WOODWARD

easYgen-3000 Series (Package P1) Genset Control

Application

Software Version: 1.10xx
Part Numbers: 8440-1816 / 8440-1817 / 8440-1818 / 8440-1831

EASY GEN
3000

Manual 37226C

WARNING

Read this entire manual and all other publications pertaining to the work to be performed before instal-ling, 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 (overtempe-rature, 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 oth-er 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 lin-kage(s), or the controlled device(s) fail.

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electric-al, 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" with-in 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 dam-age 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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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.

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Revision History

Rev.	Date	Editor	Changes
NEW	07-05-15	TP	Release
A	07-07-04	TP	Configuration examples added
B	08-02-07	TP	Remote control examples reworked
C	09-10-23	TE	Minor corrections

Content

Figures and Tables

Figures

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Chapter 1.
General Information

Type		English	German
easYgen-3000 Series			
easYgen-3000 - Installation		37223	GR37223
easYgen-3000 - Configuration		37224	GR37224
easYgen-3000 - Operation		37225	GR37225
easYgen-3000 - Application	this manual ⇨	37226	-
easYgen-3000 - Interfaces		37383	-
easYgen-3200 - Brief Operation Information		37399	GR37399
easYgen-3100 - Brief Operation Information		37409	-

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.

Chapter 2.
Basic Applications

Overview

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ⓘ NOTE

Please refer to the Configuration Manual 37224 for selection of the application mode. Depending on the application, different application modes are possible.

- Application mode {0} - [start/stop] - engine control - refer to page 7
  - Measuring of engine/generator parameters (i.e. voltage, frequency, current, power, coolant temperature, oil pressure, etc.)
  - Engine start/stop

- Application mode {1o} - [open GCB] - protection - refer to page 8
  - Measuring of engine/generator parameters (i.e. voltage, frequency, current, power, coolant temperature, oil pressure, etc.)
  - Engine start/stop
  - Engine/generator protection (relay output to open GCB)

- Application mode {1oc} - [open/close GCB] - 1-CB control - refer to page 9
  - Measuring of engine/generator parameters (i.e. voltage, frequency, current, power, coolant temperature, oil pressure, etc.)
  - Engine start/stop
  - Engine/generator protection (relay output to open GCB)
  - GCB operation (relay output to close GCB)

- Application mode {2oc} - [open/close GCB/MCB] - 2-CB control - refer to page 10
  - Measuring of engine/generator/mains parameters (i.e. voltage, frequency, current, power, coolant temperature, 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

Application Mode {0}

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This application mode may be used for isolated operation applications. In this case, the easYgen will function as an engine control.
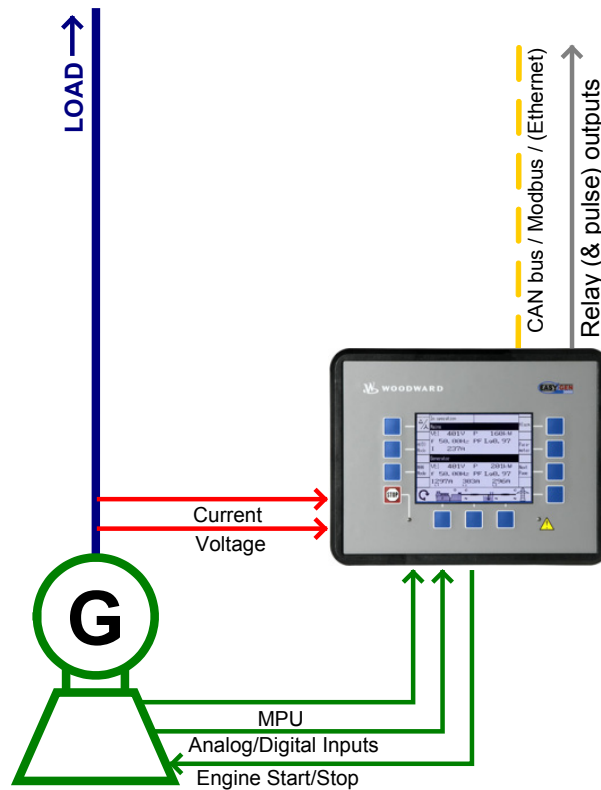

Figure 2-1: Application mode {0}

The easYgen requires in all application modes the feedback reply from the circuit breakers. These replies are used to define, whether it controls frequency, shares the load with other gensets, or performs active load control.
The following feedback signals are used in this application mode and fixed to the respective discrete inputs:

- DI 7 "Reply MCB" (mains parallel)
- DI 8 "Reply GCB" (normally closed (break) contact)

NOTE

If the easYgen is intended to be operated in parallel with the mains, the mains voltage measuring inputs must be connected. If an external mains decoupling is performed, jumpers between busbar and mains voltage measuring inputs may be installed.

Application Mode {1o}

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This application mode may be used for isolated operation applications. In this case, the easYgen will function as an engine control with generator and engine protection. The control unit can only open the GCB.
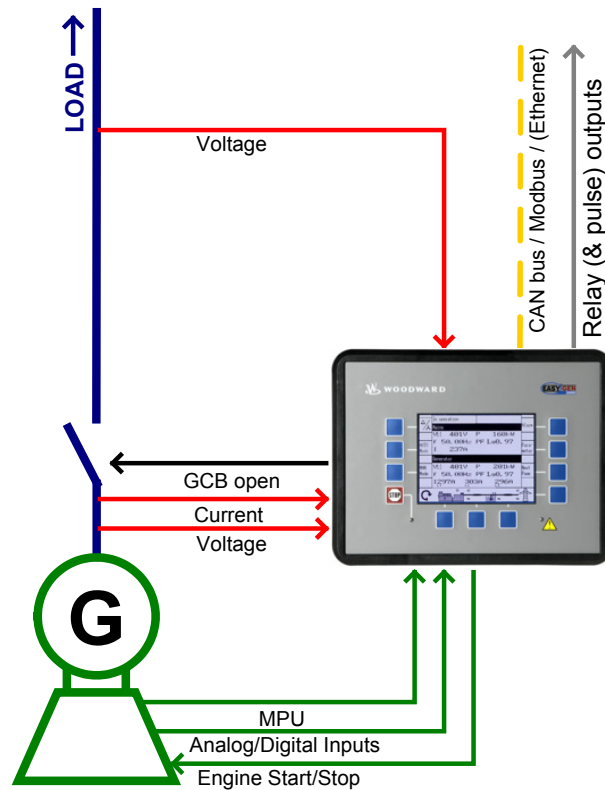

Figure 2-2: Application mode {1o}

The easYgen requires in all application modes the feedback reply from the circuit breakers. These replies are used to define, whether it controls frequency, shares the load with other gensets, or performs active load control.
The following feedback signals and commands are used in this application mode and fixed to the respective discrete inputs and outputs:

- DI 7 "Reply MCB" (mains parallel)
- DI 8 "Reply GCB" (normally closed (break) contact)
- DO 7 "Command: GCB open"

ℹ NOTE

If the easYgen is intended to be operated in parallel with the mains, the mains voltage measuring inputs must be connected. If an external mains decoupling is performed, jumpers between busbar and mains voltage measuring inputs may be installed.

