37442B

Load Share Gateway (LSG)

Manual

Software Version 1.xxxx

Manual 37442B

WARNING

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment. Practice all plant and safety instructions and precautions. Failure to follow instructions can cause personal injury and/or property damage.

The engine, turbine, or other type of prime mover should be equipped with an overspeed (overtemperature, or overpressure, where applicable) shutdown device(s), that operates totally independently of the prime mover control device(s) to protect against runaway or damage to the engine, turbine, or other type of prime mover with possible personal injury or loss of life should the mechanical-hydraulic governor(s) or electric control(s), the actuator(s), fuel control(s), the driving mechanism(s), the linkage(s), or the controlled device(s) fail.

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.

CAUTION

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts.

- **Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).**
- **Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.**
- **Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.**

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The revision level is shown at the bottom of the front cover after the publication number. The latest version of most publications is available at:

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Important definitions

WARNING

Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation that, if not avoided, could result in damage to equipment.

NOTE

Provides other helpful information that does not fall under the warning or caution categories.

Revision History

Rev.	Date	Editor	Changes
NEW	08-07-17	TE	Release
A	09-07-29	TE	Minor corrections
B	10-04-08	TE	• Minor corrections • Design and graphics adjustments **New features** *Requirements: Load Share Gateway (LSG) with device revision A or higher.* • New application mode: Load sharing of easYgen devices and GCP/MFR devices supported (Refer to “easYgen connected to GCP/MFR (CAN)” on page 12 for details).

Content

Figures and Tables

Figures

Tables

Chapter 1.
General Information

TECHNICAL REQUIREMENTS

The Load Share Gateway (LSG) works only in combination with:

- **easYgen-3100/3200 (Package P2 – Software Version 1.12xx & 1.13xx)**
- **easYgen-3100/3200 (Software Version 1.15xx or higher)**
- **easYgen-3400/3500 (Software Version 1.17xx or higher)**
- **easYgen-2000 Series.**

The following Woodward legacy devices are supported:

- **MFR 2 Series**
- **MFR 3 Series**
- **GCP 20 Series**
- **GCP 30 Series**
- **EGCP-2 Series**

All devices must support load sharing. Please refer to "Chapter 5: Configuration" for details.

State: 8 April 2011

Related Documents

Type		English	German
Load Share Gateway (LSG)			
Load Share Gateway - Manual	This Manual ►	37442	-
easYgen-3100/3200 (Package P2 – Software Version 1.12xx & 1.13xx)			
easYgen-3100/3200 - Installation		37414	GR37414
easYgen-3100/3200 - Configuration		37415	GR37415
easYgen-3100/3200 - Operation		37416	GR37416
easYgen-3100/3200 - Application		37417	-
easYgen-3100/3200 - Interfaces		37418	-
easYgen-3100/3200 - Parameter List		37420	GR37420
easYgen-3200 - Brief Operation Information		37399	GR37399
easYgen-3100 - Brief Operation Information		37419	-
easYgen-3100/3200 (Software Version 1.15xx or higher)			
easYgen-3100/3200 - Installation		37468	DE37468
easYgen-3100/3200 - Configuration		37469	DE37469
easYgen-3100/3200 - Operation		37470	DE37470
easYgen-3100/3200 - Application		37471	-
easYgen-3100/3200 - Interfaces		37472	-
easYgen-3100/3200 - Parameter List		37473	DE37473
easYgen-3200 - Brief Operation Information		37399	GR37399
easYgen-3100 - Brief Operation Information		37474	-
easYgen-3400/3500 (Software Version 1.17xx or higher)			
easYgen-3400/3500 - Manual		37528	-

easYgen-2000 Series		
easYgen-2000 - Installation	37426	-
easYgen-2000 - Configuration	37427	-
easYgen-2000 - Operation	37428	DE37428
easYgen-2000 - Application	37429	-
easYgen-2000 - Interfaces	37430	-
easYgen-2000 - Parameter List	37431	DE37431
easYgen-2000 - Brief Operation Information	37432	DE37432

Supported Woodward Legacy Devices

MFR 2 Series		
MFR 2 - Manual	37355	-

MFR 3 Series		
MFR 3 - Manual	37107	GR37107

GCP 20 Series		
GCP 20 - Manual	37128	-

GCP 30 Series		
GCP 30 - Installation	37364	GR37364
GCP 30 - Configuration	37365	GR37365
GCP 30 - Operation	37238	GR37238
GCP 30 - Application	37240	GR37240

GCP 30 Rental		
GCP 30 - Installation	37366	GR37366
GCP 30 - Configuration	37367	GR37367
GCP 30 - Operation	37238	GR37238
GCP 30 - Application	37240	GR37240

EGCP-2 Series		
EGCP-2 - Installation and Operation	26076 / 26174	-
EGCP-2 - Application	26086 / 26175	-
EGCP-2 - Communications	26099 / 26181	-

Table 1-1: Manual - overview

Intended Use The unit must only be operated in the manner described by this manual. The prerequisite for a proper and safe operation of the product is correct transportation, storage, and installation as well as careful operation and maintenance.

Overview

The Load Share Gateway (LSG) is a next generation communication converter specifically designed to operate the easYgen-2000 / easYgen-3000 Series and legacy devices (RS-485 bus or analog load share line coupled) in one single load share network.

Chapter 2.
Installation

Safety Precautions

WARNING

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- **Only qualified workers should install this equipment. Such work should be performed only after reading this entire set of instructions.**
- **NEVER work alone.**
- **Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume that all circuits are live until they have been completely de-energized, tested, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.**
- **Apply appropriate personal protective equipment and follow safe electrical practices.**
- **Turn off all power supplying the equipment in which the LSG is to be installed before installing and wiring the LSG.**
- **Always use a properly rated voltage sensing device to confirm that power is off.**
- **Beware of potential hazards, wear personal protective equipment, and carefully inspect the work area for tools and objects that may have been left inside the equipment.**
- **The successful operation of this equipment depends upon proper handling, installation, and operation. Neglecting fundamental installation requirements may lead to personal injury as well as damage to electrical equipment or other property.**

Failure to follow these instructions will result in death or serious injury!

WARNING

No dead bus closure interlock between easYgen and legacy products is provided by the LSG. A closure of the easYgen or legacy product onto a dead busbar simultaneously with other controls must be prevented by external means!

The unit does not provide any protection and in addition renders the built-in protection of the easYgen dysfunctional!

