Installation Tips

An SRE Bulletin on Making Your Installations Easier!

This application note explains how you can set up a rabbit switch on a pallet truck or "walkie" using an SE175/325 controller. A rabbit switch, when pressed by the operator, puts the truck into a high speed mode for long-distance travel. Otherwise, the truck's speed is limited to the walking speed of the operator leading it.

Rabbit mode differs from field weakening in that it does not change the field configuration of the motor and it is operator engaged using LIMIT 3. It also operates over the full range of the throttle and motor voltage (unlike field weakening which only works after the motor voltage has reached maximum). Installation is simple: connect two wires and set up the feature using a ProBit.

1. Connect the Wires

LIMIT 3 (the white/purple wire on the SRE harness) connects to one side of the rabbit switch. The other side of the switch connects to the switched side of the key switch.

2. Set Up the Feature with a ProBit

Rabbit speed is adjusted using the LIMIT 3 speed setting found after the sequence of B: Customize, C: Protection, B: Limit Switches, C: Limit 3. But before we adjust this value, let's have a look at how the limit switches work.

Unlike the top speed settings in the ProBit, the limits are scaled from 0 to 200% (rather than 0 to 100%). This scaling is the percentage of the programmed top speed (see Figure 1). What's the point of scaling the limits this way? Have a look at Figure 1 and I'll explain.

We need to set up the Walkie so that when the operator has the throttle twisted to full speed, the truck is moving at a brisk walking speed -- but no faster. This is done with the Maximum Speed Forward adjustment (under B: Customize, A: Driving). You'll probably find a setting around 50% that's reasonable. Now when you twist the throttle to maximum, you accelerate to walking speed (figure 1a). To go faster than that, you push the rabbit switch; this is where the limit scale from 0 to 200% comes in.

At maximum walking speed, from the point of view of the limit's scaling, you're going 100% full speed. If you press the rabbit switch, LIMIT 3 allows "200%" of maximum programmed output[1] (really the top end of the motor) (see figure 1b). By re-scaling LIMIT 3 this way, you can get the full range of movement on your throttle for low end speed control, yet still have the top end available on demand as "rabbit." This top end (or "rabbit") speed is still fully controllable by the throttle.

This is a general approach. If you set the maximum speed to 50% and set LIMIT 3 to 150%, then when LIMIT 3 is pressed your maximum motor voltage (with LIMIT 3 pressed) will be 75% of the battery voltage (see figure 1c).

There are a few points to keep in mind when setting up the rabbit switch. First, for safety reasons, don't set your walking speed too fast. Because each truck responds a little differently to a given speed setting, the ideal walking speed might correspond to 50% motor output, or 70%, etc. -- so experiment. Second, don't
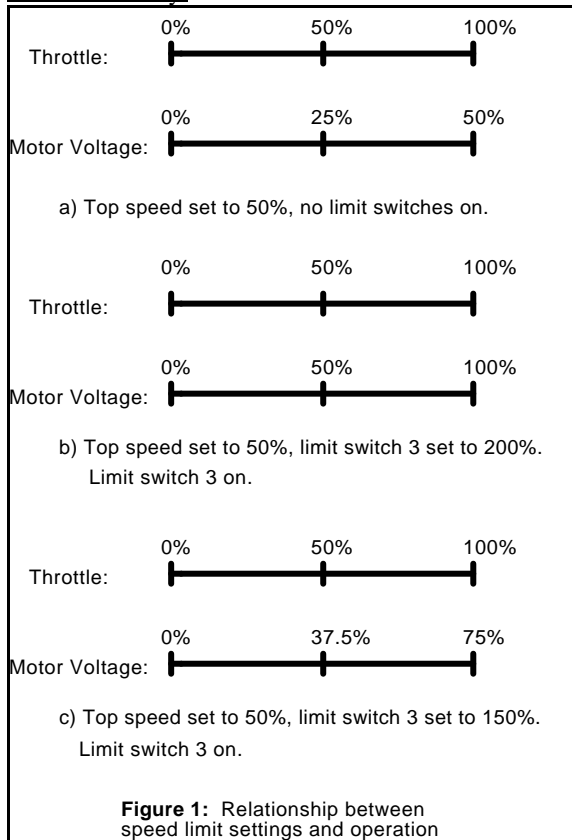
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[1] Note: If the re-scaling of the output would result in > 100% of battery voltage to the motor, the output is clipped to battery voltage. This can result in a reduced throw for your throttle if the limits are programmed in this fashion.

set the rabbit speed too fast. This isn't likely to be a problem because of the way walkies are geared and the speeds operators like to drive at, but consider the work environment.

For added safety, you should consider installing a belly switch if the walkie doesn't have one already.   Application Note #2 explains in detail how to do this. Call SRE at 1-800-461-9338 if you have any questions.

Revision History:

Throttle: 0%   50%   100%

Motor Voltage: 0%   25%   50%

a) Top speed set to 50%, no limit switches on.

Throttle: 0%   50%   100%

Motor Voltage: 0%   50%   100%

b) Top speed set to 50%, limit switch 3 set to 200%.
   Limit switch 3 on.

Throttle: 0%   50%   100%

Motor Voltage: 0%   37.5%   75%

c) Top speed set to 50%, limit switch 3 set to 150%.
   Limit switch 3 on.

Figure 1: Relationship between
speed limit settings and operation

93-11-11 JIS -- Original Version.
94-l0-11 RTA -- Rewrite scaling explanation.