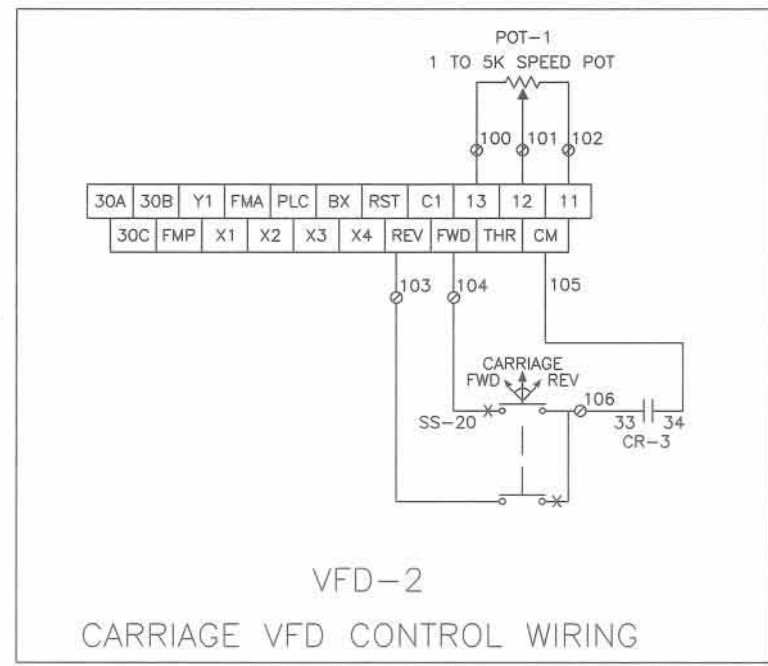
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A	X	X	X	X	X	



6 BLADE
OPTIONAL

NOTES: 8) RUNGS 700-704, OMIT IF BLADES
5 AND/OR 6 ARE NOT INSTALLED

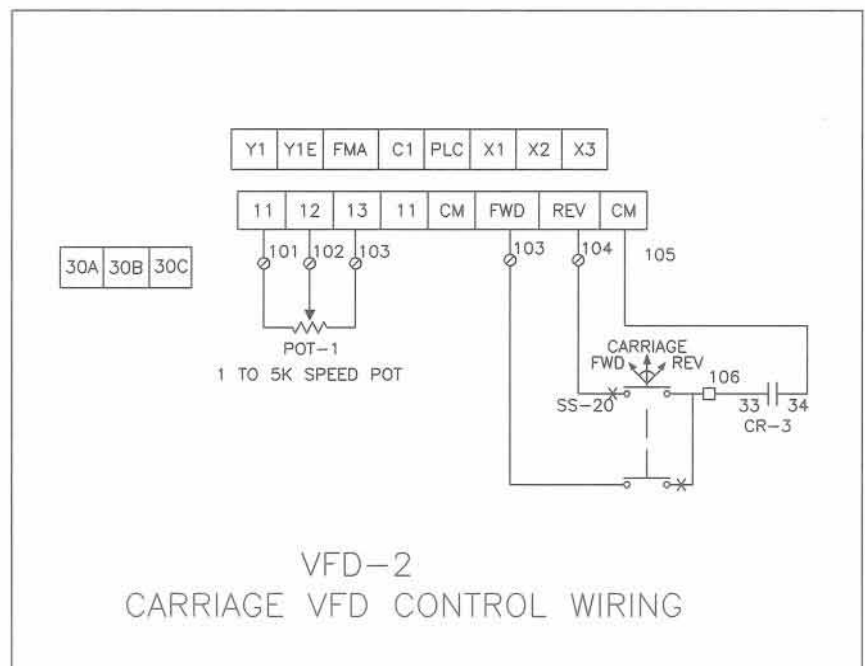
AF300 MICRO-SAVER DRIVES THRU FRAME #399



VFD PARAMETERS	
F2 =	1
F6 =	.62
F7 =	.62
F8 =	0

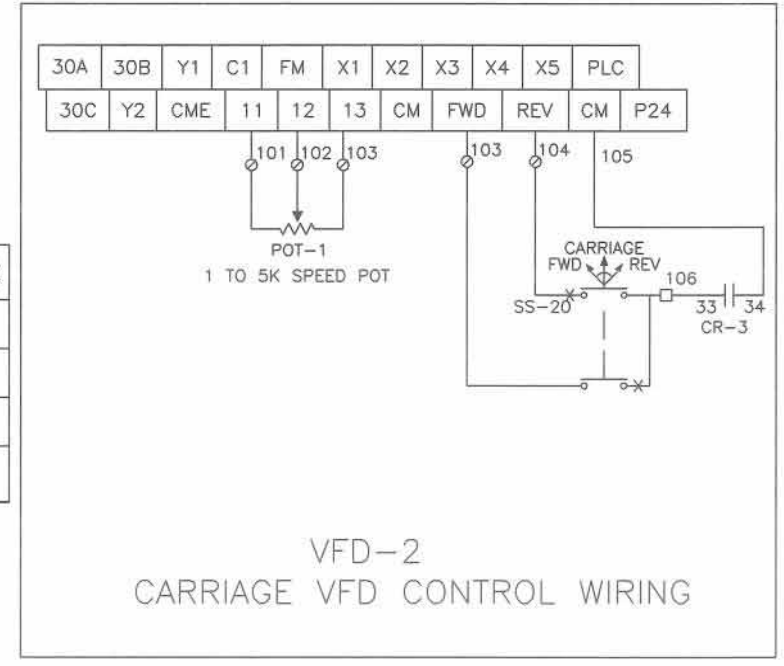
CARRIAGE DRIVE ENABLE

AF300 MINI DRIVES FRAME #492 ONWARD



VFD PARAMETERS	
F1 =	1
F2 =	1
F7 =	.62
F8 =	.62
F9 =	0
P03 =	8.5

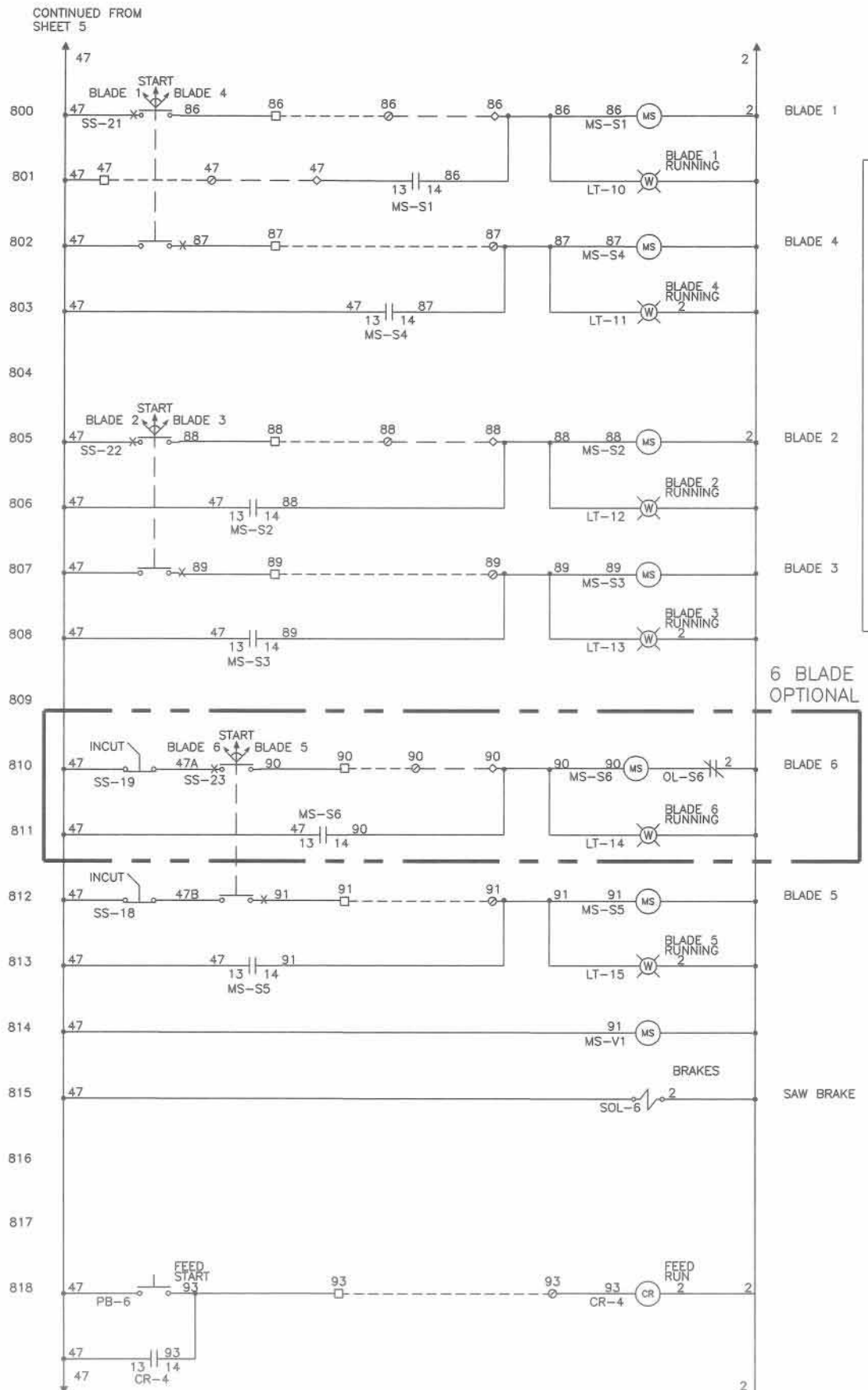
AF300 E11 DRIVES FRAME #400 THRU #491



VFD PARAMETERS	
F1 =	1
F2 =	1
F7 =	.62
F8 =	.62
F9 =	0
P03 =	8.5

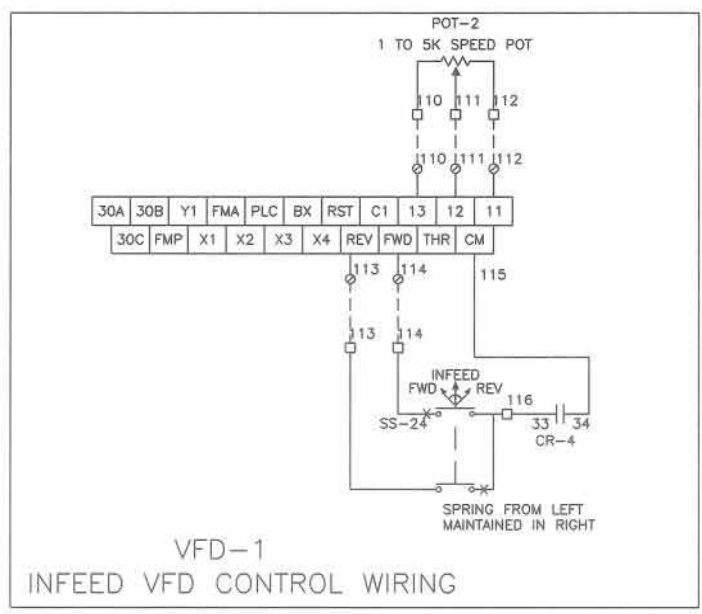
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A	X	X	X	X	X	

