

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Reference package for procurement and maintenance review

WOODWARD

8440-2050

EASYGEN-3200-5/P1 GENSET CONTROL

Used with the applicable easyGen-3000 Series system configuration.

REFERENCE PACKAGE

OFFICIAL DOCUMENT

Selected official pages follow this cover with source pagination retained.

Woodward Product Specification 37258 and Technical Manual 37532G



easYgen-3100/3200

Genset Control for Multiple Unit Operation

DESCRIPTION

The easYgen-3000 Series are control units for genset applications. The numerous inputs and outputs, along with a modular software structure, permit you to use the easYgen-3000 Series for a wide range of applications. This includes stand-by, AMF, peak shaving, import-export, cogeneration or distributed generation, among others. Also the easYgen-3000 Series is compatible for isolated, island parallel, mains parallel and multiple unit mains parallel operations. The easYgen-3000 Series is able to control up to 32 gensets connected in a network with automatic sequencing.

The easYgen-3000 Series is available for simple paralleling as well as for complex paralleling applications. Choose easYgen-3200 should you want to take your fleet of gen-sets parallel to grid or choose easYgen-3500 with LS-5 for multi grid, multi segment applications. These controllers are also available without display, in a rugged metal housing suitable for back panel installation. A remote panel (RP-3000) can be used for visualization/control purpose in this case.

FlexApp™ – This feature provides the tools to easily configure the number of operated breakers: None, GCB, GCB and MCB.

LogicsManager™ – Woodward's LogicsManager enables to change the operation sequences and adapt them to specific needs. The LogicsManager accomplishes this by monitoring a range of measuring values and internal states, which are combined logically with Boolean operators and programmable timers. This enables to create and/or modify control and relay functions.

FlexIn™ – The analog inputs are configurable to operate with VDO, resistive, and/or 0 to 20 mA senders.

Flexible Outputs – Speed and voltage bias outputs are configurable to function with all speed governors and voltage regulators. The outputs can also be used as freely scalable outputs (e.g. for driving external meters).

FlexCAN™ – Advanced network interfaces ensure unsurpassed control performance – from engine control up to total plant operation. The easYgen-3000 Series is capable of working with common industrial interfaces, including CAN, RS-232, and RS-485. The multiple communication protocols permit the easYgen-3000 Series to communicate with a vast majority of engine control units (ECUs), external I/O boards, PLCs, and modems. CANopen, J1939, Modbus RTU, and Modem protocols are supported.

DynamicsLCD™ – The adaptive and interactive 5.7", 320x240 pixel color graphical LC display with soft keys and a clear menu structure ensures intuitive user operation and navigation.

FEATURES

- Operation modes: Auto, Stop, Manual, and Load/No Load test modes via discrete input possible
- Breaker control: Slip frequency / phase matching synchronization, open-close control, breaker monitoring
- Load transfer features: open / closed transition, interchange, soft loading / soft unloading, mains parallel
- Remote control via interface and discrete/analog inputs for adjusting speed, frequency, voltage, power, reactive power, and power factor set points
- Freely configurable PID controllers for various control purposes, such as heating circuit control (CHP applications), water level, fuel level, or pressure and/or other process values
- Supported ECU: Scania S6, MTU ADEC ECU7/8, Volvo EMS2 & EDC4, Deutz EMR2 & EMR3, MAN MFR/EDC7, SISU EEM, Cummins and Woodward EGS02 ECU
- Discrete and analog I/O expansion board connectivity (Woodward IKD 1 or Phoenix Contact IL series)
- Multi-lingual capability: English, German, Spanish, French, Italian, Portuguese, Japanese, Chinese, Russian, Turkish, Polish, Slovakian, Finnish, Swedish
- Configurable voltage/frequency control allows manual control of breakers
- Neutral interlocking determines and controls one common neutral in a network of generators
- Cylinder temperature monitoring for in-line and V engines
- Reactive power regulation at the grid interchange point (kvar or PF)

- Master or Slave control capability
- Peak shaving operation
- Stand-by operation
- AMF operation
- Cogeneration (CHP)
- Islanded & mains parallel operation
- Load sharing and load-dependent start/stop for up to 32 units
- Import/export control
- Open/closed transition
- CANopen / J1939 ECU Control
- Free configurable alarms and texts
- Fast configuration by partial setting files
- Dynamic mains stabilization (as per BDEW)
- Adjustable vector groups for synchronization

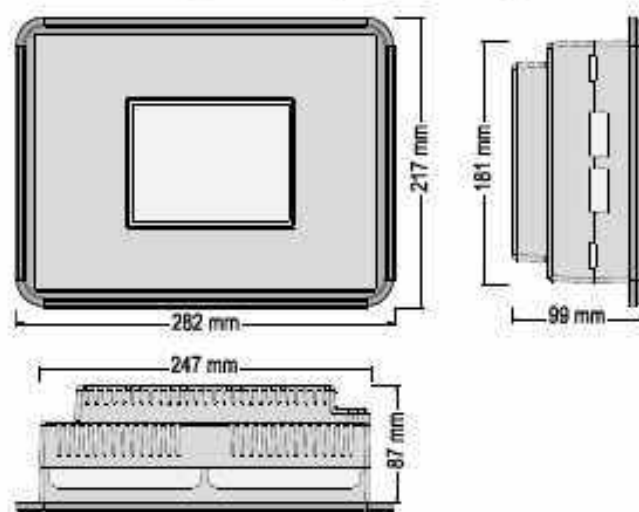
SPECIFICATIONS

Power supply	12/24 V _{DC} (8 to 40 V _{DC})
Intrinsic consumption	max. 17 W
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/Δ)
100 Vac [1]	Rated (V _{rated}) 69/120 V _{AC}
	Max. value (V _{max}) 86/150 V _{AC}
	Rated surge volt. (V _{surge}) 2.5 kV
and 400 Vac [4]	Rated (V _{rated}) 277/480 V _{AC}
	Max. value (V _{max}) 346/600 V _{AC}
	Rated surge volt. (V _{surge}) 4.0 kV
Accuracy	Class 1
Measurable alternator windings	3p-3w, 3p-4w, 3p-4w OD, 1p-2w, 1p-3w
Setting range	primary 50 to 650,000 V _{AC}
Linear measuring range	1.25×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} = 3.0×I _{rated}
	I _{meas/ground} = 1.5×I _{rated}
Setting range	1 to 32,000 A
Burden	< 0.15 VA
Rated short-time current (1 s)	[1] 50×I _{rated} , [5] 10×I _{rated}
Power	
Setting range	0.5 to 99,999.9 kW/kvar
Discrete inputs	isolated
Input range	12/24 V _{DC} (8 to 40 V _{DC})
Input resistance	approx. 20 k Ω ms

