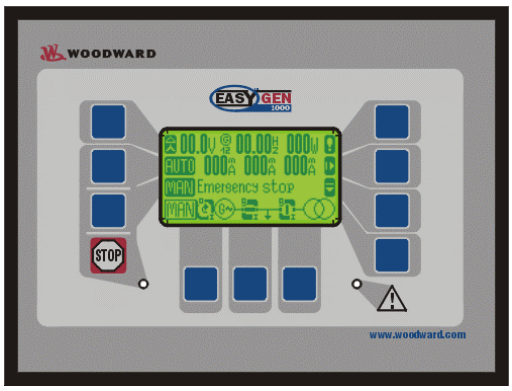
37203

easYgen-1000
Genset Control



Installation
Software Version 1.0xxx

Manual 37203

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.

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.**

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.

Content

Illustrations and Tables

Illustrations

Tables

Chapter 1.
General Information

Type		English	German
easYgen-1000 Series			
easYgen-1000 - Installation	this manual ⇨	37203	GR37203
easYgen-1000 - Configuration		37204	GR37204
easYgen-1000 - Operation		37181	GR37181
easYgen-1000 - Application		37205	GR37205
easYgen-1000 - Interfaces		37262	GR37262
Additional Manuals			
IKD 1 - Manual		37135	GR37135
Discrete expansion board with 8 discrete inputs and 8 relay outputs that can be coupled via the CAN bus to the control unit. Evaluation of the discrete inputs as well as control of the relay outputs is done via the control unit.			
IKN 1 - Manual		37136	GR37136
20channel NiCrNi temperature scanner that monitors the temperature values for exceeding or falling below a threshold value, measured through senders on the IKN 1. A configured relay on the board of the IKN 1 will trip. The IKN 1 can be coupled with the control unit using the CAN bus to display measuring values as well as alarms.			
LeoPC - Manual		37146	GR37146
PC program for visualization, for configuration, for remote control, for data logging, for language upload, for alarm and user management and for management of the event recorder. This manual describes the use of the program.			
LeoPC - Manual		37164	GR37164
PC program for visualization, for configuration, for remote control, for data logging, for language upload, for alarm and user management and for management of the event recorder. This manual describes the programming of the program.			
GW 4 - Manual		37133	GR37133
Gateway for transferring the CAN bus to any other interface or bus.			
ST 3 - Manual		37112	GR37112
Control to govern the air fuel ratio of a gas engine. The ratio will be directly measured though a Lambda probe and controlled to a configured value.			

Table 1-1: Manual - overview

Intended Use The unit must only be operated as described in 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.

NOTE

This manual has been developed for a unit fitted with all available options. Inputs/outputs, functions, configuration screens and other details described, which do not exist on your unit may be ignored.

The present manual has been prepared to enable the installation and commissioning of the unit. On account of the large variety of parameter settings, it is not possible to cover every possible combination. The manual is therefore only a guide. In case of incorrect entries or a total loss of functions, the default settings can be taken from the enclosed list of parameters.

Chapter 2.
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 cover may void the unit 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:

   - Do not touch any part of the PCB except the edges.
   - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your 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 cabinet, place it in the antistatic protective bag.

CAUTION

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.*

Chapter 3.
Housing

Panel cut-out

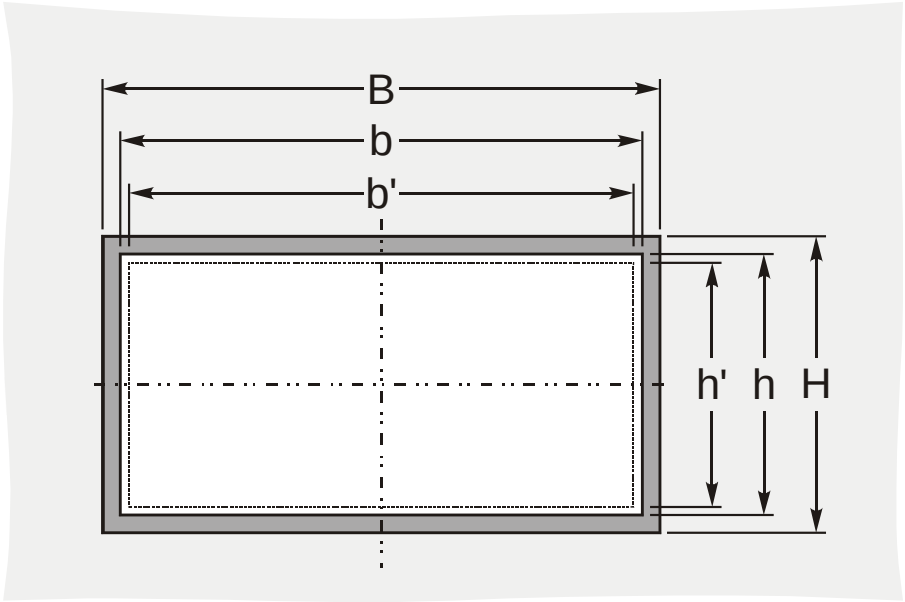


Figure 3-1: Housing - panel-board cut-out

Measure	Description			Tolerance
H	Height	Total	144 mm	---
h		Panel cut-out	138 mm	+ 1.0 mm
h'		Housing dimension	136 mm	
B	Width	Total	192 mm	---
b		Panel cut-out	186 mm	+ 1.1 mm
b'		Housing dimension	185 mm	
	Depth	Total	60.5	---

Table 3-1: Housing - panel cut-out

Dimensions

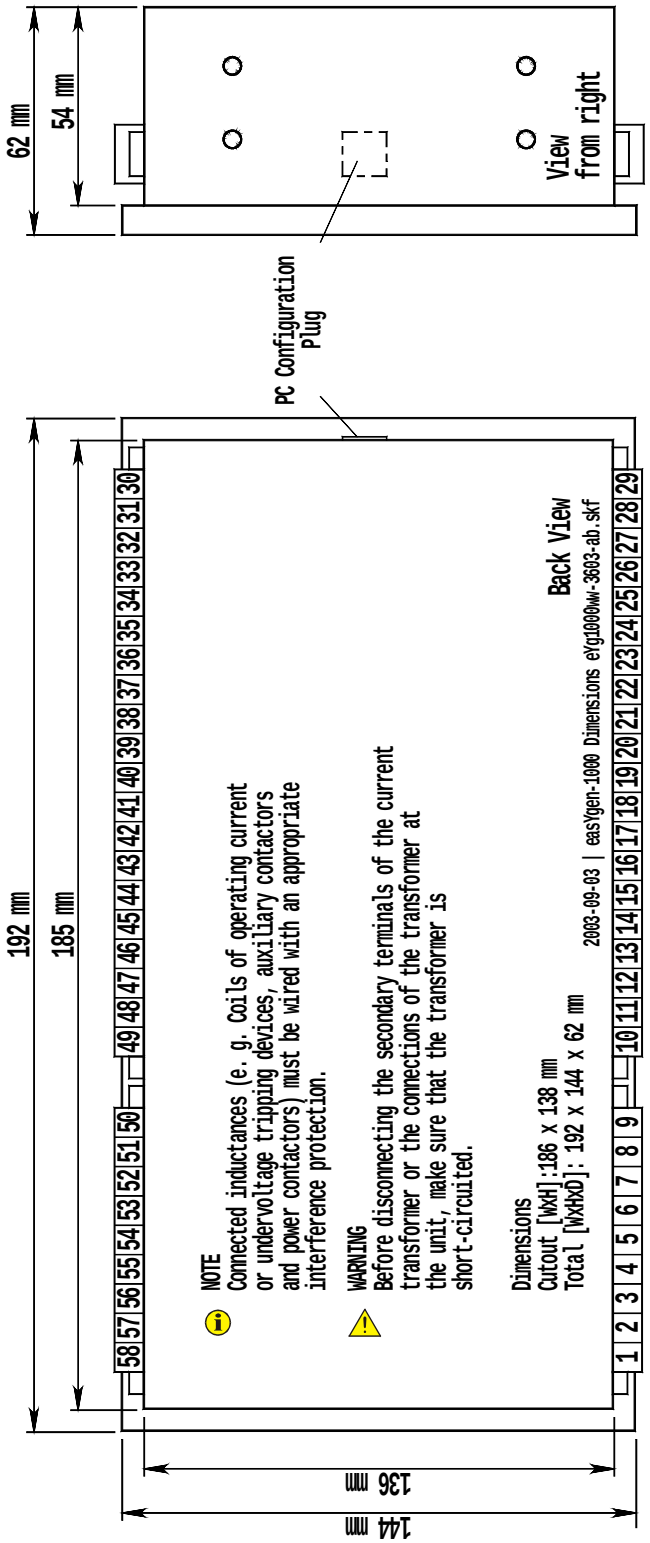


Figure 3-2: Housing - dimensions

Side view

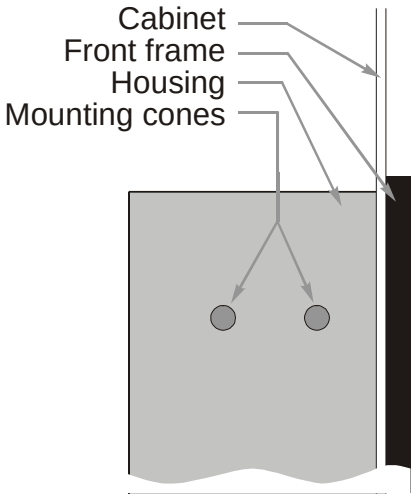


Figure 3-3: Side view - without clamps

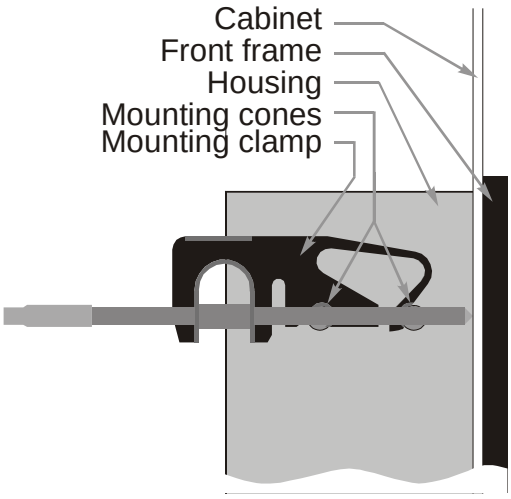
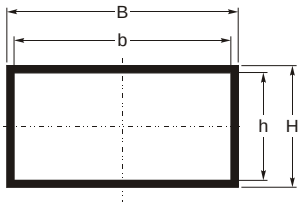


Figure 3-4: Side view - with clamps

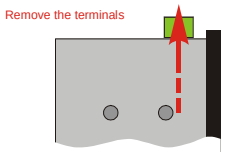
Installation

For installation into a panel door please proceed as follows:

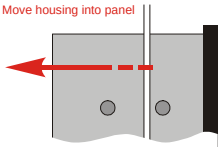
1. **Panel cut-out**
   Cut out the panel according to the dimensions in Figure 3-2.



2. **Remove terminals**
   Loose the side screw and remove the wiring terminals from the unit.

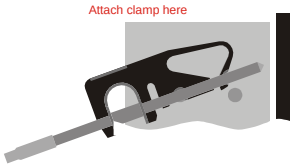


3. **Insert unit into cut-out**
   Insert the unit into the panel cut-out. Verify that the unit fits correctly in the cut-out. If the panel cut-out is not big enough, enlarge it accordingly.

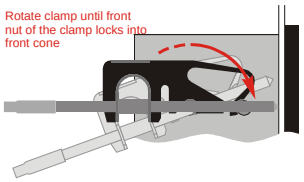


4. **Attach mounting clamps**
   Rotate clamps according to the picture on the right until they snap into the mounting cones.

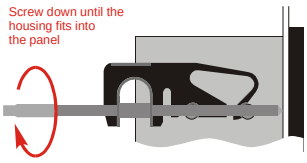
a)



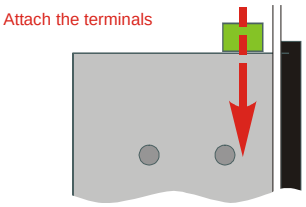
b)



5. **Screw clamps**
   Tighten the screw clamps until the housing is pressed and fixed against the panel. Be careful not to over tighten the clamps which can unsnap the frame from the housing. If this happens remove the unit from the panel and reattach the frame by pressing firmly against the housing.



6. **Reattach terminals**
   Reattach the green wiring terminals, using the side screw to secure.



Note: Using the gasket kit (P/N 8923-1043) increases the IP protection from IP42 to IP54 from front. Mounting of the gasket is described in the manual supplied with the gasket kit.

Chapter 4.
Wiring Diagrams - Overview

NOTE

Please see manual 37181 "Operations Manual" for selection of the application mode. Depending on this setting different terminals will be used.

