

1. Introduction

Our EZ Encoders effectively eliminate multiple encoder part numbers by bringing intelligence and security to the design. A four-digit LED display with two push-buttons enables the user to change its resolution (counts per turn) as well as set a password to protect unauthorized changes within seconds, conveniently eliminating the need for PCs or external devices for programming.

Additional features of the EZ25 encoder include reverse voltage protection of the inputs and our ET7272 available models have short circuit protection of the outputs with automatic thermal shutdown. This encoder is designed to operate within a wide range of industrial applications under harsh environmental conditions such as mechanical shock, vibrations, extreme temperature and humidity changes, oil mists, coolants and solvents. Nema 4 and 4x rated, submersible and explosion proof, Class 1, Div 1 models are also offered to suit a virtually limitless number of applications. The EZ Encoder is available with the most common connectors found on the market making it a universal drop-in replacement for hundreds of brands of encoders for a fraction of the price.

2. Specifications

ELECTRICAL

INPUT

Voltage: 10-30 VDC

Current: 250mA @ 24VDC exclusive of load

High Voltage: Min. 2.4VDC TTL Compatible

Low Voltage: Max. 0.4VDC TTL Compatible

POWER-ON SETTLING TIME

Upon power-up the outputs are tri-stated for up to 100mSec.

OUTPUT FORMAT

Incremental

Programmable up to 1024 Pulses Per Revolution

OUTPUT DRIVERS

Line Driver Device: ET7272

Voltage: $30V/V = 18-30VDC$ ($V_{in} = V_{out}$)

$30V/5 = 5VDC$

Max. Output Current: 40mA

High Voltage: 30 VDC @ 20mA source current

Low Voltage: 5V @ 20mA sink current

ENVIRONMENTAL

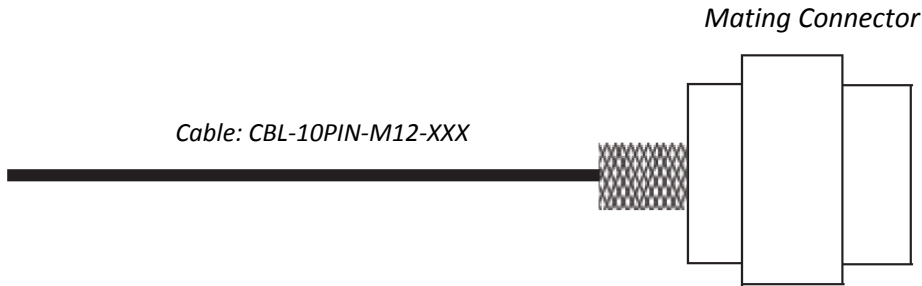
Housing	Size 25 (2.5" dia.)
Depth	3.12"
Shaft Size	3/8"
Max. Slew Speed (RPM)	5000
Max. Starting Torque @ 25 °C (oz. in.)	5
Max. Shaft Loading Axial and Radial:	80 lb.
Bearing Life at Max. Mfr. Spec.	1×10^9
Shock	100g for 11ms
Vibration	20g to 2000Hz
Enclosure	NEMA 4/IP 65
Operating Temperature	-10°C to 70° C
Storage Temperature	-40°C to 85°C

3. Wiring

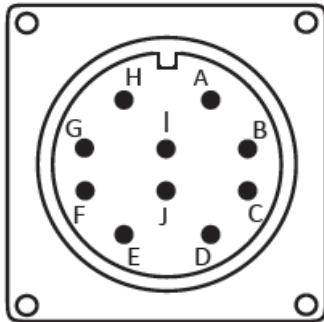
1. The shielded interconnecting cable should be routed in its own conduit and kept separate from other high voltages/high inductance wiring. The shield drain wire should be connected to earth ground at both ends of cable.
2. In addition, use the appropriate mating connector (5 pin, 7 pin, 8 pin, or 10 pin) depending on model selected.

CAUTION:

- Upon power-up the outputs are tri-stated for up to 100mSec.
- Check the cable wiring before applying power.



