

FAULT INDICATOR LODESTAR CL0.5 BM



SIMPLE SOLUTION FOR FAST FAULT DETECTION

FFFFCTS OF IMPLEMENTATION AT ENERGY FACILITIES



ECONOMIC BENEFITS

Stable and reliable power supply attracts investments and supports economic growth



REDUCTION OF UNDER-SUPPLY

More consistent and steady flow of electricity to consumers, minimizing potential disruptions in



OF ELECTRICITY

power supply



REDUCTION OF COSTS FOR THE IMPLEMENTATION AND OPERATION OF EQUIPMENT



IMPROVING THE RELIABILITY **OF POWER SUPPLY TO CONSUMERS**

Investments in smart grid technologies, monitoring, management and diagnostics of power grids improve their reliability



Online monitoring is possible devices include SMS-gateway. Data transmission to SCADA system using **DNP3 protocol.**

No need of additional

communication devices



Detection of direction

BENEFITS

- Minimum fault sensing 0,5A
- Notification of events with GPS coordinates using the Lodestar App mobile application
- Installation on the line without disconnecting the voltage - using a simple hot stick tool
- Dynamically changing sensitivity based on a load current
- **Auto-Detect Network Frequency** intellectual algorithms allow it to work in networks with frequency of 50 or 60Hz without reconfiguration
- Direct data transfer to the Scada system to the dispatcher using the DNP3 protocol
- Recording of waveforms and an accident log with date and time











