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# **D-20XX Troubleshooting Program**

The Troubleshooting Program allows reading of inputs (switches, etc.) and writing to outputs (valves, motors, etc.). This allows maintenance technicians to individually test components and identify potential issues.

### **Machine Sections**

### Winding (Coiler) Side

Includes:

- 1. Spindle Drive
- 2. Cut and Transfer
  - a. "Cutter / Grabber" Mechanism (D-200)
  - b. Transfer Arm (D-2050)
- 3. Turret, Mandrel and Endforms
- 4. Tube Inserter
- 5. Buffer
- 6. Anti-Reverse

#### **Boxing Side**

Includes:

- 1. Box Folding Table
  - a. Ball Screw Drive (D-2000)
  - b. Servo (D-2050)
- 2. Box Load Magazine including safety inhibits
- 3. Vertical Glue Cylinder
- 4. Glue Applicator
- 5. Exit Conveyor

### **Entering Troubleshooting Program**

WARNING: Experienced personnel only! Keep personnel away from moving parts! Damage to parts could occur without careful adjustments. Before attempting to move any parts make sure parts will not hit each other. Also make sure all persons are clear of any moving parts before moving them.

- 1. To enter the troubleshooting program, the machine should be E-Stopped
- Switch the "GUARDING BYPASS SWITCH" to the bypass position. This will bypass the guarding and apply power to the outputs on the machine allowing free movement of parts without restrictions.

- 3. Attach spare keyboard where the small keyboard is attached at the monitor console.
- 4. Pull out all E-STOPs and press the E-STOP RESET button.
- 5. While the computer starts up hold F5 to stop the autoboot function.
- 6. When C: prompt is seen, enter dee2013.exe or other .exe program that is not D2000.exe. This will bring up the troubleshooting program.

**NOTE:** To ensure the autoboot function is enabled again, cycle power after all troubleshooting program needs are satisfied.

#### 7. The following screen will appear:

D2000 Start-Up Menu	
1.Monitor switches and control valving:	
2.Monitor encoders:	
3.Motor control:	
4.Table position and encoder:	
5.Control opto-coupled I/O boards:	
6.Input Nodes:	
7.Output Nodes:	
Press ESC to Exit:	

To select a function, hit the appropriate number that corresponds to the function. For example, to monitor switches and control valving hit the number one on the keyboard/pad. It will bring up another screen pertaining to that function.

**NOTE:** To get out of the troubleshooting program, E-STOP the machine and follow instructions on how to start up the machine after an E-STOP condition.

### Function 1 – Monitor Switches and Control Valving

If number 1 is pressed on the keyboard/pad, the following screen will come up:

STATUS OF DEVICE NET RAM					
	MAC			MAC	
	ID#			ID#	
OUT 1A;	000000000	IN 10;	1A	10001011	139
OUT 1B;	000000000	IN 11;	1B	00001001	9
OUT 2A;	000000000	IN 12;	2A	00001100	12
OUT 2A;	000000000	IN 13;	2B	11101000	232
OUT 3A;	000000000	IN 14;	3A	01010110	86
OUT 3A;	000000000	IN 15;	3B	10001010	138
OUT 4A;	000000000	IN 16;	4A	11101000	232
OUT 5A;	000000000	IN 1C;	5A	10101001	169
OUT 5A;	000000000	IN 1D;	5B	00001000	8
OUT 6A;	000000000	IN 22;	6A	01001001	73
OUT 6A;	000000000	IN 23;	6B	00101001	41
OUT 6C;	000000000	IN 28;	7A	10010000	144
OUT 7A;	000000000	IN 29;	7B	01101001	105
OUT 7B;	000000000	IN;		11001001	203
OUT;	000000000	IN;		10001011	139
OUT PORT:					

Press ESC to go back to the previous screen.

OUT refers to outputs and IN refers to inputs. The "MAC ID #" is the number of the Devicenet connection.

#### **Outputs:**

For example: The "MAC ID" of "OUT 1A" refers to NODE 1A. On "NODE 1A" there are 8 bits (eight output devices) that corresponds to the zeros across from the "MAC ID". The zeros indicate that all the valves are off. If there are any "ones" on those 8 bits that indicates they have been turned on.