Application Mode {1oc}

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This application mode may be used in applications, where only the GCB is operated by the easYgen. If it is used for isolated or mains parallel operations, mains decoupling should be performed by the GCB or an external provision. The easYgen will function as an engine control with generator and engine protection. The control unit can open and close the GCB.
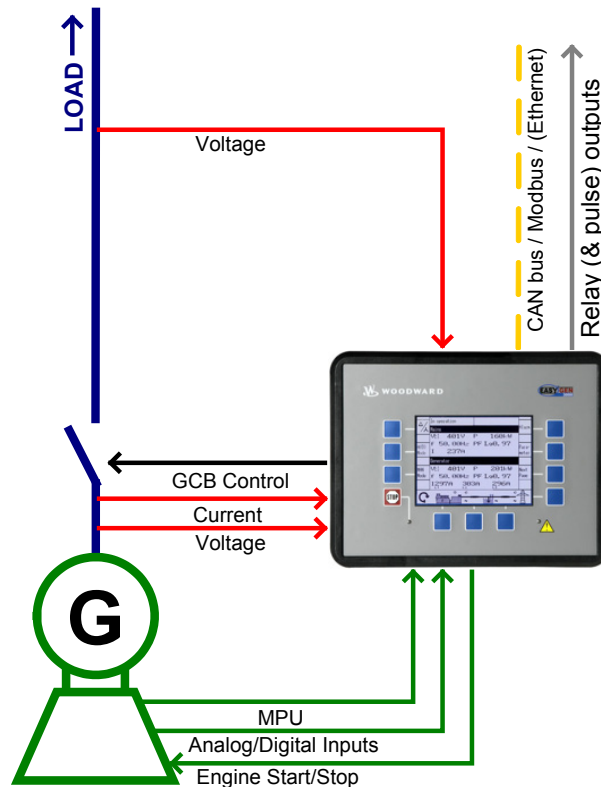

Figure 2-3: Application mode {1oc}

The easYgen requires in all application modes the feedback reply from the circuit breakers. These replies are used to define, whether it controls frequency, shares the load with other gensets, or performs active load control.
The following feedback signals and commands are used in this application mode and fixed to the respective discrete inputs and outputs:

- DI 7 "Reply MCB" (mains parallel)
- DI 8 "Reply GCB" (normally closed (break) contact)
- DO 6 "Command: GCB close"
- DO 7 "Command: GCB open"

NOTE

If the easYgen is intended to be operated in parallel with the mains, the mains voltage measuring inputs must be connected. If an external mains decoupling is performed, jumpers between busbar and mains voltage measuring inputs may be installed.

Application Mode {2oc}

This application mode may be used for mains parallel operation. In this case, the easYgen will function as an engine control with generator, mains and engine protection. The control unit can open and close the GCB and the MCB.
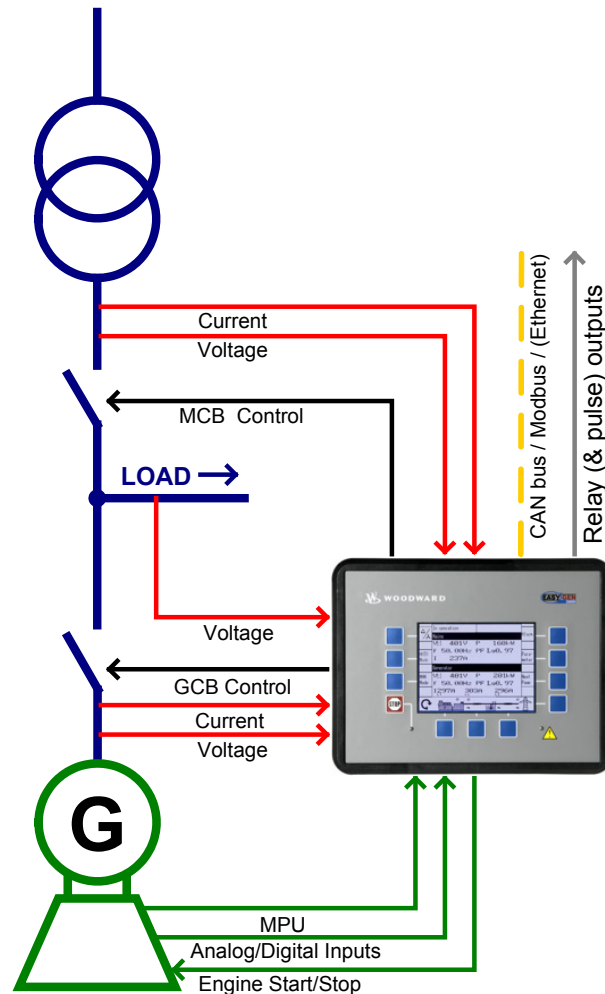An emergency mode (AMF operation) is only possible in this application mode.

Figure 2-4: Application mode {2oc}

The easYgen requires in all application modes the feedback reply from the circuit breakers. These replies are used to define, whether it controls frequency, shares the load with other gensets, or performs active load control.
The following feedback signals and commands are used in this application mode and fixed to the respective discrete inputs and outputs:

- DI 7 "Reply MCB" (mains parallel)
- DI 8 "Reply GCB" (normally closed (break) contact)
- DO 6 "Command: GCB close"
- DO 7 "Command: GCB open"
- DO 8 "Command: MCB close"
- DO 9 "Command: MCB open"

