

附件

一、參訪行程照片輯要



InnoTrans 會場升起中華民國國旗



本局參訪人員抵達展場與國旗合影



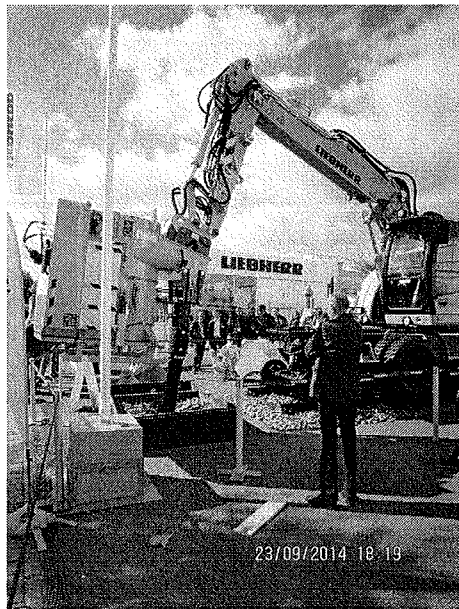
進入 InnoTrans 展場



InnoTrans International Trade Fair 由德國柏林
國際展覽有限公司(Messe Berlin GmbH)主辦



軌道檢查車展示



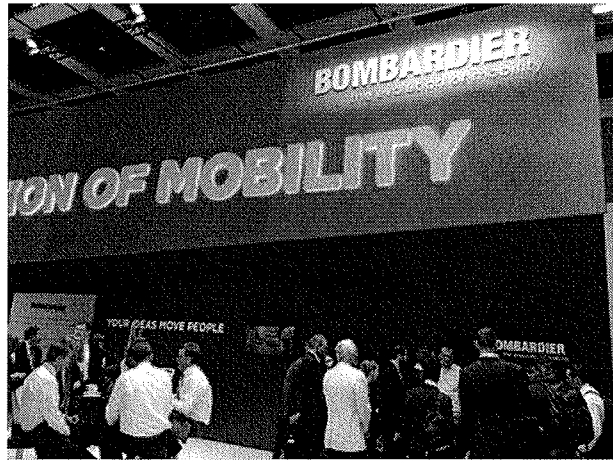
砸道車展示



SNCF 新車展示



西門子新車展示



龐巴迪公司車輛展示



西班牙卡夫公司車輛



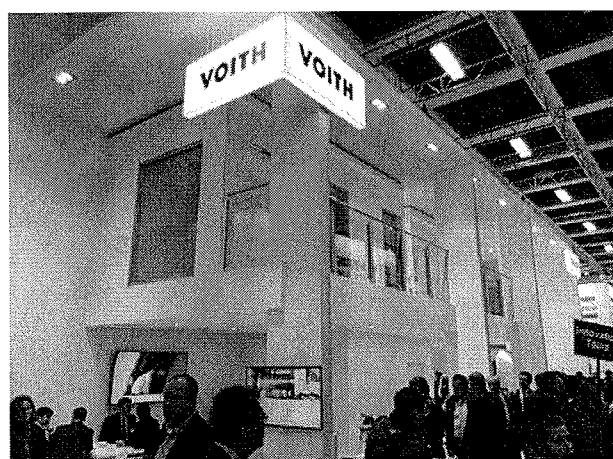
法國 ALSTOM 公司車輛



德國西門子車輛



德國 Vossloh 車輛



義大利 VOITH 車輛



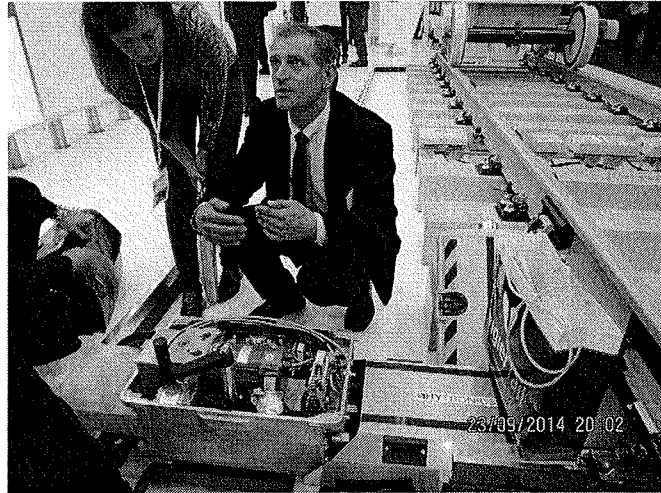
SNCF 新車展示



中國北車公司(CNR)展場



中國南車公司(CSR)展場



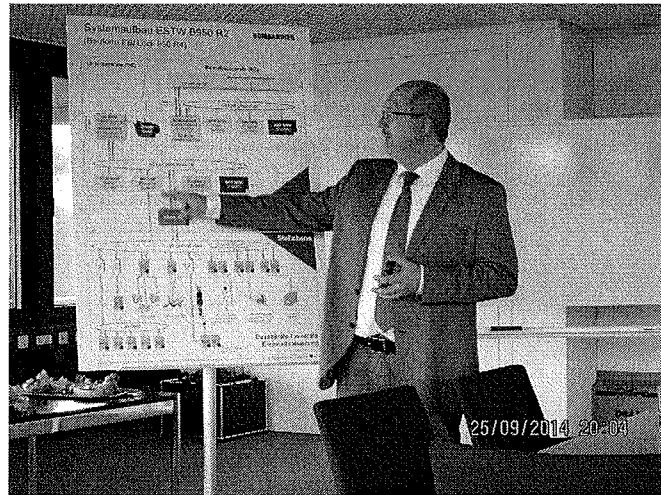
CONTEC 公司解釋轉轍器組件



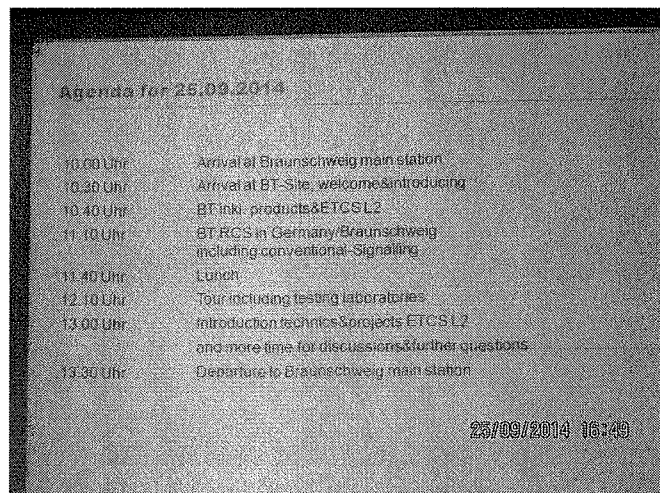
CONTEC 公司轉轍器功能測試



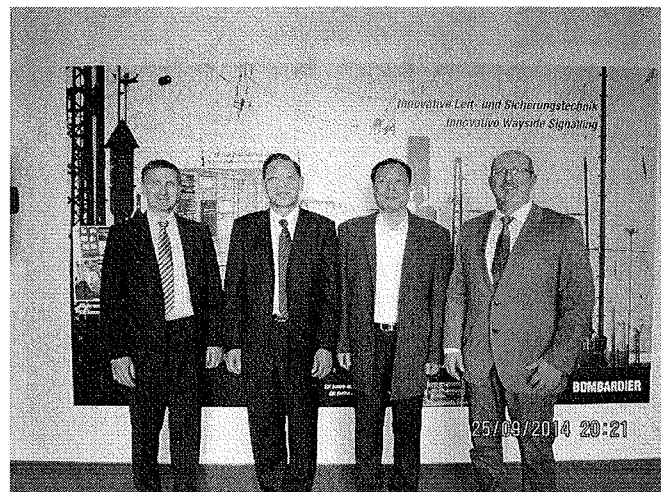
與英國 Balfour Beatty Rail 技術解決方案經理
Mr. Kevin Fry 研討電車線問題