ITEM	QTY.	PART NAME	MATERIAL AND/ OR DESCRIPTION	LENGTH	CODE	DWG. NO./PART NO.
DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED: FRACTIONS ± [1/32] DECIMALS ± [0.01] ANGLES ± [°]			THIS DRAWING AND/OR DATA SHEET, AND THE CONFIDENTIAL PROPRIETARY INFORMATION THEREON, IS PROPERTY OF MITEK INDUSTRIES, INC. AND IS NOT TO BE REPRODUCED OR COPIED IN WHOLE OR IN PART, OR USED FOR UNAUTHORIZED MANUFACTURING OR ANY OTHER EXPLOITATION OF THE ITEM DISCLOSED THEREIN, OR IN ANY OTHER WAY DISCLOSED OR USED FOR FURNISHING INFORMATION.			
FEATURES			MiTek Industries, Inc. 4203 SHORELINE DRIVE, EARTH CITY, MO. 63045			
APPROVED	DATE	DRAWN	DATE	FRESH PAINT	SCALE	PAGE
						7 of 16
ELECTRICAL SCHEMATIC						90124
SMARTSET						W



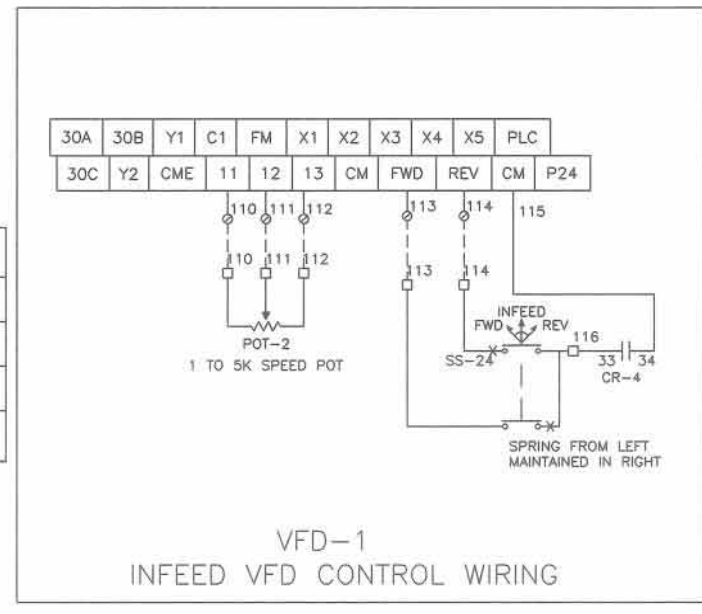
NOTES: 9) RUNGS 810-813 OMIT IF BLADES 5 AND/OR 6 ARE NOT INSTALLED

AF300 MICRO-SAVER DRIVES THRU FRAME #399



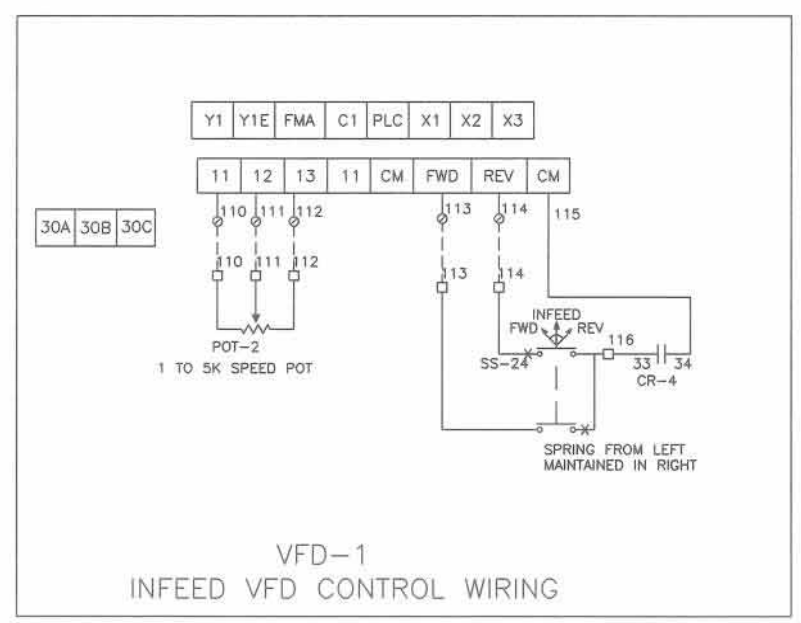
VFD PARAMETERS	
F2 =	1
F6 =	.62
F7 =	.62
F8 =	0

AF300 E11 DRIVES FRAME #400 THRU #491



VFD PARAMETERS	
F1 =	1
F2 =	1
F7 =	.62
F8 =	.62
F9 =	0
P03 =	8.5

AF300 MINI DRIVES FRAME #492 ONWARD

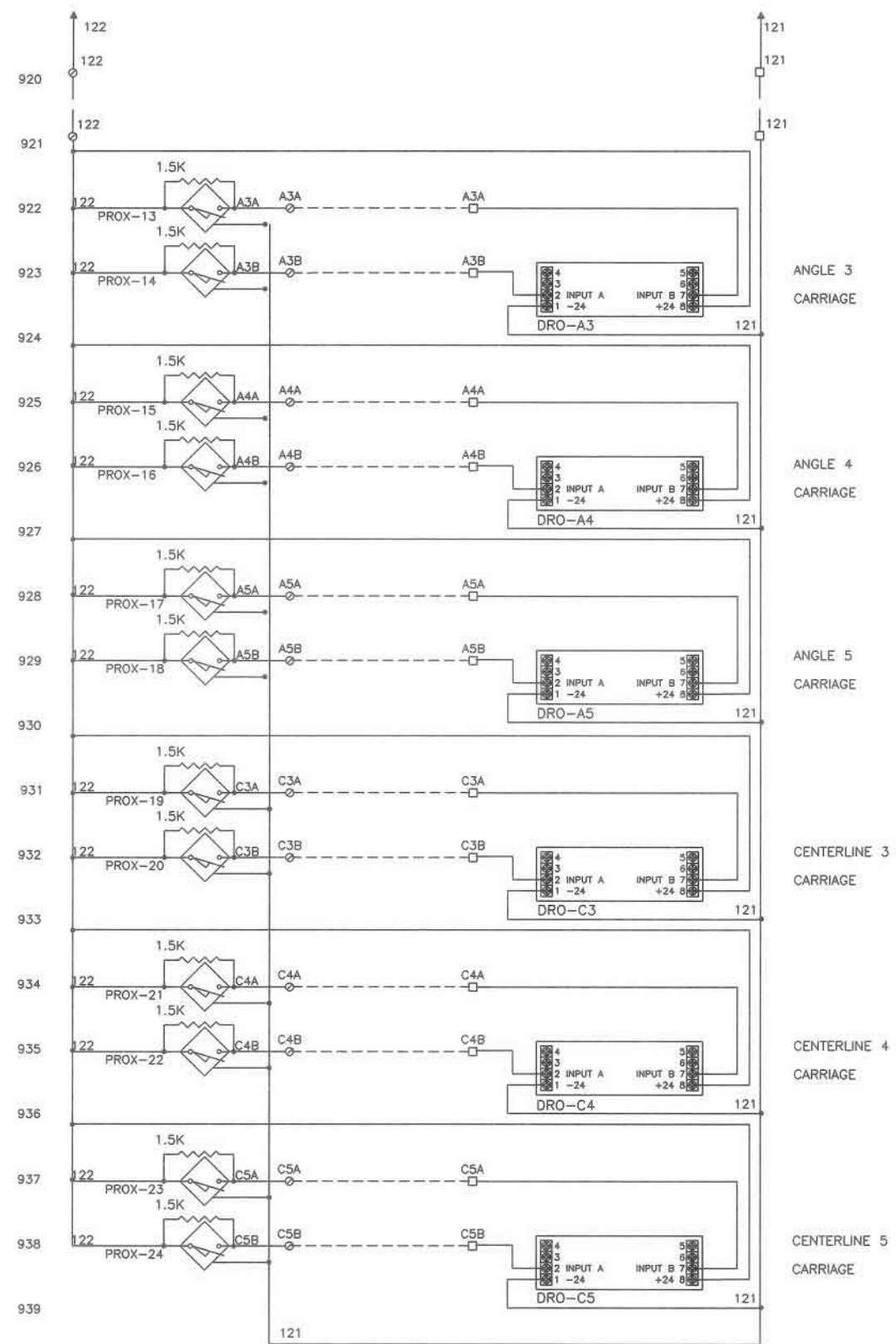
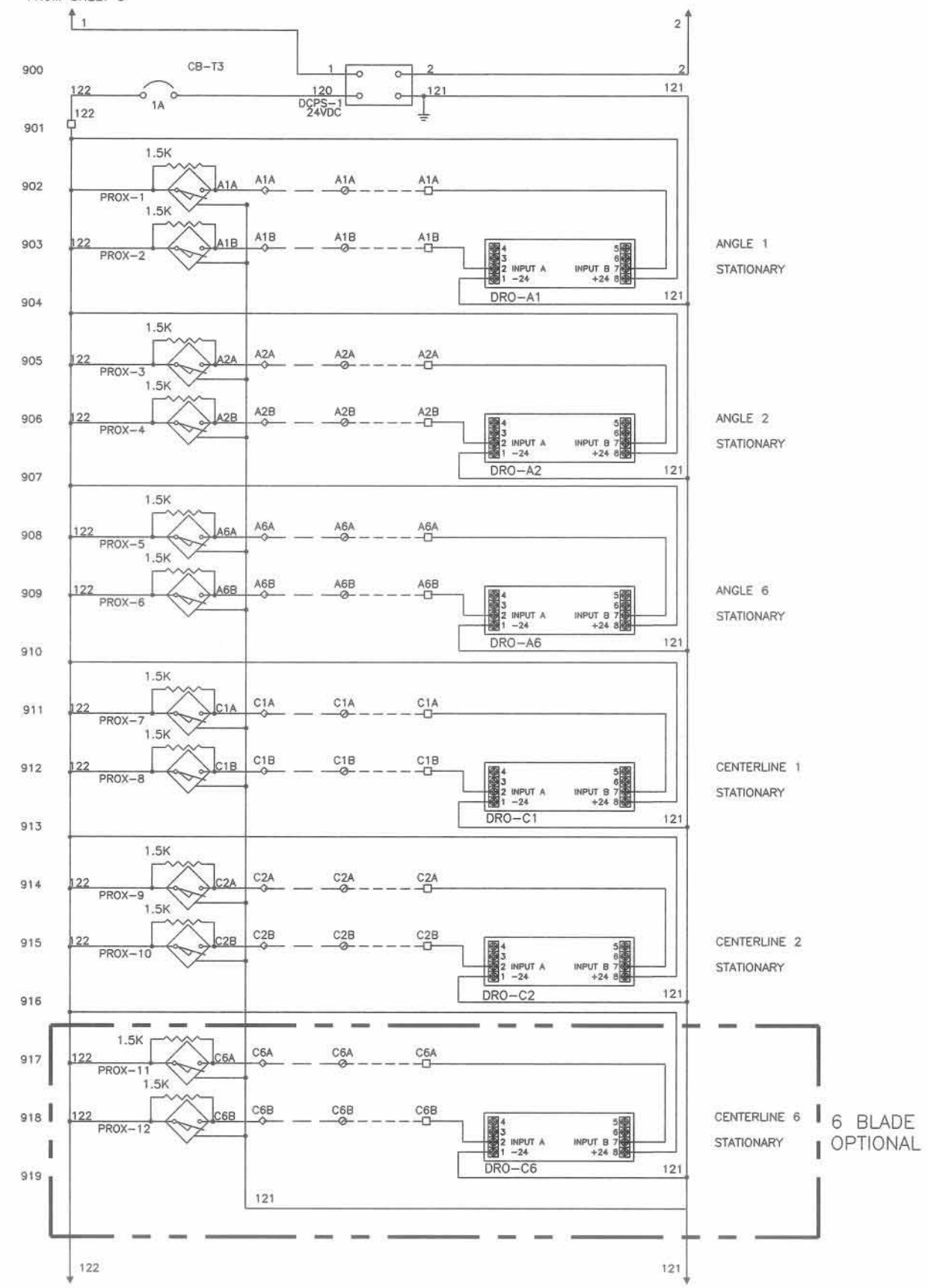