- Application mode {0} - [BM] - Base Mode - page 16
  - Measuring of engine/generator parameters (e. g. voltages, currents, coolant temp., oil pressure, etc.)
  - Engine start/stop

- Application mode {1o} - [GCB open] - 1-CB-Mode - page 17
  - Measuring of engine/generator parameters (e. g. voltages, currents, coolant temp., oil pressure, etc.)
  - Engine start/stop
  - Engine/generator protection (relay output to open GCB)

- Application mode {1oc} - [GCB open/close] - 1-CB-Mode - page 18
  - Measuring of engine/generator parameters (e. g. voltages, currents, coolant temp., oil pressure, etc.)
  - Engine start/stop
  - Engine/generator protection (relay output to open GCB)
  - GCB operation (relay output to close GCB)

- Application mode {2oc} - [GCB/MCB open/close] - 2-CB-Mode - page 19
  - Measuring of engine/generator parameters (e. g. voltages, currents, coolant temp., oil pressure, etc.)
  - Engine start/stop
  - Engine/generator protection (relay output to open GCB)
  - GCB operation (relay output to close GCB)
  - MCB operation (relay output to open and close the MCB)
  - Mains failure detection (AMF auto mains failure operation) and automatic engine start/stop

Total overview

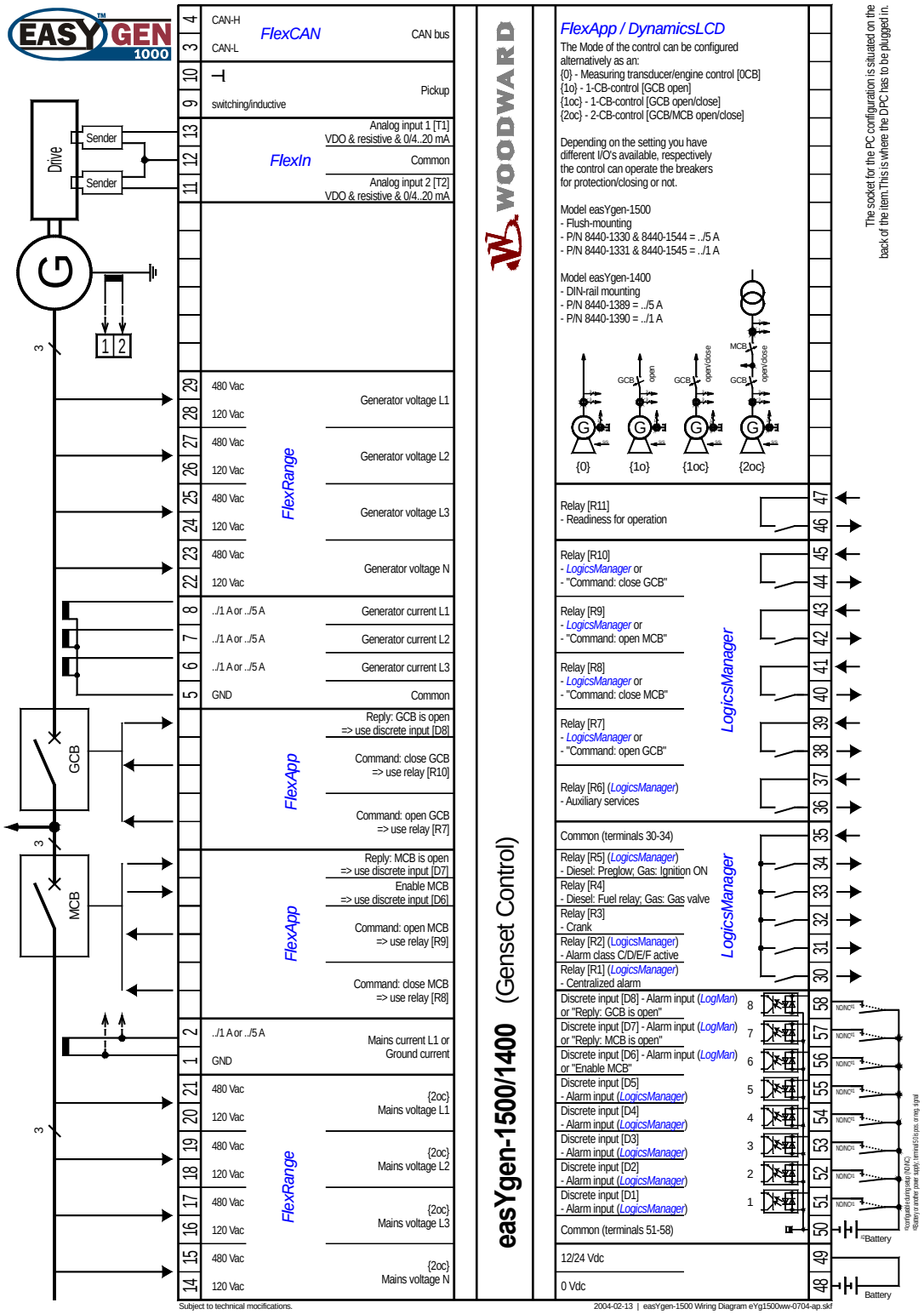
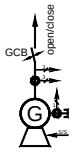
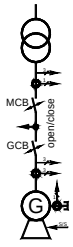


Figure 4-1: Wiring diagram - total overview

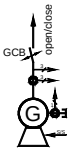
Wiring differences depending on application mode selection

The control can be programmed for one of four possible application modes. Depending on which mode is selected, certain terminals may have a different function. The following table lists all of the control terminals and their associated function for each of the four application modes.

Term.	Description	Type	Hardware	 {0} at page 16	 {1o} at page 17	 {1oc} at page 18	 {2oc} at page 19
1	Ground current #NYI	Measure	GND	✓	✓	✓	✓ #CF alternatively ✓ #CF
2			../1 A or ../5 A #A				
1	Mains current	Measure	GND	---	---	---	
2			L1: ../1 A or ../5 A #A				
3	CAN bus	Interface	CAN-L	✓	✓	✓	✓
4			CAN-H				
5	Generator current	Measure	GND	✓	✓	✓	✓
6			L3: ../1 A or ../5 A #A				
7			L2: ../1 A or ../5 A #A				
8			L1: ../1 A or ../5 A #A				
9	Pickup (magnetic MPU, discrete)	Measure	inductive/switching	✓	✓	✓	✓
10			GND				
11	Analog input	Measure	AI [T2] - alternat. #CF	✓	✓	✓	✓
12			GND				
13			AI [T1] - alternat. #CF				
14	Mains voltage	Measure	N: 120 Vac	---	---	---	✓
15			N: 480 Vac				
16			L3: 120 Vac				
17			L3: 480 Vac				
18			L2: 120 Vac				
19			L2: 480 Vac				
20			L1: 120 Vac				
21			L1: 480 Vac				
22	Generator voltage	Measure	N: 120 Vac	✓	✓	✓	✓
23			N: 480 Vac				
24			L3: 120 Vac				
25			L3: 480 Vac				
26			L2: 120 Vac				
27			L2: 480 Vac				
28			L1: 120 Vac				
29			L1: 480 Vac				

#A - alternatively (different hardware); #NYI - not yet implemented; #CF - selection during and through configuration

Table 4-1: Terminal overview, part 1

Term.	Description	Type	Hardware	 {0} at page 16	 {1o} at page 17	 {1oc} at page 18	 {2oc} at page 19
30	Relay [R1]	Relay	Make contact (NO)	*LogMa* #R	*LogMa* #R	*LogMa* #R	*LogMa* #R
31	Relay [R2]		Make contact (NO)	*LogMa* #R	*LogMa* #R	*LogMa* #R	*LogMa* #R
32	Relay [R3]		Make contact (NO)	Crank			
33	Relay [R4]		Make contact (NO)	Diesel: Fuel magnet; Gas: Gas valve			
34	Relay [R5]		Make contact (NO)	*LogMa* #R			
35	Common		Common	✓	✓	✓	✓
36	Relay [R6]	Relay	Root	Auxiliary services			
37			Make contact (NO)				
38	Relay [R7]	Relay	Root	*LogMa* #R	Command: open GCB		
39			Make contact (NO)				
40	Relay [R8]	Relay	Root	*LogMa* #R	*LogMa* #R	*LogMa* #R	Command: close MCB
41			Make contact (NO)				
42	Relay [R9]	Relay	Root	*LogMa* #R	*LogMa* #R	*LogMa* #R	Command: open MCB
43			Make contact (NO)				
44	Relay [R10]	Relay	Root	*LogMa* #R	*LogMa* #R	Command: close GCB	
45			Make contact (NO)				
46	Relay [R11]	Relay	Root	Readiness for operation			
47			Make contact (NO)				
48	Power supply	Supply	0 Vdc	✓	✓	✓	✓
49			12/24 Vdc				
50	Common	Input	Common	✓	✓	✓	✓
51	Discrete input [D1]		Contact	*LogMa* #D	*LogMa* #D	*LogMa* #D	*LogMa* #D
52	Discrete input [D2]		Contact	*LogMa* #D	*LogMa* #D	*LogMa* #D	*LogMa* #D
53	Discrete input [D3]		Contact	*LogMa* #D	*LogMa* #D	*LogMa* #D	*LogMa* #D
54	Discrete input [D4]		Contact	*LogMa* #D	*LogMa* #D	*LogMa* #D	*LogMa* #D
55	Discrete input [D5]		Contact	*LogMa* #D	*LogMa* #D	*LogMa* #D	*LogMa* #D
56	Discrete input [D6]		Contact	*LogMa* #D	*LogMa* #D	*LogMa* #D	Enab.MCB
57	Discrete input [D7]		Contact	*LogMa* #D	*LogMa* #D	*LogMa* #D	Repl:MCB
58	Discrete input [D8]		Contact	*LogMa* #D	*LogMa* #D	Reply: GCB is closed	

#R - *LogMa* - Relay Manager (via the function ***LogicsManager*** the relays can be programmed freely)
#D - *LogMa* - Discrete Input Manager (via the function ***LogicsManager*** this discrete inputs can be programmed freely)
Repl.MCB..Reply: MCB is closed
Enab.MCB..Enable MCB

