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TEST REPORT
for
Safety Certificate

“Points operating mechanism CSV 24“

Test according to DIN V 19250 / Din V 19251, AK 6

IPW-7911-CSV24-01-082004



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Project: Test for the safety certificate
Points operating mechanism CSV 24
according to Din V 19250 / DinV 19251, AK 6

Client/
Manufacturer: Contec GmbH
In den Eichen / Oberahrer Str. 9
56244 Ötzingen / Sainerholz

Number of pages -9-

Table of contents

1. In General.....	3
2. Test scope.....	4
2.1 Equipment under test.....	4
2.2 Test procedure.....	4
3. Specified requirements.....	4
4. Incorporated data.....	5
5. Individual results.....	6
5.1 Formal structure.....	
5.2 Avoidance and control of system failures in the phases of design, project planning, production and assembly.....	6
5.3 Avoidance and control of operations failures and maintenance failures.....	7
5.4 Avoidance and control of failures due to alterations in protective equipment.....	7
5.5 Avoidance and control of accidental internal failures as well as accidental failures caused by external influences.....	7
5.6 Fulfilling the conditions of the report/10/.....	8
6. Conditions.....	9
7. Overall result.....	9



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1 In General

The company named Contec Gmbh developed the points operating mechanism CSV 24 for use in signalling installations according to section 21 of BOSTrab (German ordinance on construction and operation of rail systems for light-rail transit.)

The points operating mechanism CSV 24 has the following technical characteristics:

- applicable for Vignol -, Phoenix- or grooved points (track gauge between 900 to 1435 mm) in waterproof steel housing;
- continuous adjustable regulating distance from approx. 40 to 100 mm;
- electro-hydraulic drive with modular design of the hydraulic system;
- direct mechanically operated hand adjustment system in addition to hydraulic hand adjustment;
- modular design, prefittable and retrofittable with and without fastening device;
- shaped and actuated fastening device of pull rods and test rods by means of an inner-lying clamp point fastener for safety relevant operation (here considered);
- points can be crashed through without mechanical destruction.

The basic concept of the inner lying clamp point fastener was already implemented in previous models, amongst others in the points operating mechanism CONTEC EH 81-01 P and EH 71-03 P / EH 71-23 P. For the points operating mechanism EH 81-01 P, that is installed into the German railway network, there exists a preproduction approval including a safety certificate /11/ from the Federal Railway Authority, Main Office Bonn and Munich Office. For the points operating mechanism EH 71-03 P and EH 71-23 P a safety analysis was carried out by ipw ingenieurgesellschaft for üstra Hannoversche Verkehrsbetriebe AG with a positive result /12/.

In accordance with the Association of German Transport Companies (VDV) script 331 /5/ there exists requirement class 6 (AK 6) for the system, points in the signalling installations for track controls in passenger operations for the safety equipment of the points mechanism “ Adjustment protection by locking in the track system” and “Stop-position monitoring” according to DIN V 19250 /3/

For the points operating mechanism CSV 24 a safety certificate in accordance with DIN V 19251 /4/ was produced by CONTEC GmbH. For the edition 01/2004 from 12/01/2004 of the safety certificate, there is a statement present from ipw Ingenieurgesellschaft /10/, due to the fact that the safety certificate was revised to the current edition /1/

This test report describes the test of this safety certificate /1/ for the points operating mechanism.



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2 Test scope

2.1 Equipment under test

ipw ingenieurgesellschaft was assigned the testing of the safety certificate for the points operating mechanism CSV 24 from CONTEC GmbH.

1/1 Safety test certificate
points operating mechanism
as at 16/07/2004
CONTEC TRANSPORTATION SYSTEMS
Version o.2/1
Doc. No.: SiNa 002-01-04

2.2 Test Procedure

In the framework of the test it was necessary to establish whether the above mentioned safety certificate /1/ is complete in contents, correct and consistent and the safety technical demands are according to the specified requirements.

