

Troubleshooting - Single Spindle

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Introduction

The troubleshooting program enables the operator or maintenance personnel to manually control everything electrically connected to the controller. This is done by using the hole size thumb-wheel as a keyboard, the JOG button as an ENTER button, and the four 7 segment LED's, (length) as a display. To exit the troubleshooting program press the EMERGENCY STOP button.

The CPU can either read an INPUT PORT or write to an OUTPUT PORT. The CPU has to know which one you would like so by placing the FEET/METERS switch on FEET you are indicating that you would like to read an INPUT PORT (such as thumb-wheels, A /D's, switches, etc.). If the FEET/METERS "switch" is in the METERS position, the CPU will accept data to be written to an OUTPUT PORT. (Such as D/A's, LED's and VALVES). The CPU puts a number eight in the thousands digit of the display to indicate that it is in the OUTPUT mode. Press the EMERGENCY STOP button, to exit the troubleshooting program.

The Program Has Three Basic Modes:

1. PORT SELECT

After powering up the D-750 in the troubleshooting program you must dial the port number (decimal) that you desire in the hole size thumb-wheel. Next, put the FEET/METERS switch, in the FEET position, for reading an INPUT PORT or in the METERS position, to write to an OUTPUT PORT.

2. INPUT MODE ([Chart One](#))

The CPU writes to the display what it reads from the INPUT PORT. To return to the PORT select mode momentarily push the JOG button and the LED's will flash to indicate that this has been done.

3. OUTPUT MODE ([Chart Two](#))

WARNING: DAMAGE MAY OCCUR TO MECHANICAL PARTS IF CARE IS NOT TAKEN! DO NOT PROCEED ANY FURTHER IF THIS IS NOT UNDERSTOOD!

Place the FEET/METERS switch into the meter position. Dial the port you wish to write to in the hole size thumb-wheels. The PORT number will appear in the 7 segment readout units to hundreds. Momentarily push the JOG button. The LED's will momentarily indicate that the JOG button has been pressed.

An eight will appear in the thousand digit with the port number selected remaining in the units to hundreds. Dial the data to be written out to the port in the hole size thumb-wheel. Momentarily, push the JOG button, and the number will be written at this time. The number will also be placed in the units to hundreds position in the display, with an eight remaining in the thousands position of the display. New numbers may be written by repeating the previous process. To exit this mode and return to the PORT select mode place the FEET/METERS switch in the FEET position.

Section 1: Operating Procedure

Reference Video:

- View the video here: [Troubleshooting for Single Spindle Machines - Sections 1-3](#)

To Enter Troubleshooting:

To enter the troubleshooting program hold down the JOG button and press the RESET button. After several seconds the eight LED's will flash until the JOG button is released. This is an indicator to you that you are now in the troubleshooting program.

To Exit Troubleshooting:

To exit the troubleshooting program press the EMERGENCY STOP button.

Operation:

A number will appear at the display this number should be exactly the same as the number in the hole size thumb-wheel.

1. Turn each digit of the hole size thumb-wheel to insure that the CPU is reading "thumb-wheels" and writing "to display" properly.
2. Enter the port number in decimal, which you wish to test (see Chart one or two).
 - a. Place the FEET/METERS switch in the FEET position to read an INPUT PORT
 - b. Place the FEET/METERS switch in the METERS position to write to an OUTPUT PORT.
3. Momentarily push the JOG button. The LED's will flash once to indicate that the PORT number has been entered.
4. See Sections 2 (INPUTS) or Section 3 (OUTPUTS):
 - a. Go to Section 3 if FEET/METER switch is in METERS position.
 - b. Go to Section 3 if FEET/METER switch is in METERS position.

Section 2: Read Input Ports

References:

References:

- [Chart One](#) for More Information

Reference Drawings:

- [Drawing 10621](#) - I/O Board Schematic
- [Drawing 10612](#) - Receivers and Counters

Reference Video:

- View the video here: [Troubleshooting for Single Spindle Machines - Sections 1-3](#)

nThe number read from the INPUT PORT will be on the display. To exit this mode and return to the PORT select mode momentarily hit the JOG button.