VFD PARAMETERS	
F1 =	1
F2 =	1
F7 =	.62
F8 =	.62
F9 =	0
P03 =	8.5

A	X	X	X	X	X
KEY	NO. OF HOLES	DIA.	DEPTH	DIA.	DEPTH
		HOLE		TAP	

ITEM	QTY.	PART NAME	MATERIAL AND/OR DESCRIPTION	LENGTH	CODE	DWG. NO./PART NO.
<small>DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED: FRACTIONS ± [1/32] DECIMALS ± [0.10] ANGLES ± [1°] TOTAL RUNOUT ± [] MACHINED SURFACES NOT SPECIFIED []</small>						
<small>"THIS DRAWING AND/OR DATA SHEET, AND THE CONFIDENTIAL PROPRIETARY INFORMATION THEREON, IS PROPERTY OF MITEK INDUSTRIES, INC. AND IS NOT TO BE REPRODUCED OR COPIED IN WHOLE OR IN PART, OR USED FOR UNAUTHORIZED MANUFACTURING OR ANY OTHER EXPLOITATION OF THE ITEM DISCLOSED THEREIN, OR IN ANY OTHER WAY DISCLOSED OR USED FOR FURNISHING INFORMATION."</small>						
ELECTRICAL SCHEMATIC						
APPROVED	DATE	REV	SMARTSET			
CHECKED	DATE	DRAWN	DATE	FINISH PAINT	SCALE	PAGE
JDC	1/25/98	HOSHIELD	1/25/98	X	NONE	8 of 16
90124						W

110 VAC
1-PHASE 60HZ
FROM SHEET 5



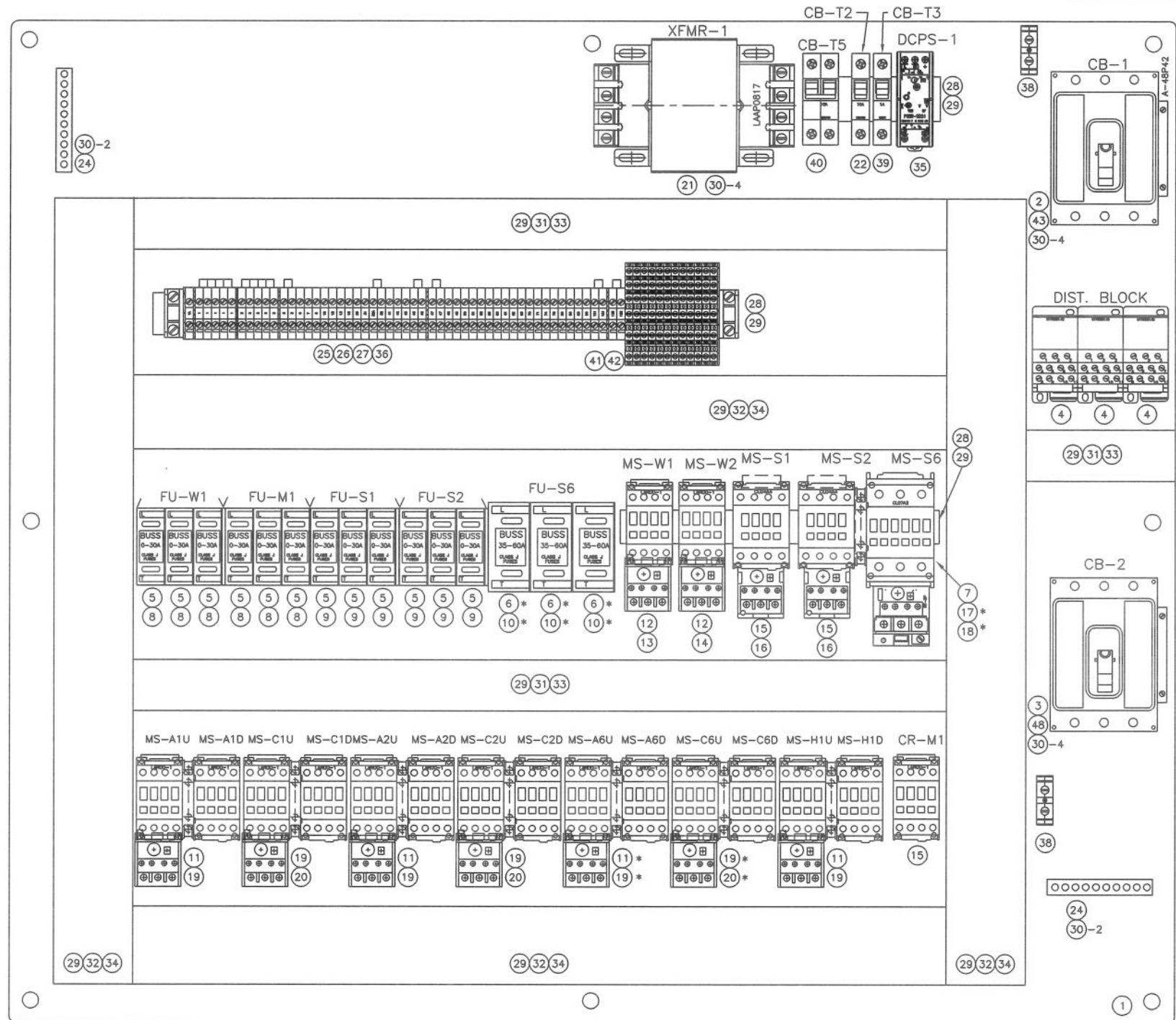
SCALE FACTOR FOR ANGLES 1 - 4 IS 0.9389
SCALE FACTOR FOR ANGLES 5 & 6 IS 0.6575
SCALE FACTOR FOR ALL CENTERLINES IS 1.0
1.5K RESISTORS ARE PROVIDED WITH ITEM #64

6 BLADE
OPTIONAL

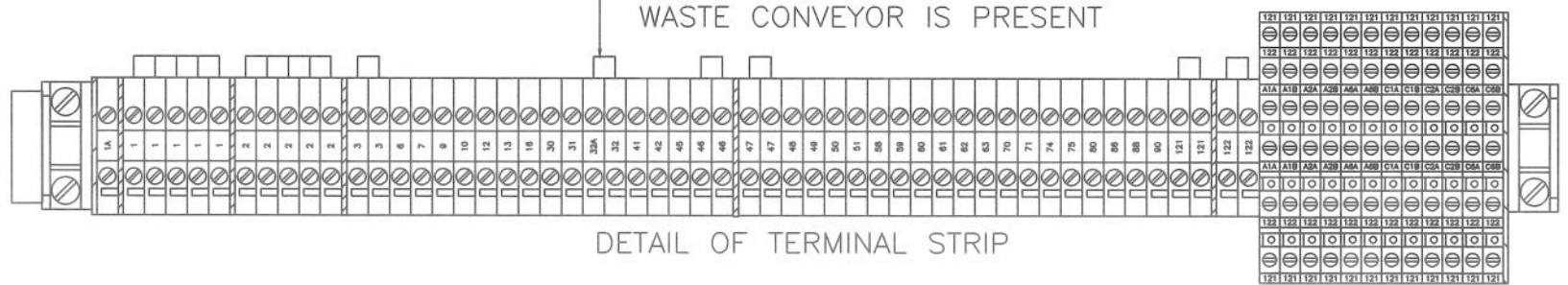
ITEM	QTY.	PART NAME	MATERIAL AND/OR DESCRIPTION	LENGTH	CODE	DWG. NO./PART NO.
DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED: FRACTIONS ± <u>1/32</u> DECIMALS ± <u>0.010</u> ANGLES ± <u>1°</u> TOTAL RUNOUT ± <u>0.005</u> MACHINED SURFACES NOT SPECIFIED <u>RV</u>						
THIS DRAWING AND/OR DATA SHEET, AND THE CONFIDENTIAL PROPRIETARY INFORMATION THEREON, IS PROPERTY OF MITEK INDUSTRIES, INC. AND IS NOT TO BE REPRODUCED OR COPIED IN WHOLE OR IN PART, OR USED FOR UNAUTHORIZED MANUFACTURING OR ANY OTHER EXPLOITATION OF THE ITEM DISCLOSED THEREIN, OR IN ANY OTHER WAY DISCLOSED OR USED FOR FURNISHING INFORMATION.						
FEATURES ELECTRICAL SCHEMATIC			MiTek Industries, Inc. 4203 SHORELINE DRIVE, EARTH CITY, MO. 63045			
APPROVED	DATE	BY	SMARTSET			
CHECKED	DATE	BY	SCALE	PAGE	DASH NO.	REV.
VDC	1/26/98	HOSHIELD	X	NONE	9 of 15	90124 W

KEY	NO. OF HOLES	DIA.	DEPTH	DIA.	DEPTH	REMARKS
A	X	X	X	X	X	

- 10) ALL QUANTITIES ARE GIVEN FOR A 6-BLADED SAW. IF BLADE 5 AND/OR BLADE 6 ARE NOT INSTALLED, THE QUANTITIES FOR ITEMS 3, 6, 10, 11, 17, 18, 19, 20, 64, 67, 70, 71, 72, 80, AND 81 WILL NEED ADJUSTMENT
- 11) OMIT ALL ITEMS MARKED WITH AN ASTERISK (*) IF BLADE 6 IS NOT INSTALLED
- 12) CONNECT ALL DEVICE GROUND WIRES TO THE SINGLE POINT GROUND TERMINAL STRIP (ITEM #24)



