



easYgen-3000XT Application Guide

February 2022

creating customer value



Save time

save time serving your customers



Save money

standardization and consolidation of functions



Infinite applications

An infinity of different applications made by standard controllers



Availability & Reliability

when the costs of failure is too high - avoid potential single points of failure!

[Need Help? Chat Now ?](#)

Which easYgen-3x00XT for which application ?

easYgen-3100XT/3200XT



8440-2081



8440-2082



RP-3000XT
Remote Touch panel
can connect to display-
and to back panel version

8446-1068

easYgen-3400XT/3500XT-P1



8440-2084



8440-2085

easYgen-3400XT/3500XT-P2



8440-2087



8440-2088

Main differences of different versions

easYgen-3200XT-LITE

Synchronization GCB, MCB, Generator/Engine/Mains protection,
2 x CANBus, 1 x RS485 & 1xE-Net Modbus TCP, 3 x flexible PID's for speed & voltage bias,
ModbusMaster

easYgen-3100XT/3200XT

Synchronization GCB, MCB, Generator/Engine/Mains protection
2 x CANBus, 1 x RS485 & 1xE-Net Modbus TCP
3 x flexible PID's for speed & voltage bias
2 PT bus sensing Mains sensing
Loadsharing via E-Net and/or CANopen, ModbusMaster

easYgen-3400XT-P1/3500XT-P1

Synchronization GCB, MCB, +GGB, +Run-up Synch, +LS5/6XT, GC3400XT Support +690VAC sensing,
+ inbuilt AVR Regulation
3 x CANBus, 1 x RS485 & 3 x E-Net Modbus TCP
3 x flexible PID's for speed and voltage bias
2 PT bus sensing Mains sensing
Loadsharing via redundant E-Net or CANopen, ModbusMaster

