



NOTE

This leaflet forms part of a series which also includes :

- Leaflet 533 : Protection by the earthing of metal parts of vehicles ;
  - Leaflet 550 : Installations for the supply of electrical energy to passenger rolling stock ;
  - Leaflet 552 : Electric power supply for trains taken from the train cable ;
  - Leaflet 554-2 : Power supply to mechanically-refrigerated wagons running in rafts ;
  - Leaflet 555 : Electric lighting of passenger stock ;
  - Leaflet 600 : Electric traction with aerial contact line.
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-

## 0 - GENERAL

0.1 - The regulations in this leaflet apply to railway vehicles where electrical equipment is supplied, either completely or partly, with electrical power, from a local mains system or from another energy source with a nominal voltage of 220 V or 380 V, 50 Hz, single-phase or multi-phase, with the exception of mechanically-refrigerated wagons, if the latter are built in accordance with Leaflet 554-2.

0.2 - The regulations in this leaflet shall not apply to railway vehicles supplied by traction current through the contact line or through the train cable.

## 1 - PROTECTION MEASURES

\*1.1 - As a measure of protection for staff on the vehicles, it is necessary to adopt an installation which makes it possible to take into account all practicable arrangements and, to this end, it must be based on the use of the protective conductor shown in Plate 1, variant 1.

\*1.2 - In junction cables the protective conductor must be insulated and enclosed in the same sheath as the power conductors.

\*1.3 - If the measures laid down in 1.1 cannot be applied, an isolating transformer must be used. This transformer must form part of the local protection measures (Plate 1, variant 2).

## 2 - FITTING OF EQUIPMENT TO VEHICLES

\*2.1 - All electrical equipment, sockets, and the structure of these vehicles, must be connected by a protective wiring to a protective contact of the coupling device of the vehicle.

The connection of the protective conductor to the structure of the vehicle must be fully accessible with an absolutely reliable electrical contact.

Where possible, there must be only one earthing connection.

\*2.2 - The protective conductor and power conductors in the same sheath must be of the same section, up to 16 mm<sup>2</sup>. When the section of the power conductor is > 16 mm<sup>2</sup>, that of the protective conductor can be 1 or 2 sizes less, but not less than 16 mm<sup>2</sup>.

If the protective conductor is not insulated, it must be protected against any mechanical, chemical or other action.

\*2.3 - The neutral conductor, where one is provided, must be of the same section as the phase conductor. It should be regarded as live and insulated to the same level as the phase conductors.

\*2.4 - The body of the vehicle must never be connected to the neutral conductor of the local mains system.

### 3 - OTHER ENERGY SOURCES

(Plate I, 3 and 4)

- \* 3.1 - It must be possible for other energy sources to have omnipolar separation from the local mains system and the electrical equipment on the vehicles. There must be no possibility of mutual interaction.
- \* 3.2 - The protective measure to be applied shall consist of neutralising the equipment or of any other equivalent arrangement.
- \* 3.3 - Where the equipment is neutralised, the protective conductor and the neutral must be directly and permanently connected at the generator output.

### 4 - SUPPLY TO ONE OR MORE VEHICLES

(Plate III)

\* 4.1 - The vehicle shall be connected to the local system by a coupling device.

4.2 - Supply to a single vehicle by its individual coupling device.

4.2.1 - It is recommended that only one coupling device shall be provided on each vehicle.

\* 4.2.2 - If several coupling devices exist in parallel on a vehicle, they must be constructed so that it is impossible for them to touch live components.

\* 4.2.3 - If coupling devices with a pilot contact are used for connection of the vehicles, the cabling of the vehicles shall be in accordance with Plate IV, i.e.:

- for 63 A as in Fig. A and
- for 125 A as in Fig. B.

In this case, the conductor of the pilot contact of the vehicle shall be connected to the phase conductor of the coupling device, i.e. to the conductor which is opposite the protective conductor.

4.3 - Supply of one or more vehicles from a three-phase train cable.

\* 4.3.1 - When several vehicles forming a raft are fed from a single supply point, their electric cabling must comply with one of the two diagrams in Plate II. They may only be connected to lineside supply installations where the main switch is controlled by a pilot voltage. Mechanically refrigerated wagons supervised by specially trained staff can also be equipped as in Leaflet 554-2.