NOTE:
REMOVE E-STOP CIRCUIT JUMPER IF
OPTIONAL INTEGRATED INCLINED
WASTE CONVEYOR IS PRESENT



STATIONARY END CONTROL PANEL

REV.	DATE	DESCRIPTION	BY	CHK'D	APP'D	DATE
------	------	-------------	----	-------	-------	------

43	2 EA	AUX. CONTACT	CUTLER HAMMER #A1X1RTK			P	512849
42	1 EA	END BARRIER	ENTRELEC#116771.20			P	518242
41	12 EA	TERMINAL BLOCK	ENTRELEC#115541.11			P	518231
40	1 EA	BRKR,2P,10A,UL/CSA	ALTECH #2DU10			P	516610
39	1 EA	BRKR,1P,1A,UL/CSA	ALTECH #1DU1			P	516603
38	2 EA	TERM,BLCK,GND-WR	ENTRELEC #165111.14			P	518244
37	1 EA	TERMINAL,MARKER,CYBER JR	ENTRELEC #RC610			P	518335
36	3 EA	JUMPER,BAR,10-POLE	ENTRELEC #168.973.07			P	518143
35	1 EA	PWR,SPPLY,24VDC ,1.7A	IDEC #PS5R-SD24			P	504524
34	11 FT	COVER,DUCT 3"	PANDUIT #C3 LG6			P	510150
33	6 FT	COVER,DUCT 2"	PANDUIT #C2 LG6			P	510152
32	11 FT	WIRING,DUCT	PANDUIT #E3 x 3LG6			P	510147
31	6 FT	WIRING,DUCT	PANDUIT #E2 x 3LG6			P	510142
30	20 EA	SCREW RDHD MACH	#10-32x3/8		MTG HDWR	P	341103
29	50 EA	RIVET 5/32"	POP #ABA53			P	390005
28	5 FT	MOUNTING,RAIL,DIN	IDEC #BND-1000			P	146122
27	2 EA	END,STOP	ENTRELEC #199408.02,			P	518192
26	6 EA	END,SECTION	ENTRELEC #118368.16			P	518234
25	53 EA	TERMINAL,BLK,FLD-FLD	ENTRELEC #115116.07			P	518223
24	2 EA	GROUNDING,BAR	SQUARE-D #PK-15-GTA			P	504382
23							
22	1 EA	BRKR,1P,10A,UL/CSA	ALTECH #1DU10			P	516608
21	1 EA	T'FORMR,1KVA,PR1230/SEC115	CH #CE1000K5EFS			P	509168
20	3 EA	RELAY,OVERLOAD,1.0-1.5A	GE #RT1G			P	514142
19	7 EA	MTR-STARTER,9A,REVERSING	GE #LAR00AJ			P	509210
18	1 EA	RELAY,OVERLOAD,24-32A	GE #RT2D			P	514176
17	1 EA	MTR-STARTER,62A,NON-REV	GE #CL07A311MJ			P	509224
16	2 EA	RELAY,OVERLOAD,14.5-18A	GE #RT1S			P	514160
15	3 EA	MTR-STARTER,32A,NON-REV	GE #CL04A310MJ			P	509219
14	1 EA	RELAY,OVERLOAD,1.8-2.7A	GE #RT1J			P	514146
13	1 EA	RELAY,OVERLOAD,2.5-4.1A	GE #RT1K			P	514148
12	2 EA	MTR-STARTER,10A,NON-REV	GE #CL00A310TJ			P	509211
11	4 EA	OVERLOAD,.65-1.1A AUT/MAN	GE #RT1F			P	509316
10	3 EA	FUSE,50A	BUSS #LPJ-50SP			P	516494
9	6 EA	FUSE,25 A	BUSS #LPJ-25SP			P	516491
8	6 EA	FUSE,15 A	BUSS #LPJ-15SP			P	516489
7	1 EA	CNTCT,BLK,NO,FRONT-MTD	GE #BCLF10			P	513823
6	3 EA	FUSE,BLOCK,30-60A,TYPE J	BUSS #JTN60060			P	516555
5	12 EA	FUSE,BLOCK,0-30A,TYPE J	BUSS #JTN60030			P	516554
4	3 EA	DISTRIBUTION BLOCK,BRU250	ENTRELEC #0179657.15			P	518205
3	1 EA	CIRCUIT,BREAKER,80A	CUTLER HAMMER #EHD3080L			P	516405
2	1 EA	CIRCUIT,BREAKER,150A	CUTLER HAMMER #FDB3150L			P	516406
1	1 EA	PANEL,45x39	HOFFMAN #A-48P42			P	519165

DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED:
 FRACTIONS ± [1/32] DECIMALS ± [0.010] ANGLES ± [T]
 TOTAL RUNOUT ± [] MACHINED SURFACES NOT SPECIFIED [R]

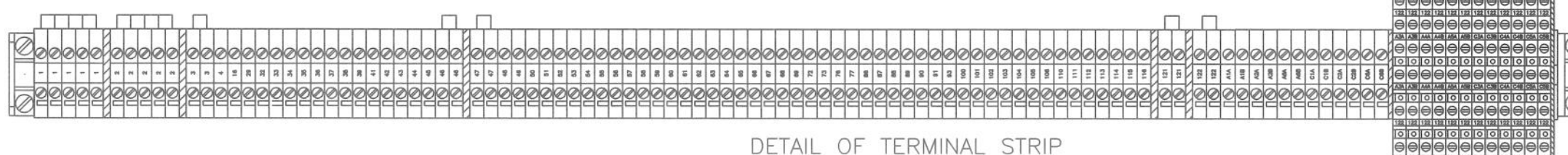
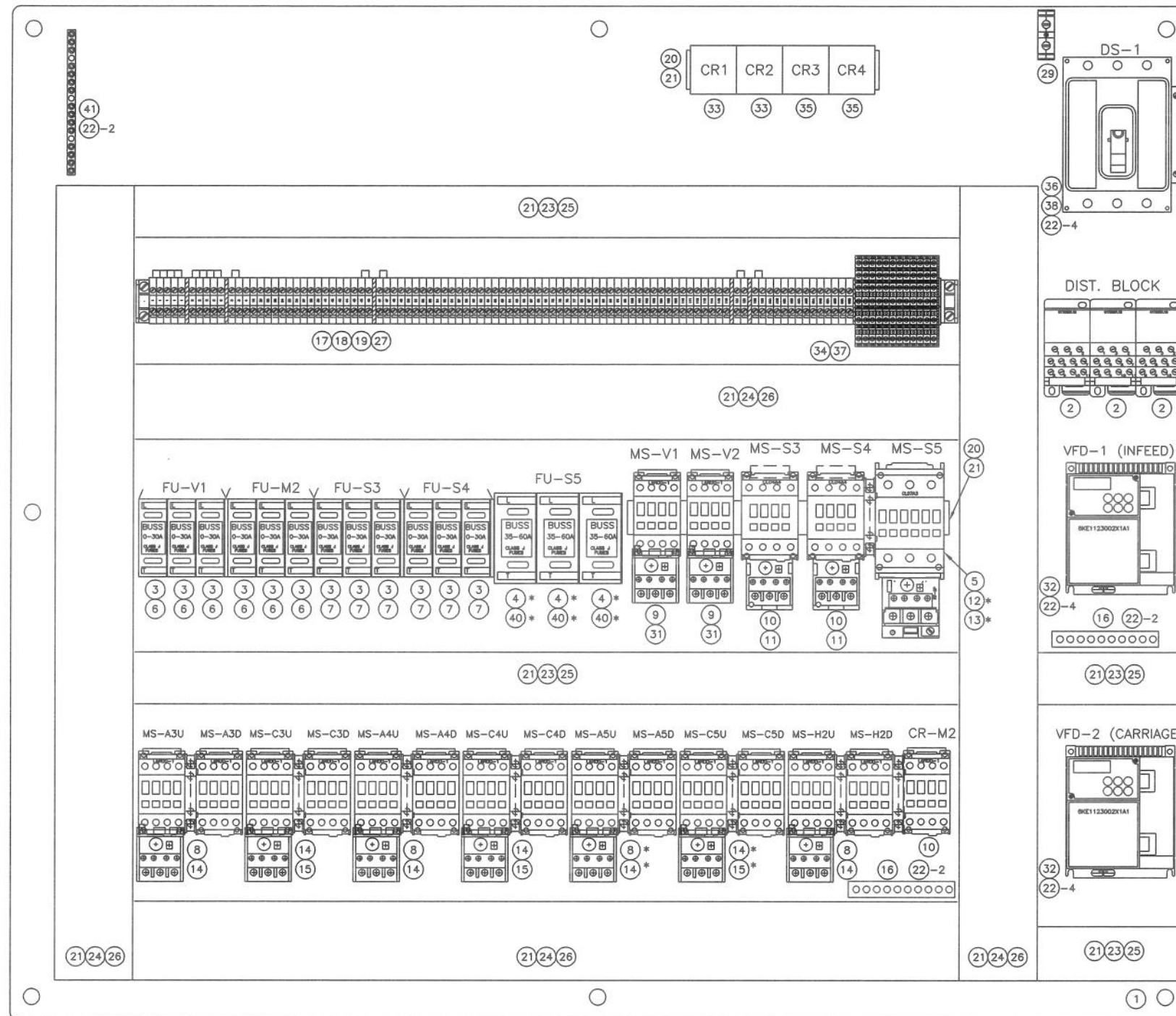
FEATURES: STA END CNTRL ENCLSR MiTek Industries, Inc. 4203 SHORELINE DRIVE, EARTH CITY, MO. 63045

APPROVED	DATE	DESIGN	DATE	FINISH PRINT	SCALE	PAGE	DASH NO.	REV.
						10 of 16	90124	502 W

NOTES:

- 1) OMIT ALL ITEMS MARKED WITH AN ASTERISK (*) IF BLADE 5 IS NOT INSTALLED
- 2) CONNECT ALL DEVICE GROUND WIRES TO THE SINGLE POINT GROUND TERMINAL STRIP (ITEM #24)