- PORT 0-** The UPPER RATIO thumb-wheels are read. The display will show what is dialed into the thumb-wheels, check both digits. (See Drawing 10621.)
- PORT 1-** The LOWER RATIO thumb-wheels are read. The display will show what is dialed into the thumb-wheels, check both digits. (See Drawing 10621.)
- PORT 2-** Length Adjustment Switch - (See Drawing 10621.)
- PORT 3-** Interrupt - See Section Four or call REELEX Packaging Solutions, Inc., (See Drawing 10621.)
- PORT 4-** Hundreds digit of the hole size thumb-wheel plus an assortment of buttons will be displayed, please check all. (See Drawing 10621.)
- PORT 5-** Units and Tens of the hole size thumb-wheels will display check both digits 0 to 9, (See Drawing 10621.)
- PORT 6-** Units and Tens of the PRESET 1 thumb-wheels will display, check both digits. (See Drawing 10621.)
- PORT 7-** Hundreds and Thousands of PRESET 1 thumb-wheels will display, check both digits. (See Drawing 10621.)
- PORT 40-** Units and Tens of the Cam Counter. Numbers from 0 to 99 will display when the cam is moved by hand. When the motor turns in the forward direction the numbers will go up, and then will go down, when rotated in the reverse direction. (See Drawing 10612.)
- PORT 41-** Hundreds of Cam Counters, and Hundreds of the Spindle counters will display. When the Spindle is moved by hand the numbers will change by tens. You will see the numbers 0, 10,20 ...70, 0 or count down, depending on the direction you move the Spindle. The number displayed will change by 1 when the Traverse is moved by hand. 0, 1, 2...7, 0, or the reverse will display. (See Drawing 10612.)

PORT 48- Switches on machine to be read. Move parts by hand to test individual switches. Add values together. For example: endform arm up (04) and in (01) will show 05 in display.

See Drawing PB24 OPTO Relays for details.

Bit	Value	Description	Description (Machines with Guarding)
0	1	Endform In	
1	2	Endform Out	
2	4	Arm Up	
3	8	Arm Down	
4	16	Count up or down	
5	32	Decel on Faults	Movable Bar
6	64	Decel on Sparker	Seq. Print
7	128	Decel on RUN & JOG	Seq/Normal Mode

PORT 50- Faults on machine and other inputs to be read.
(See Drawing PB24 OPTO Relays for details.)

Bit	Value	Description	Description (Machines with Guarding)
0	1	N.C. fault	
1	2	N.C. fault	Open/Close D-750 Guard
2	4		Guard Closed and Locked
3	8	REELEX/Spooler	Key Inserted

PORT 64- Unit and Tens of the PRESET 2 thumb-wheels will display, check both digits. (See Drawing 10621.)

PORT 65- Hundreds and Thousands of the PRESET 2 thumb-wheels will display, check both digits. (See Drawing 10621.)

PORT 66- SPINDLE A/D-Numbers from 0 to 255 will display. (See Drawing 10621.)

PORT 67- CAM A/D-Numbers from 0 to 255 will display. (See Drawing 10621.)

Section 3: Output Ports

NOTE: Reference [Chart Two](#) for More Information

The CPU writes a number eight in the thousands position (80XX) of the display to indicate that the program is in the OUTPUT mode.

Dial the data to be written into the hole size thumb-wheel, and momentarily press the JOG button. The LED's will flash to indicate that the number has been written. This number will also appear in the display with the number eight in the thousands digit.

The operation that is desired should be performed at this time. If you wish to output a new number, simply dial this number into the hole size thumb-wheel, and momentarily press the JOG button. This may be repeated as many times, as you like.

To return to the PORT Select mode (Section One), place the FEET/METERS switch in the FEET position. The number eight will disappear in the thousand position.

- PORT 0-** The LED's on the front panel are written to. A number from 0 to 255 may be used. (See Drawing 10621.)
- PORT 1-** The SPNDA, controls the speed of the spindle motor (or Stretch Wrap Module if equipped) if the spindle drive has been enabled properly (see section five). Speed is related to a number, where if 0 is outputted the motor should go full speed reverse, if 128 is outputted the motor should not turn or go slow depending on offsets, and if 255 is outputted the motor should go full speed forward. (See Drawings 10621 and #0019 for Schematics.)
- PORT 2-** The CAMDA controls the speed of the cam motor if the cam motor has been enabled properly (see Section Five). Speed of the cam motor is related to a number outputted to this port. If 0 is outputted the cam motor should go full speed reverse if 128 is outputted then the motor should not turn or will go slow, depending on offsets and the cam motor will go full speed forward if 255 is outputted.
- PORT 3-** Interrupt Disable - (See Section 4)
- PORT 4-** Control Relays - (See Section 5)
- PORT 5-** Spare - Bit 0 starts A/D conversion. Bit 1 Releases Accel Cap.
- PORT 6-** Units and Tens digit of the display.
- PORT 7-** Hundreds and Thousands digit of the display.
- PORT 49-** Turning on air valves.

WARNING: DAMAGE MAY OCCUR TO MECHANICAL PARTS IF OPERATION IS NOT UNDERSTOOD AND PERFORMED CORRECTLY! See examples below.