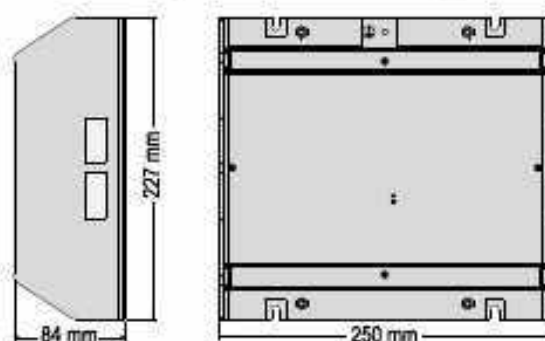
Relay outputs	isolated
Contact material	AgCdO
Load (GP)	2.00 A _{AC} @250 V _{AC}
	2.00 A _{DC} @24 V _{DC} / 0.36 A _{DC} @125 V _{DC} / 0.18 A _{DC} @250 V _{DC}
Pilot duty (PD)	1.00 A _{DC} @24 V _{DC} / 0.22 A _{DC} @125 V _{DC} / 0.10 A _{DC} @250 V _{DC}
Analog inputs (none isolated)	freely scalable
Type	0 to 500 Ohms / 0 to 20 mA
Resolution	11 Bit
Analog outputs (isolated)	freely scalable
Type	± 10 V / ± 20 mA / PWM
Insulation voltage (continuously)	100 V _{AC}
Insulation test voltage (1s)	500 V _{AC}
Resolution	11/12 Bit (depending on analog output)
± 10 V (scalable)	internal resistance ≤ 1 k Ω ms
± 20 mA (scalable)	maximum load 500 Ohms
Housing	Front panel flush mounting Plastic housing
Dimensions WxHxD	282 × 217 × 99 mm
Front cutout WxH	249 [+1.1] × 183 [+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. 1,850 g
Housing	Switch cabinet back mounting Sheet metal housing
Dimensions WxHxD	250 × 227 × 84 mm
Connection	screw/plug terminals 2.5 mm ²
Protection system	IP 20
Weight	approx. 2,150 g
Disturbance test (CE)	tested according to applicable EN guidelines
Listings	UL, cUL, CSA
Marine	LR (Type Approval), ABS (Design Assessment)

DIMENSIONS

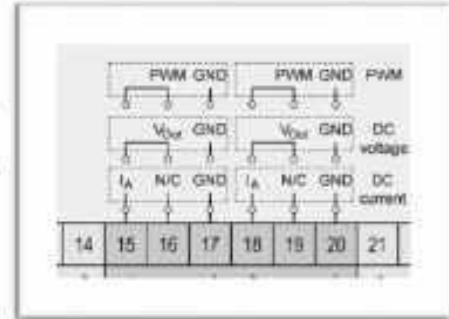
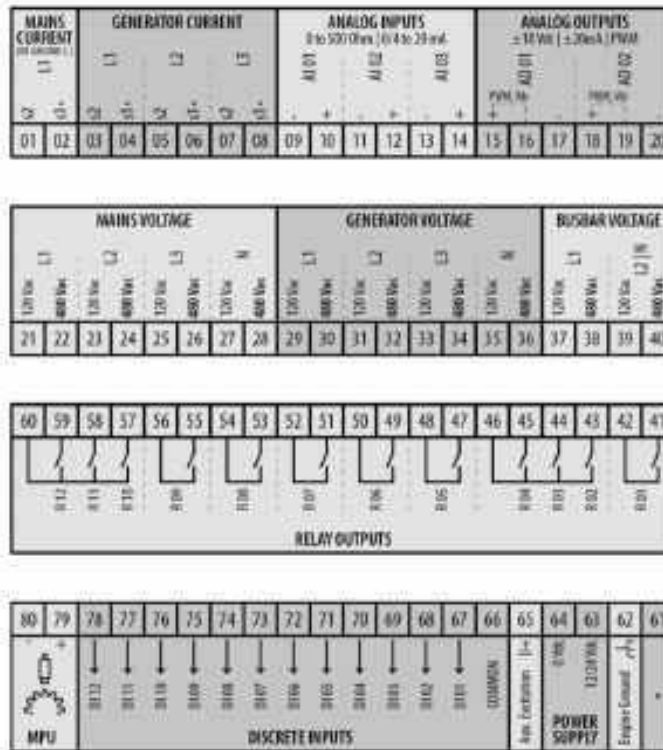
Plastic housing for front panel mounting



Metal housing for cabinet mounting



TERMINAL DIAGRAM



* pin 61
 easYgen-3100: No connection
 easYgen-3200: Protective earth

RELATED PRODUCTS

- Engine Speed Control **actiVgen** (Product Specification # 03419): P/N 8440-2108
- Remote Panel **RP-3000** (Product Specification # 37446)
- **ToolKit** (Product Specification # 03366)
- I/O Expansion Board **IKD1** (Product Specification # 37171)
- Load Share Gateway **LSG** (Product Specification # 37451)
- Electronic Pickup Unit **EPU-100** (Product Specification # 37562)
- CANbus based Remote Annunciator (Product Specification # 37279): **easYlite 100** P/N 8446-1023
- **Power Generation Learning Module** (Product Specification # 03412): P/N 8447-1012
- Profibus Gateway (Application Note # 37577): **ESEPRO** P/N 8445-1046
- Ethernet (Modbus/TCP) Gateway (Application Note # 37576): **ESENET** 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**)
- Analog Expansion Card (**PHOENIX CONTACT** Inline terminal **IB IL**)
- Thermocouple Scanner (**AXIOMATIC** **AXTC20**)