與龐巴迪實驗室鐵路控制解決
方案專家研討號誌系統



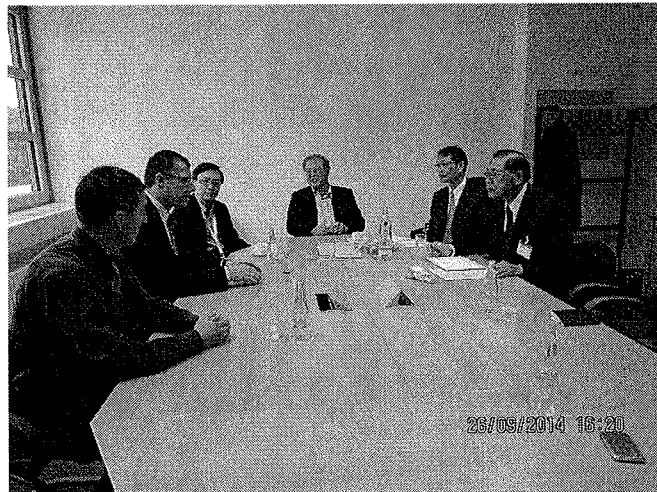
與龐巴迪實驗室號誌專家研討 ETCS L2



與 BT Lab 號誌專家研討後合影



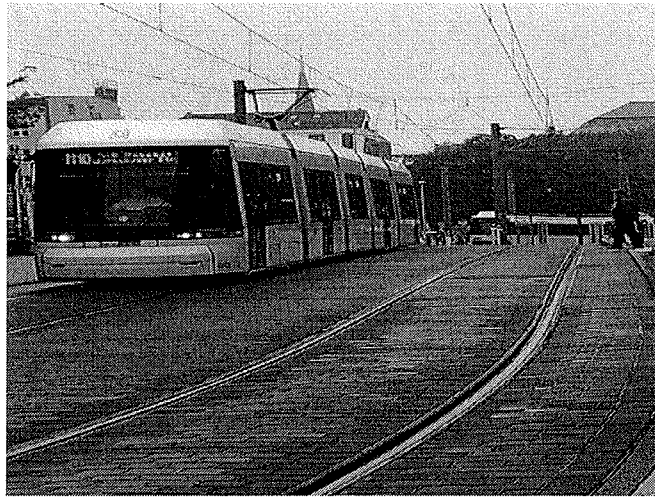
拜訪西門子公司



與西門子公司人員交換意見



柏林的輕軌列車（混合車道）



柏林的輕軌列車（專用車道）



柏林的腳踏車租用系統(一)



柏林的腳踏車租用系統(二)



柏林的腳踏車租用系統(三)

二、簡報資料摘錄

(一) Catenary Machine Vision Systems for Catenary Inspection



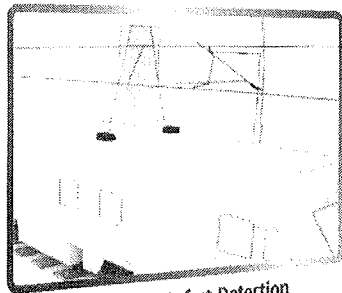
Automated optical inspection of overhead contact line systems - Manually checking every aspect of the overhead line equipment is a daunting task. Numerous man hours can be involved and even then numerous defects will go unnoticed. Railways are looking for systems that can help them to increase their inspection efficiency and accuracy, locating potentially dangerous defects and tracking new defects as they are detected. The MERMEC group's Catenary Machine Vision Systems help railways find defects in a fraction of the time compared to manual inspection, and helps railways track defects, allowing maintenance teams to focus on problem areas instead of replacing long pieces of catenary.

Catenary Inspection

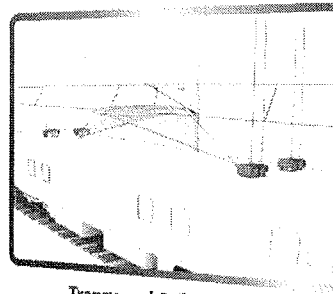
The Catenary Machine Vision systems are designed to lower inspection time, increase defects detection and tracking efficiency and speed up your maintenance program, saving you time and money. Based on non-contact optical technology using high speed line-scan cameras, the systems provide real time analysis of the recorded images. Enhanced algorithms carry out measurements and classify defects according to their properties and/or their position in the catenary structure. An analysis software package, called TRACKWARE, is included, whose ease-of-use reduces training time, allowing you to fix the problem faster.

Holistic Product Development

Every single product is designed with the complete solution in mind. This allows flawless interoperability and seamless integration among all different systems. The final result is a multifunctional platform whose scalability and modularity rely on its inner ability to be enlarged to accommodate new needs by simply adding further specific equipments.

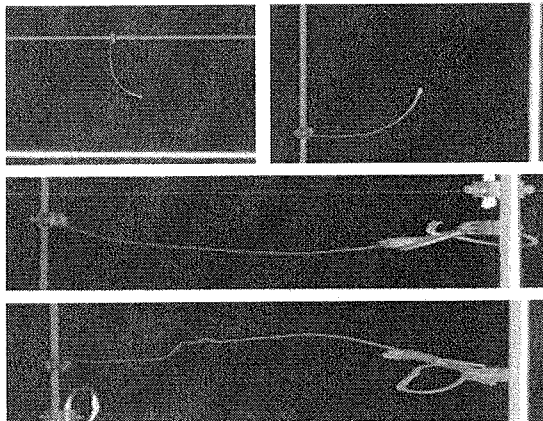


Longitudinal Defect Detection



Transversal Defect Detection

Catenary Longitudinal Defect Detection



The Catenary Longitudinal Defects Detection System inspects infrastructure devices that reside in the vertical plane along the track longitudinal axis such as catenary rope and contact wire, droppers, fixed points, insulators. It recognizes changes on the infrastructure devices.

The analysis can also be performed taking into account data coming from a catenary geometry measurement system for cross-correlation of measured data. Composed by two acquisition units (left and right units respect to catenary wires), the system is based on high speed linear cameras and a laser lighting module.

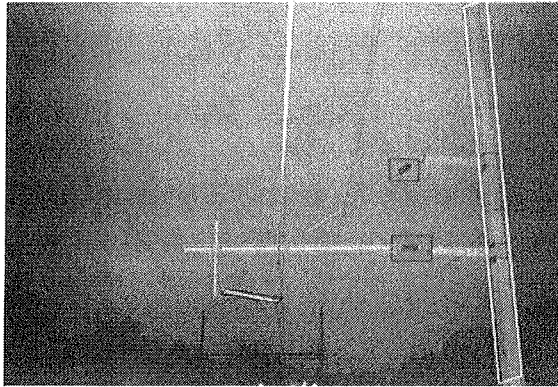
Main defects detected

High performance, smart vision algorithms extract relevant parameters and defects such as:

- Detection of broken and/or bulged droppers
- Detection of dropper slant
- Detection of broken or missing insulator parts
- Inspection of contact wires, messengers and feed lines.

Each defect is associated automatically to the kilometer position on the track and the related image is saved in a file for further evaluation by the technicians.

