

Operating and Service Manual

ELP 319

End Position Detector

Status: freigegeben LANGE_THO 22.10.2008
DCC: EDC013 OKZ Prod: TS_SZHFA

Betriebsanleitung [7620] ELP 319 DC013	PZENTW LANGE_THO 20081022	A6Z08101637795/EN1/000/B A25000-X22-Q9-7-7620 Notice no.: 500000097465	1 of 33
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1 Change List

Released by:	R. Robbe	TS RA PC ED2	11/05	sgd. R. Robbe
Checked by:	T. Lange	TS RA PC PM	11/05	sgd. T. Lange
	Name	Org. unit	Date	Signature

Rev. level	Date of issue	Author	Sections changed	Reason
1	08/97	Brock	All	First issue
2	03/00	Plattfaut-Yousefi	Product name 4.2.6, 5.2 (page 22, 23)	Editorial and technical changes
3	06/03	Hillebrecht	All	Layout reworked
4	08/04	Hillebrecht	10.1	Length of standardised part changed
5	11/05	Abraham	12.3	Inspection measures changed
6	10/08	Lange	12.4	technical changes
7	10/08	Lange	Page 15 and 23	figure 5 inserted figure 12 and 13 inserted

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3 List of Abbreviations

Abbreviation	Explanation
AC	Alternating current
DIN	Deutsches Institut für Normung (German Institute for Standardisation)
IEC	International Electrotechnical Commission
PCB	Polychlorinated biphenyl
PVC	Polyvinyl chloride
VDE	Verband Deutscher Elektrotechniker (German Association of Electrical Engineers)
VDI	Verein Deutscher Ingenieure (German Association of Engineers)

4 Scope

The contents of this manual cover handling, trackside mounting, commissioning, maintenance and testing of the ELP 319 end position detector. In addition, this documentation contains information concerning the safety of staff, technical data of the end position detector and tools to be used for preventive and corrective maintenance as well as information required for its proper use. The information is presented as text and figures. The manual has been compiled to enable qualified staff to perform the necessary maintenance work.

Where a risk of injury or damage cannot be totally ruled out, attention is drawn to the dangers by pictograms. An explanation of the pictograms is given in Section 7.1 .

5 Suggestions

Do you have any useful hints, comments or suggestions concerning this manual? Perhaps you have spotted an error or know how we could optimise a particular procedure? Please contact us direct. We welcome your ideas and suggestions.

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 Transportation Systems
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 P.O. Box 91 02 20
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6 Address of the Manufacturer and Customer Service

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7 Safety Regulations

This section tells you what regulations need to be observed for the handling and maintenance of the ELP 319 end position detector.

7.1 Symbols and Pictograms Used

In order to perform the handling and maintenance of the ELP 319 end position detector correctly, all the instructions described must be followed. Warnings and notes are highlighted by different pictograms, the words "**DANGER**", "**CAUTION**", "**NOTE**" and indented text.


	<p>DANGER This pictogram and the associated text draw attention to dangers which are life-threatening or liable to cause injury.</p>
	<p>CAUTION This pictogram and the associated text draw attention to dangers which are liable to cause damage to subassemblies or components.</p>
	<p>NOTE This pictogram and the associated text point to technical requirements and additional information to be observed by maintenance staff.</p>


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7.2 Basic Safety Regulations

To protect staff and prevent physical damage to the ELP 319 end position detector, the following regulations must be carefully observed. The personnel must be familiar with the contents of this manual in order to ensure safe and correct handling of the ELP 319 end position detector.


	<p>DANGER Preventive and corrective maintenance work is performed during normal operations.</p>
---	--

	<p>DANGER When you remove the cover of the ELP 319 end position detector, please take into account that the parts bearing a lightning symbol are carrying a current.</p>
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- Before beginning work on the track, the appropriate safety measures must be applied in accordance with the current railway regulations.
- All work is to be performed using only the tools, specialist equipment, test facilities and materials prescribed.

7.3 Qualified Staff

Maintenance work on the ELP 319 end position detector is only to be performed by specially trained and tested personnel authorised by the operator of the equipment to carry out the installation, preventive and corrective maintenance of type ELP 319 end position detectors.


	<p>CAUTION The current regulations for the prevention of accidents of the railway operator must be observed and are not invalidated by this document.</p>
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7.4 Safety-minded Work


- The qualified staff referred to in Section 7.3 are responsible for job safety.
- The ELP 319 end position detector may only be operated if it is in perfect working order.
- The work must be carried out in such a way that human safety is not diminished nor the operation of the ELP 319 end position detector impaired.
- As a rule, safety equipment must not be removed or put out of operation.
- Safety-minded work implies that staff are to be informed of incorrect actions and any faults detected are to be reported to the authority or person responsible.

	<p>DANGER</p> <p>No unauthorised modifications to the ELP 319 end position detector are to be carried out.</p>
---	---

7.5 Agents

The following detergents, lubricants and other agents are used for the ELP 319 end position detector:

Designation	Application
• White spirit	Cleaning of parts
• Molub-Alloy 243 Arctic grease	Greasing of parts
• SAE 10 W/40 oil (do not use spray oils containing turpentine or silicone)	Oiling of parts
• Flake graphite	Grase Cover lock
• De-icing agent	De-ice Cover lock

	<p>CAUTION</p> <p>Prevent your skin from coming into contact with the above-mentioned agents, in particular the grease! They (especially grease) can irritate the skin or cause other allergic reactions. Only apply them using gloves and appropriate tools (e.g. a brush).</p>
---	---

7.6 Earthing of the Detector Housing

The detector housing must be connected to earth potential or, on electrified lines, to the railway earthing system. For this purpose, use insulated copper wire-rope cable with the cross section specified by the railway operator. Connect this earthing cable to the M16 earthing terminal of the housing using a cable lug.

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7.7 Tools

The following tools are required:

- plastic hammer
- slotted-head and Philips screwdrivers
- set of Allen keys
- socket set with extension bar
- set of open-end or ring spanners
- torque spanner with an adjusting range from 8 to 40 Nm
- metal folding rule or similar measure

7.8 Transport of the ELP 319 End Position Detector

On account of its relatively high weight, the ELP 319 end position detector must be handled with care. Please check all parts delivered immediately upon unpacking for completeness and any transport damage.

	<p>DANGER</p> <p>When transporting the ELP 319 end position detector, observe the current regulations for the prevention of accidents, i.e. wear protective gloves, use appropriate lifting equipment and take into account the weight of the end position detector (27 kg), for example.</p>
---	--

7.9 Storage of the ELP 319 End Position Detector

The end position detector can be stored for a short time (< 1 month) in the packaging supplied by the manufacturer in the open air on a clean and dry surface.

When the end position detector is to be stored over a longer period of time, remove the foil and store the end position detector at a weather-protected location in mounting position.

Do not pile up end position detectors.

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8 Product Description

The ELP 319 end position detector detects the home (end) position of:

- manually operated points
- spring return points
- large-radius points with mid-blade locks
- movable frogs and wing rails

The ELP 319 end position detector has the following functions:

- detect the two point blades
- detect the point opening (continuously adjustable from 30 mm to 190 mm)
- detect the locking function
- indicate trailing of points
- detect gauge narrowing