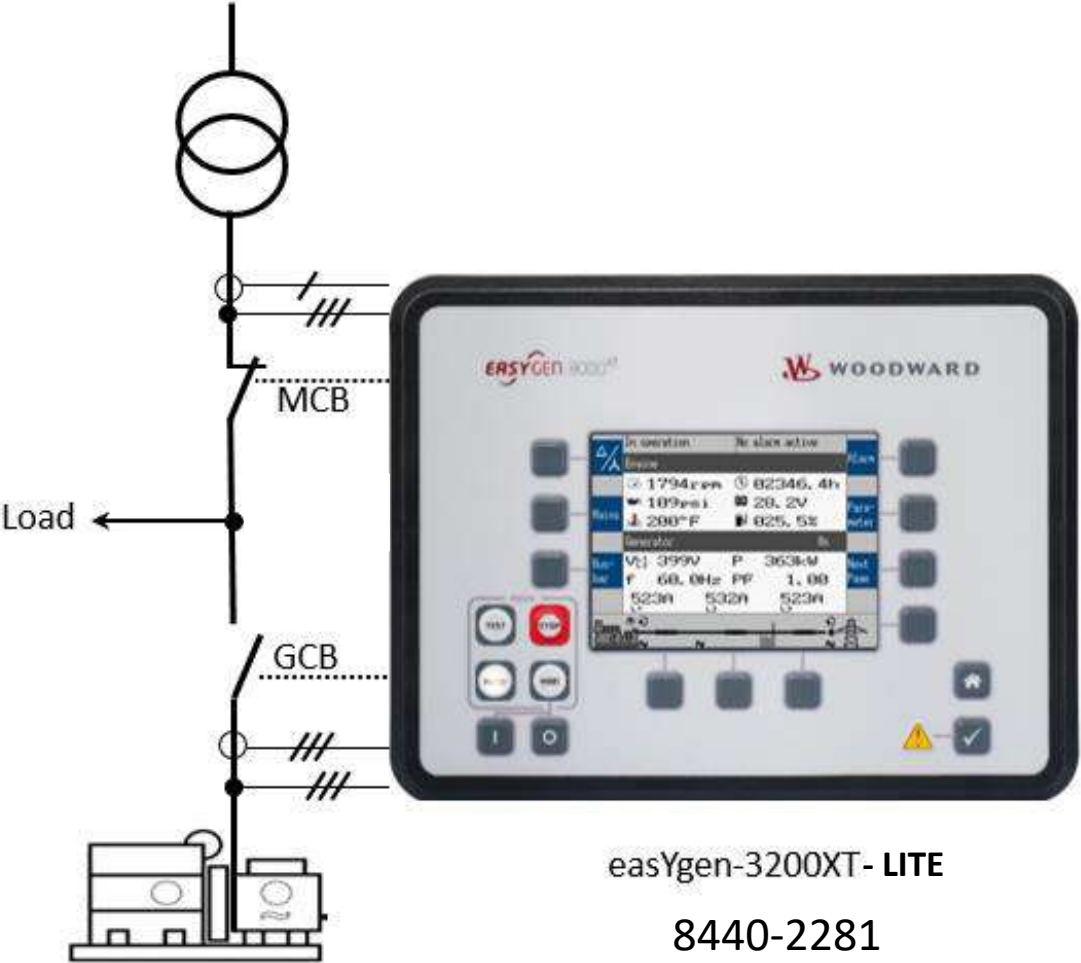
easYgen-3400XT-P2/3500XT-P2

Synchronization GCB, MCB, +GGB, +Run-up Synch, +LS5/6XT, GC3400XT Support +690VAC
sensing, + inbuilt AVR Regulation
3 x CANBus, 1 x RS485 & 3 x E-Net Modbus TCP
3 x flexible PID's for speed and voltage bias
3 PT bus sensing for rotation check, Mains sensing
Second board with additional digital/analog I/Os, pulse outputs for kWh & kVArh
Loadsharing via redundant E-Net or CANopen, ModbusMaster

Typical easYgen-3200XT Use Cases

one part number fits all!

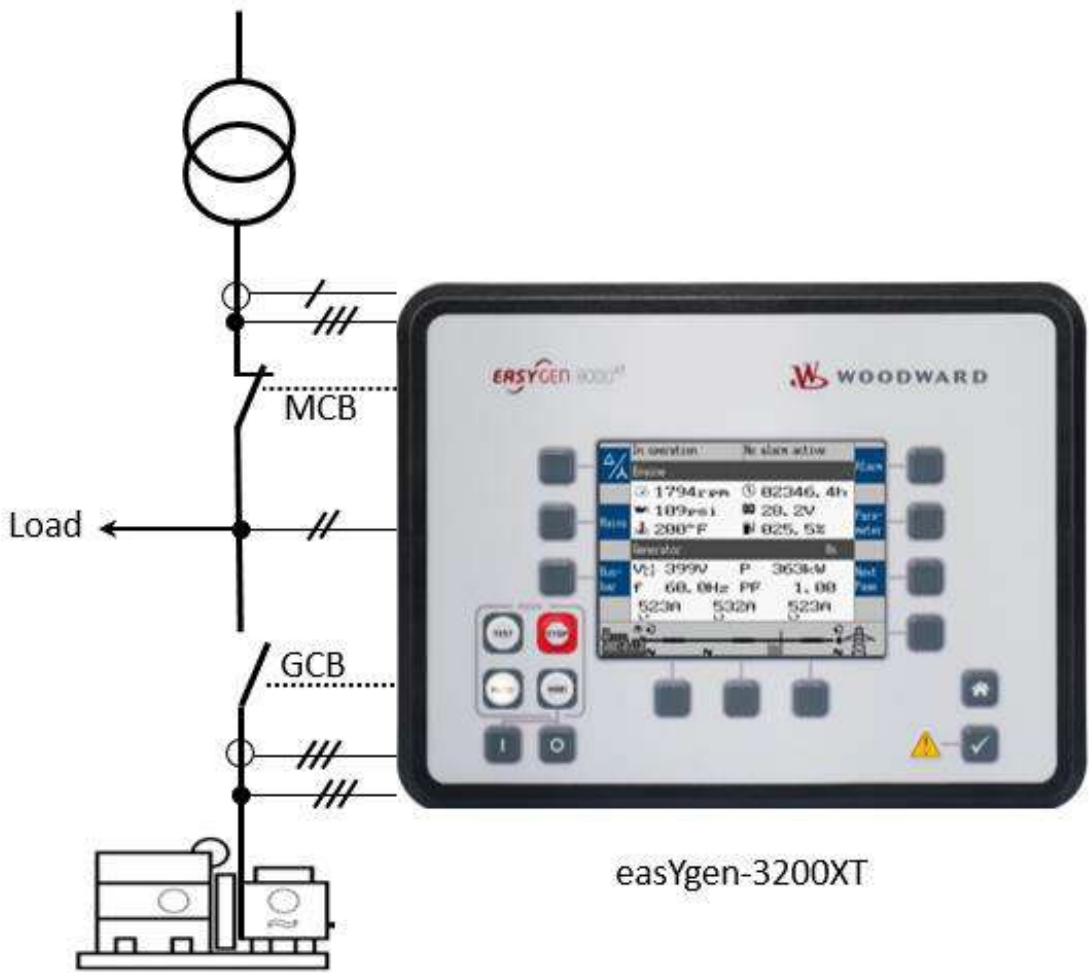
easYgen-3200XT-LITE for Single Genset only