Chapter 3.
Multiple Genset Applications

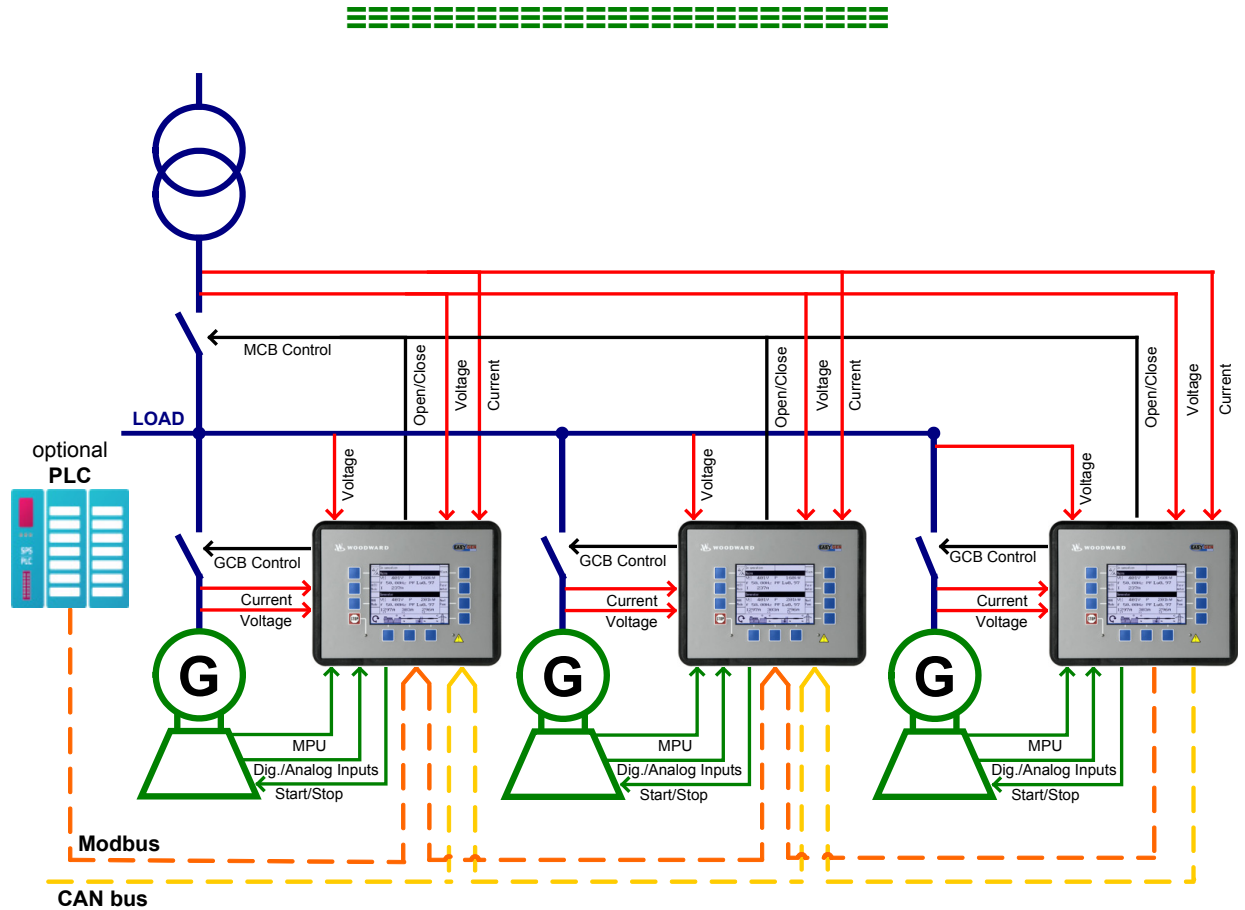## Overview

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Figure 3-1: Multiple genset application mode

In a multiple-unit mains parallel application, all easYgens need the same signals for:
- mains voltage and current
- reply and release signal of the MCB

The open and close contacts from all controls must be wired in parallel.

Configuration Example

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Mains Parallel Operation (mains interchange (import/export) power control)

The following example describes the configuration of a typical mains parallel operation with import/export power control at the interchange point and load-dependent start/stop.

Multiple generators are to be operated in parallel to the mains maintaining a stable power at the interchange point. The generators shall be started depending on the momentary load at the plant. An emergency operation in case of a mains failure is also intended. The load dependent start/stop function (LDSS) shall be enabled with a remote start request and during emergency operation. LDSS shall depend on the reserve power on the busbar. In case of a dead busbar (caused by a mains failure) all capable generators shall be started and operated with their minimum running time. No generator priority is considered. Generator selection shall be performed depending on the operating hours.

The following assumptions are valid for this example:
- 3 generators, each with 80 kW rated power, are available.
- The recommended minimum load for the generators is 40 kW.
- The minimum running time is 180 s.

Configuring Load-Dependent Start/Stop

From the main screen on the unit select Parameter -> Configuration -> Configure application -> Configure automatic run -> Load dependent start/stop and configure the following parameters:

ID	Parameter	Value	Comment
5752	Start stop mode	Reserve power	The reserve power at the interchange point is to be considered for LDSS
5753	Dead busbar start mode	All	All generators shall start in case of a dead busbar (mains failure)
5751	Base priority	5	The base priority for the genset is 5
5754	Fit size of engine	No	The generator rated power is not considered for LDSS
5755	Fit service hours	Equal	The remaining hours until next service are considered for LDSS
5756	Changes of engines	Off	No engine change will be performed
5759	Minimum running time	180 s	The minimum running time is 180 seconds

Configure the *LogicsManager* function "LD start stop" as shown in Figure 4-2 on page 17 to enable LDSS if a start request in automatic operating mode or emergency mode are enabled.
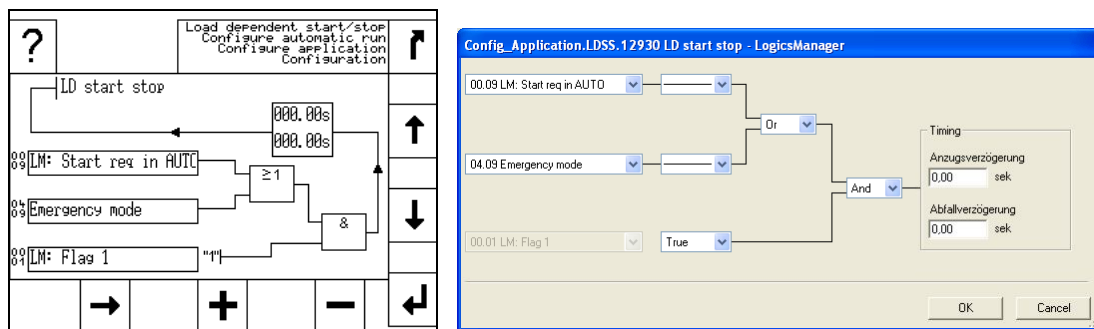

Figure 3-2: Example - configuring load-dependent start stop (LM)

Configuring Load-Dependent Start/Stop Isolated Operation

Additional assumptions are valid for isolated operation (IOP), i.e. in case of an emergency operation:
- A reserve power of 80 kW on the busbar shall be maintained, i.e. at least 2 generators are available in isolated operation for redundancy because no supporting mains are present.
- A hysteresis of 20 kW is required to avoid frequent starts and stops.
- The delay for adding another generator shall be 10 seconds.
- The delay for adding another generator shall be reduced to 3 seconds if a generator at the busbar is operating above its rated load (accelerated start of the next generator).
- The delay for removing a generator from the busbar shall be 180 seconds.

