



**AUSTRALIAN RAIL TRACK CORPORATION LTD**

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**Specification Relays, Plug-in Vital**

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## **About This Standard**

This Specification describes the general requirements for Miniature Plug-in safety Relays for vital Railway Signalling applications to be manufactured and supplied to Australian Rail Track Corporation (ARTC) or contractors to Australian Rail Track Corporation.

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## Document History

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### List of Amendments –

ISSUE	DATE	CLAUSE	DESCRIPTION
1.1	01/09/2004		Reformatting to ARTC Standard
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## 1. Introduction

This Specification describes the general requirements for Miniature Plug-in safety Relays for vital Railway Signalling applications to be manufactured and supplied to Australian Rail Track Corporation (ARTC) or contractors to Australian Rail Track Corporation.

## 2. Applicable Documents

### 2.1. International Standards

This Specification refers to the following BRB & AAR Specifications:

BR 831	- Connectors for BR miniature relay
BR 930	- Miniature Tractive Armature, DC Neutral Line Relay (plug-in type) for railway signalling applications.
BR 931	- Miniature Tractive Armature AC Immune DC Neutral Line Relay, plug-in type for railway signalling applications.
BR 932	- Miniature Tractive Armature, AC immune DC biased neutral line relay, plug-in type for railway signalling purposes.
BR 933	- Miniature Tractive Armature, AC immune DC slow pick-up neutral line relay plug-in type for Railway signalling purposes.
BR 934	- Miniature Tractive Armature, AC immune DC slow release neutral line relay plug-in type for railway signalling purposes.
BR 935	- Miniature Tractive Armature, magnetically latched neutral line relay, plug-in type for railway signalling purposes
BR 938	- Miniature Tractive Armature, DC neutral track relay plug-in type for railway signalling purposes.
BR 943	- Miniature Tractive Armature, AC Immune DC biased contactor relay plug-in type for railway signalling purposes.
BR 949	- Miniature Tractive Armature,
BR 961	- Miniature Tractive Armature, AC Immune DC biased neutral line relay unit plug-in type for railway signalling purposes
BR 962	- Miniature relay unit plug-in type for railway signalling purposes incorporating a DC neutral thermal time element relay and an independent tractive armature DC neutral thermal time element relay and an independent tractive armature DC neutral line relay.
BR966F2	- Miniature Tractive Armature relays plug-in type for railway signalling purposes - AC immune DC neutral track relay
BR966F4	- Miniature Tractive Armature, relays plug-in type for railway signalling purposes - AC immune DC biased contactor relay.
AAR#287	- Solid State Flasher

## 2.2. ARTC Standards

Specification SPS 04 - Labelling of Signalling Equipment.

## 3. Definitions

- Front Contacts : Normally Open contacts (de-energized state).
- Back Contacts : Normally Closed contacts (de-energized state).

## 4. General

Unless otherwise stated herein the Relays shall comply in every respect with the applicable BRB specifications.

Wherever a Relay does not comply with a particular BRB specification or equivalent, its description shall be related to the closest relevant specification.

### Example:

- 1) BRB 930X 12V DC 8F8B QN1 -similar to BR 930 (QN1) but with some non-conforming aspects.
- 2) BRB 93X 105mA DC 4F2B QSR3 -generally to BR 930 specification but without a close equivalent.

## 5. Time Delay Units (Electronic)

Time Delay Units shall be in accordance with BR-962 (delayed pick-up) and BR946 (delayed release) except for the following features:

- 1) Electronic time delay Units (All references to a thermal timing element in BR-962 are to be disregarded.).
- 2) Operating Time: 3 - 300 Seconds (adjustable).
- 3) Delay Adjustment: coarse adjustment - by wire links on plugboard fine adjustment - by potentiometer with provision for sealing after adjustment.
- 4) Dimensions: single standard BRB-930 relay.
- 5) Contacts arrangement shall be as per Drawing M08-456 - (Time Delay Units).