Catenary Transversal Defect Detection



TECHNICAL SPECIFICATIONS

Measurement speed	up to 360 km/h
Resolution	1 mm (0.04 in)
Accuracy	4 mm (0.15 in)
Sampling step	every cantilever
Field of view	8 m (26 ft) centered on track 4m (13 ft) from the bottom of the Overhead line infrastructure

Based on high resolution digital cameras and high power illumination modules, the Catenary Transversal Defect Detection System acquires high resolution images of cantilevers, line hangers and insulators, resting in the transversal plane, and evaluates changes and/or corrosion in these objects.

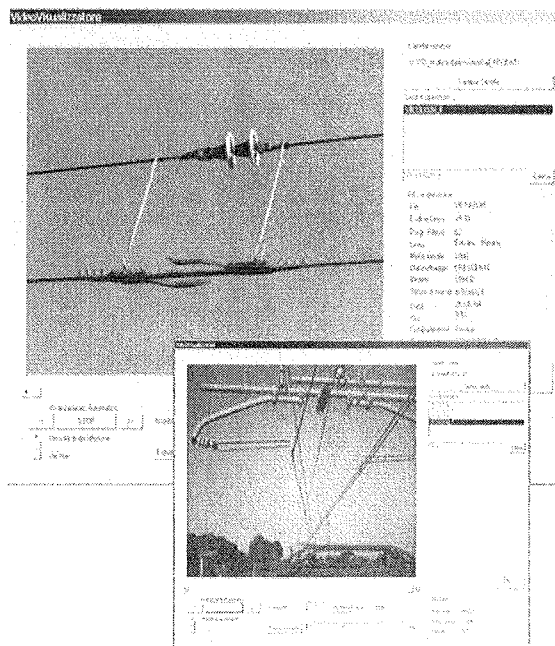
Main defects detected

Through a double sided imaging process, triggered by the Pole Detection System, images are acquired on both sides of cantilever infrastructure to detect:

- Changes on main catenary infrastructure devices
- Detection of broken or deformed parts on cantilever devices
- Detection of broken or missing parts.

Each defect is associated automatically to the kilometer position on the track and the related image is saved in a file for further evaluation by the technicians.

Catenary Video Surveillance



The Catenary Video Inspection system is a digital surveillance system (DSS) that allows video recording of the railway overhead line.

DVR cards (also known as digitizer or video capture cards) along with MERMEC Group application software enable advanced services and functionalities such as centralized command and control, and events management.

Video data are immediately displayed on command and control units as well as recorded on high-performance storage devices allowing both real-time and off-line analysis of the video stream.

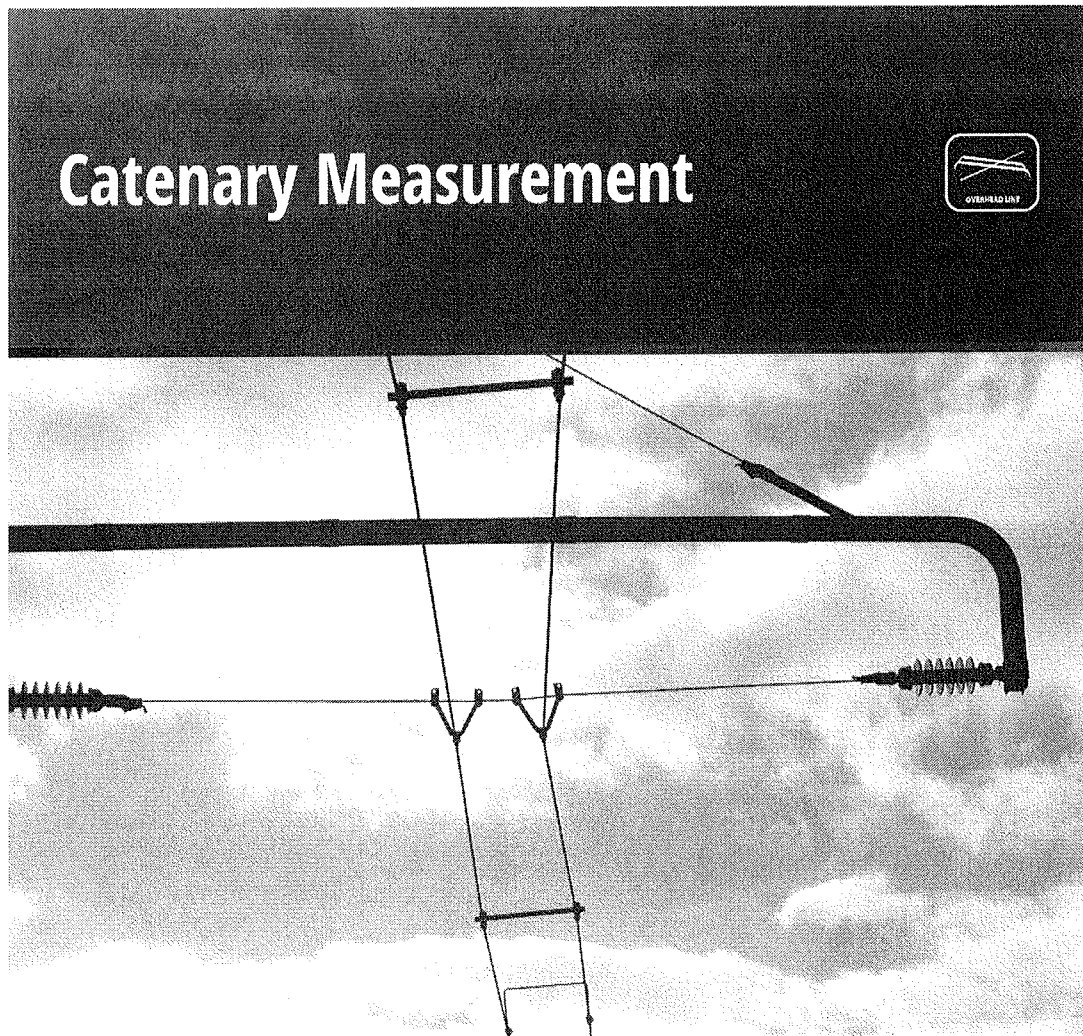
Basic components of the solution include:

- digital video data recording system
- data transfer hardware and software
- storage, retrieval and management system for digital data.

The software application allows analog video compression and playback in M-JPEG format as well as special event management (frame grabbing triggered by defects detections) and video synchronization with infrastructure positions.

The Catenary Image Analyzer is seamlessly integrated with MERMEC Group measuring systems and perfectly interoperable with them.

(二) Catenary Measurement



A new era of precision measuring - Contact wire wear, catenary stagger and height, tension, wave propagation velocity, bending rigidity, vibration endurance, wear... when it comes to overhead or catenary lines, there are lots of things to worry about, not to mention the services and added value that overhead lines bring to your customers such as high-speed transport, power for running portable computers or air conditioning. Your maintenance program needs an accurate and reliable system, one that won't have you sending out your maintenance staff for every anomaly revealed in measurement.

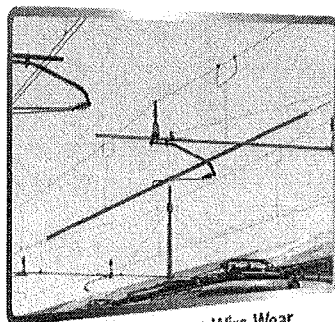
Catenary Measurement

Ever-increasing loads and speeds on railway lines are placing continually rising demands on overhead contact line installations. This leads to the increase of damage and accelerated wear to the systems.