- Single genset AMF&ATS
- Open/closed transition (<100ms)/ soft power transfer
- Import/export/baseload control
- Interconnected to grid
- Short time paralleling for monthly load test against grid
- No Loadsharing- no bus bar sensing

easYgen App Mode A04 GCB/MCB

easYgen-3200XT Single Set grid tied with island mode



Single genset AMF&ATS
Open/closed transition (<100ms)/ soft power transfer
Import/export/baseload control
Interconnected to grid

easYgen App Mode A04 GCB/MCB

easYgen-3200XT Multiple Sets Mains&Island Parallel

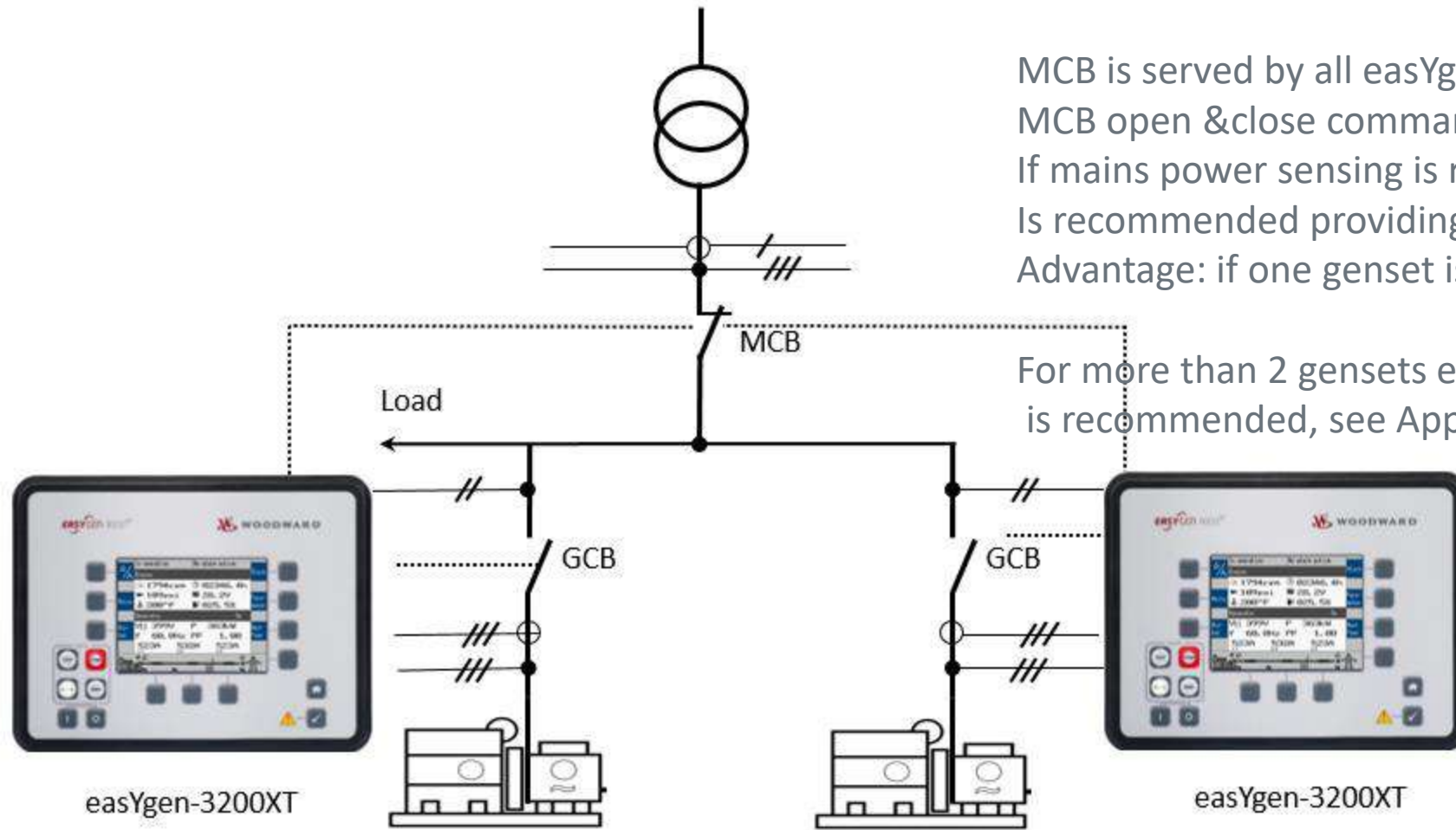
kW/kVAR Loadsharing via CANopen

2 or more gensets AMF&ATS