## 6. Plugboards

The relay plugboard shall be in accordance with drawing M08-459. Dimensions of the plugboard shall be as per BR-930 specification.

The crimp type connectors shall be in accordance with BRB specification BR-831 and suitable for wire size 7/0.4mm with a maximum outer diameter of 3mm.

## 7. Flasher Relays for Highway Level Crossing Protection

Flasher relays for level crossing protection shall be a fail safe, solid state flasher unit in accordance with AAR specification, Part 287 - (Solid State Flasher) with adjustable flashing rate and "ON" period of flashing.

- |    |        |   |
|----|--------|---|
| 1) | Input  | 10V To 18V DC (Battery or Rectified unsmoothed supply)  |
| 2) | Output | To switch from 1A to 16A load continuously per channel. |

The Unit shall provide two output channels.

- |    |                         |   |
|----|-------------------------|---|
| 3) | Flashing Rate :         | Flashing rate shall be adjustable by means of potentiometer between 30 and 60 flashes per minute.<br><br>(Factory setting shall be set at 43 per minute )<br><br>The flashing rate shall remain constant (within +/- 3 flashes per minute) under following conditions<br><br>a) an input voltage variation from 10Volts to 14.5 VDC<br><br>b) variation in ambient temperature. |
| 4) | Protection:             | The unit shall be protected against reverse polarity at the input.  |
| 5) | Operating Temperature : | (- 5) C to +70 C  |
| 6) | Method of Mounting:     | Shelf or rack mounting.   |

## 8. Types of Relays

Relays which are as per BRB specification and are compatible with relays manufactured by Westinghouse Brake & Signal Co. shall be acceptable for consideration.

The Relays that are used for RCA Signalling applications shall be as follows:

<b>DESCRIPTION</b>	<b>USED FOR</b>
<b>Neutral Line Relays, Non-Immune</b>	
Relay Vital min plug-in Code 003 BRB 930 50VDC 12F4B QN1 (Neutral)	Line Circuits
Base, Relay BRB Code 003 To fit BRB 930, 50VDC, 12F4B QN1	
Relay Vital min plug-in Code 004, BRB 930 50VDC, 8F8B QN1 (Neutral)	Line Circuits
Base, Relay BRB Code 004 To fit BRB 930 50VDC, 8F8B QN1	
Relay Vital min plug-in Code ABCFX, BRB 930X 12VDC, 8F8B QN1 (Neutral)	Level Xings
Base, Relay BRB Code ABCFX To fit BRB 930X 12VDC, 8F8B QN1	
Relay Vital min plug-in Code 212 BRB 960 50VDC 2x6F2B QNN1 (DC Neutral Twin Relay)	Finish



Base, Relay BRB Code 212 To fit BRB 960 50VDC, 2x6F2B QNN1

Relay Vital min plug-in Code 211 BRB 960 50VDC, 2x4F4B QNN1  
 (DC Neutral Twin Relay)

Push Button  
 Ring  
 Commence

Base, Relay BRB Code 211 To fit BRB 960 50VDC, 2x4F4B QNN1

### Neutral AC Immune Line Relays

Relay Vital min plug-in Code 023 BRB 931 50VDC 12F4B QNA1  
 (DC Neutral AC Immune)

AC Immune  
 External  
 Line Circuits

Base, Relay BRB Code 023 To fit BRB 931 50VDC 12F4B QNA1

Relay Vital min plug-in Code 024 BRB 931 50VDC, 8F8B QNA1  
 (DC Neutral AC Immune)

AC Immune  
 External  
 Line Circuits

### DESCRIPTION

### USED FOR

Base, Relay BRB Code 024 To fit BRB 931 50VDC 8F8B QNA1

Relay Vital min plug-in Code 209 BRB 966F6 50VDC, 2x6F2B  
 QNNA1 (AC Immune)