10- Pin M18 MS Connector Pin Out



10- Pin M12 MS Connector Pin Out

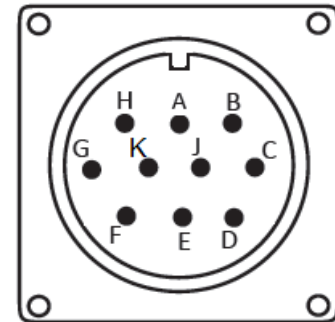


Table 1: 10DL (10 Pin Differential)

Connector Pin	Function	Cable Color Code
A	Signal A	Red
B	Signal B	Yellow
C	Signal Z	Green
D	Power Source (+V)	White
E	Not Connected	-
F	Com (-V)	White/Black
G	Case Ground	-
H	Signal \bar{A}	Red/Black
I	Signal \bar{B}	Yellow/Black
J	Signal \bar{Z}	Green/Black

Table 2: 10DM (10 Pin Differential)

Connector Pin	Function	Cable Color Code
A	Signal A	Red
B	Signal B	Yellow
C	Signal Z	Green
D	Power Source (+V)	White
E	Not Connected	-
F	Com (-V)	White/Black
G	Case Ground	-
H	Signal \bar{A}	Red/Black
K	Signal \bar{B}	Yellow/Black
J	Signal \bar{Z}	Green/Black

8- Pin M12 Connector Pin Out

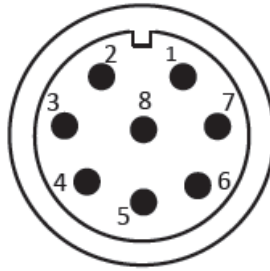


Table 3: 08D (8 Pin Differential)		
Pin	Function	Wire Color
1	Signal A	Red
2	Power Source (+V)	White
3	Signal \bar{A}	Red/Black
4	Signal B	Yellow
5	Signal \bar{B}	Yellow/Black
6	Signal Z	Green
7	Com (-V)	White/Black
8	Signal \bar{Z}	Green/Black

5- Pin M12 Connector Pin Out

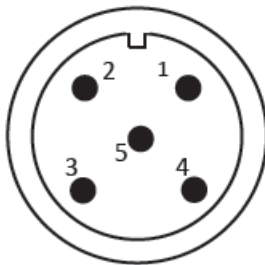


Table 4: 05D (5 Pin Differential)		
Pin	Function	Wire Color
1	Signal \bar{B}	White
2	Signal B	Yellow
3	GND	White/Black
4	Signal A	Red
5	Signal \bar{A}	Green

7- Pin M16 Connector Pin Out

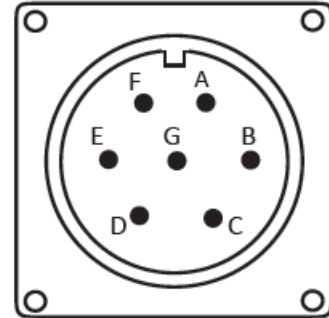


Table 5: 07D (7 Pin Differential)		
Pin	Function	Wire Color
A	Signal A	Red
B	Signal B	Yellow
C	Signal \bar{A}	Red/Black
D	Power Source (+V)	White
E	Signal \bar{B}	Yellow/Black
F	Com (-V)	White/Black
G	Case Ground	-

