

APPLICATION NOTE ESEPRO

Using proconX ESEPRO with Woodward controllers

Introduction

The gateway proconX ESEPRO allows SCADA systems, PLC's and visualization panels to communicate over Profibus with one or more Woodward controllers. The Woodward control interacts as Profibus DP device within the Profibus system. This application note describes several use cases.

About proconX ESEPRO

The ESEPRO (Woodward P/N #8445-1046), designed and manufactured by proconX Pty. Ltd. is a Profibus gateway specifically designed to interface Woodward's genset controllers and ATS controllers with Profibus DP networks. The gateway features a CAN and a Profibus DP port and can be mounted on a DIN rail. On the CAN side it implements the CANOpen protocol to connect to the Woodward controls. On Profibus side it implements a Profibus Slave Station and accepts connections from Profibus master devices like PLCs or SCADA systems. Please see product documentation from proconX for more details.

Benefits using proconX ESEPRO with Woodward controllers

The ESEPRO can be used with easYgen3000, easYgen2000, easYgen1000, DTSC-200 and LS5. One ESEPRO can communicate with up to 8 Woodward units connected on CAN bus. The ESEPRO is a dedicated product for WW devices and needs no individual adaptation. This saves setup time. The ESEPRO appears as a modular I/O module in the Profibus configuration tool, like Simatic Manager of Siemens.

The ESEPRO added to the CAN network makes the according Visualization Data of connected Woodward CANopen controls available without adding additional load to the CAN bus communication. The Visualization Data is buffered in the ESEPRO gateway which decouples Profibus' cyclic process I/O from the CANopen cyclic TPDO transfers. In addition read and write access to device Parameter IDs is possible utilising CANopen SDO transfers. ESEPRO can be used in several applications:

- Visualize process data of WW devices by a PLC or Panel PLC, for example:
 - Measurement values
 - Logical conditions
 - Alarms
 - Counter Status
- Configure single functionalities of WW devices by PLC or Panel PLC, for example:
 - Application Modes
 - Operation Modes
 - Monitoring limits
 - Delay times
- Control of WW devices by PLC, for example:
 - Power and Power Factor Setpoints
 - Voltage and Frequency Setpoints
 - Starting and Stopping of Gensets
 - RESET Alarms

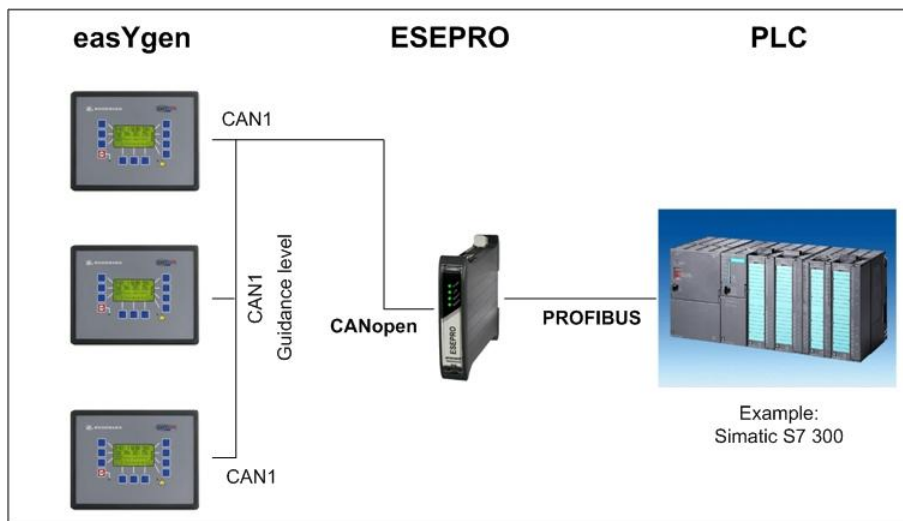
Additionally, for exceptional cases ESEPRO provides an Ethernet connection for CANopen diagnostic and firmware update purposes.