AC Immune  
 NGPR, RGKR

Base, Relay BRB Code 209 To fit BRB 966F6 50VDC, 2x6F2B  
 QNNA1

### Neutral Slow-acting and AC Immune Line Relays

Relay Vital min plug-in Code 043 BRB 933 50VDC, 8F4B QSPA1  
 (Neutral slow pick-up)

Track Repeater

Base, Relay BRB Code 043 To fit BRB 933 50VDC, 8F4B QSPA1

Relay Vital min plug-in Code 063, BRB 934 50VDC, 8F4B QSRA1  
 (Neutral slow release)

WZR Point  
 Free

Base, Relay BRB Code 063 To fit BRB 934 50VDC, 8F4B QSRA1

### Biased AC Immune Line Relays

Relay Vital min plug-in Code 027 BRB 932 50VDC, 12F4B QBA1 (DC  
 Biased AC Immune)

NKR, RKR

Base, Relay BRB Code 027 To fit BRB 932 50VDC 12F4B QBA1

Relay Vital min plug-in Code 028 BRB 932 50VDC, 8F8B QBA1 (DC  
 Biased AC Immune)

NKR, RKR

Base, Relay BRB Code 028 To fit BRB 932 50VDC 8F8B QBA1

Relay Vital min plug-in Code 049 BRB 961 50VDC, 2x6F2B QBBA1  
 (DC biased AC Immune Twin)

Point Detection

Base, Relay BRB Code 049 To fit BRB 961 50VDC, 2x6F2B QBBA1	
Relay Vital min plug-in Code 017 BRB 961 50VDC, 2x4F4B QBBA1 (DC biased AC Immune Twin)	Point Detection
Base, Relay BRB Code 017 To fit BRB 961 50VDC, 2x4F4B QBBA1	
Relay Vital min plug-in Code 172 BRB 943 50VDC, 2HF4B QBCA1 (DC biased AC Immune contactor)	IR (Maintenance use only)
Base, Relay BRB Code 172 To fit BRB 943 50VDC, 2HF4B QBCA1	
Relay Vital min plug-in Code 160 BRB 966F4 50VDC, 2HF4F4B QBCA1 (DC biased AC Immune contactor)	IR, NWR, RWR
Base, Relay BRB Code 160 To fit BRB 966F4 50VDC, 2HF4F4B QBCA1	
Relay Vital min plug-in Code BRB 966F4X 12VDC, 2HF4F4B QBCA1 (DC biased AC Immune Contactor)	Level Crossing Controls
Base, Relay BRB Code To fit BRB 966F4X 12VDC, 2HF4F4B QBCA1	

**Magnetic Latched Line Relays**

Relay Vital min plug-in Code 011 BRB 935 50VDC, 11F4B QL1 (Mag Latched)	Points & Route NLR, RLR
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**DESCRIPTION**

**USED FOR**

Base, Relay BRB Code 011 To fit BRB 935 50VDC, 11F4B QL1	
Relay Vital min plug-in Code 008 BRB 935 50VDC, 8F6B QL1 (Mag Latched)	Points & Route NLR, RLR (Maintenance only)
Base, Relay BRB Code 008 To fit BRB 935 50VDC, 8F6B QL1	
Relay Vital min plug-in Code BDGJX BRB 935X 12VDC, 11F4B QL1 (Mag. Latched)	Level Xings
Base, Relay BRB Code BDGJX To fit BRB 935X 12VDC 11F4B QL1	
Relay Vital min plug-in Code 101 BRB 938X 2F2B QT1 (4 ohm DC Neutral Track)	DC Track Relay
Base, Relay BRB Code 101 To fit BRB 938X 2F2B QT1	

**Track Relays**

Relay Vital min plug-in Code BDEGX BRB 938X 24VDC 8F8B QT2 (DC Neutral Track)	CSEE Output Relay
Base, Relay BRB Code BDEGX To fit BRB 938X 24VDC, 8F8B QT2	
Relay Vital min plug-in Code 110 BRB 966F2 2F2B QTA1 (9 ohm AC Immune DC Track)	AC Immune DC Track Relay

