CRITTENDEN CONVERSION CORPORATION
MOSES LAKE, WASINGTON

VACUUM BRIDGE GUIDE 2003

INDEX

System Overview

The bridge guide 2003 control system has been designed to provide automatic and manual opening width changing control for upper, middle and lower bridge guide stations.

Guides are moved with three 1/4 HP motors. Variable Frequency Drives (VFD) are used to drive the motors with two different speeds low and high. Positioning feedback information comes from the hollow shaft quadrature encoders, which send impulse sequences to the Programming Logic Controller (PLC). The PLC is used for processing that sequences and providing control signals to move and stop guides at desired positions.

The blower unit with a 5 HP motor is used as a vacuum source for both vacuum chambers. Three MORE-LESS vacuum motors control the level of vacuum in the vacuum chamber. Three solenoids allow vacuum quick dump.

Operators can read and change vacuum and current position values for all stations from the Operator Interface Terminal (OIT) screen, guides may be moved using manual switches on the Main and Remote panel.

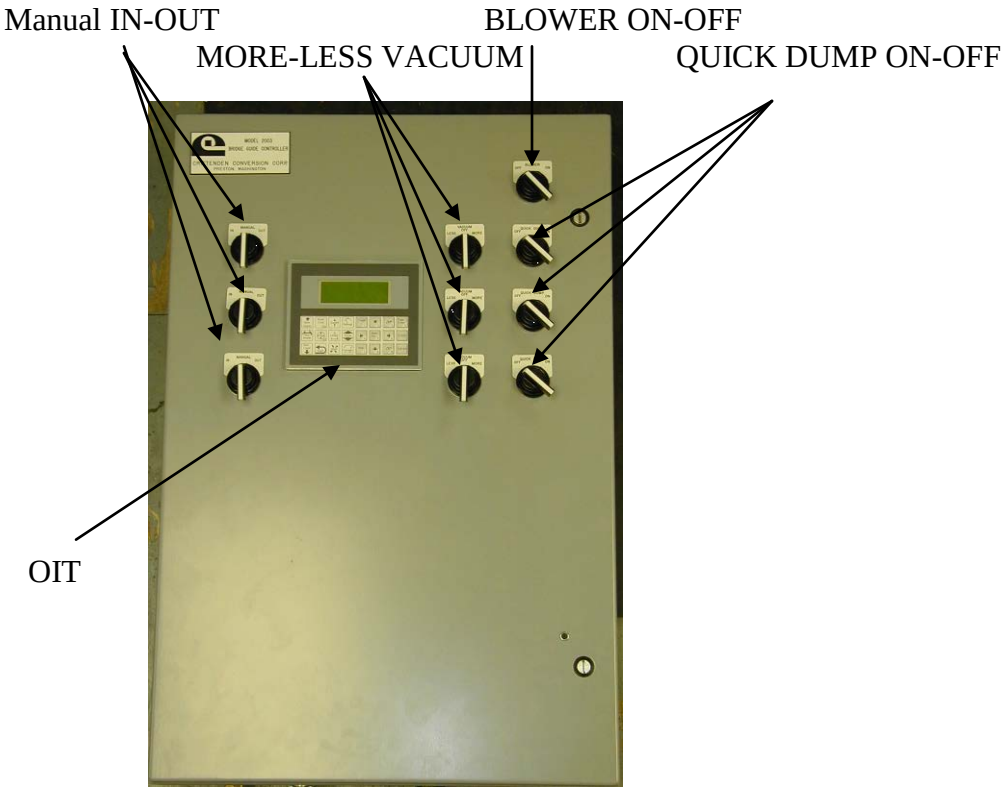


Figure 1. Main Panel front view

Two additional “Manual IN-OUT” switches locate on the opposite BLOWER side of the bridge to provide manual positioning control for the operator.

Before start

1. Connect 3 phase 480VAC from the 15 AMP source to the inputs (L1, L2, L3) mechanically activated contactor in the Main panel. Run all high voltage wires separate from the low voltage and control wires.
2. Close the panel and make sure door is closed tightly.
3. After the introduction logo message appears on the Operator Interface Terminal (OIT) screen tern “Blower ON/OFF” switch ON.
4. Check rotational direction of Blower. Swap the input two power wires if wrong.
5. Use “Manual IN/OUT” switches for all stations to move guides from the limit switches into the working area (Trip Arm is located between two limits). Check for the correct motion direction. Swap wires on the motors if wrong.
6. Guides must stop when they reach limit switches. Check limit switches (Normally Closed) and wiring if guides do not stop.

SYSTEM SETUP

1. Make sure that Guides are locating in the working area (Trip Arm is located between limit switches). If not move them manually or use “Manual IN/OUT” switches.

Attention!!! **Do not try “Move home” until you make sure that the Guides are locating between limit switches and Limit switches properly wired and tested.**

2. Push “Home” key. 

   - On the message “Home? “ Select “Yes” 

   - You can stop any time to push “Stop” key 

 or 

   - On message “Maximum width” enter measured width values for all stations
   - Push Enter 

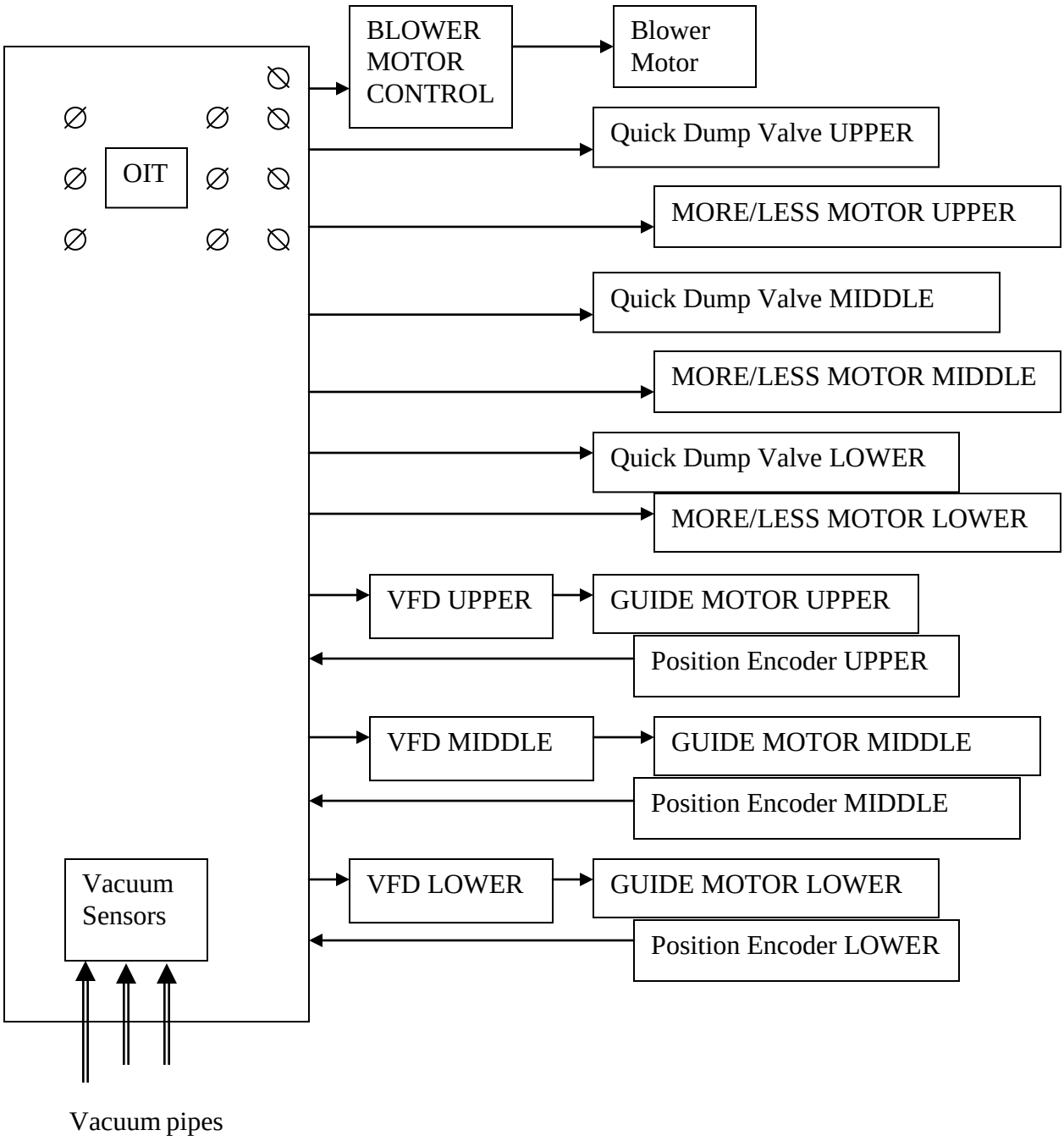
   - Push Yes 

   - On message “Minimum width” enter measured width values for all stations. Push Enter 

   - Push Yes 

3. System is ready. Numbers have saved into the memory. Switching power OFF/ON does not change them. (It is possible to lose that setting if system remains OFF for more than 6 months.)

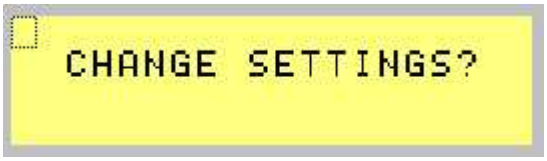
Diagram of System Configuration



Vacuum adjustment procedure

1) Push button 

On the screen you will see



2) Push 

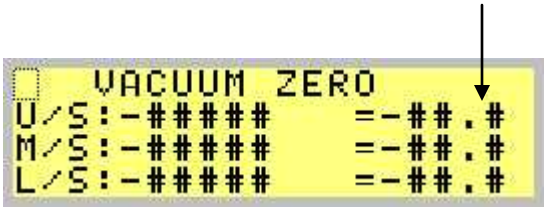
- Yes

3) Enter password 0000

Turn off Blower.

On the screen you will see

Current Vacuum Readings for Upper/Middle/Lower



4) Use 

and 

to chose Upper, Middle or Lower station

5) Use 

and 

to Increment or Decrement Zero adjustment numbers

Or Push 

and value numbers, and Push 

6) Change numbers until Current readings equal zero

7) Push 

Turn ON Blower and put paper on the vacuum chambers. Use vacuum meter gage to compare with readings.

On the screen you will see

8) 

9) Adjust slope similar with procedure described above. Use “More-Less” vacuum adjustments to set values in maximum (~15-20) and medium (~7-10).
10) Return to the previous screen and repeat ZERO adjustment if it’s necessary.

Troubleshooting

ACTION	SCREEN/SYSTEM	POSSIBLE SOURCE OF PROBLEM	SOLUTION
System power on	The OIT screen is dark and -Manual IN and OUT does not work	No power 440VAC or 110 VAC No power 24 VDC.	Check the main panel door Is it completely closed? Check 440/110 Vac. Check the fuses in the main panel. Check 24 Vdc from the power supplies in the main panel.
System power on	The OIT screen is dark and -Manual IN and OUT does work	No power to OIT.	Check wires from terminal to the OIT in the main panel.
System power on	Error message on the OIT screen	Read message and follow recommendation on the screen and HELP screen.	Read message and follow recommendation on the screen
No motion	No messages	- Corresponding Control relays failed - VFD failed	Open main panel Power up manually and check error code from the VFD display. Check corresponding relays cause of the problem.
Checking vacuum	Readings “00” does not changing when using More or Less switch Blower working properly.	There is no paper. Vacuum pipe is not on vacuum sensor or bad sensor.	Check fuse or 12 DC on the sensor’s terminals. .Install pipe or replace pipe or sensor
Start Blower	Blower starts but no vacuum	- No paper - Wrong rotational direction	- Put paper - Swap 2 input power wires
Start Blower	Blower does not start.	Overload protection relay turned off. No 460 VAC 3Phase power.	Push reset on the Blower control panel. Check 460 VAC 3 Phase power source.
Start More-Less	More-Less doe not work	No power 110 VAC from the main panel or switch or “more less” motor does not work	Check power 110 VAC from main panel to the More-less switch and to the More-less motor
Start motion	Guides move into wrong direction	Wrong 3 phase power phasing	Swap two input 3 phase power wires on the corresponding motor.
Start motion	Numbers move in wrong direction	Wrong encoder phasing	Swap A and B channel encoder wires.
Start motion	Screen show motion screen but no any motion	- Check next width numbers for out limit values. - Check VFDs for possible errors	- Reenter correct next width -Open main panel. Power up and check for error messages on VFDs.