From the main screen on the unit select Parameter -> Configuration -> Configure application -> Configure automatic run -> Load dependent start/stop -> Isolated operation and configure the following parameters:

ID	Parameter	Value	Comment
5760	IOP Reserve power	80 kW	The reserve power in isolated operation is 80 kW
5761	IOP Hysteresis	20 kW	The reserve power hysteresis in isolated operation is 20 kW
5764	IOP Add on delay	10 s	The add on delay in isolated operation is 10 seconds
5765	IOP Add on delay at rated load	3 s	The add on delay at rated load in isolated operation is 3 seconds
5766	IOP Add off delay	180 s	The add off delay in isolated operation is 180 seconds

Configuring Load-Dependent Start/Stop Mains Parallel Operation

Additional assumptions are valid for mains parallel operation (MOP):
- The first generator is only started if it is able to operate at a minimum load of 40 kW.
- A hysteresis of 20 kW is required to avoid frequent starts and stops.
- A reserve power of 10 kW on the busbar shall be maintained, i.e. at least 10 kW of generator capacity are available for short load peaks. Higher load peaks are supported by the mains.
- The delay for adding another generator shall be 30 seconds.
- The delay for adding another generator shall be reduced to 10 seconds if a generator at the busbar is operating above its rated load (accelerated start of the next generator).
- The delay for removing a generator from the busbar shall be 60 seconds.

From the main screen on the unit select Parameter -> Configuration -> Configure application -> Configure automatic run -> Load dependent start/stop -> Mains parallel operation and configure the following parameters:

ID	Parameter	Value	Comment
5767	MOP Minimum load	40 kW	The minimum load in mains parallel operation is 40 kW
5769	MOP Hysteresis	20 kW	The reserve power hysteresis in mains parallel operation is 20 kW
5768	MOP Reserve power	10 kW	The reserve power in mains parallel operation is 10 kW
5772	MOP Add on delay	30 s	The add on delay in mains parallel operation is 20 seconds
5773	MOP Add on delay at rated load	10 s	The add on delay at rated load in mains parallel operation is 10 seconds
5774	MOP Add off delay	60 s	The add off delay in mains parallel operation is 60 seconds

Configuring Automatic Operation

From the main screen on the unit select Parameter -> Configuration -> Configure application -> Configure automatic run and configure the *LogicsManager* function "Start req in AUTO" as shown in Figure 4-2 on page 17 to start the generator in Automatic operating mode if discrete input [DI 02] is energized or a remote start request (i.e. a start command via interface) is issued.
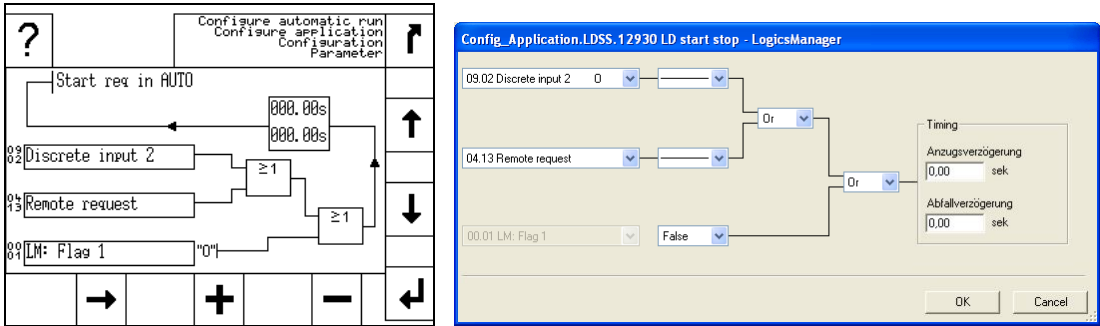

Figure 3-3: Example - configuring Start in Auto (LM)

Configuring Emergency Operation

The emergency operation is to be configured that it is initiated if the mains fail for at least 3 seconds or the MCB cannot be closed.

From the main screen on the unit select Parameter -> Configuration -> Configure application -> Configure emergency run and configure the following parameters:

ID	Parameter	Value	Comment
2802	On/Off	On	Emergency operation is enabled
2800	Mains fail delay time	3.00 s	Emergency operation is initiated if the mains fail for a t least 3 seconds
3408	Emerg. start with MCB failure	Yes	Emergency operation is initiated if the MCB fails to close

Configuring Import/Export Power Control

The power controller is to be configured to use the internal power set point 1, which is to be configured to 0 kW import power.

From the main screen on the unit select Parameter -> Configuration -> Configure application -> Configure controller -> Configure load control and configure the following parameters:

ID	Parameter	Value	Comment
5539	Load setpoint 1 source	05.04. Internal pwr. setp.1	The internal power set point 1 is used as load set point 1
5526	Load setpoint 1	Import	The internal power set point 1 is a import power value
5520	Int. load control setpoint 1	0 kW	The internal power set point 1 is configured to 0 kW

Chapter 4.
Special Application Examples

Generator Excitation Protection

The easYgen-3000 series provides the user with power factor monitoring. These monitoring functions permit for protection of the generator over- and under-excitation. The power factor monitoring consists of a warning alarm and/or a shutdown alarm when enabled. An alarm and the specified action will be initiated if the monitored power factor surpasses the defined limits. Typically the generator is monitored for loss of excitation and/or over excitation in a mains parallel application. When a generator plant is paralleled against a utility, it is possible to control the power factor at a desired reference. When the plant is operated in an island mode or isolated parallel application, it is not possible to control the power factor. The load will dictate what the power factor is due to the reactive nature of the load.

Figure 4-1 shows a typical power factor (generator excitation) protection range, where the desired range of operation (green area) is from 0.7 lagging (capacitive) to 0.8 leading (inductive). When the power factor exceeds either of these limits by entering the yellow shaded areas starting at 0.7 lagging or 0.8 leading for more than 30 seconds, a class B warning alarm is initiated. If the power factor exceeds the desired range further and enters the red shaded areas starting at 0.5 lagging or 0.6 leading for 1 second, a class E alarm is initiated and the generator is shut down.
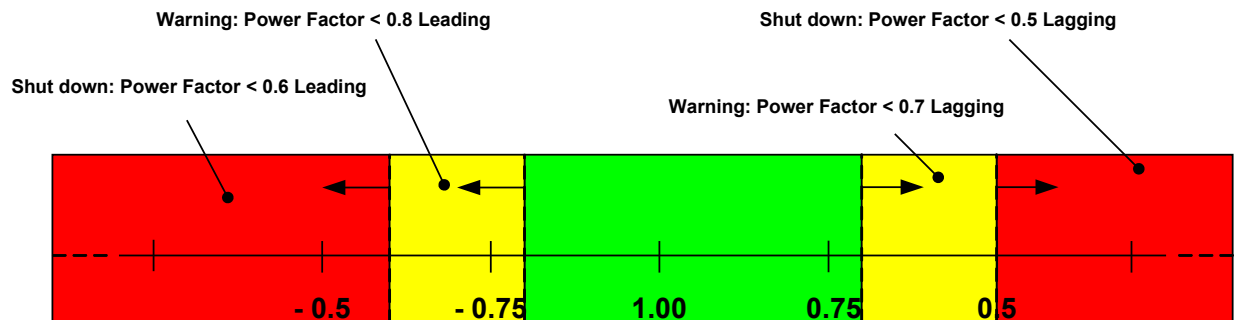
Figure 4-1: Example - generator excitation protection

In order to achieve the described protection, the power factor monitoring parameters (refer to Configuration Manual 37224 for more information) have to be configured according to Table 1-1.

