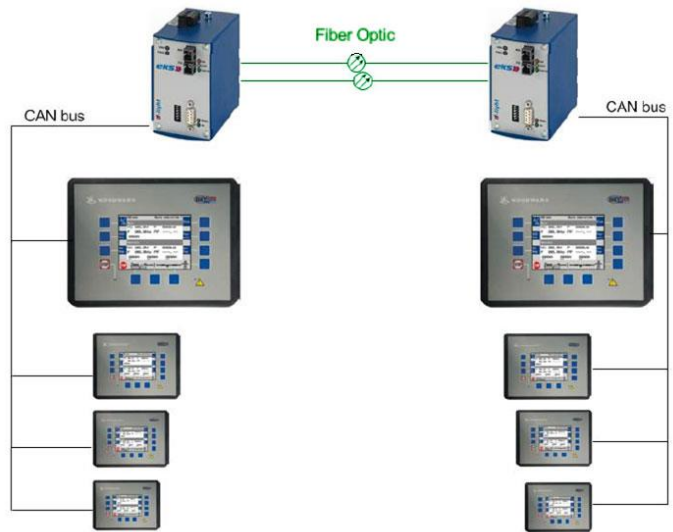
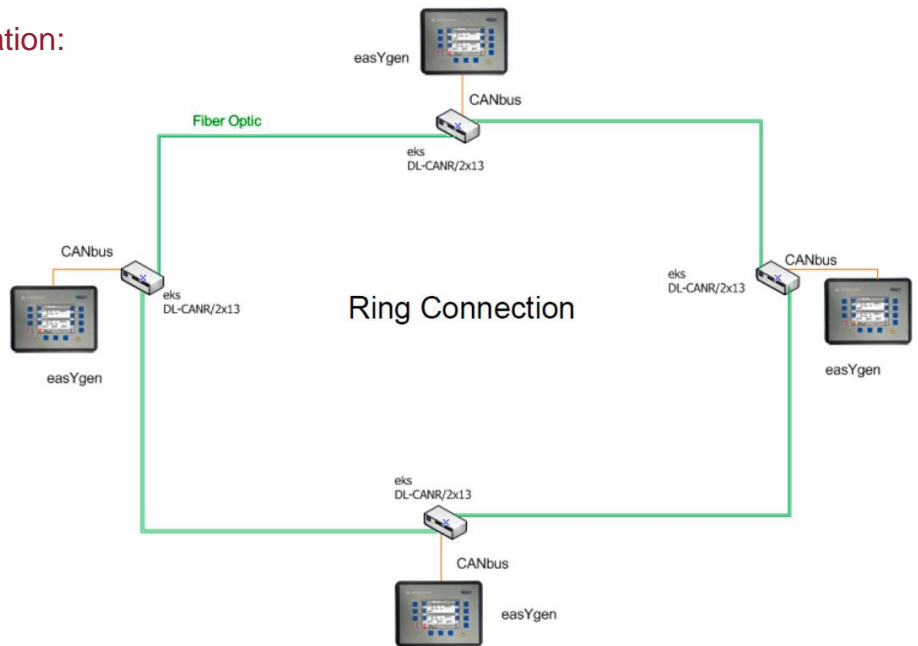


Longer Distance Communication:



Redundant Communication:



**easYgen Series**

**‘CAN goes Fiber’**  
**CAN – Fiber Optic Converter: eks d-light DL-CAN and DL-CAN-R**  
 Optional Supplementary Information

## General Information

The following alert boxes can be used in this publication:



“Danger” text.  
Death or serious injury almost certain. ANSI standard says, “This signal word is to be limited to the most extreme situations.”



“Warning” text.  
Death or serious injury possible.

This replaces most “WARNING” boxes in older manuals.



“Caution” text.  
Minor or moderate injury possible.

Noise, lifting, chemical exposure, or other non-life-threatening hazards.

**NOTICE**

“Notice” text.  
Possibility of damage to equipment or property.