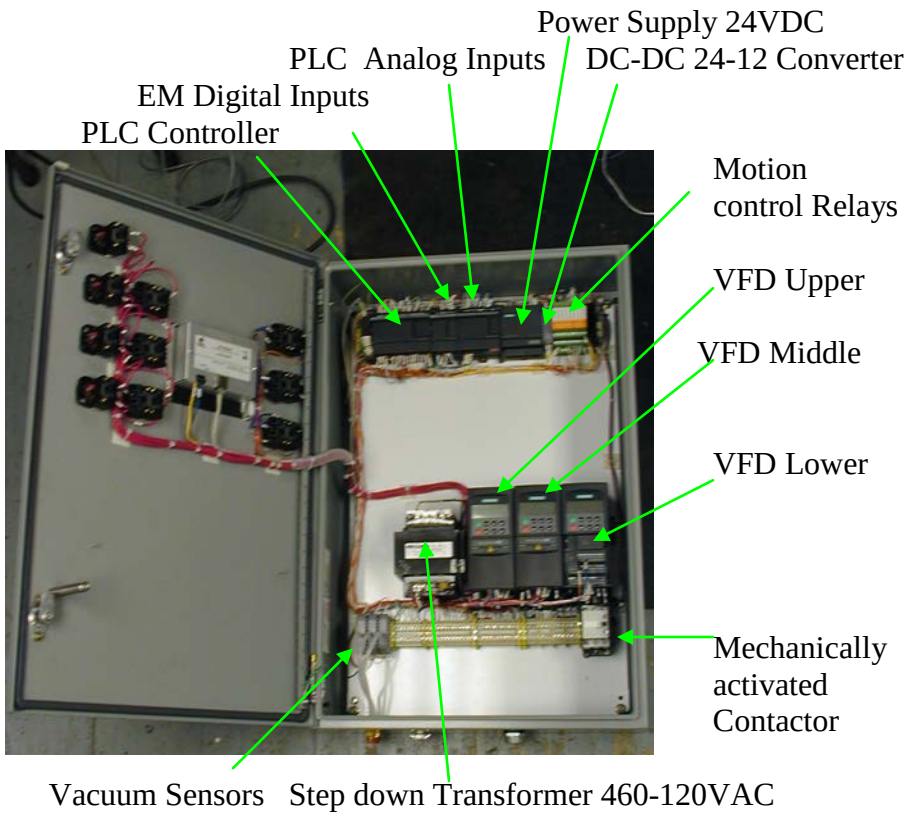


Figure 2. Main Panel inside view.

BG3 PLC DIGITAL INPUTS

	INPUTS	Device	Wires #	PLC ADDRESS
	Upper station	Upper Encoder		
1	Positioning Encoder	Ch A	A	I0.0
2	Pulses	Ch B	B	I0.1
3	Upper station Manual IN	Switch Upper Manual In/Out	1	I0.2
	Lower station Positioning Encoder	Lower Encoder		
4	Pulses	Ch A	C	I0.3
5		Ch B	D	I0.4
6	Upper station Manual OUT	Switch Upper Manual In/Out	2	I1.4
7	Lower station Manual IN	Switch Lower Manual In/Out	5	I1.3
8	Lower station Manual OUT	Switch Lower Manual In/Out	6	I1.5
9	Upper station LIMIT switch	Upper Limit switches	7	I1.2
10	Lower station LIMIT switch	Lower Limit switches	9	I0.5
11	Upper Drive Fault	VFD Upper	UF	I1.0
12	Lower Drive Fault	VFD Lower	LF	I1.1
13	N/U		N/U	
14	N/U		N/U	
1	Middle station	Ch A	E	I0.6
2	Positioning Encoder Pulses	Ch B	F	I0.7
3	Middle station Manual IN		3	I2.2

4	Middle station Manual OUT		4	I2.3
5	Middle station LIMIT switch		8	I2.4
6	Middle Drive Fault			I2.5
	N/U			
7	N/U			I2.6
8				I2.7

BG3 PLC ANALOG INPUTS

INPUTS	Device	Wires##	PLC ADRESS
Vacuum sensor Upper	Vacuum sensor UP/PLC Analog Inputs module	A+	AIW0
Vacuum sensor Lower	Vacuum sensor Low/PLC Analog Inputs module	B+	AIW2
Vacuum sensor Middle		C+	AIW4

BG3 PLC DIGITAL OUTPUTS

	OUTPUTS	**Device**	**Wires #**	**PLC ADDRESS**
1	**Upper move Out**	**Relay Uout/VFD Upper**	**UOUT**	**Q0.0**
2	Upper move IN	Relay Uin /VFD Upper	UIN	Q0.2
3	Upper slow motion	Relay Uslow/ VFD Upper	USL	Q0.4
			LOUT	Q0.1
4	**Lower move Out**	**Relay Lout/ VFD Lower**		
5	Lower move IN	Relay Lin/ VFD Lower	LIN	Q0.3
6	Lower slow motion	Relay Lslow VFD Lower	LSL	Q0.5
7	**Middle move Out**	**Relay Mout/ VFD Middle**	MOUT	Q0.6

8	**Middle** move IN	Relay Min/ VFD **Middle**	MIN	Q0.7
9	**Middle** slow motion	Relay Mslow VFD **Middle**	MSL	Q1.0
10	N/U			Q1.1

BG3 ANALOG OUTPUTS

Outputs	Control	Device	Wires##	VOLTAGE
Upper more vacuum	Upper more/less switch	Upper more/less motor	6	110VAC
Upper less vacuum	Upper more/less switch	Upper more/less motor	7	110VAC
Lower more vacuum	Lower more/less switch	Lower more/less motor	8	110VAC
Lower less vacuum	Lower more/less switch	Lower more/less motor	9	110VAC
Upper Quick dump	Upper Quick dump switch	Upper quick dump valve	10	110VAC
Lower Quick dump	Lower Quick dump Switch	Lower quick dump valve	11	110VAC
Blower ON/OFF	Blower Switch ON/OFF	Blower contactor	12	110VAC
Middle more vacuum	Middle more/less switch	Middle more/less motor		120VAC
Middle less vacuum	Middle more/less switch	Middle more/less motor		120VAC
Middle Quick dump	Middle Quick dump Switch	Middle quick dump valve		120VAC

Triple Station

System power Budget	440VAC		15 Amp source
System requirements:	Units Number	Amps per unit	Total amps
Transformer 440/110	1	0.8	0.8
VFDrives	3	2	6
Blower motor 5 hp 6.2 Amp 460VAC	1	6.2	6.2
Total (A)=			13

24VDC Power Budget	24VDC		
Power supply on CPU	**0.28 Amp**		No fuse
System requirements	Units Number	Amps per unit	Total amps
relays (outputs)	9	0.007	0.063
inputs	0	0.004	0
Extension Module 6ES7221-1BF20-0XA0	1	0.06	0.06
Extension Module EM235	1	0.06	0.06
Total (A)=			0.183

Power supply External	**1.3 Amp**		Fuse inputs 1.5 AMP
System requirements	Units Number	Amps per unit	Total amps
OIT	1	0.11	0.11
DC/DC 24/12VDC	1	0.25	0.25
CPU 224	1	0.9	0.9
Total (A)=			1.26

110VAC			
Power supply	**3.33 Amp**		FUSE 3 AMP
System requirements	Units Number	Amps per unit	Total amps
110/24 power supply	1	0.48	0.48
Blower starter	1	0.8	0.8
More\less vacuum motor	3	0.6	1.8
Quick Dump solenoid	3	0.06	0.18
Total(A)=			3.26

12 VDC			
Power supply	**1 Amp**		Fuse 1 amps
System requirements	Units Number	Amps per unit	Total amps
Encoder	3	0.025	0.075
Inputs	18	0.004	0.072
Vacuum sensor ?	3	0.01	0.03
Total (A)=			0.177

VFD PARAMETERS TABLE

Parameter	Parameter name	Range of adjustment	Default	YOURS
P01	LINE VOLTAGE	HIGH(01), LOW(02)	HIGH(01)	
P02	Carrier frequency	4kHz(01), 6kHz(02), 8kHz(03), 10kHz(04)	6kHz(02)	
P03	Start method	Normal(01),	10	
P004	Smoothing (sec)	0(0-40)	0	
P005*	Digital frequency set point (Hz)	60 (0-400)	5	
P006	Frequency set point source selection	2 Digital	0	
P007	Keypad control	0 (Front panel buttons disabled (except STOP, up and down)	1	
P009	Parameter protection setting	3 (programming –3)	0	
P011	Frequency set point memory	0	0	
P012	Minimum motor frequency (Hz)	1 (0-400)	0	
P013	Maximum motor frequency (Hz)	80 (0-400)	50	
P014	Skip frequency 1 (Hz)	0	0	
P015	Automatic restart after mains failure	0	0	
P016	Start on the fly	0	0	
P017	Smoothing type	2	1	
P018	Automatic restart after fault	0	0	
P019	Skip frequency bandwidth (Hz)	2(0-10)	2	
P020	Flying start ramp time (sec)	5	5	
P021	Minimum analogue frequency (Hz)	0.00	0.00	
P022	Max. Analogue frequency (Hz)	60.00	50.00	
P023	Analogue input function	0	0	
P024	Analogue set point addition	0	0	
P027	Skip frequency 2 (Hz)	0	0	
P028	Skip frequency 3 (Hz)	0	0	
P029	Skip frequency 4 (Hz)	0	0	
P031	Jog frequency right (Hz)	5	5	
P032	Jog frequency left (Hz)	5	5	
P041	Fixed frequency 1 (Hz)	80	5	
P042	Fixed frequency 2 (Hz)	10	10	
P043	Fixed frequency 3 (Hz)	15	15	
P044	Fixed frequency 4 (Hz)	24	20	

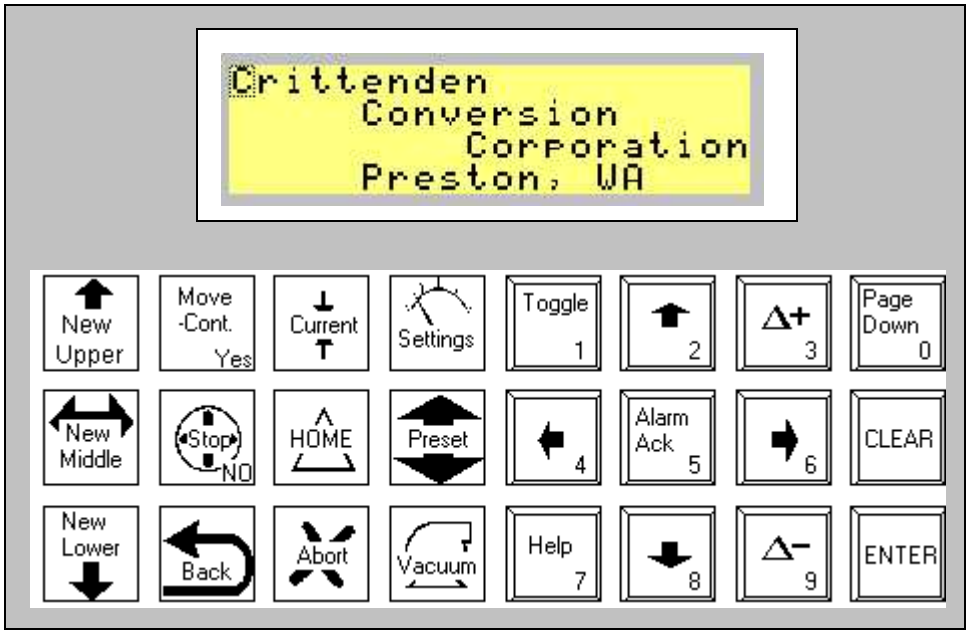
P045	Inversion fixed set point for fixed frequencies 1-4	0	0	
P046	Fixed frequency 5 (Hz)	30	25	
P047	Fixed frequency 6 (Hz)	36	30	
P048	Fixed frequency 7 (Hz)	42	35	
P050	Inversion fixed set point for fixed frequencies 5-7	0	0	
P051	Selection control function, DIN1 (terminal 5), fixed frequency 3 or binary fixed frequency bit 0	1 (ON left)	1	
P052	Selection control function, DIN2 (terminal 6), fixed frequency 2 or binary fixed frequency bit 0	2 (ON right)	1	
P053	Selection control function, DIN3 (terminal 7), fixed frequency 1 or binary fixed frequency bit 0	6 (check 12)	1	
P056	Digital input debounce time	0	0	
P061	Selection relay output RL1	9	6	
P062	Electro-mechanical brake option control	0	0	
P063	External brake release delay (second)	1	1	
P064	External brake stopping time (sec)	1	1	
P065	Current threshold for relay (A)	1	1	
P066	Compound braking	1	1	
P073	DC injection braking (%)	0	0	
P074	I^2t motor derating	1	1	
P076	Pulse frequency	4	4	
P077	Control mode	1	1	
P078	Continuous boost (%)	100	100	
P079	Starting boost (%)	0	0	
P081*	Nominal frequency for motor (Hz)	*** 60		
P082	Nominal speed for motor (RPM)	*** 1725		
P083	Nominal current for motor (A)	*** 1.0		
P084	Nominal voltage for motor (V)	*** 480		
P085	Nominal power for motor	*** 0.75		

These parameters must be set for motor used.