REV.	DATE	DESCRIPTION	BY	CHK'D	APP'D	DATE
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DETAIL OF TERMINAL STRIP

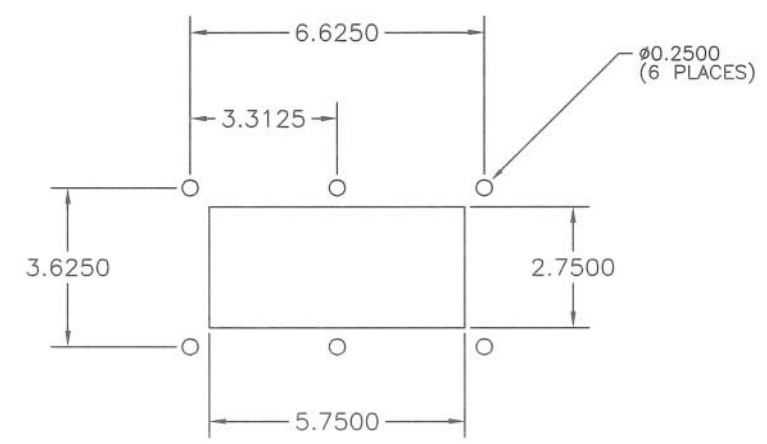
CARRIAGE END CONTROL PANEL

ITEM	QTY.	PART NAME	MATERIAL AND/OR DESCRIPTION	LENGTH	CODE	DWG. NO./PART NO.
41	1 EA	GROUNDING BAR	SQUARE-D #PK-15-GTA		P	504382
40	3 EA	FUSE, 50A, 600V, TYPE-J	BUSS #LPJ-50SP		P	516494
39						
38	1 EA	AUX. CONTACT	CUTLER HAMMER #A1X1RTK		P	512849
37	1 EA	END BARRIER	ENTRELEC #116771.20		P	518242
36	1 EA	MOLDED CASE SWITCH, 100A	CUTLER HAMMER #EHD3100KL		P	516417
35	2 EA	RELAY	GE #RL4RA031TJ		P	514197
34	12 EA	TERMINAL BLOCK	ENTRELEC #115541.11		P	518231
33	2 EA	RELAY	GE #RL4RA022TJ		P	514188
32	2 EA	VFD, 2HP, 230VAC, 3PH, 7.0A	GE #D7215		P	509764
31	2 EA	RELAY, OVERLOAD	GE #RT1M		P	514152
30						
29	1 EA	TERM. BLCK, GND-WR	ENTRELEC #165111.14		P	518244
28	1 EA	TERMINAL, MARKER, CYBER JR	ENTRELEC #RC610		P	518335
27	2 EA	JUMPER, BAR, 10-POLE	ENTRELEC #168.973.07		P	518143
26	11 FT	COVER, DUCT 3"	PANDUIT #C3 LG6		P	510150
25	6 FT	COVER, DUCT 2"	PANDUIT #C2 LG6		P	510152
24	11 FT	WIRING, DUCT	PANDUIT #E3 x 3LG6		P	510147
23	6 FT	WIRING, DUCT	PANDUIT #E2 x 3LG6		P	510142
22	20 EA	SCREW RDHD MACH	#10-32x3/8	MTG HDWR	P	341103
21	50 EA	RIVET 5/32"	POP #ABA53		P	390005
20	5 FT	MOUNTING, RAIL, DIN	IDEC #BND-1000		P	146122
19	2 EA	END, STOP	ENTRELEC #199408.02,		P	518192
18	6 EA	END, SECTION	ENTRELEC #118368.16		P	518234
17	95 EA	TERMINAL, BLK, FLD-FLD	ENTRELEC #115116.07		P	518223
16	2 EA	GROUNDING BAR	SQUARE-D #PK 9 GTA		P	504230
15	3 EA	RELAY, OVERLOAD, 1.0-1.5A	GE #RT1G		P	514142
14	7 EA	MTR-STARTER, 9A, REVERSING	GE #LAR00AJ		P	509210
13	1 EA	RELAY, OVERLOAD, 24-32A	GE #RT2D		P	514176
12	1 EA	MTR-STARTER, 62A, NON-REV	GE #CL07A311MJ		P	509224
11	2 EA	RELAY, OVERLOAD, 14.5-18A	GE #RT1S		P	514160
10	3 EA	MTR-STARTER, 32A, NON-REV	GE #CL04A310MJ		P	509219
9	2 EA	MTR-STARTER, 10A, NON-REV	GE #CL00A310TJ		P	509211
8	4 EA	OVERLOAD, .65-1.1A AUT/MAN	GE #RT1F		P	509316
7	6 EA	FUSE, 25 A	BUSS #LPJ-25SP		P	516491
6	6 EA	FUSE, 15 A	BUSS #LPJ-15SP		P	516489
5	1 EA	CNTCT, BLK, NO, FRONT-MTD	GE #BCLF10		P	513823
4	3 EA	FUSE, BLOCK, 30-60A, TYPE J	BUSS #JTN60060		P	516555
3	12 EA	FUSE, BLOCK, 0-30A, TYPE J	BUSS #JTN60030		P	516554
2	3 EA	DISTRIBUTION BLOCK, BRU250	ENTRELEC #0179657.15		P	518205
1	1 EA	PANEL, 45x39	HOFFMAN #A-48P42		P	519165

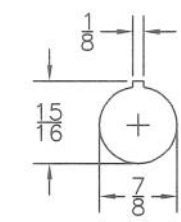
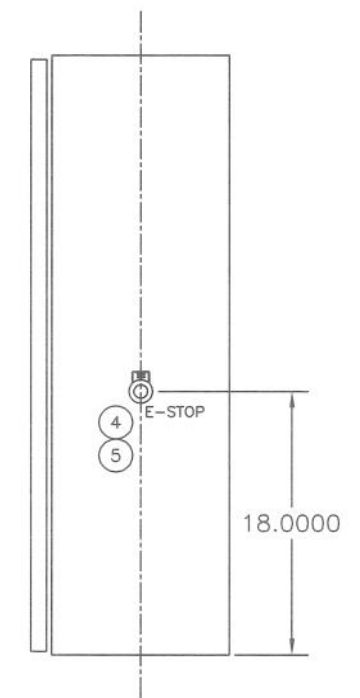
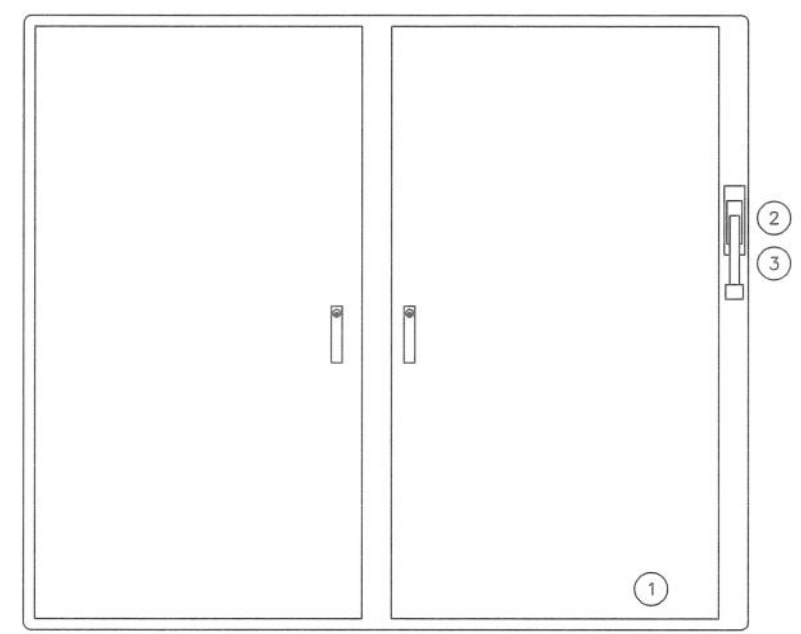
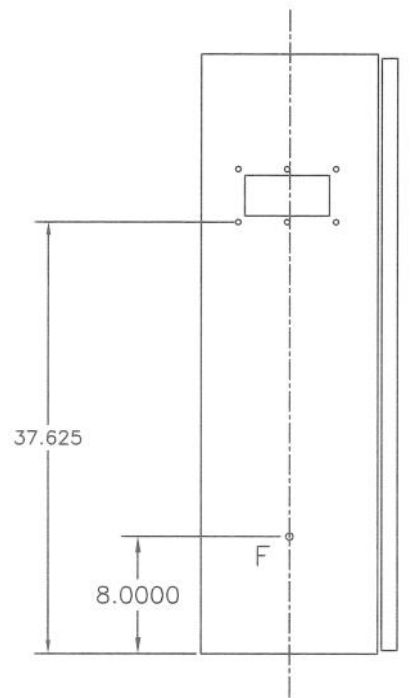
L I I L I I L I I N

DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED:
 FRACTIONS ± (1/32) DECIMALS ± (.010) ANGLES ± (1°)
 TOTAL RUNOUT ± () MACHINED SURFACES NOT SPECIFIED ()
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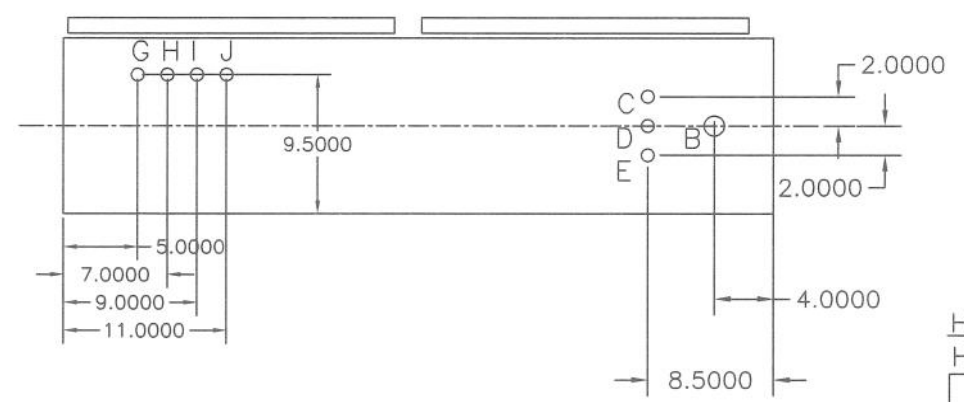
FEATURES: CRG END CNTRL ENCLSR
 MiTek Industries, Inc. 4203 SHORELINE DRIVE, EARTH CITY, MO. 63045
 APPROVED: DATE: 12/25/09 MFG. DATE: 1/26/10
 CHECKED: DATE: 1/26/10 DRAWN: HOSHILED SCALE: NONE PAGE: 11 of 16 DASH NO.: 90124 REV: 504 W



DETAIL OF DUCT MOUNT DRILLING



HOLE PATTERN OF E-STOP PUSH BUTTON



HOLE LEGEND:

HOLE	USE	SIZE
A	INCOMING POWER	1-1/8"
B	END TO END POWER	1/2"
C	PULL SWITCH	1/2"
D	WASTE CONVEYOR	1/2"
E	INCLINE CONVEYOR	1/2"
F	AIR PRESSURE SWITCH	1/2"
G	X	1/2"
H	X	1/2"
I	X	1/2"
J		1/2"

ITEM	QTY.	PART NAME	MATERIAL AND/OR DESCRIPTION	LENGTH	CODE	DWG. NO./PART NO.
6	1 EA	STAT,ELEC,PANEL	SEE PAGE 10		M	90124-502
5	1 EA	CNTCT,BLK,1NO	GE #P9B10VN		P	513649
4	1 EA	OPER,PB,MSHRM-HD,RED	GE #P9CET4RN1		P	513656
3	1 EA	DOOR,HARDWARE,3-POINT	WESTINGHOUSE #HDH-3R		P	512807
2	1 EA	DOOR,HANDLE,MECH,FLEXSHAFT	WESTINGHOUSE #F2S03		P	509417
1	1 EA	STAT,ENCLOSURE,42x49,2-DR	QUALITY FABRICATORS		P	90339-501