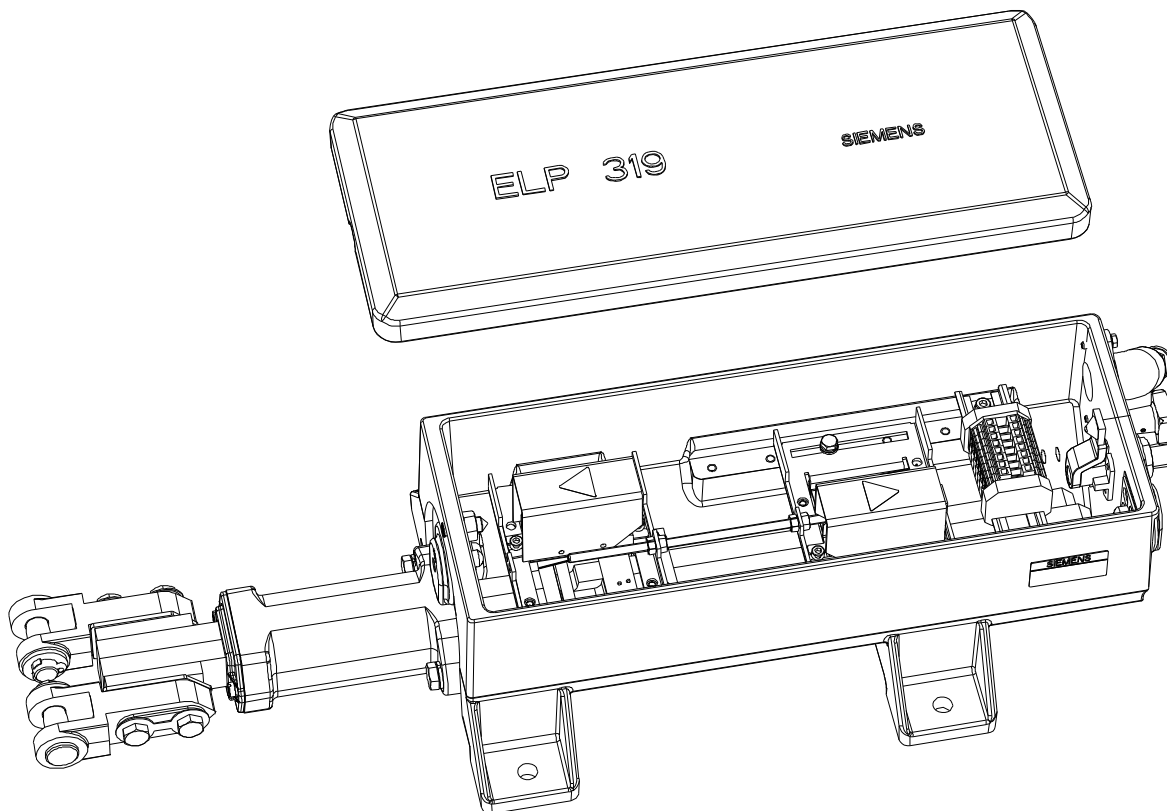


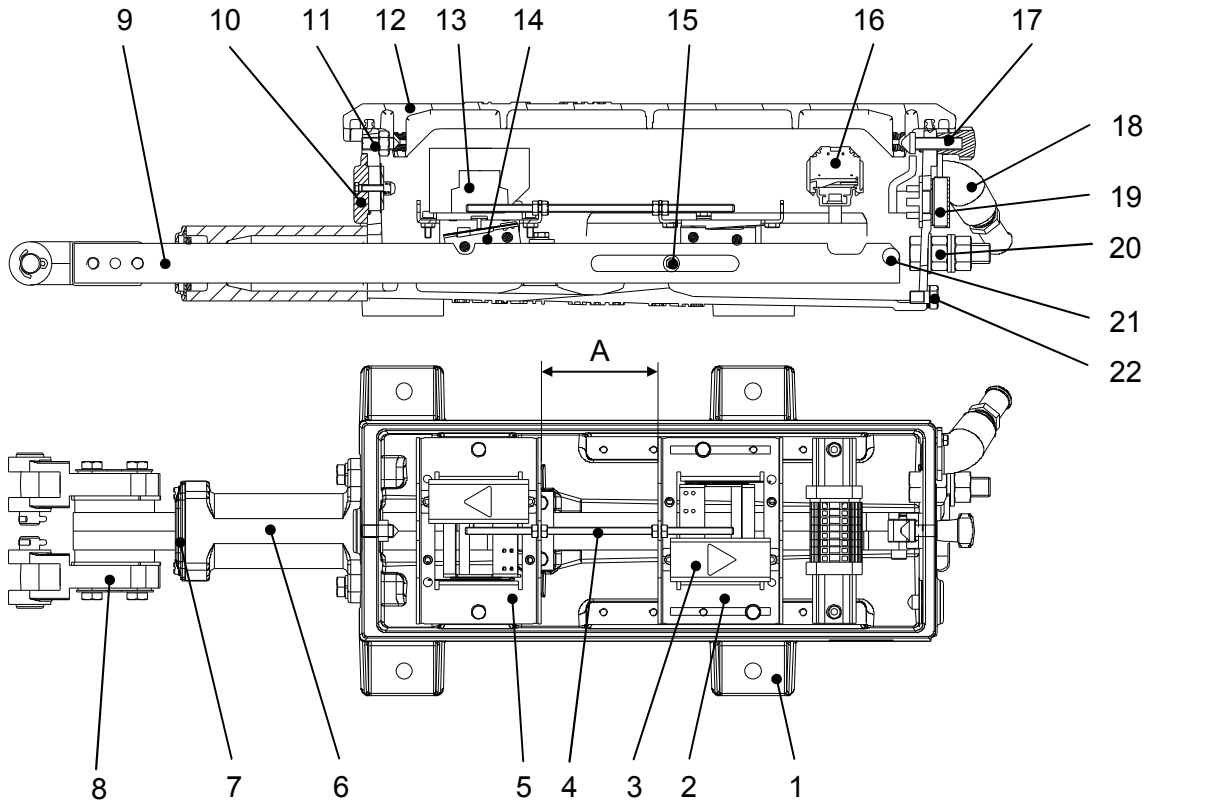
Figure 1 ELP 319 end position detector

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8.1 Components of the ELP 319 End Position Detector

The ELP 319 end position detector (see Figure 1) is of compact design and has only a few components (see Figure 2). Its slide stroke can be continuously adjusted.



- | | | | |
|----|--------------------------------|----|---------------------------------------|
| 1 | Housing | 12 | Cover |
| 2 | Movable contact arrangement | 13 | Limit switch |
| 3 | Set of contacts | 14 | Rocker |
| 4 | Threaded rod | 15 | Carrier |
| 5 | Fixed contact arrangement | 16 | Terminal strip |
| 6 | Guide sleeve | 17 | Tension screw (e.g. with star handle) |
| 7 | Gasket of slide | 18 | Cable gland |
| 8 | Insulated fork head | 19 | Built-in lock (if required) |
| 9 | Detector slides (with notches) | 20 | Earthing terminal |
| 10 | Ventilation opening | 21 | Stop pin |
| 11 | Adjusting screw | 22 | Drainage screw |

Figure 2 Components of the ELP 319 end position detector

In the standard version, the housing cover is secured by a tension screw. In addition, a padlock or a built-in lock can be provided.

The dimensions of the ELP 319 end position detector are shown in Figure 6.

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8.1.1 Housing

The cast-iron housing 1 (see Figure 2) has been designed for maximum reduction of condensation. The reduction in size of base which is near to the ground and the enlargement of sides allow a better compensation of temperature between equipment and environment. Ventilation openings 10 located opposite each other ensure a good circulation of air.

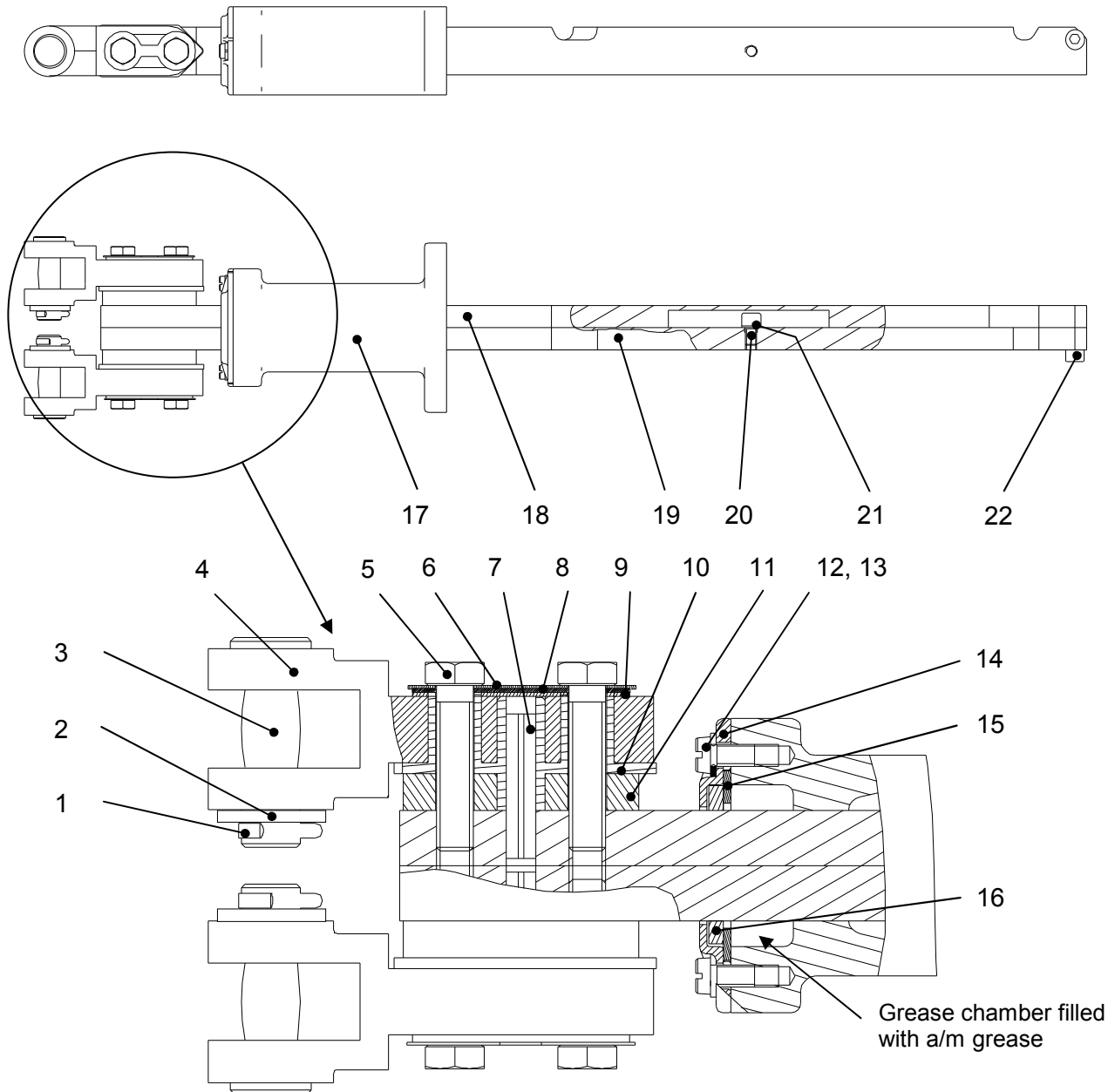
The housing has a tread-proof aluminium cover 12 with a well-sealing gasket. By turning tension screw 17, the gasket is compressed. The pressure can be adjusted by means of adjusting screw 11.

8.1.2 Detector Slides

The detector slides 9 (see Figure 2), made of drawn steel, have a carrier 15, a stop pin 21 and insulated fork heads 8 for linking the detector rods. The detector slides are supported by guide sleeve 6 and a cast stalk of the housing. By means of these standard detector slides, together with movable contact arrangement 2, point openings from 30 mm to 190 mm can be detected. The travel of the open point blade resulting from the locking stroke must not exceed 70 mm until carrier 15 reaches the slide of the closed point blade. The carrier travel is so dimensioned that a broken detector rod is indicated as soon as the slide stroke exceeds the travel resulting from the locking stroke by at least 10 mm. This applies even to slide strokes below 80 mm if a correspondingly dimensioned spacer block is placed in the slot for the carrier (see also Figure 3).