**IMPORTANT**

“Important” text.  
Operating tip, maintenance suggestion, or other helpful information requiring special attention (but not involving death, injury, or property damage).

## Personnel



**WARNING!**  
Hazards due to insufficiently qualified personnel!

If unqualified personnel perform work on or with the control unit hazards may arise which can cause serious injury and substantial damage to property.

- Therefore, all work must only be carried out by appropriately qualified personnel.

For further Product Support Options, Product Service Options, Returning Equipment for Repair, and/or Engineering Services please [download application note #37573](#).

## Requirements

This application note describes CAN – Fiber Optic Converter modules, designed and manufactured by eks Engel GmbH & Co, KG (<http://www.eks-engel.de/en/home/>).

Use the following item numbers to place your order with Woodward.

1. 8445-1048 DL-CAN-R CAN – Fiber Optic System (Redundant)
2. 8445-1049 DL-CAN CAN – Fiber Optic System

## Documentation



Read this entire application note 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!**

**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: constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and invalidate product certifications or listings.



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[www.woodward.com/publications](http://www.woodward.com/publications)

The latest version of most publications is available on the publications page. If your publication is not there, please contact your customer service representative to get the latest copy.

## Introduction

DL-CAN is normally used to increase the CAN bus length if controls are located at longer distances. For example, sometimes generator switchgear panel can be located away from the utility switchgear panel. In this case, one DL-CAN in each of the generator panel and utility panel is all that is required for seamless communication between easYgens and LS-5s.

Should your application need a redundant communication among easYgens and LS-5s use DL-CAN-R instead. The solutions described in the Application Note work with communication distances up to 5 km.

Two topologies are supported: ring and star. For most of the applications a ring topology is sufficient (and so described in this Application Note). However, if you wish to connect your controls in a star topology a central communication management channel (FIMP Splicebox from eks) is additionally needed.

### Want MORE?

It is possible to have ...

- Communication distances of up to 100 km
- Single mode fiber gateways with SC/ST connectors
- Star topology supported by FIMP splice box

**Please contact your Woodward representative**

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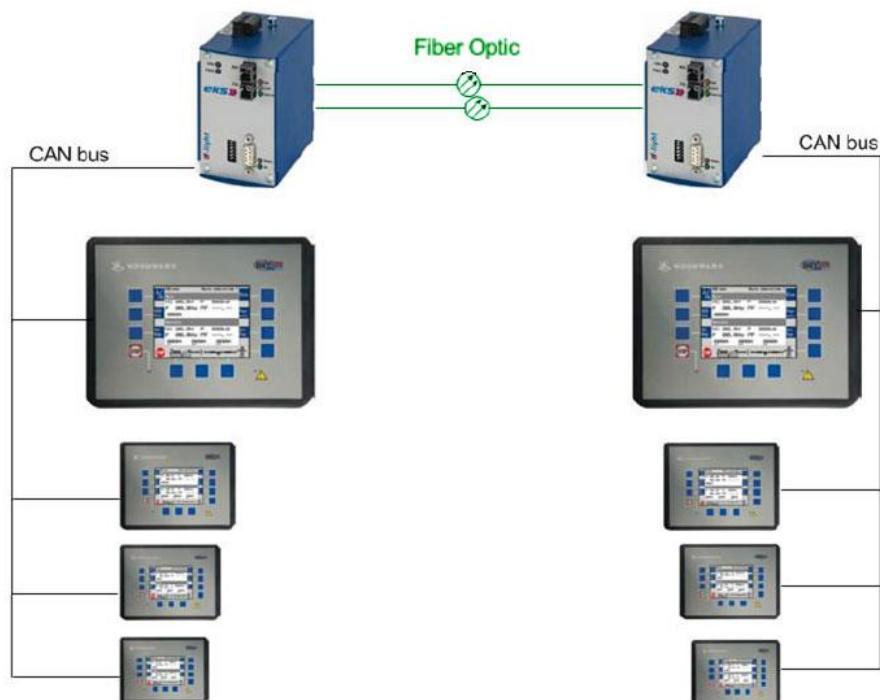
## DL-CAN

### Setup DL-CAN

The *DL-CAN CANbus to Fiber Optic converter* by eks allows the easYgen-2000/3000 series controllers and the LS-5 series controllers to communicate over much greater distances with the reliability of Fiber Optics. One DL-CAN converter is required on each end of the fiber (for standard end-to-end connection).

