Low Voltage Controlgear for Railway Applications

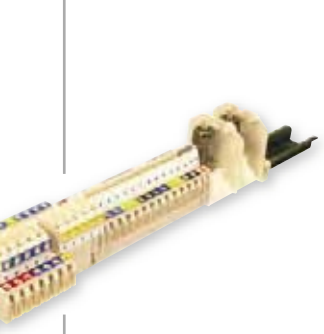
Terminal Blocks and Contactors

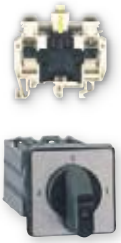
ABB

ABB Entrelec opens the way to a world on the move

- Connecting and terminal blocks: quick-connect, spring, stud or ADO System®
- Miniature circuit breakers
- Modular differential circuit breakers
- TAL and AF d.c. operated contactors

- Connecting and terminal blocks: quick-connect, spring, stud or ADO system®
- Switch terminal blocks ES8 CG
- Camline switches

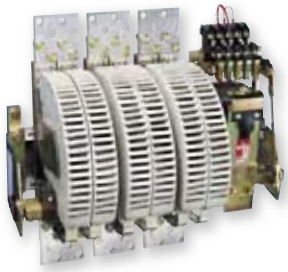




- TAL d.c. operated contactors
- Connecting and terminal blocks: quick-connect, spring, stud or ADO system®
- Tmax power circuit breakers
- Limit switches

- Current and voltage sensors
- AF d.c. operated contactors

- TCO signalling control panel
- Illuminated switches and signalling units
- Tmax power circuit breakers
- Compact modular circuit breakers
- Connecting, terminal Blocks
- R.. Series contactors
- Emergency power supplies



The ABB Entrelec offer:

Connection - Breaking - Control
Protection - Switching - Detection
Measurement - Man-machine interface

Low Voltage Controlgear for Railway Applications

ABB Entrelec offer

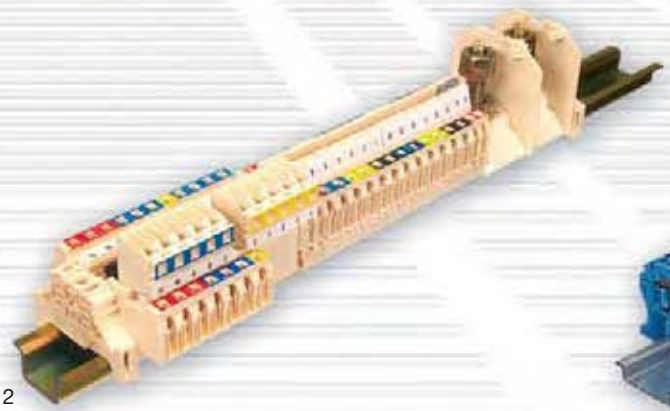
ABB has been involved in railway projects through the world for many years in providing systems or equipments such as transformer, auxiliary power supply, static converter, elements of HVAC...

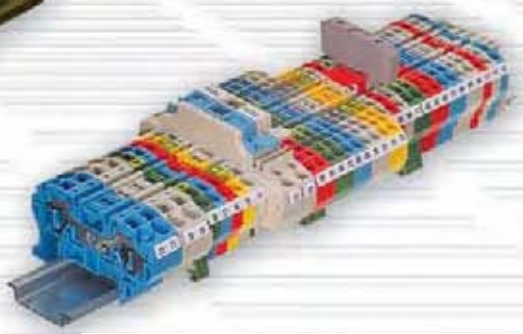
This documentation is dedicated to ABB Entrelec products used in practically every rolling stock:

- terminal blocks
- contactors
- miniature circuit breakers.

This catalogue includes also the main types of terminal blocks used in the stationary applications and some specific connecting devices.

It presents an overview of other ABB Entrelec equipments for railway applications such as breakers, contactors with variable number of poles, current and voltage sensors, limit switches and man-machine interfaces.
Some detailed catalogues are available on request for these products.





Low Voltage Controlgear for Railway Applications

General Contents

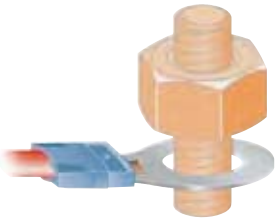
Terminal Blocks entrelec®

Contents

Terminal Blocks **entrelec**® for railway applications

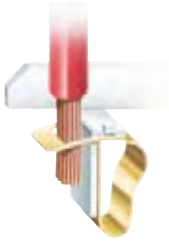
ABB Entrelec expert in the railway field (rolling stock and fixed equipment) for more than 30 years, has extensive knowledge in all connection technologies, recognized throughout the world.