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- | | | | |
|----|-------------------|----|---|
| 1 | Split pin | 13 | Spring washer |
| 2 | Washer | 14 | Flange for gasket |
| 3 | Bolt | 15 | Cover plate |
| 4 | Fork | 16 | Gasket |
| 5 | Hexagon bolt | 17 | Guide sleeve |
| 6 | Locking plate | 18 | Slide (prior to assembly, grease all sides with the above-mentioned grease) |
| 7 | Dowel pin | 19 | Slide |
| 8 | Shim | 20 | Cheese-head screw |
| 9 | Insulating plate | 21 | Spring washer |
| 10 | Insulating sleeve | 22 | Cheese-head screw |
| 11 | Plate | | |
| 12 | Cheese-head screw | | |

Figure 3 **Detector slides**

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8.1.3 Contact Equipment

The contact equipment (see Figure 2) comprises contact arrangements 2 and 5, each consisting of a base bearing the easily removable contact sets 3. Rockers with separate springs for each limit switch are also mounted on the bases. Removable hoods protect the sets of contacts when the housing cover is removed. Threaded rod 4 prevents the movable contact arrangement 2 from changing its set position. The contacts of the limit switches 13 installed in contact arrangements 2 and 5 do not require adjustment. The position of the switch axles within the slide notches is easily visible, thus facilitating adjustment of the rodding and subsequent checking of the switch axles' position. The switch axles do not touch the slide notches. Hence, vibrations from the slides are not transmitted to the switches (see also Figure 4).

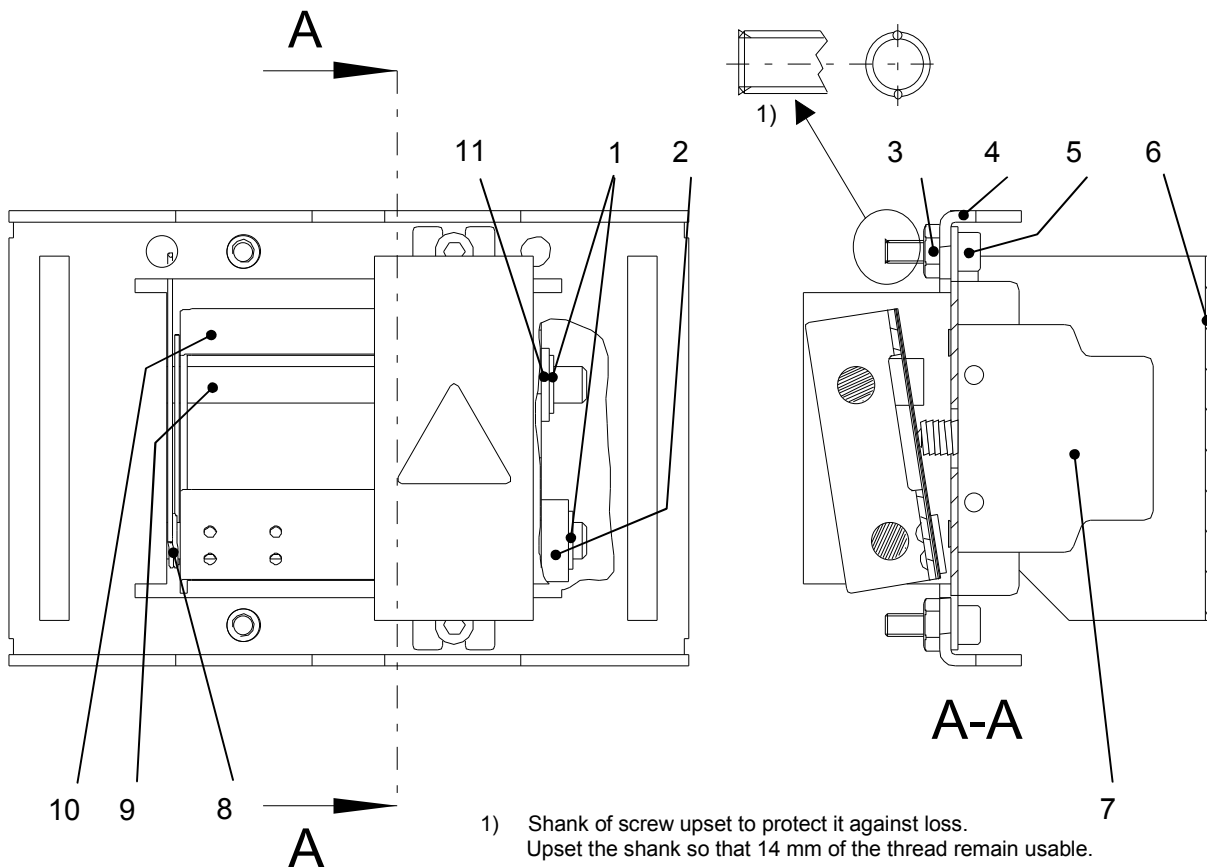


Figure 4 Contact arrangement

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8.1.4 Electrical Connections

The flexible internal wiring matches the position of the movable contact arrangement 2 (see Figure 2). The outdoor cable is connected to a terminal strip, which consists of commercially available series terminals. The cable gland 18 consists of an easily detachable elbow with clamping ring and protective-hose connector. After unscrewing the elbow, the electrical connection can be easily undone without having to dismantle cable fittings and protective hose. The earthing terminal 20 (see Figure 2) is designed as a threaded bolt with hexagon nuts.

8.1.5 Internal Circuitry

The ELP 319 end position detector is equipped with four or two sets of contacts.

8.2 Principle of Operation

The detector slides 9 (see Figure 2) are linked via detector rods to the point blades. Contact arrangements 2 and 5 detect the home (end) position of the point blades. For this, contact lever rollers engage with the notches in the detector slides.

The fixed contact arrangement 5 detects the retracted slide. It is bolted to the housing, thereby ensuring constant fitting dimensions. The movable contact arrangement 2 detects the extended slide. It is adjusted to a distance A (see Figure 2), which depends on the slide stroke, and bolted. Additionally, the contact arrangements are form-locked by threaded rod 4 and four lock nuts. This prevents the movable contact arrangement from changing its position, e.g. if the fastening bolts are loose.

There are two possibilities for setting the required slide stroke.

For points with fixed point opening:

Set the slide stroke to nominal size of point opening with the well-proven tolerance of ± 8 mm. By setting the stroke to nominal size, the clamp overlap of the clamp point locks is automatically detected.

For points without fixed point opening:

Set the slide stroke to an average point opening measured on site, with a tolerance of ± 8 mm. The required distance A between contact arrangements 2 and 5 is calculated for any slide stroke, being it fixed or not, using the following formula:

$$A = 182 - Z$$

- A = Distance between contact arrangements 2 and 5
- 182 = Largest adjustable point opening with a tolerance of ± 8 mm (A = 0)
- Z = Nominal size of the point opening to be detected or average point opening measured on site at the point of attachment of the detector rod

If required by the user, settings different from those mentioned above are possible.

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The position of the closed point blade is always detected allowing small deviations only (small slide notch). When the contact lever roller touches the slanting edge of the notch, the detection circuit is interrupted after a slide stroke of max. 1.5 mm. The open point blade must reach its end position within the tolerance of ± 8 mm, referring to the slide stroke set (large slide notch). If the point blades move beyond their end positions, a point fault indication is issued.

If the connection between a point blade and the end position detector is broken, carrier 15 provides a slide position the next time the points are reversed which prevents the indication "point position OK" from being issued.

Stop pin 21 prevents the detector slides from being pulled out of the area detected by contact arrangement 2.

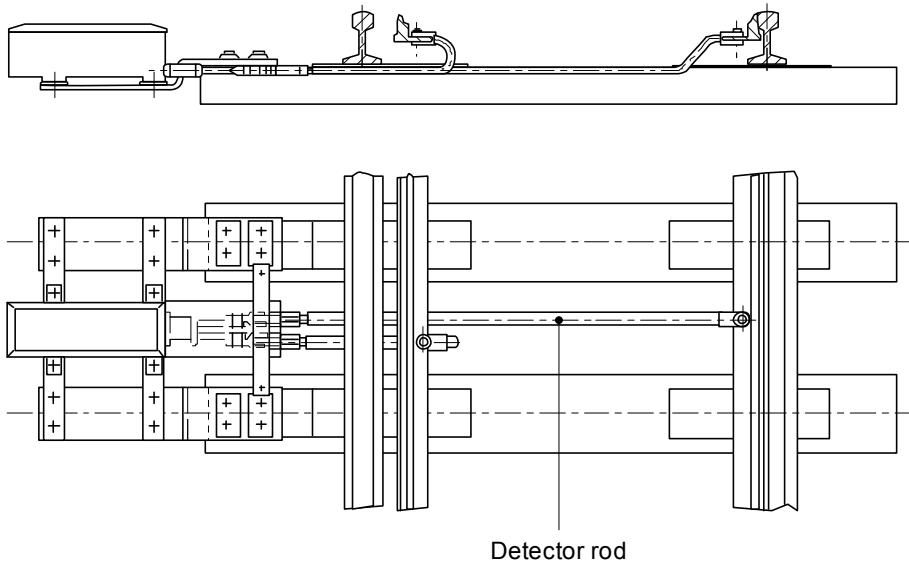


Figure 5 **Trackside arrangement of the ELP 319 end position detector**

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9 Technical Data

Dimensions <ul style="list-style-type: none"> • Length (including detector slides) • Width • Height 	See also Figure 6 731 mm 265 mm 170 mm
Weight	Approx. 27 kg
Degree of protection as per EN 60529	IP54
Electrical data	220 V, 50 Hz; 6 A ($\cos \varphi = 1$) or 4 A ($\cos \varphi = 0.8$)
Continuous current	16 A