	(kW/hp)			
P089	Stator resistance (ohm)	*** 27.9		
P091	Serial link slave address	0	0	
P092	Serial link baud rate	6 (9600)	6	
P093	Serial link timeout (sec)	0	0	
P094	Serial link nominal system set point (Hz)	60	50	
P095	USS compatibility	0	0	
P099	Option module type	0	0	
P101*	Operation for Europe or USA	1	0	
P111	Inverter power rating (kW/hp)	Read only		
P112	Inverter type (model)	Read only		
P113	Inverter type (power rating)	Read only		
P121*	Enable/disable RUN button***	0	1	
P122*	Enable/disable forward/reverse button*	0	0	
P123*	Enable/disable JOG button	0	0	
P124	Enable/disable Up and Down	1	1	
P125	Reverse direction inhibit	1	1	
P131	Frequency set point (Hz)	Read -only		
P132	Motor current (A)	Read -only		
P134	DC link voltage (V)	Read -only		
P135	Motor RPM	Read -only		
P137	Output voltage (V)	Read -only		
P140*	Most recent fault code	Read -only		
P141	Most recent fault code-1	Read -only		
P142	Most recent fault code-2	Read -only		
P143	Most recent fault code-3	Read -only		
P201	Closed loop mode	0	0	
P202	Proportional gain (%)	1	1	
P203	Integral gain (%)	0.00	0.00	
P205	Sample interval (x25ms)	1	1	
P206	Transducer filtering	0 (filter off)	0	
P207	Integral capture range (%)	100	100	
P208	Transducer type	0	0	
P210	Transducer reading (%)	-	-	
P211	0% set point	0	0	
P212	100% set point	100	100	
P220	PI frequency cut-off	0	0	
P700				
P701				

P702				
P880				
P910	Local/Remote mode	0 (remote)	0	
P918				
P922	Software version	-	-	
P923	Equipment system number	0	0	
P927				
P928				
P930	Most recent fault code	-	-	
P931	Most recent warning type	-	-	
P944	Reset to factory default settings	0	0	
P947				
P958				
P963				
P967				
P968				
P970				
P971	EEPROM storage control	1	1	

Keys



- Activate Home Procedure

- Enter NEW WIDTH for UPPER STATION

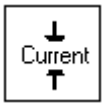
- Enter NEW WIDTH for MIDDLE STATION

- Enter NEW WIDTH for LOWER STATION

- Start Move or Continue or YES

- STOP MOTION or NO

- Move back to previous position



- Show current for UPPER and LOWER STATIONS

- ABORT all operation and reset controller

- Change settings (Password protected)

- Change preset and set preset

- Show vacuum values for UPPER and LOWER stations

- Get HELP on screen

- Scroll available screens

- Clear value

- Enter value

- 3 or Increment value

- 9 or Decrement value

- 5 or alarm acknowledgement

- 2 or cursor UP

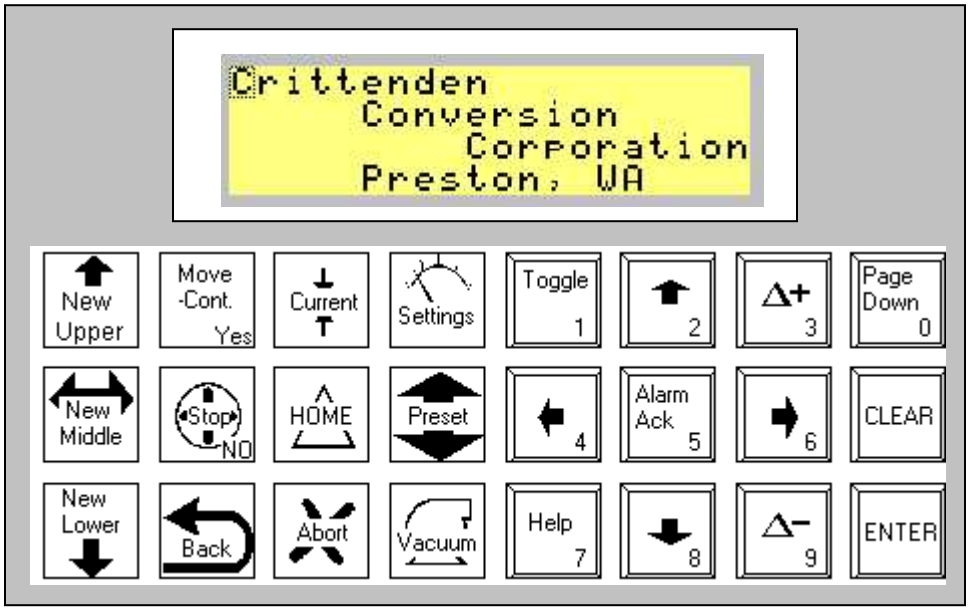
- 4 or cursor LEFT

- 6 or cursor RIGHT

- 8 or cursor DOWN

- 1 or Toggle ON/OFF settings

Screen #1

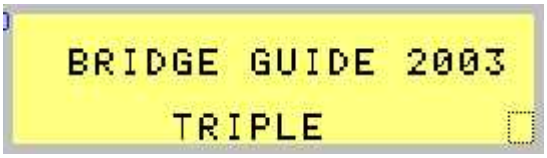


Screen Type:
Message
Start Up Screen
Control Buttons.

SDF8 

- OPEN screen #17 “Move Home?”
No password
Chain screen.
Automatically go to the Screen #2 “Bridge Guide 2003 ”
Time showed.
2 sec
Help screens.
Screen # 400

Screen #2



Screen Type:
Message
Control Buttons.

SDF8 

- Open Screen #17 “Move Home?”
No password
Chain screen.
Automatically go to the Screen #3 “Information 800-755-7894”
Time showed.
5 sec
Help screens.
Screen # 400

Screen #3

Screen Type:
Message
Control Buttons.

SDF1 

Screen #4 “Upper new Width?”
No password

SDF2 

Screen # 52 “Middle New Width”
No password

SDF3 

Screen # 23 “Low station new width”
No password

SDF4 

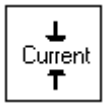
Open Screen # 34 “Current Width”
No password

SDF5 

Open Screen # 17 “HOME”

SDF6 

Open Screen # 1 “Start UP”

SDF7 

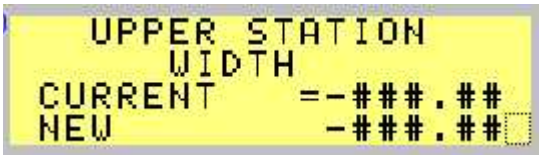
Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

No password
Chain screen.
Automatically go to the Screen #22 “Current WIDTH”
Time showed.
20 sec
Help screens.
Screen # 400

Screen #4



Screen Type:
Message
Control Buttons.

SDF2 

Screen # 52 “Middle New Width”
No password

SDF3 

Screen # 23 “Low station new width”
No password

SDF4 

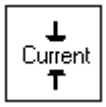
Open Screen # 31 “Move from to ”
No password

SDF5 

Open Screen # 34 “Current width”

SDF6 

Open Screen # Screen # 34 “Current width”

SDF7 

Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

No password

Chain screen.
Screen #34 “Current Width”
Time showed.
60 sec
Help screens.
Screen # 404

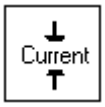
Screen #5

Screen Type:
Message Screen

Sound
Beep
Control Buttons.

SDF1 

Screen #4 “Upper new Width?”
No password

SDF7– 

Open Screen # 34 “Current Width”

SDF8 

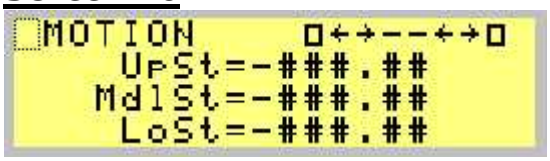
- Screen #17 “Move Home?”

No password

Chain screen.
#4 “New Upper Width”

Time showed.
10 sec
Help screens.
No

Screen #6



Screen Type:
Message
Control Buttons.

SDF5 

Stop motion

SDF6 

Back motion

Chain screen.
No
Time showed.
No
Help screens.
#406

Screen #7

Screen Type:
Message

Control Buttons.

SDF4 

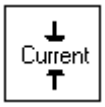
Continue Motion

SDF5 

Open Screen # 34 “Current Width”

SDF6 

Return to privies position

SDF7– 

Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Chain screen.
No
Time showed.
No
Help screens.
#407

Screen #8

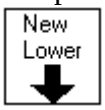
Screen Type:
Message
Control Buttons.

SDF1 

Screen #4 “Upper new Width?”
No password

SDF2 

Screen # 52 “Middle New Width”
No password

SDF3 

Screen # 23 “Low station new width”
No password

SDF4 

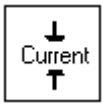
Enter Preset
No password

SDF5 

Open Screen # 34 “Current Width”

SDF6 

Open Screen # 34 “Current Width”

SDF7– 

Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Chain screen.
Forward #55
Backward #33
Time showed.
No
Help screens.
No

Screen # 9

Screen Type:
Message

Control Buttons.

SDF1 

Screen #4 “Upper new Width?”
No password

SDF2 

Screen # 52 “Middle New Width”
No password

SDF3 

Screen # 23 “Low station new width”
No password

SDF4 

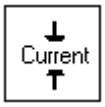
No password

SDF5 

Open Screen # 38 “Swap Width”

SDF6 

Open Screen # 34 “Current Width”

SDF7– 

Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Chain screen.
Forward #38
Backward #56
Time showed.
No
Help screens.
No

Screen #10

Screen Type:
Message
Sound .
Beep.

Control Buttons.

SDF8 

Screen #17 “Move Home?”
No password

Chain screen.
Screen #17
Time showed.
255 sec
Help screens.
410

Screen #11

Screen Type:
Message
Sound .
Beep.
Control Buttons.

SDF8 

Screen #17 “Move Home?”
No password

Chain screen.
Screen #17
Time showed.

Help screens.
#411

Screen #12

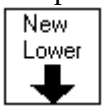
Screen Type:
Message
Sound .
No
Control Buttons.

SDF1 

Screen #4 “Upper new Width?”
No password

SDF2 

Screen # 52 “Middle New Width”
No password

SDF3 

Screen # 23 “Low station new width”
No password

SDF4 

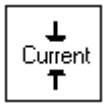
Open Screen # 34 “Current Width”
No password

SDF5 

Open Screen # 34 “Current Width”
No password

SDF6 

Open Screen # 34 “Current Width”
No password

SDF7 

Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

No password
Chain screen.
Forward #34,
Backward #
Time showed.
Help screens.

Screen #13

Screen Type:
Message
Sound .
Beep
Control Buttons.

SDF8 

Screen #17 “Move Home?”
No password
Chain screen.
No
Time showed.
No
Help screens.
#413

Screen #14

Screen Type:
Message

Sound .
No
Control Buttons.

SDF4 

Screen #17 “Move Home?”
No password

SDF5 

DEMO continue

Chain screen.

Time showed.
sec
Help screens.
#414

Screen #15

Screen Type:
Message

Sound .
No
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

SDF2
Screen # 52 “Middle New Width”
No password

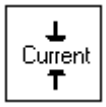
SDF3
Screen # 23 “Low station new width”
No password

SDF4
Start DEMO
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6 

Open Screen # 34 “Current Width”
No password

SDF7 

Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

No password
Chain screen.
FORWARD #24
BACKWARD #45
Time showed 5 sec
Help screens.415

Screen #16

Screen Type:
Message

Sound .
No
Control Buttons.
SDF5 

STOP
Chain screen.
No
Time showed.
No
Help screens.
No

Screen #17

Screen Type:
Message
Sound .
Beep
Control Buttons.

SDF4 

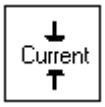
Move Home

SDF5 

Open Screen # 34 “Current Width”

SDF6 

Open Screen # 34 “Current Width”

SDF7– 

Open Screen # 34 “Current Width”

SDF8 

Screen #17 “Move Home?”
No password
Chain screen.
No
Time showed.
No
Help screens.
#417

Screen #18

Screen Type:
Alarm
Sound .
Continuous Beep
Control Buttons.

SDF8
Screen #17 “Move Home?”
No password

Chain screen.
No
Time showed.
No
Help screens.

Screen #19

Screen Type:
Message

Sound .
Beep

SDF4
Screen #17 “Move Home?”
No password

SDF5
Open Screen # 34 “Current Width ”
Control Buttons.

SDF8
Screen #17 “Move Home?”
No password

Chain screen.
17
Time showed.
No
Help screens.
#419

Screen #20

Screen Type:
Message
Sound .
No
Control Buttons.

SDF1 

Screen #4 “Upper new Width?”
No password

SDF2 

Screen # 52 “Middle New Width”
No password

SDF3 

Screen # 23 “Low station new width”
No password

SDF4 

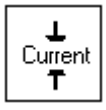
Start DEMO
No password

SDF5 

Open Screen # 24 “Set all to default”
No password

SDF6 

Open Screen # 34 “Current Width”
No password

SDF7 

Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

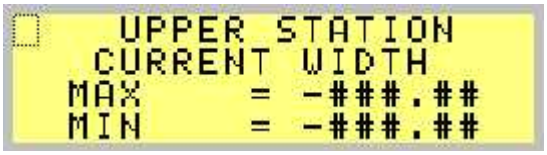
Chain screen.
Forward #57
Backward #22
Time showed.
5 sec
Help screens.
#420

Screen #21

Screen Type:
Message
Sound .
No
Control Buttons.
SDF5 

STOP
Chain screen.
No
Time showed.
No
Help screens.
No

Screen #22



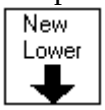
Screen Type:
Message
Sound .
No
Control Buttons.

SDF1 

Screen #4 “Upper new Width?”
No password

SDF2 

Screen # 52 “Middle New Width”
No password

SDF3 

Screen # 23 “Low station new width”
No password

SDF4 

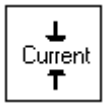
Current width
No password

SDF5 

Open Screen # 24 “Set all to default”
No password

SDF6 

Open Screen # 34 “Current Width”
No password

SDF7 

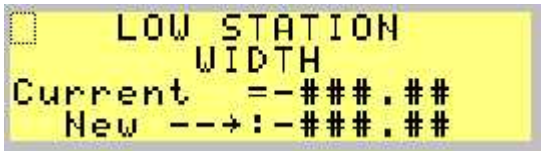
Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Chain screen.
Forward #20
Backward #3
Time showed.
5 sec
Help screens.
#420

Screen #23



Screen Type:
Message
Sound .
No
Control Buttons.

