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Electromechanical operated mechanisms

Sicat® 8WL6243, 8WL6244, 8WL6253 and 8WL6254 for overhead contact line systems

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The electromechanical operated mechanisms Sicat® 8WL6243, 8WL6244, 8WL6253 and 8WL6254 are designed for operating disconnectors and earth switches for overhead contact line systems for mass transit and main-line railways.

Features

- Reliable and low-maintenance due to robust mechanical gear system
- Safe due to mechanical locking of the end positions
- Highest actuating force applied in the end positions due to optimum force-travel characteristic of the reversing Geneva gear
- Compact casing design enables installation in profile poles
- Electrical remote-controlled and manual local operation of operated mechanism and, depending on version, local electrical operation possible
- High service life due to use of corrosion-resistant materials

Design

The electromechanical operated mechanism consists of the following assemblies:

- **Casing**
with ventilation pipe for ventilation of casing, cable connection, actuating bar sealing and locking system
- **Casing support**
only for GRP casing
- **Mechanical drive unit**
with motor, planetary gear, worm gear, Geneva gear, actuating slide, actuating bar, non-return blocking
- **Electrical equipment**
with control module, end switches and door contact (standard for GRP casing, optional for stainless steel casing)

Depending on the version, the electrical control module may or may not be equipped for local electrical operation.

The electromechanical operated mechanism is connected to the disconnector operating linkage via a standard clevis end fitting.

The casing of the operated mechanism is mechanically closed by a locking system. Optionally a semi-lock barrel can be installed as an additional protection against unauthorized opening in the GRP casing.

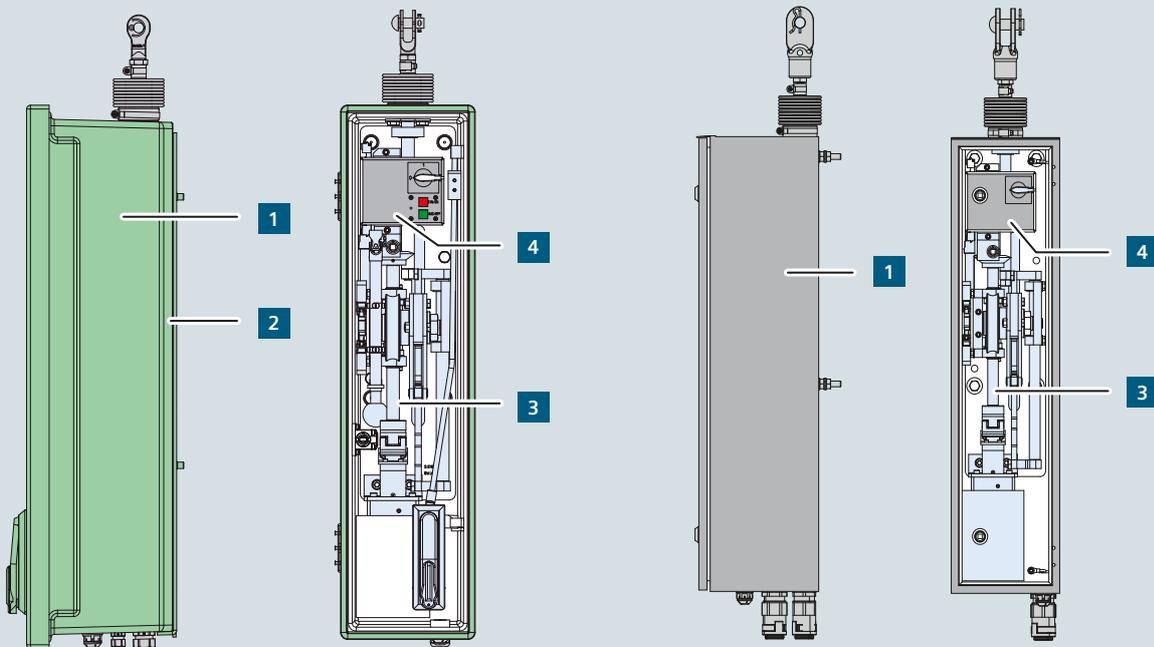
Installation

The casing support ensures easy and flexible installation of the electromechanical operated mechanism and its GRP casing in profile poles and other pole types as well as on structures. In combination with a GRP operating linkage, the mechanical connection between the casing support and the GRP casing is electrically insulating.

The electromechanical operated mechanism version in stainless steel casing is designed for direct installation (i.e. without casing support). Simple adapters enable existing standard fastening systems to be used alternatively.