9.1 Dimension Drawings

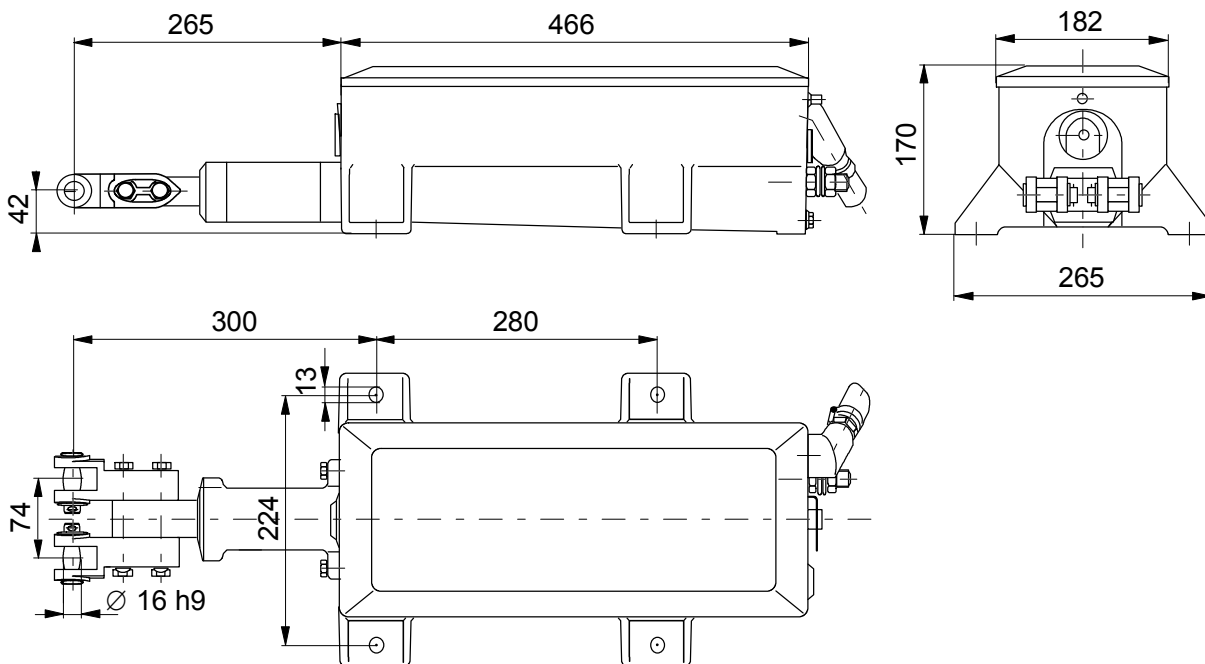


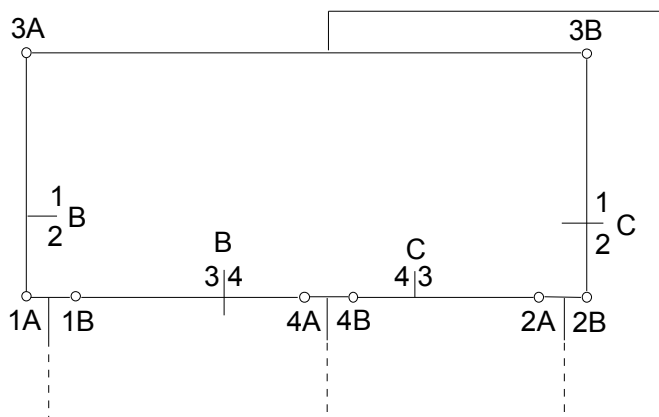
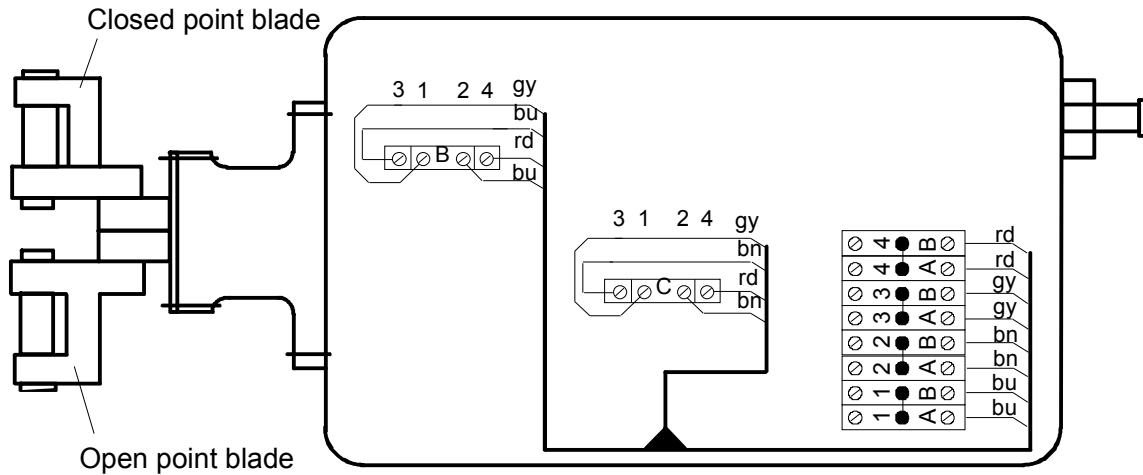
Figure 6 Dimension drawings for side view, plan view and front view

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9.2 Circuit Diagrams

The circuit diagrams below show standard internal wirings of the ELP 319 end position detector. Other wiring variants are available on request.



Contact position shown corresponds to:

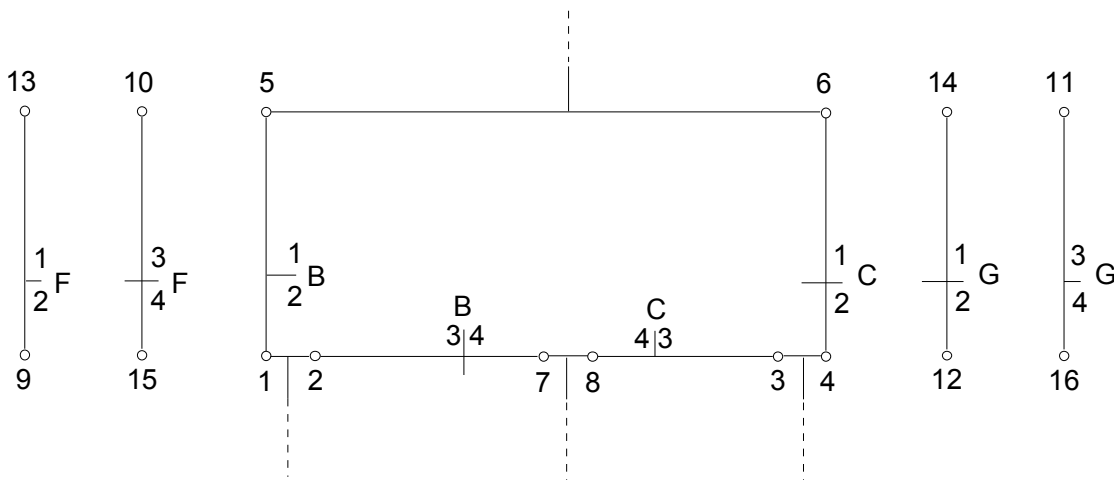
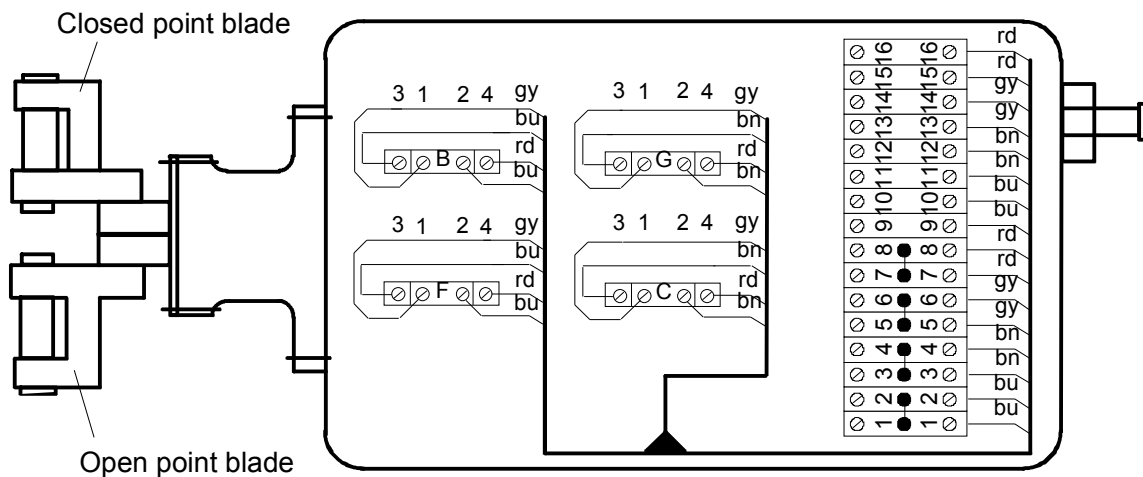
Rightmost position of points for left-hand mounting

Leftmost position of points for right-hand mounting

Figure 7 **Circuit diagram of the ELP 319 end position detector (variant with eight series terminals)**

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Contact position shown corresponds to:

Rightmost position of points for left-hand mounting

Leftmost position of points for right-hand mounting


Figure 8 *Circuit diagram of the ELP 319 end position detector (variant with 16 series terminals)*