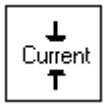
SDF1
Screen #4 “Upper new Width?”
No password

SDF2
Screen # 52 “Middle New Width”
No password

SDF4
Start motion
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6
Open Screen # 34 “Current Width”
No password



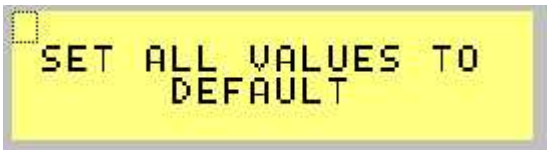
SDF7
Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Chain screen.
34
Time showed.
No
Help screens.
404

Screen #24



Screen Type:
Message
Sound .
No
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

SDF2
Screen # 52 “Middle New Width”
No password

SDF3
Screen # 23 “Low station new width”
No password

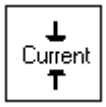
SDF4
Start set default values
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6

Open Screen # 34 “Current Width”

No password

SDF7 

Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Chain screen.
#47
Time showed.
20 sec
Help screens.
#403

Screen #25

Screen Type:
Message

Sound .
Beep
Control Buttons.

SDF8 

Screen #17 “Move Home?”
No password
Chain screen.
17
Time showed.
No
Help screens.
#425

Screen #26

Screen Type:
Message

Sound .
Beep
Control Buttons.

SDF4
Continue
No password

SDF8
Screen #17 “Move Home?”
No password
Chain screen.
No
Time showed.
No
Help screens.
#426

Screen # 27

Screen Type:
Message
Sound .
NO
Control Buttons.
Chain screen.
Time showed.
No
Help screens.
427

Screen #28

Screen Type:
Message

Sound .
Beep
Control Buttons.
Chain screen.
Time showed.
No
Help screens.
428

Screen #29

Screen Type:
Message

Sound .
NO
Control Buttons.
Chain screen.
Time showed.
No
Help screens.
427

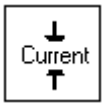
Screen #30

Screen Type:
Message

Sound .
NO
Control Buttons.
SDF4 

Move
No password
SDF5 

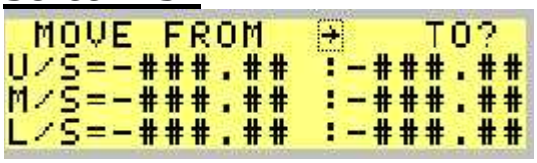
Open Screen # 34 “Current Width”
SDF6 

Open Screen # 34 “Current Width”
SDF7– 

Open Screen # 34 “Current Width”
SDF8 

Screen #17 “Move Home?”
No password
Chain screen.
NO
Time showed.
No
Help screens. 405

Screen #31

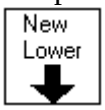


Screen Type:
Message

Sound .
NO
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

SDF2
Screen # 52 “Middle New Width”
No password

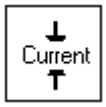


SDF3
Screen # 23 “Low station new width”
No password

SDF4
Move
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6
Open Screen # 34 “Current Width”
No password

SDF7 

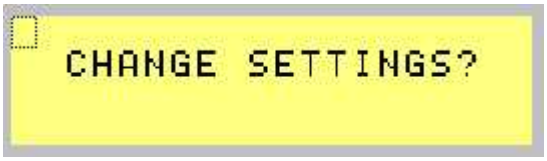
Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Chain screen.
34
Time showed.
No
Help screens.
431

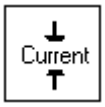
Screen #32



Screen Type:
Message
Sound .
NO
Control Buttons.
SDF4 

Yes change settings
No password
SDF5 

Open Screen # 34 “Current Width”
SDF6 

Open Screen # 34 “Current Width”
SDF7– 

Open Screen # 34 “Current Width”
SDF8 

Screen #17 “Move Home?”
No password
Chain screen.

Time showed.
No
Help screens.

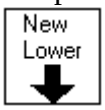
Screen #33

Screen Type:
Message

Sound .
NO
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

SDF2
Screen # 52 “Middle New Width”
No password

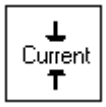


SDF3
Screen # 23 “Low station new width”
No password

SDF4
Continue
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6
Open Screen # 34 “Current Width”
No password



SDF7

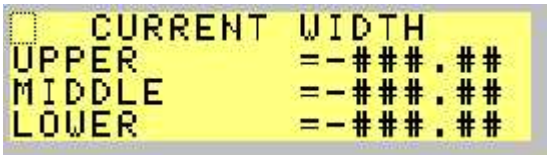
Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Forward #8
Backward #40
Time showed.
No
Help screens.
433

Screen #34



Screen Type:
Message

Sound .
NO
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

SDF2
Screen # 52 “Middle New Width”
No password

SDF3
Screen # 23 “Low station new width”
No password

SDF4
Move to next widths
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6

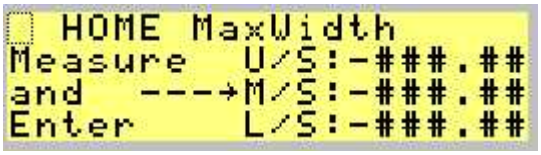
Open Screen # 34 “Current Width”
No password

SDF8 

- Screen #17 “Move Home?”

Chain screen.
Forawrd #12
Backward #12
Time showed.
Help screens.
408

Screen #35



Screen Type:
Message

Sound .
Beep
Control Buttons.

SDF4 

YES continue after Max width entered

SDF5 

Open Screen # 24 “Set all to default”
No password

SDF6 

Open Screen # 34 “Current Width”
No password

SDF8 

- Screen #17 “Move Home?”

Chain screen.
NO
Time showed.
NO
Help screens.
NO

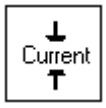
Screen #36

Screen Type:
Alarm
1 sec
Sound .
Beep.
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

SDF2
Screen # 52 “Middle New Width”
No password
No password

SDF6
Open Screen # 34 “Current Width”
No password



SDF7
Open Screen # 34 “Current Width”

SDF8

- Screen #17 “Move Home?”

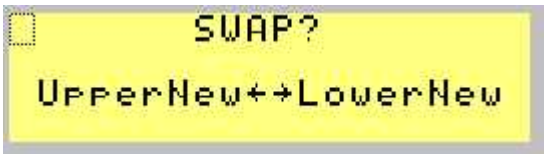
Chain screen.
Screen #23
Time showed.
60 sec
Help screens.
#

Screen #37

Screen Type:
Alarm
1 sec
Sound .
Beep.
Control Buttons.

SDF8
Screen #17 “Move Home?”
No password
Chain screen.
Time showed.
60 sec
Help screens.
#

Screen #38

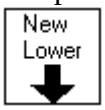


Screen Type:
Message

Sound .
NO
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

SDF2
Screen # 52 “Middle New Width”
No password



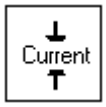
SDF3
Screen # 23 “Low station new width”
No password

SDF4
Yes Swap
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6

Open Screen # 34 “Current Width”
No password

SDF7 

Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Chain screen.
Forward #39
Backward #9

Time showed.
No
Help screens.

Screen #39

Screen Type:
Message

Sound .
NO
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

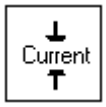
SDF2
Screen # 52 “Middle New Width”
No password

SDF3
Screen # 23 “Low station new width”
No password

SDF4
Yes Assign
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6
Open Screen # 34 “Current Width”
No password

SDF7 

Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Chain screen.
Forward #40
Backward #38

Time showed.
No
Help screens.

Screen #40

Screen Type:
Message

Sound .
NO
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

SDF2
Screen # 52 “Middle New Width”
No password

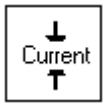
SDF3
Screen # 23 “Low station new width”
No password

SDF4
Yes Assign
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6

Open Screen # 34 “Current Width”
No password

SDF7 

Open Screen # 34 “Current Width”

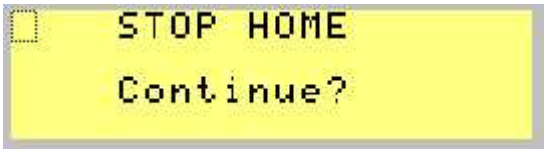
SDF8 

- Screen #17 “Move Home?”

Chain screen.
Forward #33
Backward #39

Time showed.
No
Help screens.

Screen #41



Screen Type:
Message

Sound .
NO
Control Buttons.

SDF4 

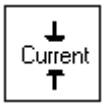
Yes
No password

SDF5 

Open Screen # 34

SDF6 

Open Screen # 17

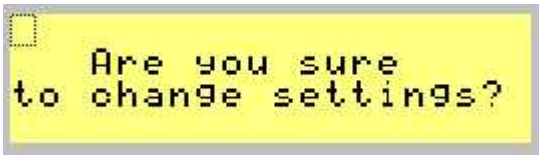
SDF7– 

Open Screen # 34 “Current Width”

SDF8 

Screen #17 “Move Home?”
No password
Chain screen.
Time showed.
No
Help screens.

Screen #42



Screen Type:
Message
Sound .
NO
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

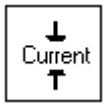
SDF2
Screen # 52 “Middle New Width”
No password

SDF3
Screen # 23 “Low station new width”
No password

SDF4
Vacuum #43
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6
Open Screen # 34 “Current Width”
No password

SDF7 

Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Chain screen.
#34
Time showed.
No
Help screens.

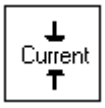
Screen #43

Screen Type:
Message

Sound .
NO
Control Buttons.

SDF6 

Open Screen # 34

SDF7– 

Open Screen # 34 “Current Width”

SDF8 

Screen #17 “Move Home?”
No password

Chain screen.
Forward #44
Backward #47

Time showed.
No
Help screens.

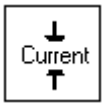
Screen #44

Screen Type:
Message

Sound .
NO
Control Buttons.

SDF6 

Open Screen # 34

SDF7– 

Open Screen # 34 “Current Width”

SDF8 

Screen #17 “Move Home?”
No password

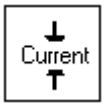
Chain screen.
Forward #45
Backward #43

Time showed.
No
Help screens.

Screen #45

Screen Type:
Message

Sound .
NO
Control Buttons.
SDF6 

Open Screen # 34
SDF7– 

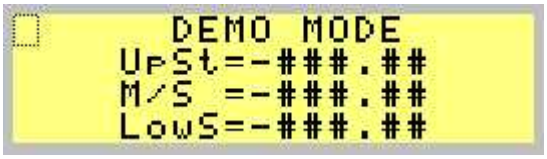
Open Screen # 34 “Current Width”

SDF8 

Screen #17 “Move Home?”
No password
Chain screen.
Forward #15
Backward #44

Time showed.
No
Help screens.

Screen #46



Screen Type:
Message

Sound .
NO
Control Buttons.

SDF5 

STOP DEMO

Chain screen.

Time showed.
No
Help screens.

Screen #47

Screen Type:
Message

Sound .
NO
Control Buttons.

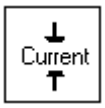
- 2 or cursor UP

- 8 or cursor DOWN

- 1 or Toggle ON/OFF settings

SDF6 

Open Screen # 34

SDF7– 

Open Screen # 34 “Current Width”

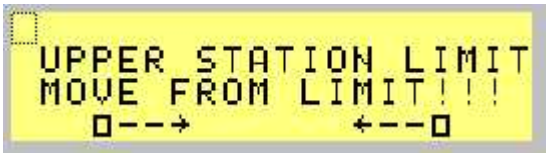
SDF8 

Screen #17 “Move Home?”
No password

Chain screen.
Forward #43
Backward #0

Time showed.
10 sec
Help screens.

Screen #48



Screen Type:
Message

Sound .
3 beps
Control Buttons.

Chain screen.
Forward #43
Backward #0

Time showed.
10 sec
Help screens.

Screen #50

Screen Type:
Message

Sound .
3 beps
Control Buttons.

Chain screen.

Time showed.
Help screens.

Screen #51

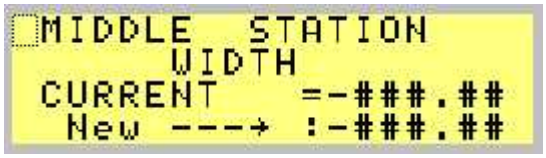
Screen Type:
Message

Sound .
3 beps
Control Buttons.

Chain screen.

Time showed.
Help screens.

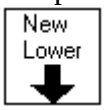
Screen #52



Screen Type:
Message

Sound .
3 beps
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

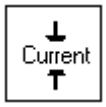


SDF3
Screen # 23 “Low station new width”
No password

SDF4
Vacuum #43
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6
Open Screen # 34 “Current Width”
No password



SDF7
Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Chain screen.
#34
Time showed.
Help screens.

Screen #53

Screen Type:
Message

Sound .
3 beps
Control Buttons.

SDF8 

- Screen #17 “Move Home?”

Chain screen.

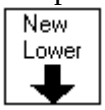
Time showed.
Help screens.

Screen #54

Screen Type:
Message

Sound .
3 beps
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

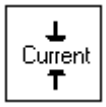


SDF3
Screen # 23 “Low station new width”
No password

SDF4
Middle station width #52
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6
Open Screen # 34 “Current Width”
No password

SDF7 

Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Chain screen.

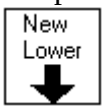
Time showed.
Help screens.

Screen #55

Screen Type:
Message

Sound .
3 beps
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

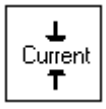


SDF3
Screen # 23 “Low station new width”
No password

SDF4
Yes assign
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6
Open Screen # 34 “Current Width”
No password



SDF7
Open Screen # 34 “Current Width”

SDF8 

- Screen #17 “Move Home?”