For distances (up to 5 km) multimode fiber provides the right cost to performance ratio.

The DL-CAN provides fast refresh of data so the Woodward devices are unaware of the CANbus to fiber optic conversion.



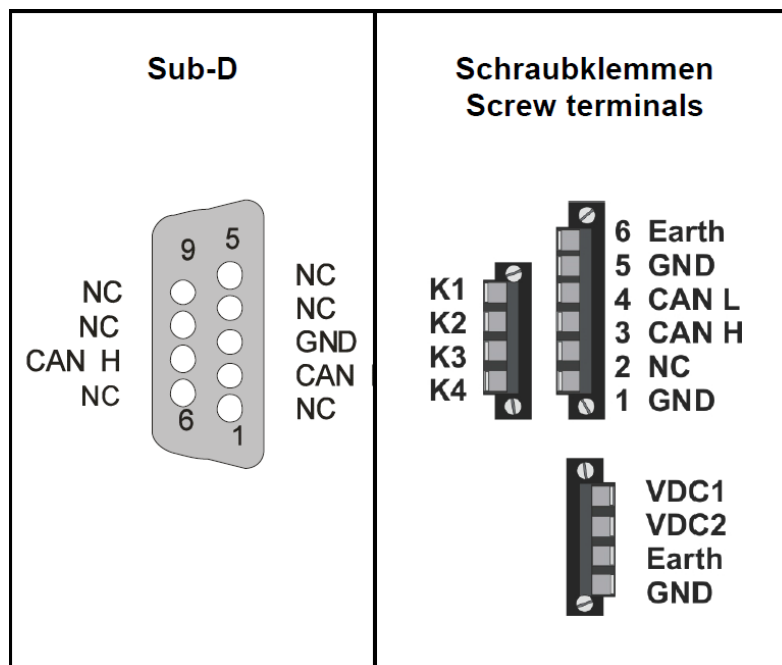
## Connect DL-CAN

1. Connect a power supply of 24 V<sub>DC</sub> to terminals marked with V<sub>DC1</sub>, V<sub>DC2</sub> and GND.

### NOTICE

V<sub>DC1</sub> and V<sub>DC2</sub> are redundant power inputs with reverse voltage protection

2. Connect optical fiber to the Rx and Tx terminals between the DL-CAN units. Make sure to connect Rx to Tx and Tx to Rx (send/receive topology).
3. Connect CAN H and CAN L to either the Sub-D9 pin connector or to the screw terminals as depicted below:



## Configure DL-CAN

Configuration of the DL-CAN converter is simple and requires no software tool. The configuration is done with 6 DIP switches as described below. No additional setup is required in the easYgen or LS-5 to incorporate the DL-CAN converter.

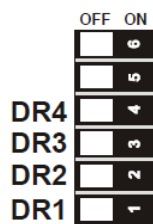
Set DIP-Switches per application

1. DIP-Switch 1-4 defines the CANbus baud rate (easYgen default is 250 kBd)
2. DIP-Switch 5 must be in position "ON"
3. DIP-Switch 6 enables the termination of CAN ( $R_w = 120 \text{ Ohm}$ )

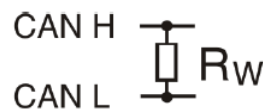
**NOTICE**

Please power off (reset) the DL-CAN after each DIP-Switch change

### Abschlusswiderstand und Datenrateneinstellung Termination and setting the data rate



Datenrate	DR 1	DR 2	DR 3	DR 4
1000KBaud	0	0	0	0
800KBaud	1	0	0	0
500KBaud	0	1	0	0
250KBaud	1	1	0	0
125KBaud	0	0	1	0
100KBaud	1	0	1	0
50KBaud	0	1	1	0
22,2KBaud	1	1	1	0
20KBaud	0	0	0	1
10KBaud	1	0	0	1



