



C1.1 Form of Offer & Acceptance

Offer

The Purchaser, identified in the Acceptance signature block, has solicited offers to enter into a contract for the procurement of:

The Supply and Delivery of Complete 1:20 DC and AC High Speed DLD Electro Hydraulic Points Machines for Turnout Sets for a period of twenty four (24) months.

The tenderer, identified in the Offer signature block, has examined the documents listed in the Tender Data and addenda thereto as listed in the Returnable Schedules, and by submitting this Offer has accepted the Conditions of Tender.

By the representative of the tenderer, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance the tenderer offers to perform all of the obligations and liabilities of the *Supplier* under the contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the *conditions of contract* identified in the Contract Data.

	The offered total of the Prices exclusive of VAT is	Cost to be determined on Purchase Order as per Pricing Schedule
	Value Added Tax @ 14% is	n/a
	The offered total of the amount due inclusive of VAT is ¹	n/a
	(in words)	

This Offer may be accepted by the *Purchaser* by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document including the Schedule of Deviations (if any) to the tenderer before the end of the period of validity stated in the Tender Data, or other period as agreed, whereupon the tenderer becomes the party named as the *Supplier* in the *conditions of contract* identified in the Contract Data.

Signature(s)

Name(s)

Capacity

For the tenderer:

(Insert name and address of organisation)

Name & signature of witness

Date

¹ This total is required by the *Purchaser* for budgeting purposes only. Actual amounts due will be assessed in terms of the *conditions of contract*.



TRANSNET SOC LTD
 CONTRACT NUMBER: EFT-PROJ-008/2012-S
 DESCRIPTION OF THE WORKS: SUPPLY AND DELIVERY OF COMPLETE 1:20 DC AND AC
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 OF TWENTY FOUR (24) MONTHS

Acceptance

By signing this part of this Form of Offer and Acceptance, the *Purchaser* identified below accepts the tenderer's Offer. In consideration thereof, the *Purchaser* shall pay the *Supplier* the amount due in accordance with the *conditions of contract* identified in the Contract Data. Acceptance of the tenderer's Offer shall form an agreement between the *Purchaser* and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract, are contained in:

- | | |
|---------|--|
| Part C1 | Agreements and Contract Data, (which includes this Form of Offer and Acceptance) |
| Part C2 | Pricing Data |
| Part C3 | Scope of Work: Goods Information including Supply Requirements |

and drawings and documents (or parts thereof), which may be incorporated by reference into the above listed Parts.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Returnable Schedules as well as any changes to the terms of the Offer agreed by the tenderer and the *Purchaser* during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Form of Offer and Acceptance. No amendments to or deviations from said documents are valid unless contained in this Schedule.

The tenderer shall within two weeks of receiving a completed copy of this agreement, including the Schedule of Deviations (if any), contact the *Purchaser's Supply Manager* (whose details are given in the Contract Data) to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the *conditions of contract* identified in the Contract Data at, or just after, the date this agreement comes into effect. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the tenderer receives one fully completed original copy of this document, including the Schedule of Deviations (if any).

Unless the tenderer (now *Supplier*) within five working days of the date of such receipt notifies the *Purchaser* in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the Parties.

Signature(s) _____

Name(s) _____

Capacity _____

**for the
Purchaser**

Transnet SOC Ltd
 Transnet Freight Rail
 Corner of Jetpark and North Reef Road
 Elandsfontein

Name & signature of witness _____ Date _____



TRANSNET SOC LTD
CONTRACT NUMBER: EFT-PROJ-008/2012-S
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Schedule of Deviations to be completed by the Purchaser prior to contract award

Note:

1. This part of the Offer & Acceptance would not be required if the contract has been developed by negotiation between the Parties and is not the result of a process of competitive tendering.
2. The extent of deviations from the tender documents issued by the Purchaser prior to the tender closing date is limited to those permitted in terms of the Conditions of Tender.
3. A tenderer's covering letter must not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid be the subject of agreement reached during the process of Offer and Acceptance, the outcome of such agreement shall be recorded here and the final draft of the contract documents shall be revised to incorporate the effect of it.