Options

- Integrated evaluation unit for disconnector monitoring system Sicat DMS, e.g. for use with earthing switches, with safety integrity level in automated earthing systems
- Floating return signal
- Integration of power supplies with akku backup (DC/DC and wide-range power supply for low voltages) of series Sicat 8WL6240



- 1 Casing
- 2 Casing support
- 3 Mechanical drive unit
- 4 Electrical equipment

Electromechanical operated mechanism in GRP casing (left) and in stainless steel casing (right)

Function

For closing or opening the disconnecter at the pole, the electrical control pulse „ON“ or „OFF“ is released to control the motor current. The motor drives the mechanical gear.

The Geneva gear and the actuating slide convert the rotary motion into a linear actuating motion. The reversing operation is ensured by the electrical control module. The disconnecter is operated via the actuating bar and the operating linkage.

A positive connection of the actuating slide with the locking disk of the drive lever prevents any undesired movement of the disconnecter in both end positions.

Operating modes

- Electrical remote control via cable connection ①
- Local electrical operation via pushbuttons (at operated mechanisms with permanent power supply) ②
- Local manual operation via hand crank, optional with cordless screwdriver ③

The drive mechanism can be controlled by means of SCADA. Remote control can be carried out by electrical control module in the control center (e.g. Sicat 8WL6240-1/-2), fiber optics by means of local RTU or by local remote control module (e.g. GSM / GPRS or faster).



Selection criteria and technical data

Electromechanical operated mechanism in GRP casing

Type	short casing long casing	8WL6243-0 8WL6244-0	8WL6244-0L	8WL6243-7
Nominal voltage		230 V AC	230 V AC	230 V AC
Nominal frequency		50-60 Hz	50-60 Hz	50-60 Hz
Perm. voltage difference		0.8...1.1 U _n	0.8...1.1 U _n	0.8...1.1 U _n
Nominal current		2 A	2 A	2 A
Electrical connection		4 wires + PE and floating return signal	permanent power supply, 4 digital inputs, 1xRJ45 (Ethernet), communication acc. to IEC 60870-5-104	3 wires and floating door signal
Operating mode		① ② ③	① ② ③	① ③

Type	short casing long casing	8WL6243-3 8WL6244-3	8WL6243-4 8WL6244-4	8WL6243-6 8WL6244-6	8WL6244-6L
Nominal voltage		110 V DC	60 V DC	24 V DC	24 V DC
Perm. voltage difference		0.8...1.1 U _n	0.8...1.1 U _n	0.8...1.1 U _n	0.8...1.1 U _n
Nominal current		4 A	7.5 A	20 A	20 A
Electrical connection		7 wires incl. door contact and floating return signal	7 wires incl. door contact and floating return signal	7 wires incl. door contact and floating return signal	permanent power supply, 4 digital inputs, 1xRJ45 (Ethernet), communication acc. to IEC 60870-5-104
Operating mode		① ② ③	① ② ③	① ② ③	① ② ③

Type		8WL6243-...	8WL6244-...
Material of casing		GRP	GRP
Dimensions			
• Height	[mm]	850	1,350
• Width	[mm]	225	225
• Depth	[mm]	233	233
Weight	[kg]	38.5	46.0
Perm. ambient temperature	[°C]	40...+50	40...+50
Degree of protection acc. to EN 60529		IP54	IP54
Max. installation height above sea level	[m]	2,000	2,000
Linear stroke	[mm]	200	200
Switching time (0.8...1.1 U _n)	[s]	3...5	3...5
Stroke velocity	[mm/s]	40...66	40...66
Actuating force in end positions (Disconnecter ON / OFF)	[kN]	min. 4.0	min. 4.0
Actuating force at half displacement	[kN]	min. 2.5	min. 2.5

Electromechanical operated mechanism in stainless steel casing

Type	short casing long casing	8WL6253-0/-0D 8WL6254-0D*	8WL6253-0A	8WL6253-0L	8WL6253-2
Nominal voltage		230 V AC	230 V AC	230 V AC	110 V AC
Nominal frequency		50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Perm. voltage difference		0.8...1.1 U _n	0.8...1.1 U _n	0.8...1.1 U _n	0.8...1.1 U _n
Nominal current		2 A	2 A	2 A	4 A
Electrical connection		3 wires	6 resp. 7 wires, with a separate return signal	3 wires with 1xRJ45 (Ethernet), commu- nication acc. to IEC 61860-5-104	6 resp. 7 wires, with a separate return signal
Operating mode		① ③	① ③	① ③	① ③