### 5 - COUPLING DEVICES

\* 5.1 - The coupling devices must conform to those prescribed by the International Committee for Regulations for the approval of electrical equipment (IEC), and shall be in accordance with Publication 17 of that body relating to round current sockets for industrial use.

\*5.2 - In order to restrict the number of types, the following models shall be adopted for voltages of 200/380 V, 50 Hz :

- for low ratings, tripolar coupling devices (P + N +  $\frac{1}{2}$ ) for 220 V alternating voltage and nominal current 16 A ;
- for medium ratings, 5-pole coupling devices (3 P + N +  $\frac{1}{2}$ ) for 3 x 380 V three-phase voltage and nominal current 32 A ;
- for high ratings:
  - either 5-pole coupling devices with pilot contact (3 P + N +  $\frac{1}{2}$  + pilot) for 3 x 380 V three-phase voltage and nominal current of 63 A ;
  - or 4-pole coupling devices with pilot contact (3 P +  $\frac{1}{2}$  + pilot) for 3 x 380 V three-phase voltage and nominal current of 125 A.

## 6 - SOCKETS ON REFRIGERATOR WAGONS

6.1 - The MARELLI coupling devices as shown in Leaflet 571-3 shall remain applicable to existing refrigerator wagons.

Réseau local  
Local mains supply  
Ortsnetz

ALIMENTATION D'UN VEHICULE FERROVIAIRE PAR LE RESEAU LOCAL  
SUPPLY TO A RAILWAY VEHICLE FROM THE LOCAL MAINS SYSTEM  
SPEISUNG EINES SCHIENENFAHRZEUGES AUS DEM ORTSNETZ

554 - 1

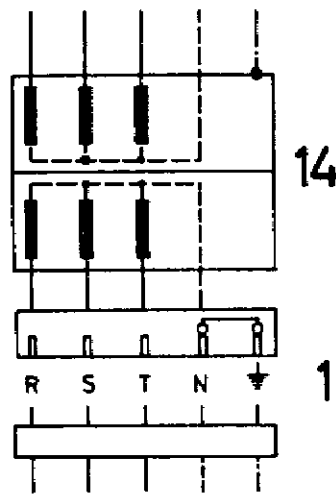
PLANCHE I

PLATE I

TAFEL I

LEGENDE  
KEY  
ERLÄUTERUNG

- 1 Dispositif de couplage selon CEE  
EEC-type coupling device  
Steckvorrichtung nach CEE
- 2 Commutateur principal  
Main switch  
Hauptschalter
- 3 Moteur à essence  
Petrol engine  
Benzinmotor
- 4 Génératrice triphasée  
Three-phase generator  
Drehstromgenerator
- 5 Fusible  
Fuse  
Sicherung
- 6 Sectionneur de neutre  
Neutral cut-off  
Nulleitertrenner
- 7 Disjoncteur  
Circuit breaker  
Schaltautomat
- 8 Commutateur  
Switch  
Umschalter
- 9 Interrupteur  
Switch  
Schalter
- 10 Lampe à fluorescence  
Fluorescent lamp  
Fluoreszenzlampe
- 11 Lampe à incandescence  
Incandescent lamp  
Glohlampe
- 12 Prise P+N  
Socket P+N  
Steckdose P+N
- 13 Prise 3P+N  
Socket 3P+N  
Steckdose 3P+N
- 14 Transformateur d'isolent  
Isolating transformer  
Isoliertransformator
- 15 Masse du véhicule  
Earthed structure of vehicle  
Wagenmasse