Open/closed transition/ softpower transfer

Import/export/baseload control

Interconnected to grid and island parallel operation



MCB is served by all easYgen,

MCB open &close command wired in parallel

If mains power sensing is required a 3 phase Transducer

Is recommended providing a 0/4-20mA Setpoint to all easYgens

Advantage: if one genset is in service second genset is still available

For more than 2 gensets easYgen3500XT & LS5 is recommended, see App Mode A08

easYgen App Mode A04 GCB/MCB

easYgen-3200XT

easYgen-3200XT

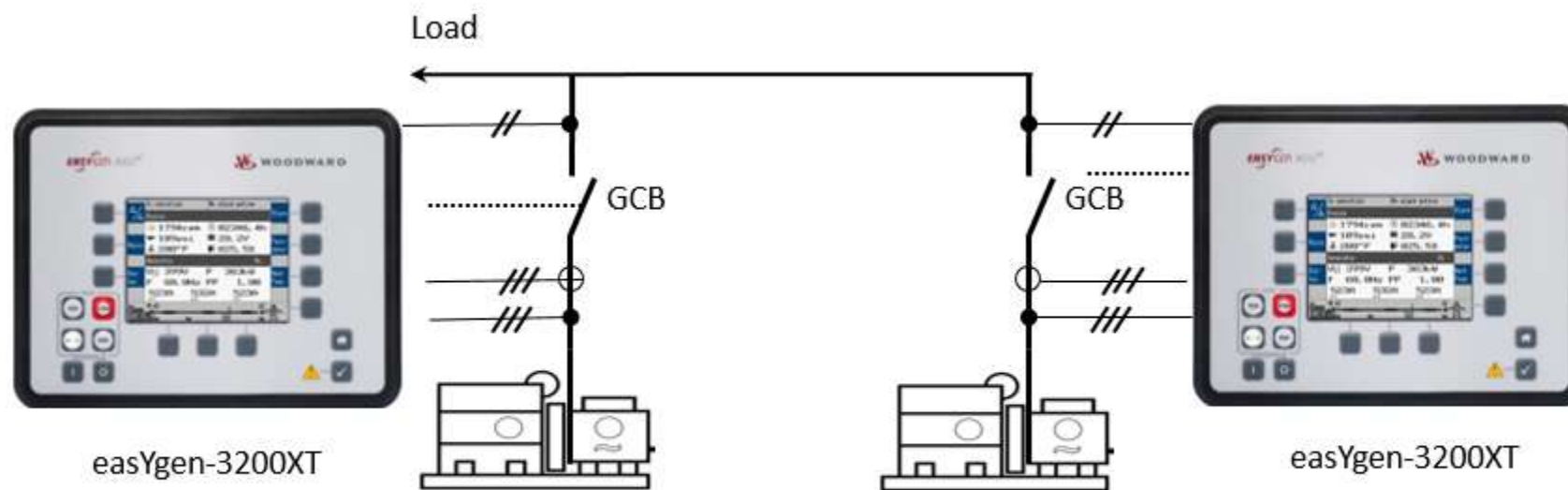
easYgen-3200XT Multiple Sets island parallel