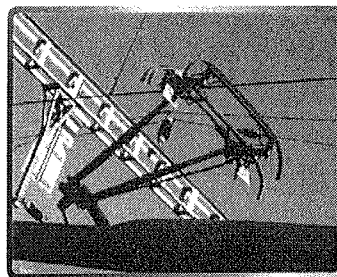
The position of the catenary above the track must be carefully controlled and maintained to ensure optimal contact between the pantograph and the contact wire for the continuous delivery of electrical power to the train. Not only must there be optimal contact, the point of contact on the pantograph must be continuously varied along the length of the pantograph as the train moves along the track to prevent excessive frictional wear at any one point on the

pantograph. Thus both the vertical and horizontal positions of the contact wire relative to the pantograph are important to the efficient running of the train.

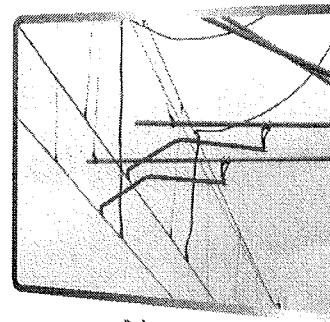
The focus of inspection of overhead contact lines is on ensuring safe operation and preventing danger to people. It is the permanent aim of all railway line operators to detect faults at an early stage, and to correct any damage, fault or wear on time in order to prevent serious disturbances of railway traffic. At the same time, it is important to take into account the aspect of achieving optimum service life of the overhead contact line installations by means of an on-condition maintenance strategy.



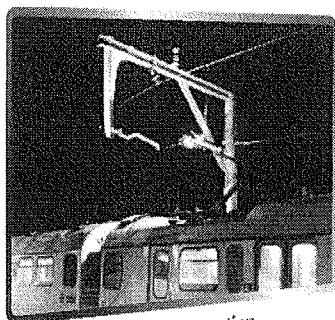
Geometry & Contact Wire Wear



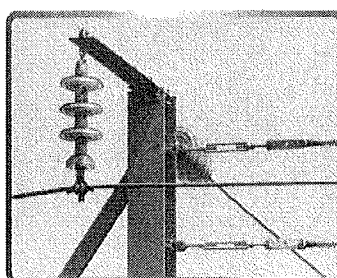
Pantograph/Catenary Interaction



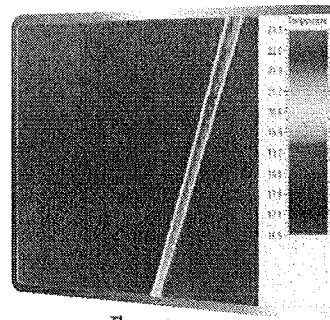
Pole Detection



Electric Arcs Detection

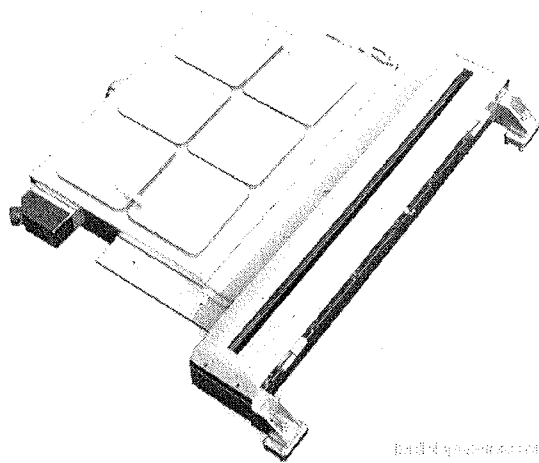


Electric Parameters

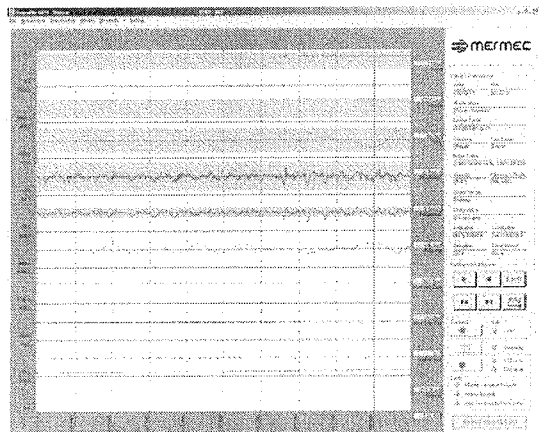


Thermal Scanning

Geometry & Contact Wire Wear



Ball of steel wire



Geometry & Contact Wire Wear Measurement System is a non-contact measuring system using laser scanners and high-resolution digital camera to measure height, residual thickness and stagger of up to 8 wires simultaneously at the top speed of 360 km/h. Camera's extremely small integration times (50-100µs) eliminate blurring at very high speeds, making the MERMEC group's measuring system the most accurate and high performance on the market. With more than 5,000 measurements per second, the system helps maintenance staff to get the most from the life of contact wires while increasing the safety of the line. Customizable sampling step (standard value 20mm) ensures precise localization of any potentially dangerous weak spots caused by uneven wear or damage from electric arcs.

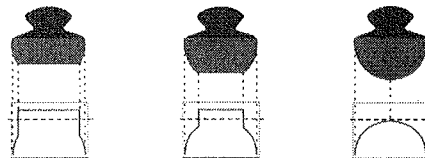
Main features

- Measurement of round and elliptical wires
- Laser illuminating system
- High resolution / high speed line scan cameras
- Very short integration time
- Integration time automatically tuned for every point measured
- Integrated cleaning and conditioning systems
- High immunity from external light sources

Measuring method

The laser system uses stereo vision measuring principle obtained from a collimated laser beam and the axis of a camera using a CCD linescan cameras (6 or 12 K pixel)

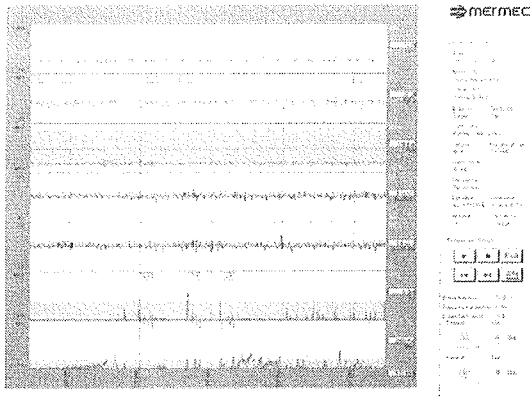
The laser beam is projected at an angle of 45° towards the underside of the wire. It draws a curve corresponding to the wire section. The camera detects the curve "drawn" by the laser beam on the inferior surface of the wire and converts the information in x-y coordinates relating to every acquired point of the curve.



Geometry & Contact Wire Wear Measurement System

Pantograph/Catenary Interaction

MAINTENANCE AND MONITORING OF THE CONTACT WIRE INTERACTION



Maintaining contact with the contact wire is fundamental in the correct functioning of electric railway. The Pantograph/Contact Wire Interaction Measuring System provides both static and dynamic measurements of interaction forces and vertical accelerations, with a dynamic sampling frequency of up to 2kHz at speeds of up to 320 km/h.