Chain screen.
#56
Time showed.
Help screens.

Screen #56

Screen Type:
Message

Sound .
3 beps
Control Buttons.

SDF1
Screen #4 “Upper new Width?”
No password

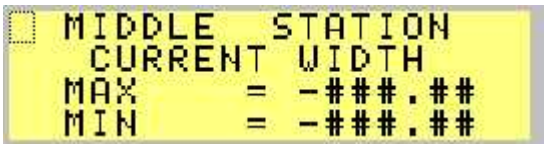
SDF3
Screen # 23 “Low station new width”
No password

SDF4
Yes assign
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6
Open Screen # 34 “Current Width”
No password
Chain screen.
#9
Time showed.
Help screens.

Screen #57



Screen Type:
Message

Sound .
3 beps
Control Buttons.

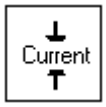
SDF1
Screen #4 “Upper new Width?”
No password

SDF3
Screen # 23 “Low station new width”
No password

SDF4
#34
No password

SDF5
Open Screen # 24 “Set all to default”
No password

SDF6
Open Screen # 34 “Current Width”
No password



SDF7
Open Screen # 34 “Current Width”

SDF8 

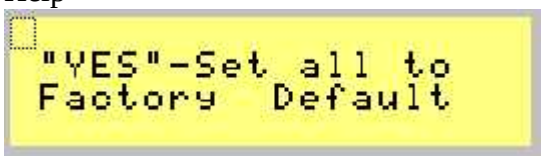
- Screen #17 “Move Home?”

Chain screen.
#17
Time showed.
Help screens.
#420

HELP SCREENS

Screen #400
Screen Type:
Help

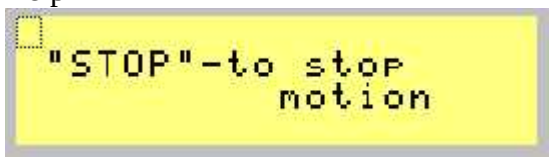
Screen#403
Screen Type:
Help



Screen #404
Screen Type:
Help

Screen #405
Screen Type:
Help

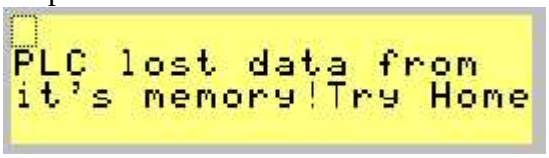
Screen #406
Screen Type:
Help



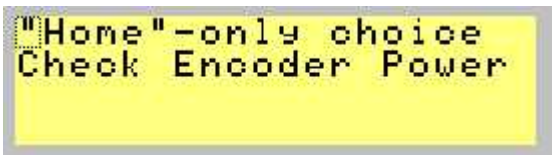
Screen #407
Screen Type:
Help

Screen #408
Screen Type:
Help

Screen #410
Screen Type:
Help



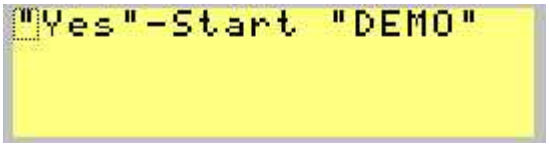
Screen #411
Screen Type:
Help



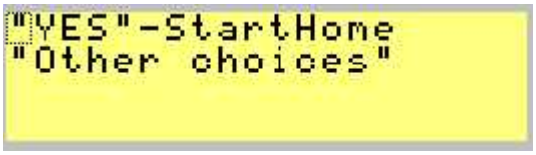
Screen #413
Screen Type:
Help

Screen #414
Screen Type:
Help

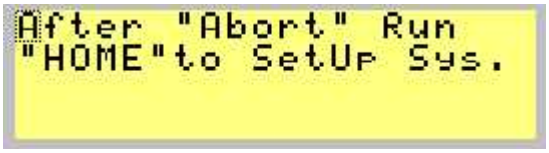
Screen #415
Screen Type:
Help



Screen #417
Screen Type:
Help

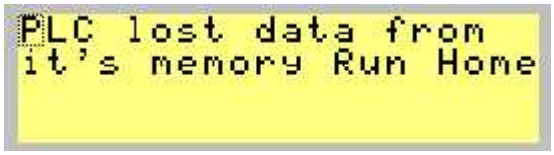


Screen #419
Screen Type:
Help

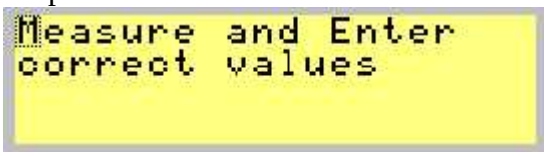


Screen #420
Screen Type:
Help

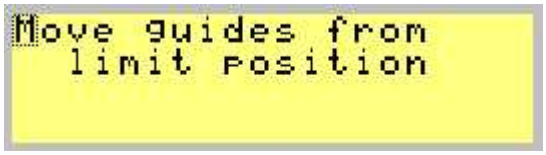
Screen #425
Screen Type:
Help



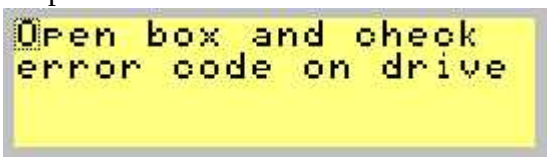
Screen #426
Screen Type:
Help



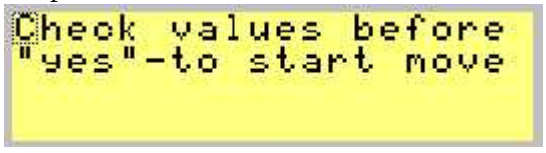
Screen #427
Screen Type:
Help



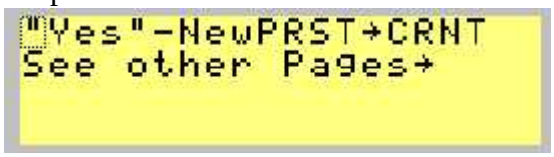
Screen #428
Screen Type:
Help



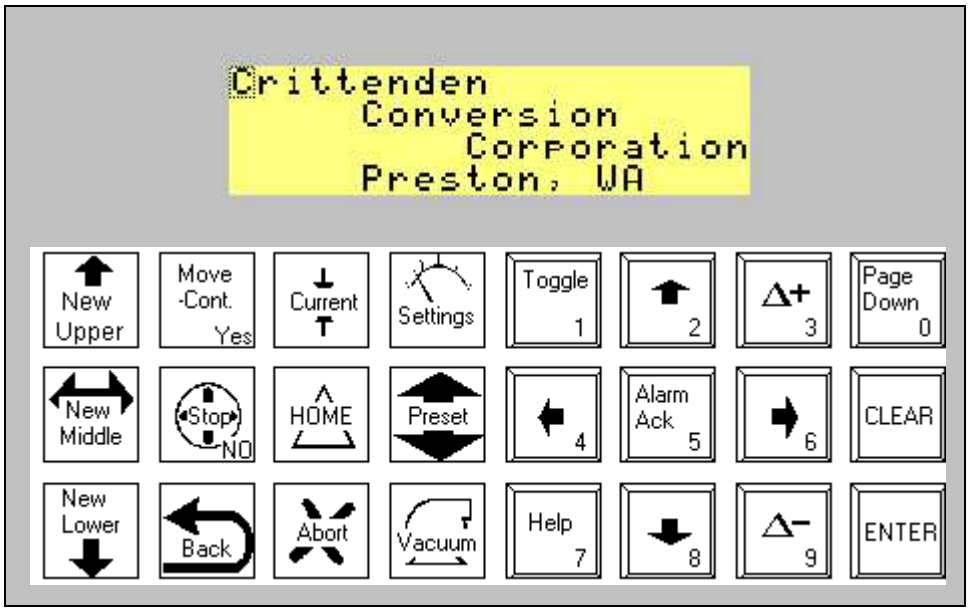
Screen #431
Screen Type:
Help



Screen #433
Screen Type:
Help

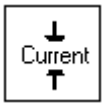


BG 2003 Operation



1. **Get Help**
   - Push and hold "Help 

" key
   - Read Help screen

2. **See current Width** .
   - Push "Current" key 

3. **See current Vacuum readings**.
   - Push "Vacuum" key. 

4. **Enter New Upper station width**.
   - Push "New Upper" key; 

   - Push "Clear", 

- Enter numbers (for example: 44.5 > 4, 4, 5)
- Push “Enter” 

- Push “Yes” 

5. **Enter New Lower station width**.

- Push “New Lower” key; 

- Push “Clear”, 

- Enter numbers (for example: 44.5 > 4, 4, 5)
- Push “Enter” 

- Push “Yes” 

6. **Enter New Middle station width**.

- Push “New Middle” key; 

- Push “Clear”, 

- Enter numbers (for example: 44.5 > 4, 4, 5)
- Push “Enter” 

- Push “Yes” 

7. **Move to the new width**.

- Push “Move” 

- Check numbers on the screen “from 44.5 to 75.2”
- Push “Move” 

8. Stop when moving.

- Push “Stop” 

- On the message “Continue or Back” select “Move” 

or “Back” 

9. Move Home.

- Push “Home” key. 

- On the message “Home? “ Select “Yes” 

or “NO” 

- You can stop any time to push “Stop” key. 

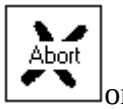
- On message “Maximum width” enter measured width values for all stations
- Push Enter 

- Push Yes 

- On message “Minimum width” enter measured width values for all stations. Push Enter 

- Push Yes 

10. **Abort motion and operation – Reset controller**.

- Push “Abort” 

or Turn power Off
- On message “Abort everything?” select “Yes”. 

11. Change settings. (Vacuum scale and slope, distance before speed slow down, demo mode)

- Push “Settings” key 

- On the message “Are you sure to change settings?” select “Yes”, 

- Enter password 0000,
- Change settings

12. Change Preset.

- Push “Preset” key. 

- Push “clear”, 

- Enter new preset value.
- Push Enter 

- Push “Page Down” 

- On the message “Assign to new Upper Width?” Select “Yes” 

or “No” 

- On massage “Assign to new Lower Width?” select “Yes” 

or “No” 

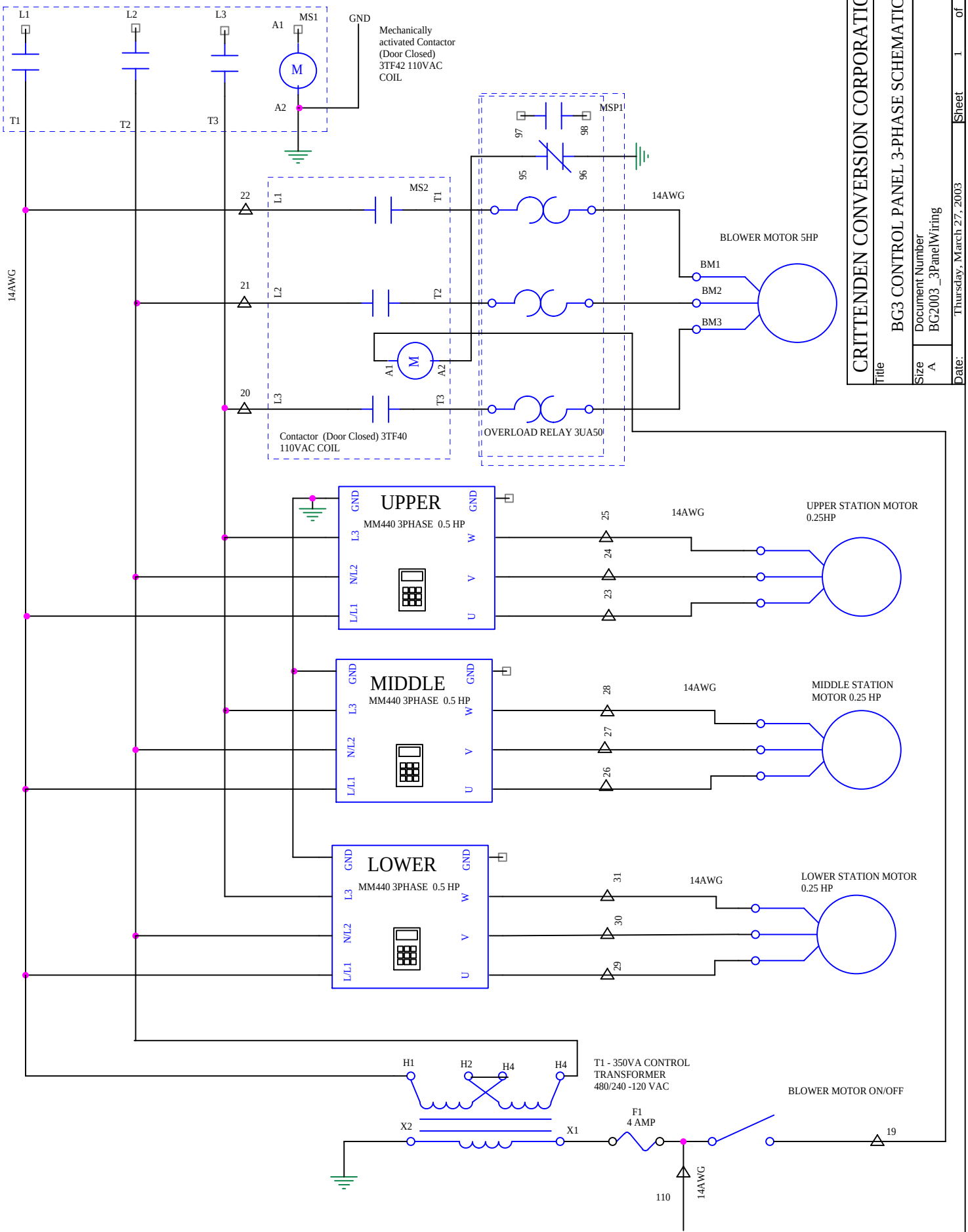
- …..”Swap Upper new and Lower new”

- ….." Assign to Upper new to lower new?"
- ….." Assign to Lower new to Upper new?"
- ….." Assign to Upper new to Middle new?"
- ….." Assign to Preset to Middle new?"

