

# easYgen-3000 Series (Package P2) Genset Control



# **Application**

Software Version: 1.12xx & 1.13xx Part Numbers: 8440-1842 / 8440-1843 / 8440-1844 / 8440-1845



Manual 37417B

### 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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#### 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

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# **Revision History**

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# Content

CHAPTER 1. GENERAL INFORMATION	8
CHAPTER 2. BASIC APPLICATIONS	9
Overview	9
Application Mode {0}	
Application Mode {10}	11
Application Mode {1oc}	12
Application Mode {2oc}	13
CHAPTER 3. MULTIPLE GENSET APPLICATIONS	14
Overview	14
Configuration Example	15
Mains Parallel Operation (mains interchange (import/export) power control)	15
CHAPTER 4. SPECIAL APPLICATION EXAMPLES	
Generator Excitation Protection	
Configuring a Set Point Control via Analog Input	19
Configuring the Rated Generator Power	19
Configuring the Analog Input for Real Power Set Point	19
Configuring the Load Controller	19
Viewing the Load Set Point on the easYgen	20
Creating Self-Toggling (Pulsing) Relays Using LogicsManager	21
Changing a Starter Battery Set Using LogicsManager	
Performing Remote Start/Stop and Acknowledgement	24
Preliminary Conditions	
Operating Modes	
Setting Up a Test With or Without Load	
Remote Start/Stop and Acknowledgement	
Bit Enabling via Moubus Protocol and K5-465 Interface.	29
Bit Enabling via CANOPER Protocol and CAN Interface 1	
easyden Configuration	
IKD 1 Configuration	
Rep 1 Configuration	
Configuration for a Second IKD 1	
Configuring a PWM Duty Cycle for a CAT ADEM Controller	
Connecting a GSM Modem	
Function	
Preconditions for this Example	
Connection	
easYgen Settings	
ToolKit Settings	
GSM Modem Settings	

Manual 37417B	easYgen-3000 Series (Package P2) - Genset Control
Connecting a Landline Modem	
Function	
Preconditions for this Example	
Connection	
easYgen Settings	
ToolKit Settings	
Phoenix Modem Settings	
Wiring Self-Powered DIs	
Connecting Analog Inputs in Series (Multiple Devices)	
Phoenix Expansion Modules	
Supported Phoenix Modules	
Possible Combinations	
Setup	
Configure External Inputs/Outputs	
CHAPTER 5. EXAMPLES FOR LOAD SHARING APPLICAT	- 10NS
General Information	
Example Configuration 1 (4 x easYgen-3100)	
Example Configuration 2 (4 x easYgen-3100)	
Example Configuration 3 (4 x easYgen-3200)	
Example Configuration 4 (8 x easYgen-3200)	
Example Configuration 5 (10 x easYgen-3200)	
Example Configuration 6 (5 x easYgen-3200)	
Example Configuration 7 (18 x easYgen-3200)	
Example Configuration 8 (20 x easYgen-3200)	
Example Configuration 9 (5 x easYgen-3200)	
Example Configuration 10 (10 x easYgen-3200)	
Example Configuration 11 (12 x easYgen-3200)	
Example Configuration 12 (12 x easYgen-3200)	
Example Configuration 13 (15 x easYgen-3200)	
Example Configuration 14 (30 x easYgen-3200)	
Example Configuration 15 (32 x easYgen-3200)	

# **Figures and Tables**

## Figures

Figure 2.1. Application mode (0)	10
Figure 2-1: Application mode {0}	10
Figure 2-2: Application mode {10}	11
Figure 2-3: Application mode {loc}	12
Figure 2-4: Application mode {2oc}	13
Figure 3-1: Multiple genset application mode	14
Figure 3-2: Example - configuring load-dependent start stop (LM)	15
Figure 3.2: Example - configuring Start in Auto (IM)	
Figure 5-5. Example - congrester availation material	17
Figure 4-1: Example - generator excitation protection	
Figure 4-2: Example - configuring load setpoint 2 for [DI 05]	
Figure 4-3: Example - Setpoints screen	
Figure 4-4: Example - Analog inputs screen	20
Figure 4-5: Example - configuring Flag 5 for a pulsing relay	
Figure 4-6: Example - configuring Relay 2 for a pulsing relay	
Figure 4-7. Example - configuring Relay 11 for a battery change logic	22
Figure 4.8: Example - configuring Relay 12 for a battery change logic	22
Figure 4-0. Example - configuring Florg 2 for a battery change logic	22 วา
Figure 4-9. Example - configuring Fig 2 101 a battery change logic	
Figure 4-10: Example - configuring Figg 3 for a battery change logic	
Figure 4-11: Example - configuring Flag 4 for a battery change logic	23
Figure 4-12: Example - configuring Flag 5 for a battery change logic	23
Figure 4-13: Configuration - Operat. mode AUTO	24
Figure 4-14: Configuration - Operat. mode AUTO	
Figure 4-15: Configuration - Operat mode STOP	25
Figure 4.16: Configuration – Elag 2 (timer)	26
Figure 4.17: Configuration Start w/a load	20 26
Figure +17. Configuration - Start w/o load	
Figure 4-18: Example - remote start request	
Figure 4-19: Example - remote acknowledgement	
Figure 4-20: Example - command variable	29
Figure 4-21: Configuration of TPDO1 for an IKD 1	30
Figure 4-22: Configuration of RPDO1 for an IKD 1	
Figure 4-23: Configuration of the IKD 1	
Figure 4-24: Configuration of the baud rate	32
Figure 4-25: Configuration of the easygen for a second IKD 1	33
Figure 4.26: Configuration of the second IKD 1	
Figure 4-20: Comfiguration of the second rice and for a CAT ADEM controllor	
Figure 4-27. Configuring a PWM duty cycle for a CAT ADEM controller	
Figure 4-28: Connecting a GSM modem	
Figure 4-29: GSM modem connection	
Figure 4-30: Connecting ToolKit with a GSM modem	37
Figure 4-31: Configuring the GSM modem software	
Figure 4-32: Configuring alarm input 1 in the GSM modem software	
Figure 4-33: Configuring alarm input 2 in the GSM modem software	
Figure 4-34: Connecting a landline modem	39
Figure 4-35: Landline modem connection	40
Figure 4.36: Connecting Toolkit with a landline modem	
Figure 4-50. Contecting roomst with a tandine modelit.	
Figure 4-57. Winning sen-powered Dis	
Figure 4-38: Example – connecting analog inputs in series	
Figure 4-39: Configuring the Phoenix modules	45
Figure 4-40: Configuring the interface baud rate	46
Figure 4-41: Set the Phoenix baud rate	46
Figure 4-42: Enter the Phoenix Node-ID	47
Figure 4-43: Set the Phoenix Node-ID	
Figure 4-44: Confirming your changes	48
Figure 4.45: Configure external DI	۲۵۱۵
Figure 4.46: Configure external DO	ر∓ ⊿ر
Figure 4-40. Compute external DO	
Figure 4-4/: Configure the input condition.	
Figure 4-48: Configure external AI	50
Figure 4-49: Example - configure AO 1	51
Figure 4-50: Confirming your changes	52
Figure 5-1: Example configuration 1	54
Figure 5-2: Example configuration 2	
Figure 5-3: Example configuration 3	56
- Bure e e . Entangle comparation e	

Manual 37417B	easYgen-3000 Series (Package P2) - Genset Control
Figure 5-4: Example configuration 4	
Figure 5-5: Example configuration 5	
Figure 5-6: Example configuration 6	
Figure 5-7: Example configuration 7	
Figure 5-8: Example configuration 8	
Figure 5-9: Example configuration 9	
Figure 5-10: Example configuration 10	
Figure 5-11: Example configuration 11	
Figure 5-12: Example configuration 12	
Figure 5-13: Example configuration 13	
Figure 5-14: Example configuration 14	
Figure 5-15: Example configuration 15	

