An X-Axis motion control program for automating paint spraying.

This program controls a motor mounted to a plate which slides along a rail.

To reverse the direction of the motor, we used two pair of PLC relay outputs to swap the polarity of the voltage to the motor.

The speed of the motor is set by a potentiometer and viewed on a digital display.

A motor controller is used to send the motor 0-30VDC from a 30VDC power supply controlled by a 0-10VDC PLC analog output signal.

Two limit switches(left and right) are used to stop the plate and then send it back the other direction.

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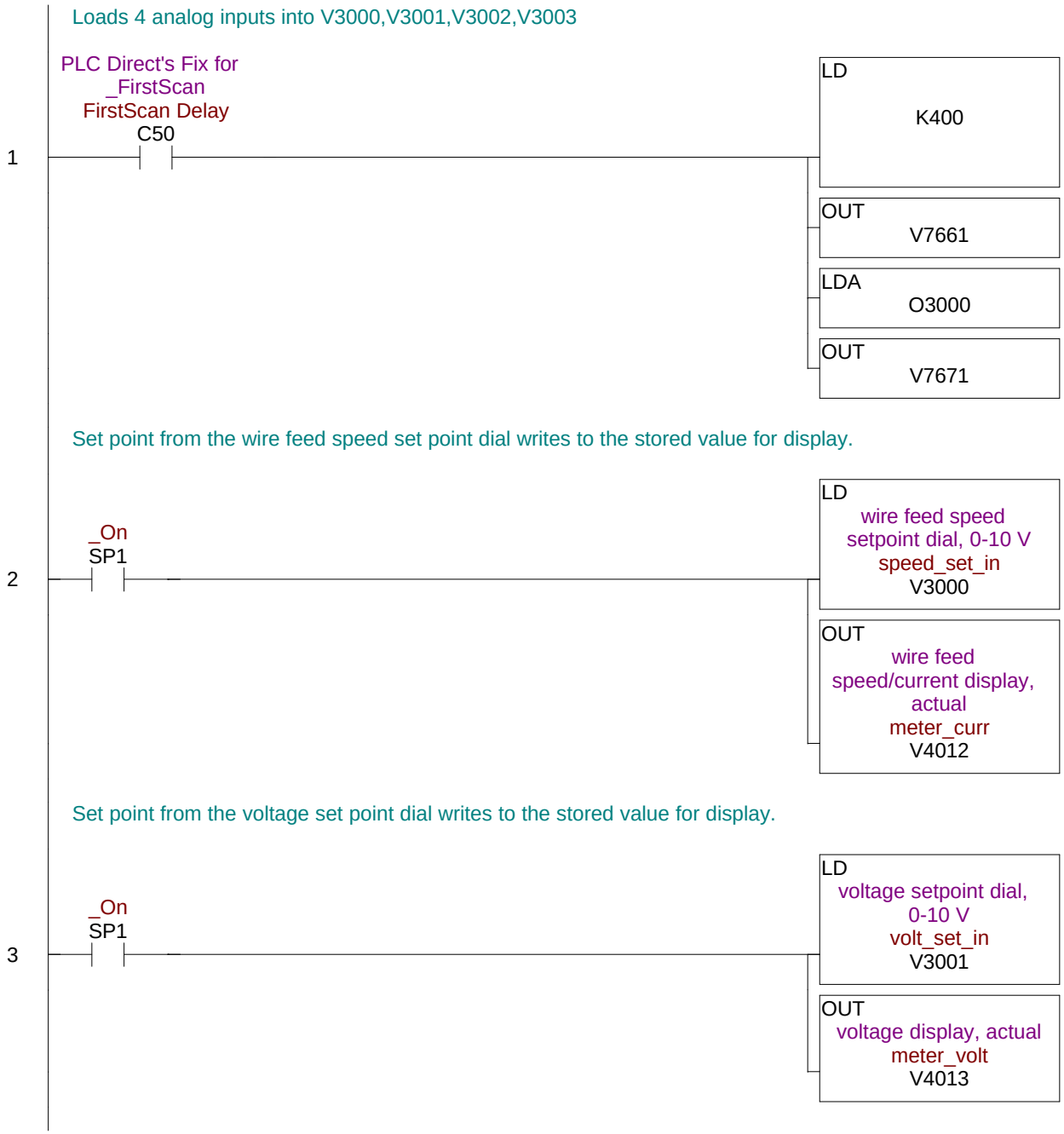
PLC symbols:
X-- Discrete Input
Y-- Discrete Output
C-- Internal Coil/Contact
K-- Constant in Hex(For free decimal to hex converter, goto http://www.ractive.ch/gpl/Hexer.html)
O-- Analog Input/Output
V-- Internal Register
T-- Timer


