WOODWARD

Product Specification
37522A

LS-5 Series

LS-511/521

Circuit Breaker Control & Protection

DESCRIPTION

The LS-5 Series are synchronizer controllers with integrated protective functions. They are designed to enable complex power management applications with multiple incoming mains and bus breakers in combination with easYgen-3400/3500 equipped genset controllers.

The LS-5 devices will manage synchronization, loading and un-loading on each bus segment and send the required voltage and frequency references via CAN bus to the easYgen-3400/3500 genset controllers. LS-5 devices which are located on the incoming mains breakers will automatically detect mains failures and start the corresponding gensets accordingly. Wiring efforts are reduced to a minimum, since only one CAN bus connection is required between all LS-5 and easYgen-3400/3500 controllers. It is not required to wire any AC measurement signals or discrete inputs/outputs between the LS-5 and easYgen-3400/3500 controllers.

Extensive remote control capabilities via discrete inputs or interfaces are provided to easily integrate the LS-5 into each application environment.

The LS-5 Series is available in two different housing versions. The LS-521 with a plastic housing and graphic LCD display is designed to be mounted on the cabinet's front door. The LS-511 with an aluminum powder coated housing without display is designed to be back panel DIN Rail mounted.

FEATURES

- Up to 16 LS-5 units can be operated in one network with up to 32 easYgen-3400/3500
- Phase match or slip frequency synchronization with voltage matching
- Full protection package (including df/dt (ROCOF), phase shift and mains voltage increasing protection according to new German grid code requirements in VDE-0126-1-1)
- Segment control for the load sharing
- Event Log with up to 300 entries
- Automatic date and time synchronization between the LS-5 units and the connected easYgen-3400/3500 controls
- LS-5 "Stand alone" mode without the easYgen-3400/3500 is possible
- Preconfigured application modes for the most common applications in the field (MCB or MCB/GGB application)
- Automatic and Manual mode
- Full remote control via CAN or RS-485 interface
- In case transformers are used in the application, vector group adjustment is available
- Breaker open/close failure detection
- Mains decoupling "Test" mode
- Multilingual capability
- Lock Keypad feature
- 8 Freely configurable LED`s are available on the LS-511 back panel mountable device

- **Designed as solution for complex power management applications**
- **Up to 16 LS-5 units can be utilized in one application**
- **Up to 32 bus segments are possible**
- **Synchronization and protection in one compact controller**
- **Adjustable vector groups for Synchronization**
- **Automatic mains failure detection**
- **Automatic and Manual mode**
- **LS-5 "Stand alone" mode for use without easYgen-3400/3500 System**
- **LogicsManager functionality**
- **CAN and RS-485 interfaces for remote control and visualization purposes**
- **True RMS sensing**
- **Available as cabinet front door mounted device or DIN-Rail back panel mounted metal housing**
- **Freely configurable relay outputs**
- **Freely configurable discrete inputs**
- **QV monitoring**
- **Time-dependent voltage monitoring**

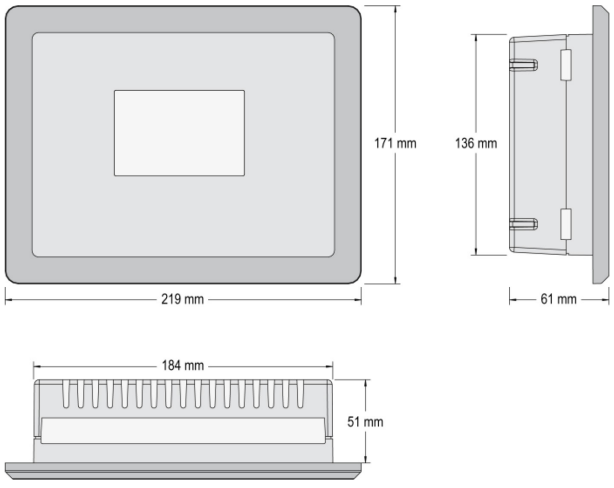
SPECIFICATIONS

Power supply ..... 12/24 Vdc (8 to 40 Vdc)
Intrinsic consumption ..... max.~ 5 W (LS-511)
..... max..~ 6 W (LS-521)
Ambient temperature (operation) ..... -20 to 70 °C / -4 to 158 °F
Ambient temperature (storage) ..... -30 to 85 °C / -22 to 185 °F
Ambient humidity ..... 95 %, non-condensing
Voltage ..... (⅄/Δ)
120 Vac [1] Rated (V_{rated}) ..... 69/120 Vac
Max. value (V_{max}) ..... 86/150 Vac
Rated voltage phase – ground ..... 150 Vac
Surge volt.(V_{surge}) ..... 2.5 kV
***and** 480 Vac [4]* Rated (V_{rated}) ..... 277/480 Vac
Max. value (V_{max}) ..... 346/600 Vac
Rated voltage phase – ground ..... 300 Vac
Surge volt.(V_{surge}) ..... 4.0 kV
Accuracy ..... Class 1
Linear measuring range ..... $1.25 \times V_{rated}$
Measuring frequency ..... 50/60 Hz (40 to 85 Hz)
High Impedance Input; Resistance per path ..... [1] 0.498 MΩ, [4] 2.0 MΩ
Max. power consumption per path ..... < 0.15 W
Current (Isolated) Rated (I_{rated}) ..... [1] ../1 A or [5] ../5 A
Linear measuring range ..... $I_{gen} = 1.5 \times I_{rated}$
Burden ..... < 0.15 VA
Rated short-time current (1 s) ..... [1] $50 \times I_{rated}$, [5] $10 \times I_{rated}$
Discrete inputs ..... isolated
Input range ..... 12/24 Vdc (8 to 40 Vdc)
Input resistance ..... approx. 20 kOhms