3 Specified Requirements

- /2/ Bostrab (German ordinance on construction and operation of rail systems for light-rail transit.)
Regulation about the building and operating of trams
from 11/12/1987
- /3/ DIN V 19250
control and communication system elementary safety observations for MSR (process measuring and control) protection equipment
May 1994
- /4/ DIN V 19251
Control and communications system
MSR-(instrumentation and control) protection equipment
Requirements and measures for assured functioning
February 1995
- /5/ Association of German Transport Companies (VDV) – script 331
Requirement Category for signal and safety equipment according to BOStrab
(German ordinance on construction and operation of rail systems for light-rail transit.)
Edition: 12/1994



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- /6/ Association of German Transport Companies (VDV) – script 346
Maintenance of electrical controlling equipment and monitoring equipment of points and track locks
BOStrab (German ordinance on construction and operation of rail systems for light-rail transit.)
Edition: 04/1999

Furthermore, the following sets of rules were considered

- /7/ Mü 8004
Instruction for the technical requirements for the approval of safety systems Federal Railway Authority,
Head Office Bonn, office Munich
Edition: 01/08/2003
- /8/ DIN German Electrical Engineering Association 0831
Electrical rail signalling installations
Edition: 08/1990 as well as amendment A1, 09/1992
- /9/ Association of German Transport Companies (VDV) – script 340
guidelines for the planning and building of town railway and underground railway safety systems
Edition: 10/1994

4 Incorporated data

- /10/ Comment on the level of the test for the safety certificate
`points operating mechanism CONTEC CSV 24'
according to DIN V 19250 / DIN V 19251, requirement category AK6
ipw ingenieurgesellschaft
IPW-7911-comment CSV 24-01-0104 from 15/01/2004
- /11/ Preproduction approval 22MUE6/3023048/0/2
Hydraulic points operating mechanism EH 81-01 P and EH 91-03
including technical safety certificate from 12/08/2002
Federal Railway Authority, head office Bonn, office Munich
12/08/2002
- /12/ Comment
for using the points operating mechanism CONTEC EH 71-03 P / EH 71-23 P
at üstra Hannoversche Verkehrsbetriebe AG
ipw ingenieurgesellschaft
IPW-7910-EH71üstra-01-1202 from 11/12/2002



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5 Individual results

5.1 Formal structure

The safety certificate corresponds to the standards of the specified requirements in its structure in accordance with chapter 3. The main emphasis is on

- Avoidance of systematic failure
- Avoidance of operation and maintenance failures
- Avoidance and control of failures caused by alterations to the safety equipment and
- Avoidance and control of accidental failures.

Documents belonging to the safety certificate are enclosed as attachments with the safety certificate. A detailed description of the function of the points operating mechanism is found in attachment 1.

5.2 Avoidance and control of systematic failures in the phases of design, project planning, production and assembly

CONTEC GmbH practises a quality management system based on DIN EN ISO 9001:2000 for the avoidance of systematic failures. The current certificate is valid until June 2005 and was present with *ipw* Ingenieurgesellschaft during the test.

To avoid systematic failures during production, routine tests are carried out on the parts and component level by the production staff, as well as sample inspections and a final inspection / final acceptance by trained test personnel. Appropriate instructions are enclosed as an attachment to the safety certificate /1/

For the electrical connection of the drive to a control as part of the proposal, there are present several connection examples as attachments to the safety certificate. The correctness of these connection examples can only be tested, however, within the framework of a concrete project, as in each case the safety certificate for it has to be present [see condition (6.1)].

To avoid failures during installation an instruction for assembly, alignment, and installation as well as an assembly and test record is enclosed as an attachment to the safety certificate /1/. In accordance with the safety certificate only sufficiently trained personnel are allowed to undertake the assembly, The certification must be done by an independent tester from the operator.

The demanded simple effectiveness according to DIN V 19251 /4/ for the phases, design, development and production and for the assembly phase demanded high effectiveness for the measures for avoiding systematic failure should be regarded as providing evidence.



Ingenieurgesellschaft
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According to DIN V 19251 /4/ no measures were implemented for the control of accidental damage in the phases, development, production and assembly.

5.3 Avoidance and control of operations failures and maintenance failures

The points operating mechanism CSV 24 is designed for automatic operation, that means that the process of switching the points will as a rule be initiated by means of an overriding points control; the exception being when it is done by hand.

Further operation guidelines were therefore not given.

For maintenance (repairs, servicing and inspection) there are instructions enclosed as an attachment to the safety certificate /1/. The Association of German Transport Companies (VDV) – script 346 should also be noted [see edition (6.2)].