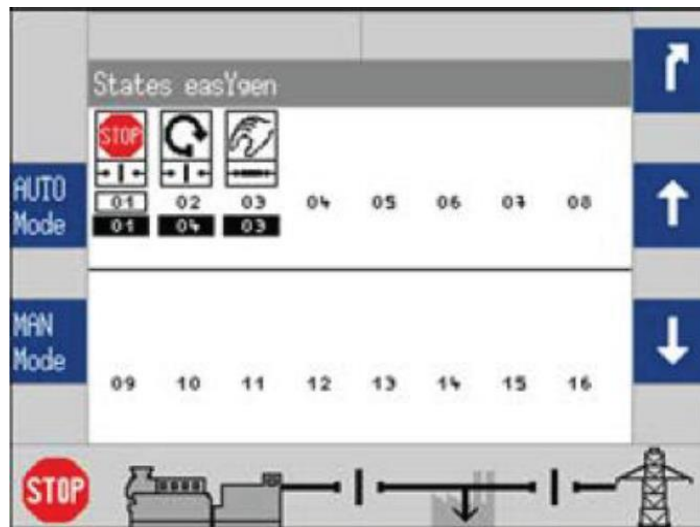
**DIP-Schalter 5 (F1):**  
ON: Default  
OFF: NICHT MÖGLICH

**DIP-Switch 5 (F1):**  
ON: Default  
OFF: NOT POSSIBLE

## Startup System

After power is applied to the easYgens(/LS-5s) and EKS Converter(s), communication should be automatically established between the units.

Verification of communication can be done by review the easYgen "States". All easYgens communicating will be visible on the "States" page (HMI).





## DL-CAN-R

### Setup DL-CAN-R (example for redundant ring connection)

Configuration of the DL-CAN-R converter is simple and requires no software tool. The configuration is done with 6 DIP-Switches as described below. No additional setup is required in the easYgens or LS-5s to incorporate the DL-CAN-R converter.

Set DIP-Switches per application


1. DIP-Switch 1-4 defines the CANbus baud rate (easYgen default is 250 kBd)
2. DIP-Switch 5 ON: Two DL-CAN-R in the ring;  
OFF: more than two DL-CAN-R in the ring
3. DIP-Switch 6 enables the termination of CAN ( $R_W = 120 \text{ Ohm}$ )

**NOTICE**

Please power off (reset) the DL-CAN-R after each DIP-Switch change

**Abschlusswiderstand und Datenrateneinstellung**  
**Termination and setting the data rate**

OFF ON



DR4

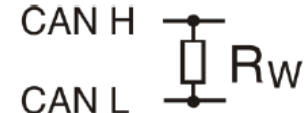
DR3

DR2

DR1

R<sub>w</sub>

Datenrate	DR 1	DR 2	DR 3	DR 4
1000KBaud	0	0	0	0
800KBaud	1	0	0	0
500KBaud	0	1	0	0
250KBaud	1	1	0	0
125KBaud	0	0	1	0
100KBaud	1	0	1	0
50KBaud	0	1	1	0
22,2KBaud	1	1	1	0
20KBaud	0	0	0	1
10KBaud	1	0	0	1



