

Unmanned railway crossing train detection system

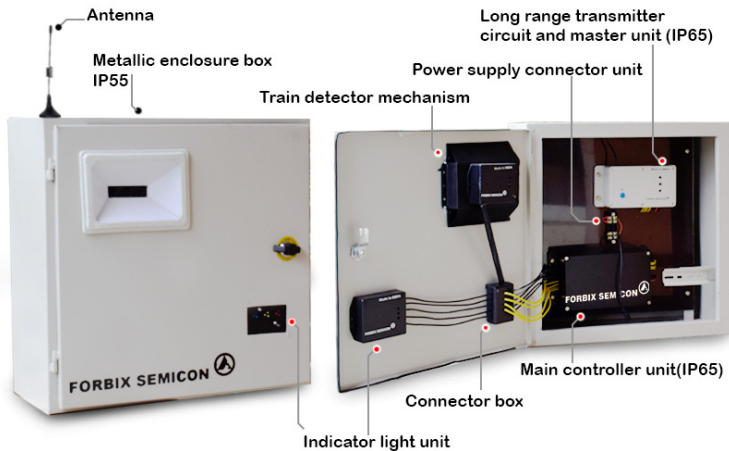
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The unmanned railway crossing alarm system alarms crossing when train approaches. The mechanism involves in automatic train detection without any human intervention. The train detection sent over RF wireless transmission to level crossing receiver. Alert sound and light alarm flashes. This therefore, alarms pedestrians and vehicles cross the track. This solution avoids accidents that occur at the unmanned railway crossing. It function 24x7

Train detector transmitter unit



Transmitter technical details:

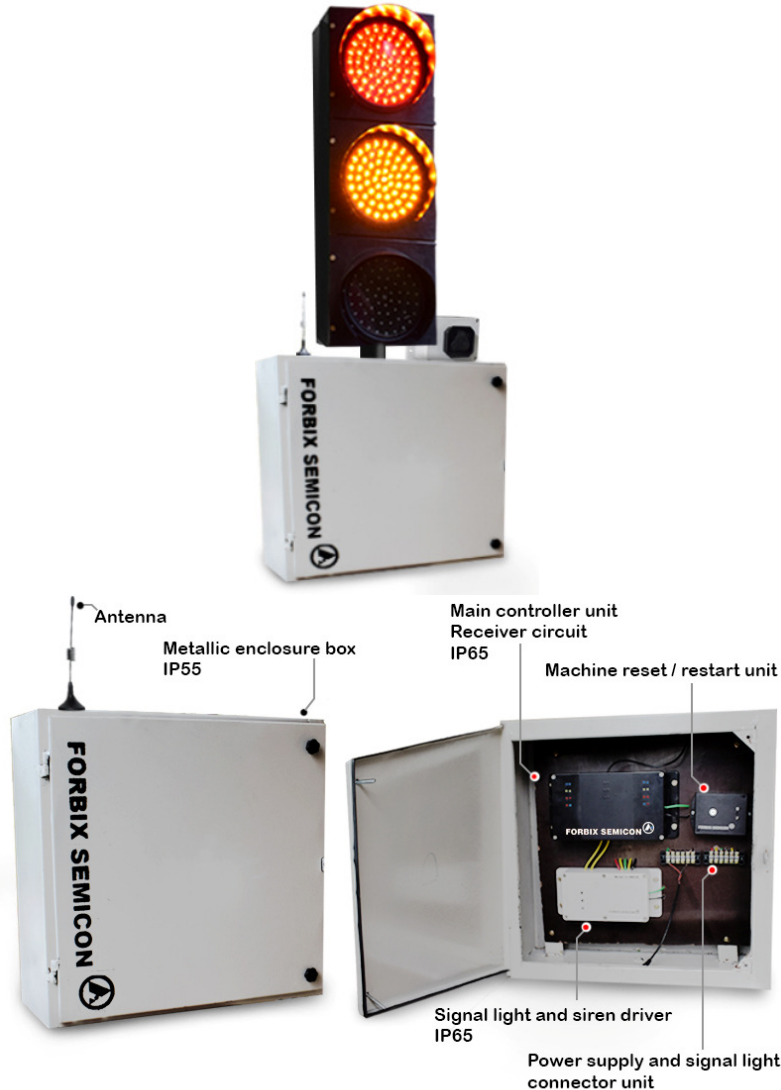
- Train detector unit needs to be mounted on the pole (not less than 10-12 feet height from the ground level)
- Make sure the transmitter unit antenna is visible to the receiver or intermediate transmitting antennas
- The detecting module pole mounting should not be more than 3.5 meters from the train
- The transmitter has inbuilt logic to avoid false detection from nearby flying objects or vibration on the poles. It is also equipped with redundant detecting units for the train detection
- Maximum train speed to detect is 200 Km/hr.
- Intermediate repeaters for range enhancement and signal boosting
- ONE number of train detector transmitter poles on either side of the receiver junction
- Number of transmitting units needs to be pre-programmed at the factory
- Antenna stub is with a magnetic base and comes with 1 meter RF connector cable.
- The transmitter unit operates on 12VDC supply. This can be fed either from a battery of 12VDC (with solar / electricity charging)

