

/// trainborne - neutral section - zero gap

Rugged system for extreme reliability, within long endurance applications and harsh environments

APC

Automatic Power Control system



Description

The Automatic Power Control system cuts the incoming power supply to a traction unit for short periods. This is required where power supplied from one part of a power distribution system in separated from another by a neutral section. Its fitment prevents damage to the power distribution system or the vehicle.

The onboard Automatic Power Control system consists of a control unit and a receiver. The system detects a track magnet positioned shortly before the beginning of the neutral section and sends a signal to the incoming power circuit breaker controller to open the circuit breaker. Once the system detects a second magnet positioned after the neutral section a second signal is sent to close the circuit breaker.

The control unit can be mounted inside the vehicle cab or integrated into an equipment rack. The receiver is a very robust unit and can be mounted on the vehicle main underbody or a bogie.

Application

All railway applications with different sections in electrified railway lines. For example when different sections of power supply are isolated from each other via an insulated material into the contact wire, the APC system detects the marking of the neutral section and controls a circuit breaker to interrupt the circuit between the pantograph and the onboard electronic equipment. This prevents damage/wear and tear to the pantograph and overhead line or third rail.

Features

- Compact design
- Robust system
- Status LED's on control unit
- Receiver bogie mounted or at main underbody
- Receiver available with conduit length to suit application
- Receiver conduit fitted with quick release bayonet connector
- Receiver compatible with Automatic
- Warning system
- Terminal box available to ease receiver changeover

Working principle

Track magnets are mounted in a railway power line with the 'South' pole facing up. One magnet is mounted leading up to the neutral section and one leaving the neutral section. In standard situation the APC receiver is in 'North' mode, sending a 'North' signal to the APC control unit.

When the receiver crosses a magnet the receiver is switched from 'North' mode to 'South' mode. The 'North' signal to the control unit is switched off and a 'South' signal switched on.

On detecting a 'South' signal from the receiver the control unit switches the outputs to the controller for the main pantograph circuit breaker which will consequently open.

After a short delay the receiver is reset to the 'North' mode. The 'South' signal to the control unit is switched off and a 'North' signal switched on. The short delay is to ensure that the receiver is no longer over the track magnet.

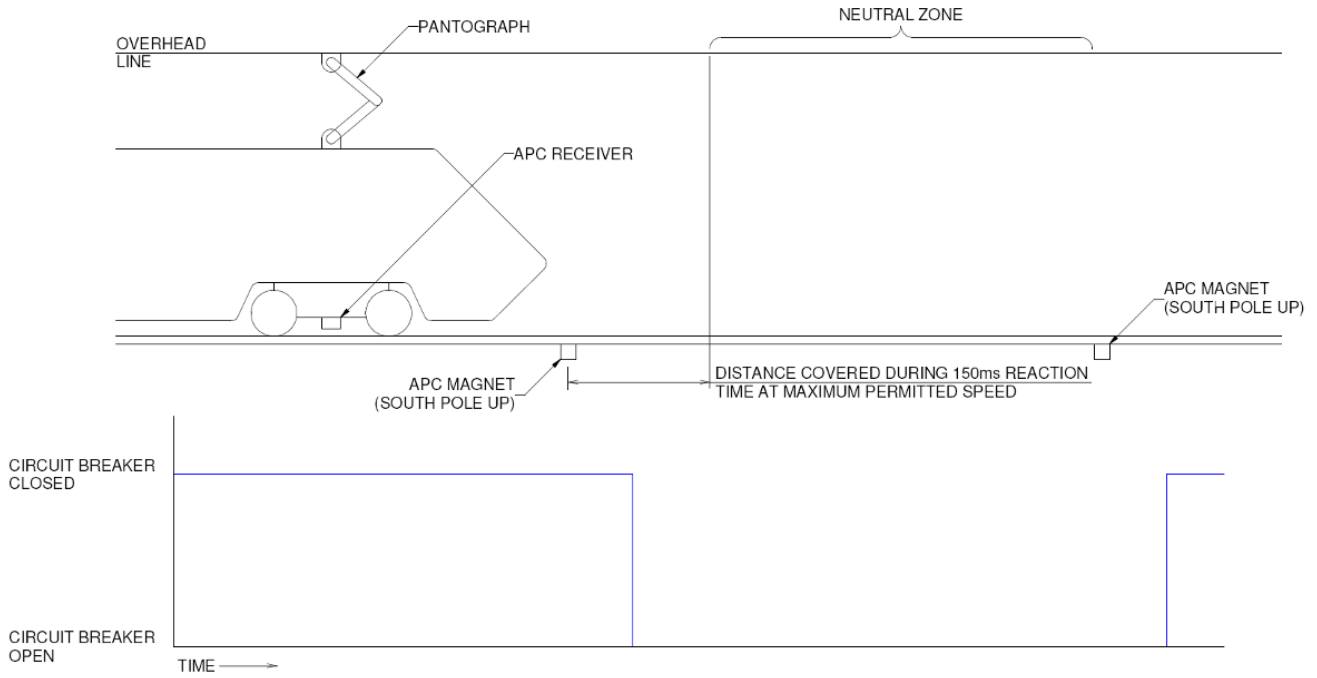
When the receiver crosses again a magnet the receiver is switched from 'North' mode to 'South' mode. The 'North' signal to the control unit is switched off and a 'South' signal switched on. On detecting a second 'South' signal from the receiver the control unit switches the outputs to the circuit breaker controller so the circuit breaker will close again.