Regulatory Notes

- The LSG is suitable for use in non-hazardous locations only.
- The LSG is not authorized for use in life support devices or systems.
- Wiring and installation must be in accordance with applicable electrical codes in accordance with the authority having jurisdiction.
- The LSG is designed for installation into an electrical switchboard or cubical as part of a fixed installation.

Electrostatic Discharge Awareness

All electronic equipment is static-sensitive, some components more than others. To protect these components from static damage, you must take special precautions to minimize or eliminate electrostatic discharges.

Follow these precautions when working with or near the control.

1. Before doing maintenance on the electronic control, discharge the static electricity on your body to ground by touching and holding a grounded metal object (pipes, cabinets, equipment, etc.).

2. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.

3. Keep plastic, vinyl, and Styrofoam materials (such as plastic or Styrofoam cups, cup holders, cigarette packages, cellophane wrappers, vinyl books or folders, plastic bottles, and plastic ash trays) away from the control, the modules, and the work area as much as possible.

4. **Opening the Control unit will void the warranty!**
   Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:

   - Make sure that the unit is completely de-energized (all connectors have to be pulled off).
   - Do not touch any part of the PCB except the edges.
   - Do not touch the electrical conductors, connectors, or components with conductive devices or with bare hands.
   - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control unit, place it in the antistatic protective bag.

WARNING

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules.*

Mounting and Removal

The enclosure provides protection against solid objects according to IP 20 classification and NEMA Type 1 rating. When mounting the enclosure observe the following rules:

- Avoid splash water and water drops
- Avoid aggressive gas, steam or liquids
- Avoid dusty environments
- Make sure there is sufficient air ventilation and clearance to other devices mounted next to the module
- Do not exceed the specified operational temperatures.
- Mount inside a sealed electrical switchboard or cubicle
- Observe applicable local regulations like EN60204 / VDE0113

Application Overview

The LSG is available in two different types:

- Active power load share (P)
- Reactive power load share (Q)

The following figures show application examples for both LSG types (marked with P or Q).

easYgen connected to EGCP-2 (CAN/RS-485)

The easYgen devices communicate via CAN bus among each other and therefore can´t communicate directly to EGCP-2 devices which have no CAN bus interface. The LSG is able to connect EGCP-2 and easYgen devices in a single load share network.

easYgen (CAN)
The LSG is fixed to work as generator with address 15 and 16. For this reason it is not allowed, to set any other easYgen device to address 15 or 16. (For further information please refer to the easYgen manuals)

EGCP-2 (RS-485)
The LSG is fixed to work as generator with address 8. For this reason it is not allowed, to set any EGCP-2 to address 8. (For further information please refer to the EGCP-2 manuals)

CAN, RS-485 interface and power supply are isolated galvanically, so there is no need for any additional galvanic isolation.

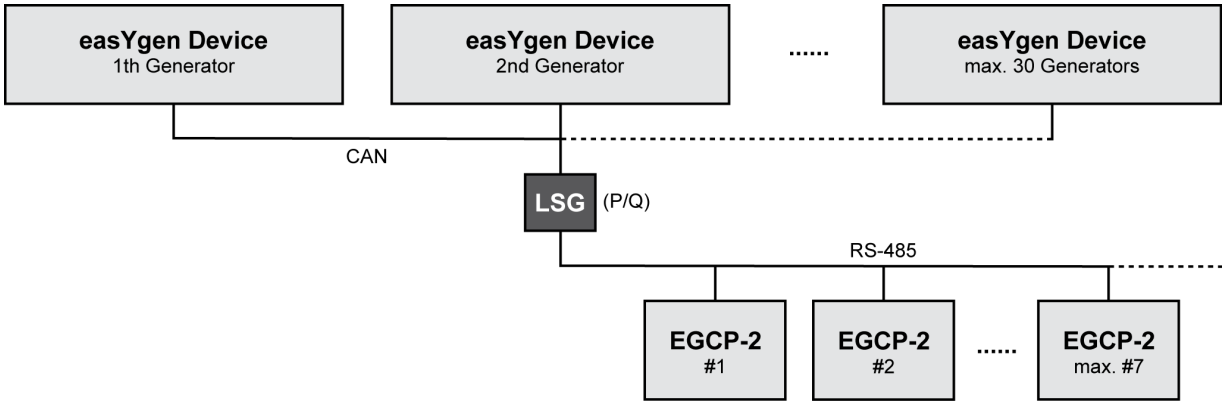


Figure 2-1: Application – EGCP-2

WARNING

Please arrange additional precautions for the dead bus closure interlock. The LSG connection doesn´t guarantee a dead bus closure interlock.

NOTE

All easYgen devices which are allowed to perform a dead bus closure, independent of the EGCP-2, must have a generator number <15.

easYgen connected to GCP/MFR (CAN)

The easYgen devices communicate via CAN bus among each other with an easYgen specific protocol which differs from the GCP/MFR protocol. The LSG is able to connect GCP/MFR and easYgen devices in a single load share network on the **same** CAN bus. The CAN baud rate of this mode is 125kB. **For this reason the number of devices at the CAN is limited to overall 16.**

easYgen (CAN)
The LSG is fixed to work as generator with address 15 or 16. For this reason it is not allowed, to set any other easYgen device to address 15 or 16. (For further information please refer to the easYgen manuals)

GCP/MFR (CAN)
The LSG is fixed to work as generator with address 8. For this reason it is not allowed, to set any GCP/MFR to address 8.

CAN interface and power supply are isolated galvanically, so there is no need for any additional galvanic isolation.

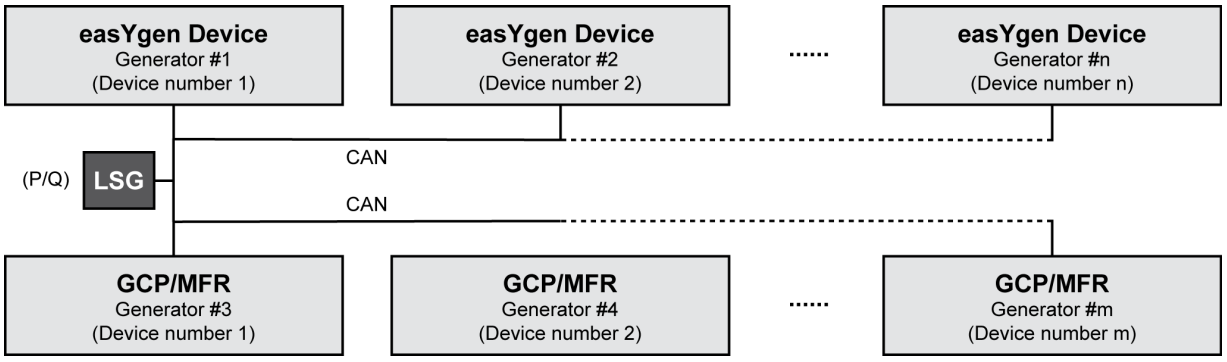


Figure 2-2: Application – GCP/MFR

NOTE

Dead bus closure interlock

The easYgen device group (LSG) appears for the GCP/MFR devices as a GCP/MFR with generator number 8. The GCP/MFR device group (LSG) appears for the easYgens devices as an easYgen with generator number 16.