No.	Subject	Details
1		
2		
3		
4		
5		

By the duly authorised representatives signing this Schedule of Deviations below, the Purchaser and the tenderer agree to and accept this Schedule of Deviations as the only deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Tender Schedules, as well as any confirmation, clarification or changes to the terms of the Offer agreed by the tenderer and the Purchaser during this process of Offer and Acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the tenderer of a completed signed copy of this Form shall have any meaning or effect in the contract between the parties arising from this Agreement.

For the tenderer:	For the Purchaser
Signature _____	_____
Name _____	_____
Capacity _____	_____
On behalf of _____ <i>(Insert name and address of organisation)</i>	Transnet SOC Ltd Transnet Freight Rail Corner of Jetpark and North Reef Road Elandsfontein
Name & signature of witness _____	_____
Date _____	_____

C1.2 SC3 Contract Data

Part one - Data provided by the Purchaser

Clause	Statement	Data
1	General	
	The <i>conditions of contract</i> are the core clauses and the clauses for Options	X1: Price adjustment for inflation X7: Delay damages
	of the NEC3 Supply Contract (December 2009) ¹	
10.1	The <i>Purchaser</i> is (name):	Transnet SOC Ltd (Reg no. 1990/000900/30)
	Address	Carlton Centre, 150 Commissioner Street, Johannesburg, 2001
	Tel No.	011 308-3001
	Fax No.	011 308-2638
	Having elected its Contractual Address for the purposes of this contract as:	Transnet Freight Rail Corner of Jet Park and North Reef Road Elandsfontein
	Tel No.	011 878 7111
	Fax No.	011 878 7055
10.1	The <i>Supply Manager</i> is (name):	Mr. Gary Andrews
	Address	Corner of Jet Park and North Reef Road Elandsfontein
	Tel	011 878 7099
	Fax	011 826 6912
	e-mail	Gary.Andrews@transnet.net
11.2(13)	The <i>goods</i> are	The supply and delivery of 1:20 DC and AC High Speed DLD Electro Hydraulic Points Machines for Turnout Sets for a period of twenty four (24) months

¹ Available from Engineering Contract Strategies Tel 011 803 3008 Fax 011 803 3009, www.ecs.co.za.



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 OF TWENTY FOUR (24) MONTHS

12.2	The <i>law of the contract</i> is the law of	the Republic of South Africa
13.1	The <i>language of this contract</i> is	English
13.3	The <i>period for reply</i> is	3 days
2	The Supplier's main responsibilities	Data required by this section of the core clauses is provided by the <i>Supplier</i> in Part 2 and terms in italics used in this section are identified elsewhere in this Contract Data.
3	Time	
30.1	The <i>starting date</i> is:	01 December 2012
	The <i>completion date</i> is:	30 November 2014
30.1	The <i>delivery date</i> of the goods is:	As per Purchase Order
4	Testing and defects	
42	The <i>defects date</i> is	12 months after Delivery.
43.2	The <i>defect correction period</i> is	4 weeks
5	Payment	
50.1	The <i>assessment interval</i> is monthly	On the 10 th of each successive month.
51.1	The <i>currency of this contract</i> is the	South African Rand
51.2	The period within which payments are made is	Payment will be effected on or before the last day of the month following the month during which a valid Tax invoice and statement were received.
51.4	The <i>interest rate</i> is	0% per annum above the prime rate of the Standard Bank of South Africa.
6	Compensation events	No additional data is required for this section of the <i>conditions of contract</i> .
7	Title	No additional data is required for this section of the <i>conditions of contract</i> .
8	Risks, liabilities, indemnities and insurance	
80.1	These are additional <i>Purchaser's</i> risks	1. Nil
84.1	The <i>Supplier</i> provides these additional insurances	1. Insurance against Motor Vehicle Liability Insurance comprising (as a minimum) "Balance of Third Party" Risks including Passenger and Unauthorised Passenger Liability indemnity with a minimum indemnity limit of R10,000,000.00
84.2	The minimum amount of cover for loss of	Nil