Loads 4 analog inputs into V3000,V3001,V3002,V3003
PLC Direct's Fix for
_FirstScan
FirstScan Delay
C50
1
LD
K400
OUT
V7661
LDA
O3000
OUT
V7671
Set point from the wire feed speed set point dial writes to the stored value for display.
_On
SP1
2
LD
wire feed speed
setpoint dial, 0-10 V
speed_set_in
V3000
OUT
wire feed
speed/current display,
actual
meter_curr
V4012
Set point from the voltage set point dial writes to the stored value for display.
_On
SP1
3
LD
voltage setpoint dial,
0-10 V
volt_set_in
V3001
OUT
voltage display, actual
meter_volt
V4013

Stored value writes to the wire feed speed/current display

4

_On
SP1

LD
wire feed
speed/current display,
actual
meter_curr
V4012

DIV
K25

MUL
K9

OUT
wire feed
speed/current display
meter_curr_out
V4002

Stored value writes to the voltage display (0-50V display max. to 0-30V display conversion)

5

_On
SP1

LD
voltage display, actual
meter_volt
V4013

DIV
K10

MUL
K6

OUT
voltage display
meter_volt_out
V4003

Slot 2 Analog Output Logic

6

PLC Direct's Fix for
_FirstScan
FirstScan Delay
C50

LD
K2

OUT
V7662

LDA
O4000

OUT
V7702

Slot 3 Analog Output Logic

7

PLC Direct's Fix for _FirstScan
FirstScan Delay
C50

LD K2

OUT V7663

LDA O4002

OUT V7703

8

_FirstScan
SP0

PLC Direct's Fix for _FirstScan
FirstScan Delay
C50
OUT

A pulse is generated upon the switch being activated.

9

System Run/Stop Switch
run/stop
X30

Start Pulse
C1
PD

A pulse is generated upon the switch being de-activated.

10

System Run/Stop Switch
run/stop
X30

Stop Pulse
C2
PD

An internal coil is set when the left limit switch is met and the system is running.

11

Left Limit
X35

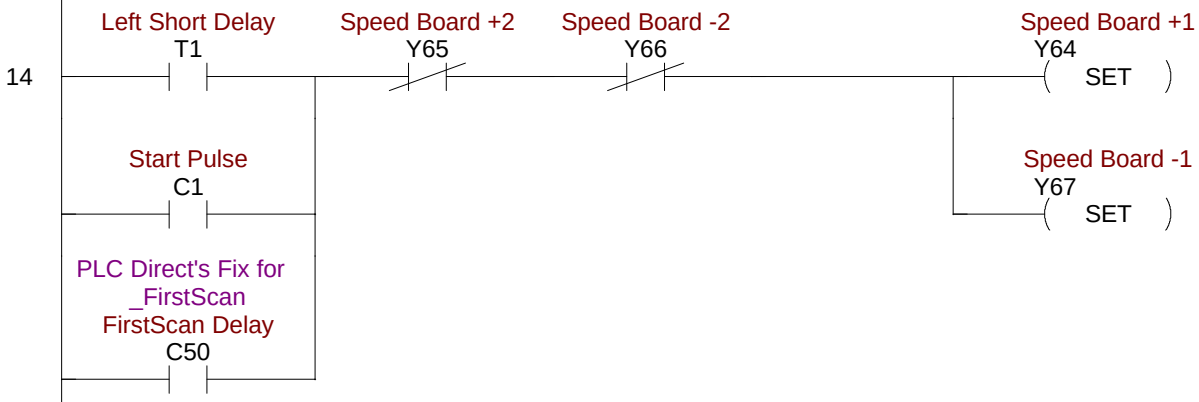
System Run/Stop Switch
run/stop
X30

Left Limit Latch
C0
SET

Two timers, one to ignore the limit switch and one to allow the motor to stop, are started.

The internal coil is reset, after the timer to ignore the limit switch has expired.

Changes the output contacts to send motor from left to right.



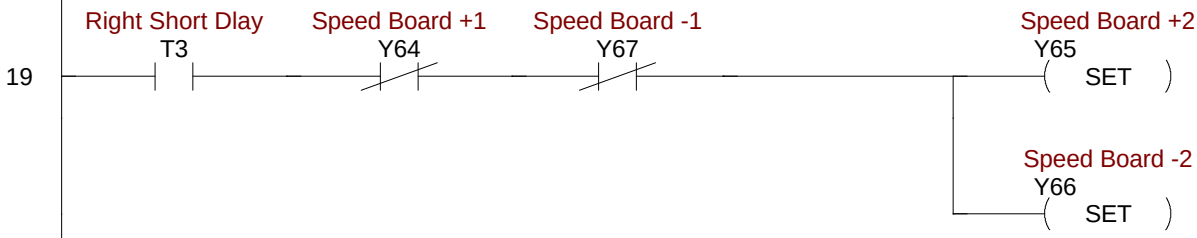
The motor is stopped, after the delay timer to allow the motor to stop has expired.