Base, Relay BRB Code 110 To fit BRB 966F2 2F2B QTA1

Relay Vital min plug-in Code ADEKS BRB 938X 4F 2MB QTM1 (DC neutral Track with metal to metal Back contacts) DC Track Relay for Cut Tracks

Base, Relay BRB Code ADEKS To fit BRB 938X 4F 2MB QTM1

**Lamp Proving Relays**

Relay Vital min plug-in Code 082 BRB 93X 105ma DC, 4F2B QSR3 (Slow release lamp proving) ECR

Base Relay BRB Code 082 To fit BRB 93X 105ma DC, 4F2B QSR3 (With full wave rectifier)

Relay Vital min plug-in Code ABCDK BRB 941, 4F2B QECX1 (AC slow release Lamp Proving) ECR (for SL 35 Lamps)

Base, Relay BRB Code ABCDK To fit BRB 941 4F2B QECX1

Time Delay Units ( Electronic )

Relay Vital min plug-in Code BCEGX BR 946X 12VDC QTD4 (Slow to release Timer) Level Xing gate delay (Timer)

Base, Relay BRB Code BCEGX To fit BRB 946X 12VDC QTD4

Relay Vital min plug-in Code BDFHX BRB 962X 50VDC 5F2B QTD5 (Slow to pick-up Timing Relay) Track Approach Timing

**DESCRIPTION**

**USED FOR**

Base, Relay BRB Code BDFHX To fit BRB 962X 50VDC 5F2B QTD5

Relay Vital min plug-in Code BEGHX BRB 962X 50VDC 4F3B QTD5 (Slow to pick-up Timing Relay) Timing Relay

Base, Relay BRB Code BEGHX To fit BRB 962X 50VDC 4F3B QTD5

Relay Vital min plug-in Code BDGHX BRB 962X 12VDC 5F2B QTD5 (Slow to pick-up Timing Relay) Timing Relay

Base, Relay BRB Code BDGHX To fit BRB 962X 12VDC 5F2B QTD5

Relay Vital min plug-in Code ACELM BRB 949 50VDC, 1F3B QCJ1. (Slow to pick-up Timing Relay) Point-Motor cut-out 10 Sec Timing

Base, Relay BRB Code ACELM To fit BRB 949 50VDC, 1F3B

Relay Vital min plug-in Code BRB 949 50VDC, 1F3B QCJ1. (Slow to pick-up Timing Relay) Point-Motor cut-out 15 Sec Timing

Base, Relay BRB Code ADFJS To fit BRB 949 50VDC, 1F3B

Flasher Relay for Level Crossing Protection

Relay, Flashing for Level Crossings PTF3 with plugboard

Level Crossing  
Flasher Relay

Base, Relay BRB Code ADFJS To fit BRB 949 50VDC, 1F3B

### 8.1. Accessories (Special Purpose Units)

DC Relay Unit Code BCGJK QR5

4-7 Second slugging for  
BRB-930, 50V Relay

Base, Relay QR5 code BCGJK

Capacitor for WB&S  
Flashing Circuit

Capacitor Unit Code CDFKX QR5

Base, Unit QR5 code CDFKX

Diode Unit Code ABEGHJ QR9

Base, Unit QR9 code ABEGHJ

Transformer-Rectifier Code ABCDJK Unit,  
110VAC/50V DC QXR1

DC Relays on AC Line  
Circuits

Base, Unit QXR1 code ABCDJK

## 9. Labelling

A label showing the type number, the relevant input voltage, the contact arrangements and the code number shall be permanently fixed to the front of the unit.

Labelling shall be as specified in specification SPS 04 (Labelling of Signalling Equipment).

## 10. Test Reports

Test reports shall be provided by supplier for each relay.