Table 4-2: Terminal overview, part 2

Application mode {0}

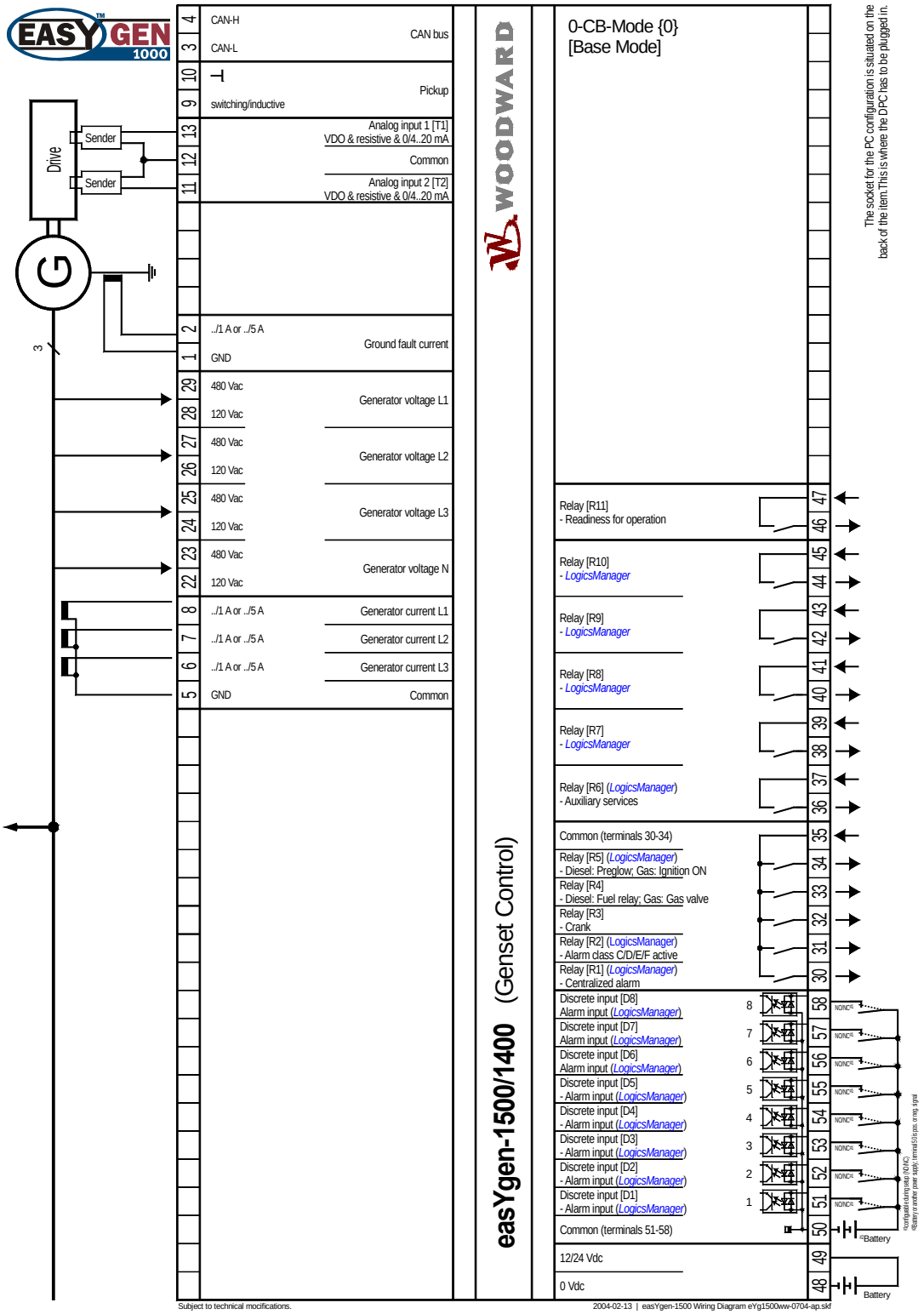


Figure 4-2: Wiring diagram - application mode {0} - base mode

Application mode {1o}

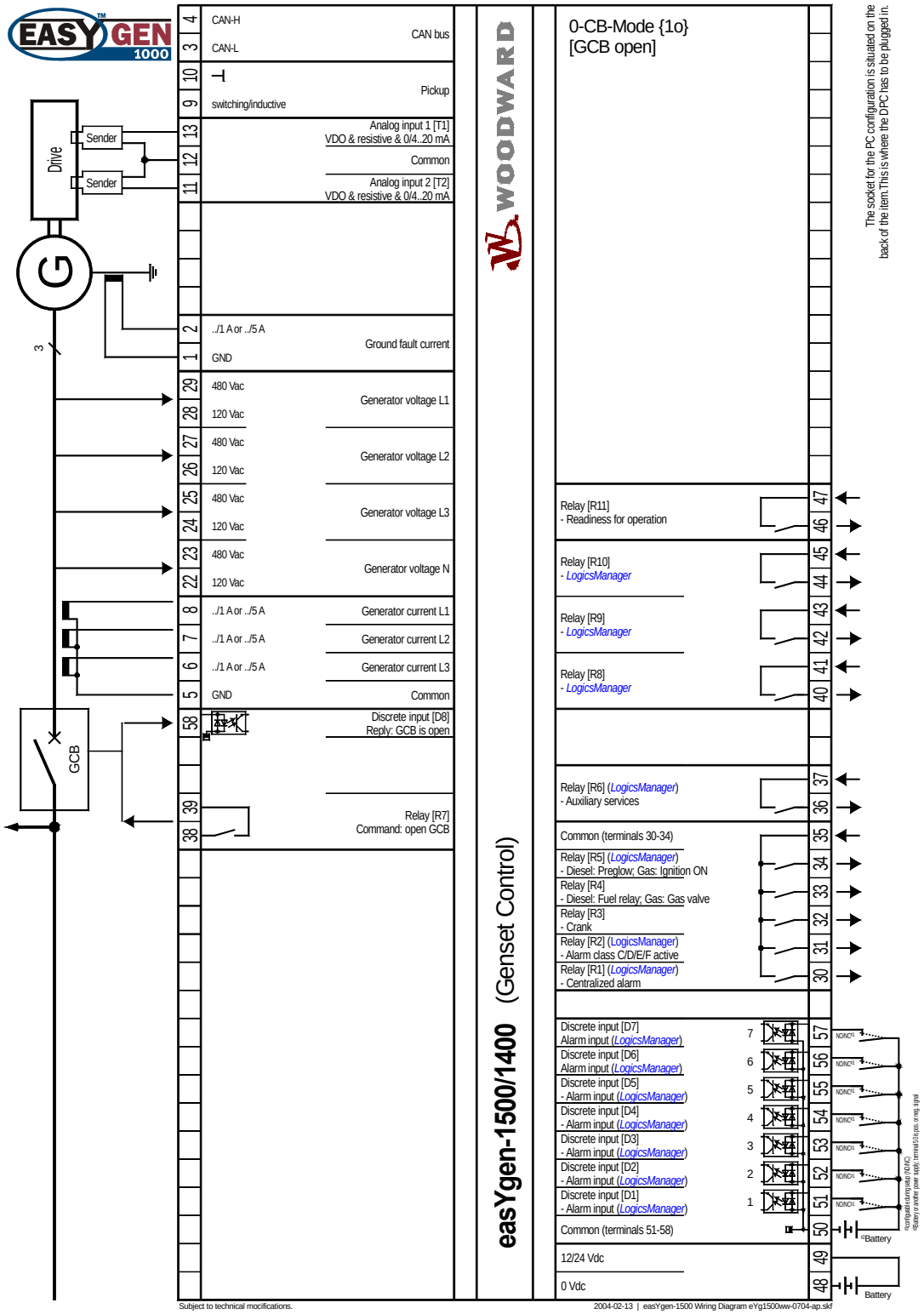


Figure 4-3: Wiring diagram - application mode {1o} - 1 CB mode

Application mode {1oc}

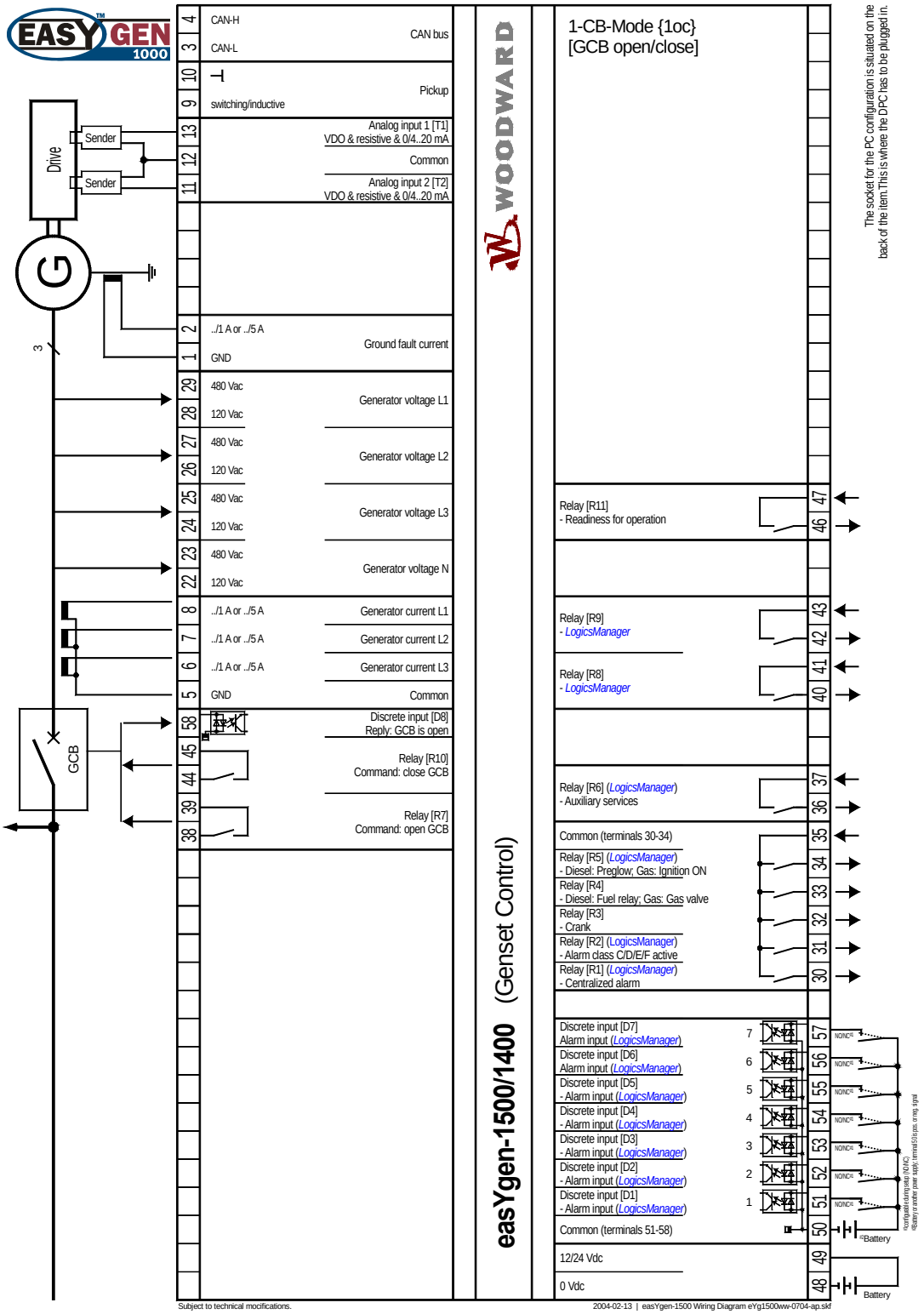


Figure 4-4: Wiring diagram - application mode {1oc} - 1 CB mode

Application mode {2oc}

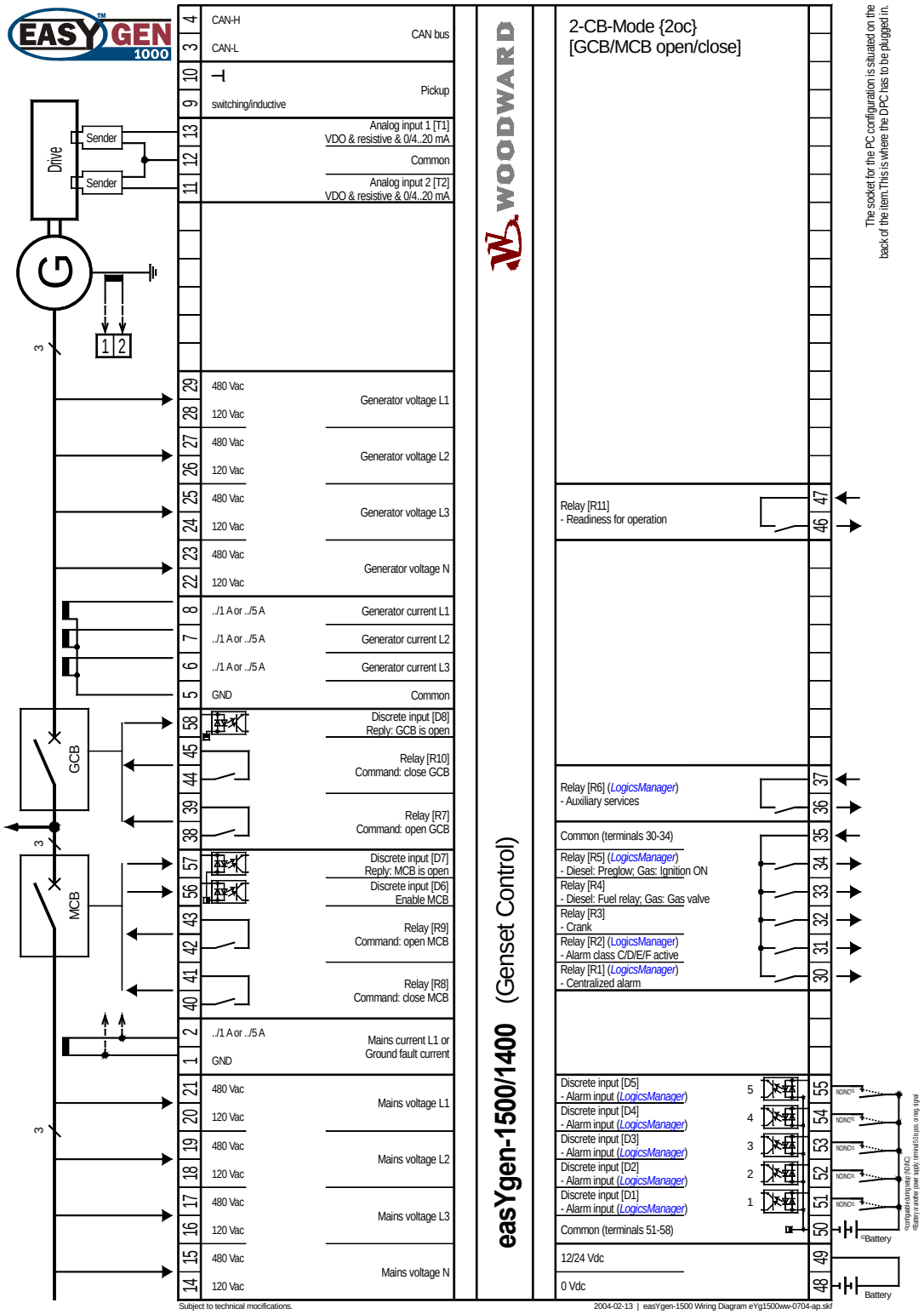


Figure 4-5: Wiring diagram - application mode {2oc} - 2 CB mode

Chapter 5.
Connections

Power supply

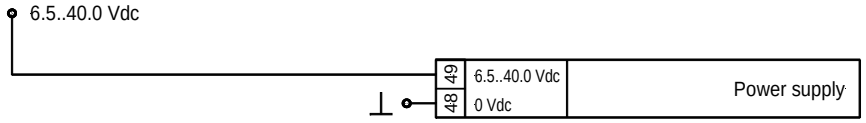


Figure 5-1: Power supply

Connect in application mode ...			
[BM]	[0CB]	[1CB]	[2CB]
✓	✓	✓	✓
✓	✓	✓	✓

Terminal	Description	A_{max}
48	0 Vdc reference potential	2.5 mm²
49	6.5..40.0 Vdc, 15 W	2.5 mm²

Table 5-1: Power supply - terminal assignment

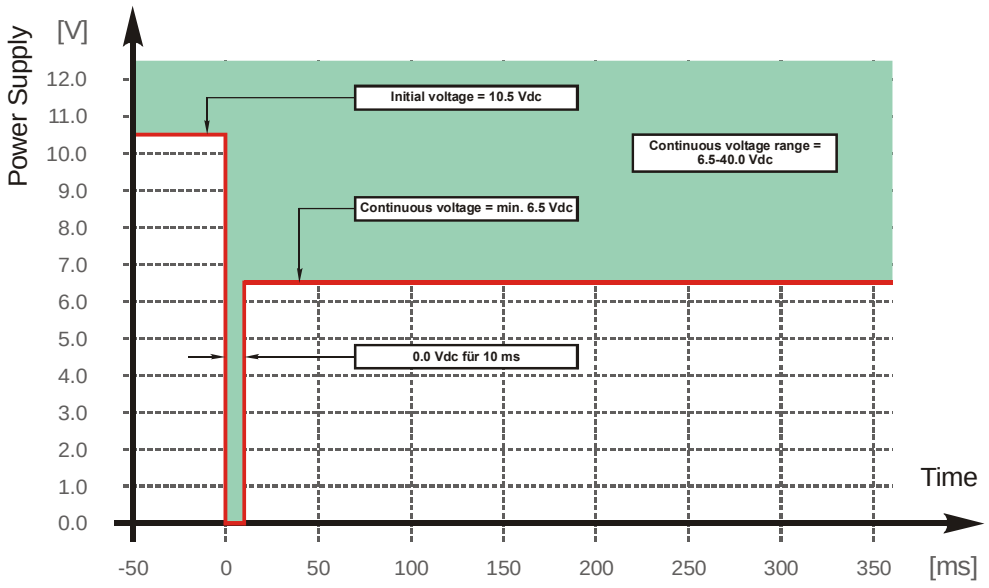


Figure 5-2: Power supply - crank waveform at maximum load

Voltage measuring (*FlexRange*)

NOTE

The measuring voltages may only be attached alternatively either on the input for 120 Vac or to the input for 480 Vac. If both measuring inputs are installed at the same time, this will cause wrong measurements!

