200 kmph Passenger Electric Locomotive & Push Pull Train Introduction
CRRC Dalian Co., Ltd.

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Delhi India
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02 200 kmph Passenger Electric Locomotive
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PART 2: 200 kmph Passenger Electric Locomotive

The latest product of CRRC Dalian. CRRC Dalian is also one of the companies approved by CHINA RAILWAY to design this type of locomotive.
200 kmph Passenger Electric Locomotive

CHARACTERISTIC

- Streamline type
- Light weight carbody
- The latest IGBT element
- Axle control technology
- CCBII brake control system
- Wheel disc basic brake unit
- Good dynamic performance

Needs from customer

Safety
Reliability
Economic
General Layout

The locomotive adopts two unit connection, each unit is equipped with one cab, middle corridor, equipments are arranged diagonally. Door is located between two units for access from one unit to the other.
# 200 kmph Passenger Electric Locomotive

## Main technical parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axle arrangement</td>
<td>2(Bo-Bo)</td>
</tr>
<tr>
<td>Electric transmission</td>
<td>AC-DC-AC</td>
</tr>
<tr>
<td>Axle load</td>
<td>19.5t</td>
</tr>
<tr>
<td>Electric brake method</td>
<td>Regeneration brake</td>
</tr>
<tr>
<td>Maximum test speed</td>
<td>241km/h</td>
</tr>
<tr>
<td>Operation speed</td>
<td>200km/h</td>
</tr>
<tr>
<td>Wheel rim power (continuous)</td>
<td>11200kW</td>
</tr>
<tr>
<td>Starting traction effort (Dry rail)</td>
<td>≥480kN</td>
</tr>
<tr>
<td>Train power supply</td>
<td>DC600V/4×200kW</td>
</tr>
<tr>
<td>Air compressor emission</td>
<td>2400L/min×2</td>
</tr>
</tbody>
</table>
### 200 kmph Passenger Electric Locomotive

#### Traction performance:

HXD3G locomotive can haul 24 units vehicles (156t+1320t), traction performance is as follows:

<table>
<thead>
<tr>
<th>Slope</th>
<th>0‰</th>
<th>6‰</th>
<th>12‰</th>
<th>18‰</th>
<th>25‰</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting capacity</td>
<td>Can start</td>
<td>Can start</td>
<td>Can start</td>
<td>Can start</td>
<td>Can start</td>
</tr>
<tr>
<td>Average speed</td>
<td>Higher than 200km/h</td>
<td>199km/h</td>
<td>159km/h</td>
<td>127km/h</td>
<td>100km/h</td>
</tr>
</tbody>
</table>

HXD3G locomotive can haul 24 units vehicles on 25‰ gradient, and can be started on the gradient. Its speed can reach 100km/h.
Carbody:

Carbody adopts frame welding structure which can carry the overall load. The roof is removable. Carbody load carrying capacity can meet the requirement of EN12663-1:2010. Carbody welding structure can meet the requirement of EN 15085-2007.
200 kmph Passenger Electric Locomotive

Bogie:

1. Light weight two axle bogie
2. Low level push-pull traction rod
3. Flexible full suspension drive unit
4. Diagonally arranged traction motors
5. Casting aluminium gearbox
6. Hollow shaft wheelset assembly

Welding structure can meet the requirement of EN 15085-2007.
200 kmph Passenger Electric Locomotive

Brake system:

- CCB II
- KNORR

Blended pneumatic & electrical brake
- Emergency brake, Parking brake
High voltage part:

Main circuit breaker is vacuum type; surge arresters are arranged before and after the main circuit breaker.
200 kmph Passenger Electric Locomotive

High voltage part:

Only pantograph and roof surge arresters are arranged on the roof.
The assembly area of 25kV electric components are painted with insulation coating.

Structure advantage:

- Effectively avoid the failure of high voltage components
- Reduce the daily maintenance
- Increase the locomotive reliability
- Reduce operation cost.
200 kmph Passenger Electric Locomotive

**Traction Transformer:**
One traction transformer per unit. Being located underneath the underframe.

Transformer adopts A level insulation and mineral oil, which complies with IEC60296;

Oil recycling cooling and forced air ventilation;

The design and manufacture of transformer complies with IEC60310.
**Traction motor:**
Locomotive adopts three phase squirrel type asynchronous traction motor which complies with IEC 60349-2:2010.

Traction motor adopts single insulation bearing, thin plate coupling output structure.
Micro computer network system

1. Micro computer control network

Locomotive adopts micro computer control network system.