Real Time Parameters

Visual interface allow your maintenance team to switch in real time:

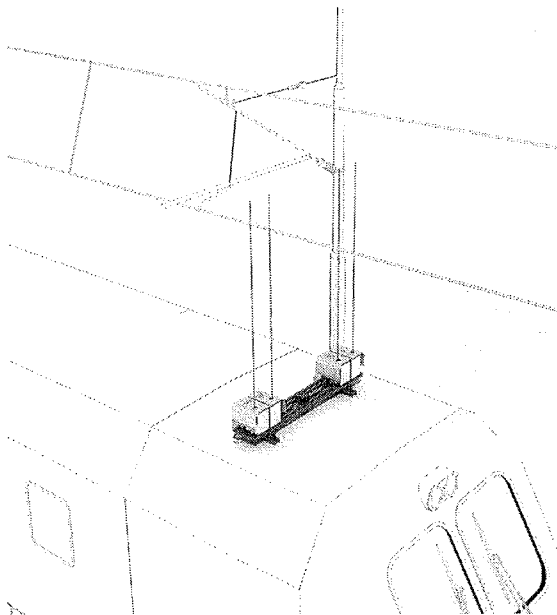
- Contact Forces
- Stagger
- Pantograph Per-Vertical Accelerations
- Singular Points
- Vehicle Speed.

Due to the technology in place, the system is extremely accurate, offering a 20 accuracy of 1% of the applied force.

TECHNICAL SPECIFICATIONS

Parameters	Measure range	Resolution	Accuracy
Contact pressure on the pantograph	-100 + 400 N	1 N	Better than 1%
Pantograph per-vertical accelerations (front posts and supports)	$\pm 10 g$	2 mg	Better than 1,5%

Pole Detection

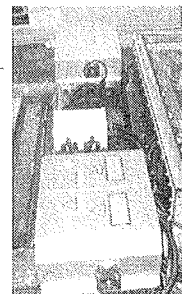


Pole Detection System (PDS) automatically and continuously identifies the catenary wire support structure along the tracks providing complementary measurement data to those systems require a precise location of the poles.

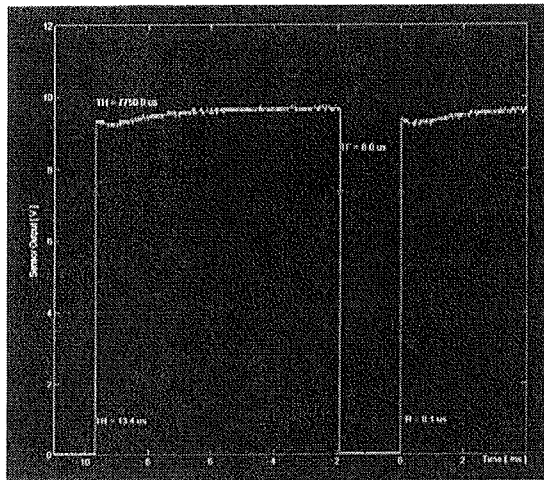
The system consists of two acquisition units mounted side by side on the inspection car's rooftop. Each unit comprises two distance measurement systems with the beams directing vertically upwards. The light of a high frequency modulated laser beam is reflected by objects and collected by a lens onto a detector. The phase of the detected signal differs from the emitted signal due to the light's time of flight. From this phase shift one can deduce the distance to the object. PDS records a pole if both laser beams of an acquisition unit are reflected simultaneously. This two-fold reflection is the result of the poles' anchor arms, side holders or cantilevers. In addition, the two sensors determine the distance to distinguish such objects from others further above. The values are digitized and recorded.

TECHNICAL SPECIFICATIONS

Measurement speed	Up to 320 km/h (198.8 mph)
Spatial accuracy	2 mm (0.078 in)
Distance accuracy	10 mm (0.393 in)
Distance range	16 mm (0.629 in)
Center dist.	Ø B



Electric Arcs Detection



Arcing at the pantograph distorts the regular waveform of the supply voltage and current and generates transients which propagate along the railway system, including tracks, track circuits, other locomotives on the same track, substation supply transformer, vehicle transformer, etc. This causes interference voltages and currents in the frequency range from DC to several MHz and radio frequency emissions up to GHz.

Electric Arcs Detection System detects the presence of electrical arcs and their duration at speeds of up to 320 km/h. Special light filters make the system immune from sunlight.

Measured Parameters

- Arc location (Kilometric position), duration and intensity
- Number of all arcs (having minimum duration of 0.015s)
- Sum of all arcs duration
- Largest arc duration
- Percentage of arcing.

Electric Parameters

TECHNICAL SPECIFICATIONS

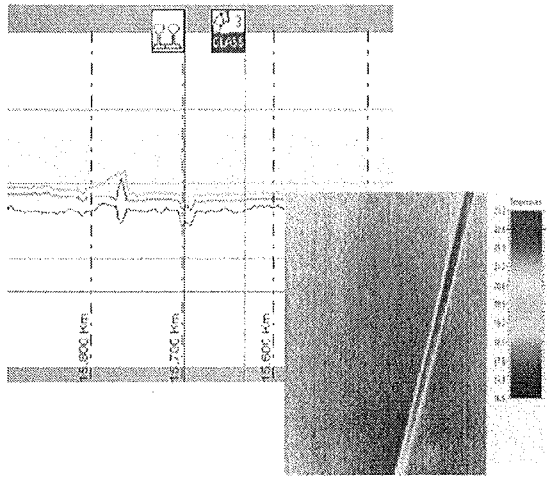
Technology	Electrical
Measuring Speed	0 - 320 km/h (0 - 199 mph)
Accuracy	1% full scale
Sampling Frequency	10 kHz
Voltage Measurement	<ul style="list-style-type: none"> • Line Voltage: DC or AC • DC or AC Line voltage harmonics content
Visualized Data	<ul style="list-style-type: none"> • Singular points • Vehicle Speed
Drain of Current Measurement	<ul style="list-style-type: none"> • DC or AC Line drained current • DC or AC Line drained current harmonics content
Visualized Data	<ul style="list-style-type: none"> • Singular points • Vehicle Speed

The system acquires, in all environment conditions, the electrical parameters that can be processed in order to identify the characteristic of the electric power drained from the contact line. Using onboard software with real time data analysis, the system can measure both the voltage and the traction current at speeds of up to 320 km/h.

Measured Parameters

- Overhead Line voltage: (DC) up to 4.5kV and (AC) up to 30kVrms
- Line drained current: up to 3Ka peak DC or 400Arms.