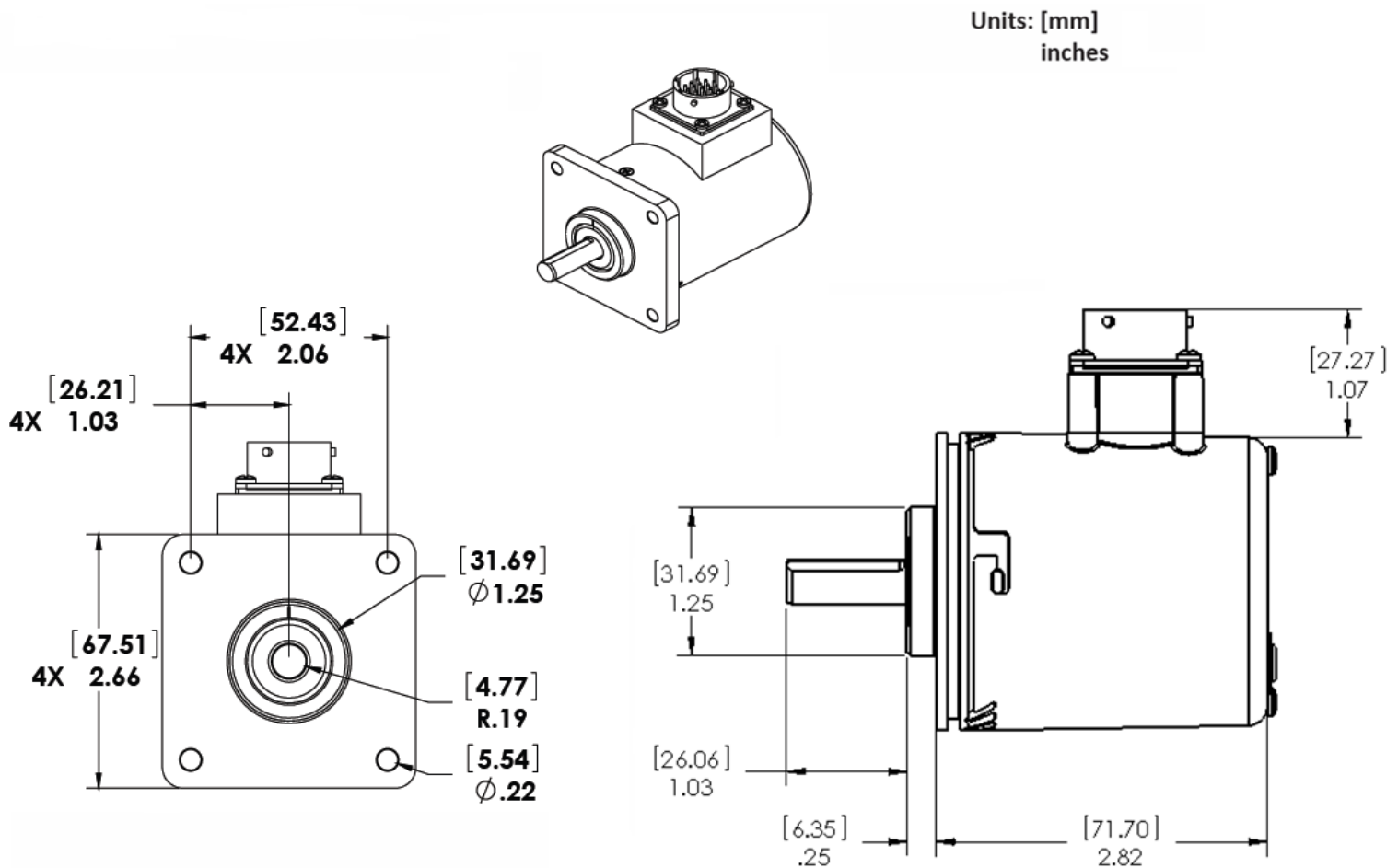
4. Mounting

Types of Mounting

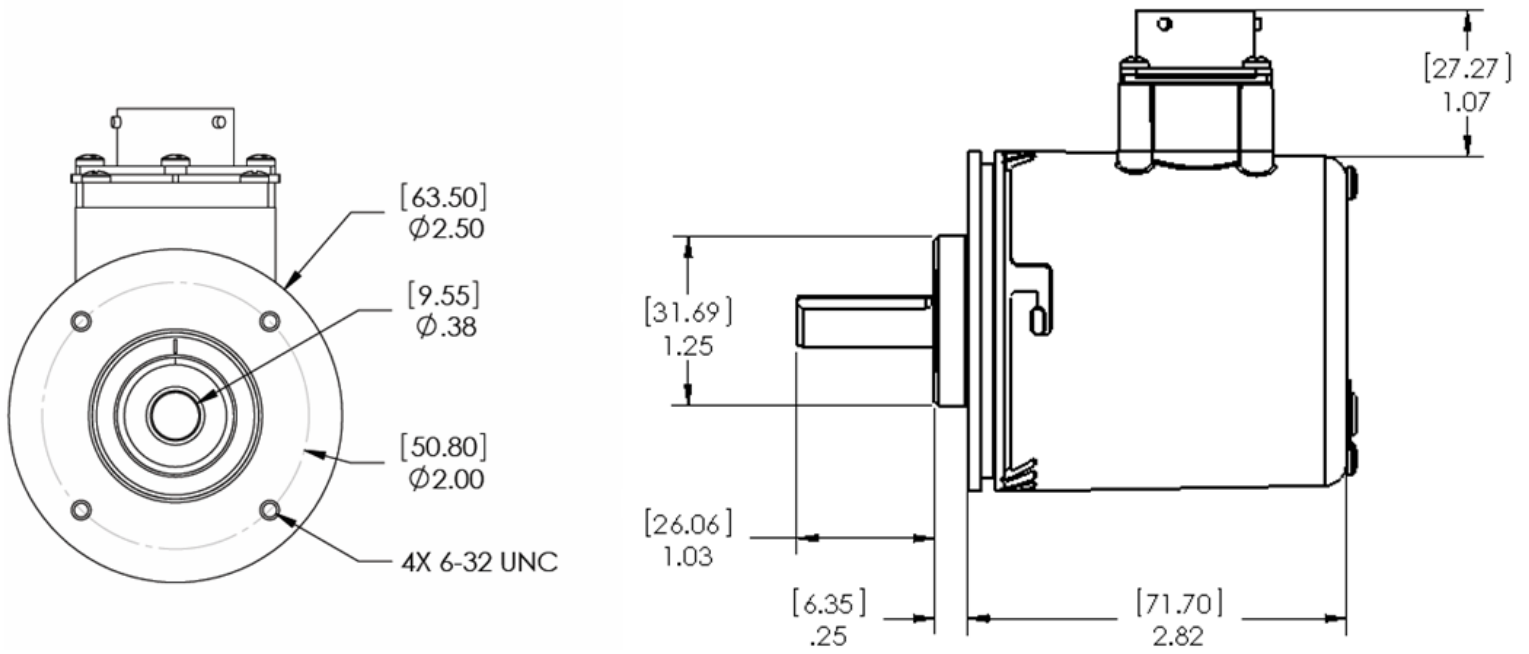
Our EZ Encoder can be mounted up to three ways: servo-mount, face mount or flange mount. Depending on model purchased, mounting options might be limited. Typically, mounting can be achieved with traditional servo-clamps or through the four 6-32 mounting holes on the face of the resolver.