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Flash light and receiver unit at the crossing



Receiver technical details:

- Receiver unit needs to be mounted on the pole (not less than 10-12 feet height from the ground level)

- Make sure the receiver unit antenna is visible to the train detector transmitters

- The receiver glows the RED and AMBER light flashing once the train is detected from one side

Once the train is detected on the other side (by the next train detector), GREEN light starts glowing. At that time RED/AMBER flashing stops

- After the train has moved out from the other side all the lights and siren turn off

- Standard model receiver has 1 set of lights viz. RED, AMBER, GREEN and 1 siren. Custom design receiver has 2 flashing lights and sirens

- The receiver is made of covered with Mild Steel (MS) material to avoid from direct heat / sunlight / rain (IP55). Inside enclosures are IP65 grade

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Following are the programmed parameters and vary from customer to customer:

- Operating data packet length and data format
- Internal data encryption logic
- FSK, GFSK, MSK, GMSK, OOK modulation techniques
- Operating frequency (380 – 480MHz). The transmitter does not operate on 1 specific frequency. It hops multiple predefined frequencies for data transmission. Data packets are transmitted in all of the predefined frequencies one by one. The receiver is tuned to the predetermined hopping frequencies.
- Communication data rate 146/293/4688/9380 depending on range requirement
- Bandwidth (62.5 or 125KHz as per sensitivity settings)
- Range of communication of any RF wireless machine is primarily dependent on environmental conditions, viz. temperature, humidity, interference, cross talk and multipath fading. It achieve best range of communication, it is suggested to mount the machine at a height not less than 10-12 feet and open line of sight to the receiver. In such conditions the range of communication can reach up to 3.5Kms as well. At various installations the range of communication is achieved within 5-6Kms. Sub-GHz antenna provided are of 2 types:
 - Fixed cylindrical type
 - Long wire extended type (with magnetic base)
 - Receiver contactor relay maximum load capacity 5A @ 220VAC/50Hz or 110VAC/60Hz

Radio technical specifications

- +20dBm (100mW) constant RF output
- +14dbm high efficiency PA for the transmitter
- Receiver sensitivity: – 148 dbm 168 dbm is the maximum link budget
- 4 stages of LNA at the receiver unit
- Operating voltage of the transmitter: 12VDC
- Operating voltage of the receiver: 12VDC
- Operating temperature: 25oC (0oC to 55oC)
- CRC on data payload: Enabled
- Packet Error Rate: PER (1%)
- Redundancy packet feature: Enabled
- fOsc = 32MHz
- Radio IC used CC1100 (from Texas Instruments) [Sub-GHz frequency]

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