According to the safety instructions only sufficiently trained personnel are allowed to undertake the operation of or working on the points mechanism. The manufacturer offers appropriate instructions.

The requirements according to DIN 19251 /4/ for the design of the measures for simple effectiveness of operation and maintenance failures are regarded as having been done.

In accordance with DIN V 19251 /4/ no measures were implemented for the controlling of operation and maintenance failures.

5.4 Avoidance and control of failures due to alterations in protective equipment

In order to avoid failures on account of alterations to the points operating mechanism CSV 24, the measures for avoiding and controlling of failures must be maintained as during construction as well as the effectiveness of the chosen combination of measures being guaranteed.

During design alterations in the product origination process, regulated by means of the QM system, the demands of DIN V 19251 /4/ will be regarded as fulfilled.

5.5 Avoidance and control of accidental internal failures as well as accidental failures caused by external influences

To avoid accidental internal failures as well as accidental failures caused by external influences, company approved, identically constructed or similarly constructed components of other already tested or approved points operating mechanism during the construction of points operating mechanism were accessed (EH71-23 and EH81-01) (see /11/ and /12/).



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For all safety relevant components mechanical calculations of dimensions were carried out and their compliances were mathematically confirmed. In addition several prototypes of the points operating mechanism CSV 24 are used by different transport companies.

In order to control internal failures as well as accidental failures through outside influences, back-up structures were chosen in the design of safety relevant functional units.

Malfunctions of single functional units reveal themselves directly during the next adjusting process of the points operating mechanism (no situation report) or during the next service.

By means of this combination of measures according to DIN V 19251 /4/ high effectiveness for the avoidance of accidental internal failures will be reached, for the avoidance of accidental failures through external influences as well as for the controlling of accidental internal failures and failures through external influence the simple effectiveness is exceeded.

5.6 Fulfilling the conditions of the report/10/

For the locking bar including the locking bolts , the mechanical requirements are to be calculated and their compliance to be mathematically verified.

The verification for the locking bar was produced. For other transferable parts reference was made to already tested or approved points mechanisms (EH 71-03, EH 71-23 and EH 81-01) (see /11/ and /12/. The condition counts as being fulfilled.

Certificates for failure avoiding and failure controlling measures are yet to be amended within the framework of safety verification management.

The certificates for failure avoiding and failure controlling measures were fully provided (see chapter 5.1 to 5.5). The condition counts as being fulfilled.

The correct functioning of the switch action with subsequent electrical adjustment must be verified with a functional check..

Switch tests are carried out according to safety certificate /1/ in every quality control test. The condition counts as being fulfilled.

There are instructions for assembly, servicing and maintenance to be documented and be assigned for testing, particularly with reference to the The Association of German Transport Companies (VDV) script 346 /5/..

The condition was fulfilled, see chapters 5.1 and 5.3.



Ingenieurgesellschaft
(Engineering Company)
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The procedure rules of BOStrab (German ordinance on construction and operation of rail systems for light-rail transit.) or the rules for appropriate to specific countries should be followed for the evidence of compliance of the user-specific design and application regulations. In particular the electrical connection to the respective control is to be checked for user application.

The condition persists [see conditions (6.1)]

6 Conditions

(6.1) The procedure rules of BOStrab (German ordinance on construction and operation of rail systems for light-rail transit.) or the rules for appropriate specific countries should be followed for the evidence of compliance of the user-specific design and application regulations. In particular the electrical connection to the respective control is to be checked for user application.

(6.2) The Association of German Transport Companies (VDV) script 346 “Maintenance procedures for electrical regulating and monitoring installations to points and track locks (BOStrab) (German ordinance on construction and operation of rail systems for light-rail transit.)” should be adhered to for carrying out maintenance.

7 Overall result

During the examination of safety evidence for points operating mechanism CSV 24 /1/ for completeness, correctness and consistency, there were no deficiencies noticed that were relevant to safety.

Because of the adherence and fulfilment of the conditions of the requirements of DIN V 19250 / DIN V 19251 according to requirement category 6 for the safety certificate “Points operating mechanism CSV 24”, the conditions are fulfilled.

Braunschweig, 3rd August 2004

(Signature illegible)

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