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Short circuit current sensitivity Automatic foult current reneficial djustment Face sequence current sensitivity OS A Descention of direction of preo sequence current Voltage monitoring Face sequence current Face sequence discretion of devices Overhead intervollinger sange Good 5 requency Visual indication Binking uttra-bright LEDS OBO Hz Visual indication Binking uttra-bright LEDS	Types of registered events	PtP, PtG
Detection of zero sequence current 1.000 Detection of devices Overhead line voltage range 6.35 kV Grids frequency 5.000 Hz Differ frequency 6.000 Hz Differ frequency	Short circuit current sensitivity	20 A
Detection of direction of zero sequence current + 100 miles + 100 mile	Automatic fault current threshold adjustment	+
Control Cont	Zero sequence current sensitivity	0.5 A
Coverhead dine voltage range Coverhead line voltage range Coverhead line voltage range Coverhead line voltage range Visual indication Bilinking ultra-bright LEDs; detection range up to 100 m (during the day), up to 500 m (at night); a set of sequences, depending on the capability of the model. At least 20000 mice per LED, 560° view voltable memory Remote control [for field config] Remote control [for field config] Remote communication Lodestar CLXX-Master is equipped with a CSM channel, for transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators to the data collection transmitting information from the indicators is equipped with a CSM channel (Indianomatic Security in Comment of the data collection transmitting information from the indicators and channel (Indianomatic Security in Comment of the indicators) Confidence of properties of the data collection transmitting information from the energy of the data collection transmitting information from the e	Detection of direction of zero sequence current flow	+
Overhead line voltage range	Voltage monitoring	+
Cridis frequency Visual indication Indication	General description of devices	
Visual indication Plans and the control of the properties of of t	Overhead line voltage range	6-35 kV
- detection range up to 100 m (during the day), up to 500 m (at night), - a set of sequences, depending on the capability of the model LED brightness At least 20000 mod per LED, 360° view Up to 20 000 Remote control (for field config) Remote communication Detection (Config) Remote communication Types of actuation control Visual; - by short-range radio channel (handheld remote control); - remote void channel (handheld remote control); - remote val Kompana & SCADA. Voltage restoration; - by thirder, - magnet; - from the portable control. Indicator health control Indicator health control Aggnet; - remotely. Changing settings (setpoints) Changing settings (setpoints) SMS notification Up to 5 phone numbers; - composition of the message: CPS coordinates, type of accident, serial numbers - remotely using the setMOMPSAN Web-clients softwere. Reading GPS coordinates Yes Time to prepare the kit for repeated triggering Integration with SCADA systems Connection to any existing SCADA easily via IEC 60870-5-104 by using its control of the message: CPS coordinates, type of accident, serial numbers - composition of the message: CPS coordinates, type of accident, serial number of the message of the codestar Master FPI) - data transmission to SCADA system using DNP3 protocol. Source of power Total indication time - 1000 hours - 10	Grid's frequency	50/60 Hz
Number of alarms stored in the internal non- woldstill ememory Remote control (for field config) Remote communication Lodestar CDX (Master is equipped with a CSM channel, for transmitting information from the indicators to the data collection stamped to the data collection st	Visual indication	detection range up to 100 m (during the day) up to 500 m (at night):
Valiatie memory Permote control (for field config) Bluetooth BLE [2.4 GHz]	LED brightness	At least 20000 mcd per LED, 360° view
Remote communication Lodestar CLXX-Master is equipped with a GSM channel, for transmitting information from the indicators to the data collection server. Types of actuation control Visual; by short-range radio channel (handheld remote control); remote via Komorsan & SCADA Voltage restoration; by timer; rangnet; from the portable control. Indicator health control Indicator health control Agnet; control to the short-range radio channel using a portable remote control; remotely using the «KOMORSAN Web-client» software. SMS notification Up to 5 phone numbers; composition of the message: CPS coordinates, type of accident, serial number. Time to prepare the kit for repeated triggering Integration with SCADA systems Integration with SCADA systems Integration with SCADA systems Connection to any existing SCADA easily via IEC 60870-5-104 by using KOMORSAN software; built-in GSM modem (for Lodestar Master FPI); data transmission to SCADA system using DNP3 protocol. Source of power 3 removable lithium batteries (19 Ah) in Lodestar CLxx Master; 1 removable lithium batteries (19 Ah) in Lodestar CLxx Sing attransmission to SCADA systems using DNP3 protocol. Thresholds Absolute current threshold in % 20-1000 A Differential current threshold in % 50-500% Current withstand (IEEE495, 4.4-7) 25 kA/S00 ms Inrush current restraint 0-200 ms Setting the reset timer Arbitrarily from 1 hour to 8 days Exploitation Installation location On the overhead line (conductor) Conductor diameters 1-2 (20 mm) Protection class In 68 according IEC Presistant to UV radiation, resistant to wind load of 40 mfs without ice and 23 m/s with ice with 35 mm wall thickness. Impact of climatic ervironmental factors Fine according IEC Procession of separature group Mi;		Up to 20 000