Application Examples

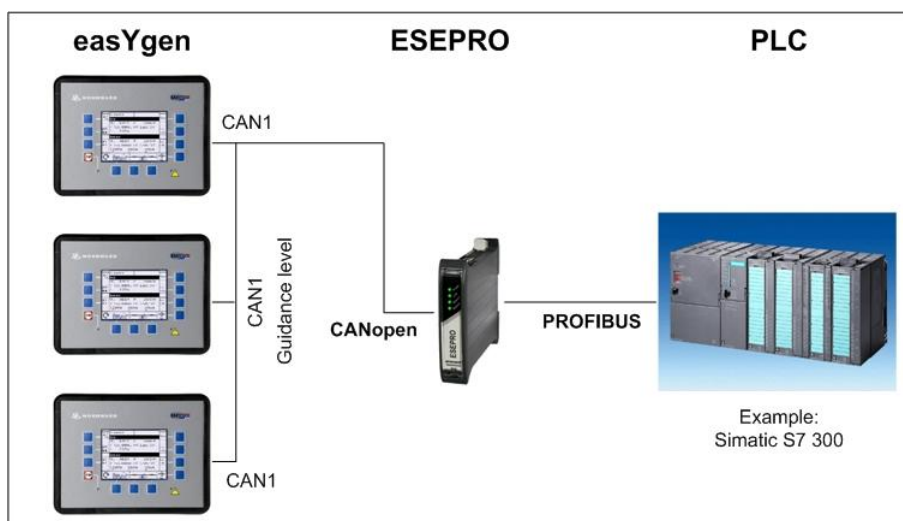
The ESEPRO offers different methods to map data into the PLC's process I/O image to suit different application requirements and programming styles. Visualization Data of connected Easygen and LS-5 devices can be mapped directly into the PLC's process image. For larger data tables which exceeds the Profibus I/O space, an indexed mapping similar to the Profidrive standard can be used.

The PLC or PLC Panel interacts as Profibus Master. Up to 8 easYgens can be connected per ESEPRO station. The programmer of the PLC uses the addresses according to the configured protocol sent by the WW device, like it is described in the ESEPRO and easYgen manual. The refreshing of visualization data depends on the CANopen protocol. When single values shall be accessed faster acyclic DP-V1 transfers can be taken, which are internally translated to CANopen SDO transfers.

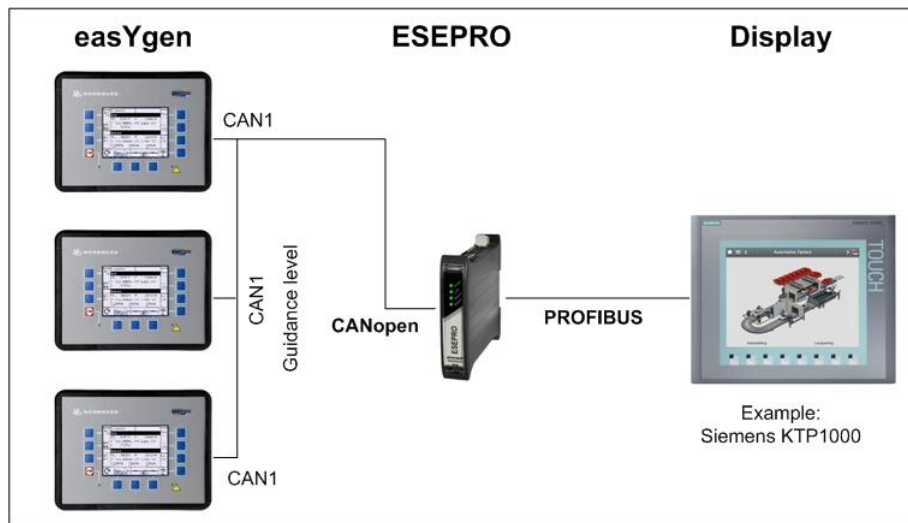
1. PLC visualizes and/or controls a system of easYgen3200 / easYgen2000