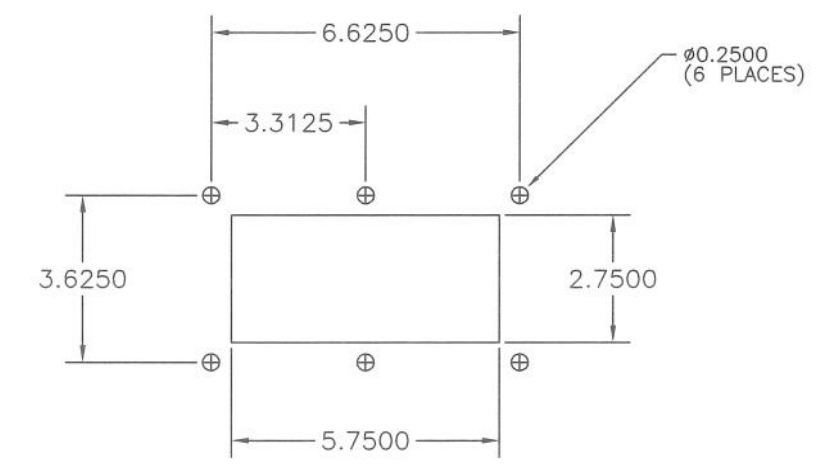
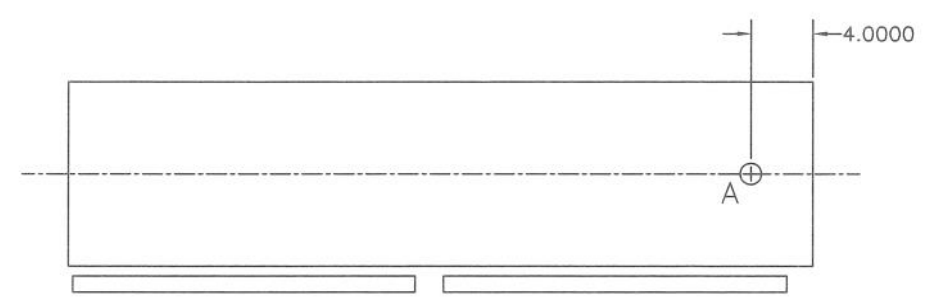
DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED:
 FRACTIONS ± $\frac{1}{32}$ DECIMALS ± $\frac{0.010}{10}$ ANGLES ± 1°
 TOTAL RUNOUT ± $\frac{0.005}{10}$ MACHINED SURFACES NOT SPECIFIED $\frac{0.005}{10}$

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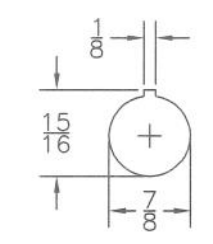
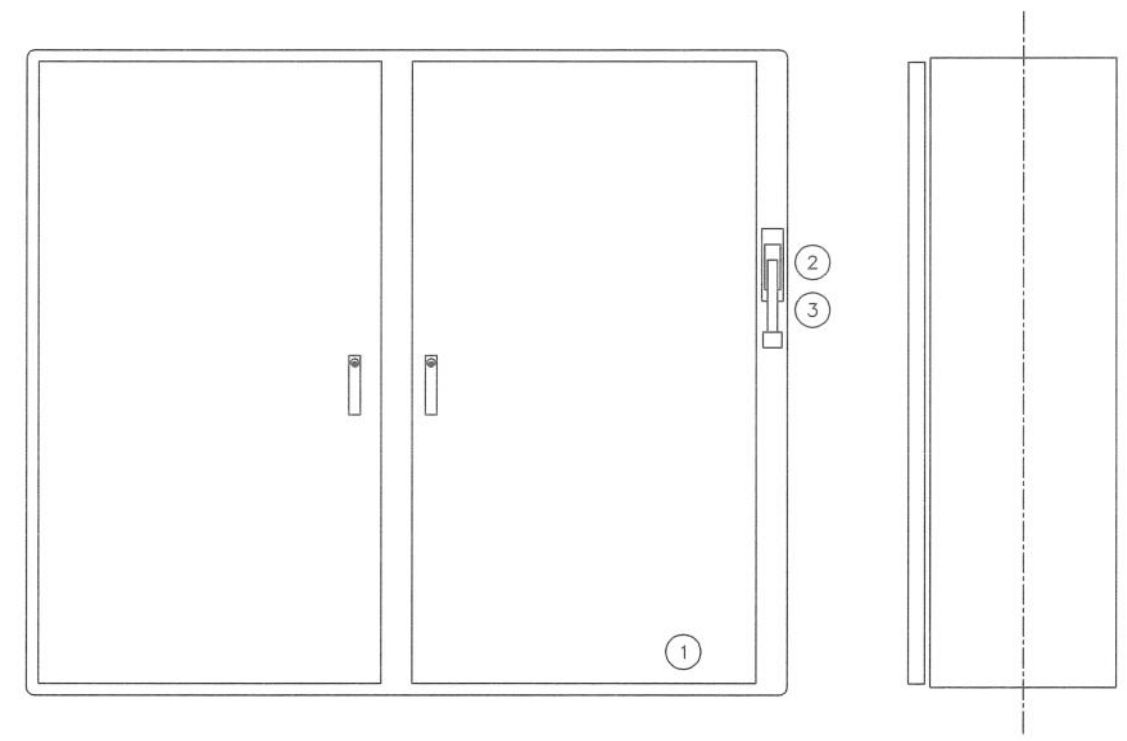
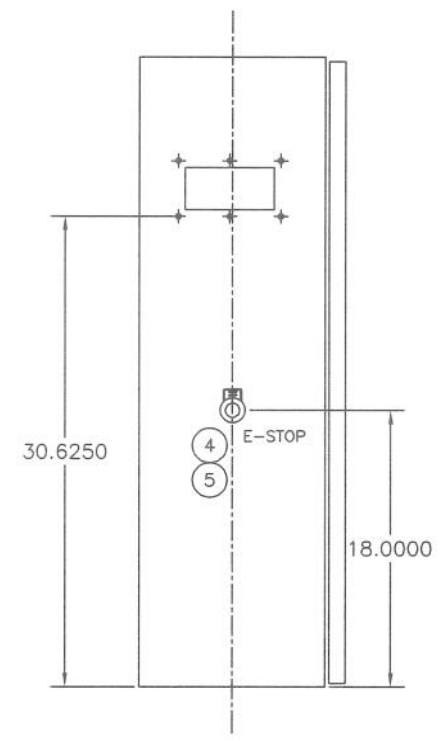
STATIONARY ENCLOSURE **SMARTSET**

APPROVED: _____ DATE: 1/26/98
 CHECKED: JDC DATE: 1/22/98 DRAWN: HOSHIELD DATE: 1/26/98 FINISH PAINT: X SCALE: NONE PAGE: 12 of 16 DASH NO.: 90124 REV.: 501 W

MiTek Industries, Inc.
 4203 SHORELINE DRIVE, EARTH CITY, MO. 63045



DETAIL OF DUCT MOUNT DRILLING



HOLE PATTERN OF E-STOP PUSH BUTTON



HOLE LEGEND:

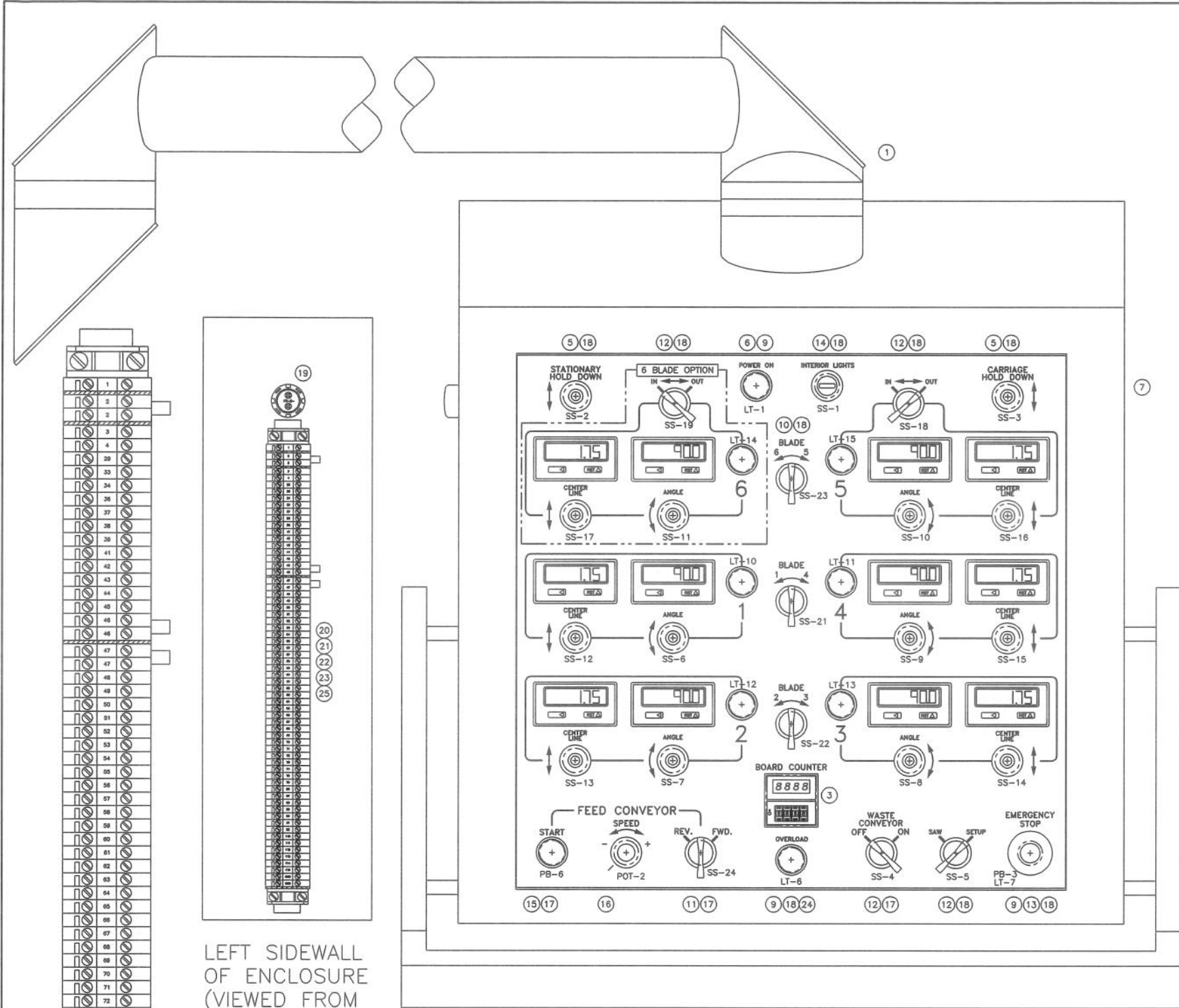
HOLE	USE	SIZE
A	X	1-1/8"
B	CARRIAGE DRIVE MOTOR	1/2"
C	CARRIAGE BRAKE SOLENOID	1/2"
D	BOARD COUNTER	1/2"

ITEM	QTY.	PART NAME	MATERIAL AND/ OR DESCRIPTION	LENGTH	CODE	DWG. NO./PART NO.
6	1 EA	CARR,ELEC,PANEL	SEE PAGE 11		M	90124-504
5	1 EA	CNTCT,BLK,1NO	GE #P9B10VN		P	513649
4	1 EA	OPER,PB,MSHRM-HD,RED	GE #P9CET4RN1		P	513656
3	1 EA	DOOR,HARDWARE,3-POINT	WESTINGHOUSE #HDH-3R		P	512807
2	1 EA	DOOR,HANDLE,MECH,FLEXSHAFT	WESTINGHOUSE #F2S03		P	509417
1	1 EA	CARR,ENCLOSURE,42x49,2-DR	QUALITY FABRICATORS		P	90339-502