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	or damage to any plant and materials provided by the <i>Purchaser</i> is:	
84.2	The minimum limit of indemnity for insurance in respect of loss of or damage to property (except the <i>goods</i> , plant and materials and equipment) and liability for bodily injury to or death of a person (not an employee of the <i>Supplier</i>) caused by activity in connection with this contract for any one event is:	whatever the <i>Supplier</i> deems necessary.
84.2	The minimum limit of indemnity for insurance in respect of death of or bodily injury to employees of the <i>Supplier</i> arising out of and in the course of their employment in connection with this contract for any one event is:	As prescribed by the Compensation for Occupational Injuries and Diseases Act No. 130 of 1993 as amended.
88.1	The <i>Supplier's</i> liability to the <i>Purchaser</i> for indirect or consequential loss, including loss of profit, revenue and goodwill is limited to	R0.0 (zero Rand)
9	Termination and dispute resolution	
94.2(3)	The <i>Adjudicator nominating body</i> is:	the Chairman of The Association of Arbitrators (Southern Africa)
94.4(2)	The <i>tribunal</i> is:	Arbitration
94.4(5)	The <i>arbitration procedure</i> is	the latest edition of Rules for the Conduct of Arbitrations published by The Association of Arbitrators (Southern Africa).
94.4(5)	The place where arbitration is to be held is	Johannesburg
	The person or organisation who will choose an arbitrator	
	- if the Parties cannot agree a choice or	
	- if the arbitration procedure does not state who selects an arbitrator, is	the Chairman for the time being or his nominee of the Association of Arbitrators (Southern Africa).
10	Data for Option clauses	
X1	Price adjustment for inflation	
X1.1	The <i>base date</i> for indices is	01 December 2012
X7	Delay damages	
X7.1	Delay damages for Delivery are	R1,500.00 per day

C1.2 Contract Data

Part two - Data provided by the *Supplier*

Notes to a tendering supplier:

1. Please read both the NEC3 Supply Contract (December 2009) and the relevant parts of its Guidance Notes (SC3-GN)¹ in order to understand the implications of this Data which the tenderer is required to complete.
2. The number of the clause which requires the data is shown in the left hand column for each statement however other clauses may also use the same data
3. Where a form field like this [] appears, data is required to be inserted relevant to the option selected. Click on the form field **once** and type in the data. Otherwise complete by hand and in ink.

Completion of the data in full, according to Options chosen, is essential to create a complete contract.

Clause	Statement	Data
10.1	The <i>Supplier</i> is (Name): Address Tel No. Fax No.	
11.2(8)	The Goods Information for the <i>Supplier's</i> design is in:	C3.1
11.2(11)	The tendered total of the Prices is	R (in words)
11.2(12)	The <i>price schedule</i> is in:	C2.2
11.2(14)	The following matters will be included in the Risk Register	
30.1	The <i>delivery date</i> of the goods is:	As per Purchase order

¹ Available from Engineering Contract Strategies Tel 011 803 3008 Fax 011 803 3009 www.co.za

PART C2: PRICING DATA

NEC3 Supply Contract

Document reference	Title	No of pages
C2.2	<i>The price schedule</i>	2

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C2.2 the price schedule

The Prices entered for each item includes for all work and other things necessary to supply the item.

The quantity stated in the price schedule is an estimate only of Transnet's projected consumption. Transnet gives no assurance of the quantities to be purchased over the contract period.

Tenderers are to ensure that prices quoted per item are **inclusive of Transport and Offloading** to the Delivery points as per Pricing Schedule.

Prices to be fixed for 12 months, thereafter to be adjusted as per the price adjustment formula submitted with tender

Item No.	Description	Unit	Estimated Quantity	Price per unit	Total Price for Quantity
01	COMPLETE 1:20 DC HIGH SPEED DLD ELECTRO HYDRAULIC POINTS MACHINES FOR TURN OUT SETS	each	16		
02	COMPLETE 1:20 AC HIGH SPEED DLD ELECTRO HYDRAULIC POINTS MACHINES FOR TURN OUT SETS	each	47		
	COMPLETE 1:20 DC HIGH SPEED DLD ELECTRO HYDRAULIC POINTS MACHINES FOR TURN OUT SETS	each	As and when required		
	COMPLETE 1:20 AC HIGH SPEED DLD ELECTRO HYDRAULIC POINTS MACHINES FOR TURN OUT SETS	each	As and when required		

The total of the Prices

PART 3: GOODS INFORMATION

Document reference	Title	No of pages
C3.1	This cover page <i>Purchaser's Goods Information</i>	1 2
Total number of pages		3

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C3.1: PURCHASER'S GOODS INFORMATION

Contents

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1 Overview of the goods

Supply and Delivery of complete 1:20 DC and AC High Speed DLD Electro Hydraulic Points Machines for Turn out Sets for a period of twenty four (24) months on an as and when required basis as per Purchase Order received.