Zero Reference ($\pm 5^\circ$): The position at which the flat on the shaft lines up with the screw in the case and the two mounting holes on the EZ Encoder's face plate.

Mounting Dimensions

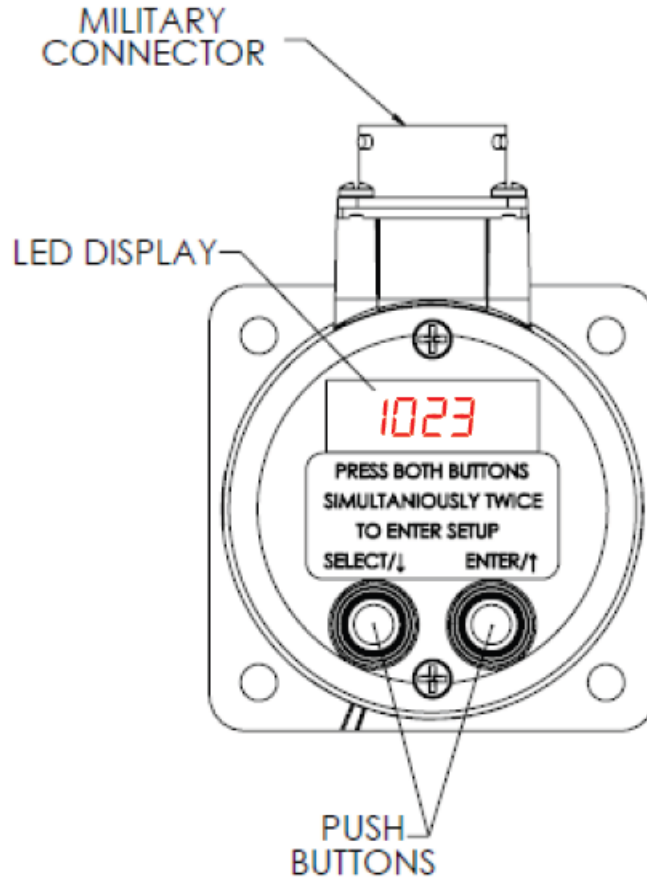


EZ Encoder : Optical Incremental (P Series)



5. Programming

The EZ25 Encoders have a 7-segment LED Display (shown below) which can be used for programming the user parameters.