If there are two units which want to perform a dead bus closure, the unit with the lowest generator number gets the permission. For this reason every device group (1x easYgen and 1x GCP/MFR) is allowed to perform a dead bus closure.

WARNING

The above described note makes it necessary to arrange additional precautions for the dead bus closure interlock. The LSG connection doesn´t guarantee a dead bus closure interlock. We highly recommend disabling the dead bus closure on the easYgen device group or the GCP/MFR device group and enable dead bus closure at all GCP/MFR devices.

easYgen connected to legacy device (CAN/Analog)

The easYgen devices communicate via CAN bus among each other and therefore can´t communicate directly to analog legacy devices which have no CAN bus interface. The LSG is able to connect analog legacy devices and easYgen devices in a single load share network.

NOTE

Find further information's on supported legacy devices in Chapter 5 - Configuration.

WARNING

Please arrange additional precautions for the dead bus closure interlock. The LSG connection doesn´t guarantee a dead bus closure interlock.

There are two application scenarios possible:

- **Examples A** shows the applications with one LSG for all easYgen devices.
- **Examples B** shows the applications with one LSG for each easYgen devices.

To decide which setup is to prefer in the application, different aspects for operation and safety should be regarded.

CAN, Analog Line and power supply are isolated galvanically, so there is no need for any additional galvanic isolation.

Examples A:

Active power loadshare:
On CAN (easYgen) the LSG is fixed to work as generator with address (15) / 16. For this reason it is not allowed, to set any easYgen to address (15) / 16.

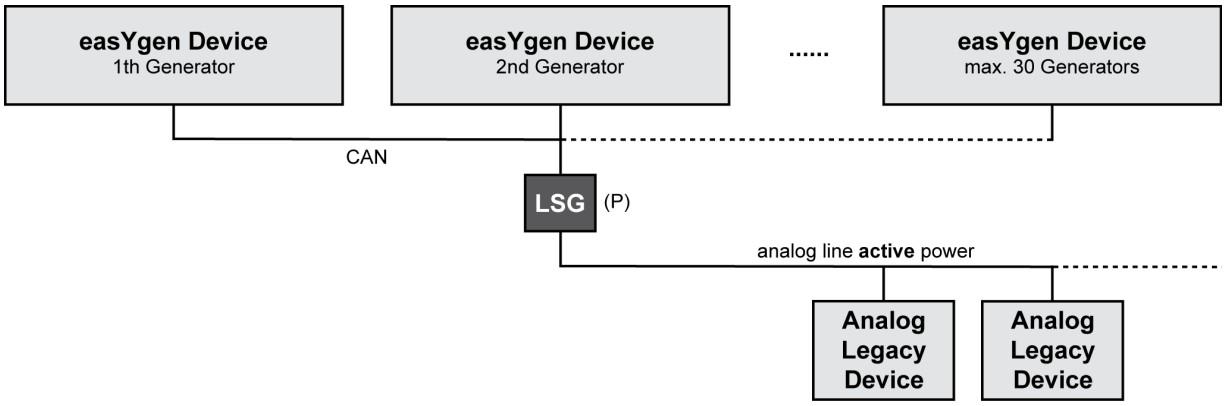


Figure 2-3: Application – analog active power

NOTE

The easYgen device reserves the address 15 and 16 by default. Address 15 is in this case not used.

Active and reactive power loadshare:
On CAN (easYgen) the LSG for active power loadsharing is fixed to work as generator with address 16 the LSG for reactive power loadsharing to work as generator with address 15. For this reason it is not allowed, to set any easYgen to address 15 or 16.

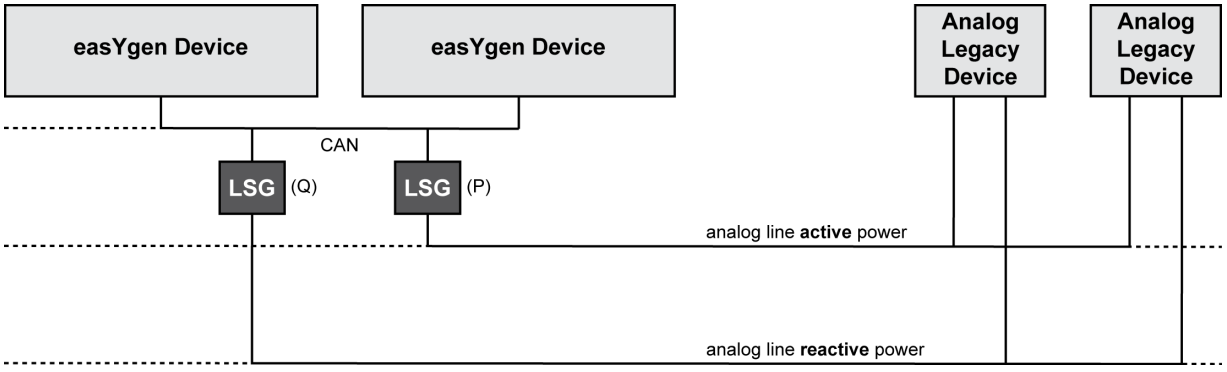


Figure 2-4: Application – analog active and reactive power

Examples B:

Active power loadshare:
On CAN (easYgen) the LSGs are fixed to work as generator with addresses 15 and 16. For this reason it is not allowed, to set any easYgen devices to address 15 and 16.
In this application the easYgen must not connected via CAN

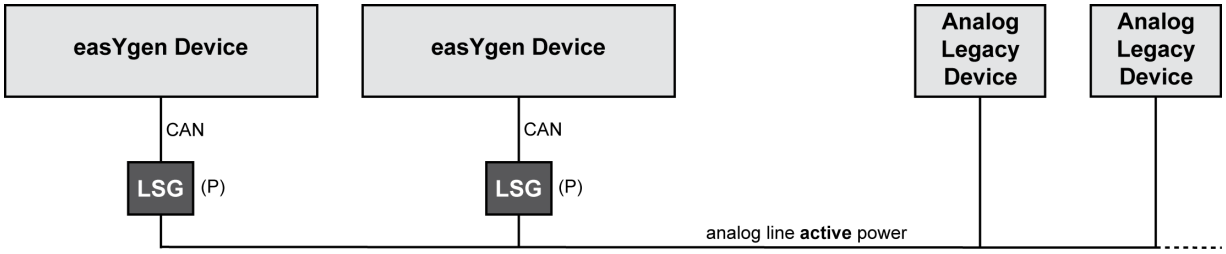


Figure 2-5: Application – analog active power

Active <u>and</u> reactive power loadshare:
On CAN (easYgen) the LSGs for active power loadsharing are fixed to work as generator with address 16 the LSGs for reactive power loadsharing to work as generator with address 15. For this reason it is not allowed, to set any easYgen device to address 15 or 16.