The complete 1:20 DC and AC High Speed DLD Electro Hydraulic Points Machines for Turn out Sets **must be approved by Transnet Freight Rail Technology.**

- Goods will be collected by Transnet Freight Rail (RME)

2 Specifications of the goods

Specifications of goods to be as per Specifications of Transnet SOC Ltd for complete 1:20 DC and AC High Speed DLD Electro Hydraulic Points Machines for Turnout Sets.

See attached Annexure A – BBB4628 Version 2.

This section sets out the broad scope of the procurement, it covers:

- The *Employer* requires 1:20 Electro Hydraulic Points Machines for Rail Turnout Sets on the Coal line
- The product offered must comply with the latest relevant specifications for signalling systems. (As per attached specification BBB4628 Version 2 - Annexure A)
- The Supplier must supply and deliver all rods, cranks, points' machines, points termination boxes, number plates, fixtures, fittings and other additional material required to complete the point's installation to the predetermined site as required by the Supervisor.
- The *Supplier* must confirm their requirements for the points machine sleepers. The Point sets will be the new generation 60E1 1:20 concrete turnout (Gauge = 1067mm)

Only Systems proven in the railway environment will be considered and preference will be given to systems already installed on Transnet Freight Rail Lines

ANEXURE A

SPECIFICATIONS

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A division of Transnet limited

TECHNICAL RAILWAY ENGINEERING

PURCHASE SPECIFICATION FOR A

POINTS MACHINE

Author: Senior Engineer
Train Authorisation Technology

RA Langley

Approved: Principal Engineer
Train Authorisation Technology

J Kannemeyer

Authorised: Chief Engineer
Technology Management

GB Paverd

Three handwritten signatures in black ink, each written over a horizontal dotted line. The signatures are for RA Langley, J Kannemeyer, and GB Paverd.

Date: October 2006

Circulation restricted to:
Transnet and relevant third parties

1. SCOPE

1.1 Identification

Electro-mechanical or electro-hydraulic points machine adaptable for use on all Spoornet points layouts and derailleurs.

1.2 Item overview

The points machine is used for the operation, locking and detection of points blades and derailer positions on all layouts

1.3 Document overview

This document is the purchase specification for an electro-mechanical or electro-hydraulic points machine. Design, layout, performance and test requirements for the machine are defined.

2. APPLICABLE DOCUMENTS

2.1 Integrated documents

2.1.1 Transnet documents

- | | | |
|-----|-----------------------|---|
| (1) | CSE-1159-001 CAT X48: | Standard Specification for Documentation for Signals Equipment. |
| (2) | CSE-Z148-29F: | Points Detection |

2.1.2 Standards

- | | |
|-----|--|
| (1) | British Standard Specification No. 170 for half hour rated motors. |
| (2) | CENELEC specifications EN 50128 and EN 50129. |

2.1.3 Drawings

- | | | |
|------|----------------------------|--|
| (1) | VAE 111909-000-01: | 1:20 Hollow sleeper – switch area* |
| | VAE 112226-000-01: | 1:20 Hollow sleeper – crossing area* |
| (2) | VAE 110932-000-02: | 1:20 points layout* |
| (3) | VAE 110932-000-02: | 1:20 Blade and stock rail mounting |
| | 110938-000-01: | hole positions and dimensions* |
| | 110939-000-01: | |
| | 110940-000-01 | |
| (4) | BBB3068: | 1:20 Chamber and pipe system |
| (5) | CSE-C130 or similar: | Spoornet Mk1b points machine interface |
| (6) | BBB1992: | Points machine mounting pedestal |
| (7) | CSE E4 135-1-1 and 2: | Cradle and hole spacing for S60 1:12 and old generation 1:20 |
| (8) | CCE E 7127 shts 21 and 22: | Concrete sleeper spacing S60 1:12 |
| (9) | CCE E 7123 shts 9 and 12: | Concrete sleeper spacing S60 old generation 1:20 |
| (10) | CSE-ZE-6/6: | Wooden sleeper spacing |
| (11) | ST ZE 221,221-1 and 221-2: | Cradle for use on wooden sleepers |

*All VAE marked drawings is the property of VAE, but the relevant detail may be requested directly from VAE Africa.