After a short delay the receiver is reset to the 'North' mode. The 'South' signal to the control unit is switched off and a 'North' signal switched on.

Railway compliancy

EN 50155	IEC 60529
IEC 61373	RT/E/S/21088
EN 50121	NR/GN/ELP/27010
NF F16-101/102	

Timing diagram



Technical specifications

APC

APC Receiver



The APC Receiver comprises a plastic enclosure complete with mild steel cover containing the control electronics and power supply. Either a conduit with fitted connector or a body mounted connector is available. The electronics consist of a hall effect device which senses the track magnets and electronics which control the receiver bi-stable output. The seven connections interface with the APC Control Unit. The APC Receiver should either be connected directly to the Control Unit or via an extension cable.

Connectors	Amphenol AC Series or equivalent circular multi-pole bayonet to MIL-C-5015 Contact layout 22-14 with 16 gauge connectors Under vehicle receptacle to plug receiver into with female contacts
Power supply	50 VDC - supplied from APC control unit
Mounting	4 inserts drilled on 100 x 135 mm centres to suit M12 fasteners Bogie mounted
Conduit length	Variable: 20 - 200 cm

Shock & vibration	IEC 61373, Category 2, Bogie mounted
Operating temperature	-25 °C...+50 °C
Salt mist	EN 50155 Clause 12.2.10 Class ST3
Protection	IEC 60529, IPx64
Fire & smoke	NF F 16-101, NF F 16-102, EN 45545-2: HL3 for requirements R22, R23, R26
Outer material	Glass reinforced polyamide and mild steel
Weight	2.5 kg with 1000 mm conduit length

Railway compliancy

EN 50155: 2017	Railway applications - Rolling stock - Electronic equipment
IEC 60571: 2012	Railway applications - Electronic equipment used on rolling stock
IEC 60947-5-1: 2016 / IEC 60947-5-4: 2012	Low-voltage switchgear and controlgear
IEC 61373: 2010	Railway applications - Rolling stock equipment - Shock and vibration tests
EN 50121-3-2: 2016	Railway applications - Electromagnetic compatibility
NF F16-101/102	Railway rolling stock - Fire behavior
EN 45545-2: 2015	Railway applications - Fire protection on railway vehicles Part 2: Requirements for fire behavior of materials and components

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