WOODWARD

Product Specification
37167A

LS 4

Circuit Breaker Control & Protection

APPLICATIONS

In complex switchgear applications the LS 4 can help to simplify the issue. Together with the GCP-31 genset controls the LS 4 offers a simple technical solution.

Each breaker to be controlled is equipped with one LS 4 that measures the three-phase voltage on each side of the breaker. Each side of the breaker is designated as either a fixed (utility) or variable (genset) source and is labeled A or B. So the LS 4 can be used to control utility feeder breakers with one fixed source and one variable source, or tie breakers between busses with two variable sources. The LS 4 is used for breaker protection, synchronization, and load control.

OPERATION

All LS 4's are coupled via a CAN bus network to each other and to the GCP genset controls. Discrete input commands are used to operate the LS 4 in the correct mode. Setpoint values for frequency and voltage are broadcast to all genset controllers on that switchgear segment. The genset controls then adjust the frequency and voltage of their respective genset to achieve synchronization. The LS 4 will handle the opening and closing of the circuit breaker based on the discrete inputs it receives.

DESCRIPTION

Features

- True RMS voltage (A and B side)
- True RMS current (A side)
- Synch-check functionality
- Black start functionality
- Synchronous networks functionality
- Remote control of frequency, voltage, and real power
- Power transfer zero control (softload)
- Configurable trip/control set points
- Config. delays for each alarm
- 7 configurable relay outputs
- Two-line LC display

Protections

Protections	ANSI #
• Overvoltage	(59)
• Undervoltage	(27)
• Overfrequency	(81O)
• Underfrequency	(81U)
• Phase/vector shift	(78)
• df/dt ROCOF	(81RL)

Functions

- Calculation of setpoint values which are transmitted to the genset controls (e.g. GCP) for synchronization and load control
- Circuit breaker close command issued when LS 4 is enabled and the two sources are in synch.
- Open command to the CB with a discrete input command or with the detection of one of the available protection functions.

