



LS-5 Series V2

LS-511/521 1breaker

Circuit Breaker Control & Protection

New Features

- ✓ Two breaker control variants
- ✓ Separate incoming and outgoing current inputs per phase
- ✓ German grid code compliance (VDE AR-N 4105 & BDEW)
- ✓ Enhanced diagnostics and visualization

DESCRIPTION

Woodward's LS-5 Series relays are synchronizer controllers with integrated mains decoupling and protection features. The applications range from independent synch check relay to complex power management with multiple utility feeds, bus tie-breakers and group breakers in combination with Woodward's easYgen-3400XT/3500XT equipped genset controllers. Wiring efforts are reduced to a minimum, since only one CAN bus connection is required between all LS-5 and easYgen controllers to transmit AC measurement signals, I/O states, flags, etc.

The LS-5x1 devices manage synchronization, loading and un-loading on each bus segment and send the required voltage, frequency and phase angle references via CAN bus to the easYgen-3400XT/3500XT genset controllers. When serving an incoming mains breaker it automatically detects mains failure, performs mains decoupling and sends the start signal to the easYgen. The LS-5x1 is software selectable to be applied as an independent synch check relay, mains circuit breaker control or bus tie-breaker control thereby providing exceptional versatility and value for OEM switchgear builders, generator packagers, and system integrators.

The LS-5x1 Series is available in two different mounting styles. An LS-521 with a plastic housing and graphic LCD display is designed to be mounted on the cabinet's front door. An LS-511 with an aluminum powder coated housing without display is designed to be back panel mounted.

FEATURES

- Up to 16 LS-5 units can be operated in one network with up to 32 easYgen-3400XT/3500XT
- 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)
- 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-3400XT/3500XT controls
- LS-5 "Stand alone" mode without the easYgen-3400XT/3500XT is possible
- Preconfigured application modes that simplify the configuration process for complex multi-breaker applications
- AUTOMATIC and MANUAL mode
- Full remote control via CAN or RS-485 interface
- Vector group adjustment in case transformers are used in the application
- Breaker open/close failure detection
- Mains decoupling "Test" mode
- Lock keypad feature
- 4 freely configurable alarms
- 8 Freely configurable LED's on the LS-511 back panel mountable device
- Multi-lingual capability: English, German, Spanish, French, Italian, Portuguese, Japanese, Chinese, Russian, Turkish, Polish
- Designed as a compact 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
- Synch check and mains decoupling in one compact controller
- Adjustable vector groups for synchronization
- Utility import/export control
- Automatic and Manual mode
- LS-5 "Stand alone" mode for use without easYgen-3400XT/3500XT System
- LogicsManager functionality for application customization
- 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
- RoHS2, BDEW and VDE AR-N 4105 compliant

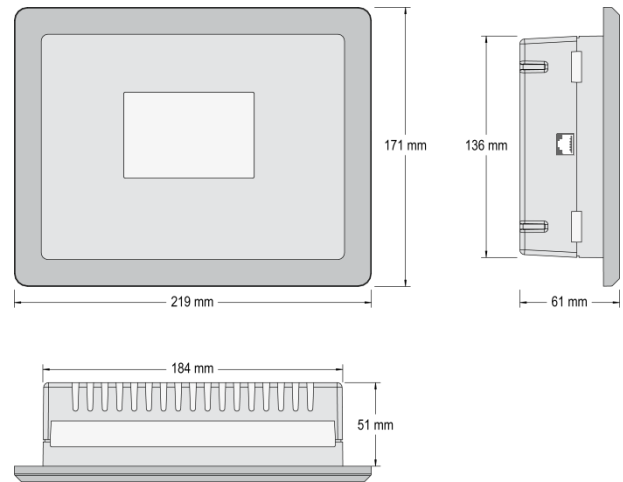
SPECIFICATIONS

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 80 °C / -22 to 176 °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 – 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
Accuracy	Class 1
Linear measuring range	$1.25 \times V_{rated}$
Measuring frequency	50/60 Hz (30 to 85 Hz)
High Impedance Input; Resistance per path	[1] 0.498 M Ω , [4] 2.0 M Ω
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 inputs	isolated
Input range	12/24 Vdc (8 to 40 Vdc)
Input resistance	approx. 20 kOhms

