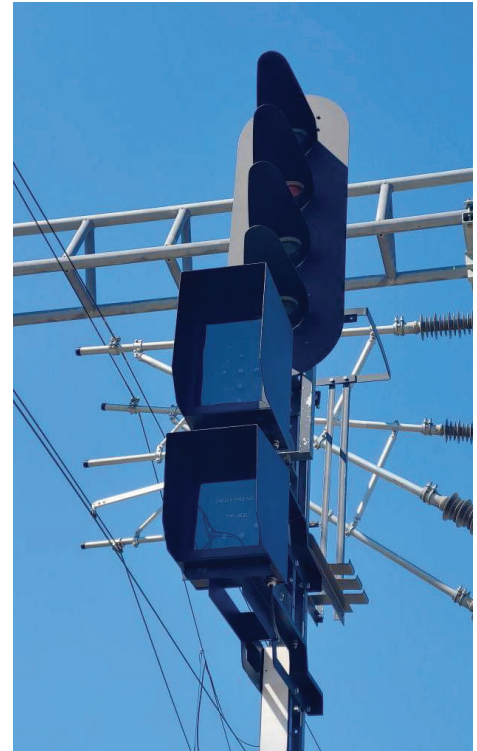


RAILWAY LED INDICATOR SIGNALS

Device features and capabilities

Developed specifically to provide alphanumeric characters and symbolic drawings, as supplement to the main railway signal:

- IND-01 for route indications and speed limit,
- IND-02 - for allowance of train departure
- Displaying any possible symbol by means of 7x5 LED matrix (IND-01)
- Ability to use two symbols in one housing (IND-01)
- Same device consumption regardless of the symbol it displays
- For every symbol device contains two independent LED arrays
- Use of high quality Cree LEDs in the device
- Completely galvanically isolated device from interlocking system
- Different levels of protection in the device (over-voltage, over-current and temperature protection for electronic circuits)
- Day and Night mode of operation with different lighting level
- Possibility to adjust the lighting level according to user requirements
- Modular and flexible design capable of supporting a wide range of operating conditions
- IND-01 and IND-02 version can be adopted according to customer requirements, for different interlocking systems
- Behavior of the device as a light bulb substitute (voltage and current are in phase)
- The device contains a power factor correction system (PFC)
- Safe at fault and long service life
- For different applications: railway, metro, tram



Basic description

Due to the complex operating requirements of a railway relay interlocking, IND-00 implements a modular and flexible design capable of supporting wide range of operating conditions, applicable on different types of relay interlocking systems, too. LED indicators IND1 and IND2 reduces cost of adapting railway indicators to different kind of interlockings.



Technical characteristics (per symbol)

Input voltage range:	from 165VAC to 240VAC (can be lowered for specific application)
Current consumption:	from 70mA to 120mA (normal working range)
Rated power:	from 10VA to 30VA (normal working range)
Operating temperature range:	from -35°C to +70°C (ambient temperature)
Distance from the station:	up to 5km with railway cable 0.9mm (loop resistance 56.6Ω/km)
IND1 – LED matrix:	standard railway 7x5 matrix for representation of any symbol and capable of using various LED colors
IND2 – LED circle:	for signal of train (with Green LEDs)
Housing material:	steel housing
Housing protection:	IP54 level for standard use, can be upgraded to IP68
Electrical protection:	Galvanic isolation for each symbol, integrated thermal, over-current, over-voltage and transient protection
Mode of operation:	Day and Night mode of operation with different lighting level
States of operation:	Three different states of operation so that interlocking can detect

Different states of operation

- | | |
|-----------------|---|
| 1. Normal state | Works properly, both LED chains work, the device returns the rated nominal current to interlocking system |
| 2. Alarm state | Device detected that one of the LED chains stopped working, the device returns the alarm current to interlocking system |
| 3. Error state | Device detected that both LED chains stopped working, the device returns the fault current to interlocking system |

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