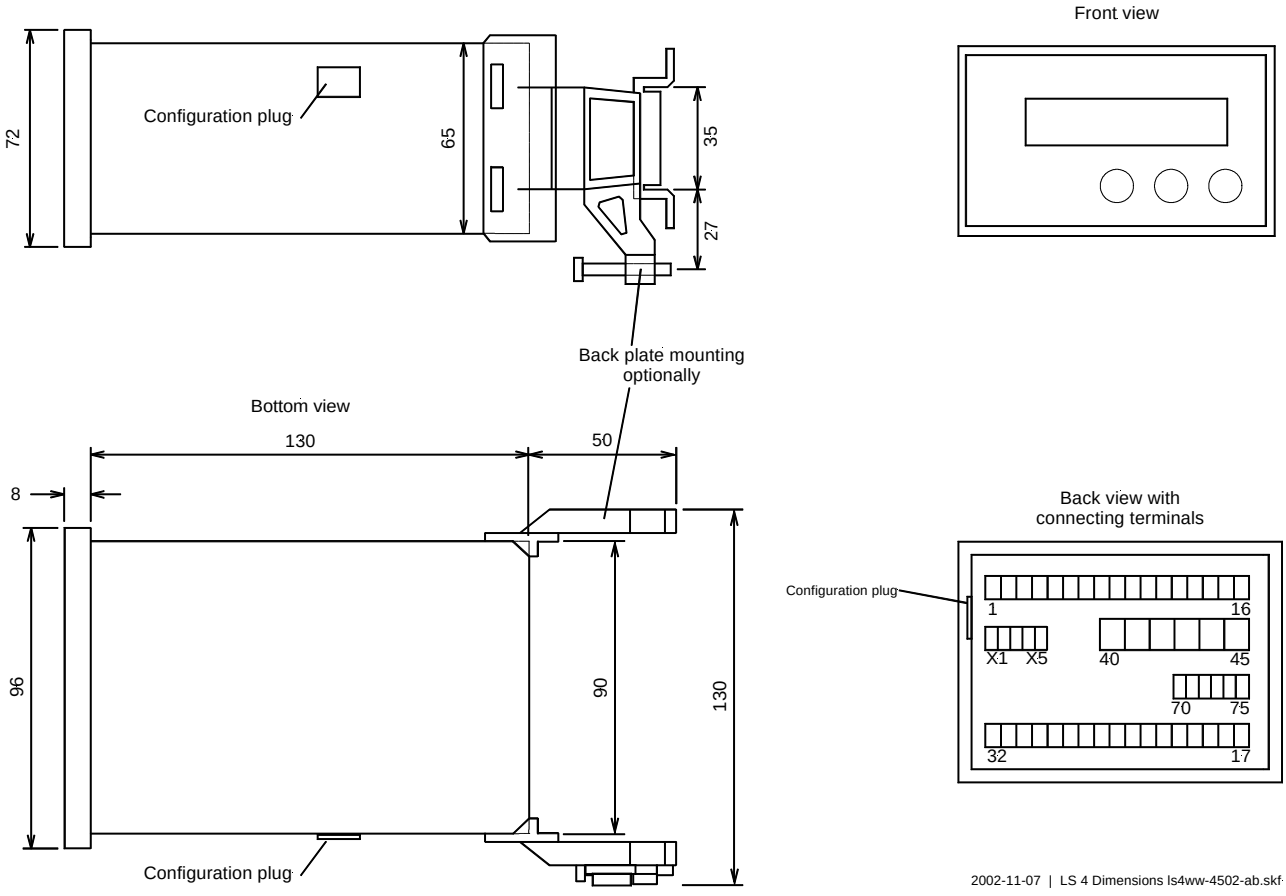
- Flexible solution for complex breaker configurations
- Synch-check relay
- Black start functions
- Protection relay
- Synchronizer
- Power transfer zero control
- CAN bus based communication
- Breaker protection and synchronizer in one single digital relay
- True RMS sensing
- Discrete inputs for remote control
- PC and front panel configurable
- Programmable relay outputs
- UL/cUL Listed
- Microprocessor technology for accurate, repeatable and reliable operation
- Programmable two-step threshold set points with individual time delays

SPECIFICATIONS

Accuracy ..... Class 1
Power supply ..... 24 Vdc (18..32 Vdc)
Intrinsic consumption ..... max. 12 W
Ambient temperature ..... -20..70 °C
Ambient humidity ..... 95 %, non-condensing
Voltage Rated: ... [1] 57/100(120) Vac or [4] 230/400 Vac
UL: ..... [1] max. 150 Vac or [4] max. 300 Vac
Setting range: ..... [1] 50..125 Vac or [4] 200..440 Vac
Measuring frequency ..... 50/60 Hz (40..70 Hz)
Linear measuring range up to ..... 1.3×Vn
Input resistance ..... [1] 0.21 MΩ, [4] 0.7 MΩ
Max. power consumption per path ..... < 0.15 W
Current ..... [../1] ../1 A or [../5] ../5 A
Current-carrying capacity ..... 3.0×In
Load ..... < 0.15 VA
Rated short-time cur. (1 s) ..... [../1] 50.0×In, [../5] 10.0×In
Discrete inputs ..... metallically separated
Input range ..... 18..250 Vac or dc
Input resistance ..... approx. 68 kΩ