2. Hot Standby

On-board computer adopts redundancy hot standby technology which can realize real-time switching to guarantee the reliable operation of locomotive.

3. Network

Train level network uses WTB, vehicle level network uses RS485+MVB.

4. IEC 61375

Network communication complies with IEC 61375.
200 kmph Passenger Electric Locomotive

Two prototypes have finished one-year trial-run and the single locomotive has run over 400,000 km according to the requirements of Chinese Railway.
This 160km/h Push Pull Train is developed for China Railway and is of centralized power traction mode.
160 km/h push pull train is mainly composed of the power car and the trail car. The power car is based on HXD3G locomotive, whose high voltage system, traction system, brake system and bogies are identical with those of HXD3G locomotive. Only the outline and arrangement in the mechanical room is adjusted.

<table>
<thead>
<tr>
<th>Axle arrangement</th>
<th>Bo-Bo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axle load</td>
<td>19.5t</td>
</tr>
<tr>
<td>Wheel rim traction power (continuous)</td>
<td>5600kW</td>
</tr>
<tr>
<td>Wheel rim traction power (short period)</td>
<td>6400kW</td>
</tr>
<tr>
<td>Operating speed</td>
<td>160km/h</td>
</tr>
<tr>
<td>Design speed</td>
<td>210km/h</td>
</tr>
<tr>
<td>Starting traction effort (dry rail)</td>
<td>240N</td>
</tr>
<tr>
<td>Continuous traction effort</td>
<td>212kN</td>
</tr>
<tr>
<td>Max. regenerating brake force</td>
<td>153kN</td>
</tr>
</tbody>
</table>
160 kmph Push Pull Train

Configuration:

Short configuration: 1Mc+7T+1Tc

Long configuration: 1Mc+18T+1Mc

Flexible configuration: 1Mc+9T~18T+1Mc
160 kmph Push Pull Train

3D drawing of the power car cab:
160 kmph Push Pull Train

The trail car is composed of the control car, first class seat car, second class seat car and the dining car, etc.

Control car（the first class seat）
160 kmph Push Pull Train

The effect drawing of trail car interior:
160 kmph Push Pull Train

The effect drawing of trail car interior:
160 kmph Push Pull Train

The effect drawing of trail car interior:
160 kmph Push Pull Train

The effect drawing of trail car interior:
Micro computer network system:

WTB Network complies with IEC 61375-1-2007

MVB+ETH double net hot-standby

Motor car

Lonworks network

Trailer car
160 kmph Push Pull Train

Information Display System

1

Broadcasting System

2

Wi-Fi System

4

Video Monitoring System

3

Trailer car
160 kmph Push Pull Train

- Fire Alarm
- Axle Temperature Detecting
- Door Monitoring and Anti-slide System

Committed to Safety Excellence
### Traction performance parameter:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>1Mc+7T+1Tc</th>
<th>1Mc+18T+1Mc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration way</td>
<td>1Mc+7T+1Tc</td>
<td>1Mc+18T+1Mc</td>
</tr>
<tr>
<td>Configuration weight</td>
<td>585 t</td>
<td>1260 t</td>
</tr>
<tr>
<td>0-40km/h average acceleration</td>
<td>0.371 m/s²</td>
<td>0.3417 m/s²</td>
</tr>
<tr>
<td>160km/h residual acceleration</td>
<td>0.1586 m/s²</td>
<td>0.1429 m/s²</td>
</tr>
<tr>
<td>200km/h residual acceleration</td>
<td>0.0969 m/s²</td>
<td>0.0844 m/s²</td>
</tr>
<tr>
<td>12‰ balancing speed</td>
<td>190km/h</td>
<td>180km/h</td>
</tr>
<tr>
<td>25‰ balancing speed</td>
<td>123km/h</td>
<td>115km/h</td>
</tr>
<tr>
<td>30‰ balancing speed</td>
<td>106km/h</td>
<td>100km/h</td>
</tr>
</tbody>
</table>
160 kmph Push Pull Train

Push Pull Train VS Normal Train

- **Configuration Flexibility**: 5 stars (Push Pull Train) | 3 stars (Normal Train)
- **Maintenance**: 5 stars (Push Pull Train) | 3 stars (Normal Train)
- **Comfort of Passenger**: 5 stars (Push Pull Train) | 3 stars (Normal Train)
- **Economic**: 5 stars (Push Pull Train) | 3 stars (Normal Train)
Summary

CRRC Dalian

01 Push Pull Train

02 200 kmph Passenger Electric Locomotive
Thanks for listening!

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