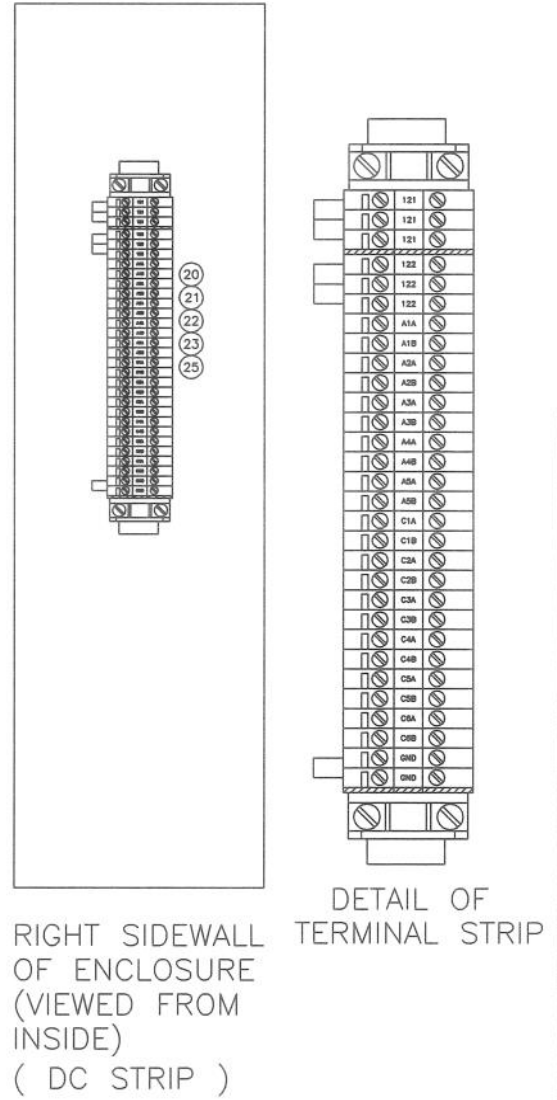
DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED:
 FRACTIONS ± [1/32] DECIMALS ± [0.010] ANGLES ± [1°]
 TOTAL RUNOUT ± [] MACHINED SURFACES NOT SPECIFIED []

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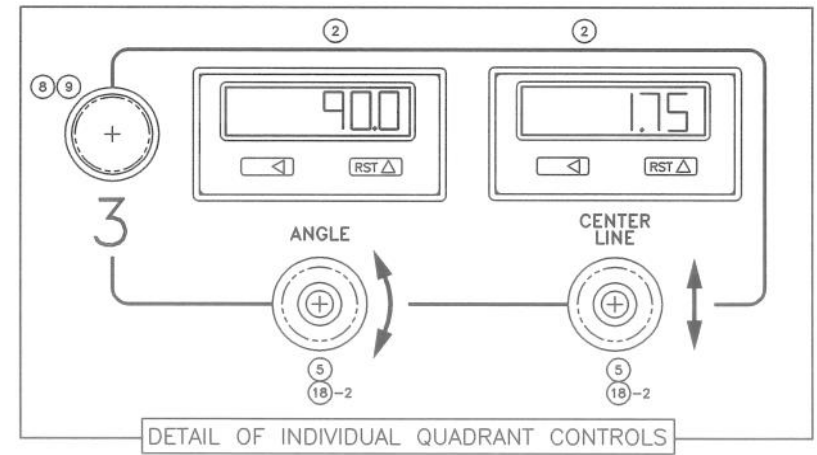
FEATURES: CARRIAGE ENCLOSURE MiTek Industries, Inc. 4203 SHORELINE DRIVE, EARTH CITY, MO. 63045



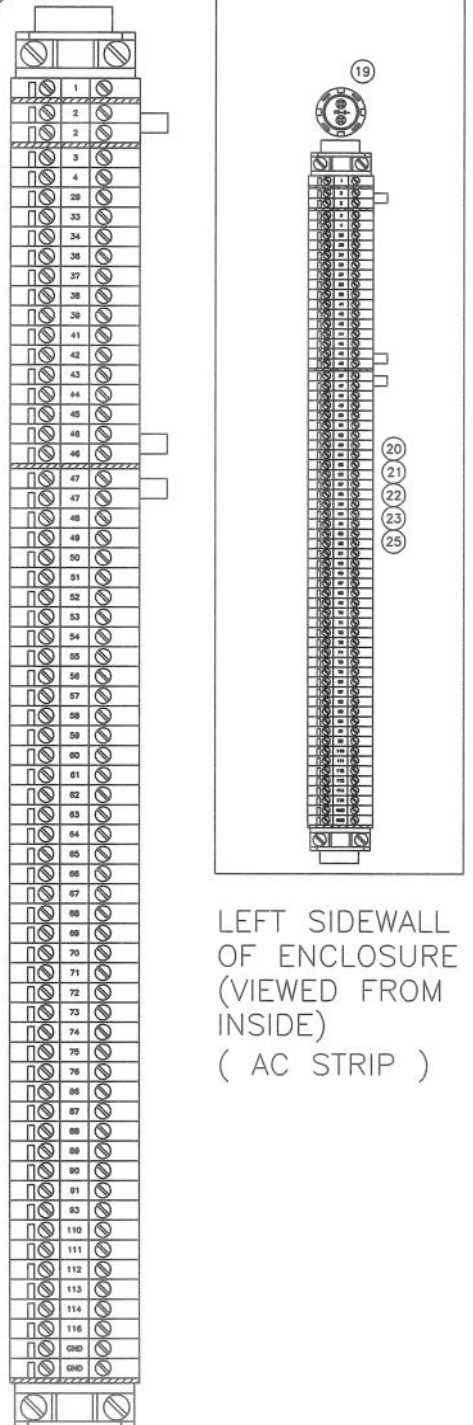
LEFT SIDEWALL OF ENCLOSURE (VIEWED FROM INSIDE)
(AC STRIP)



RIGHT SIDEWALL OF ENCLOSURE (VIEWED FROM INSIDE)
(DC STRIP)



DETAIL OF INDIVIDUAL QUADRANT CONTROLS



DETAIL OF TERMINAL STRIP

ITEM	QTY.	PART NAME	MATERIAL AND/ OR DESCRIPTION	LENGTH	CODE	DWG.NO./PART NO.
25	8 EA	TERM,BLK,JUMPER	ENTR #115215.12		P	518233
24	1 EA	LIGHT,RED LENS	GE #P9CLRD		P	513647
23	5 FT	MOUNTING,RAIL,DIN	IDEC #BND-1000		P	146122
22	4 EA	END,STOP	ENTRELEC #199408.02,		P	518192
21	6 EA	END,SECTION	ENTRELEC #118368.16		P	518234
20	96 EA	TERMINAL,BLK,FLD-FLD	ENTRELEC #115116.07		P	518223
19	1 EA	HORN (BEEPER)	MALLORY #64F328		P	504083
18	35 EA	CONTACT,BLOCK,1NO/1NC	GE #P9B11VN		P	513651
17	3 EA	CONTACT,BLOCK,1-N.O.	GE #P9B10VN		P	513649
16	1 EA	POTENTIOMETER,1K,1/2W	GE #CR104PXP01		P	507056
15	1 EA	BUTTON,GREEN,FLUSH	GE #P9CPNNG		P	513641
14	1 EA	P-BUTTON,TOGGLE,2-POS,MAINT	GE #P9CCD		P	513786
13	1 EA	PUSH-BUTTON,RED,MUSHROOM	GE #P9CET4RL1		P	513654
12	4 EA	SWITCH,2-POS, MAINTAINED	GE #P9CSMD0N		P	513644
11	1 EA	SELECTOR,3-POS,LEFT-SPRING	GE #P9CSVU1N		P	513826
10	3 EA	SELECTOR,SW.,3POS,SPRING RET	GE #P9CSVU3N		P	513665
9	9 EA	LIGHT,120VAC	GE #P9PTNWJ		P	513652
8	6 EA	LIGHT,WHITE LENS	GE #P9CLBD		P	513648
7	1 EA	CONTROL,STAT,ARTWORK,SS	SEE DRAWING	(MWA)	P	E78607
6	1 EA	LIGHT,GREEN LENS	GE #P9CLVD		P	513646
5	15 EA	JOYSTICK,3-POS	GE #P9CMN2T		P	513824
4	1 EA	RELAY,SOCKET,11PINS	IDEC #SR3P-05		P	146117
3	1 EA	COUNTER,TOTALIZER	SYRELEC #11014P V1R		P	524035
2	12 EA	COUNTER,BACKLITE	VEEDER,ROOT #A103-002		P	524039
1	1 EA	ASSY,SWINGARM/COMP-ENCL/HINGE	SEE DRAWING	(MWA)	M	519663