To turn on a device, enter the MAC ID #, a period, and a number. Each bit has a value. For example the first bit (the zero furthest to the right of the 8 numbers) has a value of one. These numbers are combined to turn on multiple devices. To find out what device corresponds to which MAC ID #, please see the

manifold drawings (#20096, #20600 and #20601). To turn devices off, enter a new number or to turn all devices off on a particular terminal enter a zero for that terminal.

For example, to send the "CUTTER/GRABBER HORIZONTAL IN" enter the following: 1A.01 and then hit enter. If the period is forgotten, an invalid MAC ID is entered, or an invalid value is entered it must correctly re-entered.

The number furthest to the right is the combined value of that particular NODE. If the number is 5 that means the following devices have been turned on: 4(Bit 2), and a 1(Bit 0).

See chart below for values of each bit.

Bit:	7	6	5	4	3	2	1	0
Value:	128	64	32	16	8	4	2	1

The screen output will look like this if a [1A.132] is entered:

STATUS OF DEVICE NET R	AM			
	MAC			MAC
	ID#			ID#
ουτ	1A;	10000100 132	IN 10;	1A 10001011 139
ουτ	1B;	00000000	IN 11;	1B 00001001 9
OUT	2A;	00000000	IN 12;	2A 00001100 12
OUT	2A;	00000000	IN 13;	2B 1 1 1 0 1 0 0 0 232
OUT	3A;	00000000	IN 14;	3A 01010110 86
OUT	3A;	00000000	IN 15;	3B 1 0 0 0 1 0 1 0 138
OUT	4A;	00000000	IN 16;	4A 1 1 1 0 1 0 0 0 232
OUT	5A;	00000000	IN 1C;	5A 10101001 169
OUT	5A;	00000000	IN 1D;	5B00001000 8
OUT	6A;	00000000	IN 22;	6A 01001001 73
OUT	6A;	00000000	IN 23;	6B00101001 41
OUT	6C;	00000000	IN 28;	7A 10010000 144
OUT	7A;	00000000	IN 29;	7B 0 1 1 0 1 0 0 1 105
OUT	7A;	00000000	IN;	11001001 203
OUT	;	00000000	IN;	10001011 139
OUT PORT:port= 1				

#### Inputs:

For example: The "MAC ID" of "IN 1A" refers to the first 8 bits of NODE 1. On "NODE 1A" there are 8 bits (eight input devices) that corresponds to the zeros and ones across from the "MAC ID". The zeros indicate that the devices are off. A one would indicate a certain input was on.

Each bit has a value. For example, the first bit (the number furthest to the right of the 8 numbers) has a value of one. To find out what device corresponds to which MAC ID #, please see the switch drawings (#20631 and #20625).

The number furthest to the right is the combined value of that particular "TERMINAL". If the number is 139 that means the following devices are on: 128 (Bit 7), 8(Bit 3), 2(Bit 1), and a 1(Bit 0).

See chart below for values of each bit.

Bit:	7	6	5	4	3	2	1	0
Value:	128	64	32	16	8	4	2	1
Hex Address (Wire#):	80	40	20	10	08	04	02	01

To change the status of a particular input device, move a part manually or output to the appropriate output device.

### Function 2 – Monitor Encoders

If number 2 is pressed on the keyboard/pad the following screen will come up:

ENCODERS		
Press ESC to Exit		
Spindle: 300		
Traverse: 475		
Table: 2000		

Press ESC to go back to the previous screen.

Looking at this screen allows reading each of the encoders. This is helpful in determining whether or not they are working correctly as well as to make sure the counter boards (W602 & W603) are working properly. The number will increase in the forward direction and decrease in the reverse direction. The numbers for the spindle and traverse should range from 0 to 719 and the table range is 0 to 65,535 although the max is around 30,000. Zero is read on the table encoder when the table is all the way back or retracted towards the glue machine.

### **Function 3 – Motor Control**

If number 3 is pressed on the keyboard/pad the following screen will come up:

Motor controls
1.Spindle motor
2.Traverse motor
3.Chuck Gear motors
Press ESC to exit

Press ESC to go back to the previous screen.

Select the appropriate motor.