CONTACT

North & Central America

Tel.: +1 970 962 7331

✉ SalesPGD_NAandCA@woodward.com

South America

Tel.: +55 19 3708 4800

✉ SalesPGD_SA@woodward.com

Europe

Tel. Stuttgart: +49 711 78954 510

Tel. Kempen: +49 2152 145 331

✉ SalesPGD_EUROPE@woodward.com

Middle East & Africa

Tel.: +971 2 6275185

✉ SalesPGD_MEA@woodward.com

Russia

Tel.: +7 812 319 3007

✉ SalesPGD_RUSSIA@woodward.com

China

Tel.: +86 512 8818 5515

✉ SalesPGD_CHINA@woodward.com

India

Tel.: +91 124 4399 500

✉ SalesPGD_INDIA@woodward.com

ASEAN & Oceania

Tel.: +49 711 78954 510

✉ SalesPGD_ASEAN@woodward.com

www.woodward.com

Subject to alterations, errors excepted.

Subject to technical modifications.

This document is distributed for informational purposes only. It is not to be construed as creating or becoming part of any Woodward Company contractual or warranty obligation unless expressly stated in a written sales contract.

We appreciate your comments about the content of our publications. Please send comments including the document number below to stpl-doo@woodward.com

© Woodward

All Rights Reserved

For more information contact:

FEATURES OVERVIEW

EASY GEN 3000	Model Package	easYgen-3000 Series			
		3100		3200	
		P1	P2	P1	P2
Measuring					
Generator voltage (3-phase/4-wire)		✓	✓	✓	✓
Generator current (3x true r.m.s.)		✓	✓	✓	✓
Mains voltage (3-phase/4-wire)		✓	✓	✓	✓
Mains or ground current (1x true r.m.s.; mains or ground current selectable)		✓	✓	✓	✓
Busbar voltage (1-phase/2-wire)		✓	✓	✓	✓
Control					
Breaker control logic (open and closed transition)	FlexApp™	2	2	2	2
Automatic, Manual, Stop, and test operating modes		✓	✓	✓	✓
Single and multiple-unit operation		✓	✓	✓	✓
Mains parallel multiple-unit operation (up to 32 units)		✓	✓ #2	✓	✓ #2
AMF (auto mains failure) and stand-by operation		✓	✓	✓	✓
Critical mode operation		✓	✓	✓	✓
GCB and MCB synchronization (slipping / phase matching)		✓	✓	✓	✓
Import / export control (kW and kvar)		✓	✓	✓	✓
Load-dependent start/stop		✓	✓	✓	✓
r/f, V, P, Q, and PF remote control via analog input or interface		✓	✓	✓	✓
Load/var sharing for up to 32 gensets		✓	✓	✓	✓
Freely configurable PID controllers		-	3	-	3
HMI					
Color Display with Softkey operation	DynamicsLCD™	-	-	✓	✓
Start/stop logic for diesel / gas engines		✓	✓	✓	✓
Counters for operating hours / starts / maintenance / active/reactive energy		✓	✓	✓	✓
Configuration via PC (serial connection and ToolKit software (included))		✓	✓	✓	✓
Event recorder entries with real time clock (battery backup)		300	300	300	300
Protection					
	ANSI#				
Generator: voltage / frequency	59 / 27 / 81O / 81U	✓	✓	✓	✓
Generator: overload, reverse/reduced power	32 / 32R / 32F	✓	✓	✓	✓
Generator: unbalanced load	46	✓	✓	✓	✓
Generator: instantaneous overcurrent	50	✓	✓	✓	✓
Generator: time-overcurrent (IEC 255 compliant)	51 / 51 V	✓	✓	✓	✓
Generator: ground fault (measured ground current)	50G	✓	✓	✓	✓
Generator: power factor	55	✓	✓	✓	✓
Generator: rotation field		✓	✓	✓	✓
Engine: overspeed / underspeed	12 / 14	✓	✓	✓	✓
Engine: speed / frequency mismatch		✓	✓	✓	✓
Engine: D+ auxiliary excitation failure		✓	✓	✓	✓
Engine: Cylinder temperature		-	✓	-	✓
Mains: voltage / frequency	59 / 27 / 81O / 81U	✓	✓	✓	✓
Mains: phase shift / rotation field / ROCOF (d/dt)	78	✓	✓	✓	✓
I/Os					
Speed input: magnetic / switching; Pickup		✓	✓	✓	✓
Discrete alarm inputs (configurable)		12 (10)	12 (10)	12 (10)	12 (10)
Discrete outputs, configurable	LogicsManager™	max. 12	max. 12	max. 12	max. 12
External discrete inputs / outputs via CANopen		16 / 16	32 / 32	16 / 16	32 / 32
Analog inputs #1, configurable	FlexIn™	3	3	3	3
Analog outputs: +/- 10V, +/- 20mA, PWM; configurable		2	2	2	2
External analog inputs / outputs via CANopen		-	16 / 4	-	16 / 4
Display and evaluation of J1939 analog values, "supported SPNs"		100	100	100	100
CAN bus communication interfaces #2	FlexCAN™	2	2	2	2
RS-232/485 Modbus RTU Slave interface(s)		1 / 1	1 / 1	1 / 1	1 / 1
Listings/Approvals					
UL / cUL Listing		✓	✓	✓	✓
CSA		✓	✓	✓	✓
LR & ABS Marine		✓	✓	✓	✓
BDEW / VDE-AR-N 4105		✓	✓	✓	✓
CE Marked		✓	✓	✓	✓
Part Numbers					
1A CT inputs / front panel mounting with display #3		-	-	8440-2049	8440-2051
5A CT inputs / front panel mounting with display #3		-	-	8440-2050	8440-2052
1A CT inputs / cabinet back mounting w/o display		8440-2055	8440-2057	-	-
5A CT inputs / cabinet back mounting w/o display		8440-2054	8440-2056	-	-
Spare connector kit		8923-1314	8923-1314	8923-1314	8923-1314

#1 - selectable sensors: VDO (0 to 180 Ohm, 0 to 5 bar), VDO (0 to 180 Ohm, 0 to 10 bar), VDO (0 to 380 Ohm, 40 to 120°C), VDO (0 to 380 Ohm, 50 to 150°C), Pt100, Pt1000, resistive input (one- or two-pole, 2pt. linear or 3pt. user defined)