2.2 References

2.2.1 Transnet documents

- (1) CSE-1154-001 CAT E48: Environmental specification for Spoornet railway signalling systems.
- (2) CSE-1162-015 CAT X47: Purchase specification for a points crank handle box.

3. **REQUIREMENTS**

3.1 Definition

3.1.1 Item definition

The point machine is a self-contained mechanism operating on an electro-mechanical or electro-hydraulic principle. The machine shall be housed in a galvanised mild steel case. Mounting shall be on the points machine pedestal (2.1.3 (6)) or directly in the hollow sleeper (2.1.3 (1)) or on cradles (2.1.3 (7)).

3.1.2 Interface definition

- (1) The interface between the interlocking and the points machine, for power supply to the machine as well as for detection of the closed and open blades and lock of the closed blade, is shown in 2.1.3 (5) or similar.
- (2) The mechanical interface to the points blades may be via an external drive and locking mechanism (external lock) or directly by rigid fastenings to the blade (internal lock).
- (3) The points machines are fed directly from the relay room with either 110VDC or 380V 3 ϕ AC supplies. Points machines can be up to 4km from the relay room. Points machines shall provide full operating force with the following power supply cable resistances:
 - 110VDC feed: Max feed resistance of 2.5 Ω (5 Ω loop resistance) for the total 1:12 layout and 1.5 Ω (3 Ω loop resistance) for the total 1:20 layout.
 - 380VAC 3 ϕ feed: Max feed resistance of 34 Ω for the total 1:12 layout and 20 Ω for the total 1:20 layout.
- (4) Separate verification of lock and detection states on both blades shall be implemented. Detection circuitry shall be to 2.1.1 (2).
- (5) Manual operation: The machine shall be designed to permit manual operation by means of a crank handle. The crank handle shall comply with 2.2.1.(2). The machine case shall be provided with an opening for the application of a hand crank. This opening shall be protected by an external metal weatherproof cover. Use of the crank handle to operate the mechanism shall disconnect the motor control circuit before engaging with the drive mechanism. The disconnecting contact shall close automatically on withdrawal of the crank handle only after mechanical disengagement. The contacts used to disconnect power, shall be rated to disrupt power to the motor under full load. Clear end-of-stroke indications or functionality shall be provided to ensure visibility of secure locking of the closed blade in the correct position after hand cranking.

3.2 **Characteristics**

3.2.1 **Performance characteristics**

(1) Required blade stroke:

New generation VAE 1:20	Blade front drive position	160mm
	Blade mid drive position	85mm
	Swing nose	103mm
VAE 1:7 double slips	140mm	
General	130mm	

The above measurements are clearly indicated in the civil points layout drawings.

(2) Operating time:

The operating time shall not exceed 4 seconds with a test load of 360kgf and rated supply voltage under all relevant environmental conditions as specified in 2.2.1 (1).

The operating time shall not exceed 4 seconds with a test load of 300kgf and 75% of the rated supply voltage under all relevant environmental conditions as specified in 2.2.1 (1).

- (3) The machine shall be provided with a suitable transmission clutch or hydraulic equivalent, the slip of which shall be adjustable between 300 and 700kgf, to allow positive movement of the blade, without overdrive or points machine damage. Alternative control mechanisms may be used to prevent blade overdrive and damage to the points machine and/or couplings. The slip value should be stable through the life of the points machine.
- (4) The points machine shall cut power to the motor on completion of stroke or on obtaining valid detection of both blade positions and lock.
- (5) Use of an external locking mechanism such as a clamp lock requires a fail-safe adjustable retention force (200kg –700kg) to prevent movement of the unlocking mechanism and the open blade.
- (6) The closed blade shall be kept in position against the stock rail without damage to any signalling equipment at opening forces of up to 9000kg. (Locking force)
- (7) The closed blade shall be kept against the stock rail within a 2mm window, but with sufficient freedom to allow sliding movement of the blade against the stock rail. Thermal expansion causes a relevant movement of blade to stock rail of up to 35mm under normal temperature swings. If the blade is pinched too tight against the stock rail, the expansion causes ballooning and gauge narrowing.
- (8) A go/no-go test will be used to determine correct blade positioning and setting of detection. Full lock and detection should be obtainable with a 2mm obstruction between blade and stock rail, but no detection shall be possible with a 3mm obstruction between blade and stock rail.
- (9) Operation of the system shall be according to the following sequence:
 - a. Breaking of lock detection.
 - b. Unlocking of blades (closed blade)*.
 - c. Movement of blades with corresponding loss of blade detection once the closed blade moves out of the 2mm detection window.