System of easYgen2000with PLC

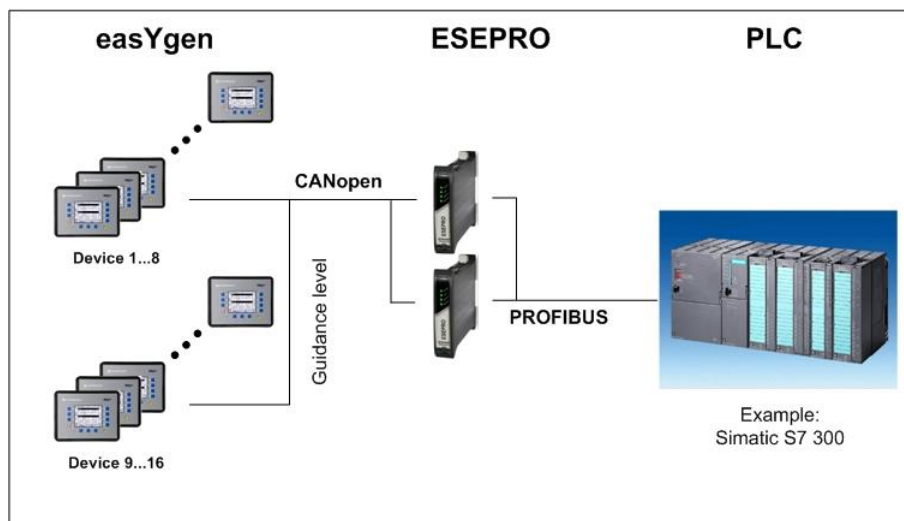


System of easYgen3200 with PLC



System of easYgen3200 with PLC Panel

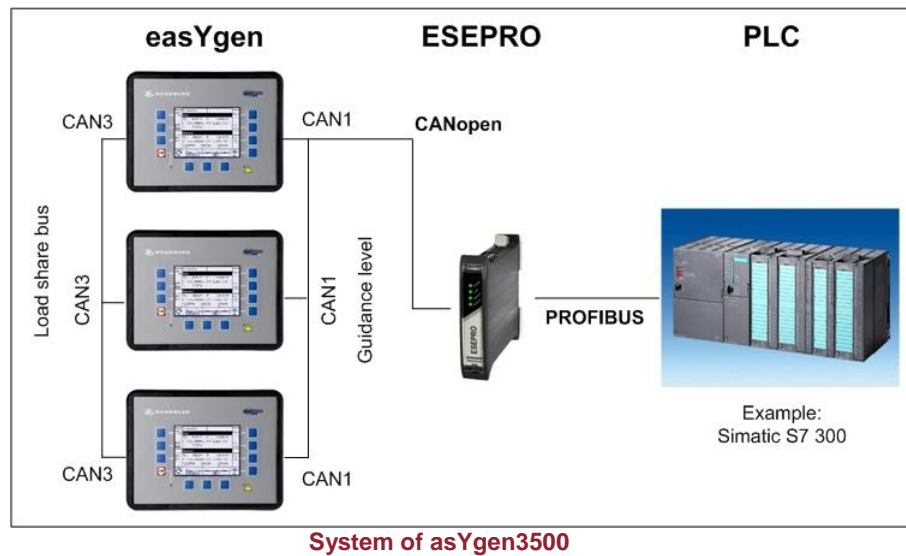
One ESEPRO supports 8 WW devices so there can be built up several ESEPRO units as Profibus stations. Other reasons for equipping multiple ESEPROs could be the access on different CANopen busses.



System of 16 easYgen3200

2. PLC visualizes and/or controls a system of easYgen3500

Note: The easYgen3500/3400 provides two CANopen systems for multiple genset systems. The ESEPRO will be connected on CAN1 bus, which is responsible for PLC and SCADA systems. Only the CAN1 bus is supporting TXPDOs and SDOS, which are needed for operating the ESEPRO(s). The CAN3 bus is the load share bus and is responsible for internal data exchange between easYgens and LS5s, if used.



3. PLC visualizes and/or controls a system of easYgen3500 / LS5

The easYgen3500 (up to 32) exchange their data with LS5 (up to 16) over the CAN3 bus. The CAN3 bus is used to allow fast communication between the units in the easYgen3500 / LS5 system. Other functionalities, like communication to PLC or SCADA systems or Display Panels are executed over the CAN1 bus. CAN2 is the dedicated bus for remote panels, engine control modules (J1939) and extended I/O modules (CANopen).