Voltage measuring: Generator

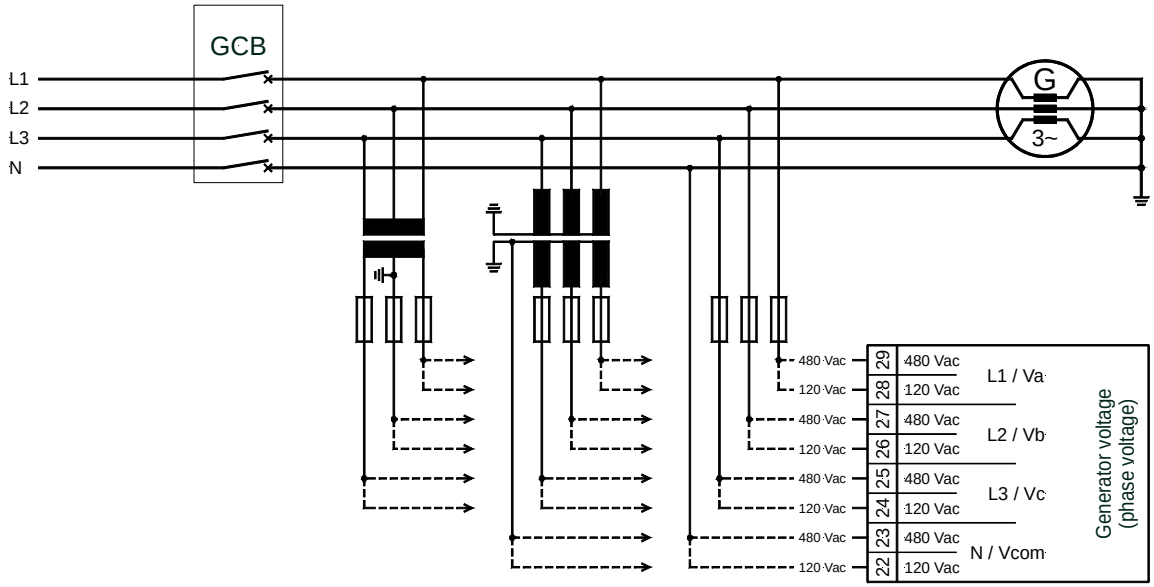


Figure 5-3: Voltage measuring (*FlexRange*) - generator

Connect in application mode ...			
[BM]	[0CB]	[1CB]	[2CB]
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓

Terminal	Description		A_{max}
22	Generator voltage - phase N	120 Vac	2.5 mm²
23		480 Vac	2.5 mm²
24	Generator voltage - phase L3	120 Vac	2.5 mm²
25		480 Vac	2.5 mm²
26	Generator voltage - phase L2	120 Vac	2.5 mm²
27		480 Vac	2.5 mm²
28	Generator voltage - phase L1	120 Vac	2.5 mm²
29		480 Vac	2.5 mm²

Table 5-2: Voltage measuring (*FlexRange*) - terminal assignment - generator voltage

Voltage measuring: Generator, parameter setting '3ph 4w' (3phase, 4wire)

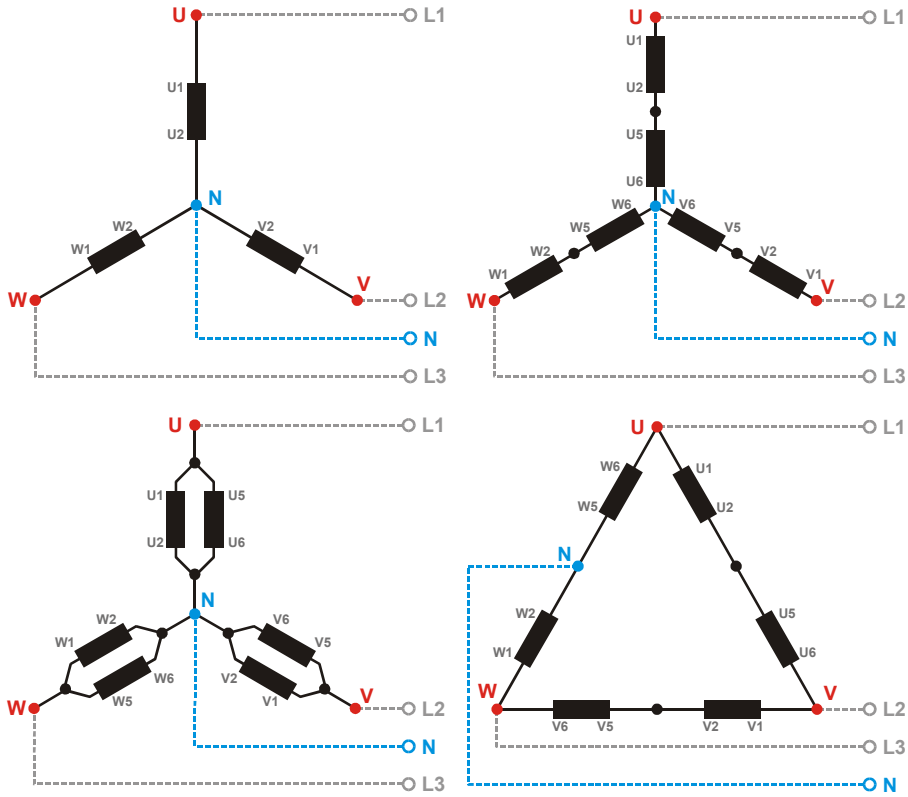


Figure 5-4: Voltage measuring (***FlexRange***) -generator, 3ph 4w

3ph 4w	Wiring terminals								Notes
Rated voltage	120 Vac				480 Vac				1
Range (max.)	0..150 Vac				0..600 Vac				
easYgen	28	26	24	22	29	27	25	23	
Phase	L1	L2	L3	N	L1	L2	L3	N	

Table 5-3: Voltage measuring (*FlexRange*) - terminal assignment - generator, 3ph 4w

1 For different voltage systems different wiring terminals have to be used. A simultaneous use of the N terminal is not possible can can lead to wrong measuring.

Voltage measuring: Generator, parameter setting '3ph 3w' (3phase, 3wire)

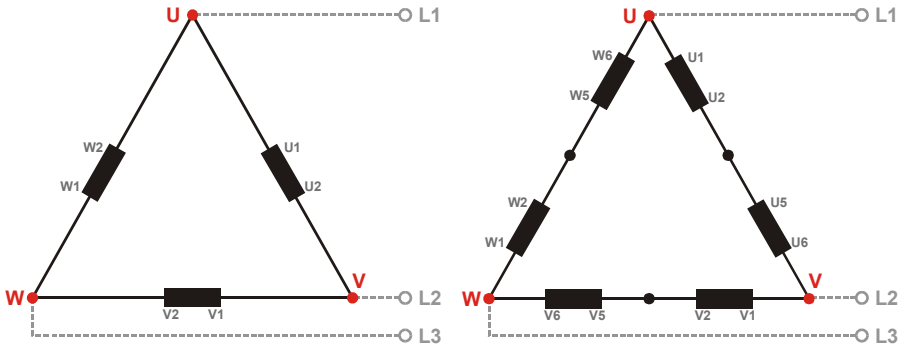


Figure 5-5: Voltage measuring (***FlexRange***) - generator, 3ph 3w

3ph 3w	Wiring terminals								Notes
Rated voltage	120 Vac				480 Vac				2
Range (max.)	0..150 Vac				0..600 Vac				
easYgen	28	26	24	22	29	27	25	23	
Phase	L1	L2	L3	---	L1	L2	L3	---	

Table 5-4: Voltage measuring (*FlexRange*) - terminal assignment - generator, 3ph 3w

2 For different voltage systems different wiring terminals have to be used. A simultaneous use of the N terminal is not possible can can lead to wrong measuring.

Voltage measuring: Generator, parameter setting '1ph 3w' (1phase, 3wire)

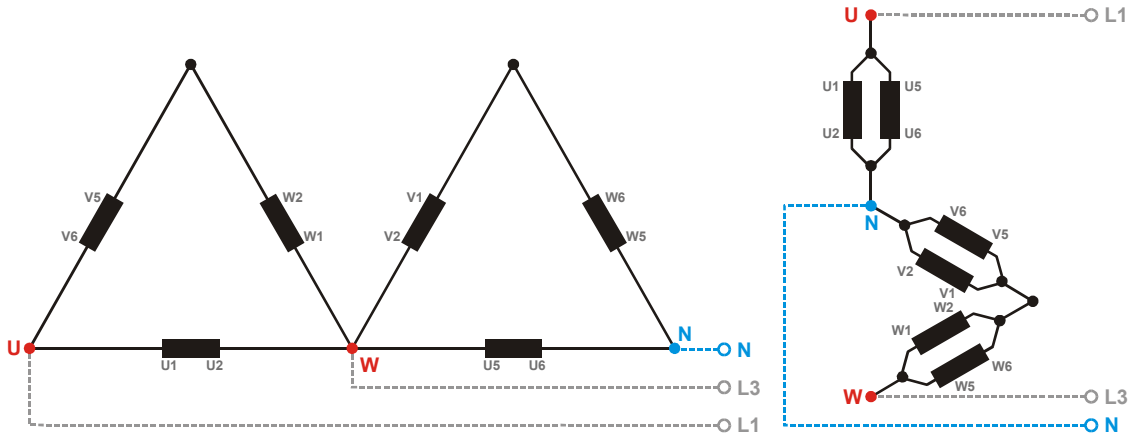


Figure 5-6: Voltage measuring (*FlexRange*) - generator, 1ph 3w

1p 3w	Wiring terminals								Notes
Rated voltage	120 Vac				480 Vac				3
Range (max.)	0..150 Vac				0..600 Vac				
easYgen	28	26	24	22	29	27	25	23	
Phase	L1	N	L3	N	L1	N	L3	N	

Table 5-5: Voltage measuring (*FlexRange*) - terminal assignment - generator, 1ph 3w

Voltage measuring: Generator, parameter setting '1ph 2w' (1phase, 2wire)

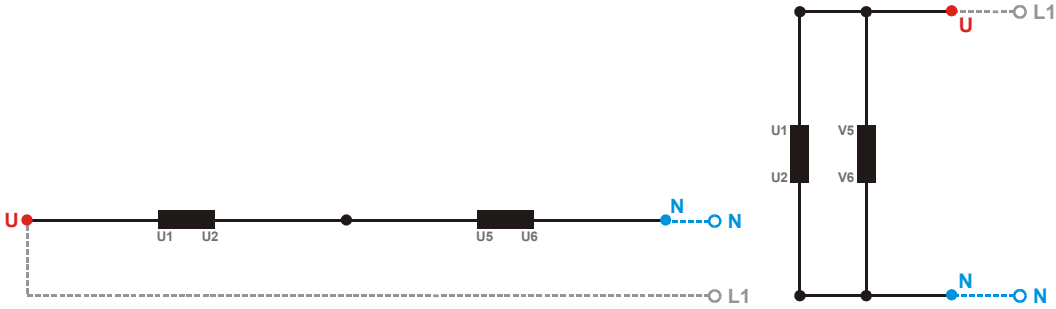


Figure 5-7: Voltage measuring (*FlexRange*) - generator, 1ph 2w

1ph 2w	Wiring terminals								Notes
Rated voltage	120 Vac				480 Vac				3
Range (max.)	0..150 Vac				0..600 Vac				
easYgen	28	26	24	22	29	27	25	23	
Phase	L1	N	N	N	L1	N	N	N	

Table 5-6: Voltage measuring (*FlexRange*) - terminal assignment - generator, 1ph 2w

3 For different voltage systems different wiring terminals have to be used. A simultaneous use of the N terminal is not possible can can lead to wrong measuring.