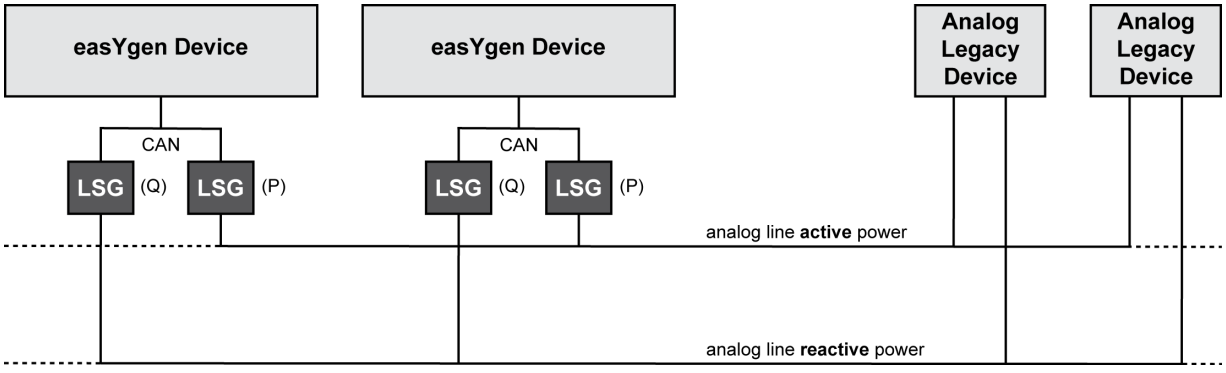
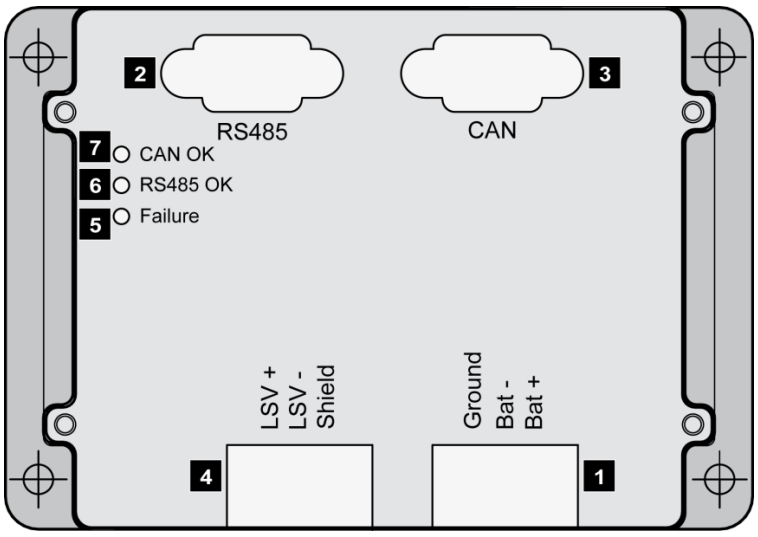


Figure 2-6: Application – analog active and reactive power

Chapter 3.
Housing

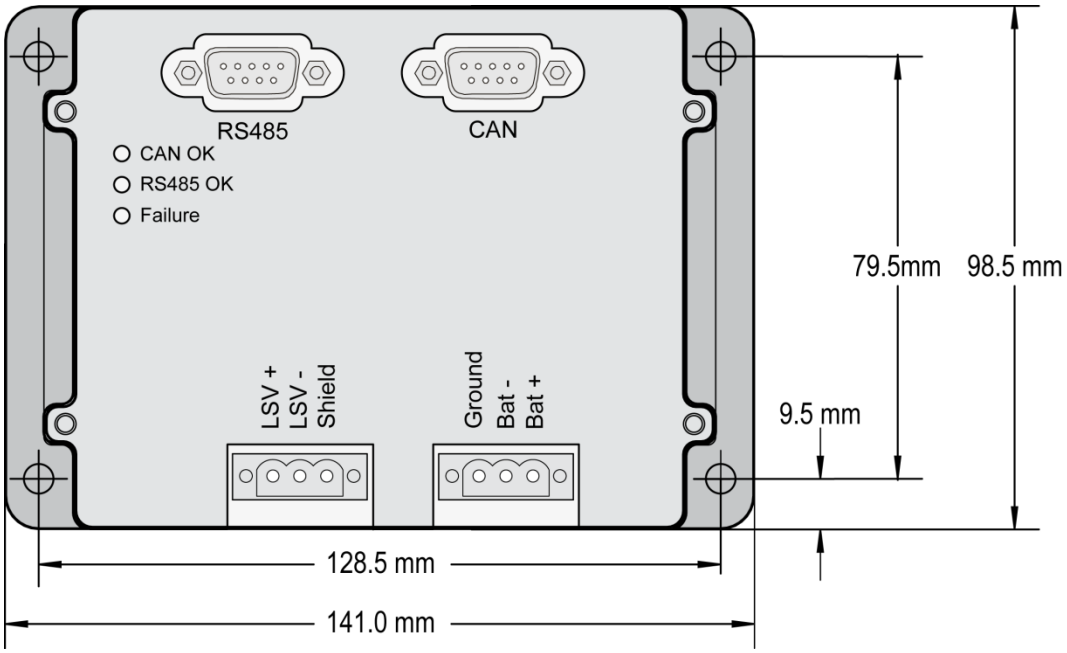
Terminal and Interface Overview



1. Power terminal block socket
2. RS-485 connector
3. CAN connector
4. Analog terminal block socket
5. Error indication LED
6. RS-485 / GCP/MFR CAN / Analog Status Indicator
7. easYgen (CAN) Communication Status LED