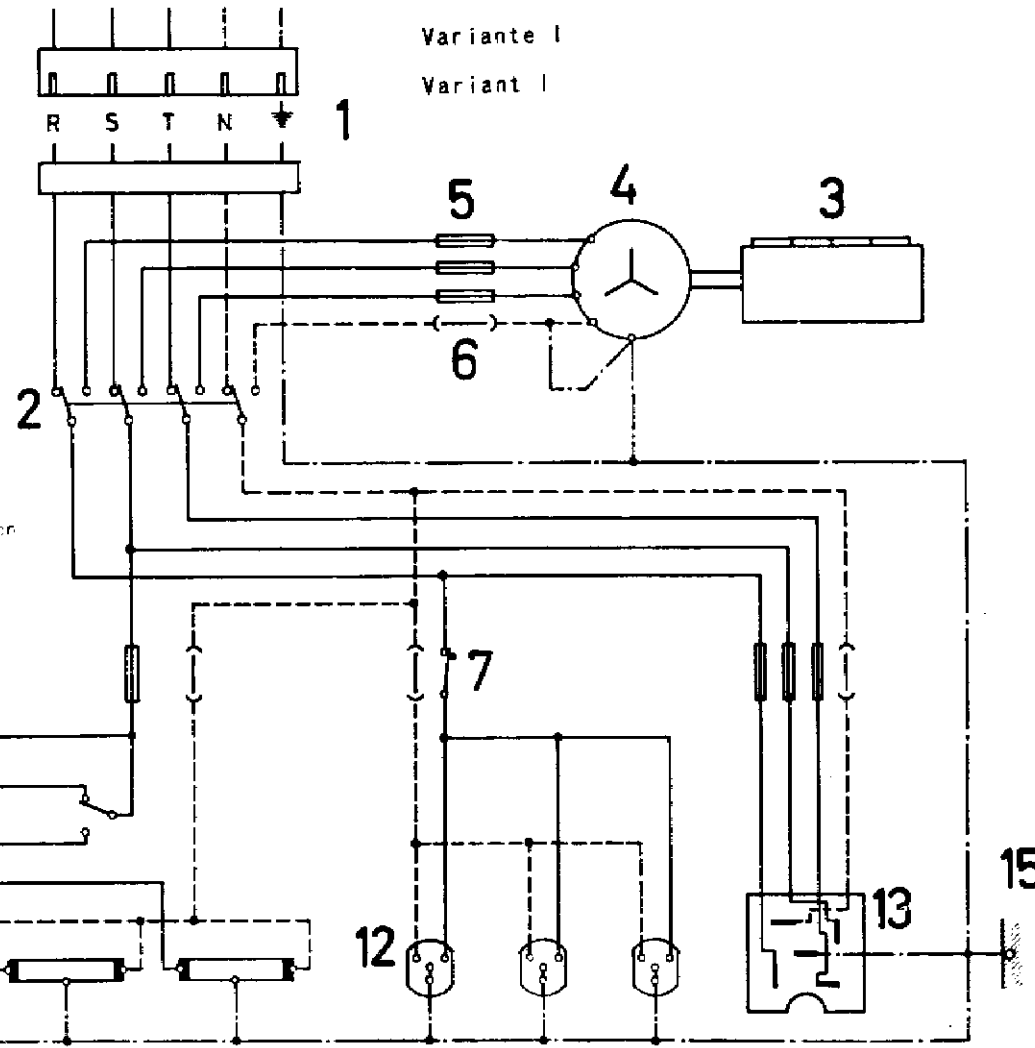
Variante 2

Variant 2

Conducteur de phase  
Phase conductor  
Phasenleiter

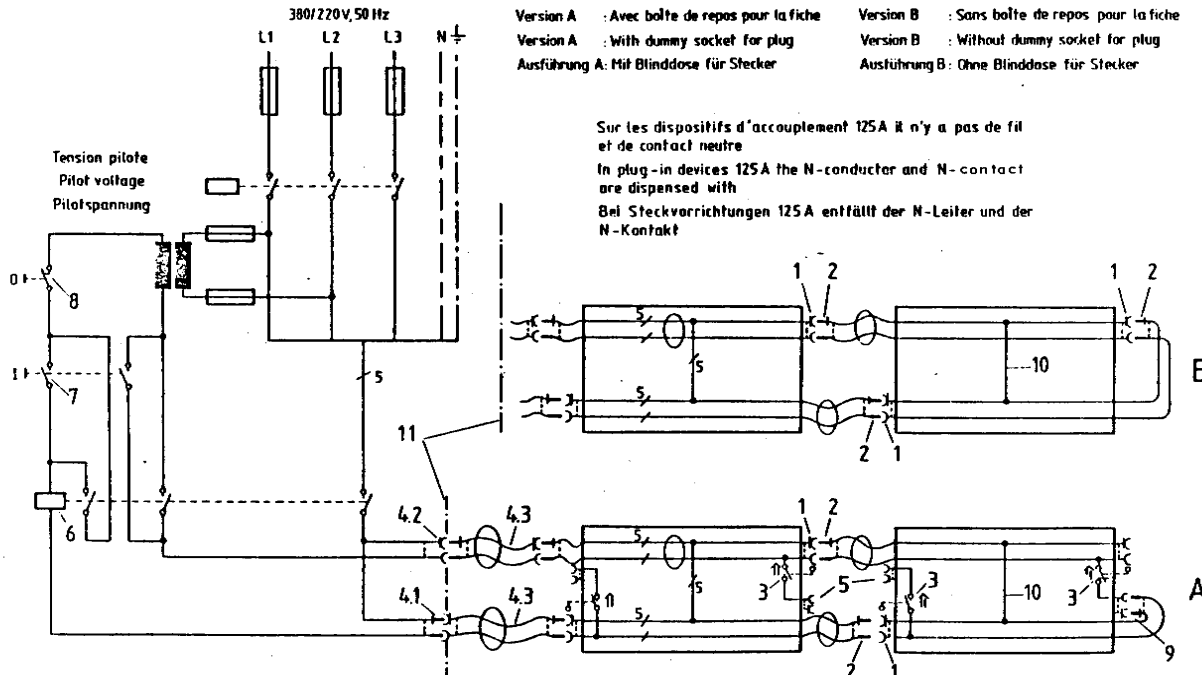
Conducteur neutre  
Neutral conductor  
Null-Leiter

Conducteur de protection  
Protective conductor  
Schutzleiter



Variante 1

Variant 1



Version A : Avec boîte de repos pour la fiche  
Version A : With dummy socket for plug  
Ausführung A: Mit Blinddose für Stecker

Version B : Sans boîte de repos pour la fiche  
Version B : Without dummy socket for plug  
Ausführung B: Ohne Blinddose für Stecker

Sur les dispositifs d'accouplement 125A il n'y a pas de fil et de contact neutre  
In plug-in devices 125A the N-conductor and N-contact are dispensed with  
Bei Steckvorrichtungen 125A entfällt der N-Leiter und der N-Kontakt

Exemple de connexion pour l'alimentation par le réseau local  
Example of connection for supply from the local mains system  
Beispiel wie die ortsfeste Einspeisung vorgenommen werden kann