Port 49 - Air Valve Values

Bit	Value	Description
0	1	Endform In Valve
1	2	Endform Out Valve
2	4	Arm Up Valve
3	8	Arm Down Valve
4	16	Dump Valve
5	32	Oiler - On for 5 Sec Every 5 Hours
6	64	Payoff Stop, Opens for 1 Sec after stopped for 5 Minutes
7	128	Run & Jog Indicator

NOTE: Dump valve (16) must be on in order for valves to operate. Thus, in adding together the values you wish to activate, include 16 if you are checking motion.

Procedure Examples:

1. Put Feet/Meters selector switch in *Meters* position.
2. Dial 49 into hole size.
3. Press the JOG button momentarily. A number eight will appear in the thousands position.
4. Dial 18 into hole size and press the JOG button momentarily. The endform will move to the out position.
 - $16 \text{ (dump valve)} + 2 \text{ (endform out)} = 18$
5. Dial 26 into hole size and press the JOG button momentarily. The arm will go down and stay in the out position.
 - $16 \text{ (dump valve)} + 2 \text{ (endform out)} + 8 \text{ (arm down)} = 26$
6. Dial 22 into hole size and press the JOG button momentarily. The arm will go up and stay in the out position.
 - $16 \text{ (dump valve)} + 2 \text{ (endform out)} + 4 \text{ (arm up)} = 22$
7. Dial 21 into hole size and press the JOG button momentarily. The arm will stay up and endform moves in the in position.
 - $16 \text{ (dump valve)} + 1 \text{ (endform in)} + 4 \text{ (arm up)} = 21$

Section 4: Interrupts

Reference Video:

- View the video here: [Troubleshooting for Single Spindle Machines - Sections 4-5](#)

Use the interrupt section to evaluate the W90 board's function. By turning off each interrupt individually, the technician can determine whether individual functions are inoperative.

Output PORT 3 enables and disables the interrupts. Input PORT 3 reads the status of the interrupts. These two PORTS operate in tandem, and must be controlled in this manner to insure correct operation. The following procedure will test all interrupts. Each interrupt has a value, see table below.

To Test Interrupts:

1. Enter digits 255 to output PORT 3. (Look at Section 3: Output Ports)
2. Read input PORT 3, the digits 255 should appear on the display. (Look at Section 2: Read Input Ports)
3. Enter digits 000 to output PORT 3.
4. Read input PORT 3. The digits 127 should appear on the display. This will be 255 less 128 (Winding).
5. Press the STOP button. The digits 63 should appear on the display. This will be 127 less 64 (Stop).
6. Press the START button. The digits 31 should appear on the display. This will be 63 less 32 (Start).
7. Turn the length counter at least two revolutions. The digits 15 should appear on the display. This will be 31 less 16 (Length Count).
8. Press the L. RESET button. The digits 7 should appear on the display. This will be 15 less 8 (L. Reset).
9. Press the ON/OFF button. The digits 3 should appear on display. This will be 7 less 4 (Arm On/Off).
10. Cause a sparker error. The digits 1 should appear on the display, This will be 3 less 2 (Sparker).

Interrupt Values:

Number	Value	Description
1	128	Winding
2	64	Stop

3	32	Start
4	16	Length Count
5	8	Length Reset
6	4	Endform Arm On/Off
7	2	Sparker
8	1	Not Used

Section 5: Motors

Reference Video:

- View the video here: [Troubleshooting for Single Spindle Machines - Sections 4-5](#)

Output PORT 4, is the control port that enables the motors and the circuits used to control the motors.

See suggested outputs below:

- Output a 2 to PORT 5. Output a 5 to PORT 4 this will enable the spindle motor with the speed selector controlling the speed.
- Output a 129 to PORT 4, this will enable the spindle motor (or Stretch Wrap Module if equipped) and have it under control of the D/A.

NOTE: A number must be written to the spindle D/A to tell the motor how fast to go and in what direction. See Output PORT 1

- Output a 21 to PORT 4 this will enable the spindle motor under the control of the low speed potentiometer. Also output 2 to port 5.
- Output a 37 to PORT 4 this will enable the spindle motor under the control of the jog potentiometer. Also output 2 to port 5.
- Output a 2 to PORT 4 this will enable the cam motor under the control of the cam D/A. (See Output PORT 2)
- Outputs to PORT 2 will enable the speed of cam motor. The CAMDA controls the speed of the cam motor if the cam motor has been enabled properly. Speed of the cam motor is related to a number outputted to this port. If 0 is outputted the cam motor should go full speed reverse if 128 is outputted then the motor should not turn or will go slow, depending on offsets and the cam motor will go full speed forward if 255 is outputted.

