

**TECHNICAL SPECIFICATION**  
**FOR**  
**TRACK TO TRAIN DATA TRANSFER SYSTEM**



## TRACK TO TRAIN DATA TRANSFER SYSTEM

1. INTRODUCTION
2. SCOPE
3. SYSTEM REQUIREMENTS
  - 3.1 Functional Requirements
    - 3.1.1 General
    - 3.1.2 Doors Enabling and Disabling
    - 3.1.3 Control of De-icing System and Sleet Brushes
    - 3.1.4 Current or Next Station Identification
4. EQUIPMENT REQUIREMENTS
  - 4.1 Trackside Equipment
  - 4.2 Trainborne Equipment



1. INTRODUCTION

The Company requires a range of information to be passed between the track and the Trains. The functions and facilities shall be undertaken by the ATC system when this is available.

2. SCOPE

Schedule 6, Part D defines the requirement for systems to provide the following facilities:-

- i) enabling the facility for opening of Train doors at stations, on the correct platform side only,
- ii) disabling the opening of specified Train doors at stations where the platform length cannot accommodate a complete Train,
- iii) enabling the Train to identify the station in which it is stopped and the next station on the line.
- iv) enable/disable the De-icing Equipment and sleet brush system.

The Contractor shall supply and install track to train data transfer system Trainborne Equipment and Trackside Equipment.

3. SYSTEM REQUIREMENTS

The track to train data transfer system shall be installed at stations and other locations, and on the Trains.

The track to train data transfer system shall meet the performance requirements specified and be compatible with existing trackside and environmental constraints.

Track to train data transfer system Trackside Equipment shall comprise all hardware, software, cabling and devices for the encoding and propagation of transmissions to the Trains and interfacing to other trackside systems and structures.

Track to train data transfer system Trainborne Equipment shall comprise all hardware, software, cabling and devices for the reception, decoding of transmissions and passage to other systems on the Train.

The configuration, location and interaction of the track to train data transfer system Trackside Equipment and Trainborne Equipment shall always enable the system performance to be achieved in full.

The track to train data transfer system Trainborne Equipment and Trackside Equipment shall comply with the safety and reliability requirements for Trainborne Equipment and Trackside Equipment defined in Schedule 4 and 6 and shall only respond to valid transmissions between correctly configured equipment and at correct locations on the Northern Line.

The track to train data transfer system shall have no functional role other than to pass information from the trackside to the Train. The track to train data transfer system shall not modify, store or hold information other than for error prevention detection or correction purposes.

The track to train data transfer system shall provide the following functions:-

<u>Track to Train:</u>	<u>Refer to:</u>
Correct side door and end door disabling	3.1.2
Control of de-icing and sleet brush systems (ON/OFF)	3.1.3
Current and next station identification	3.1.4

### 3.1 FUNCTIONAL REQUIREMENTS

#### 3.1.1 General

Commands shall originate at, and be transmitted from the trackside; the location and operation of the Trackside Equipment shall ensure that the output commands are provided only during a station stop when the Train is within the Stopping Zone and not provided at any other time.

The system shall operate reliably for transmitting to receiving aerial separations of up to 1.0 m, measured at right angles to the track in the horizontal plane. When the separation exceeds 3.2 m the receiver shall not respond.

The Trainborne Equipment shall not respond to any trackside command associated with tracks other than that on which the Train is standing.

#### 3.1.2 Doors Enabling and Disabling

These functions shall be classified as High Integrity.

Door enabling and disabling commands to the Train from the Trackside Equipment shall be available not later than 500 ms after the Train has entered the correct Stopping Zone. The appropriate command output shall not be available until a valid enabling transmission has been detected for 100 ms.

The appropriate command output shall stop no earlier than 1s following the loss of a valid enabling transmission for any reason. The system shall be integrated with the Train door control system as defined in Schedule 6, Part A (section 14 (sub-section 140)).

The commands shall be manually set in the Trackside Equipment on installation of the system at a particular location. Any coding unit shall require removal from its installed position, and a mechanical change (e.g. by changing soldered wire links) in order to make the selection of appropriate transmitted commands, switches of any form shall not be used. It shall be possible to change the coding configuration during the service life of the Trackside Equipment.

#### 3.1.2.1 Correct Side Door Enable

The track to train data transfer system Trainborne Equipment and Trackside Equipment shall provide enabling commands on board the Train which identify correctly the side on which saloon doors opening controls may be activated at a station.

The track to train data transfer system Trainborne Equipment and Trackside Equipment shall provide the following door enabling commands to the Train:-

EITHER

a) no doors enabled (the state when the Train is outside the Stopping Zone or no power is supplied to the Trainborne Equipment),

OR

b) "Instructor-side" doors enabled,

OR

"Operator-side" doors enabled,

OR

both sides doors enabled.

#### 3.1.2.2 End Door Cut-Out

The track to train data transfer system Trainborne Equipment and Trackside Equipment shall provide disabling commands to the Train which identify the first set of double doors nearest each Train end cab which shall not be opened at stations. The commands shall discriminate between leading and trailing ends of the Train, and shall be capable of disabling either or both end doors opening at any station.

The track to train data transfer system Trainborne Equipment and Trackside Equipment shall provide the following doors disabling commands to the Train:-

EITHER

a) all end doors not disabled (the state when the Train is outside the Stopping Zone),

OR

- b) leading end doors disabled  
OR  
trailing end doors disabled,  
OR  
both leading and trailing end doors disabled (the default state).

### 3.1.3 Control of De-Icing System and Sleet Brushes

The system shall provide commands to the Train which turn the sleet brush and de-icing systems on and off independently of each other. The Contractor shall provide facilities at stations (where de-icing and sleet brushes are to be turned on or off) for the commands to be set by Company operational staff.

### 3.1.4 Current or Next Station Identification

The track to train data transfer system Trainborne Equipment and Trackside Equipment shall provide information to the Train which identifies correctly the station at which the Train is stopped and the next station on the line. This information shall originate at, and be transmitted from the trackside; the location of the Trainborne Equipment and Trackside Equipment shall ensure that the information is provided to meet the timing and sequencing requirements of information systems on the Train.

## 4. EQUIPMENT REQUIREMENTS

### 4.1 TRACKSIDE EQUIPMENT

The track to train data transfer system Trackside Equipment shall be supplied in accordance with the technical requirements specified for the CCTV system and cable routing requirements as detailed in Schedule 6, Parts B and F respectively.

### 4.2 TRAINBORNE EQUIPMENT

All track to train data transfer system Trainborne Equipment shall comply with the requirements of Schedule 6, Part A.