Figure 3-1: Terminal and interface overview

Dimensions



Hole Size 4x3,12 mm.375

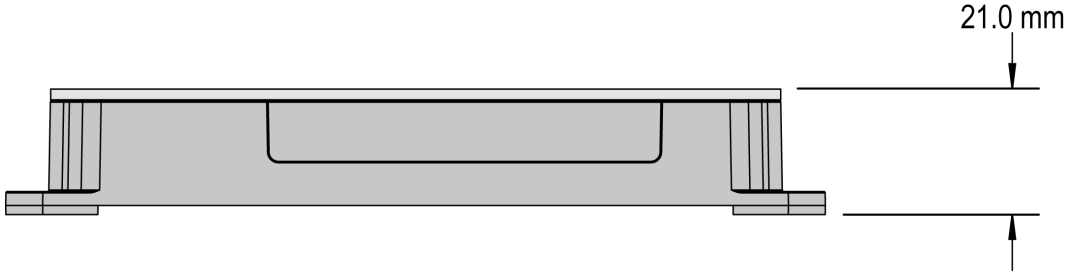


Figure 3-2: Housing LSG – dimensions

Chapter 4.
Connection

WARNING

All technical data and ratings indicated in this chapter are not definite! Only the values indicated in Chapter 7: Technical Data on page 30 are valid!

The following chart may be used to convert square millimeters [mm²] to AWG and vice versa:

AWG	mm²	AWG	mm²	AWG	mm²	AWG	mm²	AWG	mm²	AWG	mm²
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 4-1: Conversion chart - wire size

Power Supply

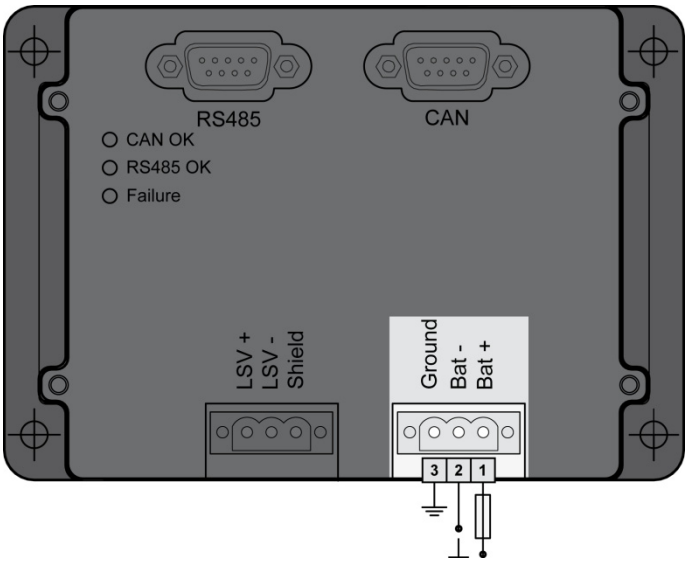


Figure 4-1: Power supply

Terminal	Description	A_{max}
3	Earth Ground	2.5 mm²
2	12/24Vdc	2.5 mm²
1	0 Vdc	2.5 mm²

Table 4-2: Power supply - terminal assignment

NOTE

Earth Ground Terminal #3 is galvanically connected to aluminum housing. If the housing is assembled on a grounded metal plate possible ground current loops via terminal #3 are to be considered!

Analog Load Share

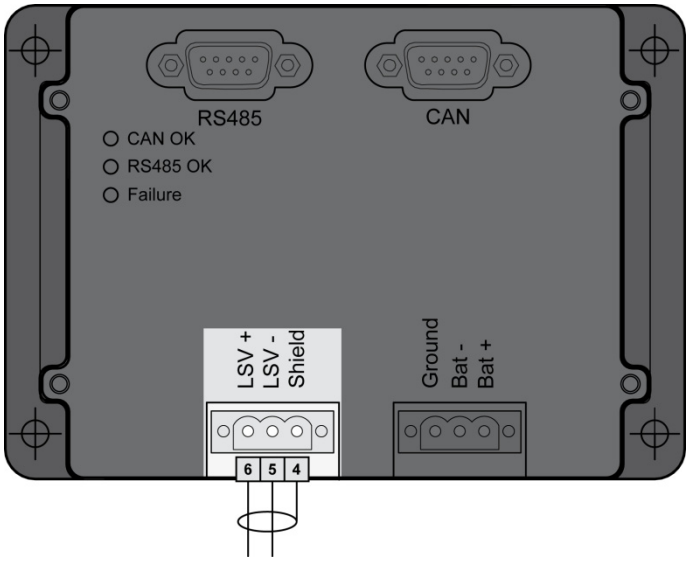


Figure 4-2: Analog load share

Terminal	Description	A_{max}
6	Analog Load Share V+	2.5 mm²
5	Analog Load Share V-	2.5 mm²
4	Shield	2.5 mm²

Table 4-3: Analog load share - terminal assignment

Interfaces

RS-485 Serial Interfaces

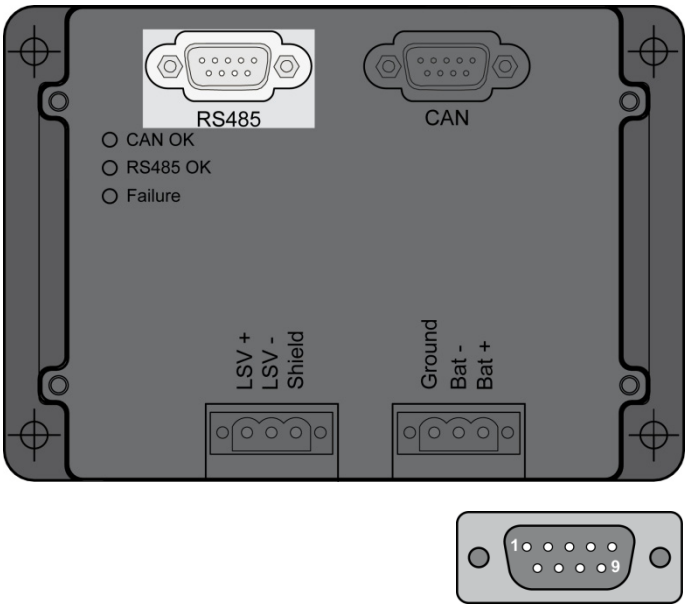


Figure 4-3: RS-485 interface - overview

Terminal	Description	A_{max}
1	not connected	N/A
2	RS-485 (-)	N/A
3	not connected	N/A
4	not connected	N/A
5	GND	N/A
6	not connected	N/A
7	RS-485 (+)	N/A
8	not connected	N/A
9	not connected	N/A