#2 - freely selectable during configuration between CANopen or J1939; please feel free to request more information

#3 - a screw and a clamp kit are delivered with the unit for fastening



easYgen-3000 Series

Manual | Genset Control



easYgen-3100/3200 P1/P2

Software Version 1.211 or higher

37532G

3 Installation

3.1 Mount Unit (Sheet Metal Housing)

Dimensions

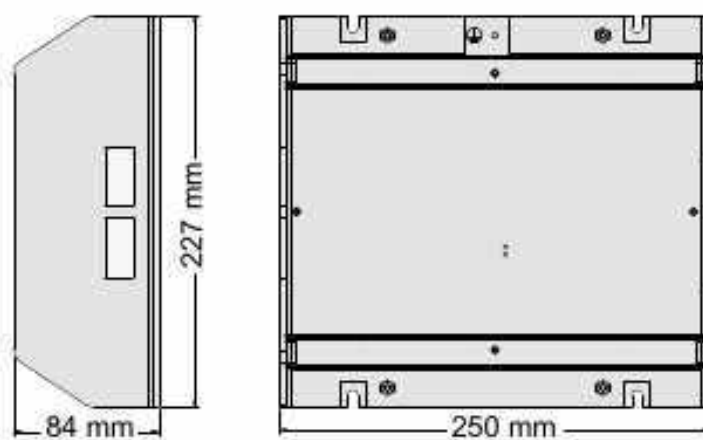


Fig. 7: Sheet metal housing - dimensions

Installation

Mount Unit (Sheet Metal Housing)

Mounting into a cabinet

Special tool: ■ Torque screwdriver

Proceed as follows to install the unit using the screw kit:

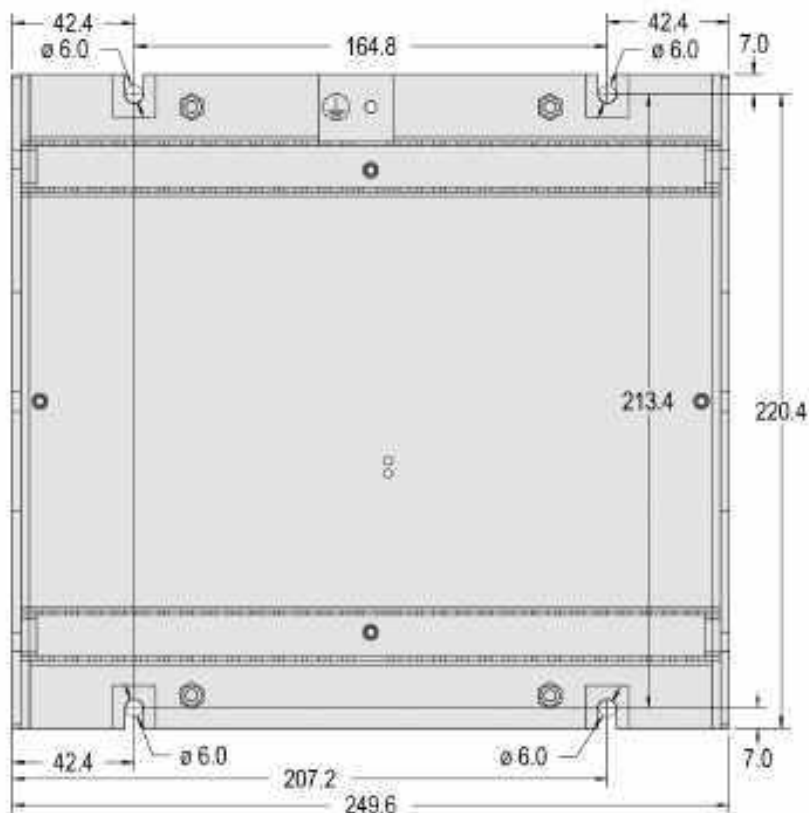


Fig. 8: Sheet metal housing - drill plan

1. Drill the holes according to the dimensions in Fig. 8 (dimensions shown in mm).



Ensure sufficient clearance for access to the terminals (top and bottom) and connectors located at the sides.

2. Mount the unit to the back panel and insert the screws.
3. Tighten the screws to a torque according to the quality class of the used screws.



Tighten the screws with a crosswise pattern to ensure even pressure distribution.



If the thickness of the panel sheet exceeds 2.5 mm, be sure to use screws with a length exceeding the panel sheet thickness by 4 mm.

3.2 Mount Unit (Plastic Housing)

Mount the unit **either** using the clamp fasteners (↗ Chapter 3.2.1 "Clamp Fastener Installation" on page 40) **or** the screw kit (↗ Chapter 3.2.2 "Screw Kit Installation" on page 41).



- Don't drill holes if you want to use the clamp fasteners. If the holes are drilled into the panel, the clamp fasteners cannot be used anymore.
- In order to enhance the protection to IP 66, fasten the unit with the screw kit instead of the clamp fastener hardware.