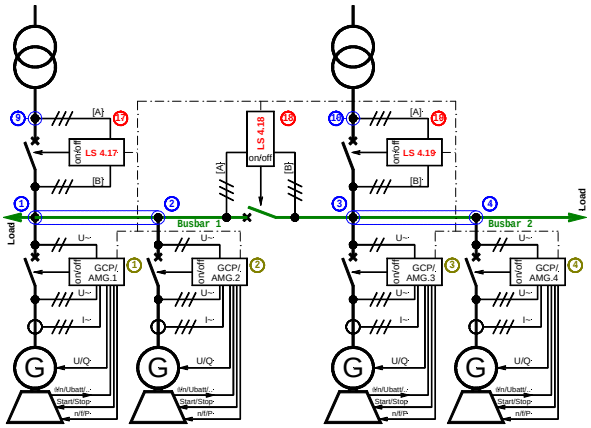
Relay outputs ..... metallically separated
Contact material ..... AgCdO
Load (GP) ..... 24 Vdc@2 Adc, 250 Vac@2 Aac
Inductive time load (PD) ..... 24 Vdc@1 Adc
Interface ..... metallically separated
Type ..... CAN bus (CAL)
Insulation voltage ..... min. 500 Vdc
Housing ..... Type APRANORM DIN 43 700
Dimensions ..... 96×72×130 mm
Front cutout ..... 91×67 mm
Connection ..... screw/plug terminals depending on connector 1.5 mm², 2.5 mm² or 4 mm²
Front ..... insulating surface
Protection system ..... IP 21
Weight ..... depending on version, approx. 800 g
Disturbance test (CE) ..... tested according to applicable EN guidelines
Listings ..... UL/cUL listed (voltages up to 300 Vac) ordinary locations, file E212970