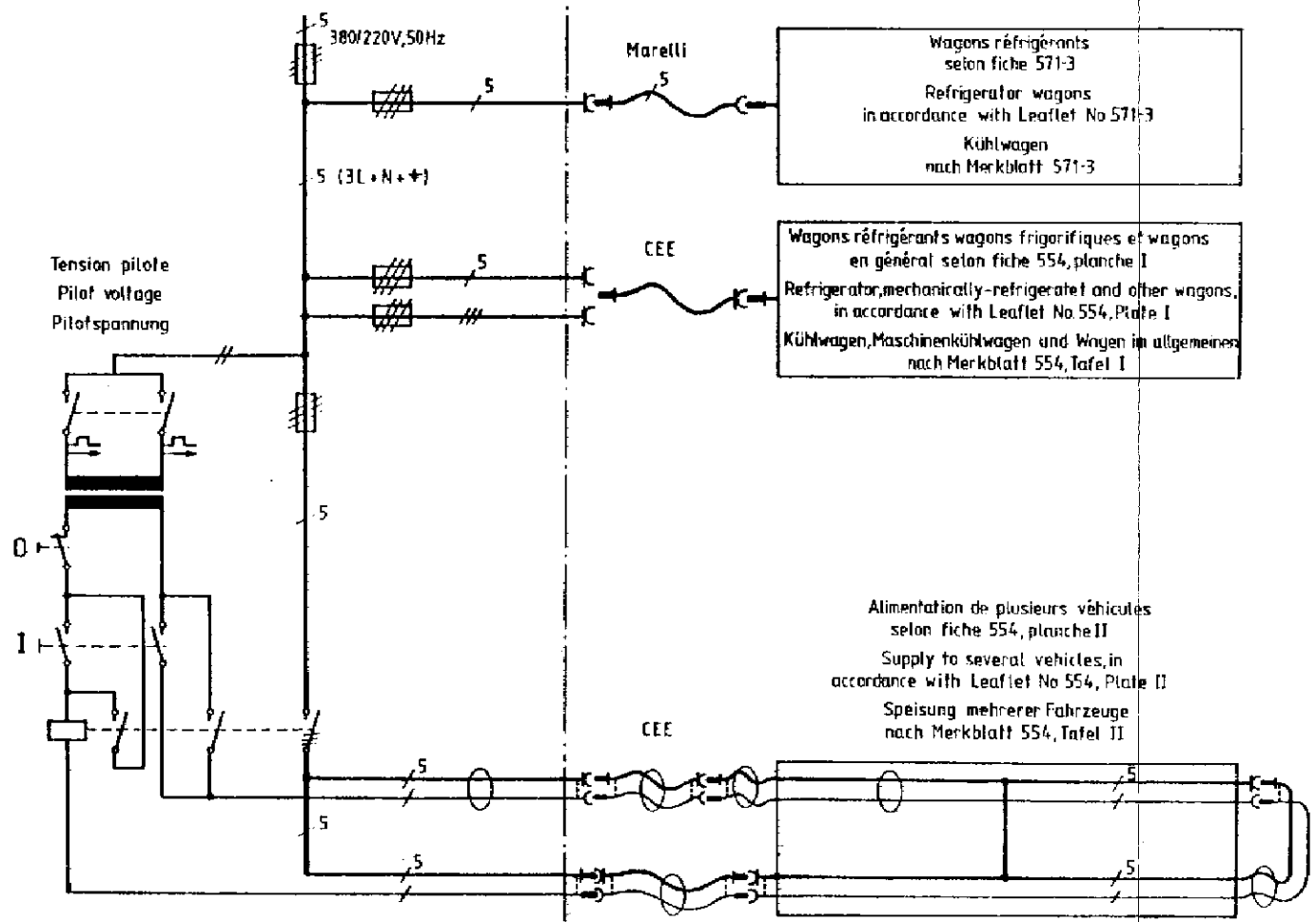
Connexion à prévoir sur les véhicules  
Connection to be provided on vehicles  
Verbindliche Schaltung an den Fahrzeugen

- 1 - Boîte d'accouplement selon CEE avec contact de sécurité 3  
Plug socket to EEC specification with safety contact 3  
Steckdose nach CEE mit Sicherheitskontakt 3
- 2 - Fiche selon CEE  
Plug to EEC specification  
Stecker nach CEE
- 3 - Contact de sécurité  
accouplé non accouplé  
Safety contact connected unconnected  
Sicherheitskontakt gekuppelt nicht gekuppelt
- ouvert fermé  
open closed  
offen geschlossen
- 4.1 - Socle connecteur selon CEE  
Apparatus plug to EEC specification  
Gerätestecker nach CEE
- 4.2 - Boîte d'accouplement selon CEE  
Plug socket to EEC specification  
Kupplungsdose nach CEE
- 4.3 - Conduite de raccordement  
Connecting line  
Anschlußleitung
- 5 - Boîte de repos sans contact de sécurité  
Dummy connection block without safety contact  
Blinddose ohne Sicherheitskontakt
- 6 - Contacteur principal, tripolaire  
Main contactor, three-pole  
Hauptschütz, dreipolig
- 7 - Bouton-poussoir «Enclenché»  
Push-button switch «Engaged»  
Tastschalter «Eins»
- 8 - Bouton-poussoir «Déclenché»  
Push-button switch «Released»  
Tastschalter «Aus»
- 9 - Fiche dans la boîte de repos sur le dernier véhicule  
Plug in dummy socket on last vehicle  
Stecker in Blinddose am letzten Fahrzeug
- 10 - Mise en parallèle  
Parallel switching  
Parallelschaltung
- 11 - Limite du réseau local  
Boundary of local mains supply  
Grenze der ortsfesten Anlage