Dimensions

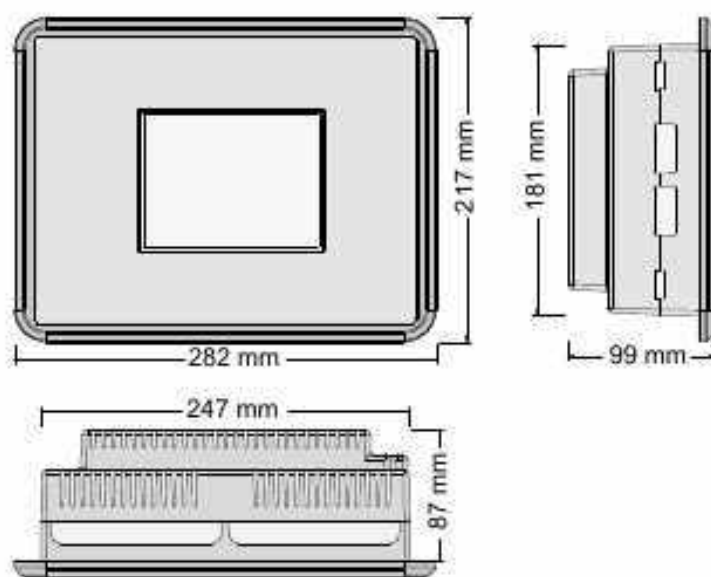


Fig. 9: Plastic housing - dimensions

Panel cutout

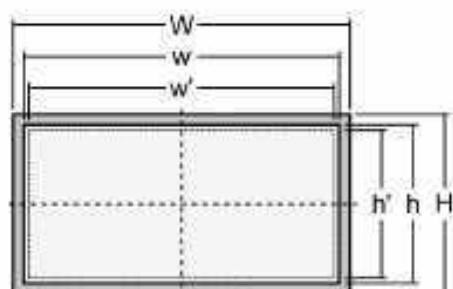


Fig. 10: Cutout schematic

Measure	Description			Tolerance
H	Height	Total	217 mm	---
		Panel cutout	183 mm	+ 1.0 mm
		Housing dimension	181 mm	
W	Width	Total	282 mm	---
		Panel cutout	249 mm	+ 1.1 mm
		Housing dimension	247 mm	
	Depth	Total	99 mm	---

Installation

Mount Unit (Plastic Housing) > Clamp Fastener Installation



The maximum permissible corner radius is 4 mm.

3.2.1 Clamp Fastener Installation

For installation into a door panel with the fastening clamps, proceed as follows:

1. ➔ Cut out the panel according to the dimensions in Fig. 10.



Don't drill the holes if you want to use the clamp fasteners. If the holes are drilled into the panel, the clamp fasteners cannot be used anymore!

2. ➔ Loosen the wire connection terminal screws on the back of the unit and remove the wire connection terminal strip if required.

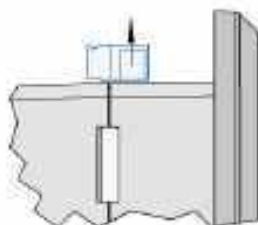


Fig. 11: Remove terminals



Fig. 12: Insert screws in clamps

3. ➔ Insert the four clamping screws into the clamp inserts from the shown side (Fig. 12; opposite the nut insert) until they are almost flush. Do not completely insert the screws into the clamp inserts.
4. ➔ Insert the unit into the panel cutout. Verify that the unit fits correctly in the cutout. If the panel cutout is not big enough, enlarge it accordingly.

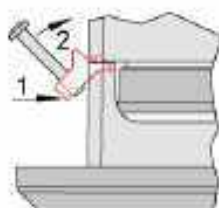


Fig. 13: Attach clamp inserts

5. ➔ Re-install the clamp inserts by tilting the insert to a 45° angle. (Fig. 13/1) Insert the nose of the insert into the slot on the side of the housing. (Fig. 13/2) Raise the clamp insert so that it is parallel to the control panel.

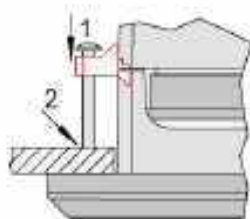


Fig. 14: Tighten clamping screws

6. Tighten the clamping screws (Fig. 14/1) until the control unit is secured to the control panel (Fig. 14/2). Over tightening of these screws may result in the clamp inserts or the housing breaking. Do not exceed the recommended tightening torque of 0.1 Nm.

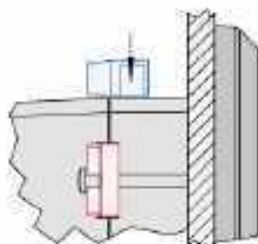


Fig. 15: Reattach terminals

7. Reattach the wire connection terminal strip (Fig. 15) and secure them with the side screws.

3.2.2 Screw Kit Installation



The housing is equipped with 12 nut inserts (Fig. 16), which must all be tightened properly to achieve the required degree of protection.