transmitting information from the indicators to the data collection server. Types of actuation control - Visual; - by short-range radio channel (handheld remote control); - remote via Kornorsan & SCADA. - Voltage restoration; - by timer; - magnet; - remote via Kornorsan & SCADA. - Voltage restoration; - by timer; - magnet; - remote via Kornorsan & SCADA. - Voltage restoration; - by timer; - magnet; - portable control. - Magnet; - portable remote control; - remotely using the «KOMORSAN Web-client» software. - On the short-range radio channel using a portable remote control; - remotely using the «KOMORSAN Web-client» software. - Up to 5 phone numbers; - composition of the message: GPS coordinates, type of accident, serial number. - Ves - Time to prepare the kit for repeated triggering - Integration with SCADA systems - Connection to any existing SCADA easily via IEC 60870-5-104 by - builter of SSM modern (for 1 destart Master FPI); - data transmission to SCADA system using DNP3 protocol. - Source of power - 3 removable lithium battery (19 Ah) in Lodestar CLxx Master; - 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; - 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; - 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; - 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; - 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; - 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; - 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; - 2000 hours - 1 standard (IEEE/495, 4.4.7) - 25 kA/500 ms - 1 standard (IEEE/495, 4.4.7) - 25 kA/500 ms - 1 standard (IEEE/495, 4.4.7) - 25 kA/500 ms - 1 standard (IEEE/495, 4.4.7) - 25 kA/500 ms - 1 standard (IEEE/495, 4.4.7) - 25 kA/500 ms - 1 standard (IEEE/495, 4.4.7) - 25 kA/500 ms - 1 standard (IEEE/495, 4.4.7) - 25 kA/500 ms - 1 standard (IEEE/495, 4.4.7) - 25 kA/500 ms - 1 standard (IEEE/495, 4.4.7) - 25 kA/500 ms - 1 standard (IEEE/495, 4.4.7) - 25 kA/500 ms - 1 standard (IEEE/495, 4.4.7) - 25 kA/5	Remote control (for field config)	Bluetooth BLE (2,4 GHz)
by short-range radio channel (handheld remote control); remote via Komorsan & SCADA. Peset display Voltage restoration; by timer; magnet; from the portable control. Magnet; portable remote control; remotely. Changing settings (setpoints) On the short-range radio channel using a portable remote control; remotely using the «KOMORSAN Web-client» software. SMS notification Ly to S phone numbers; composition of the message: GPS coordinates, type of accident, serial number. Reading GPS coordinates Yes Time to prepare the kit for repeated triggering Integration with SCADA systems Connection to any existing SCADA easily via IEC 60870-5-104 by using KOMORSAN software; built-in CSM modem (for Lodestar Master FPI); data transmission to SCADA system using DNP3 protocol. Source of power - 3 remotely Integration with standby mode) Total indication time Indicator life 130000 hours Battery life (in standby mode) Thresholds Absolute current threshold Differential current threshold in A 20-500 A Differential current threshold in A 20-500 A Differential current threshold in A 20-500 M Current withstand (IEEE495, 4.4.7) 25 kA/S00 ms Inrush current restraint O-200 ms Exting the reset timer Arbitrarily from 1 hour to 8 days The minimum duration of the emergency process Exploitation Installation on live line + emperature range Operating at an ambient temperature from - 40 °C to + 85 °C Protection class Impact of climatic environmental factors Impact of climatic environmental factors Impact of climatic environmental factors - Voltage restriation entre line - Corresponds to exploitation group MI;	Remote communication	transmitting information from the indicators to the data collection
. by timer;	Types of actuation control	 by short-range radio channel (handheld remote control);
. porfable remote control; . remotely. Changing settings (setpoints) . On the short-range radio channel using a portable remote control; . remotely using the «KOMORSAN Web-client» software. SMS notification . Up to 5 phone numbers; . composition of the message: GPS coordinates, type of accident, serial number. Reading CPS coordinates Yes Time to prepare the kit for repeated triggering Integration with SCADA systems . Connection to any existing SCADA easily via IEC 60870-5-104 by using KOMORSAN software; . built-in GSM modem for Lodestar Master FPI); . data transmission to SCADA system using DNP3 protocol. Source of power . 3 removable lithium batteries [19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx S. Total indication time . 2 2000 hours Indicator life . 130000 hours Battery life (in standby mode) Thresholds Absolute current threshold Differential current threshold in A . 20+500 A Differential current threshold in A . 20+500 A Differential current threshold in A . 20+500 A Differential current threshold in S Setting the reset timer . Arbitrarily from 1 hour to 8 days Thre minimum duration of the emergency process Exploitation Installation location Conductor diameters . 5-40 mm Installation on live line . + Temperature range . Poperating at an ambient temperature from - 40 °C to + 85 °C Protection class . Protection and Simple with the conductor of the conductor	Reset display	by timer;magnet;
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Time to prepare the kit for repeated triggering Integration with SCADA systems . Connection to any existing SCADA easily via IEC 60870-5-104 by using KOMORSAN software; . built-in CSM modem (for Lodestar Master FPI); . data transmission to SCADA system using DNP3 protocol. Source of power . 3 removable lithium batteries (19 Ah) in Lodestar CLxx Master; . 1 removable lithium batteries (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 2 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 2 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 2 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 2 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 3 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 1 removable lithium battery (19 Ah) in Lodestar CLxx Master; . 2 removable lithium battery (19 Ah) in Lodesta	SMS notification	· composition of the message: GPS coordinates, type of accident,