The LS5 is equipped with one CAN bus. This bus provides:

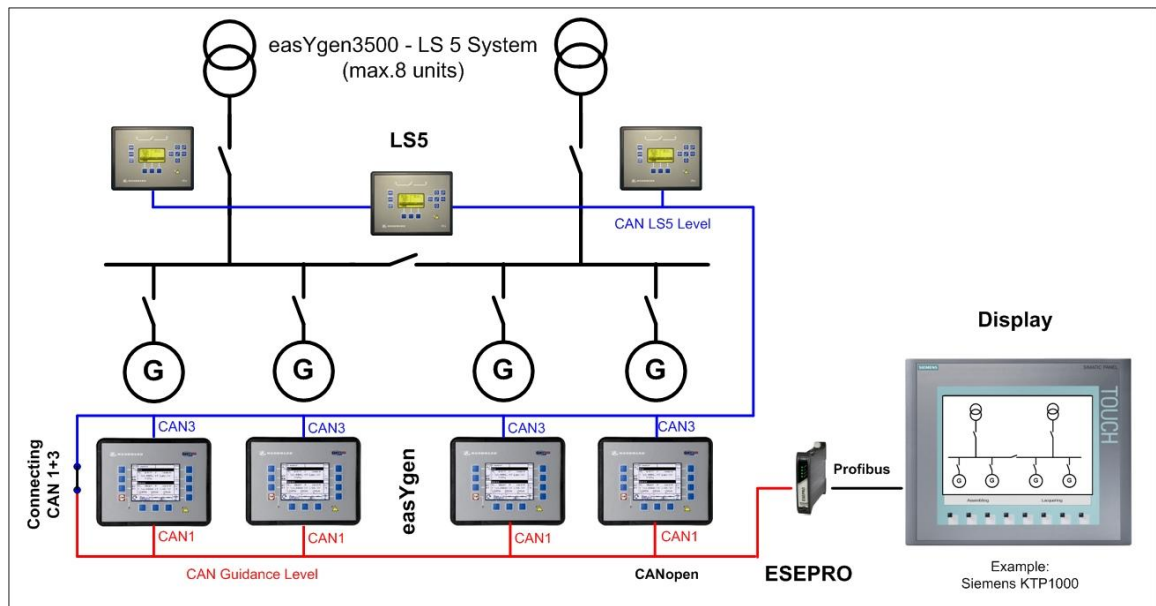
- Data exchange with neighboring LS5's and easYgen3500's
- Visualization data for PLC / SCADA systems
- Configuration capability for PLC/ SCADA systems
- Remote control functionalities for PLC/ SCADA systems

The following chapter shows, how the ESEPRO can access on the easYgen / LS 5 system under various configurations and how to avoid bandwidth trouble.

3.1. PLC visualizes and/or controls a system of easYgen3500 / LS5 (Max.8 WW devices)

If the number of members on the easYgen3500 / LS5 system is restricted to max eight in your application, it is possible to interlink the CAN1 and the CAN3 bus at one location. This topology allows using one ESEPRO to access all members in the whole system. To keep the data traffic small, the Remote Panel RP3000 shall be not connected additionally on the CAN1 bus. The CAN2 bus is the dedicated bus for the remote panel RP3000. So the single ESEPRO gateway allows now:

- Visualize measuring data and conditions of easYgen and LS5
- Control easYgen and LS5 (for example: Start/Stop engine, Open/Close breaker, Alarms, ...)
- Unit configuration



An easYgen3500 / LS5 system (max. 8 members on CAN bus)

Note: Connecting CAN1 and CAN2 at one location has the advantage that the wiring can be splitted afterwards, when more WW devices are required. Then another ESEPRO can be easily equipped without any large rewiring.

3.2. PLC visualizes and/or controls a system of easYgen3500 / LS5 (WW devices > 8)

Usually the CAN3 operates separated from the CAN1 bus. If the number of members on the easYgen3500 / LS5 system exceeds eight, two ESEPRO units are required to visualize and/or control the system. This leads to another Profibus station concept.