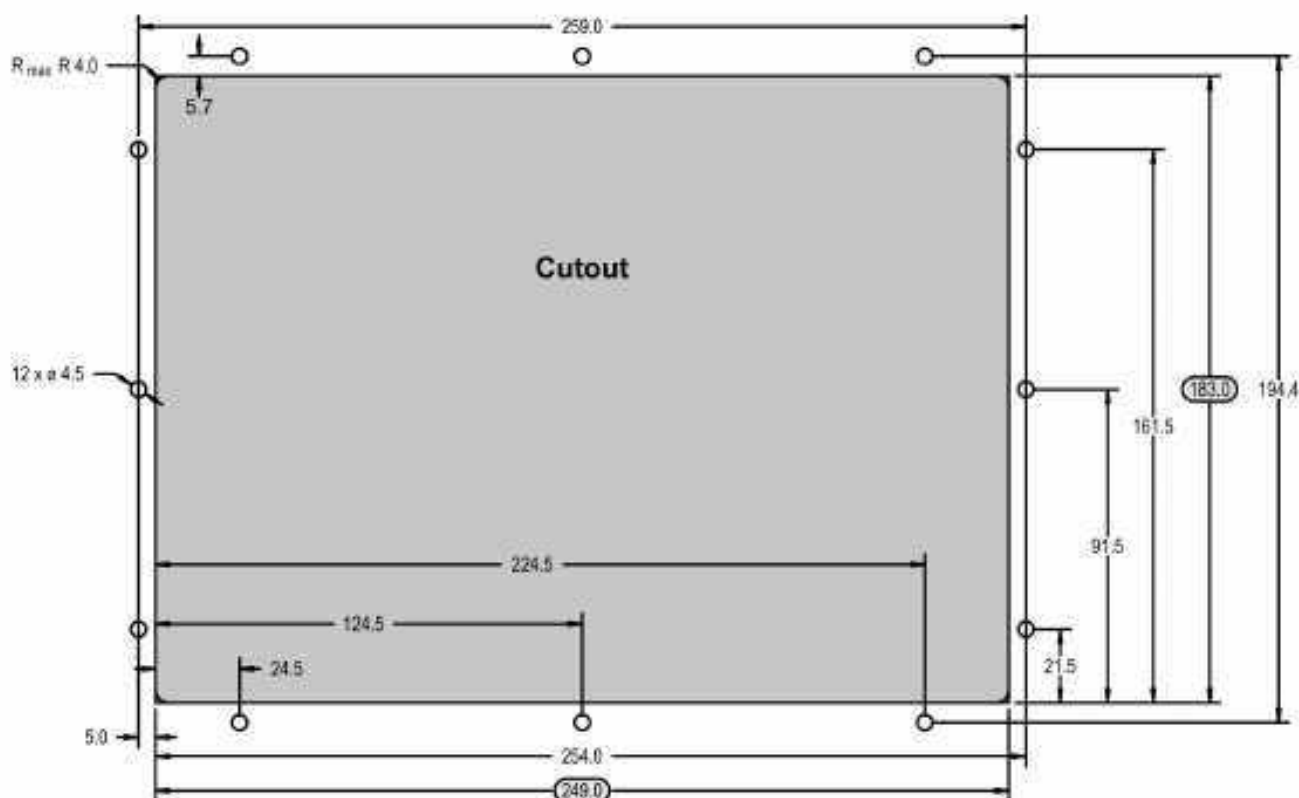


Fig. 16: Plastic housing - drill plan

Installation

Setup Connections > Terminal Allocation

Special tool: ■ Torque screwdriver

Proceed as follows to install the unit using the screw kit:

1. ➤ Cut out the panel and drill the holes according to the dimensions in Fig. 16 (dimensions shown in mm).
2. ➤ Insert the unit into the panel cutout. Verify that the unit fits correctly in the cutout. If the panel cutout is not big enough, enlarge it accordingly.
3. ➤ Insert the screws and tighten to 0.6 Nm (5.3 pound inches) of torque.



Tighten the screws with a crosswise pattern to ensure even pressure distribution.



If the thickness of the panel sheet exceeds 2.5 mm, be sure to use screws with a length exceeding the panel sheet thickness by 4 mm.

3.3 Setup Connections

General notes



NOTICE!

Malfunctions due to literal use of example values

All technical data and ratings indicated in this chapter are merely listed as examples. Literal use of these values does not take into account all actual specifications of the control unit as delivered.

- For definite values please refer to chapter [Chapter 8.1 "Technical Data" on page 543](#).

Wire sizes

AWG	mm ²	AWG	mm ²	AWG	mm ²	AWG	mm ²	AWG	mm ²	AWG	mm ²
30	0.05	21	0.38	14	2.5	4	25	3/0	95	600MCM	300
28	0.08	20	0.5	12	4	2	35	4/0	120	750MCM	400
26	0.14	18	0.75	10	6	1	50	300MCM	150	1000MCM	500
24	0.25	17	1.0	8	10	1/0	55	350MCM	185		
22	0.34	16	1.5	6	16	2/0	70	500MCM	240		

Table 3: Conversion chart - wire sizes

3.3.1 Terminal Allocation

The device terminals are allocated as follows:

- Plastic housing - for easYgen-3200
- Sheet metal housing - for easYgen-3100

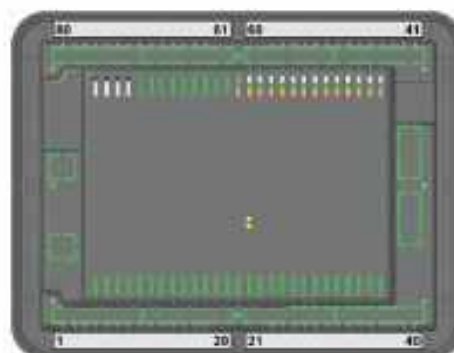


Fig. 17: easYgen-3200 plastic housing

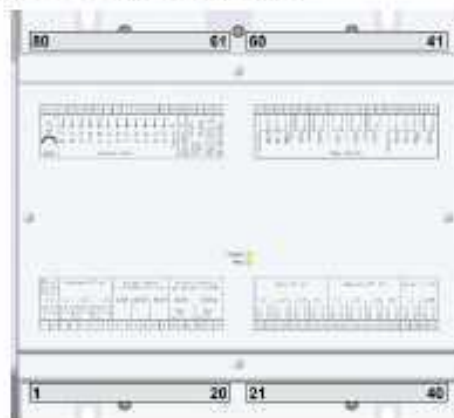


Fig. 18: easYgen-3100 sheet metal housing

3.3.2 Wiring Diagram



The Protective Earth terminal 61 is not connected on the sheet metal housing.

- Use the protective earth (PE) connector located at the bottom center of the sheet metal housing instead.