DIMENSIONS

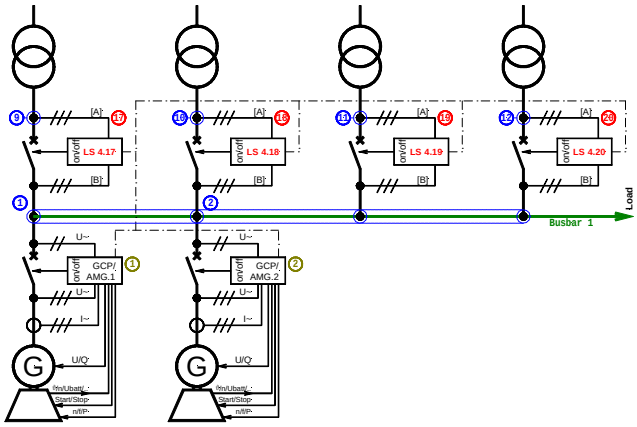


TYPICAL APPLICATIONS

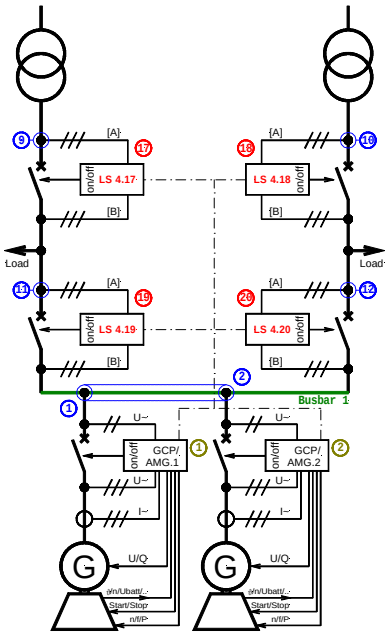
Application: H-Connection



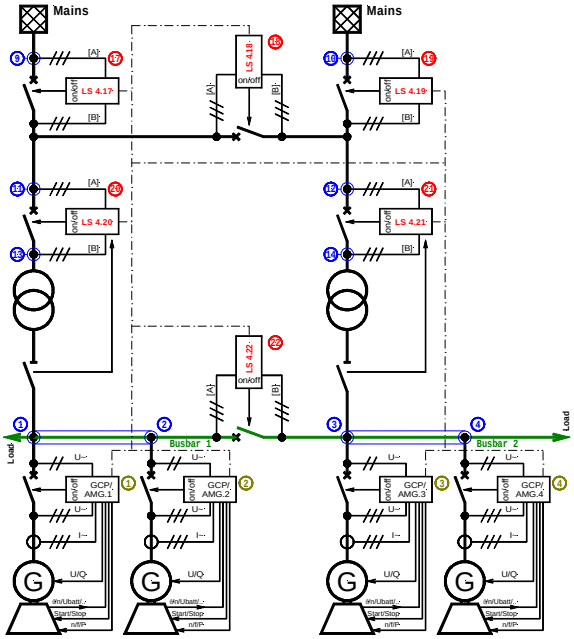
Application: Multiple Mains



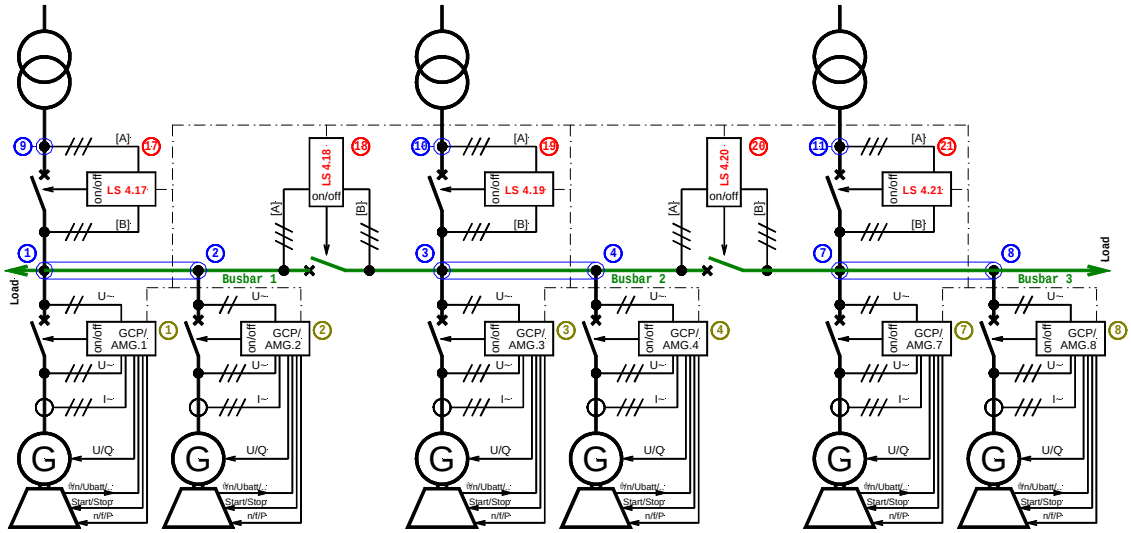
Application: Separated Load Busbar