#### Tables

Table 1-1: Manual - overview	8
Table 3-1: Configuration of load-dependent start/stop	15
Table 3-2: Configuration of load-dependent start/stop IOP	
Table 3-3: Configuration of load-dependent start/stop MOP	
Table 3-4: Configuration of emergency operation	
Table 3-5: Configuration of import/export power control	
Table 4-1: Example - generator excitation protection	
Table 4-2: Configuration of the rated generator power	19
Table 4-3: Configuration of the analog input for real power set point	
Table 4-4: Configuration of the analog input for real power set point - ToolKit only parameters	
Table 4-5: Configuration of the load controller	19
Table 4-6: Timer configuration	
Table 4-7: Configuration of TPDO1 for an IKD 1	
Table 4-8: Configuration of RPDO1 for an IKD 1	
Table 4-9: Configuration of the IKD 1	
Table 4-10: Configuring a PWM duty cycle for a CAT ADEM controller	
Table 4-11: Configuring the easYgen for GSM modem connection	
Table 4-12: Configuring the easYgen for landline modem connection	
Table 4-13: Supported Phoenix Modules	44
Table 4-14: Possible combinations of Phoenix modules	45
Table 4-15: Supported sender types	51
Table 5-1: IKD 1 - Possible Phoenix usage combinations	53

# Chapter 1. General Information

Туре		English	German
easYgen-3000 Series (Package 2)			
easYgen-3000 Series - Installation		37414	GR37414
easYgen-3000 Series - Configuration		37415	GR37415
easYgen-3000 Series - Operation		37416	GR37416
easYgen-3000 Series - Application	this manual ⇒	37417	-
easYgen-3000 Series - Interfaces		37418	-
easYgen-3000 Series - Parameter List		37420	GR37420
easYgen-3200 - Brief Operation Information		37399	GR37399
easYgen-3100 - Brief Operation Information		37419	-
RP-3000 Remote Panel		37413	-

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

#### 



## NOTE

Please refer to the Configuration Manual 37415 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 10
  - Measuring of engine/generator parameters (i.e. voltage, frequency, current, power, coolant temperature, oil pressure, etc.)
  - Engine start/stop
- Application mode {10} [open GCB] protection refer to page 11
  - 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 12
  - 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 13
  - 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}

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)

# **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 {1o}

#### 

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 {10}

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"



### 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}

#### 

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 {20c}**

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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



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**

#### ====

## 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

Table 3-1: Configuration of load-dependent start/stop

Configure the LogicsManager function "LD start stop" as shown in Figure 4-2 on page 20 to enable LDSS if a start request in automatic operating mode or emergency mode are enabled.



#### 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

Table 3-2: Configuration of load-dependent start/stop IOP

#### 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

Table 3-3: Configuration of load-dependent start/stop MOP

#### **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 20 to start the generator in Automatic operating mode if discrete input [DI 02] ("09.02 Discrete input 2") is energized or a remote start request ("04.13 Remote request" = start via interface) is issued.



## 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

Table 3-4: Configuration of emergency operation

#### **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

Table 3-5: Configuration of import/export power control

# 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 37415 for more information) have to be configured according to Table 1-1: Manual - overview.

Generator power factor lagging level 1				Generator power factor lagging level 2		
ID	Text	Setting		ID	Text	Setting
2325	Monitoring	ON		2331	Monitoring	ON
2329	Limit	+0.700		2335	Limit	+0.500
2330	Delay	30.00 s		2336	Delay	1.00 s
2326	Alarm class	В		2332	Alarm class	E
2327	Self acknowledge	NO		2333	Self acknowledge	NO
2328	Delayed by engine speed	YES		2334	Delayed by engine speed	YES
Generator power factor leading level 1			Generator power factor leading level 2			
ID	Text	Setting		ID	Text	Setting
2375	Monitoring	ON		2381	Monitoring	ON
2379	Limit	-0.800		2385	Limit	-0.600
2380	Delay	30.00 s		2386	Delay	1.00 s
2376	Alarm class	В		2382	Alarm class	Е
2377	Self acknowledge	NO		2383	Self acknowledge	NO
2270	D 1 11 1 1	VEC	I	2204	Delevered has an administration	VEC

Table 4-1: Example - generator excitation protection

## Configuring a Set Point Control via Analog Input

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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

Table 4-2: Configuration of the rated generator power

## 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	Туре	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

Table 4-3: Configuration of the analog input for real power set point

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%"

Table 4-4: Configuration of the analog input for real power set point - ToolKit only parameters

## **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

Table 4-5: Configuration of the load controller

Configure the *LogicsManager* function "Setp. 2 load" as shown in Figure 4-2 on page 20 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 ( $\sim$ 50 % or 12 mA) is displayed.

MAN	In operation	
Mode	Setpoint: Actual value:	Γ
	P 00999.9kW 🔘 0.00MW	
	<sup>2</sup> Constant © 0.99MW	•
	PFI a 98 1 00	T
	1 05.10 Internal PF setp.1	
	V 000400V 10.0kV⊣	
	<sup>1</sup> 05.07 Internal volt.setp.1	Ť.
	f 50.00Hz 50.00Hz -	•
	<sup>1</sup> 05.01 Internal freq.setp.1	
	<b>-</b> <u>-</u>	<u> </u>
L'		¥.

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 1 MW).

	In operation		
	Analog inputs		ľ
AUTO	Analog input D+ Battery voltage 20.0V	02.4V 25.3V 35.0v	
1ode	0il Pressure 00.00bar	00.00bar 10.00bar	
MAN	Water Temperat. 060	130 130	T
lode	ActivePower SP 000.00%	049.55% 100.00%	F

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

## Changing a Starter Battery Set Using LogicsManager

#### 

Various functions are possible with the *LogicsManager*. The following programming example shows how two relay outputs are energized by turns when discrete input 9 is energized. At first time, discrete output 11 will be energized, then, discrete output 12 will be energized, then discrete output 11 and so on.

This logic may be used to change between two starter battery sets for each starting cycle.

Configure Relay 11 and Relay 12 as well as the Flags 2, 3, 4, and 5 as shown in the following example. You may also use the discrete input, which starts the engine by default (DI 2) or any other input command instead of discrete input 9; for example the command variable 03.06 "Engine released".



Figure 4-7: Example - configuring Relay 11 for a battery change logic



Figure 4-8: Example - configuring Relay 12 for a battery change logic



Figure 4-9: Example - configuring Flag 2 for a battery change logic



Figure 4-10: Example - configuring Flag 3 for a battery change logic







Figure 4-12: Example - configuring Flag 5 for a battery change logic

## Performing Remote Start/Stop and Acknowledgement

#### 

The easYgen-3000 Series 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 37416 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 37415.

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 37415 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 37415 for reference. The *LogicsManager* factory settings are shown in the Factory Settings section of the *LogicsManager* appendix of the configuration manual 37415.

## **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 4-13. AUTOMATIC operation mode is always enabled.

Config_Application.Automatic_Run.*	12510 Operat. mode AUTO - LogicsManager
00.01 LM: Flag 1	
00.01 LM: Flag 1	True
00.01 LM: Flag 1	True
	OK Cancel

Figure 4-13: 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 4-13. AUTOMATIC operation mode is enabled as soon as discrete input 9 is energized.



Figure 4-14: Configuration - Operat. mode AUTO

The Operat. mode STOP *LogicsManager* function (parameter ID 12530) can be configured as shown in Figure 4-13. STOP operation mode is enabled as soon as discrete input 9 is de-energized.

Config_Application.Automatic_	Run.1	2530 O	perat. mode STOP - LogicsManager
09.09 Discrete input 9	*	Not	×
00.01 LM: Flag 1	~	True	And Contraction Co
00.01 LM: Flag 1	~	True	Delay OFF 0,00 sec
			<u>OK</u> <u>C</u> ancel

## 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 Series 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.

Figure 4-15: Configuration - Operat. mode STOP

#### Manual 37417B

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.

The following settings are to be made for the timer:

ID	Parameter	Value	Comment
1663	Active day	15	The active day is enabled every fifteenth of the month
1662	Active hour	10	The active hour is enabled between 10:00 and 11:00 am every day

Table 4-6: Timer configuration

The *LogicsManager* function Flag 2 (parameter ID 12240) can be configured as shown in Figure 4-16. Flag 2 becomes TRUE as soon as the configured active day and active time is reached.

Config_LogicsManager.Flags.02.	12240 Flag 2 - LogicsManager
11.04 Active day	
11.05 Active hour	And Contraction Co
00.01 LM: Flag 1	True

Figure 4-16: Configuration - Flag 2 (timer)

The Start without load *LogicsManager* function (parameter ID 12540) can be configured as shown in Figure 4-17. Start without load mode is enabled as soon as Flag 2 becomes TRUE.