### **Spindle Motor and Traverse Motor**

SPINDLE MOTOR:		
Mechanical damage is possible		
if spindle obstructed		
Gear motors and index will disengage.		
Enter reference 0-4095: 2048 = 0v ref		
Traverse MOTOR:		
Traverse MOTOR: Mechanical damage is possible		
Traverse MOTOR: Mechanical damage is possible if traverse obstructed		
Traverse MOTOR: Mechanical damage is possible if traverse obstructed Gear motors and index will disengage.		
Traverse MOTOR: Mechanical damage is possible if traverse obstructed Gear motors and index will disengage. Enter reference 0-4095: 2048 = 0v ref		
Traverse MOTOR: Mechanical damage is possible if traverse obstructed Gear motors and index will disengage. Enter reference 0-4095: 2048 = 0v ref		

Enter a number from 0 to 4095. 2048 is 0v reference. Anything entered lower than 2048 will go in the reverse direction and anything higher than 2048 will go in the forward direction. Press [e] to enable the motor or [esc] to ESC. Once the motor is enabled, press [d] to disable the motor or [esc] to ESC.

#### **Gear Motors**

When Chuck Gear Motor is selected the following screen will be displayed:

Please make sure all gear motors can engage hit continue when ready

After the continue button is pressed, select the chuck to be tested.



Hit the continue or pause button to open or close the appropriate chucks.



When Box Table Drive is selected the following screen will be displayed:

Cho	ose Option:
1. Jo	ng Box Table
2. W	rite Value to D/A
ESC	to Return

### Function 4 – Table Position and Encoder

If number 4 is pressed on the keyboard/pad the following screen will come up:



Press ESC to go back to the previous screen.

Press a key to continue.

Table position routine		
ESC to exit the menu		
Press a key to continue		
Counter Board Reset		
Please wait while table resets		

After the table resets, enter a number:



The table will position according to the number entered. A zero will send the table all the way back towards glue machine. After the table positions, the program will go back to the main menu.

## Function 5 – Control Opto-Coupled I/O Boards

If number 5 is pressed on the keyboard/pad the following screen will come up:

STATUS OF OPTO-COUPLED I/O		
OUT A0 0 0 0 0 0 0 0 0 0	IN B0	10001011 139
OUT A10000000000	IN B1	00001001 9
OUT A20000000000	IN B2	00001100 12

Press ESC to go back to the previous screen.

"OUT" refers to outputs and "IN" refers to inputs. There are 3 8-bit ports on each board. There are 2 boards (1 input board and 1 output board). This makes a total of 24 inputs and 24 outputs.

#### **Outputs:**

There are 3 output ports (OUT A0, OUT A1, & OUT A2). The zeros indicate that all the devices are off. If there are any "ones" on those 8 bits, that indicates they have been turned on.

To turn on a device, enter the output port, a period, and a number. Each bit has a value. For example the first bit (the zero furthest to the right of the 8 numbers) has a value of one. These numbers are combined to turn on multiple devices. To find out what device corresponds to which output port please see the drawing #20615. To turn devices off enter a new number or to turn all devices off on a particular terminal enter a zero for that terminal.

For example, to turn on the "TOWER BUZZER", enter the following: A0.01 and then hit enter. Forgetting the period, entering an invalid "OUTPUT PORT", or an invalid value will not be accepted.

The number furthest to the right is the combined value of that particular "PORT". If the number is 5, that means the following devices have been turned on: 4(Bit 2), and a 1(Bit 0).

See chart below for values of each bit.

Bit:	7	6	5	4	3	2	1	0
Value:	128	64	32	16	8	4	2	1

The screen output will look like this if a [A0.05] is entered:

STATUS OF OPTO-COUPLED I	/O BOARDS	
OUT A0000001015	IN B0	10001011 139
OUT A10000000000	IN B1	00001001 09
OUT A20000000000	IN B2	00001100 12
OUT PORT		
Port 0		
Valve 5		

### Inputs:

For example: on "IN B0" there are 8 bits (eight input devices) that corresponds to the zeros and ones across from the "INPUT PORT". The zeros indicate that the devices are off. A one would indicate a certain input was on.

Each bit has a value. For example, the first bit (the number furthest to the right of the 8 numbers) has a value of one. To find out what device corresponds to which 'INPUT PORT", please see the switch drawing #20615.

The number furthest to the right is the combined value of that particular "TERMINAL". If the number is 139 that means the following devices are on: 128 (Bit 8), 8(Bit 4), 2(Bit 2), and a 1(Bit 1).

See chart below for values of each bit.

Bit:	7	6	5	4	3	2	1	0
Value:	128	64	32	16	8	4	2	1
Hex Address (Wire#):	80	40	20	10	08	04	02	01

To change the status of a particular input device, move a part manually or by outputting to the appropriate output device.