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10 Trackside Mounting

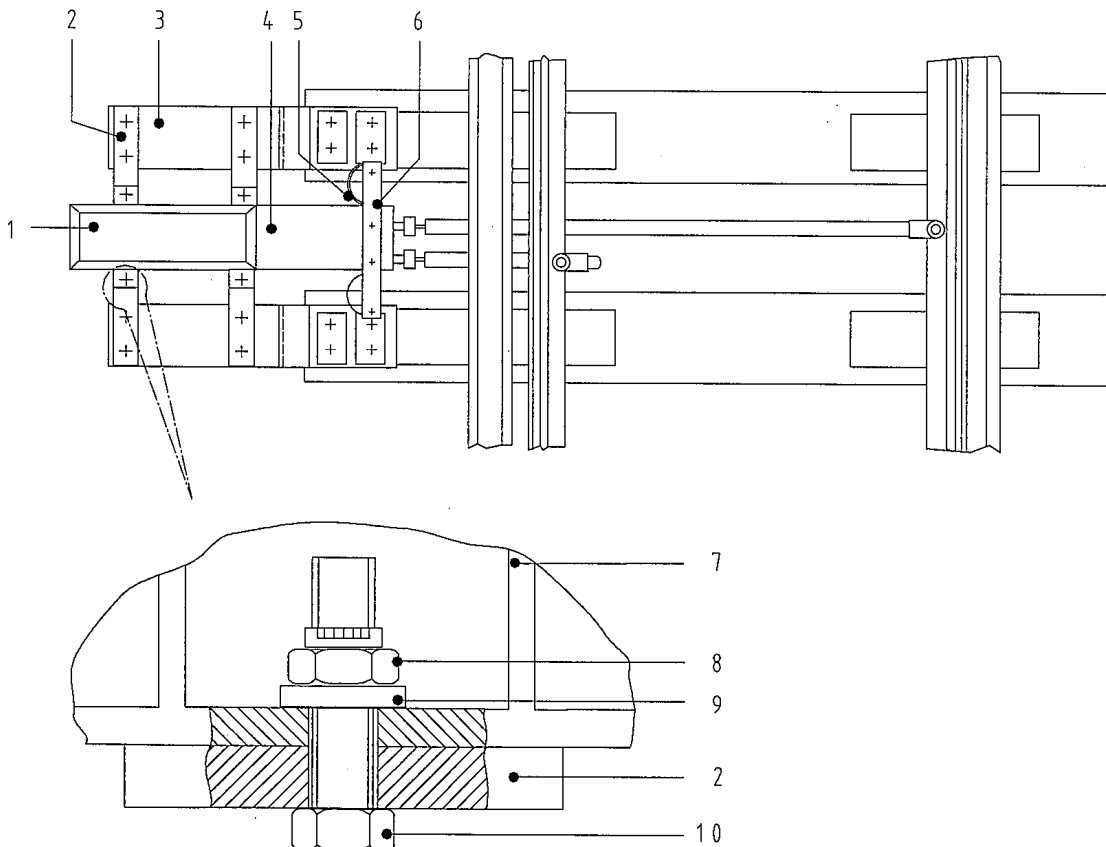
10.1 Mounting on Base Plates

	<p>DANGER</p> <p>Before you start working on the track, inform the signalman responsible in order that he blocks the points. Continually observe the traffic on the adjacent track during the work.</p>
---	--

Bolt the end position detector to the base plates (see Figure 9).

	<p>NOTE</p> <p>Re-tighten the fastening bolts of the end position detector at least twice in three- to six-weeks intervals.</p>
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Mounting example



- | | |
|---------------------------------|------------------------|
| 1 ELP 319 end position detector | 6 Holder for cover |
| 2 Bearing plate | 7 Housing |
| 3 Base plate | 8 M12 lock nut |
| 4 Cover of rodding | 9 A13 washer |
| 5 Securing rope | 10 M12x45 hexagon bolt |

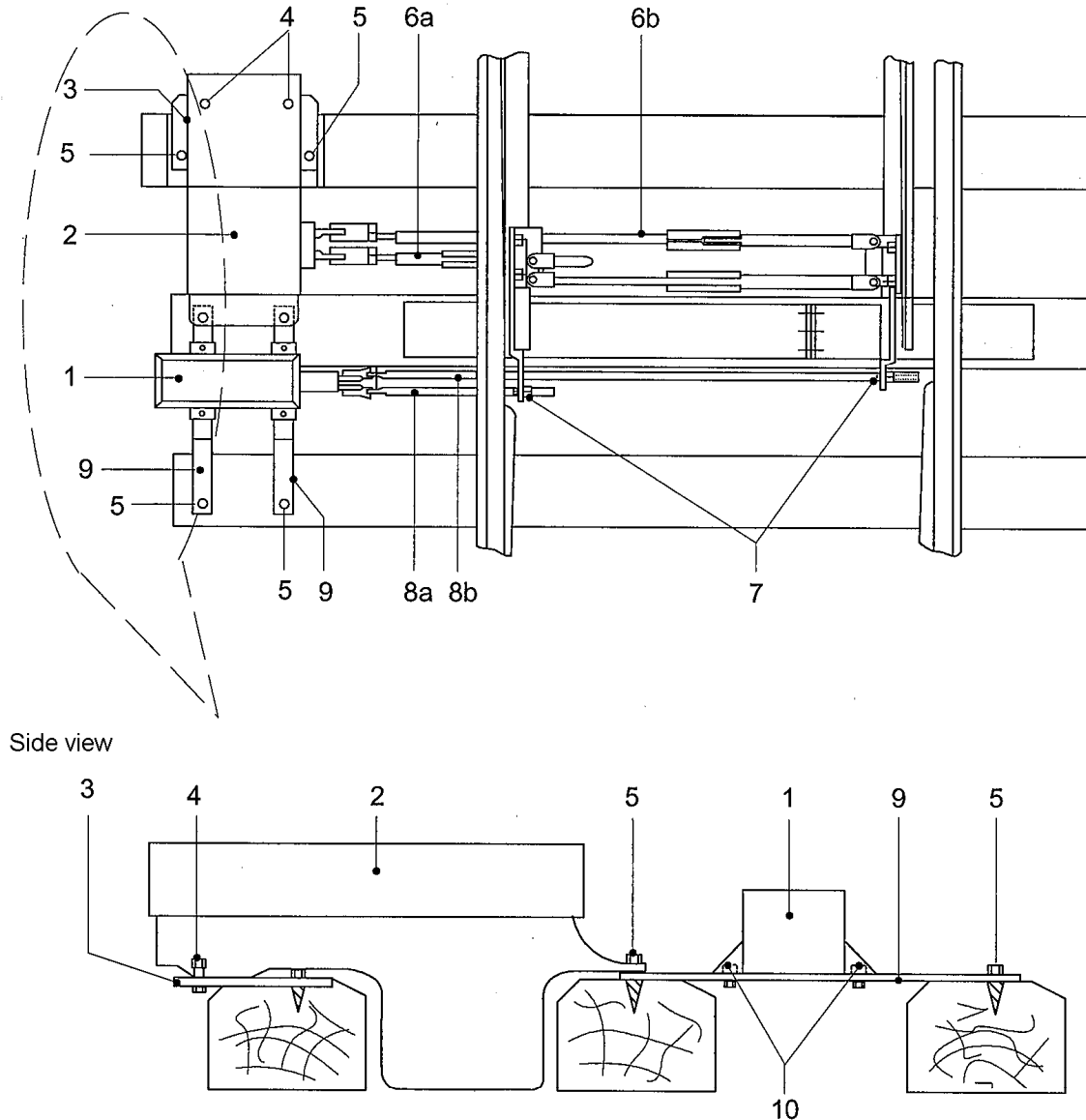
Figure 9 Trackside mounting on base plates

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10.2 Mounting together with a Bsg. antr. 9 Point Machine

The ELP 319 end position detector and Bsg. antr. 9 point machine are mounted on separate bearing plates (see Figure 10).



- | | |
|---|--------------------------------------|
| 1 ELP 319 end position detector | 6a Short operating rod |
| 2 Point machine | 6b Long operating rod |
| 3 Fixing plate
(to be provided by the customer),
for this, cut out a notch 12 mm in depth
and 500 mm in width in the sleeper | 7 Adjusting nuts of detector rods |
| 4 Hexagon bolt with nut and spring washer | 8a Short detector rod |
| 5 20x150 hexagon wood screw | 8b Long detector rod |
| | 9 Bearing plate |
| | 10 M12x50 hexagon bolt with lock nut |

Figure 10 Mounting of ELP 319 together with a Bsg. antr. 9 point machine

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10.3 Mounting the Detector Rods

The ELP 319 end position detector has two parallel, freely movable detector slides. Mounting examples of connections of the detector rods with the ELP 319 end position detector (see Figure 11):

- on single points in conjunction with point machines (see Figure 11, above)
- on type S49-1200 single points for detecting the second clamp point lock (see Figure 11, centre)
- on spring return points with return springs (here the short detector rod is generally mounted to the tip of the open point blade, see Figure 11, below)



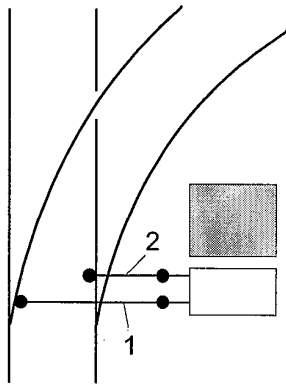
NOTE

The two detector rods are to be mounted to the two point blades and the detector slides.
 The detector rods must be adjusted to match the stroke of the points. For this, turn the hexagon nuts on the threaded section of the detector rods forwards or backwards.
 The version of the detector rods depends on the point locks used.