Terminal blocks **entrelec**® : the larger choice of connecting systems



Stud

Quick-connect



Spring

ADO System®

Our terminal blocks perfectly comply with specific requirements of the rolling stock

- Continuous vibrations stress
- Shocks, when the trains are formed
- Corrosive stresses in polluted environment
- Fire and smoke withstand.
  Special care being taken for plastic materials for which specific tests are required.
- Wide variation of temperature:
  Range of - 40°C to + 110°C to cover all climates in the world

Our terminal blocks meet, and even exceed the requirements of IEC 60947-7-1 standard, like the French national standards **NFF** (**N**ormes **F**rançaises **F**erroviaires) which are still used as reference for the French national company SNCF (a world leader for the safety and the reliability of the trains and the rail network) and a lot of other countries.

The products described in this catalogue are in accordance with the main standards listed in the opposite page (see "Reference Standards").

Numerous projects using **ABB Entrelec** products have been worldwide realized. Some examples:

- Engines: Locofret (SNCF France), Loco (Iran)
- Metros: Circleline (Singapore), Nanjing (China), Jubilee line (London, UK), MF 2000 (RATP France)
- Commuter trains : Hillside X-Trapolis (Melbourne, Australia), Merval (Valparaiso, Chile)
- Tramways: Citadis (Alstom): Bordeaux, Valenciennes, Paris, Strasbourg (France), Dublin (Ireland), Barcelona (Spain), Rotterdam (Netherlands)
  Train/Tram, Alicante (Spain)
- Intercity trains: TER 2N ng (SNCF France), Coradia X 40 (Sweden), AGC (SNCF France)
- High speed trains: TGV-A, TGV-R, TGV-PSE (SNCF France), Thalys (SNCF/SNCB), TGV Korea, Transmanche train (Eurotunnel)

This catalogue assembles all information needed to make the best choice for the connection technology in accordance with the application and its environment

Reference Standards

● **Rolling stock**

NF F 61017 :	Terminal blocks and component holder blocks. Connections by mean of quick connect (tabs) or threaded elements (studs).
NF F 16-101 :	Directive relative to selecting materials in relation to their fire resistance in terms of its behavior in a fire, the opacity of smoke and the toxicity of the gas released.
NF F 16-102 :	This standard complements NF F 16-101 standard. Its purpose is to specify the application of NF F 16-101 to electrical equipment and especially to individual apparatus.
NF F 61030 :	Mechanical strength.
EN 50155 :	Electronic equipment used on rolling stock - Shock and vibration tests.
EN 61373 :	Electronic equipment - Shock and vibration tests.
ASTM E 1354 :	Tests of fire, smoke and toxicity of plastic materials (American standard).

● **Fixed equipment**

NF F 55-251	Devices for connection or disconnection - Screw terminal blocks.

● **Low voltage controlgear**

IEC 60947-1 :	General rules.
IEC 60947-7-1 :	Link terminal blocks for copper conductors.
IEC 60947-7-2 :	Ground terminal blocks for copper conductors.
UL 1059 :	Terminal blocks. (American standard).
CSA C22-2 No 158 :	Terminal blocks. (Canadian standard).
UL 94 V0 :	Tests of flammability of plastic materials. (American standard).

● **Environment**

IEC 60068-2-1 :	Cold.
IEC 60068-2-2 :	Dry heat.
IEC 60068-2-3 :	Damp heat, steady state.
IEC 60068-2-6 :	Vibrations.
IEC 60068-2-11 :	Salt mist.
IEC 60068-2-14 :	Change of temperature.
IEC 60068-2-27 :	Shocks.
IEC 60068-2-30 :	Damp heat, cyclic.
IEC 60068-2-61 :	Tests Z/ABDM (climatic sequences).
ISO 6988 :	SO_2 test with general condensation of moisture.

● **Conductors**

NF F 63808 :	Conductors and electrical cables with thin insulation halogen free.
NF F 63826 :	Conductors and electrical cables with thick insulation halogen free.

Note: from 2008 NF F 63808 and NF F 63826 standards will be replaced by EN 50036 standard.

● **Information for "Fire and Smoke" classification**

According to NF F standards:
The general directive NF F 16-101 (1988) concern the material selection, in terms of its flammability (mark I) on the one hand, the opacity and toxicity of smoke (mark F) on the other hand.
The standard NF F 16-102 (1992) complete the standard NF F 16-101. It explicit its application for the electrical equipment and products. **The thermoplastic insulation materials of the Terminal Blocks entrelec® are at the severity level 3**. This level concern a products mounted inside a room for passengers or running crew.