Generator power factor lagging level 1		
ID	**Text**	**Setting**
2325	Monitoring	ON
2329	Limit	+0.700
2330	Delay	30.00 s
2326	Alarm class	B
2327	Self acknowledge	NO
2328	Delayed by engine speed	YES

Generator power factor lagging level 2		
ID	**Text**	**Setting**
2331	Monitoring	ON
2335	Limit	+0.500
2336	Delay	1.00 s
2332	Alarm class	E
2333	Self acknowledge	NO
2334	Delayed by engine speed	YES

Generator power factor leading level 1		
ID	**Text**	**Setting**
2375	Monitoring	ON
2379	Limit	-0.800
2380	Delay	30.00 s
2376	Alarm class	B
2377	Self acknowledge	NO
2378	Delayed by engine speed	YES

Generator power factor leading level 2		
ID	**Text**	**Setting**
2381	Monitoring	ON
2385	Limit	-0.600
2386	Delay	1.00 s
2382	Alarm class	E
2383	Self acknowledge	NO
2384	Delayed by engine speed	YES

Table 4-1: Example - generator excitation protection

Configuring a Set Point Control via Analog Input

The following example illustrates how to configure an easYgen for using an external load set point via analog input [AI 03]. The external set point may be enabled using a switch, wired to discrete input [DI 09]. An analog 0 to 20 mA input is to be used where 4 mA corresponds with 0 % power (0 MW), 12 mA corresponds with 50 % power (1 MW), and 20 mA corresponds with 100 % power (2 MW).

Configuring the Rated Generator Power

From the main screen on the unit select Parameter -> Configuration -> Configure measurement and configure the following parameter:

ID	Parameter	Value	Comment
1752	Gen. rated active power [kW]	2000	Generator rated power of 2 MW

Configuring the Analog Input for Real Power Set Point

From the main screen on the unit select Parameter -> Configuration -> Configure application -> Configure inputs/outputs -> Configure analog inputs -> Analog input 3 and configure the following parameters:

ID	Parameter	Value	Comment
1100	Type	Linear	A user-defined linear characteristic curve is to be used
1101	User defined min display value	+00000	A value of 000.00 % is displayed at the minimum of the input range
1102	User defined min display value	+10000	A value of 100.00 % is displayed at the maximum of the input range
1139	Sender value at display min.	020.00%	The sender value at minimum display is 20 % i.e. 4 mA
1140	Sender value at display max.	100.00%	The sender value at maximum display is 100 % i.e. 20 mA
1120	Sender type	0 - 20mA	A 0 to 20 mA sender is used on the analog input
1103	Monitoring wire break	Low	If the analog signal falls below 2 mA, a wire break is indicated
1104	Wire break alarm class	Class B	An alarm of class B will be issued in case of a wire break
1105	Self acknowledge wire break	No	A wire break is not automatically cleared after it has been repaired
10116	Filter time constant	Off	No filter time constant is applied to the analog signal
3636	Bargraph minimum	+00000	The start value for the bargraph display of the analog input is 00000
3637	Bargraph maximum	+10000	The end value for the bargraph display of the analog input is 10000

The following parameters may only be changed using ToolKit and serve for a more detailed display of the analog value:

ID	Parameter	Value	Comment
1125	Description	ActivePower SP (%)	Analog input [AI 03] is labeled with "ActivePower SP (%)" on the display
1135	Value format	000.00%	The value format of the bargraph display of the analog input is "000.00%"

Configuring the Load Controller

The load controller is to be configured that it uses a fixed load setpoint 1 of 2 MW unless a switch energizes discrete input [DI 09] for enabling a variable load setpoint 2, which is controlled by analog input [AI 03].

From the main screen on the unit select Parameter -> Configuration -> Configure application -> Configure controller -> Configure load control and configure the following parameters:

ID	Parameter	Value	Comment
5539	Load setpoint 1 source	05.04 Internal pwr. setp.1	Internal power setpoint 1 is used as setpoint 1
5526	Load setpoint 1	Constant	A constant load is to be controlled for setpoint 1
5520	Int. load control setpoint 1	02000.0kW	A constant load of 2 MW is to be used for internal setpoint 1
5540	Load setpoint 2 source	06.03 Analog input 3	Analog input 3 is used as setpoint 2
5527	Load setpoint 2	Constant	A constant load is to be controlled for setpoint 2

Configure the *LogicsManager* function "Setp. 2 load" as shown in Figure 4-2 on page 17 to enable load setpoint 2 if discrete input [DI 09] is energized.
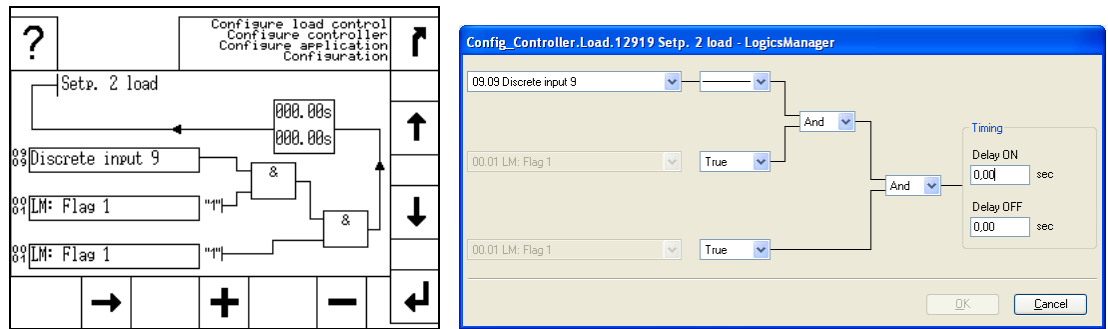
Figure 4-2: Example - configuring load setpoint 2 for [DI 05]

Viewing the Load Set Point on the easYgen

After the unit is configured as described above, the "Setpoint" screen may be viewed from the main screen by selecting Next page -> Setpoints.

Figure 4-3 shows the "Setpoint" screen with enabled load setpoint 2 ([DI 09] is energized). This is indicated by the figure "2" in fromt of the load setpoint section. A generator load of approx. 1 MW (~50 % or 12 mA) is displayed.

Figure 4-3: Example - Setpoints screen

The "Analog inputs" screen may be viewed from the main screen by selecting Next page -> Measured values -> Analog inputs/outputs.

Figure 4-3 shows the "Analog inputs" screen with the display of analog input [AI 03] at the bottom (labeled "ActivePower SP"). Analog input [AI 03] is displayed with an input signal of approx. 50 % (~12 mA or M GW).