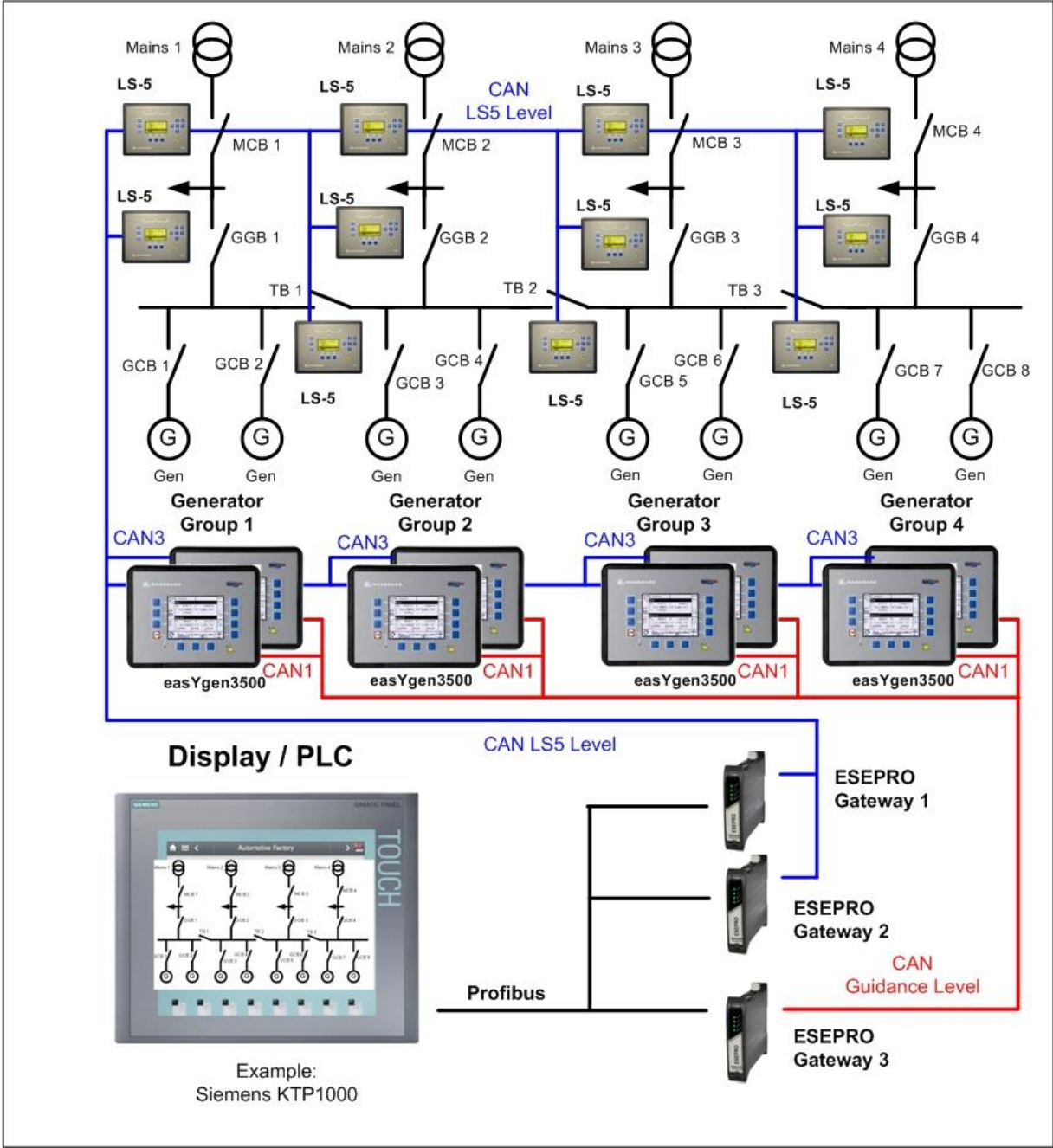
ESEPRO gateway(s) on CAN1 allow to:

- Visualize easYgen data and conditions
- Control easYgen (for example: Start/Stop engine, Open/Close breaker, Acknowledgement of alarms,)
- Configuration of the easYgen units

ESEPRO gateway(s) on CAN3 allow to:

- Visualize LS5 data and conditions ¹
- Control LS5 (for example: Open/Close breaker, Acknowledgement of alarms,)
- Configuration of the LS5 units

¹ Notice: The ESEPRO can cause additional data traffic on CAN3. For member number greater 8 a higher baudrate could be required, which has also an impact on the CAN distances. Contact Woodward for more options.



A complex easYgen3500 / LS5 system

The amount of LS5s and easYgens determine the number of ESEPROs. The example shows 19 Woodward devices, 11 LS5 and 8 easYgen, equipped on CAN3 bus. The easYgen on CAN3 bus are anyway not detectable for the ESEPRO so that finally only the amount of LS5 counts. Eight easYgens on CAN1 bus require one ESEPRO.

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