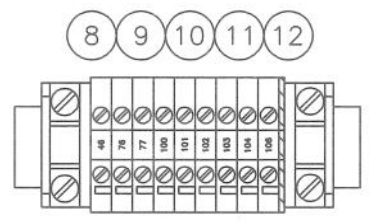
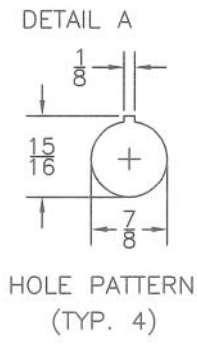
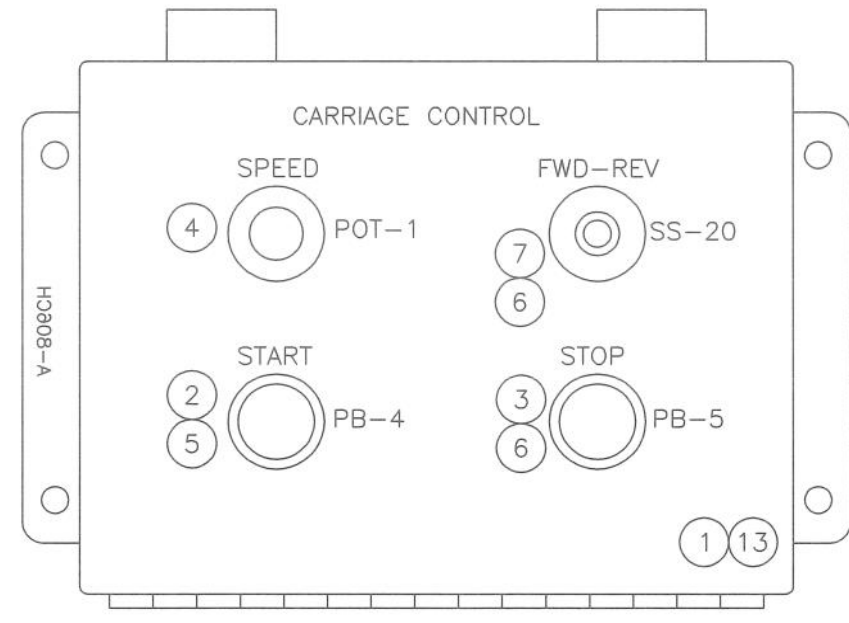
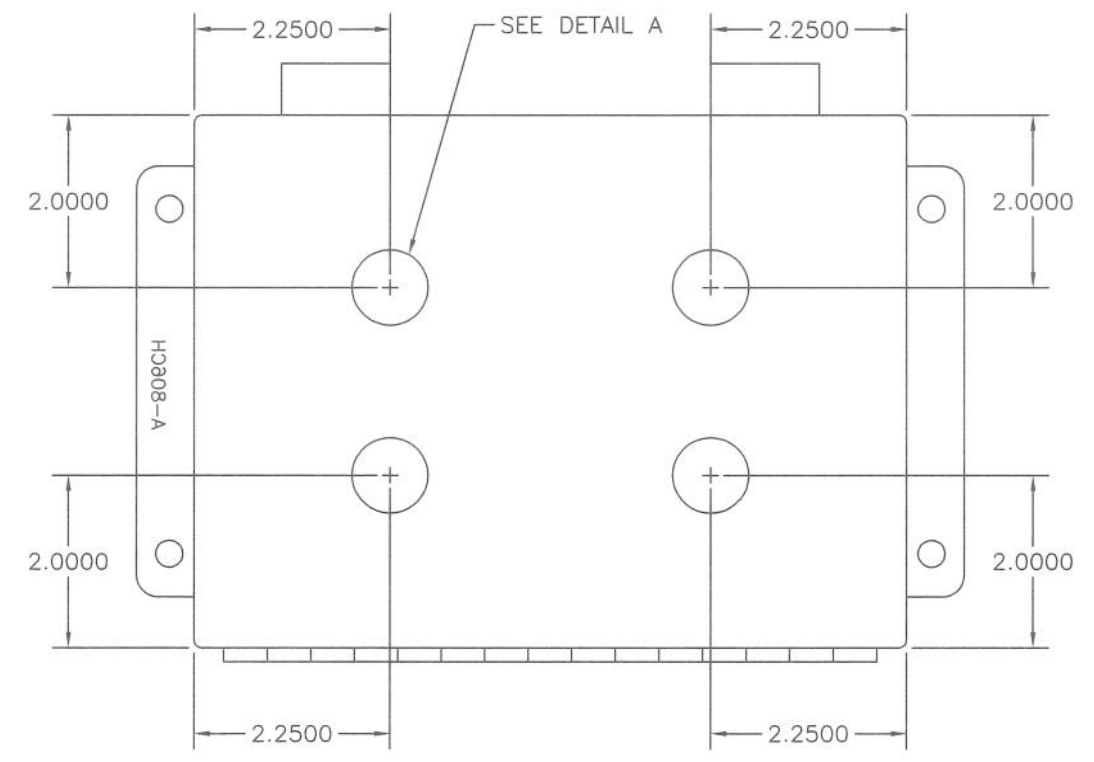
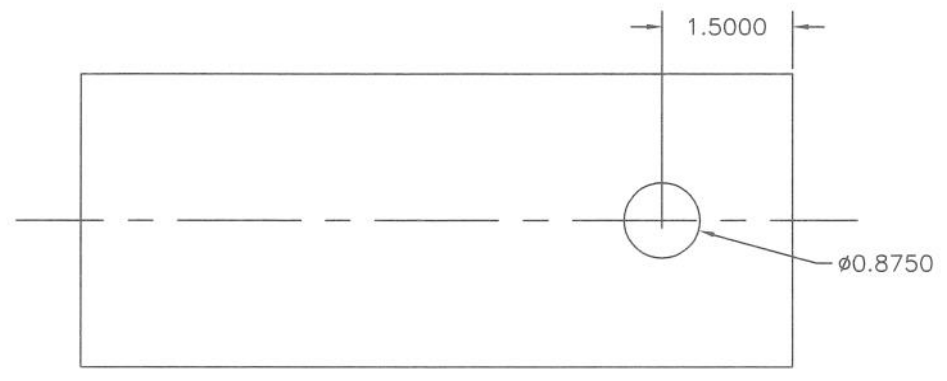
①

DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED:
 FRACTIONS ± 1/32 DECIMALS ± .010 ANGLES ± 1°
 TOTAL RUNOUT ± .005 MACHINED SURFACES NOT SPECIFIED ± .005

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FEATURES: MAIN CNTRL STATION MiTek Industries, Inc. 4203 SHORELINE DRIVE, EARTH CITY, MO. 63045

APPROVED: DATE: 1/28/98 MFG. DATE: 1/28/98 SMARTSET SCALE: NONE PAGE: 14 of 16 DASH NO.: 90124 REV.: 505 W



ITEM	QTY.	PART NAME	MATERIAL AND/OR DESCRIPTION	LENGTH	CODE	DWG. NO./PART NO.
13	1 EA	PANEL	HOFFMAN #A-8P6		P	519561
12	2 EA	RIVET 5/32"	POP #ABA53		P	390005
11	0.4 FT	MOUNTING, RAIL, DIN	IDEC #BND-1000		P	146122
10	2 EA	END, STOP	ENTRELEC #199408.02,		P	518192
9	1 EA	END, SECTION	ENTRELEC #118368.16		P	518234
8	9 EA	TERMINAL, BLK, FLD-FLD	ENTRELEC #115116.07		P	518223
7	1 EA	JOYSTICK, 3-POS	GE #P9CMN2T		P	513824
6	2 EA	CONTACT, BLOCK, 1NO/1NC	GE #P9B11VN		P	513651
5	1 EA	CONTACT, BLOCK, 1-N.O.	GE #P9B10VN		P	513649
4	1 EA	POTENTIOMETER	GE #P9CX		P	513787
3	1 EA	BUTTON, RED, EXTENDED	GE #P9CPNRS		P	513642
2	1 EA	BUTTON, GREEN, FLUSH	GE #P9CPNNG		P	513641
1	1 EA	ENCLOSURE, CONT, HING	HOFFMAN #A-8066CH		P	519543

DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED:
 FRACTIONS ± $\frac{1}{32}$ DECIMALS ± $\frac{0.010}{10}$ ANGLES ± $\frac{1}{2}$
 TOTAL RUNOUT ± $\frac{1}{16}$ MACHINED SURFACES NOT SPECIFIED $\frac{1}{16}$

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FEATURES: CRG CNTRL STATION
 MiTek Industries, Inc.
 4203 SHORELINE DRIVE, EARTH CITY, MO. 63045

APPROVED: [Signature] DATE: 1/26/98
 CHECKED: [Signature] DATE: 1/26/98
 DRAWN: HOSHIELD
 SMARTSET
 SCALE: NONE
 PAGE: 15 of 16
 DASH NO.: 90124
 REV.: 506
 W

16/30 AC (END-TO-END)

1A	BLACK
1	BLACK/BLUE
2	BROWN
3	RED
16	RED/BLACK
32	RED/ORANGE
37	UNUSED
41	RED/BLUE
42	ORANGE
45	ORANGE/RED
46	ORANGE/YELLOW
47	ORANGE/BLUE
48	ORANGE/BLACK
49	YELLOW
50	YELLOW/RED
51	YELLOW/ORANGE
58	YELLOW/BLUE
59	YELLOW/BLACK
60	BLUE
61	BLUE/RED
62	BLUE/ORANGE
63	BLUE/YELLOW
70	BROWN/RED
71	BROWN/ORANGE
74	BROWN/BLUE
75	BROWN/BLACK
86	BLACK/RED
88	BLACK/ORANGE
90	BLACK/YELLOW
NOT USED	BLUE/BLACK

16/30 AC (CONTROL CABLE 1)

1	BLACK
2	BROWN
3	RED
4	RED/BLACK
29	RED/ORANGE
35	RED/YELLOW
36	RED/BLUE
37	ORANGE
38	ORANGE/RED
39	ORANGE/YELLOW
40	ORANGE/BLUE
41	ORANGE/BLACK
42	YELLOW
43	YELLOW/RED
44	YELLOW/ORANGE
45	YELLOW/BLUE
46	YELLOW/BLACK
47	BLUE
48	BLUE/RED
49	BLUE/ORANGE
50	BLUE/YELLOW
51	BLUE/BLACK
52	BROWN/RED
53	BROWN/ORANGE
54	BROWN/BLUE
55	BROWN/BLACK
56	BLACK/RED
57	BLACK/ORANGE
58	BLACK/YELLOW
59	BLACK/BLUE

16/30 AC (CONTROL CABLE 2)

60	RED
61	RED/BLACK
62	RED/ORANGE
63	RED/YELLOW
64	RED/BLUE
65	ORANGE
66	ORANGE/RED
67	ORANGE/YELLOW
68	ORANGE/BLUE
69	ORANGE/BLACK
70	YELLOW
71	YELLOW/RED
72	YELLOW/ORANGE
73	YELLOW/BLUE
74	YELLOW/BLACK
75	BLUE
86	BLUE/RED
87	BLUE/ORANGE
88	BLUE/YELLOW
89	BLUE/BLACK
90	BROWN/RED
91	BROWN/ORANGE
93	BROWN/BLUE
110	BROWN/BLACK
111	BLACK
112	BLACK/RED
113	BLACK/ORANGE
114	BLACK/YELLOW
116	BLACK/BLUE
GND	BROWN

16/10

46
76
77
100
101
102
103
104
106
GND

CARRIAGE CONTROL ENCLOSURE
to CARRIAGE ENCLOSURE.

7 PAIR SHIELDED DC (END-TO-END)

121	WHITE/BROWN
122	BROWN/WHITE
A1A	RED/YELLOW
A1B	YELLOW/RED
A2A	BLUE/RED
A2B	RED/BLUE
A6A	ORANGE/WHITE
A6B	WHITE/ORANGE
C1A	BLUE/WHITE
C1B	WHITE/BLUE
C2A	GREEN/WHITE
C2B	WHITE/GREEN
C6A	GRAY/WHITE
C6B	WHITE/GRAY

GROUND SHIELDED WIRE TO TERMINAL STRIP
ON STATIONARY END.

GROUND SHIELDED STRAP TO GROUND BAR
ON CARRIAGE END.

DC CONTROL CABLE/15 PAIR SHIELDED (GND AT CARRIAGE END)

121	24V-	GREEN	
122	24V+	BLUE	
A1A	RED	C1A	RED
A1B	WHITE	C1B	GREEN
A2A	RED	C2A	BLACK
A2B	ORANGE	C2B	WHITE
A3A	RED	C3A	BLACK
A3B	BROWN	C3B	ORANGE
A4A	RED	C4A	BLACK
A4B	BLUE	C4B	BROWN
A5A	RED	C5A	BLACK
A5B	YELLOW	C5B	BLUE
A6A	RED	C6A	BLACK
A6B	BLACK	C6B	YELLOW

ITEM	QTY.	PART NAME	MATERIAL AND/ OR DESCRIPTION	LENGTH	CODE	DWG. NO./PART NO.
<small>DIMENSION TOLERANCES, UNLESS OTHERWISE SPECIFIED: FRACTIONS ± (1/32) DECIMALS ± (.010) ANGLES ± (°) TOTAL RUNOUT ± () MACHINED SURFACES NOT SPECIFIED ()</small>						
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FEATURES CABLE LAYOUTS						
APPROVED	DATE	MPG.	SMARTSET			
CHECKED	DATE	DRAWN	DATE	FRESH PAINT	SCALE	PAGE
		GROWERS	5/20/99	X	NONE	16 of 16
						DASH NO. REV. 90124 W