* and DB specific types 8WL6254-0DA/-0DB/-0DC

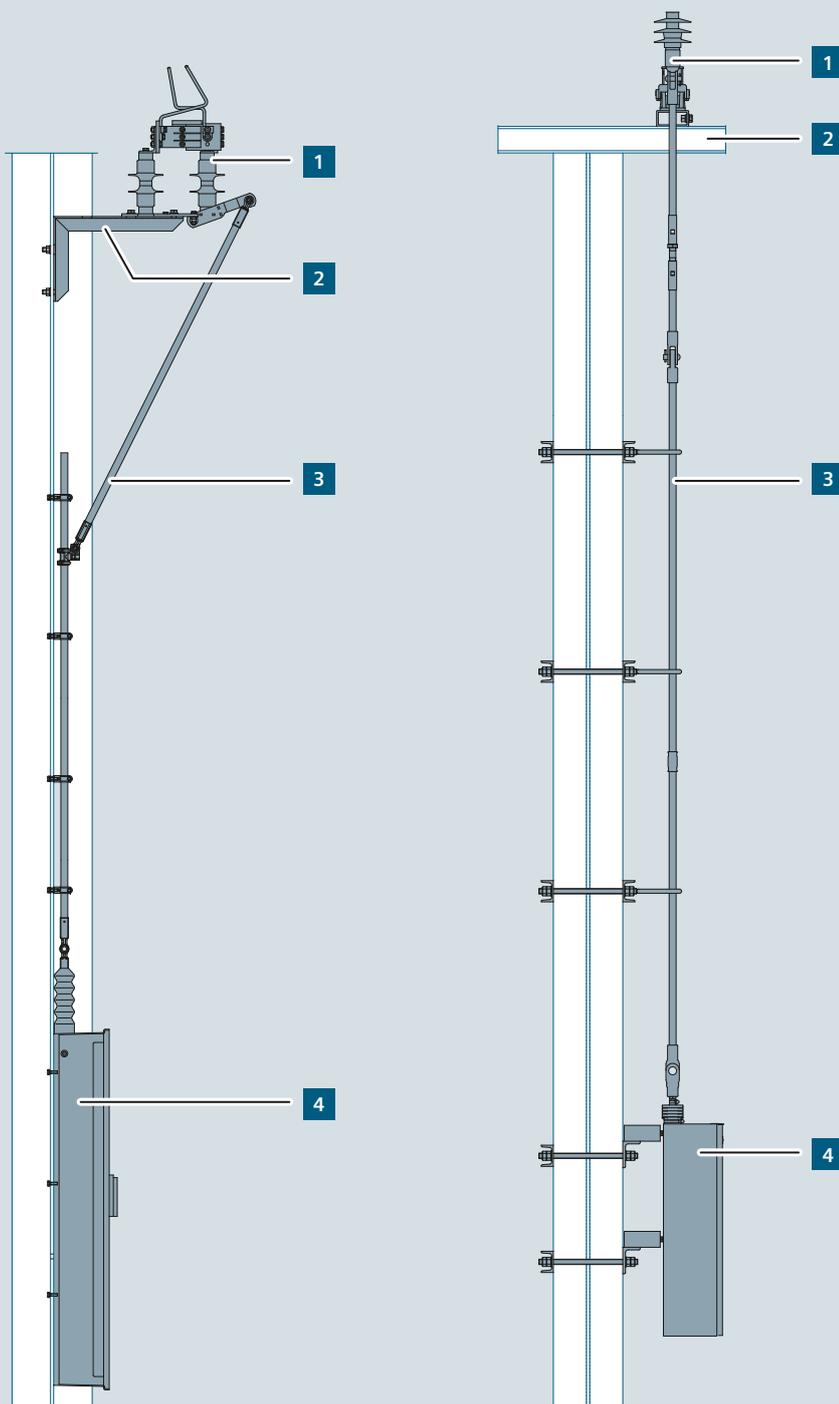
Type	short casing long casing	8WL6253-1	8WL6253-1A	8WL6253-3	8WL6253-5	8WL6253-6/-6D 8WL6254-6D
Nominal voltage		220 V DC	220 V DC	110 V DC	48 V DC	24 V DC
Perm. voltage difference		0.8...1.1 U _n	0.8...1.1 U _n	0.8...1.1 U _n	0.8...1.1 U _n	0.8...1.1 U _n
Nominal current		2 A	2 A	4 A	9 A	20 A
Electrical connection		6 resp. 7 wires, with a separate return signal	3 wires	6 resp. 7 wires, with a separate return signal	6 resp. 7 wires, with a separate return signal	6 wires, floating return signal
Operating mode		① ③	① ③	① ③	① ③	① ③