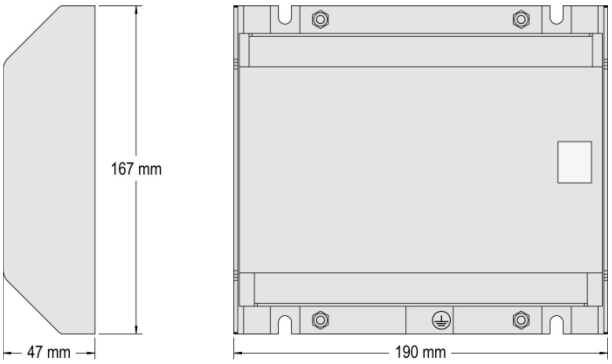
Relay outputs ..... potential free
Contact material ..... AgCdO
Load (GP) ..... 2.00 Aac@250 Vac
2.00 Adc@24 Vdc / 0.36 Adc@125 Vdc / 0.18 Adc@250 Vdc
Pilot duty (PD) .....
1.00 Adc@24 Vdc / 0.22 Adc@125 Vdc / 0.10 Adc@250 Vdc
Housing (LS-521) Front door mounting ..... Plastic housing
Dimensions WxHxD ..... 219 × 171 × 61 mm
Front cutout WxH ..... 186 [+1.1] × 138 [+1.0] mm
Connection ..... screw/plug terminals 2.5 mm²
Front ..... insulating surface
Sealing Front ..... IP65 (with screw fastening)
Front ..... IP54 (with clamp fastening)
Back IP20
Weight ..... approx. 850 g
Housing (LS-511) Back panel mounting ..... Sheet metal housing
Dimensions WxHxD ..... 190 × 167 × 47 mm
Connection ..... screw/plug terminals 2.5 mm²
Protection system ..... IP 20
Weight ..... approx. 840 g
Disturbance test (CE) ..... tested according to applicable EN guidelines
Listings ..... UL/cUL, GOST-R
Marine ..... LR (Type Approval), ABS (Design Assessment)

DIMENSIONS

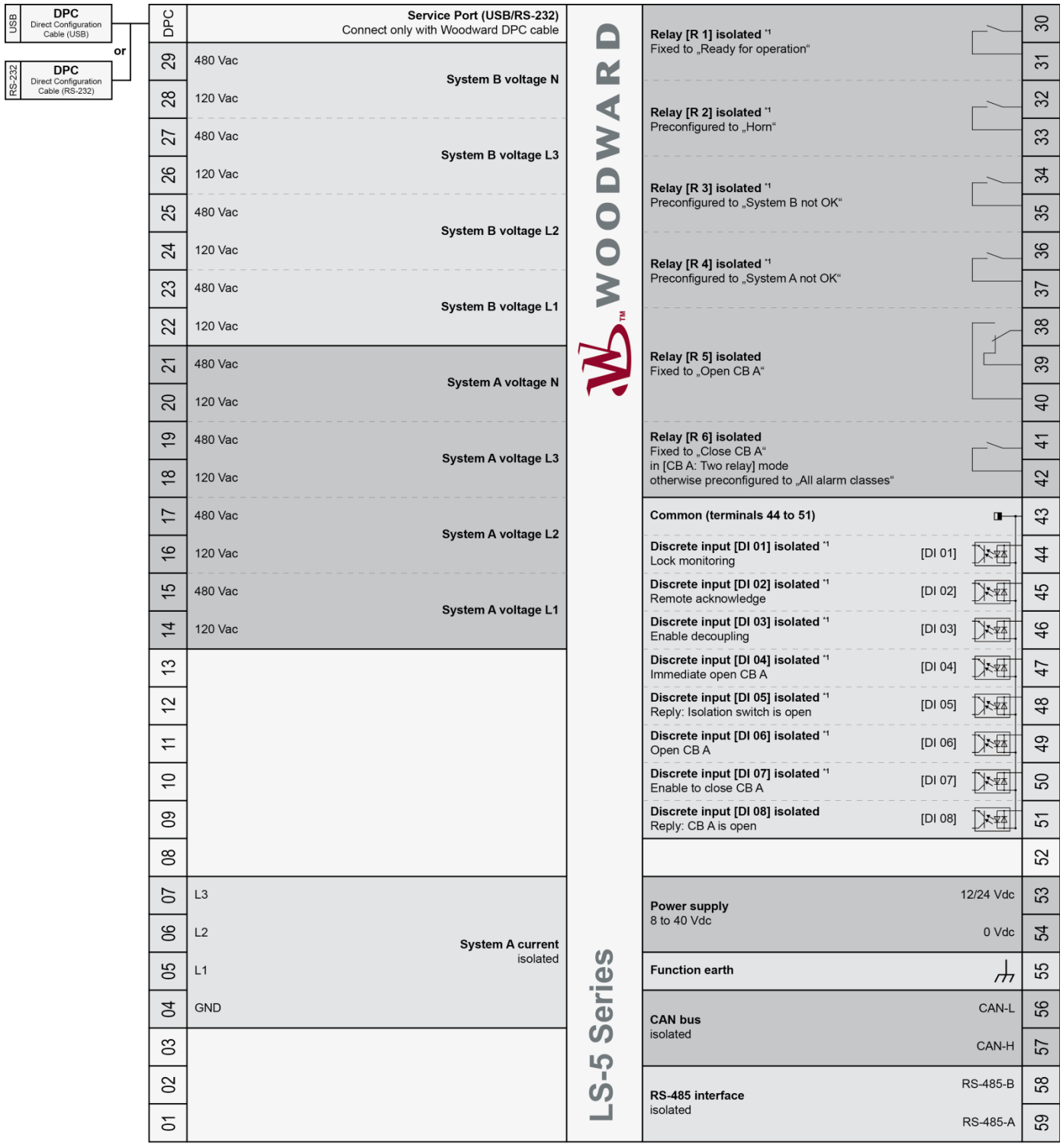
Plastic housing for front panel mounting