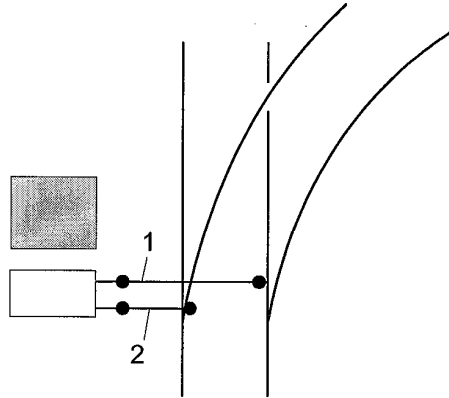
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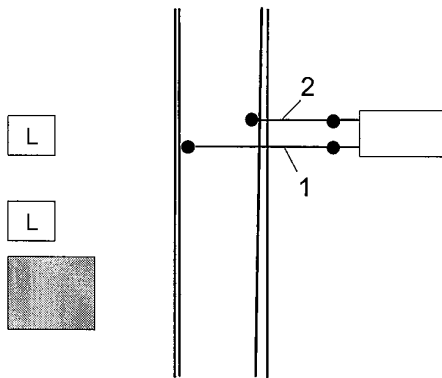
Point machine and ELP 319 mounted on the right side of the points



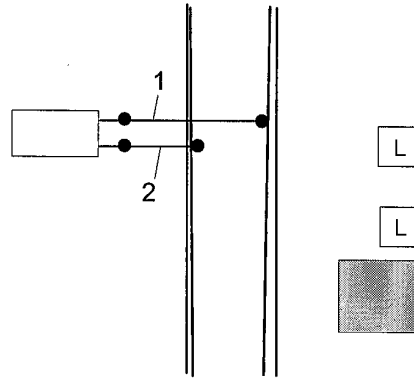
Point machine and ELP 319 mounted on the left side of the points



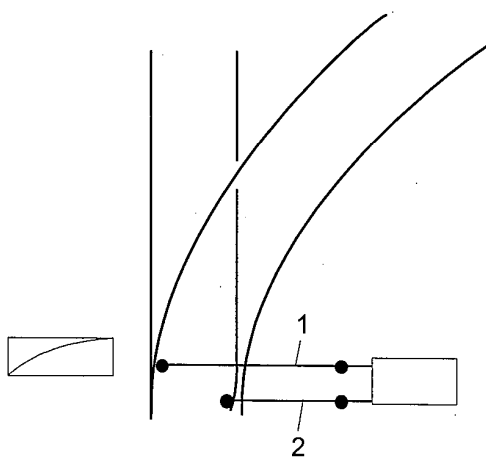
For detecting the second clamp point lock
ELP 319 mounted on the right side of the points



ELP 319 mounted on the left side of the points



For detecting spring return points with return springs







-  Point machine
-  ELP 319
-  Bell-crank lever L
-  Return spring
- 1 Long detector rod
- 2 Short detector rod

Figure 11 Arrangement of the detector rods

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10.4 Linking the Detector Slides

The detector slides are linked to the detector rods using insulated fork heads (see Figure 12).

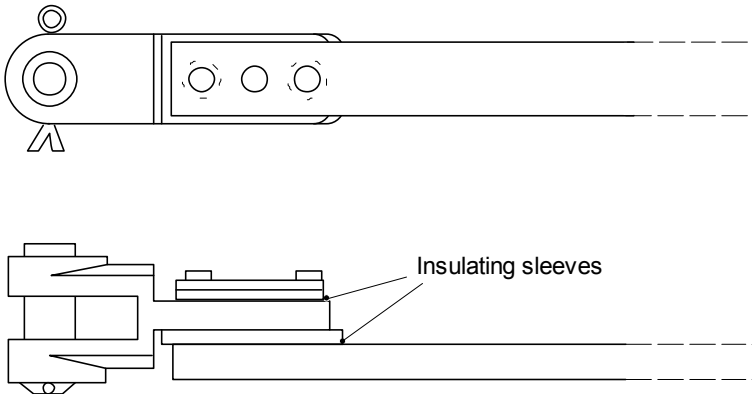


Figure 12 *Detector slide with insulated fork head*

10.5 Adjusting the Detector Slides

The detector slide stroke of the ELP 319 end position detector can be continuously adjusted from 30 mm to 190 mm.

Since the mounting and fitting dimensions are identical, the ELP 319 end position detector can be mounted on the same base plates and using the same rodding as the Bsg.ktr.26 point detector (see Figure 13). The ELP 319 end position detector replaces all models of the Bsg.ktr.26 point detector.

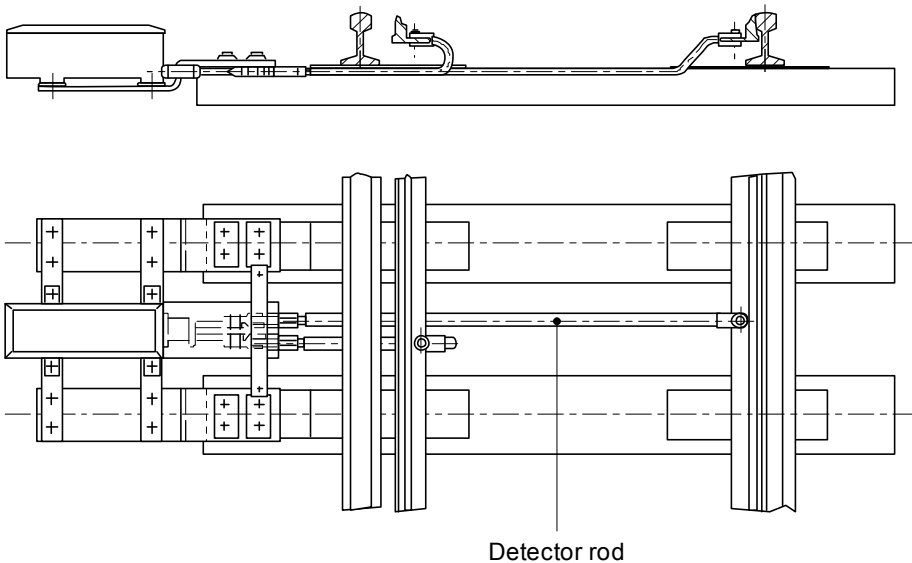


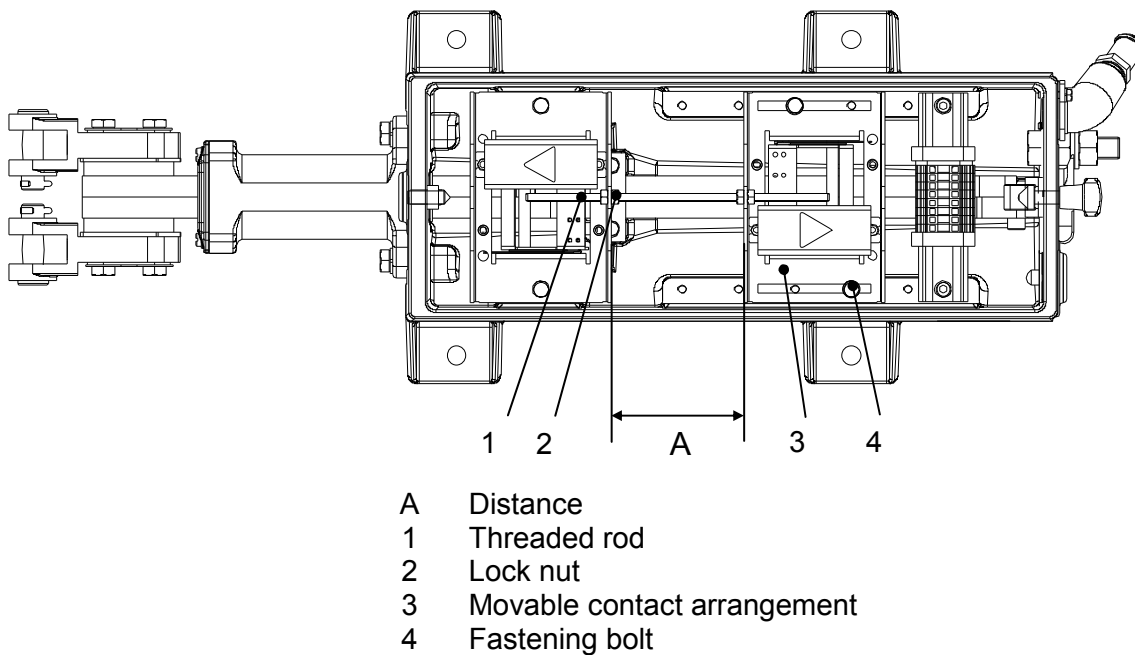
Figure 13 *Trackside arrangement of the ELP 319 end position detector*

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10.6 Individually Adjusting the Detector Slides

Depending on the type and layout of the equipment to be detected, the detector slide stroke of the ELP 319 end position detector can be adjusted individually. The detection range of the ELP 319 end position detector is adjusted to the respective point opening at the point of attachment of the detector rods to the points. The movable contact arrangement must be shifted as shown in Figure 14. The ELP 319 end position detector is supplied with a distance $A = 94 \text{ mm}$, corresponding to a point opening $Z = 88 \text{ mm} \pm 8 \text{ mm}$.



- A Distance
- 1 Threaded rod
- 2 Lock nut
- 3 Movable contact arrangement
- 4 Fastening bolt

Figure 14 Plan view of the open housing

Measure the point opening on site at the point of attachment of the detector rods to the point blades and calculate the average.

$$\text{Point opening } Z_{\text{average}} = 0.5 \times (Z_{\text{left}} + Z_{\text{right}})$$

Distance A for the adjustment of the movable contact arrangement is calculated using the following formula:

$$\text{Distance A [mm]} = 182 - Z_{\text{average}}$$

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10.7 Retracted Detector Slides

Between the roller engaged and the slanting edges of the slide notches, there must be a visible play as shown in Figure 15. For the adjustment of the detector rods, the point blades attached to them must be in the closed end position each, i.e. the rods are set separately.