Config_Application.Automatic	_Run.12540 Start w/o load - LogicsManager	
00.02 LM: Flag 2	×	
00.01 LM: Flag 1		Timing Delay ON 0,00 sec
00.01 LM: Flag 1	True	Delay OFF 0,00 sec
		<u><u>C</u>ancel</u>

Figure 4-17: Configuration - Start w/o load

### **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  $\downarrow$  and  $\uparrow$  softkeys and press  $\downarrow$  to enter the "Start req in AUTO" *LogicsManager* screen.



Configure the "Start req in AUTO" *LogicsManager* function as above using the  $\checkmark$  and  $\uparrow$  as well as + and  $\frown$  softkeys and Confirm the change by pressing the  $\checkmark$  softkey:

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

Press **r** until you return to the start screen.



## 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 1 and 1 softkeys and press 1 to enter the "Ext. acknowledge" *LogicsManager* screen.



Configure the "Ext. acknowledge" *LogicsManager* function as above using the  $\checkmark$  and  $\uparrow$  as well as + and  $\frown$  softkeys and Confirm the change by pressing the  $\checkmark$  softkey:

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



## NOTE

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 37418 for a description of how to configure the *LogicsManager* functions via Modbus.

# i

All interfaces access to the same bits. The command variable "04.13 Remote request" remains 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" (refer to Figure 4-20 on page 29).

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

An acknowledgement is generally performed twice:

- 1<sup>st</sup> change of the logical output "External acknowledge" from "0" to "1": Silence horn
- 2<sup>nd</sup> change of the logical output "External acknowledge" from "0" to "1": Acknowledges all inactive alarms



### 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:



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 0StartBit 1StopBit 4Acknowledgement

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

Please refer to the Interface Manual 37418 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 37418 and the CANopen file \*.eds, which is delivered with the unit.

Please refer to the Interface Manual 37418 for a description of how to enable control bits via CAN bus.

## Connecting an IKD 1 on CAN Bus 1

#### 

We recommend to connect external expansion boards, like the Woodward IKD 1 to CAN bus 2. This CAN bus offers preconfigured settings for operating several expansion boards including the IKD 1.

However, it is also possible to connect an IKD 1 to CAN bus 1. Proceed as follows for this.

### easYgen Configuration

Refer to the easYgen-3000 Series Configuration Manual 37415 for the configuration of the unit and the parameters concerned. Refer also to the easYgen-3000 Series Interface Manual 37418 for a description of the data objects.

The easYgen may either be configured directly using the display screens or using the ToolKit software. The following screenshots show both options.

#### **Transmit PDO**

The easYgen must be configured for sending objects with the index 8001 (external DOs 1 to 8) and 3 x 8000 on CAN ID 181 (hex) every 20 ms on TPDO1. This is used to send messages to an external device. For this, TPDO1 must be configured as follows:

ID	Parameter	Value	Comment
9600	COB-ID	181 (hex) / 385 (dec)	The COB-ID is configured to 181 (hex) or 385 (dec)
9602	Transmission type	255	Data is automatically broadcasted (transmission type 255)
9604	Event timer	20ms	The event timer is configured to 20 ms
8962	Selected Data Protocol	65000	Data protocol 65000 is selected

Table 4-7: Configuration of TPDO1 for an IKD 1

Transmit PDO 1						
9600 COB-ID (decimal)	385		Thomas it PDO 1	C Configur	ANopen interface re CAN interface	7
8962 Selected Data Protocol	65000		Iranswitt PDO I	Conf	Igure Interfaces Configuration	
9602 Transmission type	255		<b>DUB-ID</b> Transmission type	2	1888181hex 255	
9604 Event-timer	20 ms	:	Event-timer Selected Data Protoco	1 1	30020ms 55000	Ť
9609 Number of Mapped Objects	0		Number of Marred Obje 1 Manned Object	cts 6 Ø	3 30000	
9605 1. Mapped Object	0		2. Marred Object	ĺ	30000 30000	Ŧ
9606 2. Mapped Object	0		4. Marred Object	ĺ	30000	-
9607 3. Mapped Object	0					
9608 4. Mapped Object	0		STOP			-

Figure 4-21: Configuration of TPDO1 for an IKD 1

#### **Receive PDO**

The easYgen must be configured for receiving data on an RPDO. The data received on CAN ID 201h is interpreted as object with the index 8011 (external DIs 1 to 8). For this, RPDO1 must be configured as follows:

ID	Parameter	Value	Comment
9300	COB-ID	201 (hex) / 513 (dec)	The COB-ID is configured to 201 (hex) or 513 (dec)
9121	Event timer	2000ms	The event timer is configured to 2000 ms
8970	Selected Data Protocol	65000	Data protocol 65000 is selected



Table 4-8: Configuration of RPDO1 for an IKD 1

CANopen interface Configure CAN interface Configure interfaces Configure interfaces

00000201he

02000ms

65000

00000

00000

00000

0 00000 r

t

t

┛



### **IKD 1 Configuration**

Refer to the IKD 1 Manual 37135 for the configuration of the unit and the parameters concerned. Please note that the DPC cable (P/N 5417-557) together with the LeoPC1 software is required to configure the IKD 1.

The IKD 1 must be configured as follows to communicate with an easYgen:

ID	Parameter	Value	Comment
-	CAN Node ID	0	The CAN node ID is configured to 0
-	CAN ID receive data	385 (dec)	The CAN ID for receive data is configured to 385 (dec)
-	CAN ID send data	513 (dec)	The CAN ID for send data is configured to 513 (dec)
-	Physical state only	Yes	Only the physical state of the IKD 1 inputs is evaluated

Table 4-9: Configuration of the IKD 1

Parametrize			
Please select <u>d</u> evice:			Close
· 8440_1041_G_1		•	Help
Name	Value	Rights 🔺	
CAN-INTERFACE			Stop
NOTE		_	Marked rows
CAN Node ID	00	BW BW	<u>R</u> ead all
CAN ID receive data CAN ID send data	00513	RW BW	Print
CAN ID send config CAN ID receive upload	01505	RW BW	
CAN ID send upload	01505	RW BW	
Mux send	001	BW BW	
Rate to send (s)	00.10	RW DW	<u>S</u> ave
<	373 OFF	× ×	
)			

Value 01505	Rights 🔺	Input
Value 01505	Rights 🔨	Innut
01505		To desire.
	HW	
01505	RW 🔤	
01505	RW 📃	
01505	RW	Marked ro
250	RW	
001	RW	Read al
001	RW	
00.10	HW	Print
S7S UFF	HW	
02.50	BW	
t Yes	BW	
	01505 01505 250 001 001 00.10 S/S OFF 02.50 t Yes	01505 PW 01505 PW 250 PW 001 PW 001 PW 0010 PW 0010 PW 0010 PW 0010 PW 02.50 PW 2.50 PW

Figure 4-23: Configuration of the IKD 1

### **Baudrate Configuration**

The baud rate must be configured identical in the easYgen and the IKD 1. The following example shows the configuration of both units to 250 kBd:



				Please select <u>d</u> evice:		
				·8440_1041_G_1		•
Configure CAN interface 1	Configur Confi	e CAN interface 9ure interfaces Configuration Parameter	٦	Name	Value	Rights 🔺
<mark>Baudrate</mark> Node-ID CAN bus 1 CANopen Master	2 9 D	50 kBd 01 efault Master	<b>▲</b>	CAN-INTERFACE NOTE IDs are valid for only N	ode-ID = 0 !!	
Producer heartbeat ti COB-ID SYNC Message Producer SYNC message	me 8 9 time 9	2000ms 2000080hex 2020ms		CAN Node ID CAN ID receive data CAN ID send data CAN ID receive config CAN ID cond config	00 00385 00513 01505 01505	RW RW RW RW
COB-ID TIME Message Additional Server SDC	ls I	0000100hex	Ŧ	CAN ID send corring CAN ID receive upload CAN ID send upload CAN baudrate	01505 01505 250	RW RW RW
Receive PDO 1 Receive PDO 2	-	¥	_	Mux sena Mux receive Rate to send (s) Start-up procedure	001 001 00.10 S/S OFF	RW RW RW
STOP			-	<		

Parametrize

Figure 4-24: Configuration of the baud rate

<u>C</u>lose <u>H</u>elp <u>I</u>nput

Marked rows
<u>R</u>ead all
<u>Print</u>

<u>S</u>ave

## Configuration for a Second IKD 1

If a second IKD 1 shall be connected to the easYgen, the following settings must be made to TPDO2 and RPDO2 in the easYgen:



Figure 4-25: Configuration of the easYgen for a second IKD 1

The second IKD 1 must be configured as follows to communicate with an easYgen:

Parametrize			×
Please select <u>d</u> evice:			<u>C</u> lose
- 8440_1041_G_1		•	Help
Name	Value	Rights 🔺	Input
CAN-INTERFACE			Stop
NOTE		_	<u>M</u> arked rows
CAN Node ID		RW	<u>R</u> ead all
CAN ID receive data CAN ID send data	00514	RW	Print
CAN ID receive coning CAN ID send config	01505	RW	
CAN ID receive upload	01505	RW	
LAN baudrate Mux send	250	RW	
Mux receive Rate to send (s)	001 00.10	HW RW	Save
Start-up procedure	S/S OFF	RW	2570

9440 1041 G 1			<u></u>
] • 0440_1041_d_1			Help
Name	Value	Rights 木	Input
CAN ID receive config	01505	BW	
CAN ID send config	01505	HW BW	Stop
CAN ID send upload	01505	RW -	Marked ros
CAN baudrate	250	RW	
Mux send	001	BW	<u>R</u> ead all
Mux receive Rate to send (s)	001	HW PW	
Start-up procedure	S/S OFF	BW	<u>Print</u>
CANLEDDODS			
	~~~~~		
CAN error delay (s)	02.50	BW	
CAN error self-acknowledgeme	ent Yes	RW	
DIGITAL INPUTS	$\frown$		C
physical state only	(Yes)	BW 🗖	<u>o</u> ave

Figure 4-26: Configuration of the second IKD 1

## Configuring a PWM Duty Cycle for a CAT ADEM Controller

#### 

If a PWM signal shall be used with a CAT ADEM speed controller, the duty cycle must be limited between 10% and 85%. For this, the following settings must be made to the respective analog output (the following parameter IDs and figures refer to analog output 1; however, another analog output may also be used):

ID	Parameter	Value	Comment
5200	Data source	[00.03] Speed bias	A speed signal will be output
5201	Selected hardware type	User defined	A user-defined hardware type will be used
5208	User defined min. output value	10.00%	The minimum output value of the user-defined hardware type is 10%
5209	User defined max. output value	85.00%	The minimum output value of the user-defined hardware type is 85%
5202	PWM signal	On	The PWM signal is enabled
5210	PWM output level	10.00V	The PWM output level is configured to 10 V

Table 4-10: Configuring a PWM duty cycle for a CAT ADEM controller

<b>₩ 8440-1842-7_us_5418-2934-1_x32.wt</b> o	ol - Woodward ToolKit	
File View Device Settings Tools Help		
Control     Contro     Control     Control     Control     Control     Control     Co	LIO.ANALOG OUT.01	HOME PAGE Previous Page ALARM STATUS PARAMETER STATUS MENUS Go Back To Menu INPUT/OUTPUT
Connected on COM4 Min: 0,00, Max	: 100,00	.;

Analos output 1	Configure analog outputs Configure inputs/outputs Configure application Configuration	r
Data source Source value at minim Source value at maxim Filter time constant Selected hardware typ User defined min. out User defined max. out PWM signal PWM output level	ial output +00000 Off e User defined put value 010,00% put value 885,00% On 18,00V	↑ ↓
STOP		Ļ

Figure 4-27: Configuring a PWM duty cycle for a CAT ADEM controller

## **Connecting a GSM Modem**

#### 



Figure 4-28: Connecting a GSM modem

## Function

It is possible to establish a cellular connection to the system using a GSM modem. This application is intended for mobile use. It is also interesting to trigger a call in case of an alarm with this application. The GSM modem provides a discrete input for this, which can trigger e.g. a short message (SMS) (depending on the network provider, it can also be possible to send a fax message).

Different actions can be performed 'online' using the ToolKit application software, which is delivered on the CD-ROM with the control. These actions include:

- Configuration
- Visualization
- Transfer settings to and from the hard drive

## **Preconditions for this Example**

- easYgen-3000
- Straight serial cable for connecting the easYgen with the GSM modem
- Wireless modem INSYS GSM 4.2 with antenna (http://www.insys-tec.de)
- SIM card with data transfer enabled (to be enabled by the GSM provider)
- PC or notebook with Windows OS 2000, XP, or Vista with modem (we recommend to use the Windows standard driver for older modems (e.g. ELSA Microlink 56k) if the dedicated driver does not work)
- Application software ToolKit version 2.2 or higher
- Configuration files available (\*.sid, \*.wtool)
- FAX/SMS receiver for receiving alarm messages



## NOTE

If a SIM card is used, which is enabled to send SMS messages, an SMS can be sent by the GSM modem. To establish a data connection, data transfer has to be enabled by the network provider.



## NOTE

The INSYS GSM Modem 4.2 has two discrete inputs, which can be used to send two different alarm messages. One relay of the easYgen is required for each alarm message.



## NOTE

The easYgen does not send AT commands to the connected modem. The dispatch of an alarm message is performed by the modem after energizing a discrete input.

If a different modem is used, this has to accept incoming calls automatically and establish a connection between calling PC and easYgen.

### Connection

It is possible to issue an active call in case of a malfunction using a relay of the relay manager. Connect the easygen and the modem with the power supply as directed.



Figure 4-29: GSM modem connection

#### NOTE

Use the *straight* RS-232 cable delivered with the GSM modem for connecting the easYgen with the modem.

When commissioning the system, use a null modem cable to configure the easYgen via a PC with ToolKit.

### easYgen Settings

Configure the following setting in the easYgen (refer to the Configuration Manual 37415) to connect to the modem for configuration purposes (the same settings must be configured in the modem):

ID	Parameter	Value	Comment
3163	Baudrate	9600 Bd	The baud rate is set to 9600 Baud
3161	Parity	No	The transmission protocol is configured without parity
3162	Stop bits	One	The transmission protocol is configured with one stop bit
7901	Enable ServLink protocol	Yes	The ServLink protocol is enabled

Table 4-11: Configuring the easYgen for GSM modem connection



## NOTE

If the transmission quality of the phone line is poor, the baud rate should be lowered since no data flow control is performed between easYgen and modem.

Generally, the connection via modem is a bit slower than a direct connection of PC and easYgen.

Configure the relay(s) connected with the modem using the easYgen *LogicsManager* (refer to the Configuration Manual 37415).

### **ToolKit Settings**

In ToolKit, select Connect... from the Device menu to open the Communications window. Select the modem (this must be installed and configured under Windows) from the network list, enter the phone number and click the Connect button to establish a connection with the modem.

穿 Communications		
Select a network:		
Network Status	Enter the telephone number to dial or select	it from the list.
COM1 Unavailable		
IPC-1320/PCI CAN - A     Available     ISB.to.CAN compact CAN - A	Phone Number: <enter number="" phone=""></enter>	Connect
Standard 9600 bps Modem Available	Always connect to my last selected netwo	rk.
Sessions		
Network Device Tool Device	Application Id Sta	atus
📓 Disconnect	💁 Login 🛛 🔒 Logout 🛛 🐉	<u>S</u> ave Values

Figure 4-30: Connecting ToolKit with a GSM modem

### **GSM Modem Settings**

INSYS Microelectronics provides the application software HS-COMM to configure the GSM modem for the application. Refer to the operation manual of the modem for detailed information.