13. Stop Alarm

- Push "Alarm Acknowledgment" 

460 VAC 60 Hz 3-PHASE MAIN
POWER FEEDER 15 AMP



CRITTENDEN CONVERSION CORPORATION

Title: BG3 CONTROL PANEL 3-PHASE SCHEMATIC

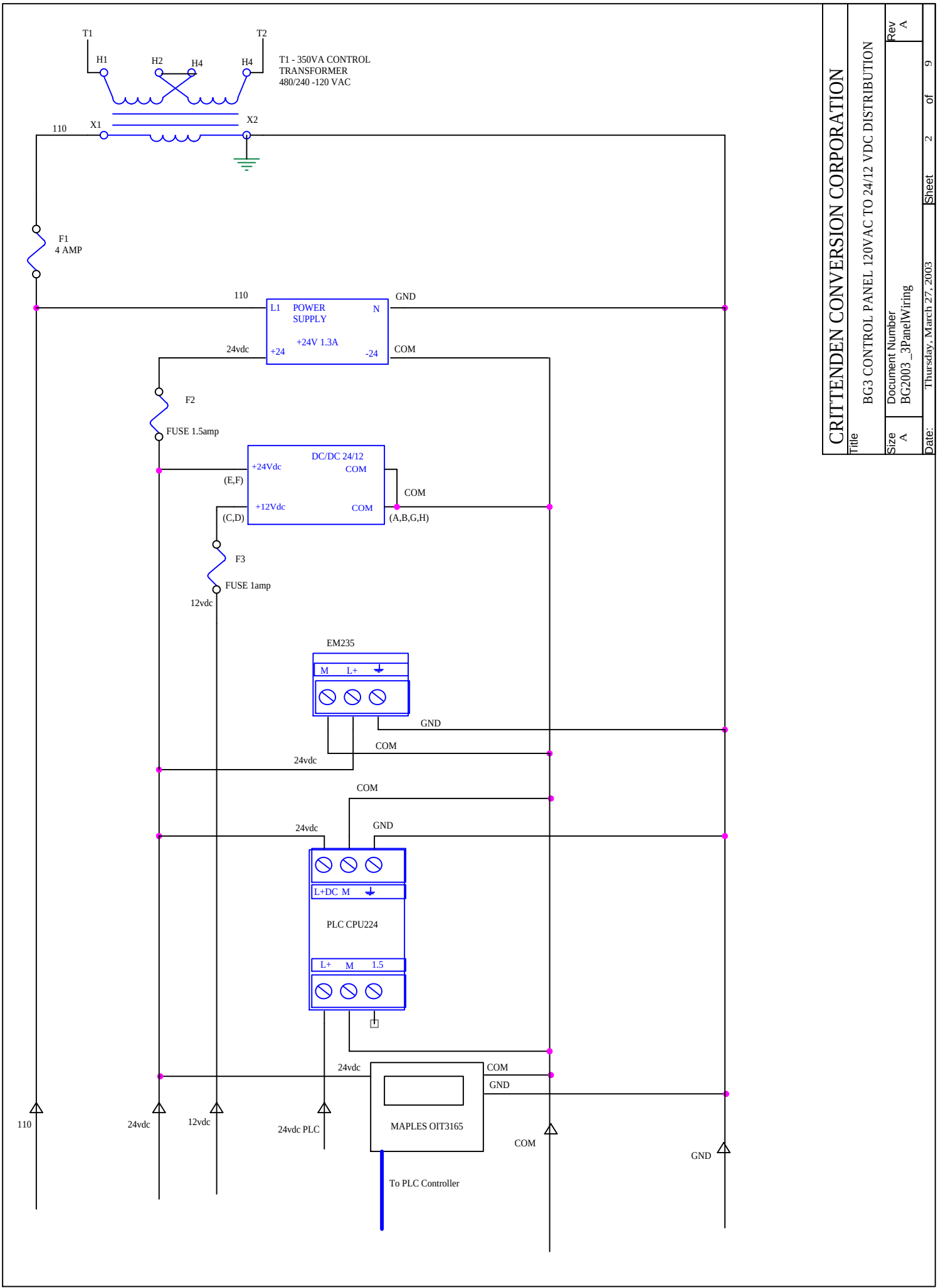
Rev: A

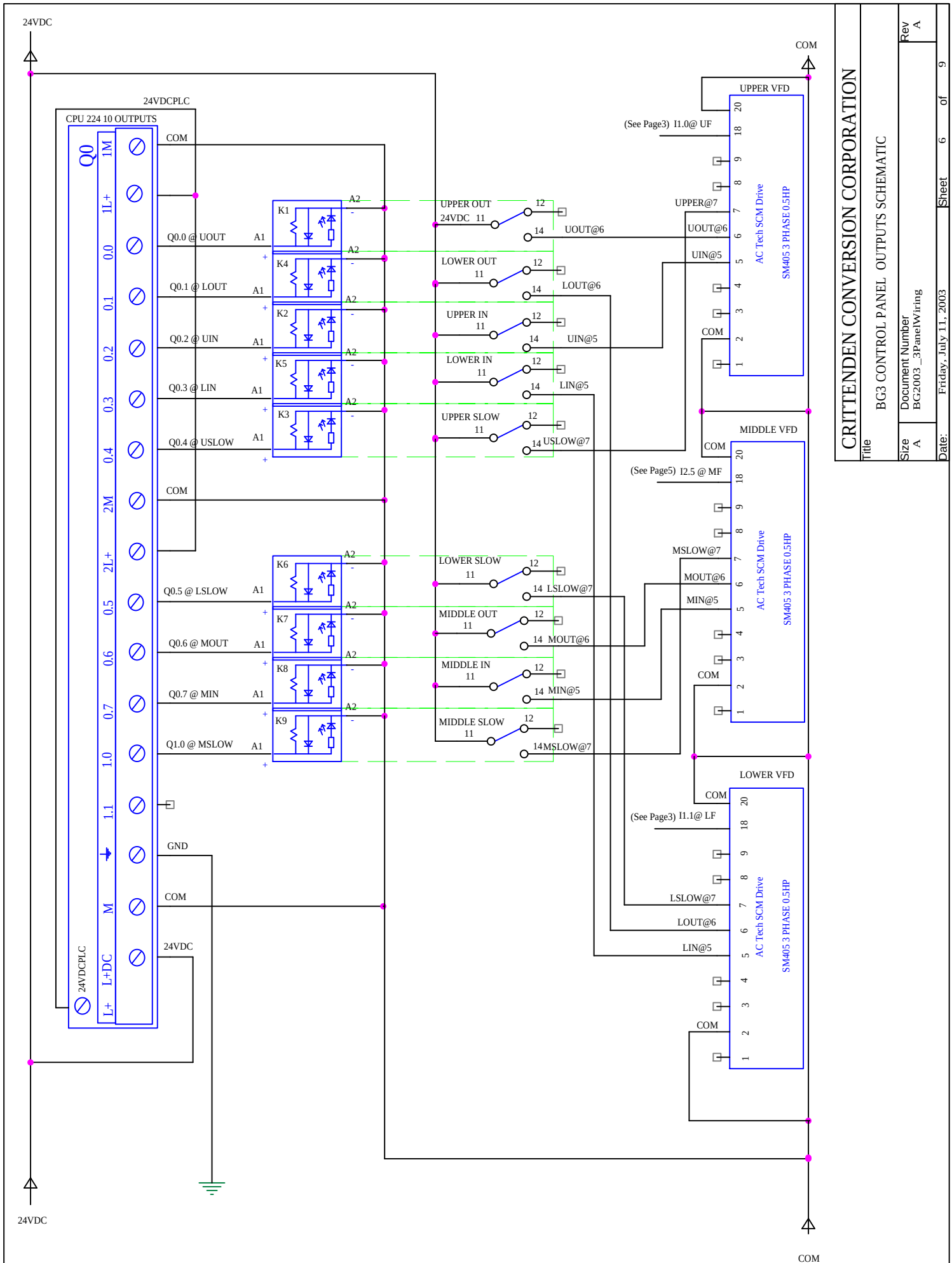
Size: A

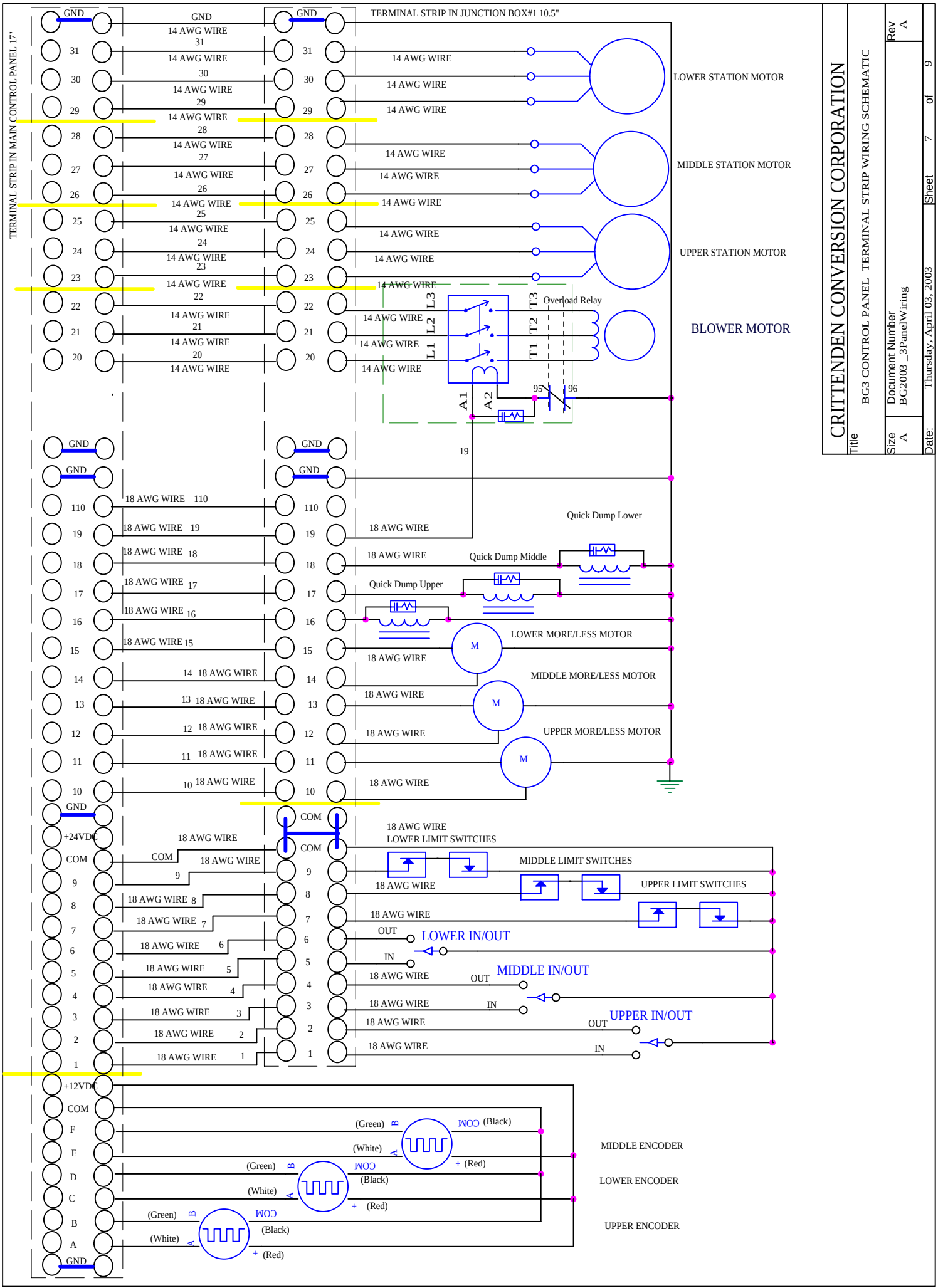
Document Number: BG2003_3PanelWiring

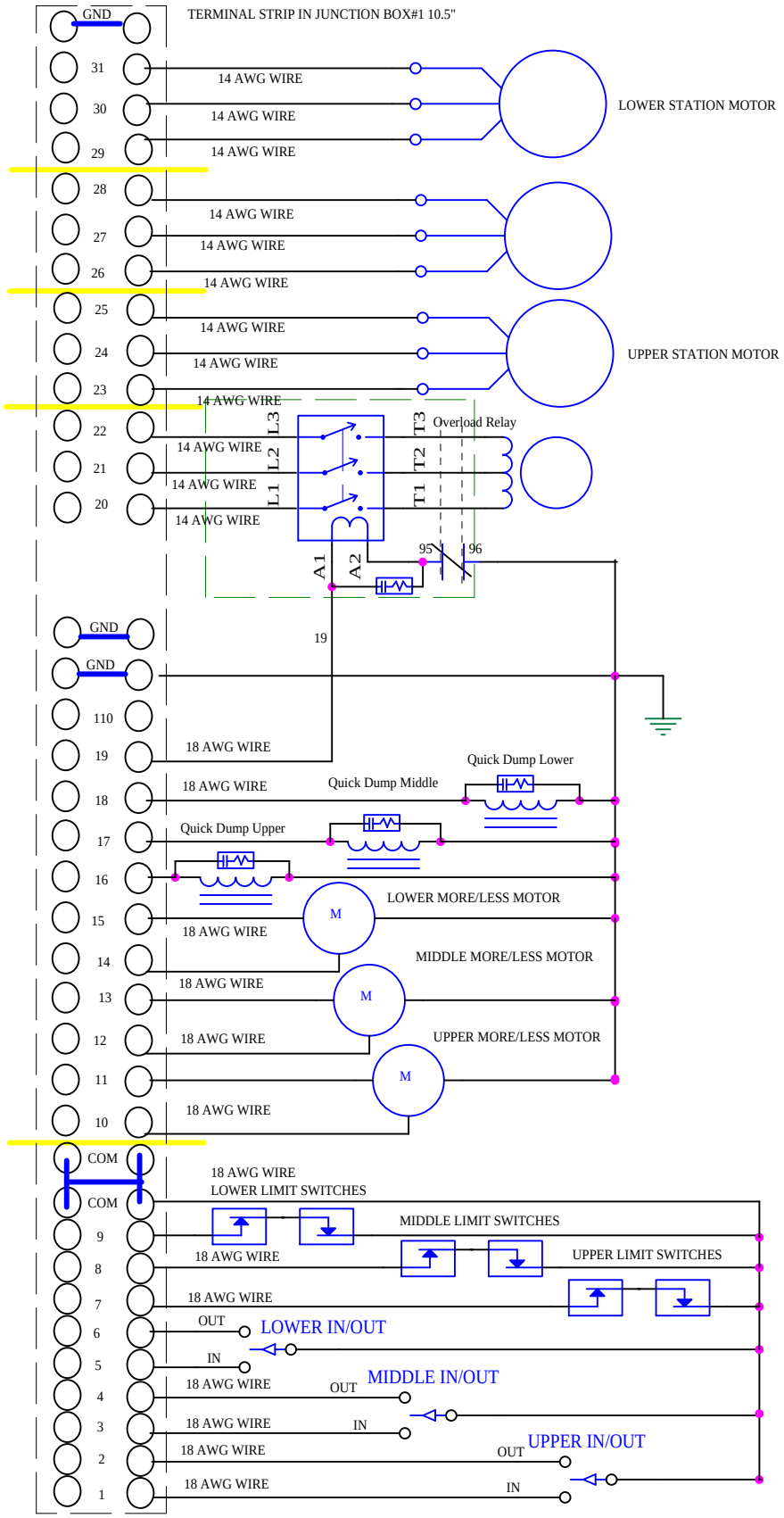
Date: Thursday, March 27, 2003

Sheet 1 of 9


T1
T2
H1
H2
H4
H4
T1 - 350VA CONTROL
TRANSFORMER
480/240 -120 VAC
110
X1
X2
F1
4 AMP
110
L1
POWER
SUPPLY
N
GND
+24V 1.3A
24vdc
+24
-24
COM
F2
FUSE 1.5amp
DC/DC 24/12
+24Vdc
COM
(E,F)
COM
+12Vdc
COM
(C,D)
(A,B,G,H)
F3
FUSE 1amp
12vdc
EM235
M
L+
GND
COM
24vdc
COM
24vdc
GND
L+DC M
PLC CPU224
L+
M
1.5
24vdc
COM
GND
MAPLES OIT3165
To PLC Controller
110
24vdc
12vdc
24vdc PLC
COM
GND
CRITTENDEN CONVERSION CORPORATION
Title
BG3 CONTROL PANEL 120VAC TO 24/12 VDC DISTRIBUTION
Rev
A
Size
A
Document Number
BG2003_3PanelWiring
Sheet
2
of
9
Date:
Thursday, March 27, 2003


24VDC
24VDCPLC
CPU 224 10 OUTPUTS
Q0
1M
1L+
0.0
0.1
0.2
0.3
0.4
2M
2L+
0.5
0.6
0.7
1.0
1.1
M
L+DC
L+
COM
Q0.0 @ UOUT
Q0.1 @ LOUT
Q0.2 @ UIN
Q0.3 @ LIN
Q0.4 @ USLOW
Q0.5 @ LSLOW
Q0.6 @ MOUT
Q0.7 @ MIN
Q1.0 @ MSLOW
GND
24VDC
K1
K2
K3
K4
K5
K6
K7
K8
K9
A1
A2
UPPER OUT
LOWER OUT
UPPER IN
LOWER IN
UPPER SLOW
LOWER SLOW
MIDDLE OUT
MIDDLE IN
MIDDLE SLOW
24VDC 11
12
14
UOUT@6
LOUT@6
UIN@5
LIN@5
USLOW@7
LSLOW@7
MOUT@6
MIN@5
MSLOW@7
UPPER VFD
MIDDLE VFD
LOWER VFD
(See Page3) I1.0@ UF
(See Page5) I2.5 @ MF
(See Page3) I1.1@ LF
UPPER@7
AC Tech SCM Drive
SM405 3 PHASE 0.5HP
CRITTENDEN CONVERSION CORPORATION
Title
BG3 CONTROL PANEL OUTPUTS SCHEMATIC
Rev A
Size A
Document Number BG2003_3PanelWiring
Sheet 6 of 9
Date: Friday, July 11, 2003


TERMINAL STRIP IN MAIN CONTROL PANEL 17"
TERMINAL STRIP IN JUNCTION BOX#1 10.5"
GND
14 AWG WIRE
LOWER STATION MOTOR
MIDDLE STATION MOTOR
UPPER STATION MOTOR
BLOWER MOTOR
Overload Relay
L1
L2
L3
T1
T2
T3
A1
A2
95
96
19
18 AWG WIRE
Quick Dump Lower
Quick Dump Middle
Quick Dump Upper
LOWER MORE/LESS MOTOR
MIDDLE MORE/LESS MOTOR
UPPER MORE/LESS MOTOR
M
COM
+24VDC
+12VDC
LOWER LIMIT SWITCHES
MIDDLE LIMIT SWITCHES
UPPER LIMIT SWITCHES
OUT
IN
LOWER IN/OUT
MIDDLE IN/OUT
UPPER IN/OUT
(Green)
(White)
(Black)
(Red)
MIDDLE ENCODER
LOWER ENCODER
UPPER ENCODER
CRITTENDEN CONVERSION CORPORATION
Title
BG3 CONTROL PANEL TERMINAL STRIP WIRING SCHEMATIC
Rev A
Size A
Document Number BG2003_3PanelWiring
Sheet 7 of 9
Date: Thursday, April 03, 2003