The EZ25 Encoders have two modes of operation: **Run Mode** and **Programming Mode**.

1. Run Mode

When in Run Mode the encoder will display the position of RPM (Revolutions Per Minute). To differentiate between the two parameters, the Resolver includes a decimal point following the right-most digit while displaying the RPM.

RUN MODE	EXAMPLE
Position	0344
RPM	0311.

Left Pushbutton:

Pressing the Left Pushbutton in run mode toggles between the position and RPM display.

Right Pushbutton:

Pressing the Right Pushbutton in the run mode provides the user with a quick overview of the encoder's resolution setting and the firmware version. After automatically scrolling through the values, the display returns to the Run Mode.

Parameter Overview	
Firmware Version	uEr
Resolution	rE5

2. Programming Mode

- a. To enter the Programming Mode, press both pushbuttons simultaneously twice.
- b. Use the left pushbutton to navigate through the parameters to be set.
- c. Use the right pushbutton to select the parameters to be programmed.
- d. Once a parameter has been selected, use the left pushbutton to decrement values and the right pushbutton to increment values.
- e. Next, press both pushbuttons simultaneously to save the changes, program the flash and return to Programming Mode.
- f. If there is 10 sec. of inactivity in Programming Mode, the encoder will discard the changes and return to Run Mode.

The following parameters may be programmed:

Main Menu		
1	Resolution	rES
2	Password	PASS

Note: If a password has been previously set, upon entering the Programming Mode the user is immediately prompted to enter the password. The LED display shows **PASS** momentarily and then **0000**. The left pushbutton decreases the value while the right pushbutton increases it. Once the desired value is set, press both pushbuttons simultaneously to enter the password.

- If an incorrect password is entered, the display prompts for the password once more.
- If an incorrect password is entered again, the display shows **bAd** briefly and then returns to Run Mode.

Resolution

In **rES** mode, the encoder displays the current resolution (counts per turn). The programmable resolution range is 2-1024 Pulses Per Revolution (PPR). To decrease the resolution use the left pushbutton and to increase use the right pushbutton. Pressing both pushbuttons simultaneously saves the current resolution and brings the encoder back to the programming menu.

Password

In **PASS** mode, the encoder displays **0n** to indicate a password on or **oFF** to indicate password feature disabled.

Pressing any one of the pushbuttons toggles password between “on” and “off.” To disable the password feature choose **oFF** and press both pushbuttons simultaneously. The encoder will then return to Run mode. To enable the password protection choose **0n**. The encoder then shows the current password stored in memory. The right pushbutton increases the value while the left pushbutton decreases it. When the desired value has been selected, press both pushbuttons simultaneously to save the new password and return to Run Mode.

*For instructions on resetting the password please consult the factory .

3. Programming Example

This example will illustrate how to program the encoder with the following parameters: a resolution of 1024 pulses per revolution (PPR) and a password set to “1111”.

- a. Wire the encoder according to the wiring instructions on page 2 and supply the appropriate power.
- b. The encoder is now in Run Mode. Press the left pushbutton to see the RPM while rotating the shaft of the encoder.
- c. Press both pushbuttons twice simultaneously to enter Programming Mode. The LCD display will show **rES**.
- d. Press the right pushbutton to enter resolution set mode. Then use the left and right pushbuttons to decrease and increase the counts per turn respectively. Once you reach **1024** press both pushbuttons simultaneously to save the setting.
- e. The encoder should now display the next programming option: the password **PASS**. Press the right push button to enter password set mode.