An internal coil is set when the right limit switch is met and the system is running.

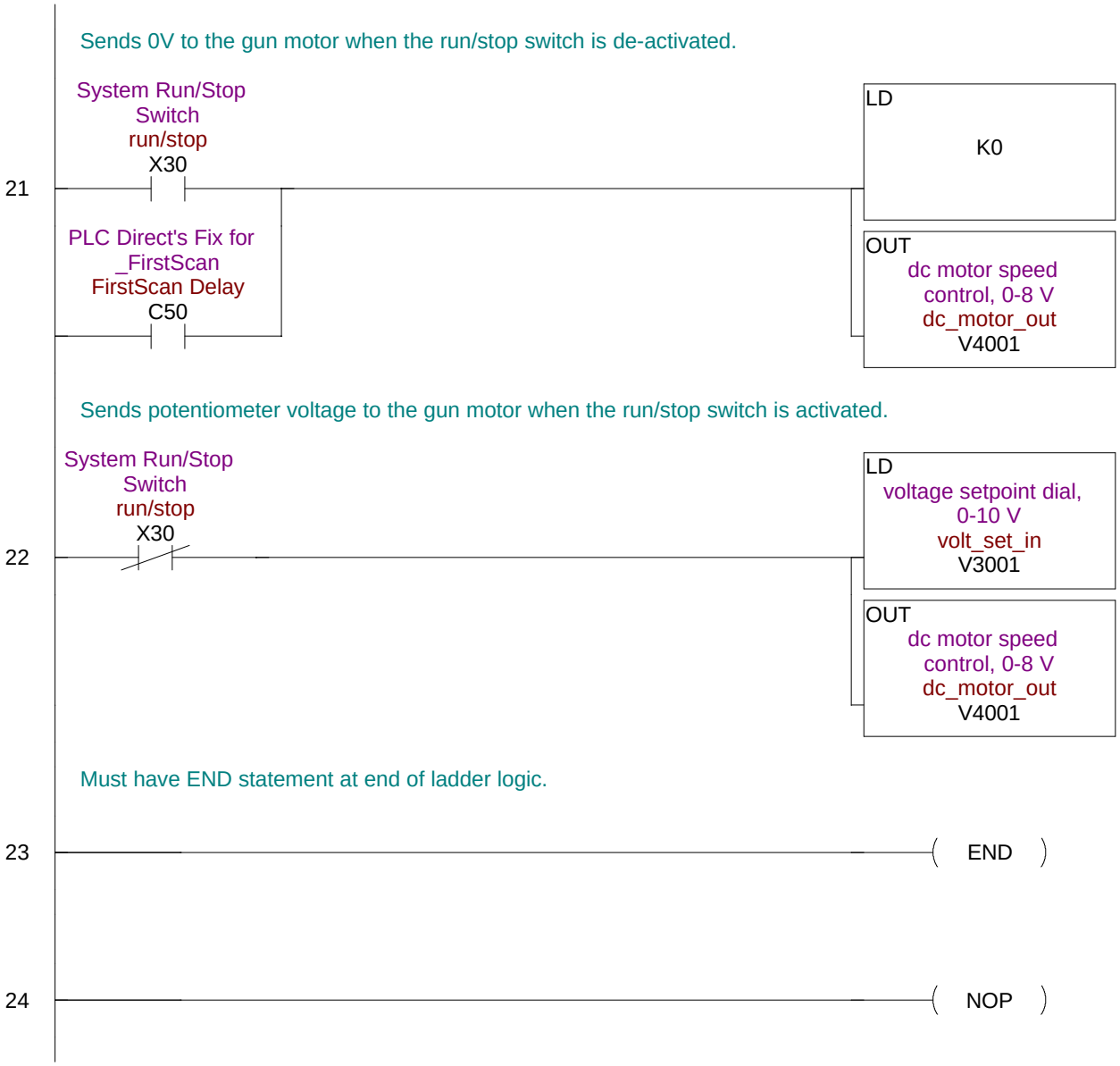
Two timers, one to ignore the limit switch and one to allow the motor to stop, are started.

The internal coil is reset, after the timer to ignore the limit switch has expired.

Changes the output contacts to send motor from right to left.



The motor is stopped, after the delay timer to allow the motor to stop has expired.


Sends 0V to the gun motor when the run/stop switch is de-activated.
System Run/Stop Switch
run/stop
X30
21
PLC Direct's Fix for _FirstScan
FirstScan Delay
C50
LD
K0
OUT
dc motor speed control, 0-8 V
dc_motor_out
V4001
Sends potentiometer voltage to the gun motor when the run/stop switch is activated.
System Run/Stop Switch
run/stop
X30
22
LD
voltage setpoint dial, 0-10 V
volt_set_in
V3001
OUT
dc motor speed control, 0-8 V
dc_motor_out
V4001
Must have END statement at end of ladder logic.
23
END
24
NOP