Output Port 4 Values

BIT	VALUE	DESCRIPTION
0	1	Spindle Drive Enable Relay JD
1	2	Cam Drive Enable Relay JE
2	4	Accel Control Relay JA
3	8	Cam D/A Integrator Relay JF
4	16	Hi/Low speed select JB
5	32	Jog Speed Relay JC

6	64	Run Light (Low for On)
7	128	Speed Select/D/A (Low for Speed Select) Relay JG

Chart One: Input Ports

Port Number

Decimal	Hexadecimal	Function
0	0H	Upper ratio thumb wheels
1	1H	Lower ratio
2	2H	Length Adjustment Switches
3	3H	Interrupt

Port 3 Values

Bit	Value	Description
0	1	Spare
1	2	Sparker
2	4	On / Off
3	8	Length Reset Button
4	16	Footage Pickup
5	32	Start Button
6	64	Stop Button
7	128	Winding Routine

Port 4 Values

4	4H	Hole Bias - Bit 0-3 Hundreds Digit on hole size Thumb-Wheel
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Bit	Value	Description
4	16	Feet/Meters Switch
5	32	Stop Button
6	64	Count Up/Down

7	128	Jog Button
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Decimal	Hexadecimal	Function
5	5H	Units & Tens of hole size thumb wheels
6	6H	Units & Tens of PRESET 1 thumb wheels
7	7H	Thousand & Hundreds of PRESET 1 thumb wheels
40	28H	Cam Counters (Units and Tens)
41	29H	Hundreds of Counters (Cam and Spindle)
42	2AH	Spindle Counters (Units and Tens)
48	30H	PB24 OPTO Rack

Port 48 Values

Bit	Value	Description	Description (Guarding)
0	1	Endform In	
1	2	Endform Out	
2	4	Arm Up	
3	8	Arm Down	
4	16	Count up or down	
5	32	Decel on Faults	Movable Bar
6	64	Decel on Sparker	Seq. Print Input
7	128	Decel on STOP & JOG	Seq. (Closed) Normal (Open)

50	32H	PB24 OPTO Rack
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Port 50 Values

Bit	Value	Description	Description (Guarding)
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0	1	N.C. fault #1	
1	2	N.C. fault #2 OR Payoff Run Relay	Open/Close D-750 Guard
2	4	N.O. fault #3	D-750 Guard Closed And Locked
3	8	N.O. fault #4 OR Reelex/Spooler	Key Inserted Into Lock

64	40H	Units & Tens of PRESET 2 thumb wheels
65	41H	Thousands & Hundreds of PRESET 2 thumb wheels
66	42H	A/D
67	43H	A/D

Chart Two: Output Ports

Port Number

Decimal	Hexadecimal	Function
0	0H	LEDs Bit 0 Upper Ratio Indicator Bit 5-7 Error Indicator
1	1H	Spindle D/A
2	2H	Cam D/A
3	3H	Interrupt Disable

Output Port 3 Values

Bit	Value	Description
1	2	Sparker
2	4	On / Off
3	8	Length Reset
4	16	Footage Pickup
5	32	Start Button
6	64	Stop Button
7	128	Winding Int.

4	4H	Control Relays
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Output Port 4 Values

BIT	VALUE	DESCRIPTION
0	1	Spindle Drive Enable Relay JD
1	2	Cam Drive Enable Relay JE
2	4	Accel Control Relay JA
3	8	Cam D/A Integrator Relay JF

4	16	hi/low speed select JB
5	32	Jog Speed Relay JC
6	64	Run Light (Low for On)
7	128	Speed Select/D/A (Low for Speed Select) Relay JG

Decimal	Hexadecimal	Function
5	5H	Control Bit 0 Start A/D's Bit 1 Accel. Integrator
6	6H	Units & Tens of Display (Length)
7	7H	Hundreds & Thousands of Display (Length)
49	41H	PB24 OPTO Rack

Output Port 49 Values

Bit	Value	Description
0	1	Endform In Valve
1	2	Endform Out Valve
2	4	Arm Up Valve
3	8	Arm Down Valve
4	16	Dump Valve
5	32	Oiler – On for 5 Sec.Every 5 Hours
6	64	Sparker Indicator OR Payoff Stop
7	128	Run & Jog Indicator

50	42H	PB24 OPTO rack
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Output Port 50 Values

Bit	Value	Description	Description (Guarding)
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4	16	Fault 1 Indicator	
5	32	Fault 2 Indicator	Open/Close Guard Door Valve
6	64		Lock D-750 guard
7	128	Spooler / Online-Offline	