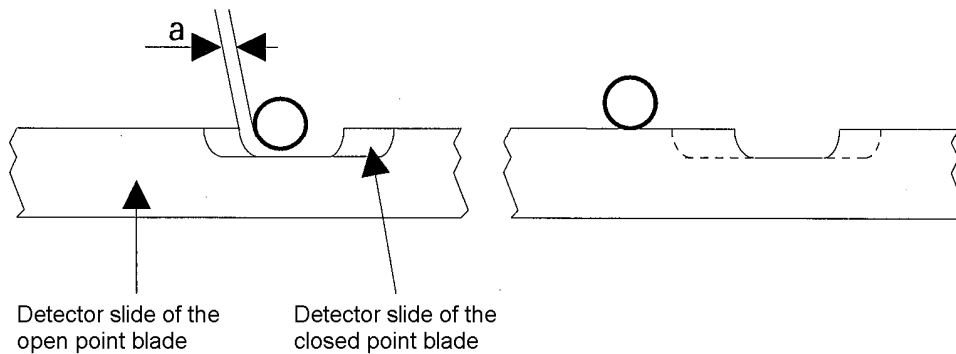


Figure 15 Retracted detector slides

In the closed end position of the point blade, the contact lever roller must be able to engage with the small notch of the associated detector slide. By adjusting the length of the detector rod, move the detector slide to a position which ensures a distance "a" between roller and slanting edge of the slide notch. Adjust the distance at mean annual temperature, taking into account the changes in length of the detector rod caused by temperature variations.

The distance between roller and slanting edge of the large slide notch varies as a function of the point opening. However, it must be so small that the detection contact breaks before the point lock reaches its minimum clamp overlap when the open point blade leaves the end position.

Distance "a" can be set between 0 mm and 6 mm. It depends on the type and layout of points and the specifications of the points' manufacturer.

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10.8 Shifting the Movable Contact Arrangement

1. Determine distance A by following the instructions given above.
2. Undo the lock nuts of the threaded rod and turn the nuts backwards.
3. Undo the fastening bolts of the movable contact arrangement and shift it until reaching the distance A determined. If required, remove one of the fastening bolts and insert it in an adjacent tapped hole.

For point openings below 70 mm, place the terminal strip between the contact arrangements.

4. Tighten the fastening bolts, turn the lock nuts of the threaded rod against the switch bases and tighten the nuts.
5. Accommodate the cable harness.
6. If the ELP 319 end position detector is to be retrofitted with a built-in lock, mount the built-in lock, supplied as an accessory, using the fastening elements (see Figure 16).

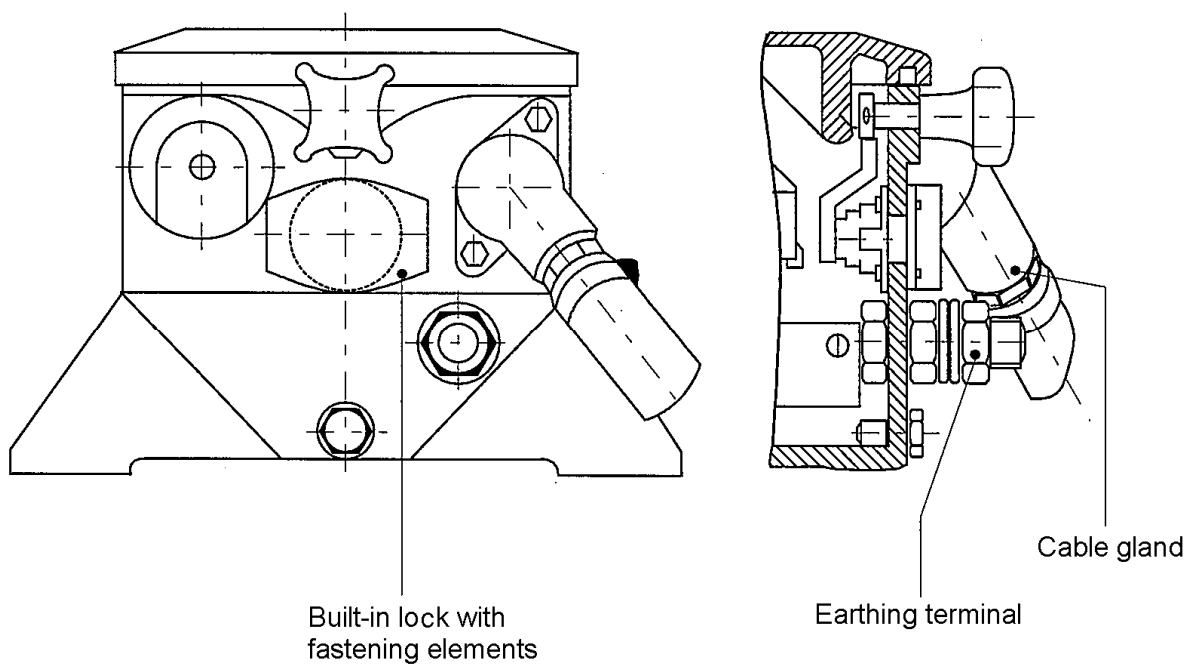
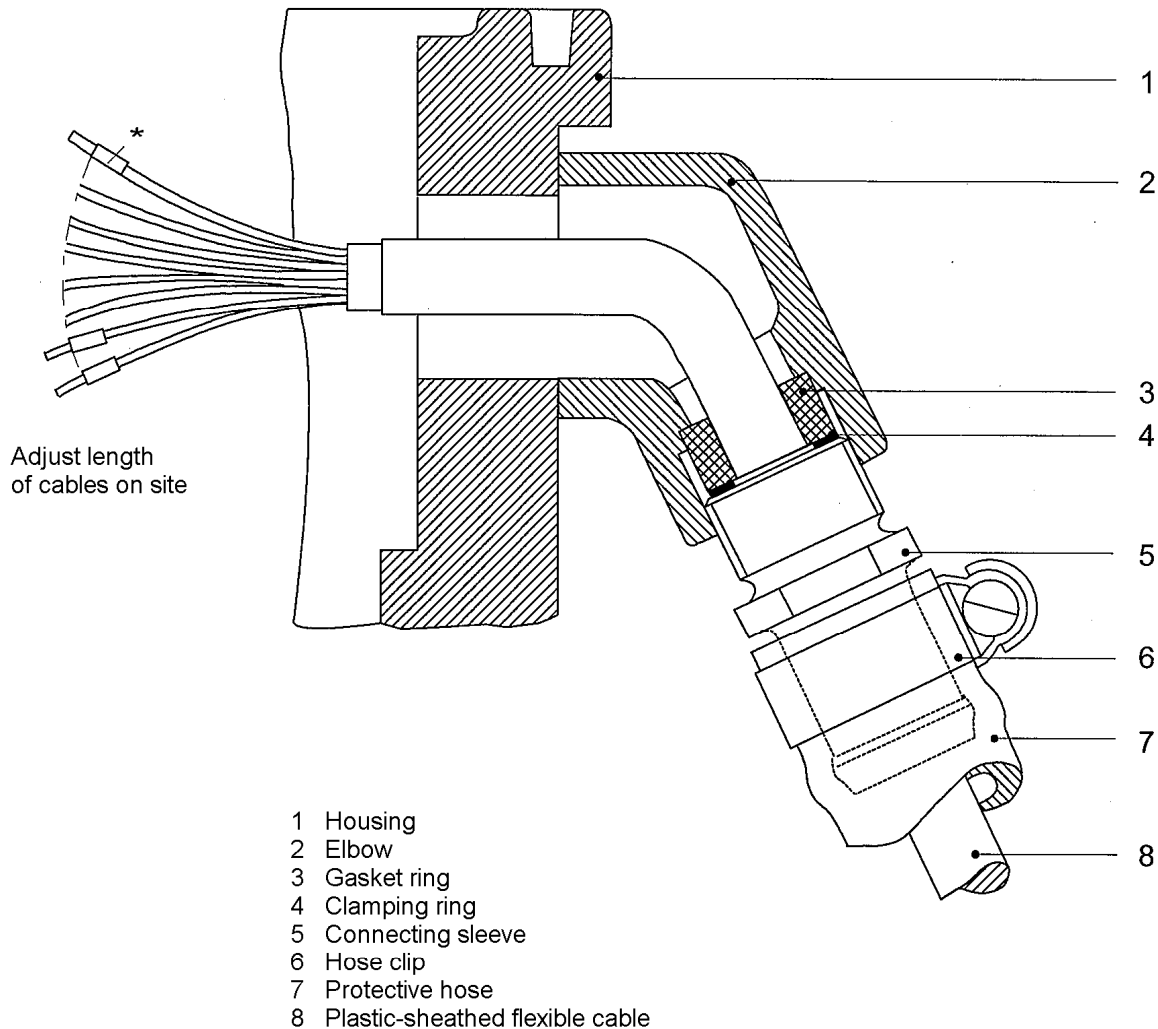


Figure 16 Front and side views of the built-in lock

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10.9 Stripping the Plastic-sheathed Flexible Cable



* Pin-end connector D46231-X10-Z1 (nominal size 1, identification colour of insulating sleeve red) is to be pressed on on site using the WZ 24 crimping pliers from Weitkowitz

Figure 17 Stripping the plastic-sheathed flexible cable

For point openings below 70 mm, the terminal strip is to be placed between the two contact arrangements. In this case the plastic-sheathed flexible cable must be stripped flush with the terminal strip.

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11 Commissioning

After mounting of the ELP 319 end position detector, check that it functions perfectly by throwing the points several times. A correspondence check must be carried out to see if the point position corresponds to the detection indications in the interlocking.

The current regulations of the railway operator must be observed.

The parts of the end position detector must not be greased or oiled when putting it into service.

12 Maintenance

12.1 Inspection and Preventive Maintenance

Inspection includes a functional check, preventive maintenance the greasing and oiling of the parts of the ELP 319 end position detector. Use the products listed in Section 7.5 to grease and oil the end position detector parts.

12.2 Technical Information relating to Inspection and Preventive Maintenance Work

By performing the inspection and preventive maintenance work in the intervals prescribed, the functional integrity of the ELP 319 end position detector is maintained even under extreme operating conditions.