Up to 32 gensets can be paralleled on one bus
kW and kVAR sharing via CANbus and/or E-Net
Load dependent starts & stop

kW/kVAR Loadsharing via CANopen

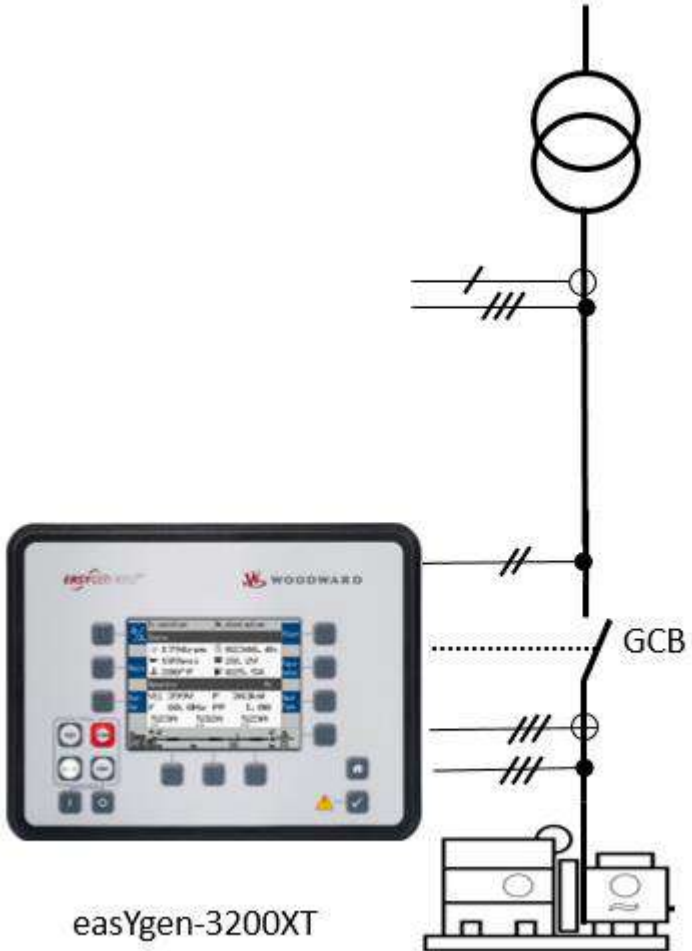
If you have more than 32 gensets on one bus go for
easYgen-3500XT and GC3400XT