### **Function 6 – Input Nodes**

Press number 6 and the following screen will appear:

D2000 initiate Startup Diagnostic < H > help	
1-NODE #1 Inputs Located On Frame Above Turret	
2-NODE #2 Spindle Table Inputs	
3-NODE #3 Turret Inputs	
4-NODE #4 Cut Grab Table Inputs	
5-NODE #5 Top Box Side Inputs	
6-NODE #6 Box Table Inputs	
7-NODE #7 Button Box I/O Module	
PRESS <ctrl &="" q=""> to Exit:</ctrl>	

Check any of the nodes to see what switch is on. Press the number 1-7 on the keyboard/pad to see the following inputs. They will be off or on. Move the appropriate parts on the D-2000 to change state of the switch. Press "ESC" to exit.

Manifold Node #1 Input Switches Loca	Manifold Node #1 Input Switches Located on Frame Above Turret			
0-T.H. Jaws Closed		ON		
1-Tube Present		ON		
2-Turret Rotate Clockwise	OFF			
3-Turret Rotate CCW	ON			
4-T.H. Vertical Down	OFF			
5-T.H. Vertical Up		OFF		
6-T.H. Horizontal In		OFF		
7-T.H. Horizontal Out	ON			
8-T.H. Vertical Eye	OFF			
9-T.H. Vertical Mid		OFF		
10-T.H. Fingers Retract	OFF			
< ESC > To Select Menu				

Manifold node #2 Switches Windin	ng Side Spindle Table	
0-Spindle Table Out		OFF
1-Spindle Table In	ON	
2-Sp Index Unlocked	ON	
3-Sp Index Locked	OFF	
4-Sp Mandrel Collapsed	- ON	
5-Sp Mandrel Expanded OFF	:	
6-Sp Gear Motor Disengaged	ON	
7-Sp Gear Motor Engaged	ON	
8-C.G. Horizontal Mid	OFF	
< ESC > To Select Menu		

Manifold node #3 Switches on Turret

0-RT Mandrel Collapsed	OFF
1-LT Mandrel Collapsed ON	
2-RT Gear Motor Engaged	ON
3-LT Gear Motor Engaged	OFF
4-RT Mandrel Mid	ON
5-LT Mandrel Mid	OFF
6-RT Gear motor Disengaged ON	
7-LT Gear motor Disengaged ON	
8-RT Mandrel Expanded	OFF
9-LT Mandrel Expanded	ON
9-LT Mandrel Expanded 10-RT Endform Up	ON OFF
9-LT Mandrel Expanded 10-RT Endform Up 11-LT Endform Up	ON OFF ON
9-LT Mandrel Expanded 10-RT Endform Up 11-LT Endform Up 12-RT Endform Mid	ON OFF ON OFF
9-LT Mandrel Expanded 10-RT Endform Up 11-LT Endform Up 12-RT Endform Mid 13-LT Endform Mid	ON OFF ON OFF ON
9-LT Mandrel Expanded 10-RT Endform Up 11-LT Endform Up 12-RT Endform Mid 13-LT Endform Mid 14-RT Endform Down	ON OFF ON OFF ON

< ESC > To Select Menu

A0-Cut Grab Vertical Down O	OFF		
A1-Cut Grab Horizontal Left -	ON		
A2-Not Used		OFF	
A3-C.G. Horizontal Mid -	ON		
B0-Cut Grab Horizontal Right	OFF		
B1-Cut Grab Table In	OFF		
B2-Cut Grab Table Out	ON		
B3-Cut Grab Vertical Up	ON		
< ESC > To Select Menu			

A0-Glue Gun Photo		
A1-Glue Nozzle Down		ON
A2-Glue Flaps Up		
A3-Glue Flaps Mid		ON
B0-Box Load Vacuum	OFF	
B1-Box Load Vertical Up	OFF	
	<b>O</b> TT	
B2-Box Load Horizontal Out	ON	
B3-Box Load Horizontal In	OFF	
C0-Low box Supply		OFF
C1-Box Exit		ON
C3-Low Tube Supply	ON	
D0-Tube Pickup Cup		OFF
D1-Box Table Mid		OFF
D2 Poy Table End Posst		
D2-Box Table End Reset	ON	
D3-Not Used		ON
< ESC > To Select Menu		