Table 4-4: RS-485 interface - pin assignment

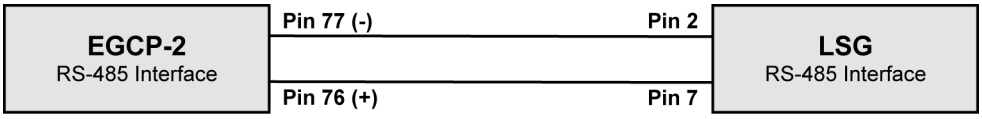


Figure 4-4: RS-485 Connection EGCP-2 - LSG

Half-Duplex on RS-485

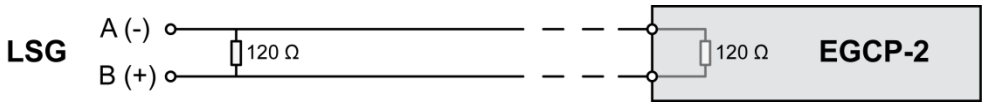


Figure 4-5: RS-485 - connection for half-duplex operation

NOTE

Please refer to EGCP-2 manual 26076 / 26174 „Installation and Operation – Chapter 3. Electrical Installation and Specifications".
This manual describes how the bus needs to be terminated. Is the LSG at the end of the RS-485 bus, a terminating resistor of 120 ohm needs to be connected to the Sub-D connector.
The EGCP-2 must be configured via DIP switches according to the manual.

CAN Bus Interface

The CAN baud rate is detected automatically. For the supported baud rates please refer to „Maximum CAN Bus Length“, Page 23.

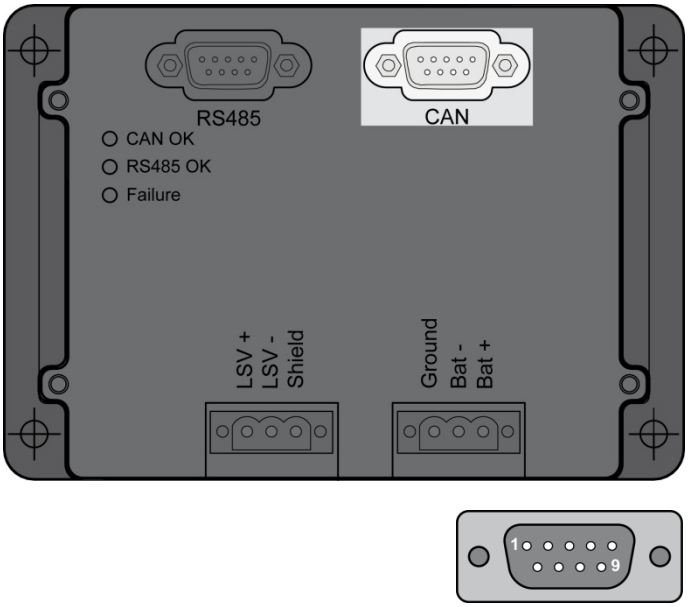


Figure 4-6: CAN bus - overview

Terminal	Description	A_{max}
1	not connected	N/A
2	CAN-L	N/A
3	GND	N/A
4	not connected	N/A
5	CAN Shield	N/A
6	GND	N/A
7	CAN-H	N/A
8	not connected	N/A
9	CAN-VCC	N/A

Table 4-5: CAN bus - pin assignment

NOTE

Please make sure that the LSG CAN interface is connected to the corresponding device CAN interface which supports load sharing.

CAN Bus Topology

NOTE

Please note that the CAN bus must be terminated with a resistor, which corresponds to the impedance of the cable (e.g. 120 Ohms, 1/4 W) at both ends. The termination resistor is connected between CAN-H and CAN-L.

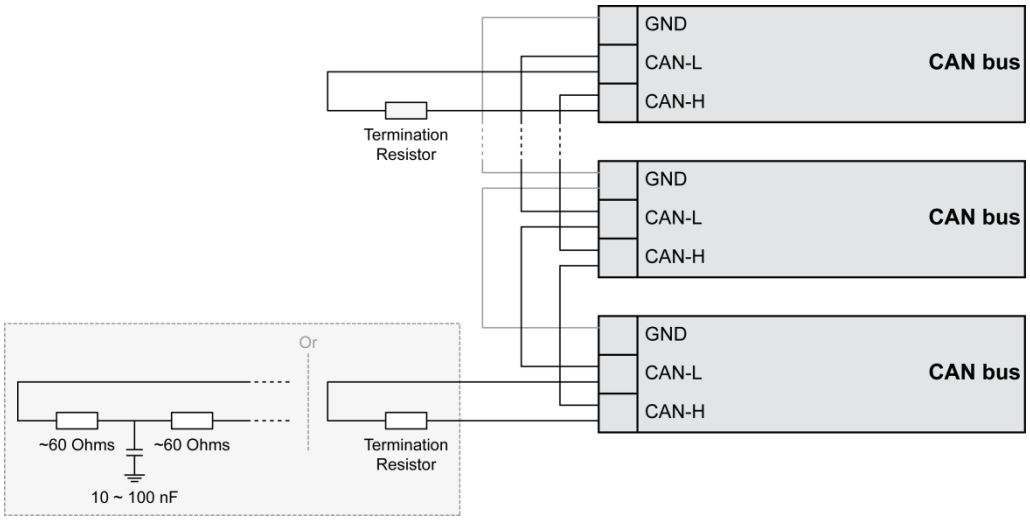


Figure 4-7: Interfaces - CAN bus - termination

Troubleshooting Possible CAN Bus Problems

If data is not transmitting on the CAN bus, check the following for common CAN bus communication problems:

- A T-structure bus is utilized
- CAN-L and CAN-H are interchanged
- Not all devices on the bus are using identical baud rates
- Terminating resistor(s) are missing
- The configured baud rate is too high for wiring length
- The CAN bus cable is routed in close proximity with power cables

Woodward recommends the use of shielded, twisted-pair cables for the CAN bus (i.e.: Lappkabel Unitronic LIYCY (TP) 2×2×0.25, UNITRONIC-Bus LD 2×2×0.22).

Maximum CAN Bus Length

The maximum length of the communication bus wiring is dependent on the configured baud rate. Refer to Table 4-6 for the maximum bus length (Source: CANopen; Holger Zeltwanger (Hrsg.); 2001 VDE VERLAG GMBH, Berlin und Offenbach; ISBN 3-8007-2448-0).