- d. Making of blade detection once the new closed blade enters the 2mm detection window and the new open blade is detected sufficiently open (3.2.1(1)).
- e. Locking of the blades (closed blade*) in the new position.
- f. Making of lock detection in the new position.

3.2.2 Physical characteristics

- (1) All parts of the points drive system susceptible to environmental conditions, damage, theft or vandalism, shall be suitably protected by galvanised mild steel covers. Covers shall allow ease of inspection and maintenance on all parts. Lockable covers shall be secured by standard Spornet signalling padlocks through 13mm diameter holes.
- (2) The machine shall be suitable for either right-hand or left-hand operation, and shall be so constructed that it can readily be converted on site from right-hand to left-hand operation and vice-versa.
- (3) Cable entry into pedestal-mounted machines shall be through the bottom of the machine through 25mm diameter holes. Cable entry into sleeper mounted points machines or sleeper mounted detection circuitry, shall be protected from environmental conditions and vandalism. Cable entry shall also allow for vertical displacement of the (hollow) sleeper under trains.
- (4) The points machine or the different discretely mountable parts thereof shall weigh less than 120kg to allow easy man handling during installation or replacement.
- (5) Contacts shall be adjustable where necessary and be positive in action.
- (6) The contact elements shall be corrosion resistant and of sufficient strength and current carrying capacity to function satisfactorily in connection with their respective circuits.
- (7) The contact opening shall not be less than 5mm.
- (8) Detection via limit switch shall be implemented such that loss of detection will force the limit switch to operate while making of detection will be by the normal spring-loaded action.

3.2.3 Item availability factors

The complete points operating mechanism shall provide not more than 2 faults per year attributable to the mechanism itself.

3.2.4 Environmental conditions

The machine case shall be splash proof and the motor shall be housed and protected to minimise the ingress of water should the machine be momentarily submerged by floodwaters.

- (1) The points machine shall be designed to function in a grade E environment as per 2.2.1 (1).
- (2) The case shall be resistant to spillage from bulk loads commonly found in the railway environment.
- (3) The points machine shall be resistant to vandalism.

3.2.5 Transportability

Not applicable.

* Clamp lock type devices where independent movement of blades is possible.

3.2.6 Portability

Not applicable.

3.2.7 Fail-safety requirements

Detection and all motor drive circuitry shall be implemented through a fail-safe design. Separate verification of lock and detection states on both blades shall be implemented. The safety of electronic circuitry used in the design shall be measured against 2.1.2 (2).

3.2.8 Flexibility and expansion

The machine shall be adaptable for use in all points layouts found in the Spoonet rail network including double slips and derailleurs.

3.3 Design and construction

3.3.1 Materials

Materials used for any part of the system shall not be less than industry standard. Where possible, all materials used shall be SABS approved.

3.3.2 Electromagnetic radiation and susceptibility

The points machine and motor controller shall not be affected by exposure to electromagnetic noise experienced in high-voltage traction areas in the railway environment.

3.3.3 Nameplates and marking

(1) A durable circuit diagram of the machine showing all connection and wiring detail shall be attached to the inside of the cover of the machine. The manufacturer's name, machine operating voltage and power requirements shall also appear on the diagram.

(2) A serial number shall be attached to the machine.

3.3.4 Workmanship

Quality of workmanship and production techniques on any part of the system shall not be less than industry standard.

3.3.5 Interchangeability

(1) All equipment used shall be industry-standard and commonly available.

(2) The machine shall be adaptable for different supply voltages (24VDC, 48VDC, 110VDC, 220VAC and 380VAC 3 ϕ) with only changes to the motor and motor controller to suit the different operating voltages.

(3) Refer to 3.2.8.

3.3.6 Safety

The points machine shall withstand the applied high voltage test and insulation resistance test, as described in 4.2.

3.3.7 Ergonomics

The machine shall allow easy maintenance and all parts requiring maintenance shall be accessible without removing any other components.

3.3.8 Item security

See 3.2.2 (1).