The following settings show an example for sending an alarm message as a short message.

Descriptions of the individual parameters can be taken from the operation manual of the modem.

#### Settings Using the Configuration Software

Make the following settings on the Basic Settings tab. These settings configure the modem to accept an incoming call for remote configuration. The phone number and text can be configured as required.

🐝 HS-COMM G5M 4.0		_ 🗆 ×
File Interface Settings Ierminal Language/Sprache	PLC Overview Error Info Help	
Basic Settings   Alarm/Uutput ]   Alarm/Uutput 2   Additional Heciepie	ents   Access Control   History	
GSM Connection new PIN delete PIN service Center Number: idle connection control: automatic SMS processing: Leave unknown SMS in SIM memory: DTMF processing: connection attempts: muthempts: purpler of insos before answer purpler of insos before answer 2	System Monitoring         Scheduled Logout/Login:         ✓ logout with reset       time:       00.00         ✓ logout       duration:       0 min         Periodic alive message by SMS         recipient:       01733494586         text:       INSYS-Modem ready.       122	MICROELECTRONICS
configured SMS memory spaces: 0 SIM SMS memory spaces: get SMS-memory spaces detect OSM intensity	time: dayly y y 15.35 Power-Up-SMS	✓ Send settings
Date/Time           date:         21.06.2004         Mo	PowerUp-SMS: active Destination:	Send default settings
time: 10:29:18 💼 system clock (PC)	Message:	Reset
Serial Interface: baud rate: 9600 data format: 8N	1 🔽 🔽 echo	Synchronize RS232
Protocol (outside GSM)       Handshake         V.110 (for ISDN)       no handshake         V.32 9600 (for analogue modem)       software XDN/XD         hardware RTS/CT	FF C hang up 'S C command mode	Abort

Figure 4-31: Configuring the GSM modem software

Make the following settings on the Alarm/Output 1 tab. The phone number and the text can be set as required.



Figure 4-32: Configuring alarm input 1 in the GSM modem software

Make the following settings on the Alarm/Output 2 tab. The phone number and the text can be set as required.



Figure 4-33: Configuring alarm input 2 in the GSM modem software

## **Connecting a Landline Modem**

#### 



landline modem with discrete input for dial up Notebook with modem and Windows operating system 2000, XP, or Vista and ToolKit application SW

Figure 4-34: Connecting a landline modem

## Function

It is possible to establish a phone connection to the system using a modem. This application is intended for stationary use, where a steady remote control is required.

It is also interesting to trigger a call in case of an alarm with this application. The Phoenix modem provides a discrete input for this, which can trigger e.g. a call or a fax message.

Different actions can be performed 'online' using the ToolKit application software, which is delivered on the CD-ROM with the control. These actions include:

- Configuration
- Visualization
- Transfer settings to and from the hard drive

## **Preconditions for this Example**

- easYgen-3000
- Straight serial cable for connecting the easYgen with the modem
- Phoenix PSI data/fax modem/RS232 (www.phoenixcontact.com)
- PC or notebook with Windows OS 2000, XP, or Vista with modem (we recommend to use the Windows standard driver for older modems (e.g. ELSA Microlink 56k) if the dedicated driver does not work)
- Application software ToolKit version 2.2 or higher
- Configuration files available (\*.sid, \*.wtool)
- FAX/SMS receiver for receiving alarm messages



## NOTE

Sending an SMS via the fixed-network line may be enabled by the network provider.



## NOTE

The Phoenix PSI-Data/Fax-Modem/RS232 has one discrete input, which can be used to send an alarm message. One relay of the easYgen is required for the alarm message. It is also possible to use the switch output of the modem to operate a discrete input of the easYgen, for example for a remote start.



## NOTE

The easYgen does not send AT commands to the connected modem. The dispatch of an alarm message is performed by the modem after energizing a discrete input.

If a different modem is used, this has to accept incoming calls automatically and establish a connection between calling PC and easYgen.

### Connection

It is possible to issue an active call in case of a malfunction using a relay of the relay manager. Connect the easygen and the modem with the power supply as directed.



Figure 4-35: Landline modem connection

### NOTE

Use a *straight* RS-232 cable (not delivered with the modem) for connecting the easYgen with the modem.

When commissioning the system, use a null modem cable to configure the easYgen via a PC with ToolKit.

### easYgen Settings

Configure the following setting in the easYgen (refer to the Configuration Manual 37415) to connect to the modem for configuration purposes (the same settings must be configured in the modem):

ID	Parameter	Value	Comment
3163	Baudrate	4800 Bd	The baud rate is set to 4800 Baud
3161	Parity	No	The transmission protocol is configured without parity
3162	Stop bits	One	The transmission protocol is configured with one stop bit
7901	Enable ServLink protocol	Yes	The ServLink protocol is enabled

Table 4-12: Configuring the easYgen for landline modem connection



## NOTE

If the transmission quality of the phone line is poor, the baud rate should be lowered since no data flow control is performed between easYgen and modem.

Generally, the connection via modem is a bit slower than a direct connection of PC and easYgen. The maximum baud rate depends on the used modem. The easYgen supports the following baud rates: 2400, 4800, 9600, 14400, 19200, 38400, 65000, and 11500 Bauds.

Configure the relay(s) connected with the modem using the easYgen *LogicsManager* (refer to the Configuration Manual 37415).

### **ToolKit Settings**

In ToolKit, select Connect... from the Device menu to open the Communications window. Select the modem (this must be installed and configured under Windows) from the network list, enter the phone number and click the Connect button to establish a connection with the modem.

2	Communications					
	Select a network:					
	Network	Status	Enter the telephon	e number to dial or se	lect it from the list.	
	🍠 СОМ1	Unavailable				
	🛸 TCP/IP	Available				
	😨 iPC-1320/PCI CAN - A	Available	Phone Number:	<enter number<="" phone="" td=""><td>&gt; 🖌</td><td></td></enter>	> 🖌	
	Setup USB-to-CAN compact CAN - A	Available				Lonnect
	Standard 9600 bps Modem	Available				
			Always connect	to my last selected ne	twork.	
	Sessions					
	Network Device To	ol Device	Applicat	ion Id 🛛	Status	
	🗾 🖉 Di	sconnect	鹶 Login	A Logout	🎲 <u>S</u> ave Values	

Figure 4-36: Connecting ToolKit with a landline modem

### **Phoenix Modem Settings**

The settings refer to an example for sending an alarm message via fax. Descriptions of the individual parameters can be taken from the operation manual of the modem.

#### **DIP Switches**

All DIP switches are set to OFF (default state).

#### Settings using the configuration software

Phoenix provides an application software to configure the modem for the application. Refer to the operation manual of the device for detailed information.

The following settings form an example for sending an alarm message via fax.