Type		8WL6253-...	8WL6253-0L	8WL6254-...
Material of casing		stainless steel	stainless steel	stainless steel
Dimensions				
• Height	[mm]	800	800	915
• Width	[mm]	200	380	200
• Depth	[mm]	222	223.5	222
Weight	[kg]	33.5	44.8	40.5
Perm. ambient temperature	[°C]	40...+50	40...+50	40...+50
Degree of protection acc. to EN 60529		IP54	IP54	IP54
Max. installation height above sea level	[m]	2,000	2,000	2,000
Linear stroke	[mm]	200	200	200
Switching time (0.8...1.1 U _n)	[s]	3...5	3...5	3...5
Stroke velocity	[mm/s]	40...66	40...66	40...66
Actuating force in end positions (Disconnecter ON / OFF)	[kN]	min. 4.0	min. 4.0	min. 4.0
Actuating force at half displacement	[kN]	min. 2.5	min. 2.5	min. 2.5

System integration

Disconnectors, switch-disconnectors and earthing switches are installed at the top of contact line poles. A disconnector bracket is available optionally.

Via an operating linkage, the switching devices are operated electrically with the electromechanical operated mechanism.



- 1 Disconnector
- 2 Bracket
- 3 Operating linkage
- 4 Electromechanical operated mechanism

Disconnector up to 3 kV DC 8WL6134-3 with electromechanical operated mechanism and GRP operating linkage (left) and Disconnector 25 kV AC 8WL6144-0 with electromechanical operated mechanism and aluminium operating linkage (right)

Tests

The following tests have been carried out:

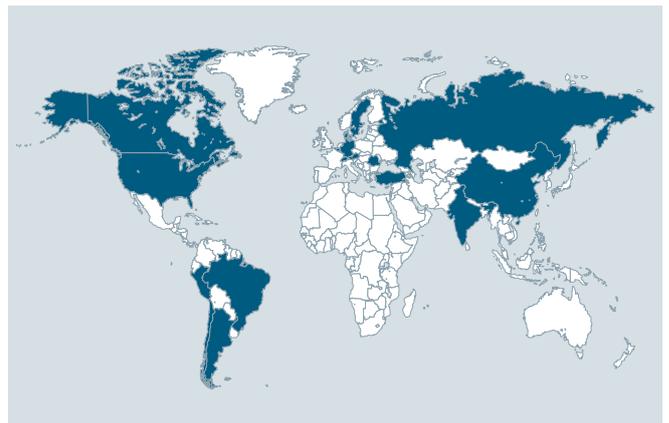
- Mechanical operation test
- Actuating force in end positions
- Function at low and high ambient temperatures
- EMV test to prove emission acc. to EN 50121-5
- Determination of insulation voltage between GRP casing and casing support
- Insulation and protective earth conductor resistance

References

Since market introduction in autumn 2010 more than 2,670 items of the electromechanical operated mechanism have been sold worldwide. Amongst others, they are in service at the following transportation companies:

Germany:

- Berliner Verkehrsbetriebe (BVG)
- Bochum-Gelsenkirchener Straßenbahnen AG (BOGESTRA)
- Chemnitzer VerkehrsAG
- Deutsche Bahn AG
- Dortmunder Stadtwerke AG
- Dresdner Verkehrsbetriebe AG
- Erfurter Verkehrsbetriebe AG
- Häfen und Güterverkehr Köln AG
- Hallesche Verkehrs-AG
- Jenaer Nahverkehr GmbH
- Kasseler Verkehrs-Gesellschaft AG
- Kölner Verkehrs-Betriebe AG
- Leipziger Verkehrsbetriebe GmbH (LVB)
- Magdeburger Verkehrsbetriebe GmbH & Co. KG
- Rheinbahn AG
- Rhein-Neckar-Verkehr GmbH (RNV)
- Siemens Prüfcenter Wegberg-Wildenrath
- Stadtwerke Augsburg Verkehrs-GmbH
- Stadtwerke Bonn
- Üstra Hannoversche Verkehrsbetriebe AG
- ViP Verkehrsbetrieb Potsdam GmbH
- Via Verkehrsgesellschaft mbH



Worldwide:

- Metrô de Salvador, Salvador da Bahia, Brazil
- Empresa de los ferrocarriles del estado, Santiago, Chile
- Mass transit Rail Corporation, Hongkong, China
- Metro Chennai, India
- Consorcio Tren Electrico, Lima, Peru
- Corridor IV, Romania
- UralLoco, Russia
- Forchbahn AG, Switzerland
- Metro Kayseri, Turkey

Security information

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens' products and solutions constitute one element of such a concept.

For more information about industrial security, please visit:
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Sicat 8WL6243, 8WL6244, 8WL6253 and 8WL6254 /
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