Mains

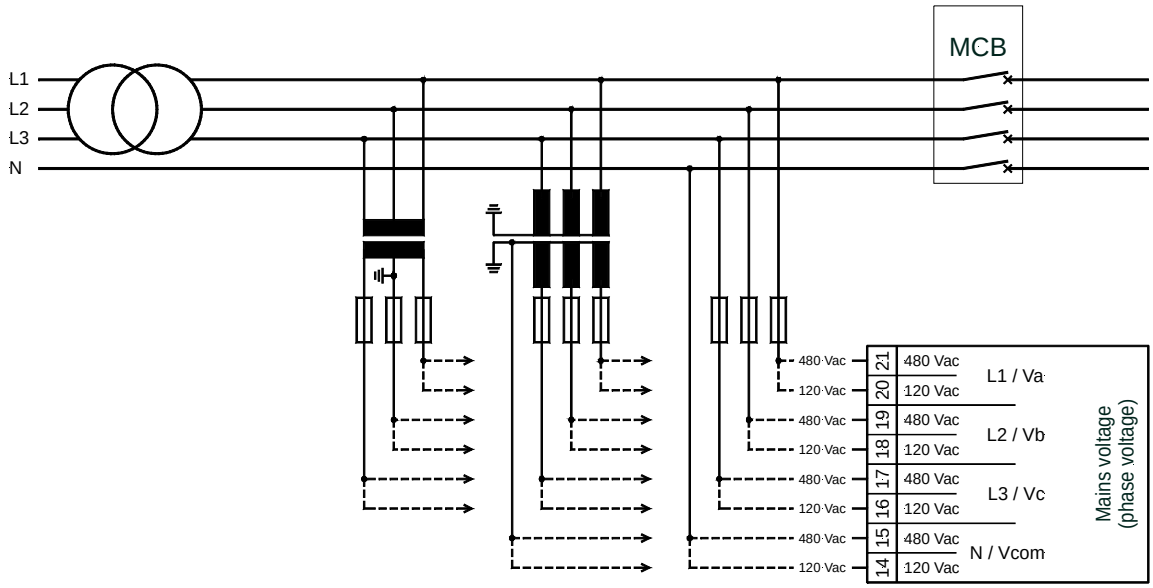


Figure 5-8: Voltage measuring (***FlexRange***) - mains

Connect in application mode ...			
[BM]	[0CB]	[1CB]	[2CB]
---	---	---	✓
---	---	---	✓
---	---	---	✓
---	---	---	✓
---	---	---	✓
---	---	---	✓
---	---	---	✓
---	---	---	✓

Terminal	Description		A_{max}
14	Mains voltage - phase N	120 Vac	2.5 mm²
15		480 Vac	2.5 mm²
16	Mains voltage - phase L3	120 Vac	2.5 mm²
17		480 Vac	2.5 mm²
18	Mains voltage - phase L2	120 Vac	2.5 mm²
19		480 Vac	2.5 mm²
20	Mains voltage - phase L1	120 Vac	2.5 mm²
21		480 Vac	2.5 mm²

Table 5-7: Voltage measuring (***FlexRange***) - terminal assignment - mains voltage

Voltage measuring: Mains, parameter setting '3ph 4w' (3phase, 4wire)

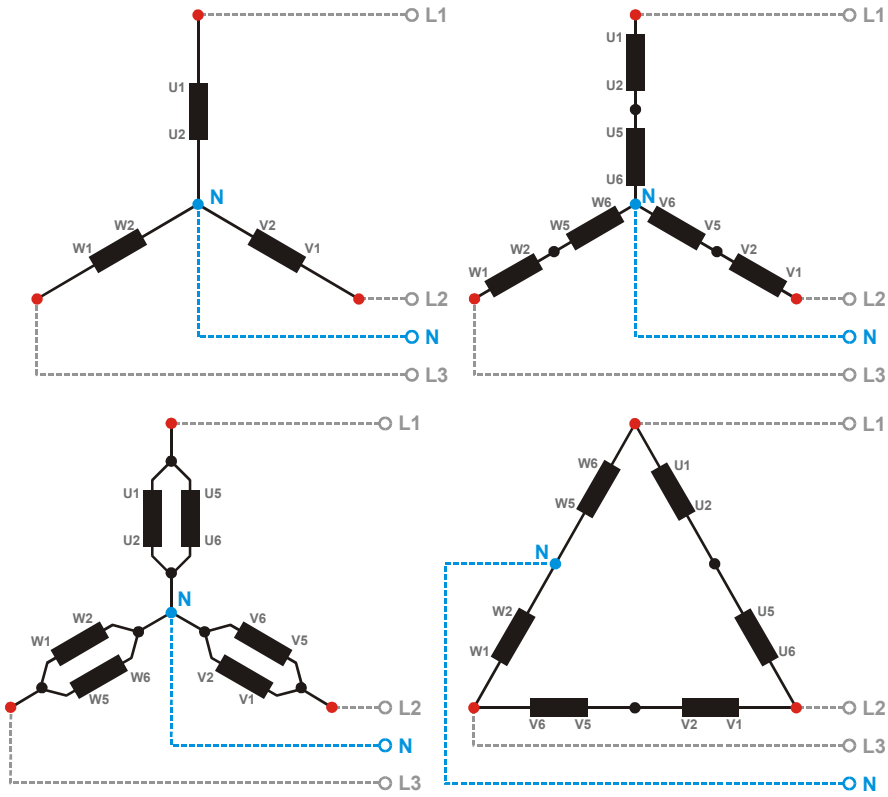


Figure 5-9: Voltage measuring (***FlexRange***) - mains, 3ph 4w

3ph 4w	Wiring terminals								Notes
Rated voltage	120 Vac				480 Vac				4
Range (max.)	0..150 Vac				0..600 Vac				
easYgen	20	18	16	14	21	19	17	15	
Phase	L1	L2	L3	N	L1	L2	L3	N	

Table 5-8: Voltage measuring (*FlexRange*) - terminal assignment - mains, 3ph 4w

4 For different voltage systems different wiring terminals have to be used. A simultaneous use of the N terminal is not possible can can lead to wrong measuring.

Voltage measuring: Mains, parameter setting '3ph 3w' (3phase, 3wire)

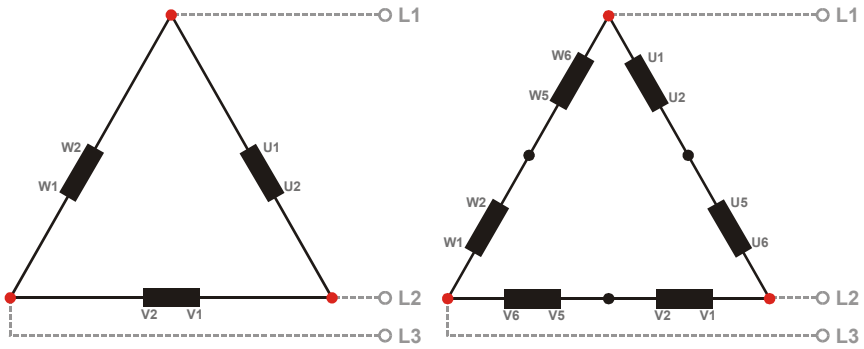


Figure 5-10: Voltage measuring (***FlexRange***) - mains, 3ph 3w

3ph 3w	Wiring terminals								Nots
Rated voltage	120 Vac				480 Vac				5
Range (max.)	0..150 Vac				0..600 Vac				
easYgen	20	18	16	14	21	19	17	15	
Phase	L1	L2	L3	---	L1	L2	L3	---	

Table 5-9: Voltage measuring (*FlexRange*) - terminal assignment - mains, 3ph 3w

5 For different voltage systems different wiring terminals have to be used. A simultaneous use of the N terminal is not possible can can lead to wrong measuring.

Voltage measuring: Mains, parameter setting '1ph 3w' (1phase, 3wire)

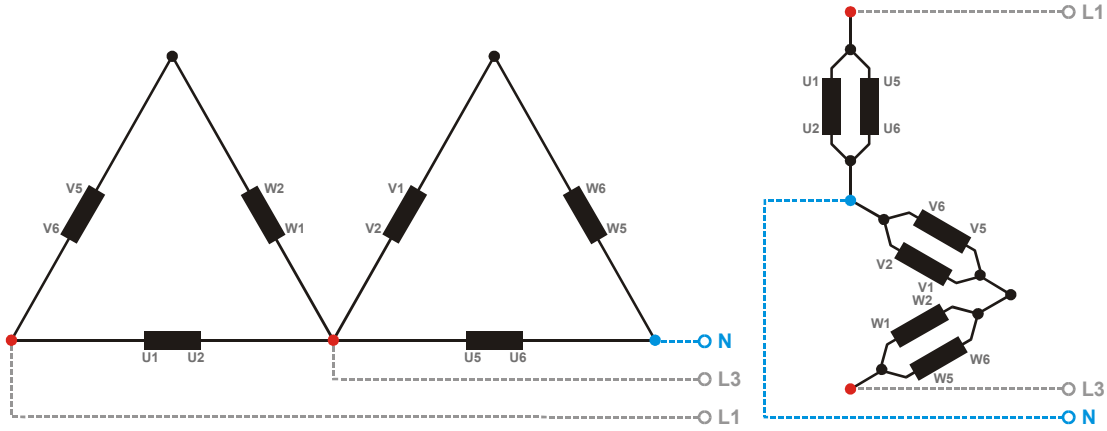


Figure 5-11: Voltage measuring (*FlexRange*) - mains, 1ph 3w

1p 3w	Wiring terminals								Nots
Rated voltages	120 Vac				480 Vac				6
Range (max.)	0..150 Vac				0..600 Vac				
easYgen	20	18	16	14	21	19	17	15	
Phase	L1	N	L3	N	L1	N	L3	N	

Table 5-10: Voltage measuring (*FlexRange*) - terminal assignment - mains, 1ph 3w

Voltage measuring: Mains, parameter setting '1ph 2w' (1phase, 2wire)

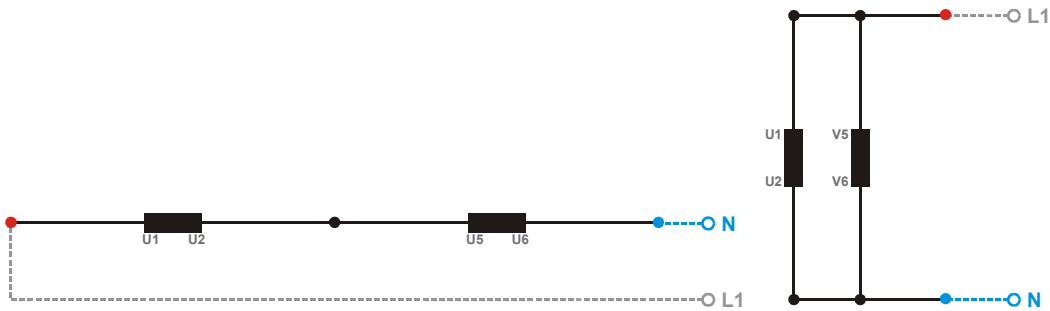


Figure 5-12: Voltage measuring (*FlexRange*) - mains, 1ph 2w

1p 2w	Wiring terminals								Notes
Rated voltages	120 Vac				480 Vac				6
Range (max.)	0..150 Vac				0..600 Vac				
easYgen	20	18	16	14	21	19	17	15	
Phase	L1	N	N	N	L1	N	N	N	

Table 5-11: Voltage measuring (*FlexRange*) - terminal assignment - mains, 1ph 2w

6 For different voltage systems different wiring terminals have to be used. A simultaneous use of the N terminal is not possible can can lead to wrong measuring.

Current measuring

CAUTION

Before disconnecting the secondary current transformer/CT's connections or the connections of the current transformer/CT's at the device, make sure that the current transformer/CT's is short-circuited.

Generator

NOTE

Please connect the wires of the current transducer "I (s)" as near as possible to the unit.

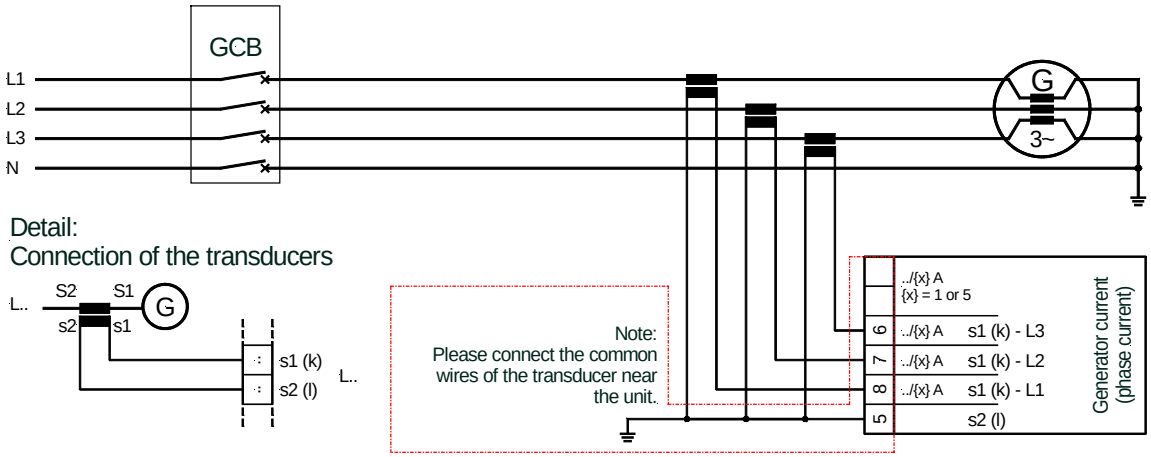


Figure 5-13: Current measuring - generator

Connect in application mode ...			
[BM]	[0CB]	[1CB]	[2CB]
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓
✓	✓	✓	✓

Terminal	Description	A_{max}
5	Generator current - phases L1/L2/L3 - transformer terminals s2 (I)	2.5 mm²
6	Generator current - phase L3 - transformer terminal s1 (k)	2.5 mm²
7	Generator current - phase L2 - transformer terminal s1 (k)	2.5 mm²
8	Generator current - phase L1 - transformer terminal s1 (k)	2.5 mm²

Table 5-12: Current measuring - terminal assignment - generator current

Current measuring: Generator, parameter setting 'L1 L2 L3'

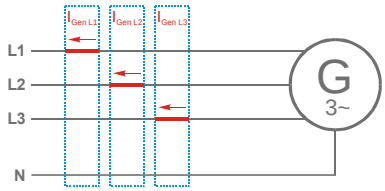


Figure 5-14: Current measuring - generator, L1 L2 L3

L1 L2 L3	Wiring terminals				Notes
easYgen	8	7	6	5	
Phase	L1	L2	L3	GND	

Table 5-13: Current measuring - terminal assignment - generator, L1 L2 L3

Current measuring: Generator, parameter setting 'Phase L1', 'Phase L2' & 'Phase L3'