Figure 4-4: Example - Analog inputs screen

Creating Self-Toggling (Pulsing) Relays Using *LogicsManager*

Various functions are possible with the *LogicsManager*. This is a simple example of a relay output that toggles from energized to de-energized in automatic mode with adjustable on and off time. This pulsing relay may be combined with a flexible limit, which can be programmed with a function like low battery voltage to get a blinking warning light.

Relay 2 is the discrete output (DO 2) and Flag 5 is used as an auxiliary flag. Relay 2 will be ON (energized) for 2 seconds and then OFF (de-energized) for 2 seconds as long as the easYgen is in automatic mode.
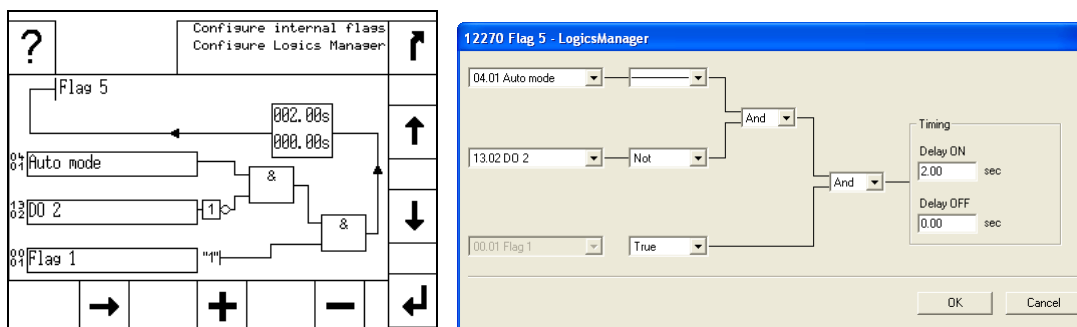

Figure 4-5: Example - configuring Flag 5 for a pulsing relay

In this example is the Delay ON time in the *LogicsManager* of Flag 5 indicates how long the pause is. The Delay OFF time of Relay 2 is the pulse duration.
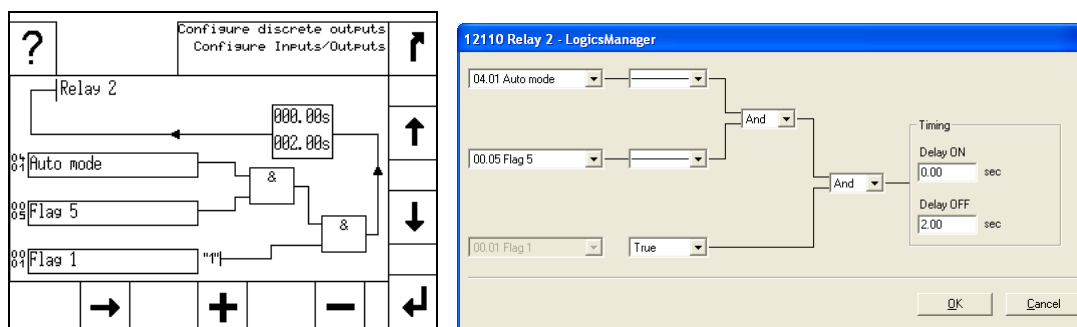

Figure 4-6: Example - configuring Relay 2 for a pulsing relay

Performing Remote Start/Stop and Acknowledgement

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The easYgen-3000 controller may be configured to perform start/stop/acknowledgement functions remotely through the CAN bus or Modbus. The required procedure is detailed in the following steps.

> **NOTE**
>
> **Refer to the operation manual 37225 for a detailed description of the navigation through the various display screens. A detailed description of the individual parameters may be found in the configuration manual 37224.**
>
> **Be sure to enter the password for code level 2 or higher to be able to access the required configuration screens.**
>
> **Refer to the configuration manual 37224 for a description of the installation, configuration and usage of the ToolKit visualization and configuration application.**

Preliminary Conditions

We recommend to reset the unit to factory settings before proceeding. Refer to the System Management section of the Parameters chapter in the configuration manual 37224 for reference. The *LogicsManager* factory settings are shown in the Factory Settings section of the *LogicsManager* appendix of the configuration manual 37224.

Operating Modes

Two operating modes may be used with remote control:

1. STOP
2. AUTOMATIC

It is possible to fix the operating mode using the *LogicsManager* function 00.16 "Operat. mode AUTO" (parameter ID 12510).

The Operat. mode AUTO *LogicsManager* function (parameter ID 12510) can be configured as shown in Figure 4-7. AUTOMATIC operation mode is always enabled.
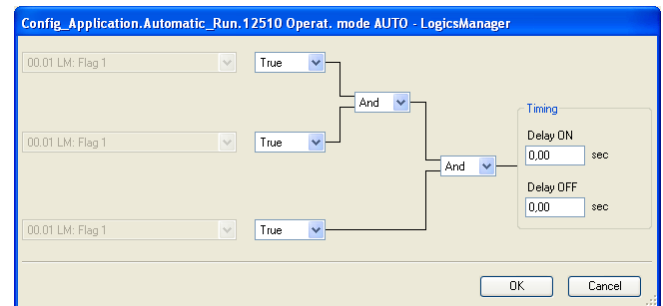

Figure 4-7: Configuration - Operat. mode AUTO

If an alarm of alarm class C through F occurs in AUTOMATIC operating mode, the control does not return to STOP operating mode if the alarm is cleared after acknowledgement and a restart is initiated.

It is also possible to configure a discrete input for controlling the operating mode using the *LogicsManager* function 00.16 "Operat. mode AUTO" (parameter ID 12510) and 00.18 "Operat. mode AUTO" (parameter ID 12530).

The Operat. mode AUTO *LogicsManager* function (parameter ID 12510) can be configured as shown in Figure 4-7. AUTOMATIC operation mode is enabled as soon as discrete input 9 is energized.
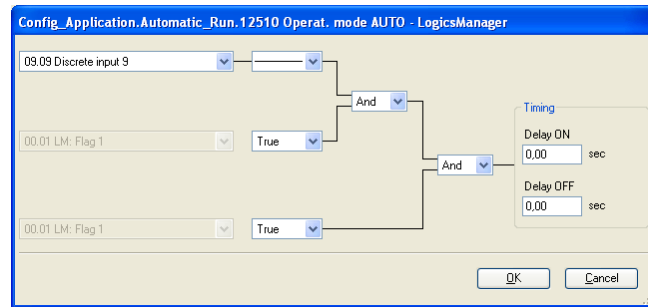

Figure 4-8: Configuration - Operat. mode AUTO

The Operat. mode STOP *LogicsManager* function (parameter ID 12530) can be configured as shown in Figure 4-7. STOP operation mode is enabled as soon as discrete input 9 is de-energized.
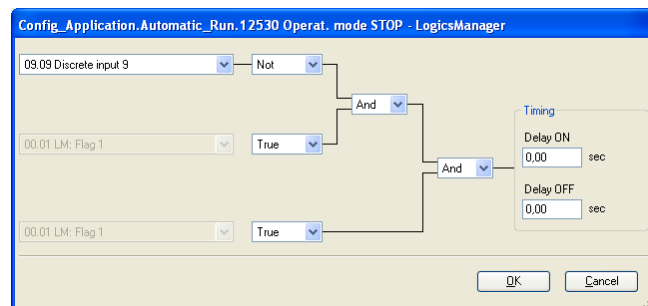

Figure 4-9: Configuration - Operat. mode STOP

Setting Up a Test With or Without Load

There are a lot of different opinions of the behavior of a proper test mode. The easYgen-3000 can support the following two modes: **Test with load** and **test without load.** Both modes work only in automatic mode. The correct test mode depends on your local specifications.