Baud rate	Max. length
1000 kbit/s	25 m
800 kbit/s	50 m
500 kbit/s	100 m
250 kbit/s	250 m
125 kbit/s	500 m
50 kbit/s	1000 m
20 kbit/s	2500 m

Table 4-6: Maximum CAN bus length

The maximum specified length for the communication bus wiring might not be achieved if poor quality wire is utilized, there is high contact resistance, or other conditions exist. Reducing the baud rate may overcome these issues.

Bus Shielding

All bus connections of the LSG are internally grounded via an RC element. Therefore, they may either be grounded directly (recommended) or also via an RC element on the opposite bus connection.

CAN / RS-485 / Analog Share Load

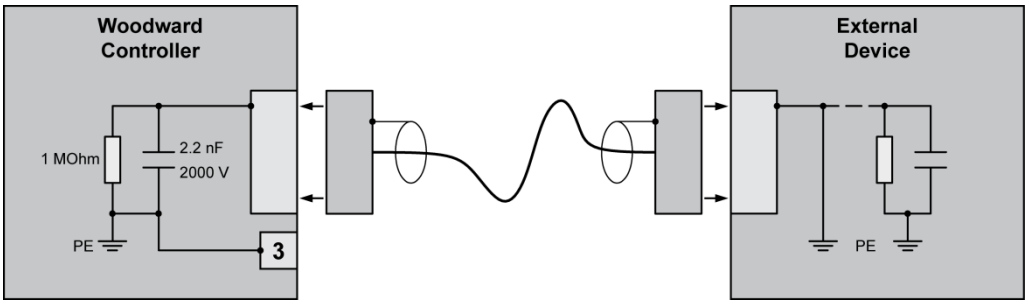


Figure 4-8: Interfaces - shielding

Chapter 5.
Configuration

LSG Configuration

- **The LSG does not need to be configured.**
- The LSG is receiving his operation mode via CAN from the easYgen with the **lowest** address.
- The CAN baud rate will be detected automatically.
- The RS-485 parameters are fixed.
- The LSG transmits always **segmentnumber 1**.

easYgen Configuration

The operation mode of the LSG must be configured by the parameter 5568 of the easYgen.

Operation Modes		
No.	**Device**	**Internal Resistance | Voltage Range**
0	Off	-
1	Woodward EGCP-2	RS-485 (**P** & **Q**)[1]
2	Woodward SPM-D	**R** = 4.99k | **P**: 0 − 4V (0 to 100%) | **Q**: 0 − 5V (-85% to +85%)
	MFR 15	**R** = 4.99k | **P**: 0 − 4V (0 to 100%)
3	Woodward 2301 A	**R** = 54.90k | **P**: 0 − 3V (0 to 100%)
4	Caterpillar LSM	**R** = 25.00k | **P**: 0 − 3V (0 to 100%)
5	Cummins PCC 3100; PCC 3200; PCC 3201; PCC 3300	**R** = 5.00k | **P**: 0 − 2.5V (-14.1 to 121.9%) | **Q**: 0 − 2.5V (-16.7% to +125.3%)
6	POW-R-CON	**R** = 20.67k | **P**: 0 − 5V (0 to 100%)[2]
7	Prepared[3]	**R** = 25.00k | **P**: -5 − +5V (0 to 100%)[2]
8	Prepared[3]	**R** = 25.00k | **P**: 0 − 7V (0 to 100%)[2]
9	GCP/MFR	CAN (**P** & **Q**)[1] − easYgens and GCP/MFR share the same CAN bus
10 to 15	Not defined	-

Table 5-1: easYgen configuration

[1] Operation mode supports one LSG device. This single device is able to share P and Q.
[2] If this setting is reactive power mode, the voltage is representing a Q range: -100% to +100%
[3] For Load Share devices that meet the specifications shown in the table above.

- If the operation mode is not 0, the device numbers 15/ 16 are reserved for the LSG, the easYgen device numbers must not be configured as 15 and16.
- The loadshare CAN ID must be set to 5xx (=default Value).
- The baud rate of the load share bus must be configured to **125kb** in the GCP/MFR mode (the baud rate of the GCP/MFR is fixed to this baud rate).
- In GCP/MFR mode the CAN IDs 181h to 18Eh are reserved for the GCP/MFR. It is **not allowed** to use these IDs for other things e.g. transmit PDOs.

NOTE

Please refer to the note “Dead bus closure interlock” on page 12.

easYgen – LSG Display Information

If the LSG mode is set to 1 (EGCP-2) the icon “LSG” at the LDSS screen (easYgen) is twinkling if the CAN connection between easYgen and LSG is OK. This icon is permanent, if an EGCP-2 in automatic mode is detected on the RS-485 bus. The GCB icon shows closed if one or more EGCP-2 has a closed GCB.

If the LSG mode is set to 9 (GCP/MFR) the icon “LSG” at the LDSS screen (easYgen) is twinkling if the CAN connection between easYgen and LSG is OK. This icon is permanent, if a GCP/MFR is detected on the CAN bus. The GCB icon shows closed if one or more GCP/MFR has a closed GCB.

In analog mode “LSG” at the LDSS screen is permanent if the CAN connection between easYgen and LSG is OK. The GCB icon shows closed if at least one easYgen device, which is connected via CAN to the LSG, has a closed GCB.

EGCP-2 Configuration

- One EGCP-2 must be configured as the system master. It is recommended to configure the master unit with device number 1 and priority number 1. The EGCP-2 device numbers must **not** be configured as 8, because the LSG is using this device number.
- The EGCP-2 must be operating in the automatic mode. The Auto discrete input #1 must be closed on this unit at all times.
- The configuration item Auto Sequencing must be set to disabled.
- Please configure DIP switch of the EGCP-2s to a correct termination of the RS-485
- The LSG is always slave
- If reactive power needs to be shared, the parameters “RATED KW” and “RATED KVAR” must be configured to the same values within the EGCP-2.

GCP/MFR Configuration

- With the exception of number 8 all generator numbers can be configured. Generator **number 8 is not allowed** because the LSG is using generator number 8.
- Please make sure that easYgen the parameters “Active power load share” (parameter 5531) and “Reactive power load share” (parameter 5631) are configured identical than the corresponding GCP/MFR parameters.

NOTE

Please refer to the note “Dead bus closure interlock” on page 12.

Chapter 6.
Operation

Status LEDs

The three LEDs indicate the status of the module. The LEDs assist maintenance personnel in quickly identifying wiring or communication errors.

A LED test is exercised at power-up. After power up the LEDs are building a “running light” until the correct CAN baud rate is found.