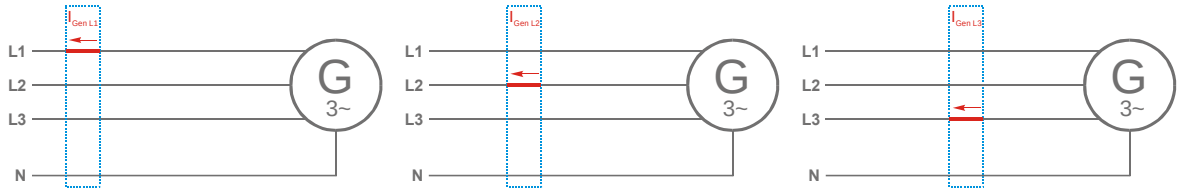


Figure 5-15: Current measuring - Generator, Phase Lx

	Wiring terminals				Notse
Phase L1					
easYgen	8	7	6	5	
Phase	L1	---	---	GND	
Phase L2					
easYgen	8	7	6	5	
Phase	---	L2	---	GND	
Phase L3					
easYgen	8	7	6	5	
Phase	---	---	L3	GND	

Table 5-14: Current measuring - terminal assignment - generator, Phase Lx

Mains current ({2oc} only)

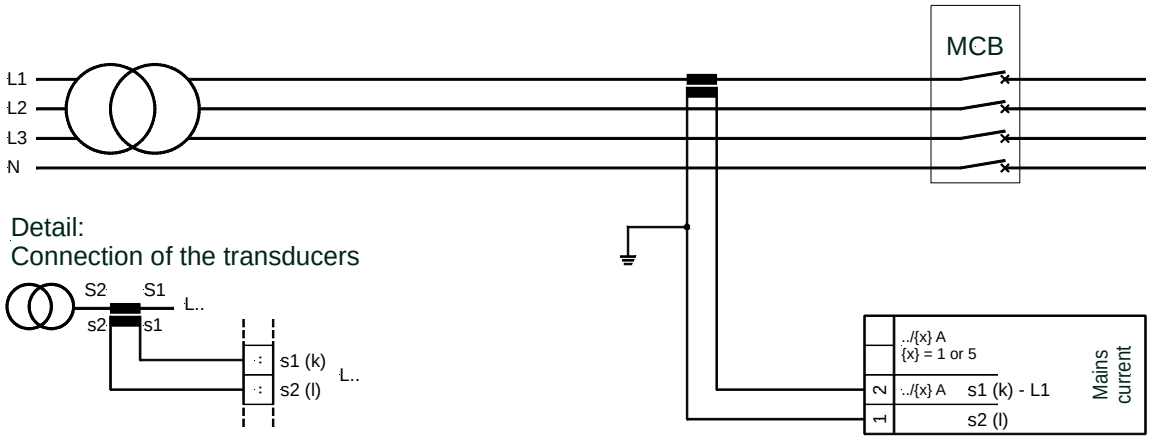


Figure 5-16: Current measuring - mains current

Connect in application mode ...			
[BM]	[0CB]	[1CB]	[2CB]
---	---	---	☑
---	---	---	☑

Terminal	Description	A_{max}
1	Mains current - phase L1 - transformer terminal s2 (l)	2.5 mm²
2	Mains current - phase L1 - transformer terminal s1 (k)	2.5 mm²

Table 5-15: Current measuring - terminal assignment - mains current

Current measuring: Mains, parameter setting 'Phase L1', 'Phase L2' & 'Phase L3'

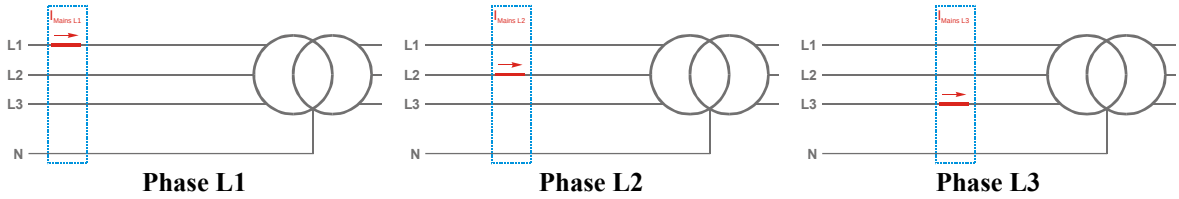


Figure 5-17: Current measuring - generator, Phase Lx

	Wiring terminals		Notes
Phase L1			
easYgen	1	2	
Phase	GND	L1	
Phase L2			
easYgen	1	2	
Phase	GND	L2	
Phase L3			
easYgen	1	2	
Phase	GND	L3	

Table 5-16: current measuring - terminal assignment - generator, Phase Lx

Power measuring

If the unit's current transformers are wired according to the diagram shown, the following values are displayed.

NOTE

The value of the reactive power measuring is valid for symmetric systems only.

Application mode	Parameter	Description	Sign displayed
{BM}-{1o}-{1oc}-{2oc}	Generator real power		Positive
{BM}-{1o}-{1oc}-{2oc}	Generator real power		Negative
{BM}-{1o}-{1oc}-{2oc}	Generator power factor cos φ	Inductive / lagging	Positive
{BM}-{1o}-{1oc}-{2oc}	Generator power factor cos φ	Capacitive / leading	Negative
{BM}-{1o}-{1oc}-{2oc}	Mains real power	Plant exporting kW	Positive
{BM}-{1o}-{1oc}-{2oc}	Mains real power	Plant importing kW	Negative
{BM}-{1o}-{1oc}-{2oc}	Mains power factor cos φ	Plant generating kvar's	Positive
{BM}-{1o}-{1oc}-{2oc}	Mains power factor cos φ	Plant absorbing kvar's	Negative

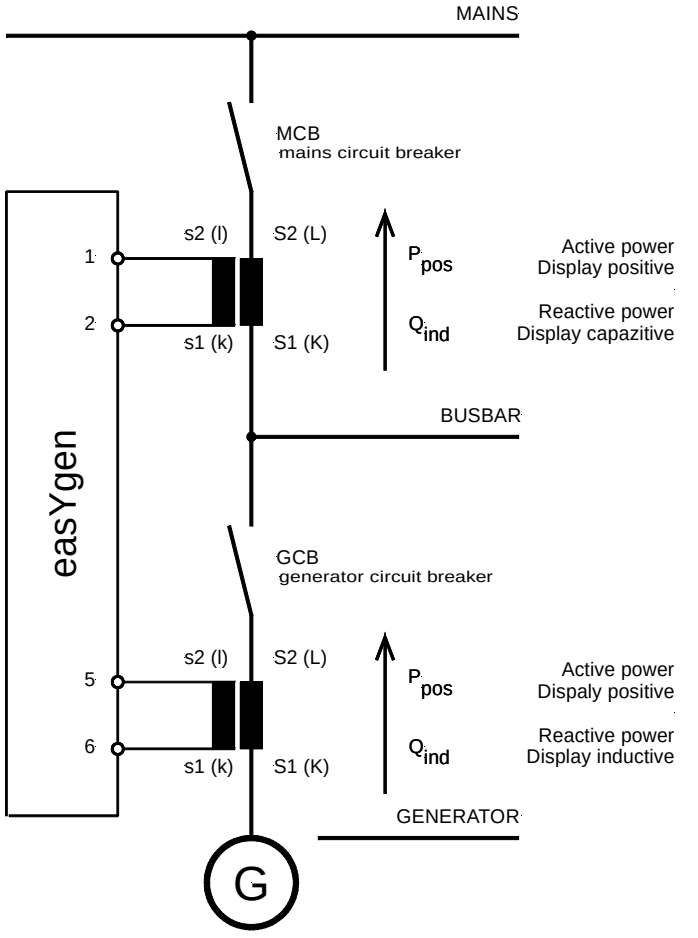


Figure 5-18: Power measuring - direction of power

Pickup

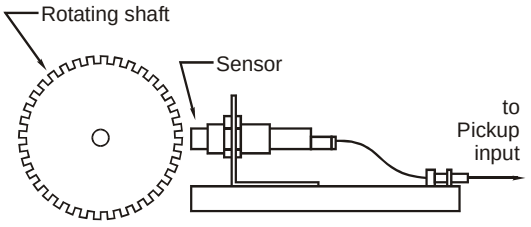


Figure 5-19: Pickup - principle overview

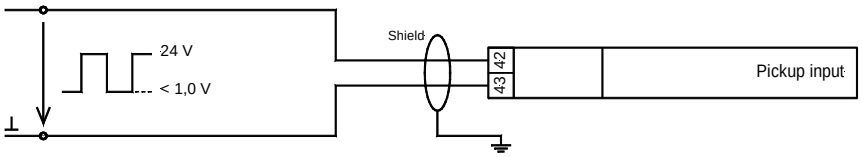


Figure 5-20: Pickup input

Connect in application mode ...			
[BM]	[0CB]	[1CB]	[2CB]
✓	✓	✓	✓
✓	✓	✓	✓

Terminal	Description		A_{max}
9	Pickup input	inductive/switching	2.5 mm²
10		GND	2.5 mm²

Table 5-17: Pickup - terminal assignment

NOTE

The input frequency of the Pickup has to be limited to 14 kHz.

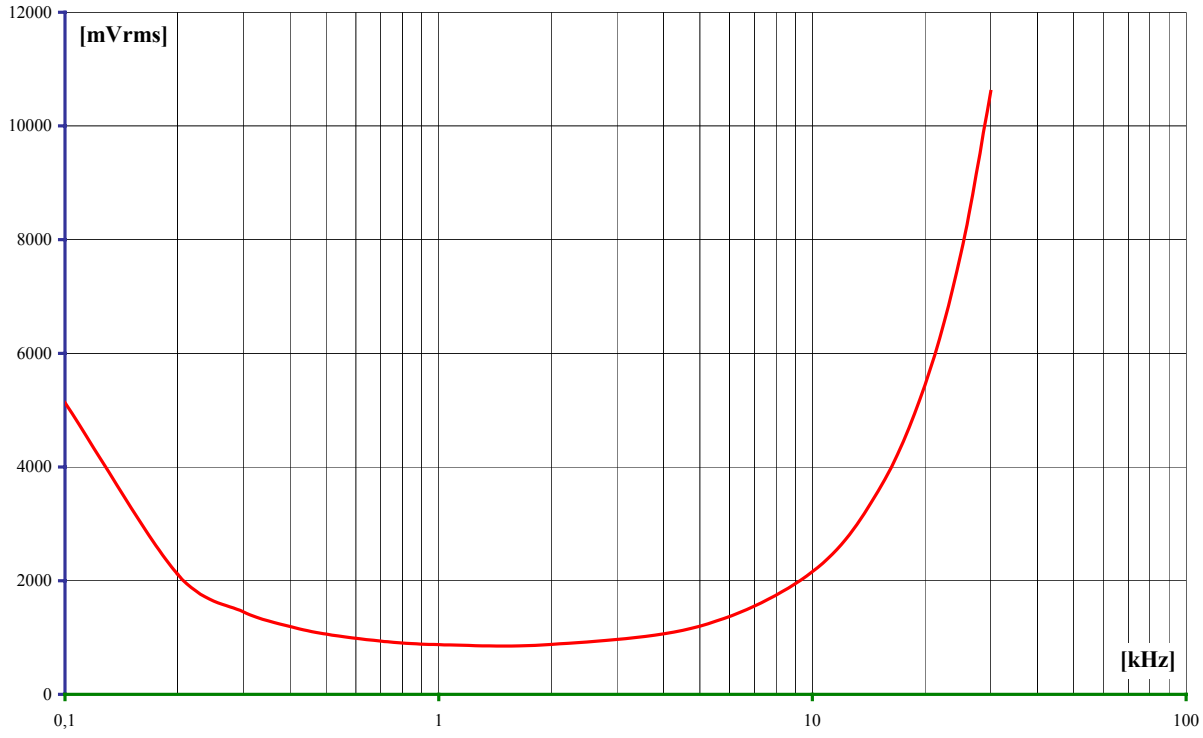


Figure 5-21: Minimal necessary input voltage depending on frequency

Discrete inputs

Positive logic
(usable alternatively to negative logic - see next chapter)

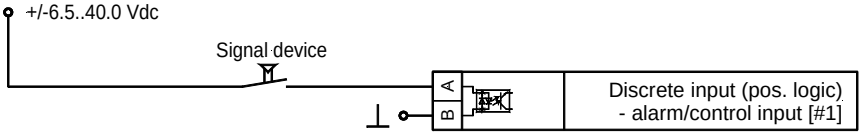


Figure 5-22: Discrete inputs - alarm/control inputs [type #1] - positive logic

For the circuit breaker reply inputs the input is closed when the breaker is opened. This would be a "B" type contact on the circuit breaker.