CRITTENDEN CONVERSION CORPORATION

Title: BG3 CONTROL PANEL BOX#1 TERMINAL STRIP WIRING SCHEMATIC

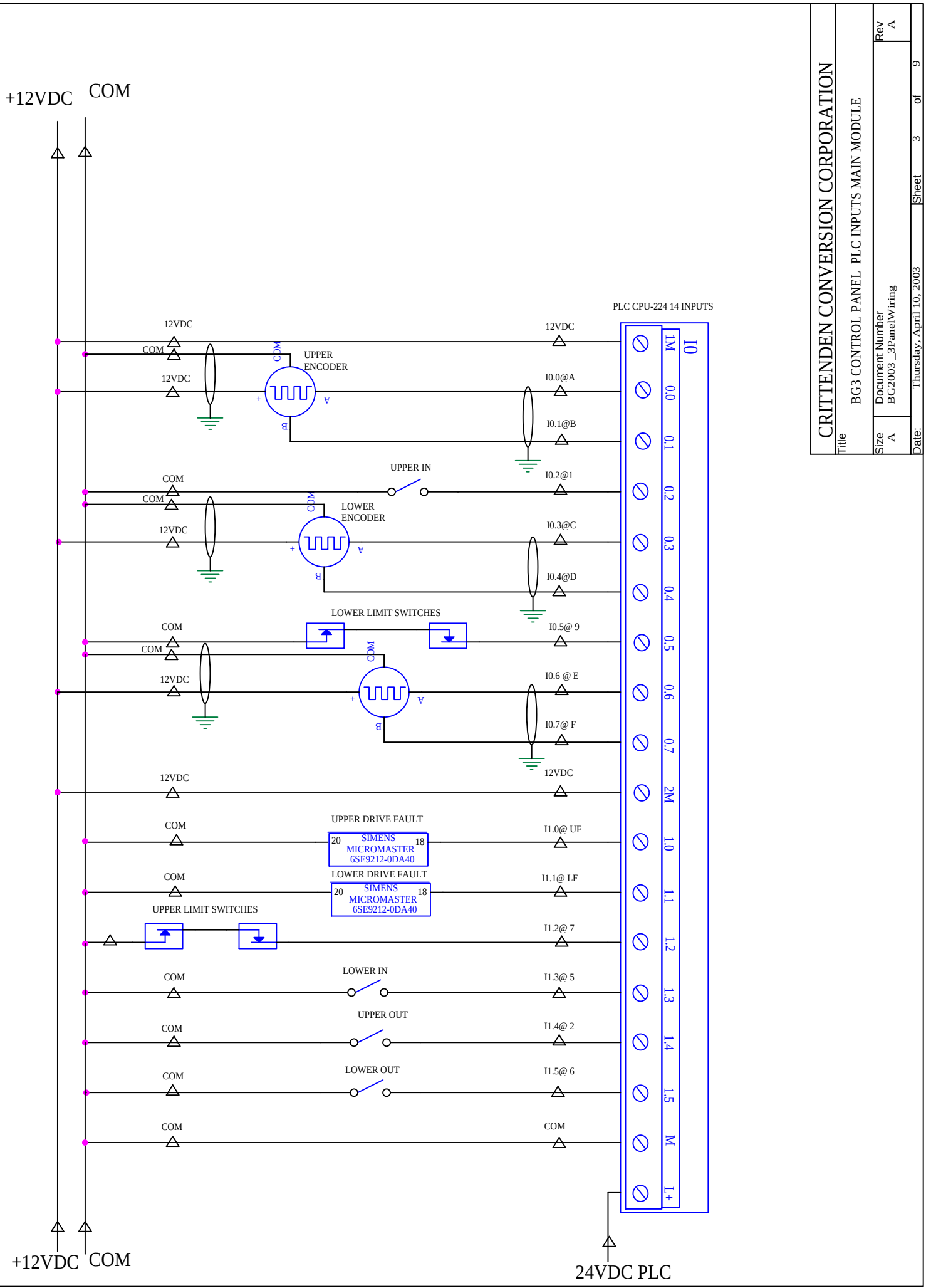
Rev: A

Size: A

Document Number: BG2003_3PanelWiring

Sheet: 8 of 9

Date: Thursday, April 10, 2003



CRITTENDEN CONVERSION CORPORATION

Title: BG3 CONTROL PANEL PLC INPUTS MAIN MODULE

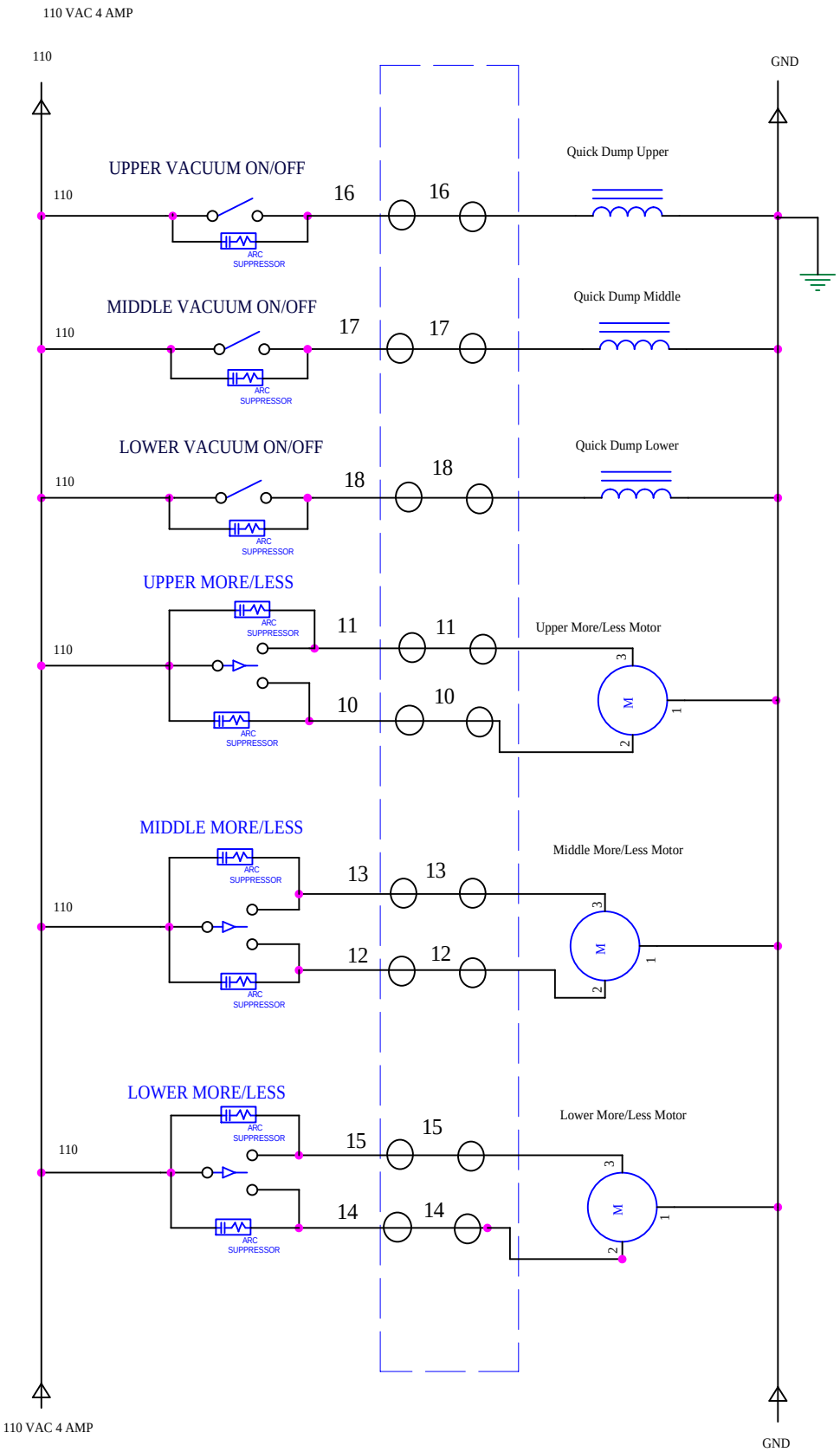
Rev: A

Size: A

Document Number: BG2003_3PanelWiring

Date: Thursday, April 10, 2003

Sheet 3 of 9



CRITTENDEN CONVERSION CORPORATION

Title: BG3 CONTROL PANEL VACUUM CONTROL SWITCHES SCHEMATIC

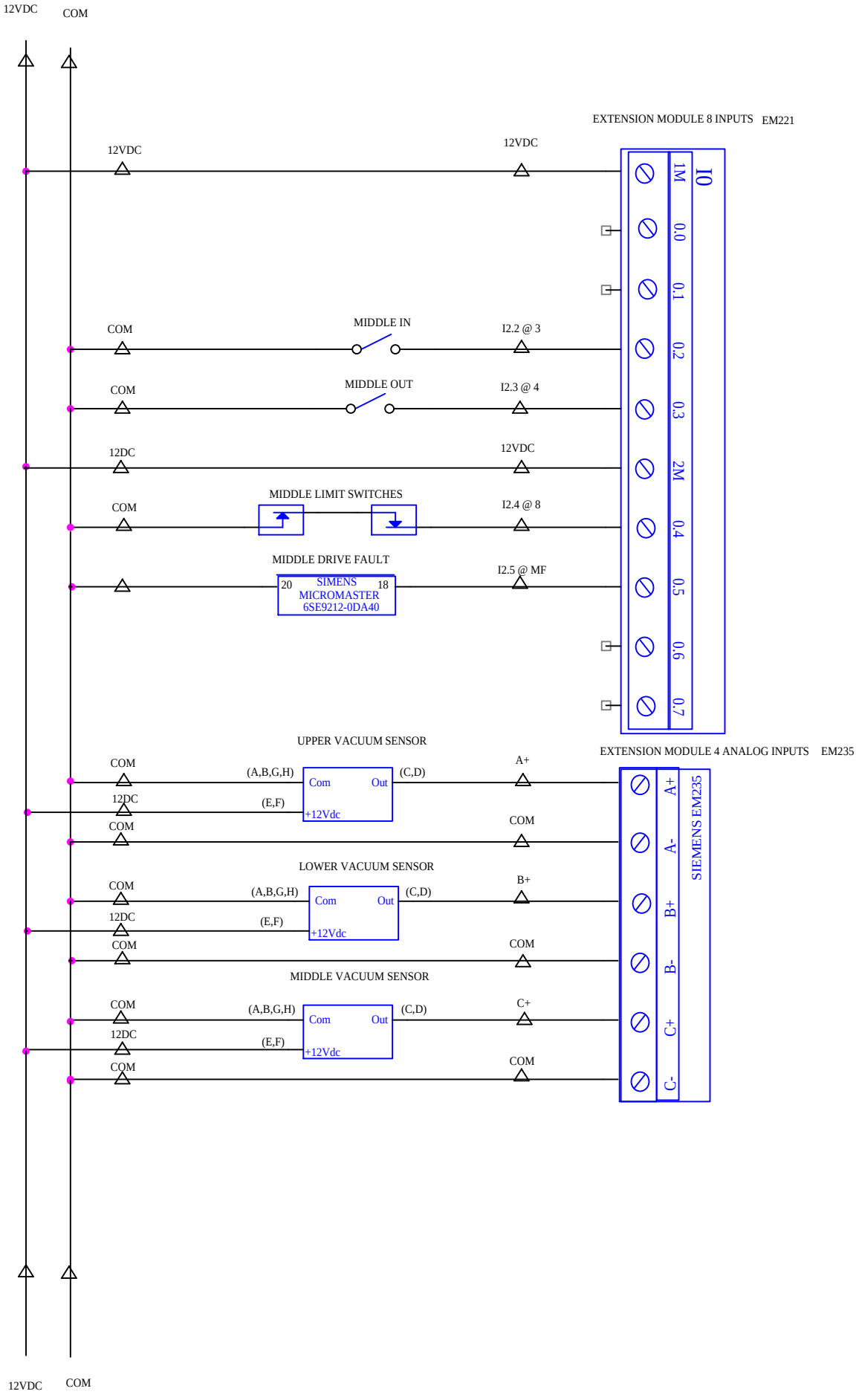
Rev: A

Size: A

Document Number: BG2003 _3PanelWiring

Sheet: 4 of 9