Test With Load
This is the *LogicsManager* function "Start req. in AUTO" (parameter 12120). No special message appears on the display. If the mains fail during start in auto, the unit keeps running until the mains return and the mains settling time is expired or the conditions for "Start req. in AUTO" are FALSE again. It depends on which is longer active.

Test Without Load
This is the *LogicsManager* function "Start w/o load" (parameter 12540). If the conditions for this *LogicsManager* function are TRUE, the engine will provide an automatic starting sequence and keep the generator running until this function is FALSE again. Then the unit will perform an automatic stop sequence and remain stand by in auto mode. The message "Start w/o load" is displayed during the test without load. If the mains fails during test without load and the emergency mode is enabled, the unit will take over the load.
It will open the MCB and close the GCB. When the mains return, it will transfer the load back to the mains according to the configured breaker transition mode after the mains settling timer has expired. The engine will keep running until the conditions for "Start w/o load" are FALSE again.

Example for test without load: The engine shall start once a month and run for one hour without overtaking the load. The test day shall be every fifteenth of a month (with flag 2). A relay output can be configured that this test is running, e.g. for a signal lamp.

Settings for the timer:
- Parameter 1663 "Active day": 15
- Parameter 1662 "Active hour": 10 (for example)

The *LogicsManager* function Flag 2 (parameter ID 12240) can be configured as shown in Figure 4-10. Flag 2 becomes TRUE as soon as the configured active day and active time is reached.
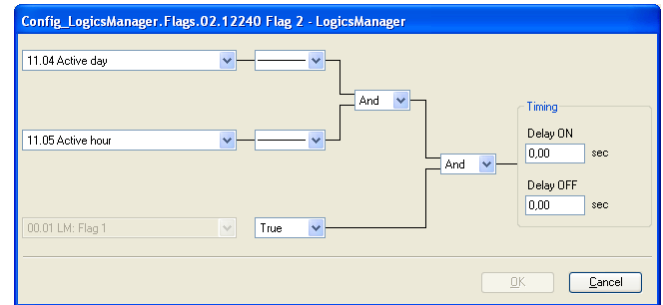

Figure 4-10: Configuration – Flag 2 (timer)

The Start without load *LogicsManager* function (parameter ID 12540) can be configured as shown in Figure 4-11. Start without load mode is enabled as soon as Flag 2 becomes TRUE.
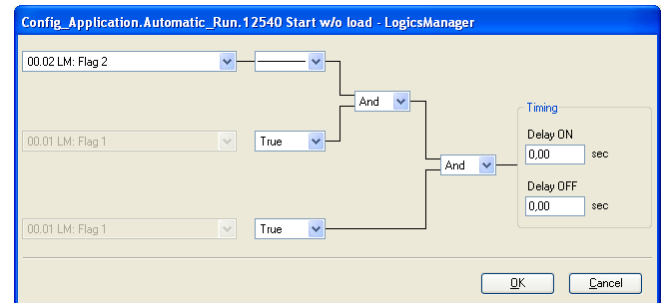

Figure 4-11: Configuration - Start w/o load

If an engine start is performed, switching from mains to generator supply is prevented (the GCB close operation is blocked).

Remote Start/Stop and Acknowledgement

The easYgen may be started, stopped, or acknowledged with Modbus or CAN protocol via the interface. Two logical command variables are available for this in the *LogicsManager*:

04.13   Remote request
04.14   Remote acknowledge

Configuration of the *LogicsManager* Functions via HMI and/or ToolKit

Start Request in AUTOMATIC Operating Mode
Navigate to the "Configure automatic run" screen by pressing the following softkeys in this sequence:
Parameter -> Configuration -> Configure application -> Configure automatic run
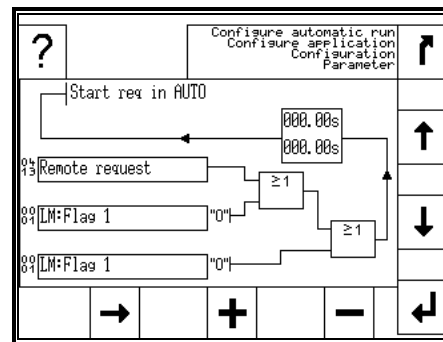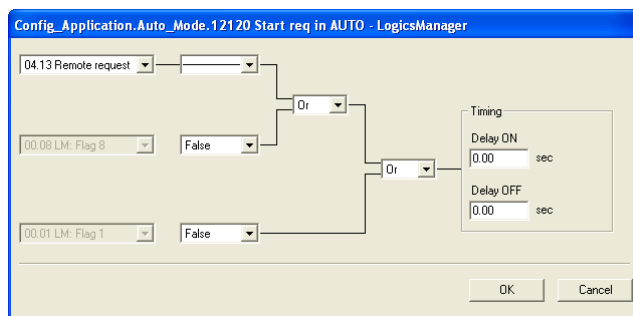Navigate to the entry "Start req in AUTO" by using the ⬇ and ⬆ softkeys and press ↵ to enter the "Start req in AUTO" *LogicsManager* screen.

Figure 4-12: Example - remote start request

Configure the "Start req in AUTO" *LogicsManager* function as above using the ⬇ and ⬆ as well as ➕ and ➖ softkeys and Confirm the change by pressing the ↵ softkey:

With this setting, the "Start req in AUTO" *LogicsManager* output becomes TRUE as soon as the remote request signal is enabled.

Press ↱ until you return to the start screen.

(i) NOTE

The *LogicsManager* commands 2 and 3 may be used to configure additional conditions like discrete inputs, which must be energized to be able to issue the remote start request.