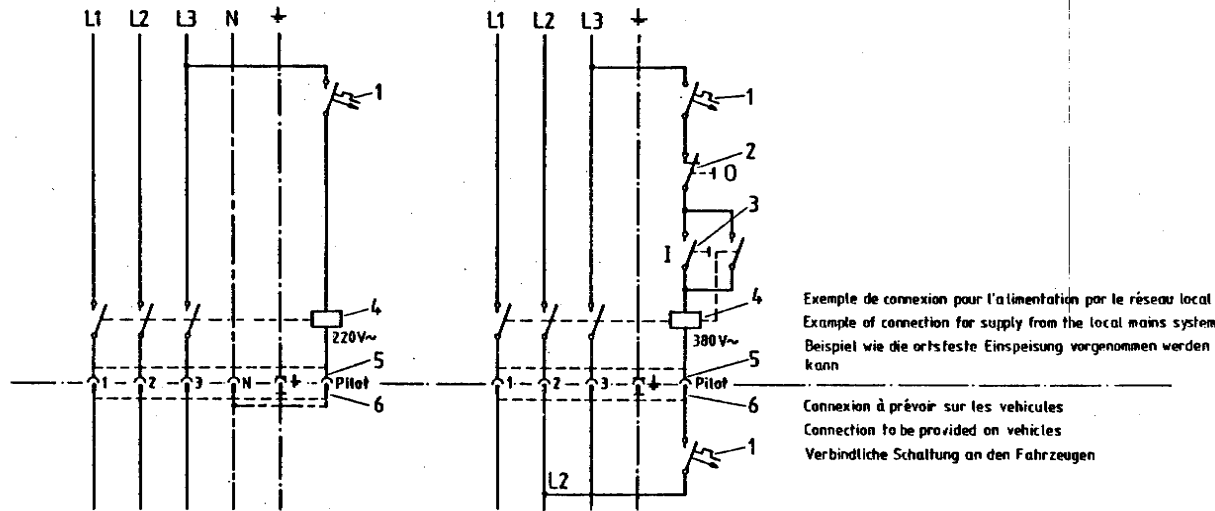
RESEAU LOCAL - LOCAL MAINS SUPPLY - ORTSNETZ

VEHICULES ALIMENTES - VEHICLES SUPPLIED -  
GESPEISTE FAHRZEUGE

554 - 1  
PLANCHE III  
PLATE III  
TAFEL III







Montage avec conducteur neutre  
 Mounting with N-conductor  
 Schaltung mit N-Leiter

Montage sans conducteur neutre  
 Mounting without N-conductor  
 Schaltung ohne N-Leiter

Version A  
 Version A  
 Ausführung A

Version B  
 Version B  
 Ausführung B

- 1 - Disjoncteur ou fusible  
 Disconnecting switch or fuse  
 Sicherungsautomat oder Sicherung
- 2 - Bouton-poussoir «Déclenchés»  
 Push-button switch «Released»  
 Tastschalter «Aus»
- 3 - Bouton-poussoir «Enclenchés»  
 Push-button switch «Engaged»  
 Tastschalter «Ein»
- 4 - Contacteur tripolaire  
 Three-pole contactor  
 Schütz dreipolig
- 5 - Boite d'accouplement selon CEE  
 Plug socket to EEC specification  
 Kupplungsdose nach CEE
- 6 - Fiche selon CEE  
 Plug to EEC specification  
 Stecker nach CEE

Exemple de connexion pour l'alimentation par le réseau local  
 Example of connection for supply from the local mains system  
 Beispiel wie die ortsfeste Einspeisung vorgenommen werden kann

Connexion à prévoir sur les véhicules  
 Connection to be provided on vehicles  
 Verbindliche Schaltung an den Fahrzeugen

APPLICATION

As from 1st January, 1979 for all vehicles as regards the obligatory provisions.

All Railways in the Union.

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RECORD REFERENCES

*Headings under which the question has been dealt with :*

- Safety rules to be adopted for an external power supply to electrical installations on stationary vehicles.

(5th Committee : Florence, May 1968. - Working Party for «electrical equipment in coaches and wagons» : Paris, January 1969 ; January 1970 ; January 1971 ; Berne, November 1971 ; Paris, January 1973).

- Question 5/R/FIC : Revision of Leaflet 554-1 :  
«Power supply to electrical equipment on stationary railway vehicles from a local mains system or another source of energy at 220 V or 380 V, 50 Hz».

(Traction and Rolling Stock Committee : Brussels, June 1978).