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 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.

2

On

SP1

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.

3

On

SP1

LD

voltage setpoint dial, 0-10 V
volt_set_in
V3001

OUT

voltage display, actual
meter_volt
V4013
POWERARC 1500 Linear Motion Ladder Logic

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

PLC Direct's Fix for
_FirstScan
FirstScan Delay
C50

6

LD
K2

OUT
V7662

LDA
O4000

OUT
V7702
Slot 3 Analog Output Logic

PLC Direct's Fix for _FirstScan
FirstScan Delay
C50

A pulse is generated upon the switch being activated.
System Run/Stop
Switch
run/stop
X30

A pulse is generated upon the switch being de-activated.
System Run/Stop
Switch
run/stop
X30

An internal coil is set when the left 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 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.

```
Right Limit Run/Stop
X34 run/stop X30
```

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

```
Right Limit Latch
C10
```

```
TMR
  Right Delay
  T2
  K50

TMR
  Right Short Delay
  T3
  K20
```

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

```
Right Delay
T2
```

```
Right Limit Latch
C10
```

```
Right Short Delay
T3
```

```
Speed Board +1
Y64

Speed Board -1
Y67
```

```
Speed Board +2
Y65
```

```
Speed Board -2
Y66
```

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.
```

```
Right Limit Latch
C10
```

```
Speed Board +1
Y64
```

```
Speed Board -1
Y67
```

```
RST
```
Sends 0V to the gun motor when the run/stop switch is de-activated.

System Run/Stop Switch
run/stop X30

PLC Direct's Fix for FirstScan Delay
C50

Sends potentiometer voltage to the gun motor when the run/stop switch is activated.

System Run/Stop Switch
run/stop X30

Must have END statement at end of ladder logic.

23

24

END

NOP