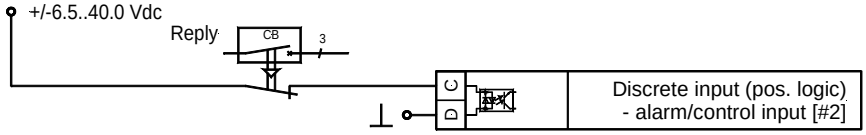


Figure 5-23: Discrete inputs - alarm/control inputs [type #2] - positive logic

Connect in application mode ...				Terminal		Description				A_{max}
[BM]	[0CB]	[1CB]	[2CB]	Term. **A / C**	Com. **B / D**				Type ⇩	
✓	✓	✓	✓	51	50	Discrete input [D1]	[BM] - [0CB] - [1CB] - [2CB] -	Alarm input (programmable)	SW	2.5 mm²
✓	✓	✓	✓	52		Discrete input [D2]	[BM] - [0CB] - [1CB] - [2CB] -	Alarm input (programmable)	SW	2.5 mm²
✓	✓	✓	✓	53		Discrete input [D3]	[BM] - [0CB] - [1CB] - [2CB] -	Alarm input (programmable)	SW	2.5 mm²
✓	✓	✓	✓	54		Discrete input [D4]	[BM] - [0CB] - [1CB] - [2CB] -	Alarm input (programmable)	SW	2.5 mm²
✓	✓	✓	✓	55		Discrete input [D5]	[BM] - [0CB] - [1CB] - [2CB] -	Alarm input (programmable)	SW	2.5 mm²
✓	✓	✓	✓	56		Discrete input [D6]	[BM] - [0CB] - [1CB] - [2CB] -	Alarm input (programmable) Alarm input (programmable) Alarm input (programmable) Enable MCB	SW SW SW SW	2.5 mm²
✓	✓	✓	✓	57		Discrete input [D7]	[BM] - [0CB] - [1CB] - [2CB] -	Alarm input (programmable) Alarm input (programmable) Alarm input (programmable) Reply: MCB is open	SW SW SW #2	2.5 mm²
✓	✓	✓	✓	58		Discrete input [D8]	[BM] - [0CB] - [1CB] - [2CB] -	Alarm input (programmable) Alarm input (programmable) Reply: GCB is open Reply: GCB is open	SW SW #2 #2	2.5 mm²

SW..switchable via the software, [#1]..type 1 (NO/make contact), [#2]..type 2 (NC/break contact)

Table 5-18: Discrete input - terminal assignment - alarm/control input - positive logic

Negative logic
(usable alternatively to positive logic - see previous chapter)

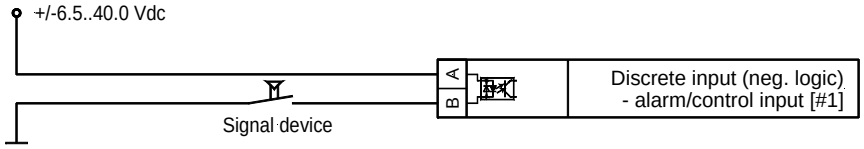


Figure 5-24: Discrete inputs - alarm/control inputs [type #1] - negative logic

For the circuit breaker reply inputs the input is closed when the breaker is opened. This would be a "B" type contact on the circuit breaker.

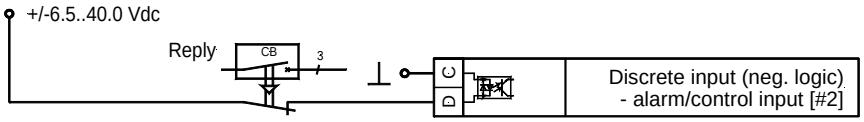


Figure 5-25: Discrete input - alarm/control inputs [type #2] - negative logic

Connect in application mode ... [BM]	[0CB]	[1CB]	[2CB]	Terminal Com. A / C	Term. B / D	Description				A_{max}
									Type ⇩	
✓	✓	✓	✓	50	51	Discrete input [D1]	[BM] - [0CB] - [1CB] - [2CB] -	Alarm input (programmable)	SW	2.5 mm²
✓	✓	✓	✓		52	Discrete input [D2]	[BM] - [0CB] - [1CB] - [2CB] -	Alarm input (programmable)	SW	2.5 mm²
✓	✓	✓	✓		53	Discrete input [D3]	[BM] - [0CB] - [1CB] - [2CB] -	Alarm input (programmable)	SW	2.5 mm²
✓	✓	✓	✓		54	Discrete input [D4]	[BM] - [0CB] - [1CB] - [2CB] -	Alarm input (programmable)	SW	2.5 mm²
✓	✓	✓	✓		55	Discrete input [D5]	[BM] - [0CB] - [1CB] - [2CB] -	Alarm input (programmable)	SW	2.5 mm²
✓	✓	✓	✓		56	Discrete input [D6]	[BM] -	Alarm input (programmable)	SW	2.5 mm²
							[0CB] -	Alarm input (programmable)	SW	
							[1CB] -	Alarm input (programmable)	SW	
							[2CB] -	Enable MCB	SW	
✓	✓	✓	✓		57	Discrete input [D7]	[BM] -	Alarm input (programmable)	SW	2.5 mm²
							[0CB] -	Alarm input (programmable)	SW	
							[1CB] -	Alarm input (programmable)	SW	
							[2CB] -	Reply: MCB is open	#2	
✓	✓	✓	✓		58	Discrete input [D8]	[BM] -	Alarm input (programmable)	SW	2.5 mm²
							[0CB] -	Alarm input (programmable)	SW	
							[1CB] -	Reply: GCB is open	#2	
							[2CB] -	Reply: GCB is open	#2	

SW..switchable via software, [#1]..type 1 (NO/make contact), [#2]..type 2 (NC/break contact)

Table 5-19: Discrete input - terminal assignment - alarm/control inputs - negative logic

Relay outputs
(control outputs and *LogicsManager*)

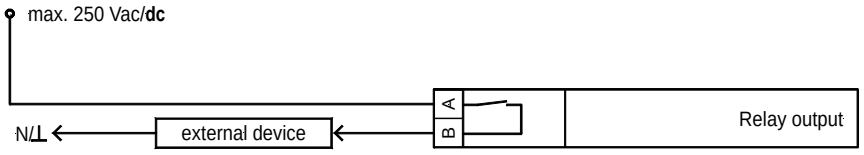


Figure 5-26: Relay outputs

Connect in application mode ... {0}	{1o}	{1oc}	{2oc}	Terminal Term.	Terminal Com.	Description				A_{max}
				A	**B**	**Form A, common contact**			Type ⇩	
✓	✓	✓	✓	30	35	Relay output [R1]	[BM] -	*LogicsManager*	SW	2.5 mm²
							[0CB] -		SW	
							[1CB] -		SW	
							[2CB] -		SW	
✓	✓	✓	✓	31		Relay output [R2]	[BM] -	*LogicsManager*	SW	2.5 mm²
							[0CB] -		SW	
							[1CB] -		SW	
							[2CB] -		SW	
✓	✓	✓	✓	32		Relay output [R3]	[BM] -	Crank	SW	2.5 mm²
							[0CB] -		SW	
							[1CB] -		SW	
							[2CB] -		SW	
✓	✓	✓	✓	33		Relay output [R4]	[BM] -	Diesel: Fuel relay Gas: Gas valve	SW	2.5 mm²
							[0CB] -		SW	
							[1CB] -		SW	
							[2CB] -		SW	
✓	✓	✓	✓	34		Relay output [R5]	[BM] -	*LogicsManager*	SW	2.5 mm²
							[0CB] -		SW	
							[1CB] -		SW	
							[2CB] -		SW	

LogicsManager..using the function ***LogicsManager*** it is possible to freely program the relays
SW..switchable via the software, [#1]..type 1 (NO/make contact)

Table 5-20: Relay outputs - terminal assignment, part 1

Connect in application mode ...				Terminal		Description			A_{max}
{0}	{1o}	{1oc}	{2oc}	Term.	Com.				
				A	**B**	**Form A, separated contacts**		Type ⇩	
✓	✓	✓	✓	36	37	Relay output [R6]	[BM] -	SW	2.5 mm²
							[0CB] - *LogicsManager*	SW	
							[1CB] -	SW	
							[2CB] -	SW	
✓	✓	✓	✓	38	39	Relay output [R7]	[BM] - *LogicsManager*	SW	2.5 mm²
							[0CB] - Command: open GCB	#1	
							[1CB] - Command: open GCB	#1	
							[2CB] - Command: open GCB	#1	
✓	✓	✓	✓	40	41	Relay output [R8]	[BM] - *LogicsManager*	SW	2.5 mm²
							[0CB] - *LogicsManager*	SW	
							[1CB] - *LogicsManager*	SW	
							[2CB] - Command: close MCB	#1	
✓	✓	✓	✓	42	43	Relay output [R9]	[BM] - *LogicsManager*	SW	2.5 mm²
							[0CB] - *LogicsManager*	SW	
							[1CB] - *LogicsManager*	SW	
							[2CB] - Command: open MCB	#1	
✓	✓	✓	✓	44	45	Relay output [R10]	[BM] - *LogicsManager*	SW	2.5 mm²
							[0CB] - *LogicsManager*	SW	
							[1CB] - Command: close GCB	#1	
							[2CB] - Command: close GCB	#1	
✓	✓	✓	✓	46	47	Relay output [R11]	[BM] -		2.5 mm²
							[0CB] - Readiness for operation	#1	
							[1CB] -		
							[2CB] -		

LogicsManager..using the function ***LogicsManager*** it is possible to freely program the relays
SW..switchable via the software, [#1]..type 1 (NO/make contact)

Table 5-21: Relay outputs - terminal assignment, part 1

Analog inputs (*FlexIn*)

NOTE

For proper measuring use VDO senders with isolated return to common ground of the easYgen-1500 (terminal 12).

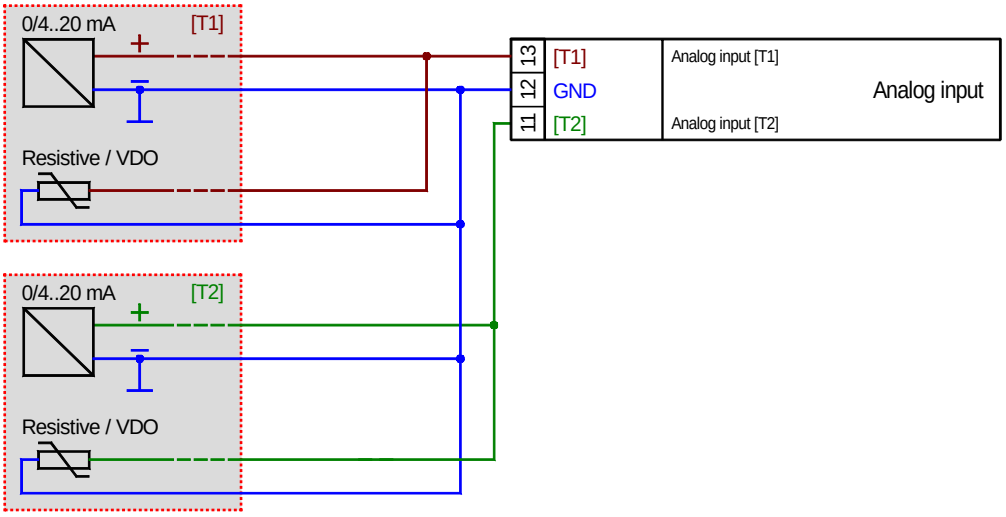


Figure 5-27: Analog inputs (*FlexIn*)

Connect in application mode ... {0}	{1o}	{1oc}	{2oc}	Terminal	Description	A_{max}
✓	✓	✓	✓	13	Analog input [T1], alternatively the following sensors: - 0/4..20 mA - resistor - VDO, 0..180 Ohm#VDO - VDO, 0..380 Ohm#VDO - Pt100	2.5 mm²
✓	✓	✓	✓	12	Common (GND)	2.5 mm²
✓	✓	✓	✓	11	Analog input [T2], alternatively the following sensors: - 0/4..20 mA - resistor - VDO, 0..180 Ohm#VDO - VDO, 0..380 Ohm#VDO - Pt100	2.5 mm²

#VDO - please download a catalog of all available VDO sensors at the VDO homepage (http://www.vdo.com/siemens)

Table 5-22: Analog inputs (*FlexIn*) - terminal assignment

Interfaces

Overview

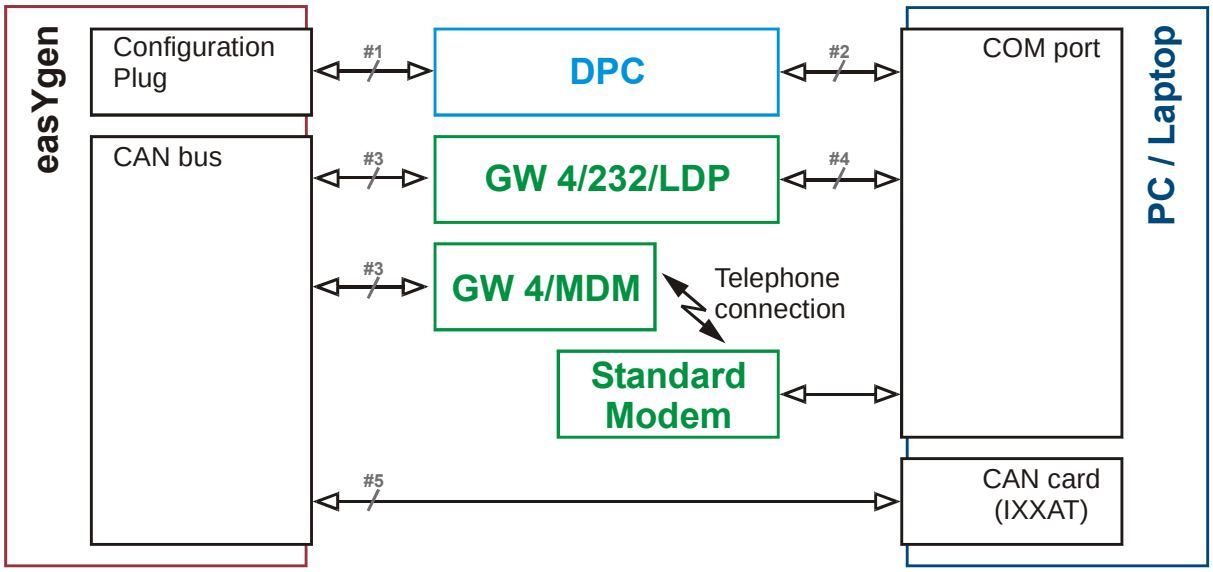


Figure 5-28: Interfaces - overview

Nr.	Connection between ... ... from ...	... to ...
#1	easYgen [DPC connector]	DPC
#2	DPC	PC [COM-Port]
	PIN 1	PIN 4 (connect with PIN 8)
	PIN 2	PIN 3
	PIN 3	PIN 2
	PIN 4	PIN 1
	PIN 5	PIN 5
	N/A	N/A
	PIN 7	PIN 8 (connect with PIN 4)
	PIN 8	PIN 7
	PIN 9	PIN 9
		Connect PIN4/8
#3	easYgen [CAN terminals]	GW 4 [CAN terminals]
	Terminal 3 - CAN-L	Terminals X5 - CAN-L
	Terminal 4 - CAN-H	Terminals X4 - CAN-H
#4	GW 4 [RS232 terminals]	PC [COM port, submin-D, 9pole, female]
	Terminal Y1 - RxD	PIN 3 - TxD
	Terminal Y2 - RTS	PIN 8 - CTS
	Terminal Y3 - GND	PIN 5 - GND
	Terminal Y4 - CTS	PIN 7 - RTS
	Terminal Y5 - TxD	PIN 3 - RxD
#5	easYgen [CAN terminals]	PC [CAN port, submin-D, 9pole, female]
	Terminal 3 - CAN-L	PIN 7 - CAN-H
	Terminal 4 - CAN-H	PIN 2 - CAN-L
	CAN termination resistor between terminals 3/4	CAN termination resistor between terminals 2/7