easYgen App Mode A03 GCB



Up to 32 gensets

easYgen-3200 Sets Mains parallel

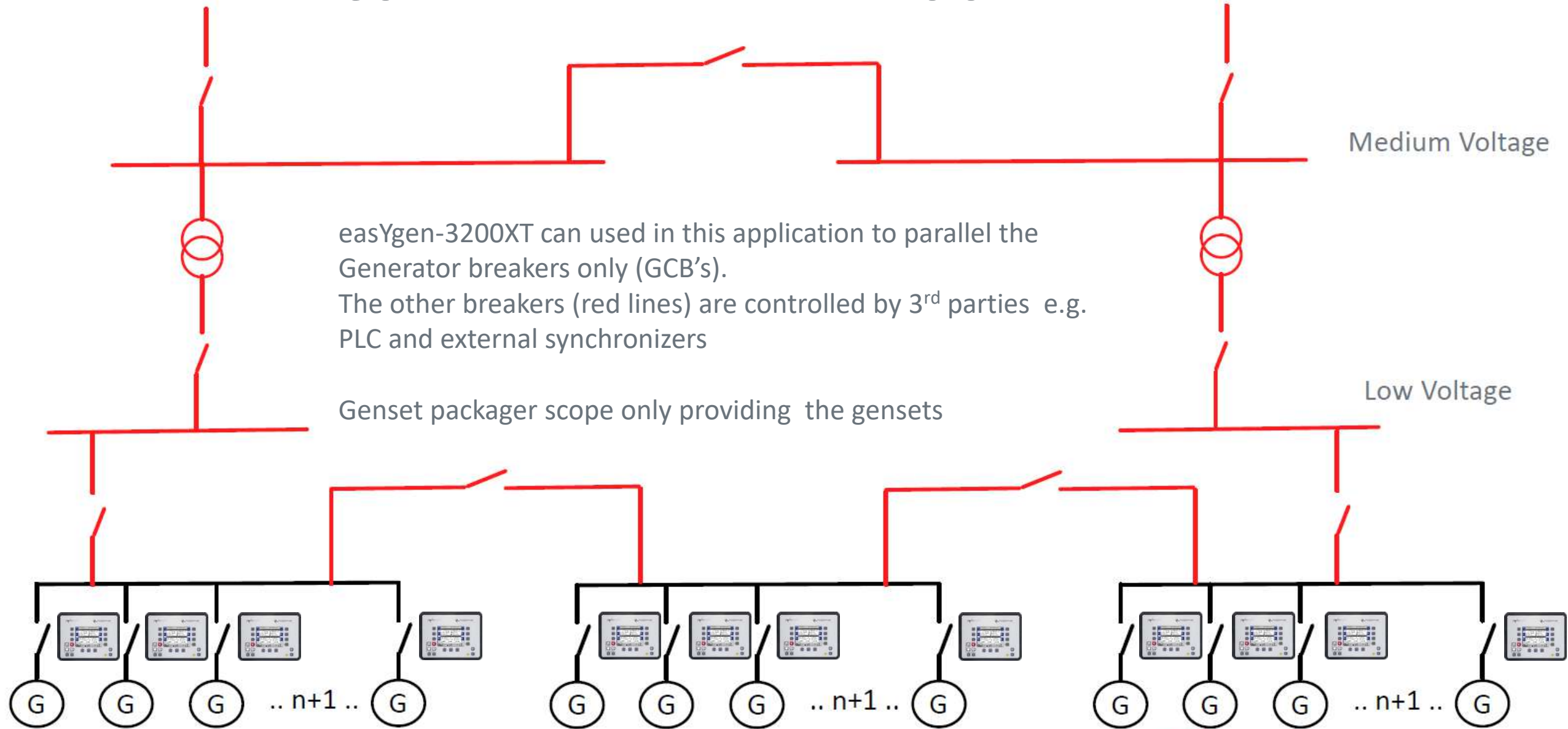


Import/export control
Load dependent starts & stop
Continuous mains parallel operation

Typical application: CHP, prime power generation

easYgen App Mode A03 GCB

Typical Datacenter Application



easYgen-3200XT can be used in this application to parallel the Generator breakers only (GCB's).
The other breakers (red lines) are controlled by 3rd parties e.g. PLC and external synchronizers