A0-Box fold Right Extend	OFF	
A1-Box fold Left Extend		ON
A2-WireEnd assm Out	OFF	
A3-Box Top Fold Photo Eye	O	N
B0-Compress Open	OFF	
B1-BottomFlap Left Down	OFF	
B2-Unused		OFF
B3-BottomFlap Left Up		ON
C0-Compress closed		ON
C1-BottomFlap Right Down	OFF	
C2-Table Vacuum		ON
C3-BottomFlap Right Up	OFF	
< ESC > to Select Menu		

I/O Module node #7 Switches Button B	ox
Module A	
	Ix0-Start Button OFF
	Ix1-Stop ButtonON
	Ix2-Speed Slowdown OFF
	Ix3-Speed upON
	Ix4-Continue Button OFF
	Ix5-Pause Button OFF
	Ix6-Length Reset OFF
	Ix7-TransferON
Module B	
	Ix0-SeQ Window OFF

	Ix1-Door Release OFF	
	Ix2-Clear Faults	OFF
	Ix3-Coil Removed	OFF
	Ix4-No Box Coil OFF	
	Ix5-No Glue	ON
	Ix6-Low Glue Supply	ON
	Ix7-Glue Ready	ON
< ESC > to Select Menu		

## **Function 7 – Output Nodes**

Press number 7. The following screen will appear:



Press the node needed. A new menu will come up.

Manifold node #1 Winding side large Festo	
1-Cut Grab Horizontal	
2-Spindle Table	
3-Tube Retain	
4-Tube Holder Horizontal	
5-Rotate Turret	
6-Tube Hold Vertical	
7-Wire Grabber Jaws	
8-Spindle Table Lock Return Cyl Not Used	
< ESC > to select Menu	

Select which value (1-7) is needed. Another screen will appear. Turn the value on. It also indicates which direction it will go.

Cut Grab Horizontal	
Press < Pause > Push Button Move IN toward Turret	
Press < Continue > Push Button Move OUT away from Turret	
Press < ESC > Return to Main Menu	

This can be done for all the rest of the output nodes.

Manifold node #2 Winding Side Festo small	
1-Anti Reverse	
2-Buffer Dancer	
3-Oiler Traverse	
4-Tube Magazine	
5-Spindle Index	
6-Spindle Gear motor	
7-Soft Start Valve Brake Relay	
8-Tube Holder Fingers	
< ESC > to Select Menu	

#### Manifold node #3 On Turret

- 1-Tailhold Left
- 2-Tailhold Right
- 3-Gearmotor Right side
- 4-Gearmotor Left side
- 5-Endform Left
- 6-Endform Right
- 7-Tube Inserter Stop Cyc
- 8-Not used
- < ESC > to Select Menu

Manifold node #4 Cut Grab
1-Cut Grab Cut
2-Cut Grab Cut
3-C.G Vertical
4-C.G Horizontal
< ESC > to Select Menu

Manifold node #5 SMC Top of Boxside

- 1-Glue Gun
- 2-Glue Flap Vertical
- 3-Boxload Vacuum
- 4-Boxload 2nd CUP
- 5-Glue Nozzle Vertical
- 6-Boxload Vertical
- 7-Boxload Horizontal

Manifold node #6 SMC Box Table

1-Box Fold Bottom Left

2-Box Fold Bottom Right

3-B.F Back Right

4-B.F Front

5-Wire Grabber Assm or Nylon Rod & Switch

6-Table Vacuum Unlatch Box Fold Compress

7-Wire Grab Around

8-Table Vacuum Top Flap Start

9-1st Top Flap Nylon

0-Box Flap Left

A-Vac Cup Purge

< ESC > to Select Menu

I/0 Modual node #7 Button Box

1-Start Light

2-Continue Light

3-Box Side Slow Start dump

4-Hotmelt Standby Reset Signal

5-Door Release Light

6-No Box Light

7-No Glue Top Light

< ESC > to Select Menu

# **Devicenet Switch Locations**

## Node 1

### Figure 4- Turret Rotary Actuator, Tube Holder Horizontal Cylinder



**NOTE:** The Left Turret's "L" Bracket will move under the traverse while in motion. The right side will never, the machine will reset and always start on the right turret

