



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.
- Features "Mains voltage increase" monitoring according to new German grid code requirements in VDE-0126-1-1
- 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 backpanel mounted metal housing
- Freely configurable relay outputs
- Freely configurable discrete inputs

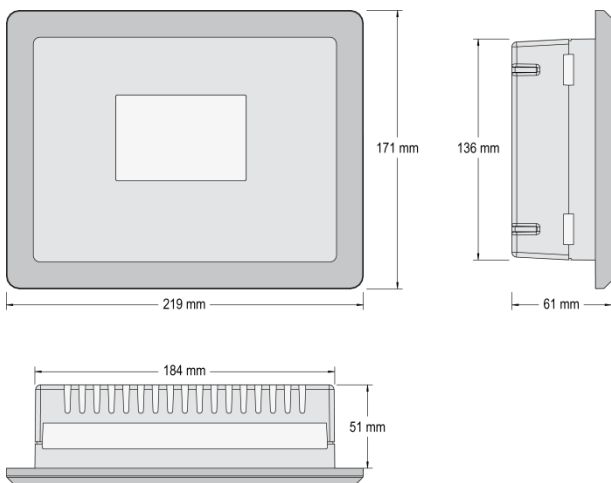
SPECIFICATIONS

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 / Δ)
 120 Vac [1] Rated (V_{rated}).....69/120 Vac
 Max. value (V_{max}).....86/150 Vac
 Rated voltage phase – ground150 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 – ground300 Vac
 Surge volt. (V_{surge}).....4.0 kV
 AccuracyClass 1
 Linear measuring range1.25 $\times V_{rated}$
 Measuring frequency.....50/60 Hz (40 to 85 Hz)
 High Impedance Input; Resistance per path.....[1] 0.498 M Ω , [4] 2.0 M Ω
 Max. power consumption per path.....< 0.15 W
Current (Isolated) Rated (I_{rated}).....[1] ..1 A or [5] ..1/5 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 inputsisolated
 Input range12/24 Vdc (8 to 40 Vdc)
 Input resistance..... approx. 20 kOhms

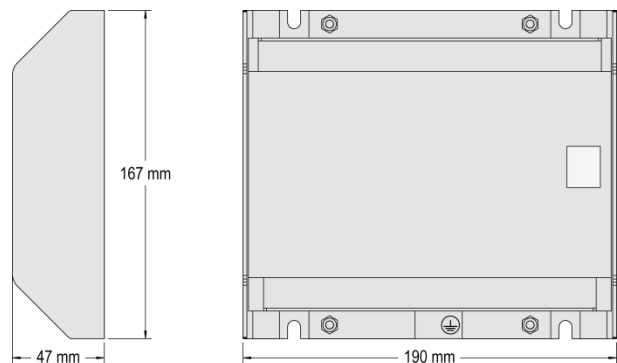
Relay outputspotential free
 Contact material.....AgCdO
 Load (GP)2.00 Aac@250 Vac
 2.00 Adc@24 Vdc / 0.36 Adc@125 Vdc / 0.18 Adc@250 Vdc
 Pilot duty (PD).....
 1.00 Adc@24 Vdc / 0.22 Adc@125 Vdc / 0.10 Adc@250 Vdc
Housing (LS-521) Front door mounting..... Plastic housing
 Dimensions WxHxD219 x 171 x 61 mm
 Front cutout WxH186 [+1.1] x 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)
 BackIP20
 Weight.....approx. 850 g
Housing (LS-511) Back panel mounting..... Sheet metal housing
 Dimensions WxHxD190 x 167 x 47 mm
 Connection.....screw/plug terminals 2.5 mm²
 Protection systemIP 20
 Weight.....approx. 840 g
Disturbance test (CE)tested according to applicable EN guidelines
ListingsUL/cUL, GOST-R
Marine Approvals.....LR (Type Approval)