Integration with SCADA systems - Connection to any existing SCADA easily via IEC 60870-5-104 by using KOMORSAN software; - built-in CSM modem (for Lodestar Master FPI); - data transmission to SCADA system using DNP3 protocol. Source of power - 3 removable lithium batteries (19 Ah) in Lodestar CLxx Master; - 1 removable lithium batteriey (19 Ah) in Lodestar CLxx S. Total indication time > 2000 hours Indicator life - 130000 hours Battery life (in standby mode) **Threshold** Absolute current threshold - 20÷1000 A Differential current threshold in A - 20÷500 A Differential current threshold in % - 50÷500% Current withstand (IEEE495, 4.4.7) - 25 kA/500 ms Inrush current restraint - 0-200 ms Setting the reset timer - Arbitrarily from 1 hour to 8 days The minimum duration of the emergency process **Exploitation** Installation location - On the overhead line (conductor) Conductor diameters - 5-40 mm Installation on live line - + Temperature range - Operating at an ambient temperature from - 40 °C to + 85 °C Protection class - Protection class - Resistant to UV radiation; - resistant to UV radiation; - resistant to Wind load of 40 m/s without ice and 23 m/s with ice with 35 mm wall thickness Corresponds to exploitation group M1;	Reading GPS coordinates	Yes
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- 1 removable lithium battery (19 Ah) in Lodestar CLxx S. Total indication time > 2000 hours Indicator life 130000 hours Battery life (in standby mode) 8-10 years Thresholds Absolute current threshold 20+1000 A Differential current threshold in A 20+500 A Differential current threshold in % 50+500% Current withstand (IEEE495, 4.4.7) 25 kA/500 ms Inrush current restraint 0-200 ms Setting the reset timer Arbitrarily from 1 hour to 8 days The minimum duration of the emergency process 0,02 s Exploitation Installation location On the overhead line (conductor) Conductor diameters 5-40 mm Installation on live line + Temperature range Operating at an ambient temperature from - 40 °C to + 85 °C Protection class IP 68 according IEC Impact of climatic environmental factors Parent of the conductor of the conductor of the service and 23 m/s with ice with 35 mm wall thickness. Impact of mechanical factors Corresponds to exploitation group M1;	Integration with SCADA systems	using KOMORSAN software; built-in GSM modem (for Lodestar Master FPI);
Indicator life Battery life (in standby mode) Battery life (in	Source of power	 3 removable lithium batteries (19 Ah) in Lodestar CLxx Master; 1 removable lithium battery (19 Ah) in Lodestar CLxx S.
Battery life (in standby mode) Thresholds Absolute current threshold 20÷1000 A Differential current threshold in A 20÷500 A Differential current threshold in % 50÷500% Current withstand (IEEE495, 4.4.7) 25 kA/500 ms Inrush current restraint 0-200 ms Setting the reset timer Arbitrarily from 1 hour to 8 days The minimum duration of the emergency process 0,02 s Exploitation Installation location On the overhead line (conductor) Conductor diameters 5-40 mm Installation on live line + Temperature range Operating at an ambient temperature from - 40 °C to + 85 °C Protection class IP 68 according IEC Impact of climatic environmental factors Passistant to UV radiation; resistant to UV radiation; resistant to Wradiation; resistant	Total indication time	> 2000 hours
Thresholds Absolute current threshold 20÷1000 A Differential current threshold in A 20÷500 A Differential current threshold in % 50÷500% Current withstand (IEEE495, 4.4.7) 25 kA/500 ms Inrush current restraint 0-200 ms Setting the reset timer Arbitrarily from 1 hour to 8 days The minimum duration of the emergency process 0,02 s Exploitation Installation location On the overhead line (conductor) Conductor diameters 5-40 mm Installation on live line + Temperature range Operating at an ambient temperature from - 40 °C to + 85 °C Protection class IP 68 according IEC Impact of climatic environmental factors Presistant to UV radiation; resistant to Wind load of 40 m/s without ice and 23 m/s with ice with 35 mm wall thickness. Impact of mechanical factors - Corresponds to exploitation group M1;	Indicator life	130000 hours
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The minimum duration of the emergency process 0,02 s Exploitation Installation location On the overhead line (conductor) Conductor diameters 5-40 mm Installation on live line + Temperature range Operating at an ambient temperature from - 40 °C to + 85 °C Protection class IP 68 according IEC Impact of climatic environmental factors Presistant to UV radiation; resistant to wind load of 40 m/s without ice and 23 m/s with ice with 35 mm wall thickness. Impact of mechanical factors Corresponds to exploitation group M1;	Inrush current restraint	
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Installation location Conductor diameters 5-40 mm Installation on live line Temperature range Operating at an ambient temperature from - 40 °C to + 85 °C Protection class Impact of climatic environmental factors Impact of mechanical factors On the overhead line (conductor) 5-40 mm Conductor diameters Fersital to wind load of 40 m/s without ice and 23 m/s with ice with 35 mm wall thickness. Corresponds to exploitation group M1;		s 0,02 s
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Protection class IP 68 according IEC Impact of climatic environmental factors Resistant to UV radiation; resistant to wind load of 40 m/s without ice and 23 m/s with ice with 35 mm wall thickness. Impact of mechanical factors Corresponds to exploitation group M1;		Operating at an ambient temperature from - 40 °C to + 85 °C
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Impact of mechanical factors · Corresponds to exploitation group M1;		Resistant to UV radiation; resistant to wind load of 40 m/s without ice and 23 m/s with ice
	Impact of mechanical factors	Corresponds to exploitation group M1;