Installation

Setup Connections > Wiring Diagram

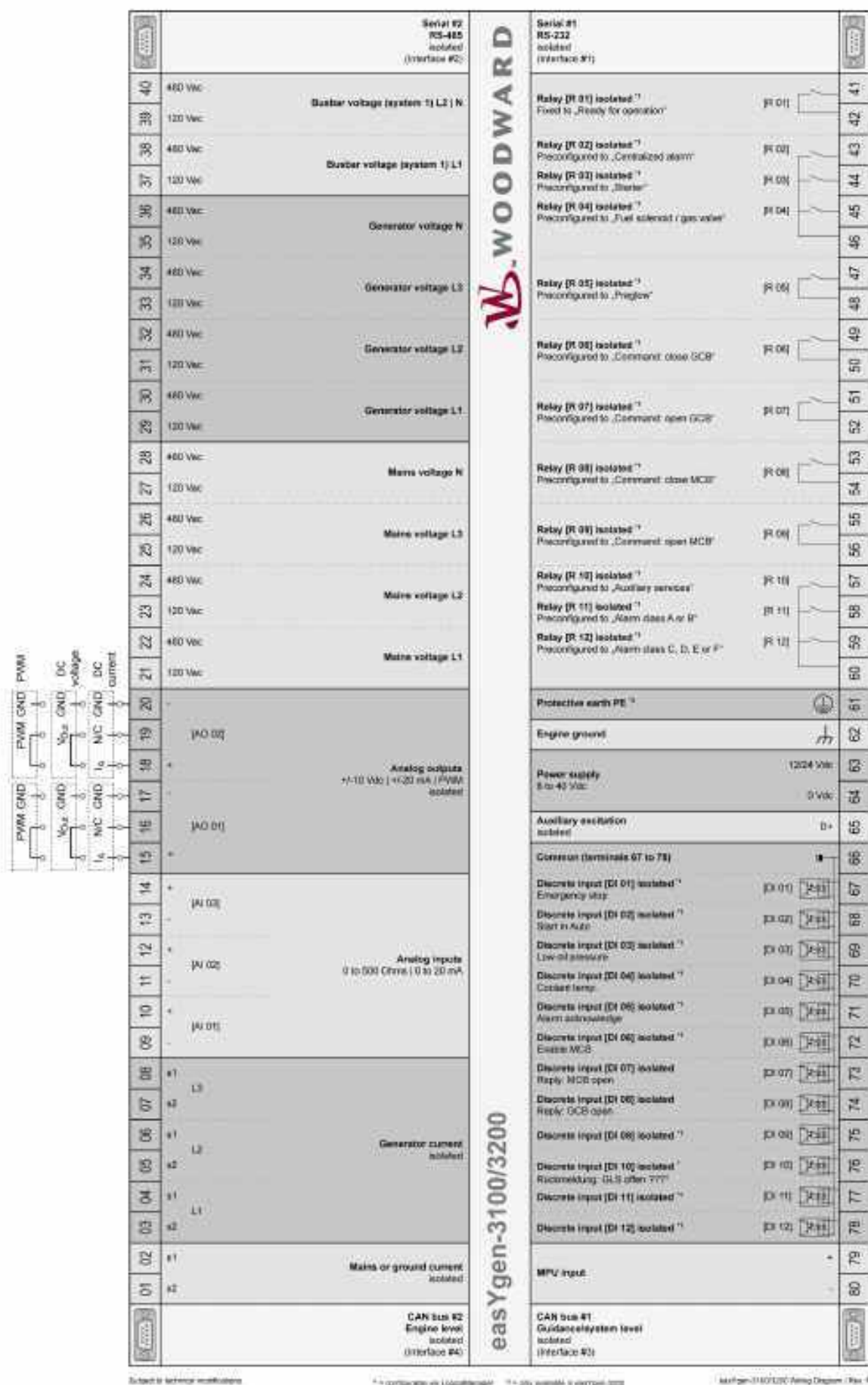


Fig. 19: Wiring diagram

3.3.3 Power Supply

General notes



WARNING!

Risk of electric shock - plastic housing

- Connect Protective Earth (PE) to the unit to avoid the risk of electric shock.
Setup the connection using screw-plug-terminal 61.
- The conductor providing the connection must have a wire larger than or equal to 2.5 mm² (14 AWG).
The connection must be performed properly.



WARNING!

Risk of electric shock - sheet metal housing

- Connect Protective Earth (PE) to the unit to avoid the risk of electric shock.
Use the protective earth (PE) connector located at the bottom center of the sheet metal housing.
- The conductor providing the connection must have a wire larger than or equal to 2.5 mm² (14 AWG).
The connection must be performed properly.



WARNING!

Permissible differential voltage

The maximum permissible differential voltage between terminal 64 (B-) and terminal 61 (PE) is 40 V. On engines where a direct connection between battery minus and PE is not possible, it is recommended to use an isolated external power supply if the differential voltage between battery minus and PE exceeds 40 V.



Woodward recommends to use one of the following slow-acting protective devices in the supply line to terminal 63:

- Fuse NEOZED D01 6A or equivalent **or**
- Miniature Circuit Breaker 6A / Type C
(for example: ABB type: S271C6 or equivalent)

Schematic and terminals

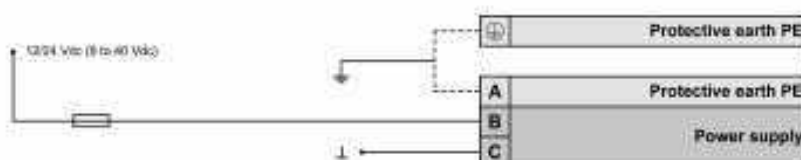


Fig. 20: Power supply - wiring

Installation

Setup Connections > Charging Alternator

Terminal		Description	A _{max}
A	61	PE (protective earth) - plastic housing ONLY	2.5 mm ²
B	63	12/24Vdc (8 to 40.0 Vdc)	2.5 mm ²
C	64	0 Vdc	2.5 mm ²

Table 4: Power supply - terminal assignment

Characteristics

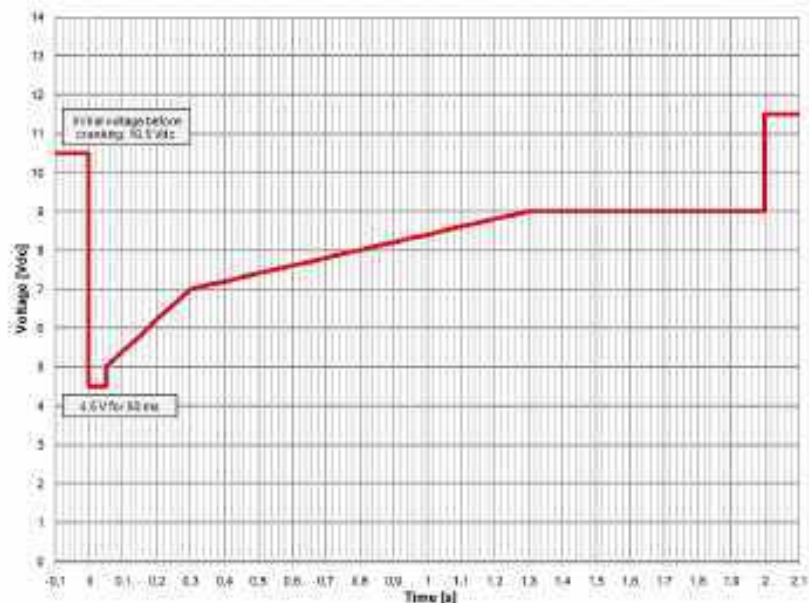


Fig. 21: Power supply - crank waveform

3.3.4 Charging Alternator

General notes



The charging alternator D+ acts as a pre-exciting output during the engine start-up.

During regular operation, it acts as an input for monitoring the charging voltage.