### Figure 9- Tube Holder, Tube Holder Vertical Eye



### Figure 10 - Tube Holder Vertical Cylinder



1020 Tube Holder Vert Up sw SWITCH-DH7CL SWITCH-BAN/040

1102 Tube Holder Vert Mid sw SWITCH-DG5NTL SWITCH-BAN/04

1010 Tube Holder Vert Down sw SWITCH-DH7CL SWITCH-BAN/040

### Node 2

### Figure 1 - Spindle Table



1202 Spindle in sw SWITCH-STOP/01

### Figure 7 - Spindle Mandrel



1220 Spindle Mandrel Opened sw SWITCH-PROX/02

1210 Spindle Mandrel Closed sw SWITCH-PROX/02

1301 Cutter/Grabber Table Stop sw SWITCH-STOP/01

### Figure 8 - Spindle Index, Spindle Gear Motor Engage/Disengage



### Node 3

#### Figure 2 - Endform/Turret Rotation



Rotation Stop for

### **Figure 3 - Endform Cylinder**



#### Figure 5 - Mandrel



1502 Left Mandrel Opened sw 1501 Right Mandrel Opened sw SWITCH-PROX/02

1420 Left Mandrel Mid sw 1410 Right Mandrel Mid sw SWITCH-PROX/02

1402 Left Mandrel Closed sw 1401 Right Mandrel Closed sw SWITCH-PROX/02

### Figure 6 - Turret Gearmotor Engage/Disengage



1408 Left Gear Motor Engaged sw 1404 Right Gear Motor Engaged sw SWITCH-DA90/D

1480 Left Gear Motor Disengaged sw 1440 Right Gear Motor Disengaged sw SWITCH-DA90/D

### Node 4

Figure 12 - Cutter/Grabber L/R/Mid, Vertical Up/Down (D-2000 Only)



1680 Cutter/Grabber Vert Up sw SWITCH-DH7CL

1602 Cutter/Grabber Horz Left sw SWITCH-DY69BL/D

1608 Cutter/Grabber Left-Right Mid sw SWITCH-DY69BL/D (See DWG. 18036 SWITCH-LATCH/K1)

1610 Cutter/Grabber Horz Right sw SWITCH-DY69BL/D

1601 Cutter/Grabber Vert Down sw SWITCH-DH7CL SWITCH-BAN/040

### Figure 13 - Cutter/Grabber Horizontal In/Out (D-2000 Only)



1640 Cutter/Grabber Horz Out sw SWITCH-DY69BL/C

1620 Cutter/Grabber Horz In sw SWITCH-DY69BL/C

Figure 23 - Robot Arm (D-2050 Only)



### Figure 24 - Robot Arm Shoulder/Elbow (D-2050 Only)



### Node 5

#### Figure 14 - Box Load Horizontal Cylinder



1C40 Box Load Horz Out sw SWITCH-DY69BL/C (D2000) SWITCH-DY69BL/D (D2050)

1C80 Box Load Horz In sw SWITCH-DY69BL/C

1C10 Box Load Vacuum sw VACUUM-SWITCH/3

### Figure 15 - Box Load Vertical Cylinder



### Figure 16 - Box Fold Top/Glue Nozzles



Node 5

#### Figure 11 - Tube Pickup Cup

1D08 Low Tube Supply sw SWITCH-PROX/04A -



1D10 Tube Pickup Cup sw SWITCH-PROX/04A

Or - SWITCH-PHOTO/03 When used with SWITCH REFLE/02

### Node 6

#### Figure 18 - Box Fold Back/Table Box Hold Vacuum Switch



2208 Box Top Fold Photo Eye SWITCH-PHOTO/02

2204 Tail Grabber In sw SWITCH-DG5NTL SWITCH-BAN/32

2202 Box Fold Back Left sw SWITCH-DH7CL SWITCH-BAN/01

2201 Box Fold Back Right sw SWITCH-DH7CL SWITCH-BAN/01

2304 Table Box Hold Vacuum SW VACUUM-SWITCH/3

#### Figure 19 - Box Fold Bottom



2280 Box Fold Bottom Left Up sw SWITCH-DH7CL SWITCH-BAN/32

2308 Box Fold Bottom Right Up sw SWITCH-DH7CL SWITCH-BAN/32

PU3 Table Mid sw SWITCH-PROX/02A

2220 Box Fold Bottom Left Mid sw SWITCH-DG5NTL SWITCH-BAN/02

2302 Box Fold Bottom Right Mid sw SWITCH-DG5NTL SWITCH-BAN/02

#### Figure 21 - Compression Cylinder

2210 Box Compress Open sw SWITCH-DA54C

2301 Box Compress Close sw SWITCH-DA54C



### Figure 22 - Conveyor