Contact Wire Thermal Scan

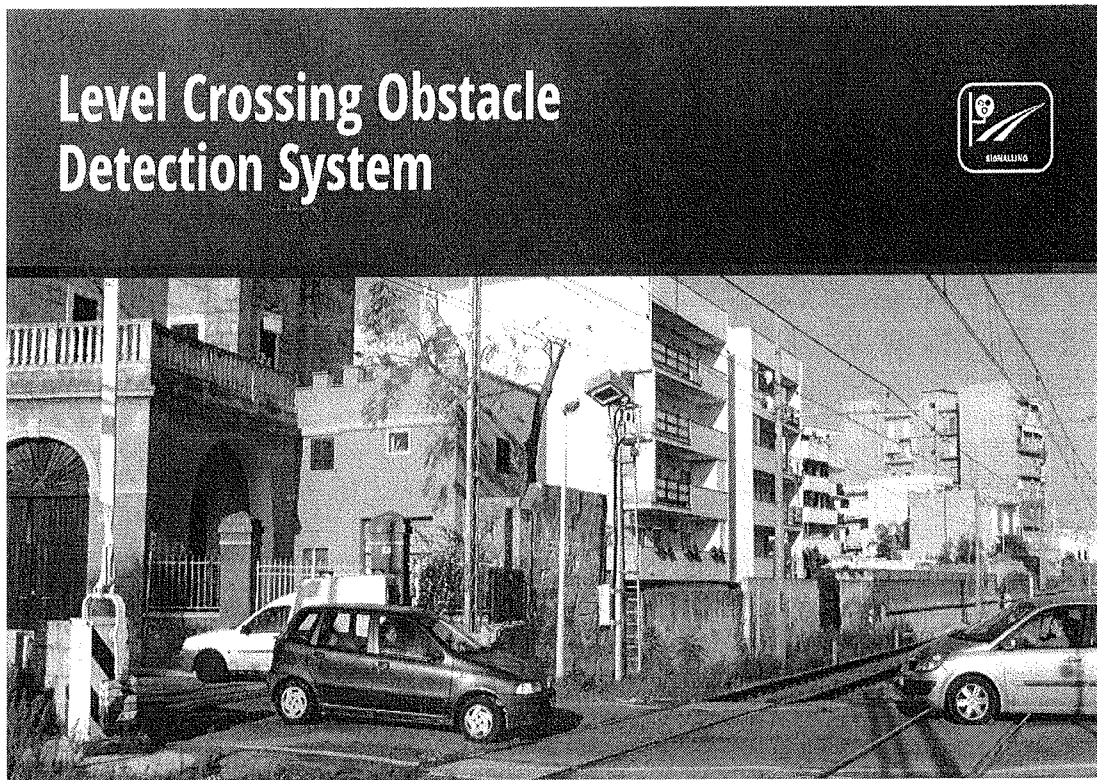


The Thermal Scan System for catenary lines is a no contact, optical system designed to carry out the infrared thermogram of the catenary contact wire. Able to take measurements in a range of 40°C to +500°C, the system has an accuracy of $\pm 10^\circ\text{C}$. Real Time analysis on a Windows platform gives your maintenance staff specific temperature readings which are synchronized with location data.

TECHNICAL SPECIFICATIONS

Technology	No-contact Optical
Spectral Range	7.5 to 13.5 microns
Measuring Range	-40 to +500°C (-40 to 932°F)
Accuracy	$\pm 10^\circ\text{C}$ ($\pm 50^\circ\text{F}$)
Sampling Step	1 meter at 120 km/h
Resolution	320x240 or 640x480 pixels
Additional Notes	Real Time Analysis can be synchronized with location data

(三) Level Crossing Obstacle Detection System

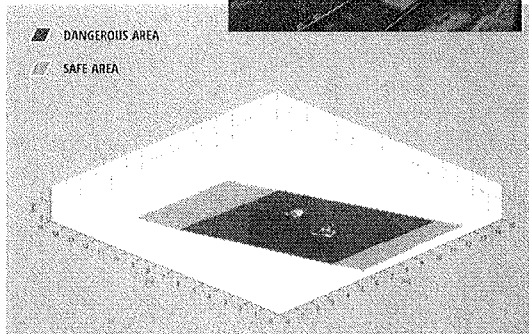
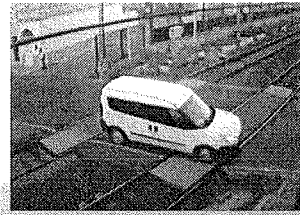


The Level Crossing Obstacle Detection System performs the automatic detection of obstacles at level crossings preventing accidents to incoming trains. The detection is made through one or more sensing units depending on the size of level crossing.

A wayside control unit collects the information received by the sensing units and generates alarms based on high-level thresholds (minimum obstacle dimensions). The control unit is able to integrate with the traditional level crossing protection system with complete barriers and drives and to communicate with the Interlocking System through safe interfaces.

Advantages and Benefits

- Easy installation and adaptation to the morphology of the area
- Number of sensing units per installation far lower compared to other technological solutions, e.g. micro-wave radar monitoring systems
- Simple configuration for the specific geometry of level crossing
- Easy configuration of alarm thresholds depending on the size/volume objects
- No false positive when it is required the recognition of small objects and/or people lying on the tracks
- Extremely reliable performance in harsh weather conditions, such as rain, snow and fog
- Composite fail-safe architecture based upon SIL4 principles
- Integration with level crossing protections systems and communication to the Interlocking System (inputs from voltage-free contacts, voltage-free contact outputs, 24V DC vital outputs)
- Closed-circuit television system for visual check of the status of the area (optional).



Obstacle detection system at a railway level crossing

Reliability and Safety

- MTBF 80,000 hours
- SIL4 compliant with the standards EN 50126, EN 50128 and EN 50129 on functional safety of railway technology.

Overview of the Obstacle Detection System

- Configurable to the specific geometry of level crossing
- Configurable to detect obstacles with in-specifier and customizable dimensional ranges
- Interfaced with the railway signalling system and remote monitoring stations

PRODUCT SPECIFICATIONS

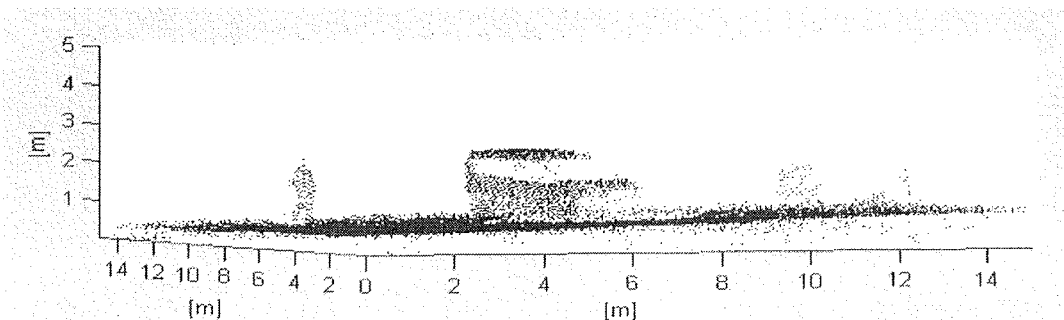
Sensing unit size	600 x 500 x 400 mm
Way in control distance	600 x 860 - 1340 mm (in interlocking system)
Working temperature range	-40°C - 40°C
Supply voltage	1500 W AC (110V - 15V @ 50/60 Hz)
Sensing unit power consumption	500 W max
Way in control power consumption	300 W max
Protection grade	IP67

Electrical safety

- Compliance with the standard EN 50122-1 on protective provisions against electric shock
- Compliance with the standard EN 50124-1 on clearances and creepage distances for all electrical and electronic equipment

Environmental conditions

- Compliance with the standard EN 50125-3 on environmental conditions for equipment



三、 S700K 型電動轉轍器安裝與調整細則

SIEMENS

Siemens Signalling Co. , Ltd.