Metal housing for cabinet mounting



TERMINAL DIAGRAM



Subject to technical modifications.

*1 = configurable via LogicsManager

LS-5 Series Wiring Diagram | Rev. A

WOODWARD

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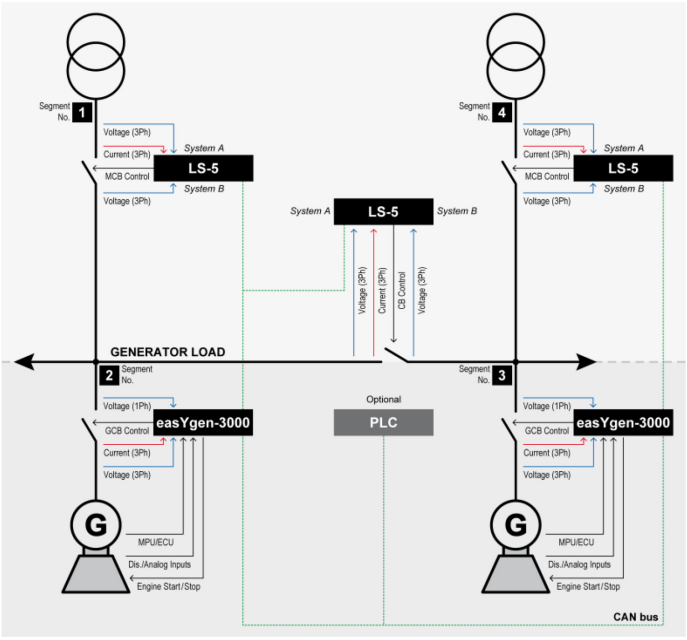
37522A - 2014/08/Stuttgart

EXAMPLE APPLICATION



FEATURES OVERVIEW

	LS-511	LS-521
I/Os		
Display	No	Yes
Configurable LEDs on Faceplate	Yes	No
System A/B voltage measurement	3-Phases + Neutral	3-Phases + Neutral
System A current measurement	3-Phase	3-Phase
Discrete inputs	8	8
Relay outputs	6	6
CAN Interface	1	1
RS-485 Interface	1	1
Control		
Automatic and Manual operating modes	✓	✓
Breaker synchronization (slip synchronization /phase matching)	✓	✓
Vector group adjustment for synchronization	✓	✓
Configurable dead bus closure direction	✓	✓
HMI		
Configuration via HMI and PC	✓	✓
Event recorder with real time clock (battery backup)	✓	✓
Date and Time Synchronization between LS-5 units and easYgen-3400/3500-P1	✓	✓
Protection		
Over-/undervoltage (59/27)	✓	✓
Over-/underfrequency (81O/U)	✓	✓
Voltage asymmetry (47)	✓	✓
Phase shift (78)	✓	✓
df/dt (ROCOF) (81)	✓	✓
QV monitoring	✓	✓
Time-dependent voltage	✓	✓
Mains voltage increase (accord. to VDE-AR-N-4105)	✓	✓
Monitoring		
Breaker open/close monitoring	✓	✓
Synchronization time out monitoring	✓	✓
Counter		
Circuit breaker closure counter	✓	✓
Listings/Approvals		
UL / cUL / GOST-R / LR & ABS Marine	✓	✓
CE Marked	✓	✓
Part Numbers		
LS-511 (1A / 5A)	8440-1951 / 8440-1946	---
LS-521 (1A / 5A)	---	8440-1952 / 8440-1947
DIN-Rail mounting Kit for LS-511	8923-1746	---
DPC-RS-232 direct configuration cable	5417-557	
DPC-USB direct configuration cable	5417-1251	