Schematic and terminals

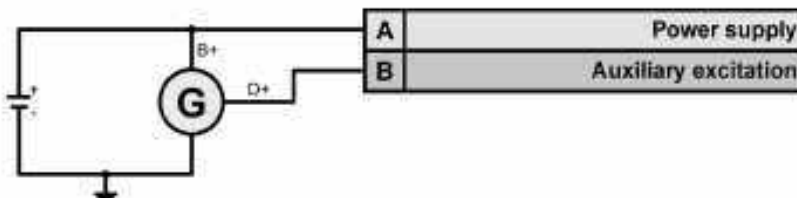


Fig. 22: Charging alternator - wiring

Installation

Setup Connections > Current Measuring > Generator Current

3.3.6 Current Measuring

3.3.6.1 Generator Current

General notes



WARNING!

Dangerous voltages due to missing load

- Before disconnecting the device, ensure that the current transformer (CT) is short-circuited.



Generally, one line of the current transformers secondary must be grounded close to the CT.

Schematic and terminals

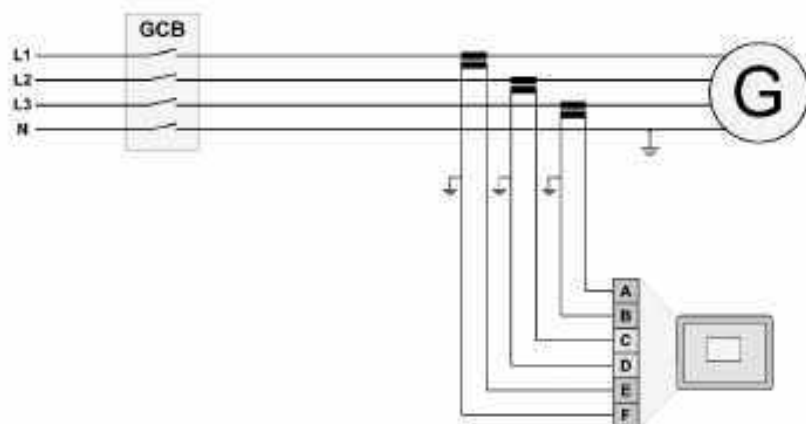


Fig. 39: Current measuring - generator - wiring

Terminal		Description	A _{max}
A	8	Generator current - L3 - transformer terminal s1 (k)	2.5 mm ²
B	7	Generator current - L3 - transformer terminal s2 (l)	2.5 mm ²
C	6	Generator current - L2 - transformer terminal s1 (k)	2.5 mm ²
D	5	Generator current - L2 - transformer terminal s2 (l)	2.5 mm ²
E	4	Generator current - L1 - transformer terminal s1 (k)	2.5 mm ²
F	3	Generator current - L1 - transformer terminal s2 (l)	2.5 mm ²

Table 22: Current measuring - generator - terminal assignment

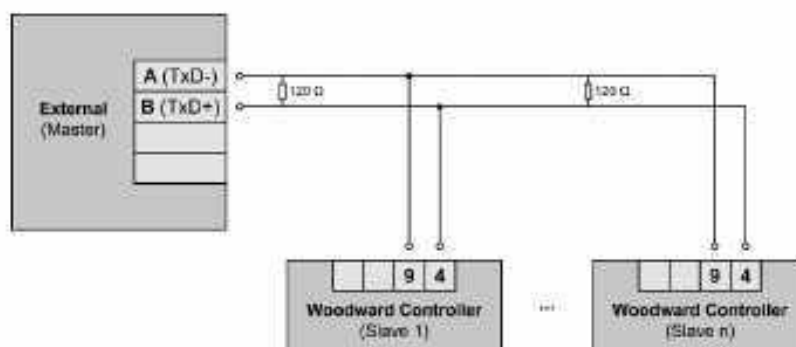
RS-485 half-duplex

Fig. 60: RS-485 - connection for half-duplex operation

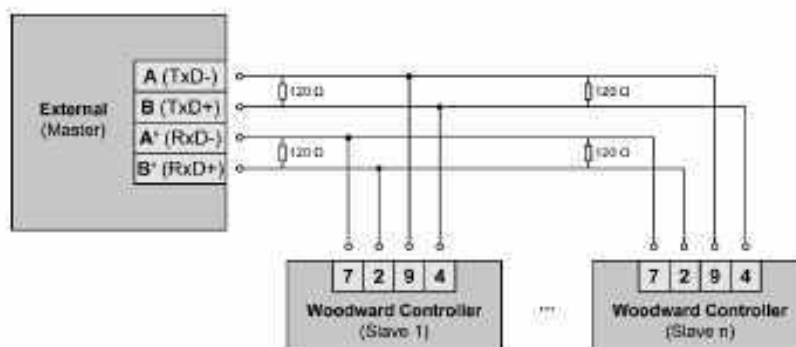
RS-485 full-duplex

Fig. 61: RS-485 - connection for full-duplex operation

Shielding

easYgen is prepared for shielding: Terminal 1 and the connector housing are internally grounded via an RC element.

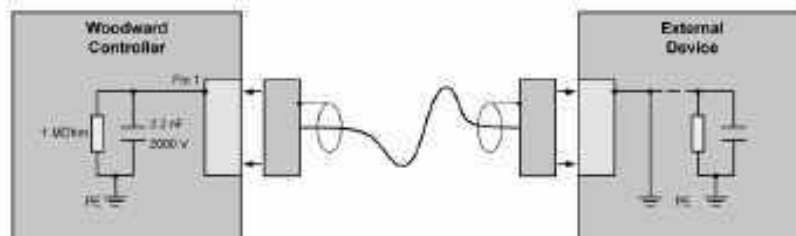


Fig. 62: Shielding preparation (internal RC element)

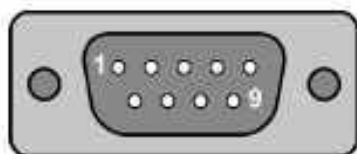
3.3.14.2 RS-232 Interface**Pin assignment**

Fig. 63: SUB-D connector - pins

Terminal	Description	A _{max}
1	Not connected	N/A
2	RxD (receive data)	N/A
3	TxD (transmit data)	N/A
4	Not connected	N/A
5	GND (system ground)	N/A
6	Not connected	N/A
7	RTS (request to send)	N/A