Descriptions of the individual parameters can be taken from the operation manual of the modem.

To configure the modem, proceed as follows.

U	71			
		COM Interface Interface COM 1 COM2 baudrate 4800 parity NONE OK	X CON 3 CON 4 databits V 8 stopbits V 1 Abort	Configure the COM port
	PSI-MODEM-CONF File Option ? Type Version Serial Input Output Output Hodus SHS-Hessages FAX-Hessages Hello world	PSI 33.6 VI.38 50386402 SIMS V Fax Number Password Number		The phone number and the text can be set as required.
ofile settings Echo DCD-Signal DSR-Signal DTR-Signal TR-Signal Flow-Controll Error-Correction Compression Modulation Select Compression Modulation Select Result Codes Auto Answer Dialtone Detect Country Code Speaker Additional Init SMS Mode		Store Number 0 Store Number 1 Store Number 1 Store Number 2 Store Number 3 Store Number 3 Store Number 5 Store Number 6 Store Number 7 Caller ID Mode Caller ID Mode Caller ID 1 Caller ID 2 Password	Enable	These settings configure the modem to accept an incoming call for remote configuration.

V OK Abort

Profile setting

SMS Provider

Deutsche Telekom

## Wiring Self-Powered DIs

#### 

In order to create self-powered discrete inputs, it is required to connect battery negative (B-) to ground and PE (terminal 61). Moreover, DI common (terminal 66) must be connected to Power supply 12/24 V (terminal 63, minimum wire size 0.5 mm<sup>2</sup> (20 AWG)).

Now, it is possible to energize the discrete inputs against ground.



Figure 4-37: Wiring self-powered DIs

## **Connecting Analog Inputs in Series (Multiple Devices)**

#### 

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 4-38: Example – connecting analog inputs in series

## Phoenix Expansion Modules

#### 

## **Supported Phoenix Modules**

Bus coupler	Discrete outputs	Discrete inputs	Analog outputs	Analog inputs
IL CAN BK	IB IL 24 DO 2	IB IL 24 DI 2	IB IL AO 2/SF	IB IL AI 2/SF
	IB IL 24 DO 8	IB IL 24 DI 4		IB IL TEMP 2 UTH
	IB IL 24 DO 16	IB IL 24 DI 8		IB IL TEMP 2 RTD
	IB IL 24 DO 32	IB IL 24 DI 16		
	IB IL 24/230 DOR4/W	IB IL 24 DI 32		

Table 4-13: Supported Phoenix Modules

### **Possible Combinations**

The possible combinations of Phoenix modules are listed below. The parameters display the maximum extension. It is also possible to connect fewer modules. For example choose parameter ID 9941 (12AI 4AO) for connecting 10 AI and 1 AO. It is possible to use multiple Phoenix modules with one bus coupler. Each single value in the marked screenshot can be handled by one bus coupler.

	tool - Woodward Toolk	lit	
File View Device Settings Tools He	lp iCE.CAN#2	- E 🖉 Connect 😴 Disconnect	
Currently entered code level for More Device Active session 17 5	CON	NFIGURE INTERFA CAN #2	CES
3157 Baudrate	250 kBd 💌		
CANopen Interface		J1939 Interface	
9940 This device	Node-ID 7 💌	15106 J1939 own address	234
9930 IKD1 DI/DO 18	Off 💌	15107 Engine control address	0
9931 IKD2 DI/DO 916	Off 💌	15108 Reset previous act. DTCs - DM3	No 🛩
9932 IKD3 DI/D0 1724	Off 💌	15133 Reset act. DTCs - DM11	No 🕶
9933 IKD4 DI/DO 2532	Off 💌	15103 SPN version	Version 1
9934 Phoenix DI/DD 116	Off 💌	15102 Device type	Standard 🛩
9935 Phoenix DI/DO 1732	Off 💌	15127 ECU remote controlled	Off 🕶
9936 Phoenix DI/DO 132	Off 💌	5537 Speed deviation ECU	120 rpm
9943 Phoenix 4AI 4AD	Off 💌		
9942 Phoenix 8AI 4AD	Off 💌		
9941 Phoenix 12AI 4AD	Off 💌		
9937 Phoenix 16AI 4AD	Off 💌		
9944 Phoenix 4AI 4AD DI/DO 132	Off 💌		
9945 Phoenix 8AI 4AD DI/DO 132	Off 💌		
9946 Phoenix 12AI 4AD DI/DO 132	Off 💌		
9938 Phoenix 16AI 4AD DI/DO 132	Off 💌		
9939 RemoteDisplay	Node-ID 6 💌		
15134 Configure external devices	No 🛩		
		ш	
Connected on COM2 🔂 Details			

Figure 4-39: Configuring the Phoenix modules

Table 4-14: Possible combinations of Phoenix modules

	Phoenix Di/DO 116	Phoenix Di/DO 1732	Phoenix Di/DO 132	Phoenix 4AI 4AO	Phoenix 8AI 4AO	Phoenix 12AI 4AO	Phoenix 16AI 4AO	Phoenix 4AI 4AO DI/DO 132	Phoenix 8AI 4AO DI/DO 132	Phoenix 12AI 4AO DI/DO 132	Phoenix 16AI 4AO DI/DO 132
Phoenix Di/DO 116		Х		Х	Х	х	х				
Phoenix Di/DO 1732	х			х	х	х	х				
Phoenix Di/DO 132				х	х	х	х				
Phoenix 4AI 4AO	х	х	х								
Phoenix 8AI 4AO	х	х	х								
Phoenix 12AI 4AO	х	х	х								
Phoenix 16AI 4AO	х	х	х								
Phoenix 4AI 4AO DI/DO 132											
Phoenix 8AI 4AO DI/DO 132											
Phoenix 12AI 4AO DI/DO 132											
Phoenix 16AI 4AO DI/DO 132											



## NOTE

There is a maximum of three bus couplers on the CAN bus. There is also a maximum of 16AI 4AO DI/DO 1..32, which must not exceeded in all possible combinations.

#### Setup

#### **Baud rate**

Set the Baud rate of CAN #2 in the easYgen and the Phoenix module to the same value. All members on the CAN bus need to have the same baud rate.

File View Device Settings Tools H	Help		
🗅 💣 📕 🔛 🤅 😋 🕤 CONFIG.INTERF	FACE.CAN#2	🔹 🧾 Connect 👷 Disconnect	
arrently entered code level for More evice Active session 17 5	CON	IFIGURE INTERFA CAN #2	CES
3157 Baudrate	250 kBd 💌		
ANopen Interface		J1939 Interface	
9940 This device	Node-ID 7 💌	15106 J1939 own address	234
9930 IKD1 DI/DO 18	Off 💌	15107 Engine control address	0
9931 IKD2 DI/DO 916	Off 💌	15108 Reset previous act. DTCs - DM3	No 🛩
9932 IKD3 DI/D0 1724	Off 🗸	15133 Reset act. DTCs - DM11	No 🛩
9933 IKD4 DI/DO 2532	Off 🗸	15103 SPN version	Version 1 💌
9934 Phoenix DI/DO 116	Off 💌	15102 Device type	Standard
9935 Phoenix DI/DO 1732	Off 💌	15127 ECU remote controlled	Off 🛩
9936 Phoenix DI/DO 132	Off 🗸	5537 Speed deviation ECU	120 rp
9943 Phoenix 4AI 4AD	Off 🗸		
9942 Phoenix 8AI 4AD	Off		
9941 Phoenix 12AI 4AO	Off 💌		
9937 Phoenix 16AI 4A0	Off		
9944 Phoenix 4AI 4AO DI/DO 132	Off 💌		
9945 Phoenix 8AI 4AO DI/DO 132	Off 💌		
9946 Phoenix 12AI 4AO DI/DO 132	Off 💌		
9938 Phoenix 16AI 4AO DI/DO 132	Off 💌		
9939 RemoteDisplay	Node-ID 6 💌		
15134 Configure external devices	No 💌		
		11	

Figure 4-40: Configuring the interface baud rate

Each bus coupler has 10 DIP switches. These switches are located on the left side of the CANopen bus coupler. DIP switches 1 through 7 are used to set the node address and DIP switches 8 to 10 are used to set the baud rate.



Figure 4-41: Set the Phoenix baud rate

#### Set the Node-ID

Set the Node-ID for the configuration you are using.

₩ 8440-1843-E_us_5418-3531-C_x32.wtool	- Woodward Too	Kit	
: File View Device Settings Tools Help			
CONFIG.INTERFACE.C	AN#2	🔹 🦉 Connect 📈 Disconnect	
Currently entered code level for More	0.0	NEIGURE INTEREA	CES
Device Active session	00		020
17 5		CAN #2	
3157 Baudrate	250 kBd av		
	200 KBU		
CANopen Interface		J1939 Interface	
9940 This device	Node-ID 7 💌	15106 J1939 own address	234
9930 IKD1 DI/DO 18	Off 💌	15107 Engine control address	0
9931 IKD2 DI/DO 916	Off 💌	15108 Reset previous act. DTCs - DM3	No 💌
9932 IKD3 DI/DO 1724	Off 💌	15133 Reset act. DTCs - DM11	No 💌
9933 IKD4 DI/DO 2532	Off 💌	15103 SPN version	Version 1 💌
9934 Phoenix DI/DO 116	Off 💌	15102 Device type	Standard 🛩
9935 Phoenix DI/DO 1732	Off 💌	15127 ECU remote controlled	Off 🕶
9936 Phoenix DI/DO 132	Off 💌	5537 Speed deviation ECU	120 rpm
9943 Phoenix 4AI 4A0	Off 💌		
9942 Phoenix 8AI 4A0	Off 🗸		
9941 Phoenix 12AI 4AD	Node-ID 4 💌		
9937 Phoenix 16AI 4AO	Off 💌		
9944 Phoenix 4AI 4AO DI/DO 132	Off 💌		
9945 Phoenix 8AI 4AD DI/DO 132	Off 💌		
9946 Phoenix 12AI 4A0 DI/D0 132	Off 💌		
9938 Phoenix 16AI 4AO DI/DO 132	Off 💌		
9939 RemoteDisplay	Node-ID 6 💌		
15134 Configure external devices	No 💌		