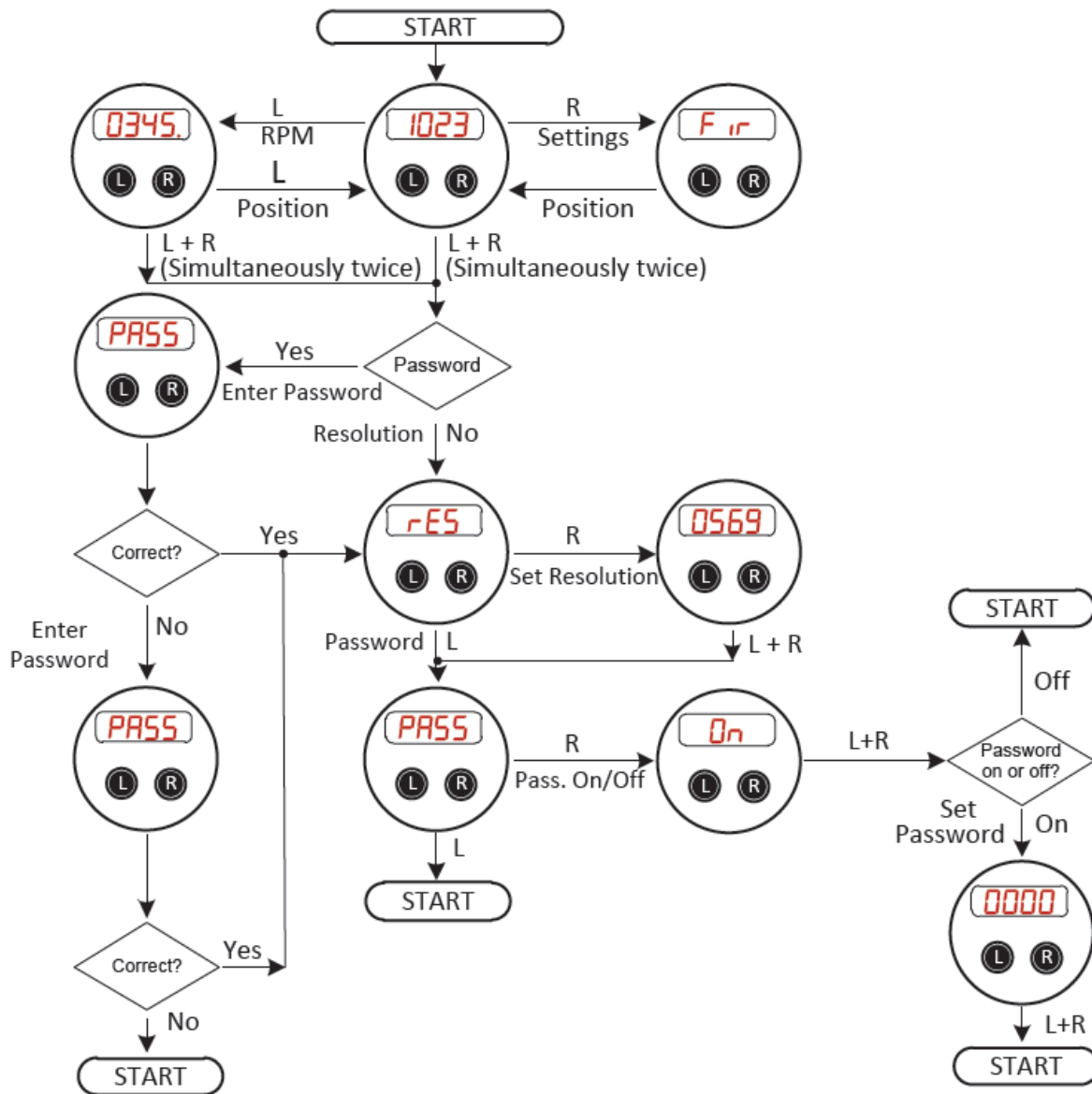
- f. Use the left or right push buttons to toggle the password to **0n**. Now press both of the pushbuttons simultaneously to save the setting.
- g. The screen will now display **0000**. Using the right pushbutton, increment the password to **1111**. Press both pushbuttons to save the password.
- h. The encoder is now back in Run Mode.

This completes the programming example. You may check the resolution by pressing the right pushbutton while in run mode.

To enter programming mode use password **1111**.

*For instructions on resetting the password please consult the factory .

4. Programming Flowchart



NOTES

- Press "L + R" Simultaneously twice to enter programming mode.
- Use "L" (left push button) to decrease value, advance to next programming mode, or toggle settings.
- Use "R" (right push button) to increase value, select the current setting to be programmed, or toggle settings.
- While setting a parameter press "L+R" **once to save changes** and advance to the next mode.
- While navigating, **press "L+R" once to return to Run Mode** (Position or RPM Display)
- While in programming mode, after 10 sec. of inactivity the encoder will return to Run Mode.