External Acknowledgement

Navigate to the "Configure automatic run" screen by pressing the following softkeys in this sequence:
Parameter -> Configuration -> Configure monitoring -> Miscellaneous
Navigate to the entry "Ext. acknowledge" by using the ⬇ and ⬆ softkeys and press ⏎ to enter the "Ext. acknowledge" *LogicsManager* screen.
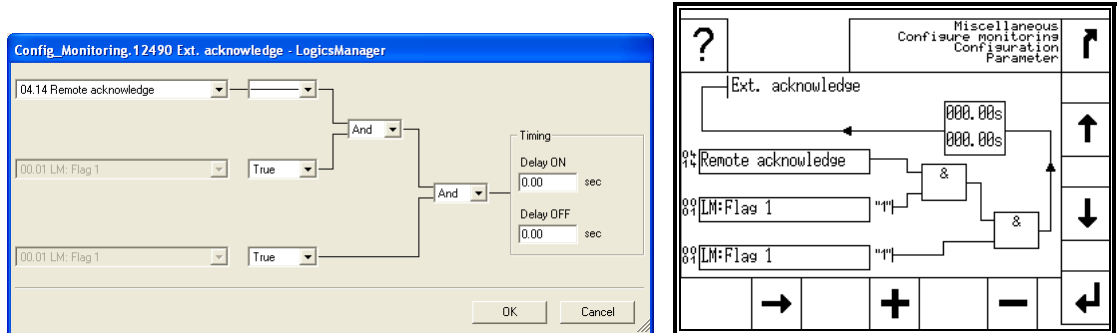

<div align="right">Figure 4-13: Example - remote acknowledgement</div>

Configure the "Ext. acknowledge" *LogicsManager* function as above using the ⬇ and ⬆ as well as ➕ and ➖ softkeys and Confirm the change by pressing the ⏎ softkey:

With this setting, the "Ext. acknowledge" *LogicsManager* output becomes TRUE as soon as the remote acknowledge signal is enabled.

> **NOTE**
>
> **The *LogicsManager* commands 2 and 3 may be used to configure additional conditions like discrete inputs, which must be energized to be able to issue the remote acknowledge command.**

Please refer to the Interface Manual 37383 for a description of how to configure the *LogicsManager* functions via Modbus.

> **NOTE**
>
> **All interfaces access to the same bits. They remain enabled in the easYgen until a new command is sent or the power supply failed or is removed.**

Remote start: The command variable "04.13 Remote request" changes to "1" (high) if the start bit (ID 503, bit 0) changes from "0" to "1". The command variable "04.13 Remote request" changes to "0" (low) if the stop bit (ID 503, bit 1) changes from "0" to "1".

Acknowledgement: The command variable "04.14 Remote acknowledge" reflects the acknowledgement bit (ID 503, bit 4).

An acknowledgement is generally performed twice (the easYgen deactivates the horn with the first change from "0" to "1" of the logical output "External acknowledge", and acknowledges all inactive alarm messages with the second change from "0" to "1").

> **⚠ ATTENTION**
>
> **The easYgen does NOT react on the disabling of the start bit, but only on the enabling of the stop bit. This has the advantage that it is not required to maintain the connection established for the whole time in case of a remote start.**

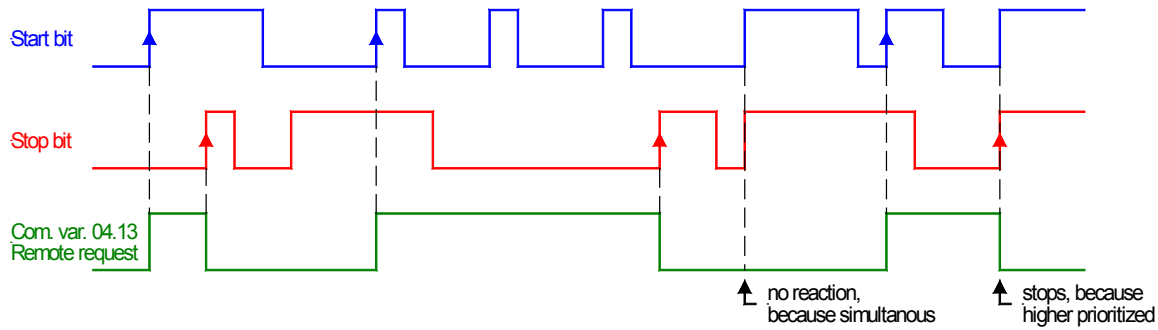The following figure shows the reaction of the command variable on the various changes of the bits:

<div align="right">Figure 4-14: Example - command variable</div>

Enabling the bits may be performed with several methods:

Bit Enabling via Modbus Protocol and RS-485 Interface

The parameter Modbus Slave ID must be configured. The control bits are sent on address 503 for a start via Modbus.

Bit 0   Start
Bit 1   Stop
Bit 4   Acknowledgement

Bits 2 and 3 must be "0" (for the watchdog).

Please refer to the Interface Manual 37383 for a description of how to enable control bits via Modbus.

Bit Enabling via CANopen Protocol and CAN Interface 1

Protocol CANopen: For further information refer to the interface manual 37383 and the CANopen file *.eds, which is delivered with the unit.

Please refer to the Interface Manual 37383 for a description of how to enable control bits via CAN bus.

Connecting Analog Inputs in Series (Multiple Devices)

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The analog inputs of the easYgen-3000 Series are galvanically isolated. This enables a series connection for up to 3 analog inputs. This connection allows for example to share a power setpoint for up to 3 devices.

The example shows the terminal numbers for the analog input #3, but in principle it works for all analog inputs which support a 0-20 mA signal.
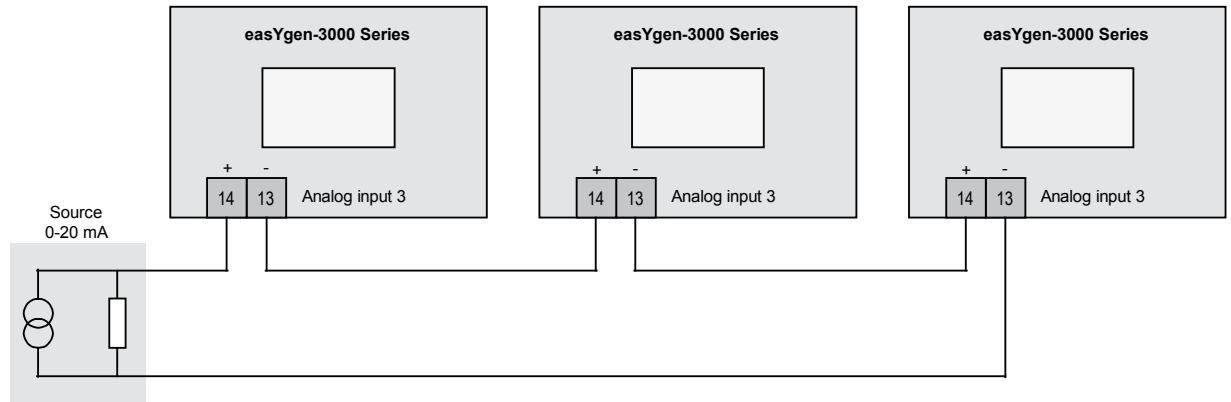

Figure 4-15: Example – connecting analog inputs in series

WOODWARD