Connected on COM2 💭 Details			

Figure 4-42: Enter the Phoenix Node-ID

The node address is set using DIP switches 1 through 7. DIP switch 1 is the least significant digit of the node address and DIP switch 7 is the most. Valid node address settings range from 1 to 127. Note that the UL power will need to be cycled in order to implement any changes to the node address. Node address 0 is reserved, and used to auto-configure the I/O attached to the module. The unit will not go online at address 0.



Figure 4-43: Set the Phoenix Node-ID

### **Confirm Your Changes**

Initialize the startup routine in the phoenix device. Set parameter ID 15134 "Configure external devices" to "yes" to confirm your changes in the easYgen.

😿 8440-1843-E_us_5418-3531-C_x32.wtool	- Wo 💶 🗖 🔀
: File View Device Settings Tools Help	
i 🗅 🗳 🖬 📓 i G 🕤	
Currently entered code level for More Device Active session 17 5	
3157 Baudrate	250 kBd 💌
CANopen Interface	
9940 This device	Node-ID 7 💌
9930 IKD1 DI/DO 18	Off 💌
9931 IKD2 DI/DO 916	Off 💌
9932 IKD3 DI/D0 1724	Off 💌
9933 IKD4 DI/DO 2532	Off 💌
9934 Phoenix DI/DO 116	Off 💌
9935 Phoenix DI/DO 1732	Off 💌
9936 Phoenix DI/DO 132	Off 💌
9943 Phoenix 4AI 4AD	Off 💌
9942 Phoenix 8AI 4AO	Off 💌
9941 Phoenix 12AI 4AO	Node-ID 4 💌
9937 Phoenix 16AI 4AO	Off 💌
9944 Phoenix 4AI 4A0 DI/D0 132	Off 💌
9945 Phoenix 8AI 4AO DI/DO 132	Off 💌
9946 Phoenix 12AI 4AO DI/DO 132	Off 💌
9938 Phoenix 16AI 4AO DI/DO 132	Off 💌
9939 RemoteDisplay	Node-ID 6 🔽
15134 Configure external devices	Yes 🗸
< IIII	>
Connected on COM2 😚 Details	

Figure 4-44: Confirming your changes

## **Configure External Inputs/Outputs**

#### **Configure External DI**

🕉 8440-1843-E_us_	5418-3531-C_x32.wtool - Woodward ToolKit			_ □ 🛛							
: File View Device	Settings Tools Help										
Confriguence Confr											
HOME PAGE	HOME PAGE Unrefly entered code level for More CONFIGURE INPUT/OUTPUT EXTERNAL DI 1 - 4										
Previous Next Page Page	External discrete input 1 16200 Description Ext. DI 1		External discrete input 3 16220 Description Ext. DI 3								
	16000 Delay	0,20 \$	16020 Delay	0,20 \$							
PARAMETER	16001 Operation	N.O. 💌	16021 Operation	N.O. 🛩							
	16002 Alarm class	Control 🛩	16022 Alarm class	Control 🛩							
STATUS MENUS	16003 Delayed by engine speed	No	16023 Delayed by engine speed	No 💌							
	16004 Self acknowledge	No 🕶	16024 Self acknowledge	No 💌							
	External discrete input 2		External discrete input 4								
Go Back To Menu INPUT/OUTPUT EXTERNAL	16210 Description Ext. DI 2		16230 Description Ext. DI 4								
	16010 Delay	0,20 \$	16030 Delay	0,20 \$							
	16011 Operation	N.O. 💌	16031 Operation	N.O. 💌							
	16012 Alarm class	Control 💌	16032 Alarm class	Control 💌							
	16013 Delayed by engine speed	No 🛩	16033 Delayed by engine speed	No 💌							
	16014 Self acknowledge	No	16034 Self acknowledge	No 🛩							
Connected on COM2	\iint Details Enter up to 1548 character	rs. Limit varies with different (	characters.								

Figure 4-45: Configure external DI

#### **Configure External DO**

Click "Edit" Button to enter the LogicsManager.

🖗 8440-1843-E_us_5	5418-3531-C_x32.wtool	Woodward Too	Kit			
File View Device	Settings Tools Help		- (* en -			
E 🖸 💆 🖬 🔝 E G	CONFIG.IO.EXTERNAL	0.01-04	Connect	X Disconnect		
HOME PAGE	Currently entered code level fo Device Active session 17 5	r More	CONF E	IGURE IN XTERNAL	PUT/OUT . DO 1 - 4	TPUT
Page Page	12330 External DO 1			12350 External DO 3 —		
ALARM STATUS	(False And True) And True			(False And True) And Tr	ue	
	Delay ON		0,00 sec	Delay ON		0,00 sec
PARAMETER	Delay OFF		0.00 sec	Delay OFF		0,00 sec
STATUS MENUS	11892 00.63 LM: External DO 1	False	Edit	11894 00.65 LM: External DO 3	False	Edit
	12340 External DO 2			12360 External DO 4		
Go Back To Menu	(False And True) And True			(False And True) And Tr	ue	
EXTERNAL	Delay ON		0,00 sec	Delay ON		0,00 sec
	Delay OFF		0,00 sec	Delay OFF		0,00 sec
	11893 00.64 LM: External DO 2	False	Edit	11895 00.66 LM: External DO 4	False	Edit
Connected on COM2	😼 Details					

Figure 4-46: Configure external DO



Figure 4-47: Configure the input condition

#### **Configure External Al**

For getting an analog input to work, there are 3 major settings to adjust. The parameter numbers are examples for the first analog input, they are different for the second one.

- Parameter ID 5851 "Type" defines the characteristic curve of the sensor.
- Parameter ID 5856 "Sender Type" defines the sensor hardware (be sure that this value matches with the wired and connected extension board).
- Parameter ID 5859 "Sender connection type" defines the wiring of the sensor.

🌾 8440-1843-E_us_	5418-3531-C_x32.wtool - Woodward To	oolKit		
EFile View Device	Settings Tools Help			
i 🗅 🔌 🔲 🔛 i 🔇	CONFIG.IO.EXTERNAL AI.01	- 🕴 🎾 Connect	i 📈 Disconnect	
HOME PAGE	Currently entered code level for More Device Active session 17 5	CONF EXTE	IGURE INPUT/OU RNAL ANALOG INF	TPUT PUT 1
ALARM STATUS	16203 Description Ext. Al 1 5851 Type Linear	Off	Wire break 5854 Wire break alarm class 5855 Self acknowledge wire break	Class B 💌 No 💌
STATUS MENUS	5652 User defined min usplay value 5853 User defined max display value Linear, Table A or Table B (Hardware range) – 5857 Sender value at display min. 5858 Sender value at display max.	0.00 %	Display 16204 Value format 000000 5861 Bargraph minimum 5862 Bargraph maximum	0
Go Back To Menu INPUT/DUTPUT EXTERNAL	5856 Sender type 0 - 500 Dhm 5859 Sender connection type 5863 Filter time constant	0 - 10V V Two wite V 3 V		
Connected on COM2	\iint Details			

Figure 4-48: Configure external AI

The following table shows the possible configuration combination of the "Type" settings (parameter ID 5851) and the "Sender type" setting (parameter ID 5856).

Parameter Type	Sender Type	0 - 10V	±10V	0 - 20mA	±20mA	4 - 20mA	0 - 400 Ohm	0 - 4000 Ohm	Thermocouple	R0=100	R0=10	R0=20	R0=30	R0=50	R0=120	R0=150	R0=200	R0=240	R0=300	R0=400	R0=500	R0=1000	R0=1500	R0=2000	R0=3000
OFF																									
Linear		Х	Х	Х	Х	Х	Х	Х	Х																
Table A		Х	Х	Х	Х	Х	Х	Х	Х																
Table B		Х	Х	Х	Х	Х	Х	Х	Х																
Thermo couple type K									Х																
Thermo couple type J									Х																
Thermo couple type E									Х																
Thermo couple type R									Х																
Thermo couple type S									Х																
Thermo couple type T									Х																
Thermo couple type B									Х																
Thermo couple type N									Х																
Thermo couple type U									Х																
Thermo couple type L									Х																
Thermo couple type C									Х																
Thermo couple type W									Х																
Thermo couple type HK									Х																
Pt DIN(R0)										Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Pt SAMA(R0)										Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	X
Ni DIN(R0)										Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Ni SAMA(R0)										Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х	Х
Cu10																									
Cu50																									
Cu53																									
Ni 1000(Landis)																									
Ni 500(Viessm.)																									
KTY 81-110																									
KTY 84																									
		•	<b>c</b>																						