S700K 型電動轉轍器安裝與調整細則

西門子信號有限公司

1	概述	Error! Bookmark not defined.
2	安裝	Error! Bookmark not defined.
3	調整	Error! Bookmark not defined.
4	收尾工作	Error! Bookmark not defined.
5	貯存	Error! Bookmark not defined.
附 1	: S700K 型轉轍器附件明細.....	7
附 2	: S700K 型電動轉轍器機蓋密封的調整方法.....	8
附 3	: 電纜密封裝置安裝圖示	9

1 概述

S700K 型電動轉轍器可用來操縱各種型式和規格的道岔。它的安裝簡單，無需特別關注即可完成。安裝後的總高不超過鋼軌平面。它可以安裝在道岔的左側或右側，停電時可以手搖操作轉轍器。轉轍器線上路上的安裝見圖 1。

轉轍器的防塵防水等級滿足中 IP54 的要求。

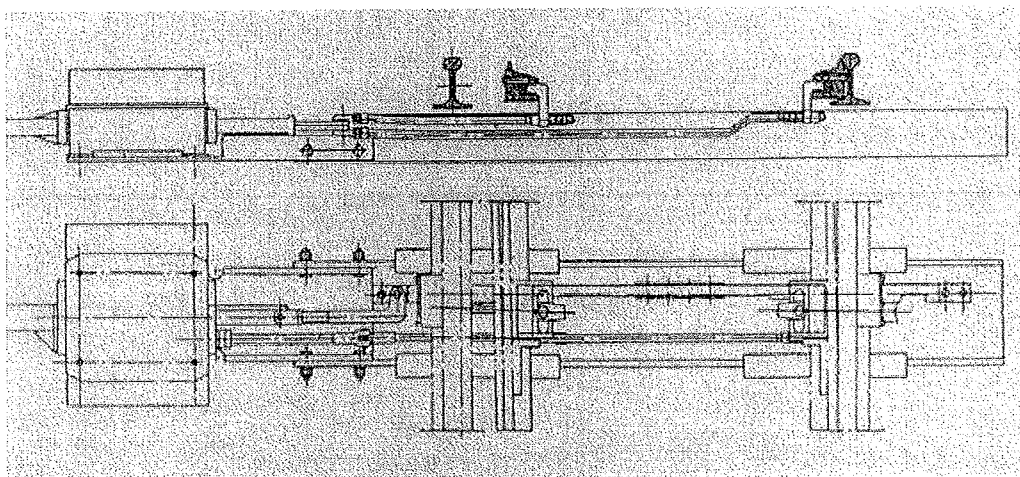


图 1 线路设备

2 安裝

S700K 型電動轉轍器的外形及安裝尺寸見圖 2。請按下面的要求安裝轉轍器：

- 打開開關鎖（4），此時手搖把可以插入搖把齒輪；
- 打開機蓋鎖；
- 取出乾燥劑和地腳孔堵孔塞；
- 將轉轍器安裝於穩定的水準基礎之上，安裝後轉轍器後端（動作桿罩筒端）比前端（動作桿伸出端）超高 4~8mm；
- 用四個六角螺栓（M20×105）可靠地將轉轍器固定在安裝位置上；
- 根據系統接地要求連接接地螺栓（20）

S700K 型電動轉轍器各部件的配置見圖 2。

電纜密封裝置（5）是以附件形式提供的，使用者在安裝時請參見附件清單及安裝圖。

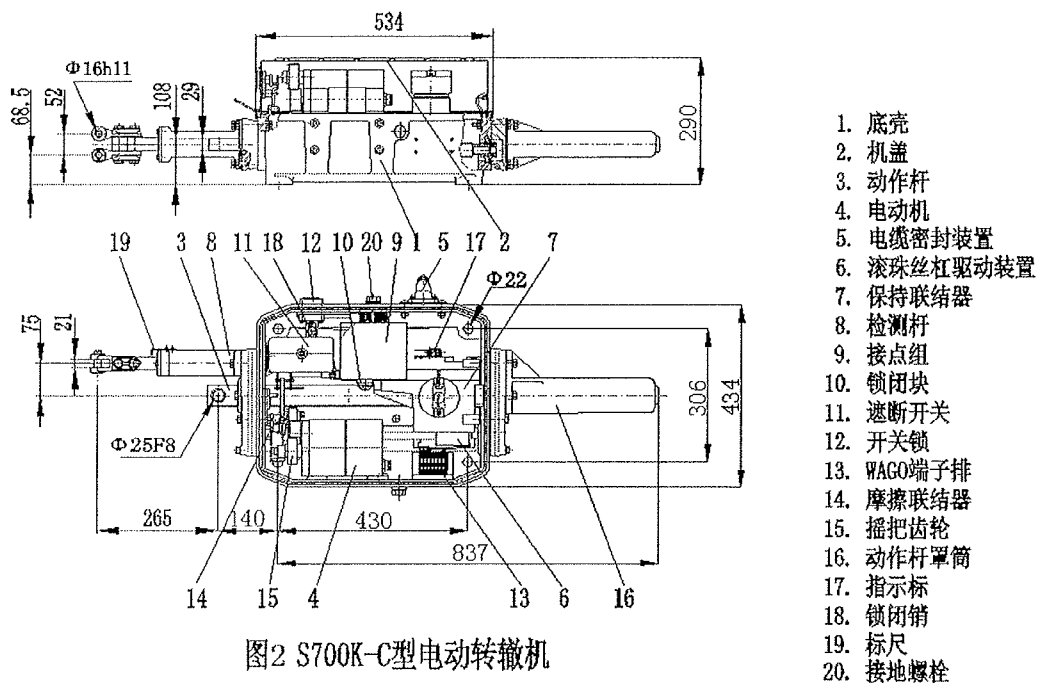


图2 S700K-C型电动转辙机



注意：轉轍器的底殼、法蘭和罩筒等零件均為噴漆件，施工過程中應避免碰撞，以免漆層破損，造成銹蝕！！

3 調整

為了對兩岔尖的正確位置進行故障—安全檢測，轉轍器備有檢測桿（8）。上層檢測桿用來檢查被“拉回”的岔尖的位置，下層檢測桿用來檢查被“推送”的岔尖的位置（見圖 1）。

在終端位置下，調節外鎖裝置及安裝裝置相應的螺母，盡可能降低道岔對轉轍器的反彈力，以保持轉轍器長期處於良好工作狀態，反彈力過大會加劇設備的磨損，可能引起故障。

我們建議：道岔對轉轍器的反彈力 $\leq 1000\text{N}$ ！

分別在兩個終端位置下，通過調整轉轍器外部的長、短表示桿上的螺母，改變其長度，使轉轍器內檢測桿（8）的小缺口對準指示標（17），如圖 3 所示。

調整合適後，合機蓋前應先提起鎖閉銷（18）並反向關閉開關鎖（12），才能重新接通電源。

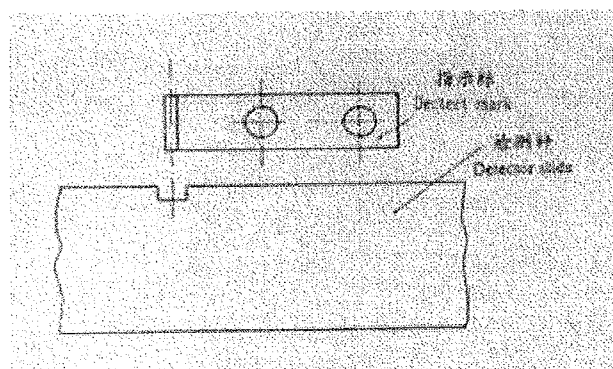


图 3 检测杆与指示标

4 收尾工作

S700K 型電動轉轍器安裝及調整結束後，應按如下要求確認有關工作的完成：

- 無工具或零件遺留在機內；
- 確認安裝良好，調整無誤；
- 接通轉轍器的電源，使轉轍器動作 4 個來回，動作時間間隔為 4 秒；
- 鎖好機蓋。

5 貯存

轉轍器應保存於通風良好，溫度為 $-40^{\circ}\text{C}\sim+40^{\circ}\text{C}$ ，相對濕度不大於 85%，周圍無腐蝕性有害氣體的庫房中。