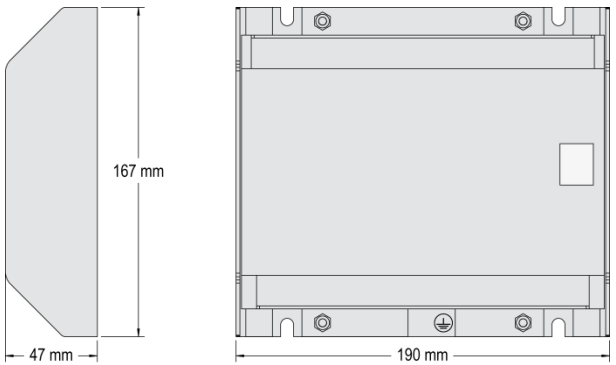
Relay outputs	potential free
Contact material	AgCdO
Load (GP)	AC: 2.00 Aac@250 Vac
	DC: 2.00 Adc@24 Vdc / 0.36 Adc@125 Vdc / 0.18 Adc@250 Vdc
Pilot duty (PD)	AC: B300
	DC: 1.00 Adc@24 Vdc / 0.22 Adc@125 Vdc / 0.10 Adc@250 Vdc
Housing (LS-521)	Front door mounting..... Plastic housing
Dimensions	WxHxD..... 219 x 171 x 61 mm
Front cutout	WxH..... 186 [+1.1] x 138 [+1.0] mm
Connection	screw/plug terminals 2.5 mm ²
Front	insulating surface
Sealing	Front..... IP66 (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 x 167 x 47 mm
Connection	screw/plug terminals 2.5 mm ²
Protection system	IP 20
Weight (plastic/sheet metal)	approx. 850/840 g
Disturbance test (CE)	tested according to applicable EN guidelines
Listings	CE, UL/cUL, BDEW, VDE AR-N 4105, EAC
Marine	Pending: LR, ABS

