LOGIC RAIL™ TECHNOLOGIES

"Sophisticated Model Railroad Electronics"

21175 Tomball Pkwy
Suite 287
Houston, TX 77070

Phone: (281) 251-5813
email: info@logicrailtech.com
http://www.logicrailtech.com

Grade Crossing Pro

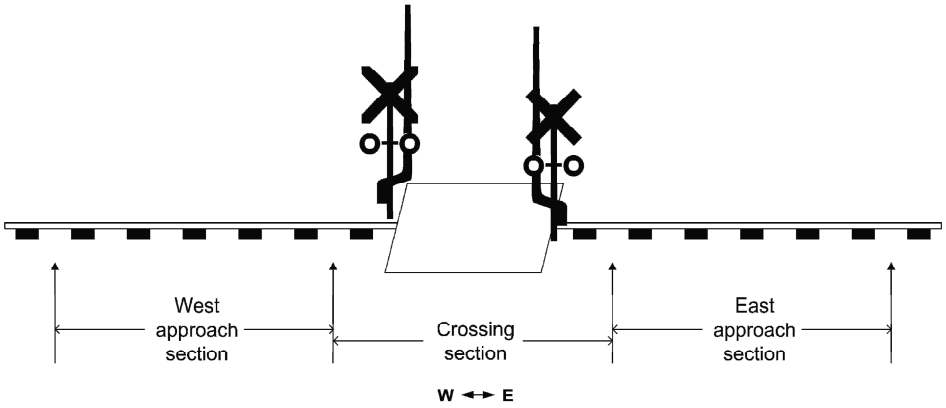
Application Note: Using current-sensing track occupancy detectors instead of photocells or infrared components

Revised 4/13/09

Introduction

This application note describes how to use current-sensing track occupancy detectors instead of the ***Grade Crossing Pro's*** (**GCP**) optical detection that uses photocells. You might choose current-sensing detectors in order to utilize existing occupancy detection circuits you already have in place or in order to operate in dark conditions and don't wish to use infrared detection. There is a wide selection of commercially-available current-sensing track occupancy detectors that could be used in this application. Specific details on wiring these detectors to your track are NOT provided here; refer to the instructions that come with the detector! This application note does not provide details on wiring your crossing signals and gates nor does it cover power connections or controlling a grade crossing bell module – these details are provided in the GCP instructions!

The grade crossing "zone" will be broken up into three detection sections. There is an "approach" section on each side of the crossing and the crossing section itself. This is illustrated below.



Detector outputs

The majority of commercially-available current-sensing track occupancy detectors have an open-collector type of output. This means that when the track section is occupied the detector output will be "low" which means it will be close to 0 volts; when the track section is unoccupied the detect output will be "floating" which means it will look like an open circuit.

If your GCP came with photocells then you will need to add an "inverter circuit" to "correct" the polarity difference between the detector output and the GCP's photocell inputs. This is necessary due to the nature of the GCP's photocell inputs. A covered photocell (i.e. very high resistance) is detected like an open circuit while an uncovered photocell (i.e. low resistance) is detected as close to 0 volts. The inexpensive inverter circuit consists of a 10K ohm resistor (e.g. Radio Shack #271-1335) and an NPN transistor (e.g. Radio Shack #276-2058 or 276-2009).

The West approach section is associated with the WF sensor input whereas the East approach section is associated with the EF sensor input. The Crossing section is associated with BOTH the WN and EN sensor inputs. The wiring for generic current-sensing track occupancy detectors is shown in the following figures. Note that a connection must be made between the detector's ground (GND) and the GCP's GND terminal in addition to the detector output.

Figure 1 illustrates the wiring for a GCP that came with photocells. Figure 2 illustrates the wiring for a GCP that came with infrared components (note that the inverter circuit is not needed!).