Date: Friday, March 21, 2003



CRITTENDEN CONVERSION CORPORATION

Title: BG3 CONTROL PANEL EXTENSION MODULES INPUTS SCHEMATIC

Rev: A

Size: A

Document Number: BG2003_3PanelWiring

Date: Monday, February 11, 2013

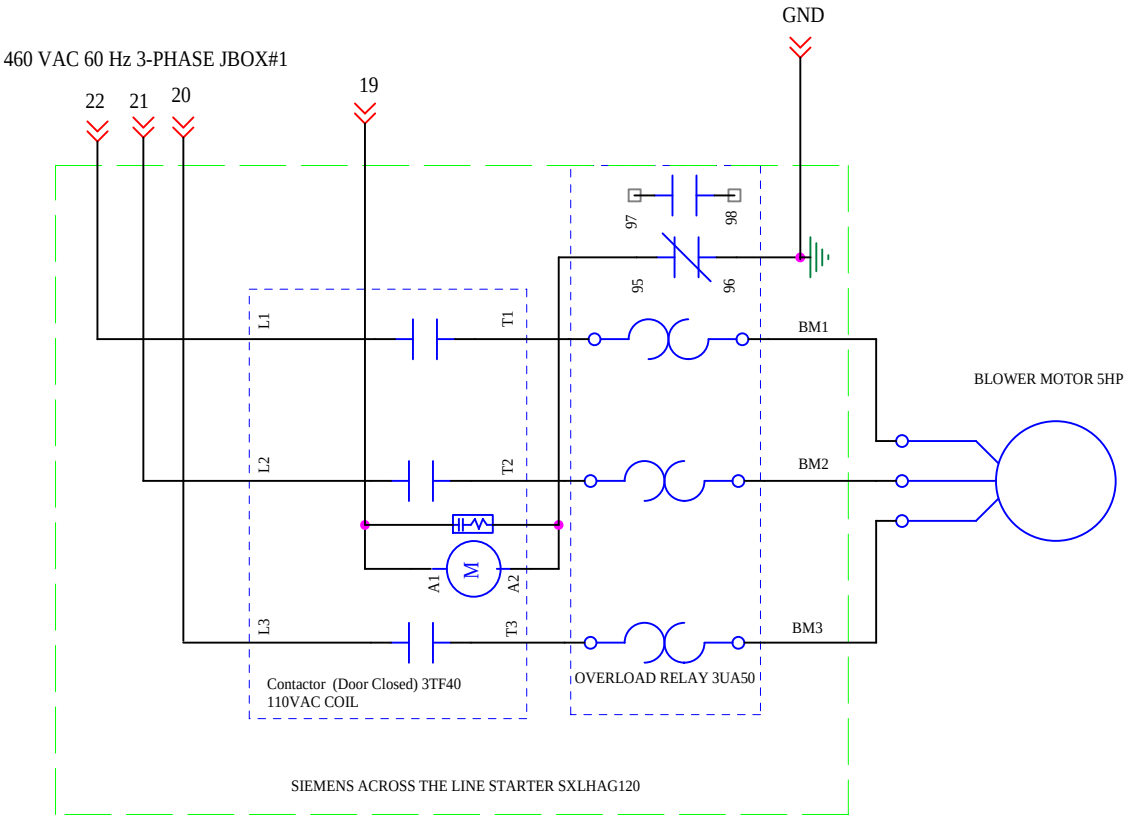
Sheet 5 of 9

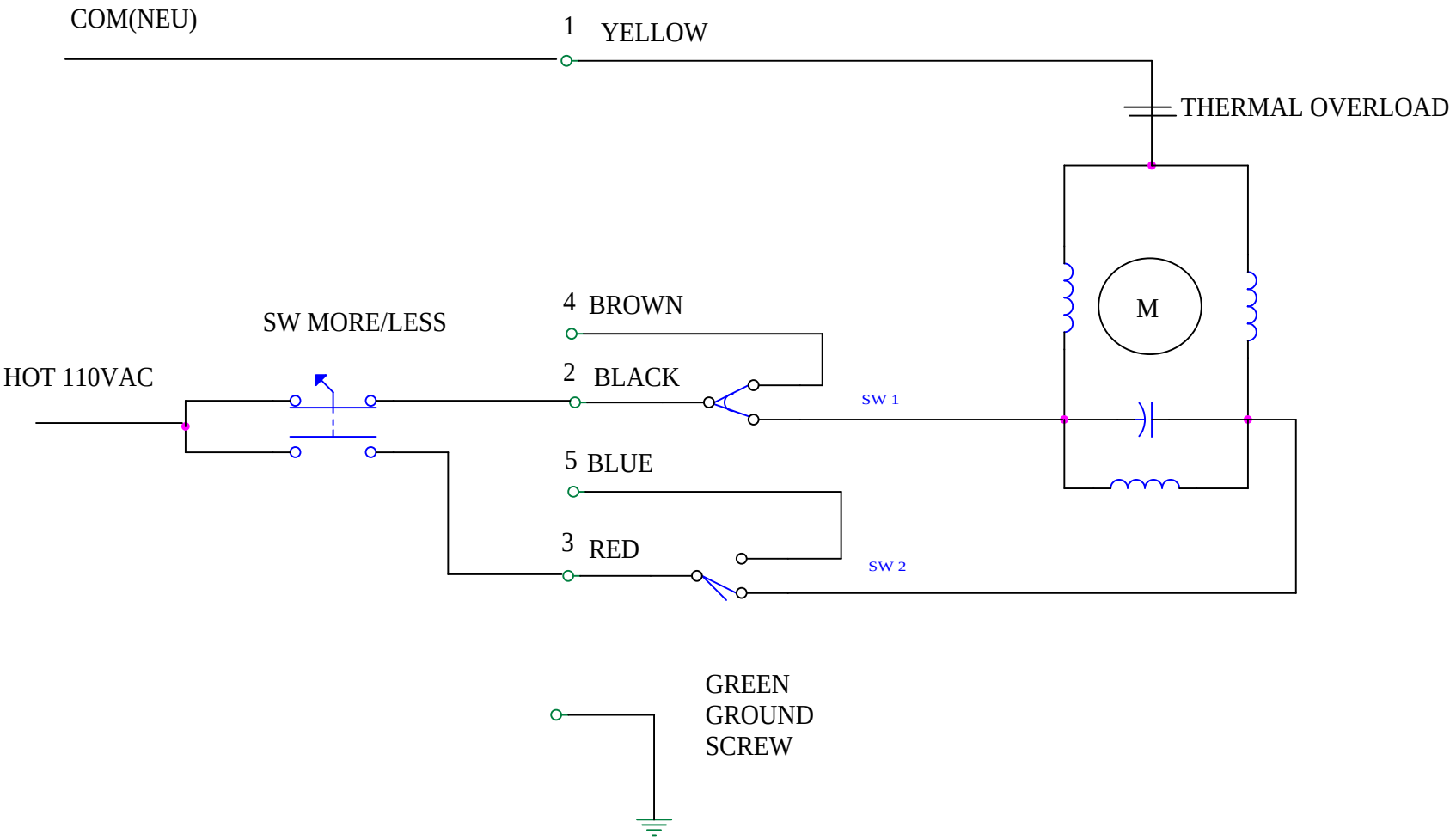
CRITTENDEN CONVERSION CORPORATION

Title: BG3 BLOWER 3-PHASE SCHEMATIC

Size: A | Document Number: BG2003_3PanelWiring | Rev: A

Date: Thursday, April 03, 2003 | Sheet 9 of 9





CRITTENDEN CONVERSION CORPORATION		
Title: MODEL MAR 8RH-8 120 50/60 0.6 AMP (VACUUM MORE/LESS)		
Size: A	Document Number: BG3_3PANEL WIRING	Rev: A
Date: Tuesday, April 08, 2003	Sheet 1 of 1	