3.3.9 Equipment supplied by Spoornet

- (1) The VAE hollow sleeper and cradles as per 2.1.3(7) will be supplied and installed with the points set where applicable.
- (2) Where required, the pipe and chamber system will be prepared by Spoornet, before the final occupation.
- (3) Where required, the pedestal for the mounting of the points machine will be supplied by Spoornet.
- (4) Where applicable the necessary rods and stretchers shall be supplied by Spoornet.

3.4 Documentation

- (1) Three detailed installation manuals shall be provided with each order.
- (2) Three detailed maintenance manuals shall be provided with each order.
- (3) Where machines have not been previously supplied to Spoornet, detailed assembly drawings with parts lists, must be provided in duplicate.
- (4) All documentation shall conform to 2.1.1 (1).

3.5 Logistics**3.5.1 Maintenance**

Provision shall be made for adequate lubrication of the mechanism. Exposed lubrication holes shall be provided with weatherproof cups or covers. However, the periods between maintenance shall be as long as possible, minimum three months, and the tenderer shall state the minimum maintenance requirements. The maximum permissible period as well as maximum number of operations before maintenance is required, shall be indicated.

3.5.2 Supply

Unless part of a full signalling contract, orders of up to 30 machines shall have a delivery time of less than three months. The tenderer shall provide a delivery schedule for larger orders. The tenderer or his accredited agent (Spoornet approved for installation of safety equipment), shall be in a position to install his product and may be asked to include installation costs as part of the tender.

3.5.3 Spares

A full range of spare parts in sufficient quantities shall be kept by the local supplier of the points machine to ensure immediate (within 24 hour) availability throughout the Spoornet network

3.5.4 Support

The equipment shall carry a full guarantee for at least one year after installation. The local supplier of the equipment shall supply a full support service within 48 hours of such service being required, throughout the Spoornet rail network.

3.5.5 Facilities and equipment

Standard tools as issued to a technician. Any additional or special tools required shall be indicated and quoted for separately.

3.6 **Personnel and training**

3.6.1 **Personnel**

Installation and adjustment shall easily be achieved by one engineering technician and one labourer.

3.6.2 **Training**

Where machines have not been previously supplied to a specific depot, the supplier shall provide training for the Depot Manager and a core group of his technicians. A separate quotation for training shall be provided.

3.7 **Approval requirements**

The points machine forms part of Spoornet's safety equipment and therefore needs to be approved by Spoornet before it can be considered for use. Approval of a new points machine includes laboratory testing of critical components and the installation of a machine for trial purposes. Approval therefore may take up to 18 months.

3.8 **Precedence**

Aspects of the points machine and its components in descending order of importance are :

- Safety
- Reliability
- Maintainability
- Life cycle costing
- Ease of installation

3.9 **Sample**

Where machines have not been previously supplied to Spoornet, one machine must be provided for evaluation and testing, free of charge. The machine shall be returned to the supplier after testing. Should the machine be approved for use within Spoornet, the machine used during the approval process will generally be purchased by Spoornet and kept in use for a longer period of evaluation.

4. **QUALITY ASSURANCE PROVISIONS**

4.1 **Responsibility for inspection**

Spoornet accredited agents shall be responsible for inspection and testing of all delivered products and services.

4.2 **Tests and examinations**

(1) Applied high voltage test: The insulation of the assembled machine shall withstand, for one minute, a test voltage of 2000V RMS ($\pm 1\%$) applied between all parts of electric circuits and other metallic parts insulated there from. Separate windings, which are insulated from each other, shall withstand, for one minute, a test voltage of 2000V RMS ($\pm 1\%$) applied between the terminals of the windings. The test voltage in the above paragraphs shall be alternating, approximately sinusoidal, and of any frequency between 25 and 100Hz.

- (2) Insulation resistance test: This test shall be made within 10 seconds after the applied high voltage test and at a potential of approximately 1000VDC. The insulation resistance shall be measured between all insulated circuits and earth. The minimum value for the completely wired machine shall not be less than 8 MΩ.

5. **PREPARATION FOR DELIVERY**

- (1) The points machine shall be crated to facilitate loading and moving by forklift.
(2) The machine shall be delivered ready for installation with all necessary internal wiring marked and tested.

6. **NOTES**

A clause-by-clause statement of compliance to this specification shall be submitted. A broad statement to the effect that the equipment is in accordance with this specification is not acceptable. All relevant information relating to any deviation of the equipment from this specification must be provided in a covering letter.

“PREVIEW COPY ONLY”