Table 5-23: Interfaces - connection overview

CAN bus (*FlexCAN*)

Wiring

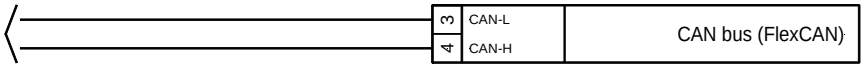


Figure 5-29: Interfaces - CAN bus (*FlexCAN*)

Connect in application mode ...			
{0}	{1o}	{1oc}	{2oc}
✓	✓	✓	✓
✓	✓	✓	✓

Terminal	Description		A_{max}
3	CAN bus (*FlexCAN*)	CAN-L	2.5 mm²
4		CAN-H	2.5 mm²

Shielding

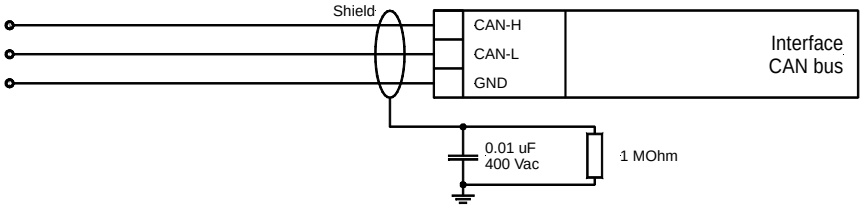


Figure 5-30: Interfaces - CAN bus - wiring of shielding

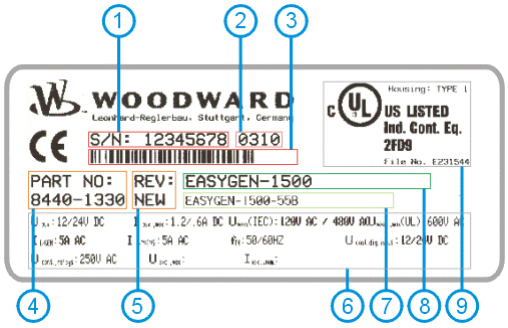
DPC - Direct Configuration Cable

NOTE

Please note that the configuration via the direct configuration cable DPC (P/N 5417-557) is possible starting with Revision B (first delivered July 2003). If you have an older model please contact technical sales.

Chapter 6.
Technical Data

Name plate



1	S/N	Serial number (numerical)
2	S/N	Date of production (YYMM)
3	S/N	Serial number (Barcode)
4	P/N	Item number
5	REV	Item revision number
6	Details	Technical data
7	Type	Description (short)
8	Type	Description (long)
9	UL	UL sign

Measuring values, voltages ---------- ⅄/Δ

- Measuring voltages

[1] 120 Vac (terminals 22/24/26/28 & 14/16/18/20)
Rated value (Vn) ..... 69/120 Vac
Maximum value (Vmax) ..... max. 86/150 Vac

[5] 480 Vac (terminals 23/25/27/29 & 15/17/19/21)
Rated value (Vn) ..... 277/480 Vac
Maximum value (Vmax) ..... max. 346/600 Vac

- Measuring frequency ..... 50/60 Hz (40.0..70.0 Hz)
- Accuracy ..... Class 1
- Input resistance per path ..... [1] 0.498 MΩ, [5] 2.0 MΩ
- Maximum power consumption per path ..... < 0.15 W

Measuring values, currents ---------- isolated

- Measuring current

[../1] Rated value (In) ..../1 A
[../5] Rated value (In) ..../5 A

- Accuracy ..... Class 1
- Linear measuring range
  Generator (terminals 5-8) ..... 3.0 × In
  Mains/ground current (terminals 1/2) ..... 1.5 × In
- Maximum power consumption per path ..... < 0.15 VA
- Rated short-time current (1 s)
  [..1/ A] ..... 50.0 × In
  [../5 A] ..... 10.0 × In

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

- Power supply ..... 12/24 Vdc (6.5..40.0 Vdc)
- Intrinsic consumption ..... max. 15 W
- Ambient temperature
  Storage ..... -30..+80 °C / -22..176 °F
  Operation ..... -20..+70 °C / -4..158 °F
- Ambient humidity ..... 95 %, non condensing

Discrete inputs ---------- isolated

- Input range ($U_{Cont, digital input}$) ..... Rated voltage 12/24 Vdc (6.5..40.0 Vdc)
- Input resistance ..... approx. 6.7 kΩ

Relay outputs ---------- potential free

- Contact material ..... AgCdO
- General purpose (GP) ($U_{Cont, relay output}$)

  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) ($U_{Cont, relay output}$)

  AC B300
  DC ..... 1.00 Adc@24 Vdc
  0.22 Adc@125 Vdc
  0.10 Adc@250 Vdc

Analog inputs ---------- freely scaleable

- Resolution ..... 10 Bit
- 0/4..20 mA input ..... internal load 50 Ω
- 0..180/380 Ω input ..... load current ≤ 2.3 mA

Magnetic Pickup Input ---------- capacitive decoupled

- Input impedance ..... min. approx. 17 kΩ
- Input voltage ..... see Figure 5-21

Interface ----------

Service interface
- Version RS232
- Signal level 5V
  Level conversion and insulation by using DPC (P/N 5417-557)

CAN bus interface ..... **isolated**
- Insulation voltage ..... 1,500 Vdc
- Version ..... CAN bus
- Internal line termination ..... Not available

Battery (models with battery buffered real-time clock only) ----------
- Type ..... NiCd
- Durability (at operation without power supply) ..... approx. 5 years
- Battery field replacement ..... not possible

Housing ----------

• **Model "1500"**
- Type ..... APRANORM DIN 43 700
- Dimensions (W × H × D) ..... 192 × 144 × 64 mm
- Front cutout (W × H) ..... 186 [+1.1] × 138 [+1.0] mm

• **Model "1400"**
- Type ..... Phoenix, Um122
- Dimensions (W × H × D) ..... 194 × 128 × 50 mm

• **all Models**
- Wiring ..... screw-plug-terminals 2.5 mm²
- Recommended locked torque ..... 0.5 Nm
  use 60/75 °C copper wire only
  use class 1 wire only or equivalent
- Weight ..... approx. 800 g

Protection ----------

• **Model "1500"**
- Protection system ..... IP42 from front at professional installation
  IP54 from front with gasket (gasket: P/N 8923-1043)
  IP21 from back
- Front folio ..... insulating surface

• **Model "1400"**
- Protection system IP20

• **all Models**
- EMC test (CE) ..... tested according to applicable EN guidelines
- Listings ..... CE marking; UL listing for ordinary locations
- Type approval ..... UL/cUL listed, Ordinary Locations, File No.: 231544
- Marine certification ..... GL, LR, others upon request

Chapter 7.
Accuracy

Measuring value		Display	Accuracy	Notes
Frequency				
Generator	f_{L1N}, f_{L2N}, f_{L3N}	15.0..85.0 Hz	1 %	-
Mains	f_{L1N}, f_{L2N}, f_{L3N}	40.0..85.0 Hz	1 %	-
Voltage				
Generator	U_{L1N}, U_{L2N}, U_{L3N},	0..650 kV	1 %	Transformer ratio selectable
Mains	U_{L1N}, U_{L2N}, U_{L3N},	0..650 kV	1 %	Transformer ratio selectable
Current				
Generator	I_{L1}, I_{L2}, I_{L3}	0..32,000 A	1 %	-
Max. value	I_{L1}, I_{L2}, I_{L3}	0..32,000 A	1 %	Slave pointer
Mains/ground current	I_{L1}	0..32,000 A	1 %	-
Real power				
Current total real power value		-2..0..+2 GW	2 %	-
Reactive power				
Current value in L1, L2, L3		-2..0..+2 Gvar	2 %	-
cos φ				
Current value cos φL1		lg0.00..1.00..ld0.00	2 %	-
Miscellaneous				
Real energy		0..4,200 GWh		not calibrated
Operating hours		4×10^9 h		-
Maintenance call		0..9,999 h		-
Start counter		0..65,535		-
Battery voltage		6.5..40 V	1 %	-
Pickup speed		$f_n \pm 40$ %		-
Analog inputs				
Pt100		-180..0..+800 °C		not calibrated
0..180 Ohm		freely scaleable		for VDO sensors
0..360 Ohm		freely scaleable		for VDO sensors
PTC		freely scaleable		-
0/4..20 mA		freely scaleable		-

Reference conditions (to measure the accuracy):

- Input voltage ..... sinusoidal rated voltage
- Input current..... sinusoidal rated current
- Frequency..... rated frequency ± 2 %
- Power supply..... rated voltage ± 2 %
- Power factor cos φ 1.00
- Ambient temperature..... 23 °C ± 2 K
- Warm-up period..... 20 minutes

Chapter 8.
Declaration of Conformity

Declaration of Conformity

WOODWARD

Type: easYgen-1000 Series

Manufacturer

Woodward Governor Company
Leonhard-Reglerbau GmbH

Handwerkstrasse 29
70565 Stuttgart - Germany

Tel: +49 (711) 789 54-0
Fax: +49 (711) 789 54-100

E-mail: sales-stuttgart@woodward.com

Type

easYgen-1000 Series
Model: [easYgen-1100, easYgen-1200, easYgen-1400, easYgen-1500]

Product description

Microprocessor driven engine and generator control with integrated monitoring, protection, and control

The named product fulfills the following directives of the European Community:

73/23/EEC Low Voltage Switchgear Directive
'Council directive on the harmonization of the laws of member state relating to electrical equipment designed for use within certain voltage limits '

89/336/EEC Electromagnetic Compatibility Directive
"Council directive on the approximation of the laws of the member states relating to electromagnetic compatibility"

The conformity of the indicated product with the essential safety requirements of the standards is proven by the strict observation of the directives mentioned.

CE The company Woodward Governor Company Leonhard-Reglerbau GmbH, Handwerkstrasse 29, 70565 Stuttgart, Germany, has checked the product and provided it with the opposite indicated sign.

70565 Stuttgart, August 18, 2003

Gerd Zoellmer (Chief R+D Manager)

Druck/Printed 18.08.2003
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Declaration of Conformity

Type: easYgen-1000 Series

WOODWARD

European Norm	German Norm	VDE Classification	Description
73/23/EEC - Low Voltage Switchgear Directive			
EN 50178	DIN EN 50178 Edition: 1998-04	VDE 0160	Electronic equipment for use in electrical power installations and their assembly into electrical power installations
89/336/EEC - Electromagnetic Compatibility Directive			
EN 50081-2	DIN EN 50081-2 Edition: 1994-09	VDE 0839 Part 81-2	Electromagnetic compatibility (EMC) Generic emission standard Part 2: Industrial environment
EN 61000-6-2	DIN EN 61000-6-2 Edition: 2002-08	VDE 0839 Part 6-2	Electromagnetic compatibility (EMC); Part 2: Environment Section 6: Assessment of the emission levels in the power supply of industrial plants as regards low-frequency conducted disturbances
EN 61000-4-2	DIN EN 61000-4-2 Edition: 2001-12	VDE 0847 Part 4-2	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 2: Electrostatic discharge immunity test
EN 61000-4-3	DIN EN 61000-4-3 Edition: 2001-12	VDE 0847 Part 3	Electromagnetic compatibility (EMC) Basic Immunity Standard Part 4-3: Radiated, radio-frequency electromagnetic field – immunity test.
EN 61000-4-4	DIN EN 61000-4-4 Edition: 2002-07	VDE 0847 Part 4-4	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 4: Electrical fast transient/burst immunity test
EN 61000-4-5	DIN EN 61000-4-5 Edition: 2001-12	VDE 0847 Part 4-5	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 5: Surge immunity test
EN 61000-4-6	DIN EN 61000-4-6 Edition: 2001-12	VDE 0843 Part 4-6	Electromagnetic compatibility Basic immunity standard Part 6: Immunity to conducted disturbances, induced by radio frequency fields
EN 55011	DIN EN 55011 Edition: 2000-05	VDE 0875 Part 11	Suppression of radio disturbances caused by electrical appliances and systems; Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment

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Woodward Governor Company
Leonhard-Reglerbau GmbH
Handwerkstrasse 29 - 70565 Stuttgart - Germany
Phone +49 (711) 789 54-0 • Fax +49 (711) 789 54-100
sales-stuttgart@woodward.com

Homepage

http://www.woodward.com/smart-power

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