The ELP 319 end position detector requires little maintenance. All the bearing surfaces remain operational, even if they have not been re-lubricated for a long time. The end position detector is insensitive to oil and grease in the housing.

The limit switches of the two contact arrangements are maintenance-free. Dimensions and material combinations of the remaining movable components have been so chosen that, when sufficiently lubricated, long intervals between maintenance can be attained.

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12.3 Intervals

Inspection / maintenance jobs Interval: 6 months
Clean and grease detector slides
Oil connecting bolts
Refill grease chambers in the guide sleeve from the side of the gasket
Saturate felt rings at the bearing surfaces of the rockers with oil
Check proper breaking and making of switching contacts in both end positions
For 60 V systems, the DC voltage at terminals 3 and 4 must be greater than or equal to 35 V.
Point machine and end position detector mounted on the same side: <ul style="list-style-type: none"> - With the points in the rightmost position (end position detector mounted on the left side of points), the resistance between wires 2 and 4 must be below 1.0 Ω. - With the points in the leftmost position (end position detector mounted on the left side of points), the resistance between wires 1 and 4 must be below 1.0 Ω.
Point machine and end position detector mounted opposite each other: <ul style="list-style-type: none"> - With the points in the rightmost position, the resistance between wires 1 and 4 must be below 1.0 Ω. - With the points in the leftmost position, the resistance between wires 2 and 4 must be below 1.0 Ω.
Inspection / maintenance jobs Interval: 12 months
Check type label is still in place and clean it
Check fastening bolts of end position detector and base plates and re-tighten them
Check, clean and grease detector rods
Check and grease visible threads of outside fastening bolts
Check easy movement of cover lock and grease it
Check end position detector is tight and dry inside, clean and dry it inside
Check cable gland, connecting cable and protective hose and re-tighten fastening screws
Check condition of internal wiring
Check connecting wires are held firmly in the terminal strip
Re-tighten clamping screws of terminal strip, if necessary
Check earthing
Check, clean and grease bolts of detector rods
Check locking of bolts
Check lock nuts of adjustable detector rods are tight
Check fastening and locking elements (bolts, nuts) are tight
Check cover of detector rods
Check fastening of detector rod guide is tight
Check whether any visible parts are damaged or worn out
Check coat of paint and corrosion protection

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12.4 Corrective Maintenance

Maintenance Work on the ELP 319 end position detector can only be performed specially by qualified and authorised personnel.

In order to maintain its availability, we recommend you to perform repair work on the end position detector if it has been operating for ten years or has reached its service life of 10^6 throwing operations.


The ELP 319 end position detector must be repaired by qualified staff only in the event of the following:

- The end position detector has been waterlogged.
- The end position detector is damaged.
- The end position detector is in a severely neglected state or showing signs of excessive wear.

The fixed and movable contact arrangements must be exchanged each time the ELP 319 end position detector is repaired, irrespective of their apparent state.

12.4.1 Technical Information relating to Corrective Maintenance Work

The sections below generally describe how to remove various components. To replace them, carry out the same steps in reverse.

	<p>CAUTION Before replacing the components, make sure they are free from contamination, surface damage or other defects.</p>
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Components not galvanised or coated with lacquer must be greased with the specified grease before assembling them.

12.4.2 Tools Required

- Plastic hammer
- Philips screwdriver
- Socket set with extension bar
- Folding rule or similar measure

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12.4.3 Exchanging the Contact Arrangements

Both the movable and the fixed contact arrangement must be exchanged each time the ELP 319 end position detector is repaired (see Figure 18).

For removing contact arrangements 2 and 4, remove the fastening bolts 1 and unscrew the wiring 3. For fitting the contact arrangements, carry out the same steps in reverse. Adjust distance A as described in Section 10.5 . Once the work has been completed, put the hoods on the sets of contacts again.

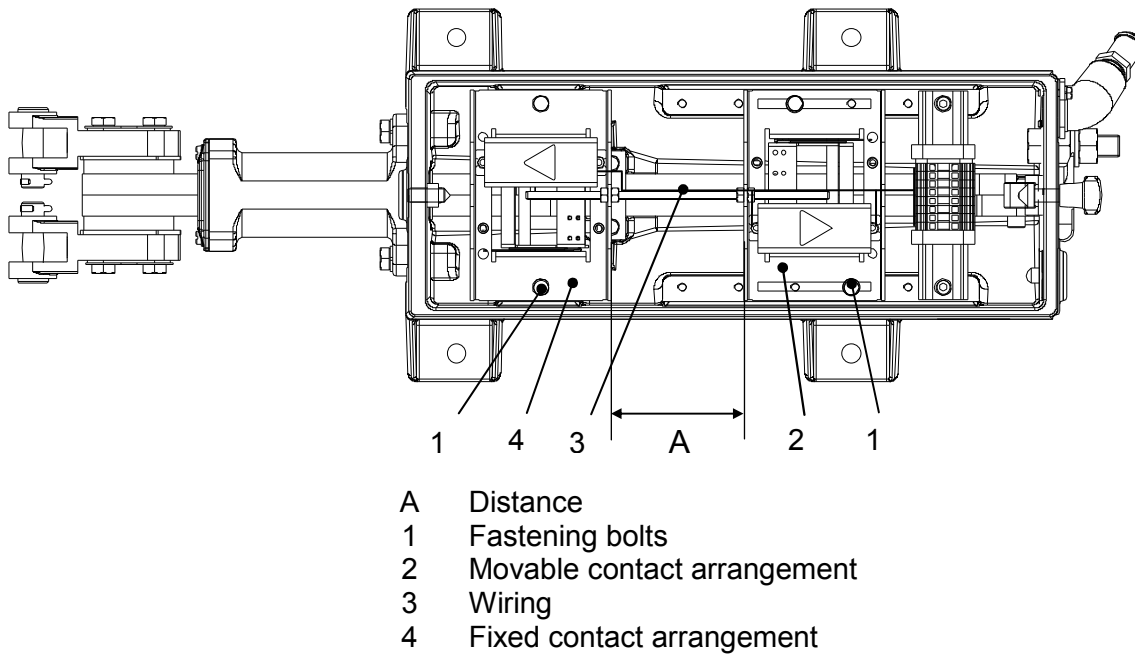


Figure 18 *Exchanging the contact arrangements*

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12.4.4 Removing the Detector Slides

Check the easy movement of the detector slides with the end position detector detached. The detector slides must be easy to move from one end position to the other by pulling or pushing them with one hand.

The detector slides 1 (see Figure 19) with guide sleeve 3 must be exchanged in the event of the following:

- sluggish movement of the detector slides
- worn-out guides in the guide sleeve
- leakiness of the guide sleeve

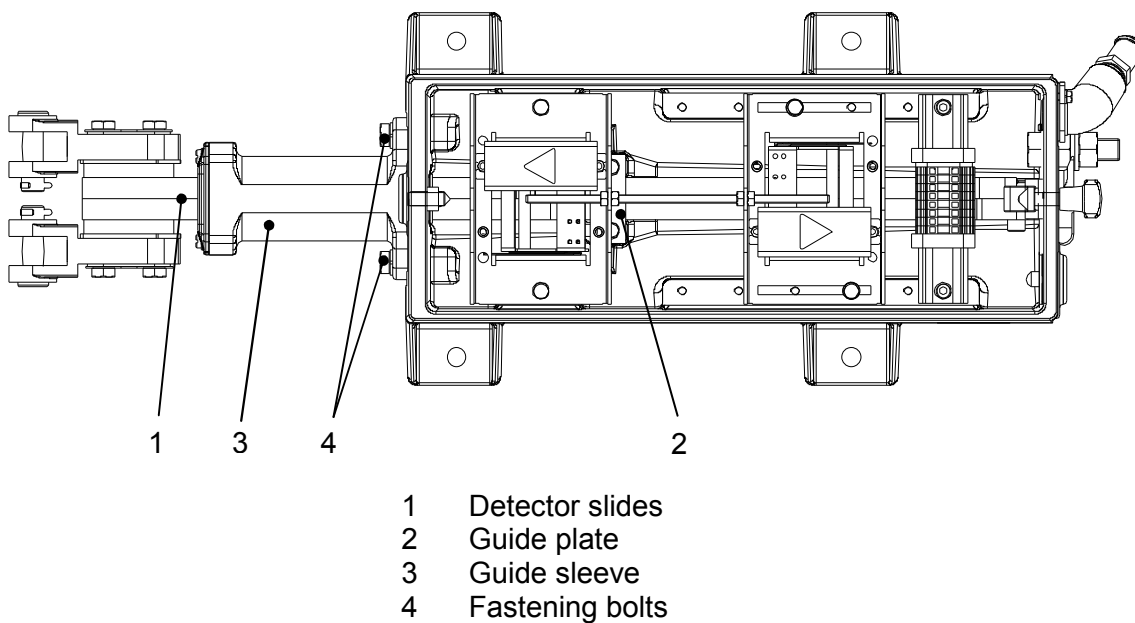


Figure 19 Removing the detector slides

Before removing the detector slides 1, remove the contact arrangements and guide plate 2 (see Figure 19). Then, undo the fastening bolts 4. Swing the detector slides 1 up to remove them from the housing of the end position detector. For assembling the detector slides 1, mount all components by carrying out the same steps in reverse. Perform a functional check as described in Section 12.5 .

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12.5 Functional Check after Maintenance Work

Operate the point machine by means of the crank handle until the mid-blade lock has an overlap of min. 4 mm and the opening between stock rail and point blade is not greater than 58 mm. Check that the roller of the contact lever is not engaged with the large notch (open point blade) and the contacts have changed over.

Disengage the roller of the closed point blade. Is a "points trailed" indication being issued? If so, the ELP 319 end position detector is correctly adjusted and fully operational.

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