DIMENSIONS

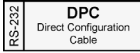

















Plastic housing for front panel mounting



Metal housing for cabinet mounting



TERMINAL DIAGRAM

		Service Port (RS-232) Connect only with Woodward DPC cable		 LS-5 Series	Relay [R 1] isolated *1 Fixed to „Ready for operation“		30
29	480 Vac	System B voltage N			Relay [R 2] isolated *1 Preconfigured to „Horn“		31
28	120 Vac				Relay [R 3] isolated *1 Preconfigured to „System B not OK“		32
27	480 Vac	System B voltage L3			Relay [R 4] isolated *1 Preconfigured to „System A not OK“		33
26	120 Vac				Relay [R 5] isolated Fixed to „Open CB A“		34
25	480 Vac	System B voltage L2			Relay [R 6] isolated Fixed to „Close CB A“ in [CB A: Two relay] mode otherwise preconfigured to „All alarm classes“		35
24	120 Vac				Common (terminals 44 to 51)		36
23	480 Vac	System B voltage L1			Discrete input [DI 01] isolated *1 Lock monitoring		37
22	120 Vac				Discrete input [DI 02] isolated *1 Remote acknowledge		38
21	480 Vac	System A voltage N			Discrete input [DI 03] isolated *1 Enable decoupling		39
20	120 Vac				Discrete input [DI 04] isolated *1 Immediate open CB A		40
19	480 Vac	System A voltage L3			Discrete input [DI 05] isolated *1 Reply: Isolation switch is open		41
18	120 Vac				Discrete input [DI 06] isolated *1 Open CB A		42
17	480 Vac	System A voltage L2			Discrete input [DI 07] isolated *1 Enable to close CB A		43
16	120 Vac				Discrete input [DI 08] isolated Reply: CB A is open		44
15	480 Vac	System A voltage L1			Power supply 8 to 40 Vdc	12/24 Vdc	45
14	120 Vac				Function earth		0 Vdc
13		System A current isolated			CAN bus isolated CAN-L		55
12					CAN bus isolated CAN-H		56
11					RS-485 interface isolated RS-485-B		57
10					RS-485 interface isolated RS-485-A		58
09							59
08							
07	L3						
06	L2						
05	L1						
04	GND						
03							
02							
01							

Subject to technical modifications.

*1 = configurable via LogicsManager

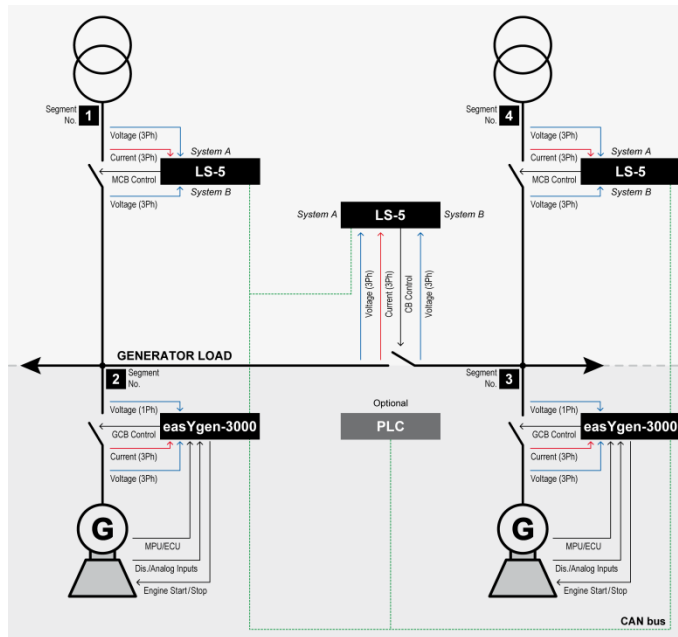
LS-5 Series Wiring Diagram | Rev. NEW

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EXAMPLE APPLICATION



FEATURES OVERVIEW

www.woodward.com/power

For more information contact:

Subject to technical modifications.

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	LS-511	LS-521
I/Os		
Display	No	Yes
Configurable LEDs on Faceplate	Yes	No
System A voltage measurement	3-Phases + Neutral	3-Phases + Neutral
System 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
DPC Interface	1	1
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)	✓	✓
Mains voltage increase (According to VDE-0126-1-1)	✓	✓
Monitoring		
Breaker open/close monitoring	✓	✓
Synchronization time out monitoring	✓	✓
Counter		
Circuit breaker closure counter	✓	✓
Listings/Approvals		
UL / cUL / GOST-R / LR 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 Cable		5417-557
USB-UART Serial Converter		5417-1251