Genset packager scope only providing the gensets

easYgen-3200XT's

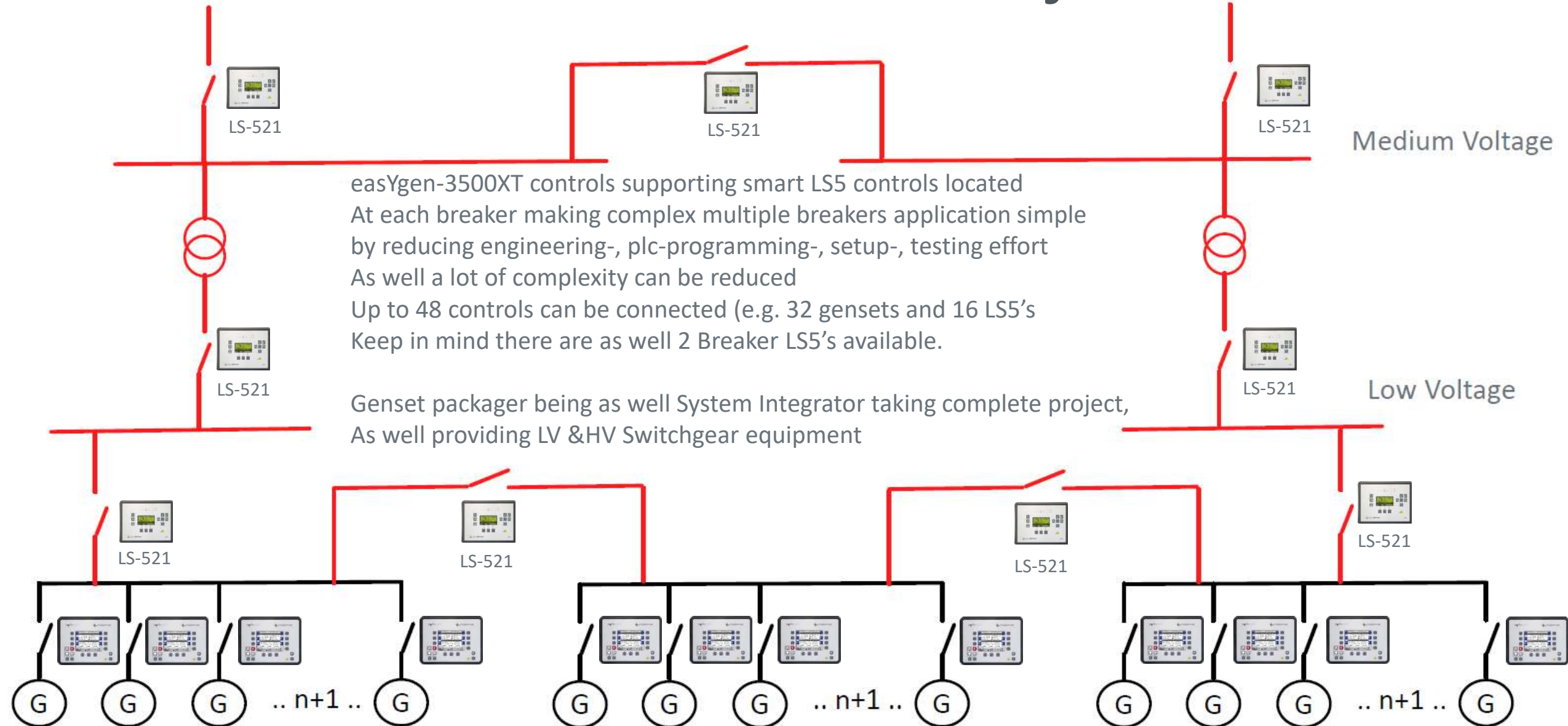
PROPRIETARY INFORMATION - © 2016 WOODWARD, INC.

easYgen-3200XT's

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 easYgen-3200XT's
WOODWARD
Always Innovating for a Better Future

Executed Datacentre Project



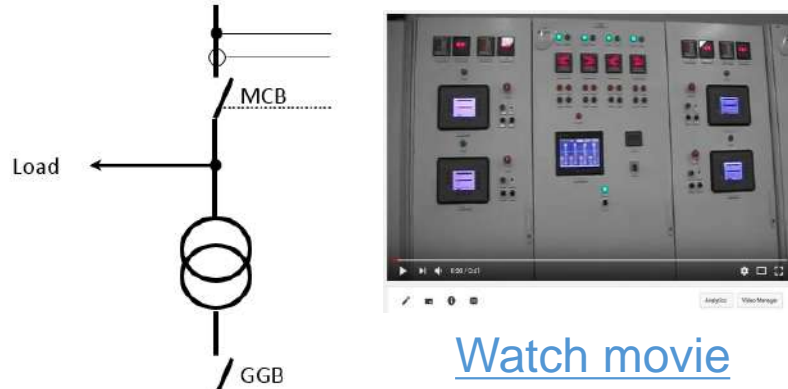
easYgen-3500XT controls supporting smart LS5 controls located
At each breaker making complex multiple breakers application simple
by reducing engineering-, plc-programming-, setup-, testing effort
As well a lot of complexity can be reduced
Up to 48 controls can be connected (e.g. 32 gensets and 16 LS5's
Keep in mind there are as well 2 Breaker LS5's available.