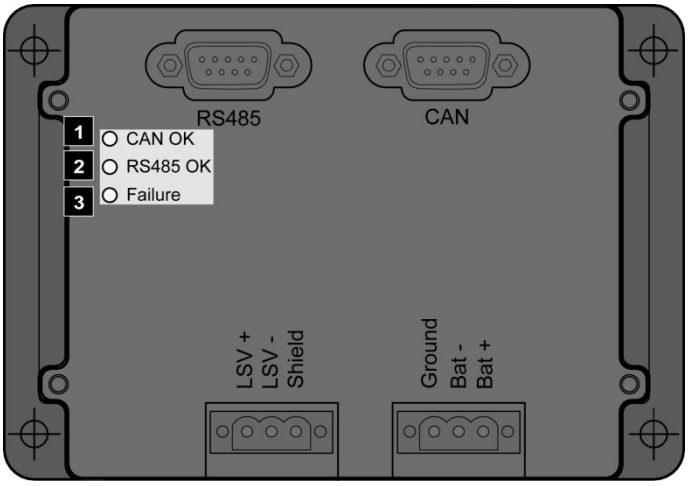


Figure 6-1: Status LEDs

NOTE

The direction of the running light indicates, if the LSG is for active (light is running from LED1 to LED3) part number 8440-1075 or reactive power (light is running from LED3 to LED1) part number 8440-1074.

LED	Function	Condition	Indication
1	easYgen Status (CAN bus)	Off	No valid CAN bus messages are received
		Toggling	Valid CAN bus messages are received
2	EGCP-2 Status (RS-485) / GCP/MFR Status (CAN) / Analog line	Off	No RS-485 messages are received / Analog line is on high impedance
		Toggling (RS-485 or CAN)	RS-485 or CAN messages are received
		On (Analog)	Analog: LSG is sharing load on the analog line
3	Error indication	Off	The LSG detects no bus communication error
		On	At least one device on the bus (RS-485 / CAN) is missing

Table 6-1: Outlines the indicator condition and the corresponding status after the baud rate is found.

Functional Test

Testing the CAN Bus Communication

If the connection between the easYgen and the LSG is working properly, the LSG is recognized as a further "easYgen" by the easYgen devices. The LSG appears with the address 16. If a second LSG is used for analog reactive Load Share this will appear with address 15.

Testing the EGCP-2 Network Communication

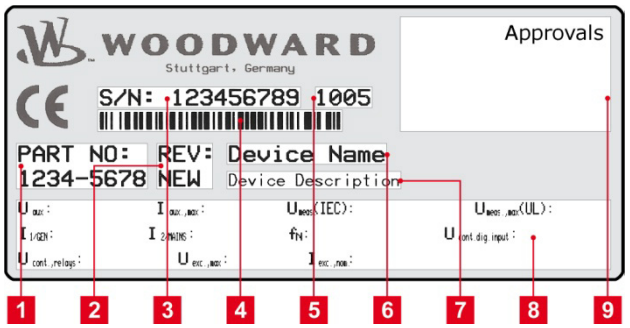
If the connection between the EGCP-2 and the LSG is working properly **and** the easYgen is detected by the LSG, the LSG is indicated on the EGCP-2 sequence display screen as an **EGCP-2 Slave** with device number 8.

Testing the CAN Bus Communication (GCP/MFR)

If the connection between the GCP/MFR and the LSG is working properly, the LSG is recognized as a further "GCP/MFR" by the GCP/MFR devices. The LSG appears with the address 8.

Chapter 7.
Technical Data

Nameplate



1	P/N	Item number
2	REV	Item revision number
3	S/N	Serial number (numerical)
4	S/N	Serial number (barcode)
5	S/N	Date of production (year-month)
6	Type	Description (short)
7	Type	Description (long)
8	Details	Technical data
9	Approval	Approvals

Ambient variables ----------

- Power supply (SELV) ..... 12/24 Vdc (8 to 40.0 Vdc)
  Intrinsic consumption ..... max. 3 W
- Degree of pollution 2
- Maximum Altitude 3000m
- Grounding ..... Earth Ground Terminal # 3 galvanically connected to housing

Interface ----------

RS-485 interface ..... **isolated**
- Isolation voltage ..... 500 Vac
- Type ..... Half duplex, max 38.4kBaud
- Shield Termination ..... internal R||C against Ground (Terminal # 3)

CAN bus interface ..... **isolated**
- Isolation voltage ..... 500 Vac
- Version ..... CAN bus
- Internal line termination ..... Not available
- Shield Termination ..... internal R||C against Ground (Terminal # 3)

Analog Load Share Line----------

..... **isolated**
- Isolation voltage ..... 500 Vac
- Input / Output type ..... Analog voltage in- / output, configurable
- Internal Resistance ..... configurable
- Shield Termination ..... internal R||C against Ground (Terminal # 3)

Housing ----------

- Type ..... aluminum .....
- Dimensions (W × H × D) ..... approx. 141mm × 98.5mm × 21 mm
- Wiring ..... screw-plug-terminals 2.5 mm²
- Recommended locked torque ..... 4 inch pounds / 0.5 Nm
  use 60/75 °C copper wire only
  use class 1 wire only or equivalent
- Weight ..... approx. 280 g

Protection ----------

- Protection system IP20
- EMC test (CE) ..... tested according to applicable EN guidelines

Chapter 8.
Environmental Data

Vibration----------

- Frequency Range – Sine Sweep ..... 5Hz to 100Hz
  - Acceleration 4G
- Frequency Range - Random ..... 10Hz to 500Hz
  - Power Intensity.....0.015G²/Hz
  - RMS Value.....1.04 Grms
- Standards .....

EN 60255-21-1 (EN 60068-2-6, Fc)
Lloyd's Register, Vibration Test2
SAEJ1455 Chassis Data
MIL-STD 810F, M514.5A, Cat.4,
Truck/Trailer tracked-restrained
cargo, Fig. 514.5-C1

Shock ----------

- Shock .....40G, Saw tooth pulse, 11ms
- Standards .....

EN 60255-21-2
MIL-STD 810F, M516.5, Procedure 1

Temperature ----------

- Cold, Dry Heat (storage) .....-30°C (-22°F) / 80°C (176°F)
- Cold, Dry Heat (operating).....-20°C (-4°F) / 70 °C (158°F)
- Standards .....

IEC 60068-2-2, Test Bb and Bd
IEC 60068-2-1, Test Ab and Ad

Humidity----------

- Humidity..... 60°C, 95% RH, 5 days
- Standards .....

IEC 60068-2-30, Test Db

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