DIMENSIONS

Plastic housing for front panel mounting

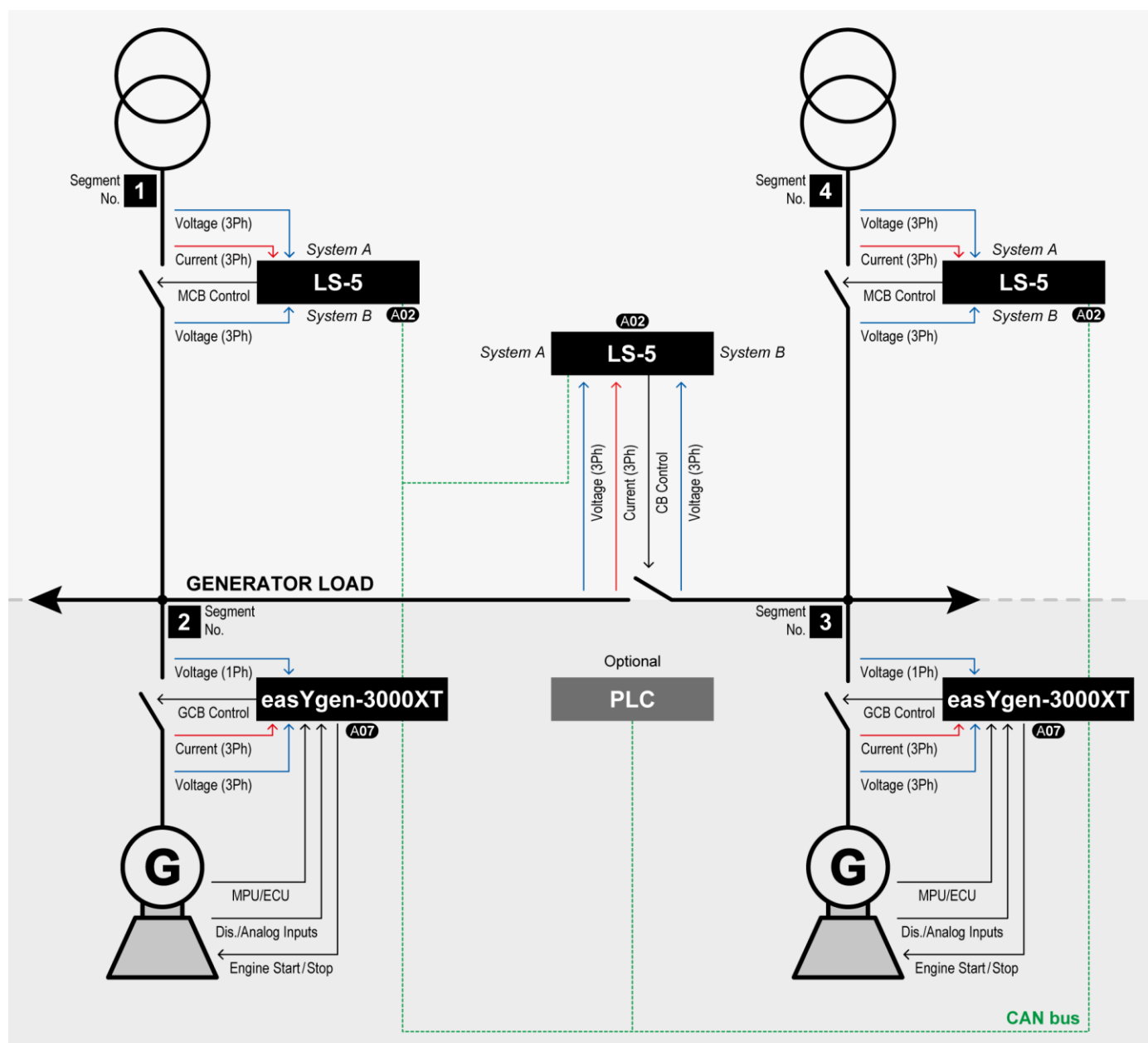


Metal housing for cabinet mounting



42	41	40	39	38	37	36	35	34	33	32	31	30
R06		R05			R04		R03		R02		R01	
RELAY OUTPUTS												

NO CONNECTION				SYSTEM A VOLTAGE								SYSTEM B VOLTAGE							
				L1 120 Vac 480 Vac		L2 120 Vac 480 Vac		L3 120 Vac 480 Vac		N 120 Vac 480 Vac		L1 120 Vac 480 Vac		L2 120 Vac 480 Vac		L3 120 Vac 480 Vac		N 120 Vac 480 Vac	
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29



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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 frequency/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-3400XT/3500XT	✓	✓
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	✓	✓
Voltage plausibility	✓	✓
Freely configurable alarms	4	4
Counter		
Circuit breaker closure counter	✓	✓
Energy counters	✓	✓
Listings/Approvals		
UL / cUL / EAC / CE Marked	✓	✓
Pending: LR & ABS Marine	✓	✓
Part Numbers	Metal housing	Plastic housing with display
LS-511 (1A / 5A)	8440-2180 / 8440-2152	---
LS-521 (1A / 5A)	---	8440-2178 / 8440-2150
DIN-Rail mounting Kit for LS-511	8923-1746	---
DPC-RS-232 direct configuration cable	5417-557	
DPC-USB direct configuration cable	5417-1251	
Spare parts: Plug set containing all terminal plugs	8928-7544	8928-7545

RELATED PRODUCTS

- Two breakers control **LS-512/522** (Product Specification # 37665)
- **easYgen-3400XT/3500XT** (Product Specification # 37583)
- **ToolKit** (Product Specification # 03366)
- **Power Generation Learning Module** (Product Specification # 03412): P/N 8447-1012
- Profibus Gateway **ESEPRO** (Application Note # 37577): P/N 8445-1046
- Ethernet (Modbus/TCP) Gateway **ESENET** (Application Note # 37576): P/N 8445-1044
- CANbus to Fiber Optic Converters (Application Note # 37598):
DL-CAN P/N 8445-1049 and **DL-CAN-R** P/N 8445-1048
- Remote Access Gateway (with HMS **Netbiter** EasyConnect **EC250** and **EC350**)

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