Application: Multiple Breaker Solution



Application: Double H-Connection



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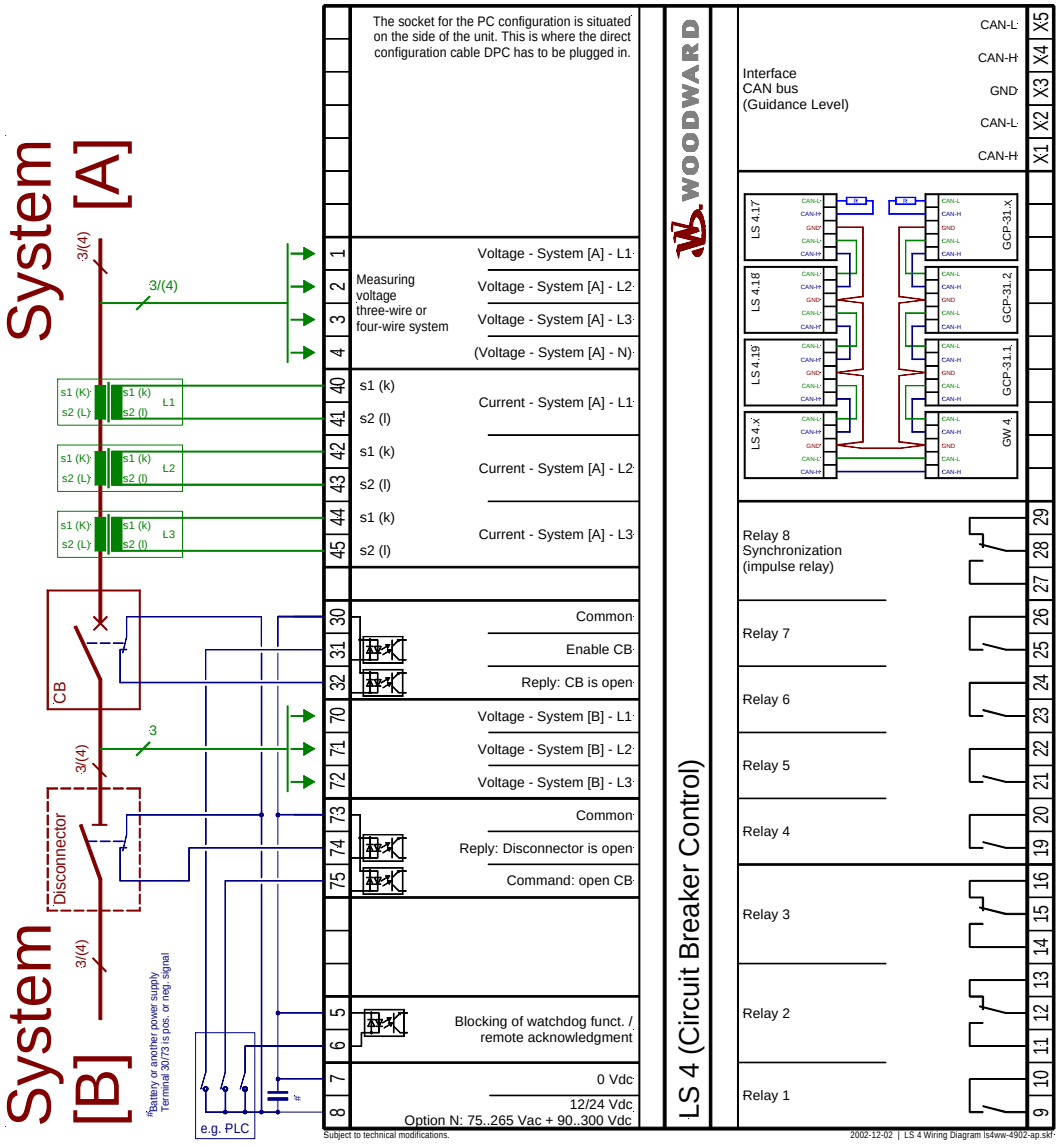
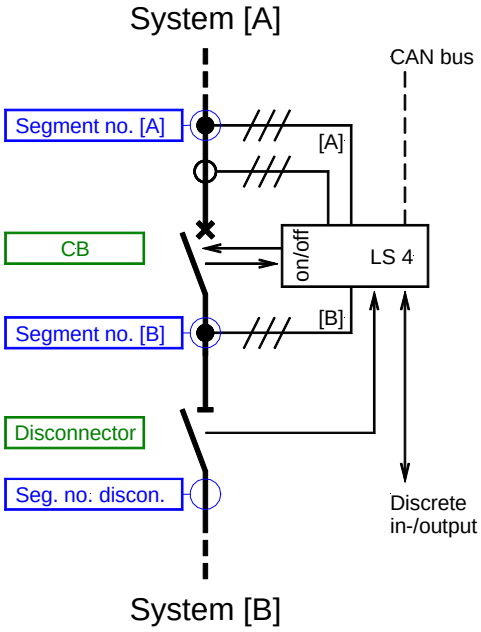
WIRING DIAGRAM





For more information contact:

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