Configuration of sender type is not used NOT ALLOWED RIGHT CONFIGURATION

Table 4-15: Supported sender types

#### **Configure External AO**

By clicking the "Help" button, you get further information and examples regarding the format you need to choose. For a detailed description of all parameters see the configuration manual.

🌾 8440-1843-E_us_5	418-3531-C_x32.wtool - Woodward ToolKit		_ 🗆 🖂
File View Device	Settings Tools Help		
: 🗅 🔌 🔲 🔝 : 😋	CONFIG.IO.ANALOG OUT.01	🔹 📜 🎾 Connect 🚀 Disconnect	
HOME PAGE	Currently entered code level for More Device Active session 17 5	CONFIGURE INPUT/OUTPUT ANALOG OUTPUT 1	
Page Page ALARM STATUS	5200 Data source 00.03 Speed bias 5201 Selected hardware type	10310 Analog output 1     0-20mA / 0.10V	49,99 %
PARAMETER	5208 User defined min. output value	0.00 %	
STATUS MENUS	5209 User defined max. output value	100,00 %	
Go Back To Menu INPUT/DUTPUT	5204 Source value at minimal output 5206 Source value at maximum output 5203 Filter time constant	0 HELP AnalogManager	
	5202 PWM signal		
	5210 PWM output level	10.00 V	
Connected on COM2	🞲 Details		:

Figure 4-49: Example - configure AO 1

**Confirm Your Changes** Set parameter ID 15134 "Configure external devices" to "yes" to confirm your changes in the easYgen.

₩ 8440-1843-E_us_5418-3531-C_x32.wtool	- Wo 💶 🗖 🔀
File View Device Settings Tools Help	
! □ ≧ H   <u> </u> : G Ə	<del>,</del> <del>,</del> <del>,</del>
Currently entered code level for More Device Active session 17 5	
3157 Baudrate	250 kBd 💌
CANopen Interface	
9940 This device	Node-ID 7 💌
9930 IKD1 DI/DO 18	Off 💌
9931 IKD2 DI/DO 916	Off 💌
9932 IKD3 DI/D0 1724	Off 💌
9933 IKD4 DI/DO 2532	Off 💌
9934 Phoenix DI/DO 116	Off 🖌
9935 Phoenix DI/DO 1732	Off 💌
9936 Phoenix DI/DO 132	Off 💌
9943 Phoenix 4AI 4AD	Off 💌
9942 Phoenix 8AI 4AD	Off 💌
9941 Phoenix 12AI 4AO	Node-ID 4
9937 Phoenix 16AI 4AO	Off 🗸
9944 Phoenix 4AI 4AO DI/DO 132	Off 🗸
9945 Phoenix 8AI 4AO DI/DO 132	Off 🗸
9946 Phoenix 12AI 4AO DI/DO 132	Off 🗸
9938 Phoenix 16AI 4AO DI/DO 132	Off 🗸
9939 RemoteDisplay	Node-ID 6
15134 Configure external devices	Yes 🗸
Connected on COM2	

Figure 4-50: Confirming your changes

# Chapter 5. Examples for Load Sharing Applications

## **General Information**

#### 

The following examples show different suggested configurations for load sharing applications. The number of gensets in a load sharing application is limited by the maximum CAN bus load. The CAN bus load again depends on the number of messages sent on the bus, i.e. the number of connected peripheral devices. We have tested the maximum number of gensets for the following common configurations.

It is not important for the following configurations whether Woodward IKD 1 or Phoenix expansion boards are used for the discrete I/Os, the bus load remains the same.

Any combination of Phoenix expansion boards of the Inline Modular (IL) series and Woodward IKD 1 DI/DO expansion boards is possible with the following restrictions:

- The total number of inputs and outputs must not exceed:
  - o 32 discrete inputs
  - 32 discrete outputs
  - $\circ$  16 analog inputs
  - 4 analog outputs
- A maximum of three CANopen bus couplers IL CAN BK-TC-PAC (Phoenix order no. 2718701) can be used
- Not all IKD 1 / Phoenix DI/O combinations are possible; Table 5-1 shows some possible combinations (the Phoenix DI/Os may be composed of any combinations of terminal blocks with 2, 4, 8, 16, or 32 in-puts/outputs):

DIs 1 to 8	DIs 9 to 16	DIs 17 to 24	DIs 25 to 32			
IKD 1 #1	IKD 1 #2	IKD 1 #3	IKD 1 #4			
IKD 1 #1	IKD 1 #2	16 Phoer	ix DI/Os			
4 Phoen	ix DI/Os	IKD 1 #3	-			
IKD 1 #1	-	8 Phoen	ix DI/Os			
IKD 1 #1	-	IKD 1 #3	-			
16 Phoer	nix DI/Os	16 Phoenix DI/Os				
-	-	IKD 1 #3	IKD 1 #4			

Table 5-1: IKD 1 - Possible Phoenix usage combinations

- Only the following Phoenix analog input terminal blocks may be used:
  - IB IL AI 2/SF-PAC (Phoenix order no. 2861302) for connecting 2 analog sources (0-20 mA, 4-20 mA, ±20 mA, 0-10 V, ±10 V)
  - o IB IL TEMP 2 UTH-PAC (Phoenix order no. 2861386) for connecting 2 thermocouples
  - o IB IL TEMP 2 RTD-PAC (Phoenix order no. 2861328) for connecting 2 RTDs
- Only the following Phoenix analog output terminal block may be used:
   IB IL AO 2/SF-PAC (Phoenix order no. 2863083) for 2 analog outputs (0-20 mA, 4-20 mA, 0-10 V)
- The J1939 analog inputs have been tested with Axiomatic analog input modules



## NOTE

#### The instructions in the Phoenix Contact manuals must be observed.

TPDOs may be used to transmit signals of an external board, which is connected to CAN bus 2, on CAN bus 1.

## Example Configuration 1 (4 x easYgen-3100)

### 



Figure 5-1: Example configuration 1

Max. 4 Gensets

CAN #1:

- ToolKit

- PLC

- Maximum engine bus load
- Remote panel

# Example Configuration 2 (4 x easYgen-3100)

#### 



Figure 5-2: Example configuration 2

Max. 4 Gensets

CAN #1:

- ToolKit

- Maximum engine bus load
- Remote panel

## Example Configuration 3 (4 x easYgen-3200)

### 



Figure 5-3: Example configuration 3

Max. 4 Gensets

CAN #1:

- ToolKit

- PLC

CAN #2:

- Maximum engine bus load

# Example Configuration 4 (8 x easYgen-3200)

#### 



Figure 5-4: Example configuration 4

Max. 8 Gensets

CAN #1: - PLC

- CAN #2:
- Maximum engine bus load
- ToolKit

# Example Configuration 5 (10 x easYgen-3200)

### 



Max. 10 Gensets

CAN #1: - PLC

CAN #2:

- Maximum engine bus load

Figure 5-5: Example configuration 5

# Example Configuration 6 (5 x easYgen-3200)

#### 



Figure 5-6: Example configuration 6

Max. 5 Gensets

CAN #1:

- ToolKit

## CAN #2:

- Maximum engine bus load

## Example Configuration 7 (18 x easYgen-3200)

#### 



Max. 18 Gensets

## CAN #1:

- load sharing line only

## CAN #2:

- Maximum engine bus load

- ToolKit

Figure 5-7: Example configuration 7

## Example Configuration 8 (20 x easYgen-3200)

#### 



Figure 5-8: Example configuration 8

## CAN #1:

- load sharing line only

## CAN #2:

- Maximum engine bus load

## Example Configuration 9 (5 x easYgen-3200)

#### 



Max. 5 Gensets

CAN #1:

- ToolKit

- PLC

- ECU
- 32 discrete I/Os
- 32 analog inputs

Figure 5-9: Example configuration 9

## Example Configuration 10 (10 x easYgen-3200)

#### 



Figure 5-10: Example configuration 10

Max. 10 Gensets

CAN #1:

- PLC

- ToolKit
- ECU
- 32 discrete I/Os
- 32 analog inputs

# Example Configuration 11 (12 x easYgen-3200)

#### 



Max. 12 Gensets

CAN #1: - PLC

- ECU
- 32 discrete I/Os
- 32 analog inputs

Figure 5-11: Example configuration 11

## Example Configuration 12 (12 x easYgen-3200)

#### 



Figure 5-12: Example configuration 12

Max. 12 Gensets

CAN #1:

- PLC

- ToolKit
- ECU
- 32 analog inputs

- PLC

## Example Configuration 13 (15 x easYgen-3200)

#### 



Figure 5-13: Example configuration 13

## Example Configuration 14 (30 x easYgen-3200)

#### 



Figure 5-14: Example configuration 14

Max. 30 Gensets

CAN #1: - load sharing line only

## CAN #2:

- ToolKit

## Example Configuration 15 (32 x easYgen-3200)

#### 



Max. 32 Gensets

CAN #1: - load sharing line only

CAN #2:

- not used

Figure 5-15: Example configuration 15

We appreciate your comments about the content of our publications. Please send comments to: <u>stgt-documentation@woodward.com</u> Please include the manual number from the front cover of this publication.



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