According to US standards :
The **UL 94** standard (June 1991, rev. 1994) describe the flammability tests of plastic materials, for controlgear and products.
Principle: measuring of the combustion time of a test piece according to its thickness. This classification is divided in 4 parts: HB for the most flammable materials, then V2, V1, then **V0** for the least flammable.
All terminal blocks in this catalogue has thermoplastic insulation materials classified UL 94 V0.

The **ASTM E 1354** standard describe the test method of the oxygen consumption, using a calorimeter for determine as a function of heat, the smoke emission rate for materials and products.
All terminal blocks in this catalogue comply with this standard.
Their individual surface is below 16 $inch^2$, consequently they are not concerned by ASTM E 162 and 662 standards.

PANORAMA

Terminal blocks IEC :

Grey color for the standard blocks, they comply exclusively to international standards (IEC 60 947-7...). These products agree on a large number of railway applications.

A
2

IEC 60 947-7...

	FEED THROUGH	GROUND	FUSE HOLDER	COMPONENT HOLDER
ADO - ADO IDC TERMINAL BLOCKS				
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ADO SYSTEM				
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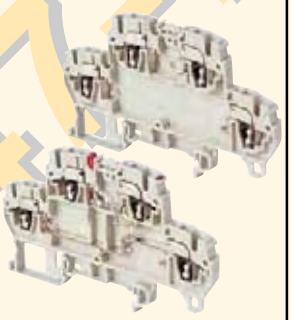
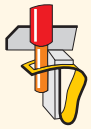
SPRING TERMINAL BLOCKS				
	Pages 70...80	Pages 81...86		
				
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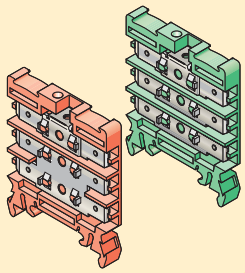
TERMINAL BLOCKS WITH QUICK-CONNECT TABS				
				
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TERMINAL BLOCKS WITH STUD TERMINALS				
				
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ACCESSORIES

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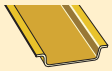
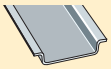
Mounting rails


PR30


PR3.Z2


PR3.G2


PR4


PR5


PR1.Z2

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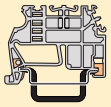
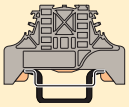
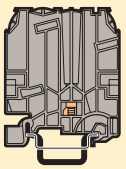
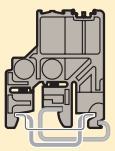
End stops


BADL


BAM2


BADH


BAMH

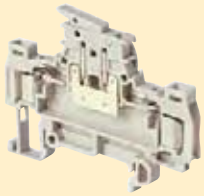
MF0005_gb 051221

Terminal blocks IEC / NF :

They are of beige color and they comply , in addition to international standards IEC, to the French Railway Standards (NF F 61017) requirements.
SNCF and RATP french logos are printed under products that have obtained the using approvals. NF F 61017 is stated for all products complying to this standard (terminal blocks with stud terminals and quick connect tabs).

NF F 61017 and IEC 60 947-7...

SWITCH



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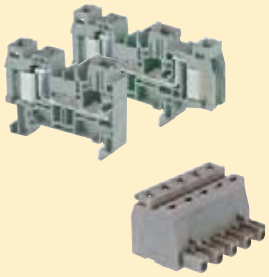
PLUGGABLE



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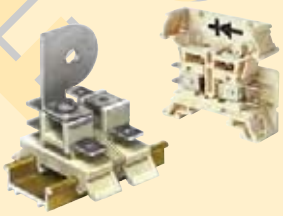

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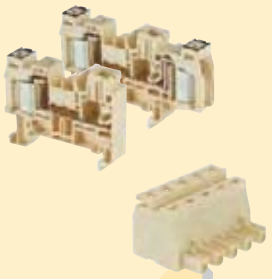
PLUGGABLE



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MARKING

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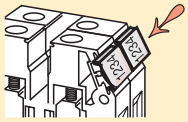
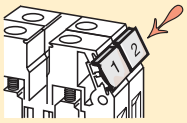


Vertical marking



Horizontal marking

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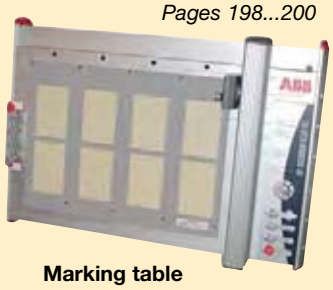

Marking table

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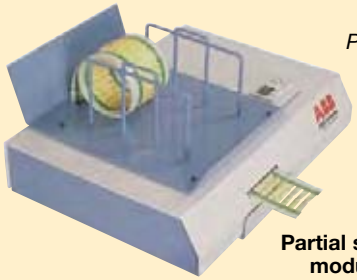

Partial shrink module

Notes