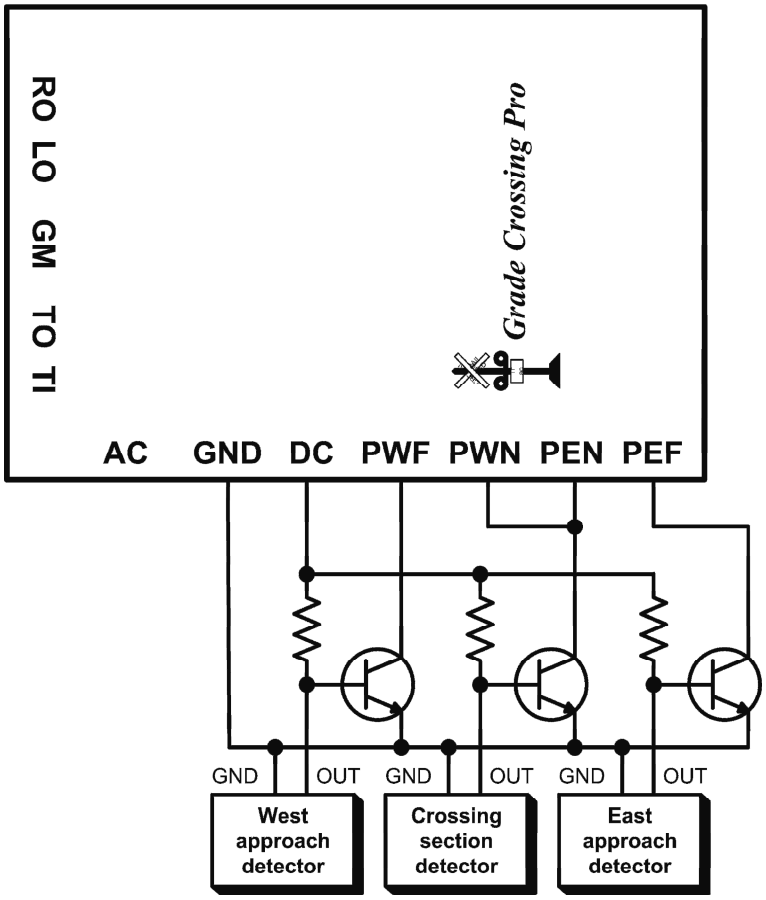


Figure 1 – Wiring for a GCP that came with photocells

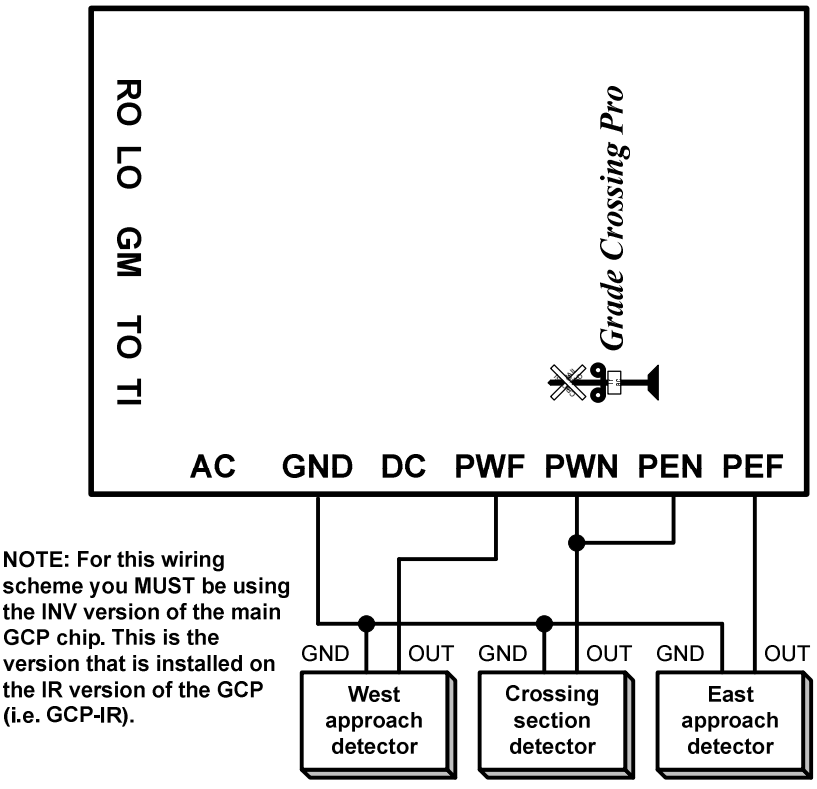


Figure 2 – Wiring for a GCP that came with infrared components

Photocell sensitivity setup

Each of the GCP's four sensor sensitivity adjustment potentiometers must be set to the "midway" point. This is easily accomplished by using the procedure detailed below.

1. You must have the GCP switch labeled SETUP in the ON/CLOSED position.
2. Insert the blade of a flat-blade screwdriver (from the edge of the circuit board, not from the center of the board) into the adjustment pots, one at a time. Turn the screwdriver completely **counter-clockwise** in each of the adjustment pots. Note the position/orientation of the screwdriver.
3. Rotate each potentiometer fully **clockwise** and note the position/orientation of the screwdriver.
4. Now rotate each potentiometer **counter-clockwise** until the screwdriver is approximately half-way between fully clockwise and fully counter-clockwise.
5. Place the SETUP switch in the OFF/OPEN position.

Technical Support

If you need further assistance with this application please do not hesitate to contact us by phone, mail and email; our contact information can be found on the top of Page 1.