CAN H

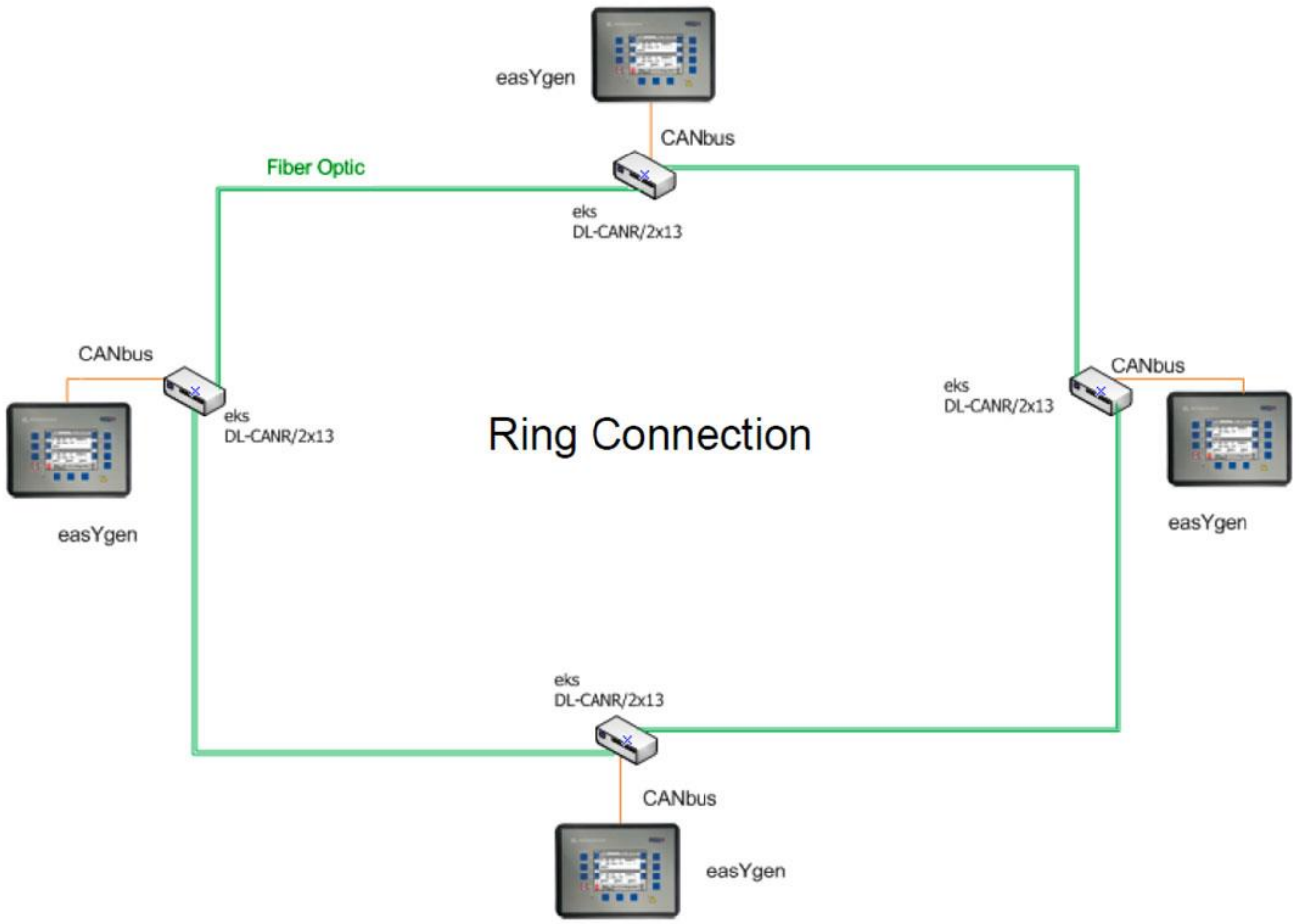
CAN L

R<sub>w</sub>

	OFF	ON
<b>F1</b>	<input type="checkbox"/>	6
	<input type="checkbox"/>	5
	<input type="checkbox"/>	4
	<input type="checkbox"/>	3
	<input type="checkbox"/>	2
	<input type="checkbox"/>	1

**DIP-Schalter 5 (F1):**  
**ON:** Zwei DL-CANR im Ring  
**OFF:** mehr als zwei DL-CANR im redundanten Ring

**DIP-Switch 5 (F1):**  
**ON:** Two DL-CANR in the ring  
**OFF:** more than two DL-CANR in the redundant ring



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