附 1：S700K 型轉轍器附件明細

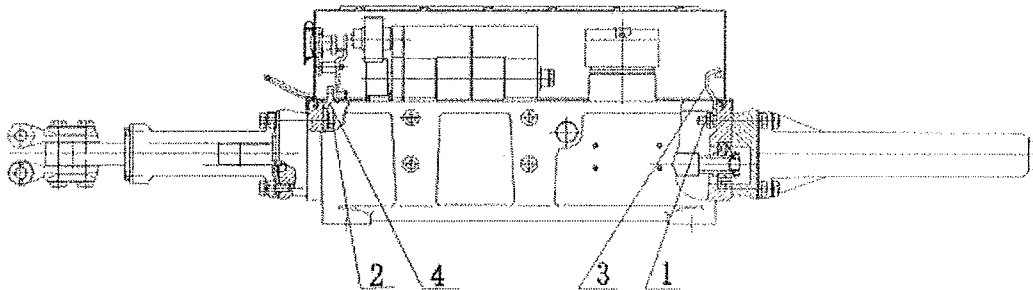
序號	名稱	圖號	數量
1	彎頭	C25106-A202-C99	1
2	管接頭	C25106-A202-C98	1
3	壓緊環	C25195-A11-C54	1
4	密封圈	C25195-A11-C71	1
5	密封圈	C25195-A11-C72	1
6	密封圈	C25195-A11-C73	1
7	六角螺栓 M5x16	D933-Q160-R865	2
8	彈墊 5	H60727-X50-R	2
9	墊圈 5	D125-A53-R865	2
10	手搖把	C25106-A202-B110	1
11	鑰匙	H26732-C2	1
12	鑰匙	C25106-A31-B434	1
13	塑膠袋		1
14	軟管卡箍	D3017-S7020-Z3	1
15	壓線套 1)		10
16	4x100 紮帶		2
17	安裝與調整細則		1
18	乾燥劑		1
	注 1): 當採用插接座時用		

附 2：S700K 型電動轉轍器機蓋密封的調整方法

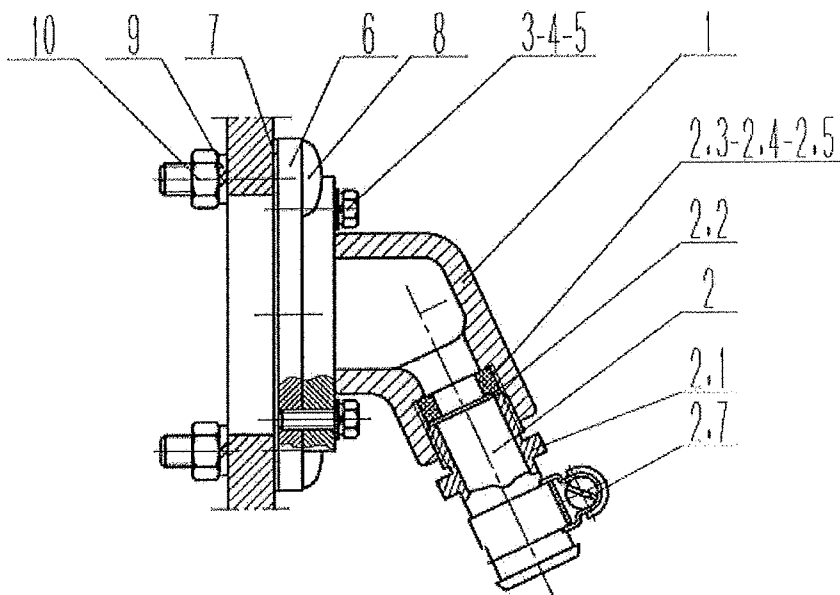
- 1、 鬆開螺母（1）和螺栓（2），見下圖；
- 2、 向下調整鎖鉤（3）或鎖栓（4）的位置，此時機蓋向緊的方向調整；
- 3、 緊固螺母（1）和螺栓（2）。當機蓋密封過緊而影響開機蓋鎖時，可適當向上調整鎖鉤（3）或鎖栓（4）的位置，調整後應保證機蓋密封良好。



注意：在開機蓋鎖時，應適當向下按壓機蓋，避免直接用力旋轉鑰匙而致鑰匙折斷！



附 3：電纜密封裝置安裝圖示



1	彎頭（附件）
2	管接頭組件
2.1	管接頭（附件）
2.2	壓緊環（附件）
2.3~2.5	密封圈（附件）（根據電纜外徑選擇其一）
2.7	軟體卡箍（附件）
3	六角螺栓 M5×16（附件）
4	墊圈 5（附件）
5	彈簧墊圈 5（附件）
6	蓋板（隨機）
7	密封墊（隨機）
8	大半圓頭螺栓 M8×25（隨機）
9	彈簧墊圈（隨機）

10	六角螺母 (隨機)
----	-----------

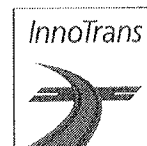
四、InnoTrans 國際大眾交通運輸科技貿易展覽會來函

iiiiiii Messe Berlin

Messe Berlin GmbH · Messedamm 22 · D-14055 Berlin



Taiwan Railway Administration
Electrical Engineering Department
San-Chyi Chen
5F1, No 3, Peiping W Rd,
Taipei 100
TAIWAN



Internationale Fachmesse
für Verkehrstechnik
International Trade Fair
for Transport Technology

InnoTrans-Team T +49 30 3038 2376

F +49 30 3038 2190

innotrans@messe-berlin.de

November 2014

Cust.-No. 351993

InnoTrans 2016, 20 – 23 September, Berlin International Trade Fair for Transport Technology Innovative Components • Vehicles • Systems

Dear Mr. Chen,

Enclosed is a copy of the InnoTrans Report with highlights and impressions of this year's InnoTrans, the tenth anniversary edition of the event. 138,872 trade visitors from 146 countries came to find out about the latest products and services exhibited by 2,761 companies from 55 countries, including 140 products making their world debut. Read the direct comments of the global rail industry with their all-round positive assessments of the trade fair.

We are delighted to have already received registrations for the forthcoming event. Exhibitors who register until **7 January 2015** can take advantage of our **special early booking conditions** for InnoTrans 2016. The relevant forms can be found on our website at www.innotrans.com.

Between now and the next InnoTrans the **Virtual Market Place®** will provide a practical source of information for the entire industry. In order to find the latest exhibitor updates and contact details and to search for categories and products please visit www.virtualmarket.innotrans.com.

You can obtain the InnoTrans Report at www.innotrans.com > Press > InnoTrans Report, or simply by scanning the QR code to download it as an app.

Your country's local representative can also supply you with further details.

DEinternational Taiwan Ltd.
Contact: Ms. Wanda Chang
E-mail: messe@deinternational.com.tw

T +886-2-87585829



We look forward to seeing you at InnoTrans 2016 at the latest.

Your InnoTrans-Team

To notify us of any change of address or other details please visit www.innotrans.com/address.

Messe Berlin GmbH · T +49 30 3038 0 · Fax +49 30 3038 2325
www.messe-berlin.com · E-Mail central@messe-berlin.com
Supervisory Board Chairman: Peter Zuhlsdorff
Management Board: Dr. Christian Göke (CEO), Ingrid Maaß (COO)
HRG Amtsgericht Charlottenburg Nr. 92 HRB 5484

Berliner Bank AG	Bank-Code 100 70 848	AN 510990600	Swift-Code: BEBEDEBB
Deutsche Bank AG	Bank-Code 100 700 00	AN 5816 558	Swift-Code: DEUTDEBB
Landesbank Berlin	Bank-Code 100 500 00	AN 0740004271	Swift-Code: BELADEBE
Postbank Berlin	Bank-Code 100 100 10	AN 0001992109	Swift-Code: PBNKDEFF100