Genset packager being as well System Integrator taking complete project,
As well providing LV &HV Switchgear equipment

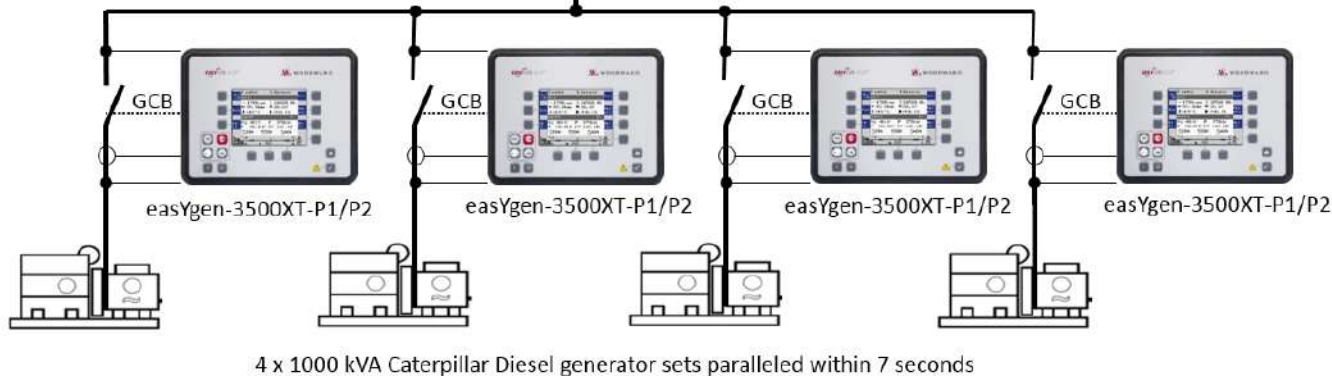
Typical easYgen-3500XT Use Cases

one part number fits all!

Run-up Synch Fast Paralleling



[Watch movie](#)



Run-Up Synch can be done in various App Modes depending on the application, only easYgen-3400/3500XT is required

Customer problem:

Want to parallel n+1 backup gensets together in shortest possible time within only some seconds, to shrink Battery UPS backup system, to be able to provide suddenly power for heavy load one genset alone cannot provide, or be able to provide total genset load beyond 10 or 15 seconds which is a requirement in many critical applications like Datacenters, Hospitals, Airport, Chemical & Process Industry .

Solution: Run-Up Synch:

All the generators are paralleled together by closing their circuit breakers during the engine start sequence. Then after a certain speed is achieved the voltage regulators are enabled and the generators will produce voltage. The run-up synchronization method is used to get several synchronous generators onto load in a very short time. This time is determined by the engine start time and the AVR on-excitation.

What is a LS5 Controller?

A LS5 controller is a smart Synchronizer transferring U+/- & f+/- commands via CANopen Bus to the easYgen-3400/3500XT Controls taking care of GCB and providing this information then to engine and generator controls to parallel other circuit breakers (MCB's, GGB's-T-couplers) within the application.

As well LS5's and easYgen controllers taking care of segmentation.

There is a Display & back panel version , LS5 for 1 breaker or 2 breaker operation and variants for ../1A and ../5A CT's



LS-521



LS-522

LS5 have a RS485 Modbus interface to connect to PLC controllers.

Woodward ESENET CAN/E-NET can be used to connect LS5's via E-Net to PLC controls



LS-511



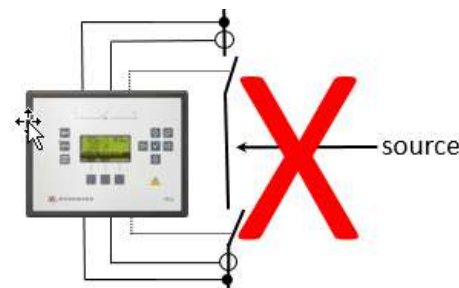
LS-512

Pre-Defined Application Modes

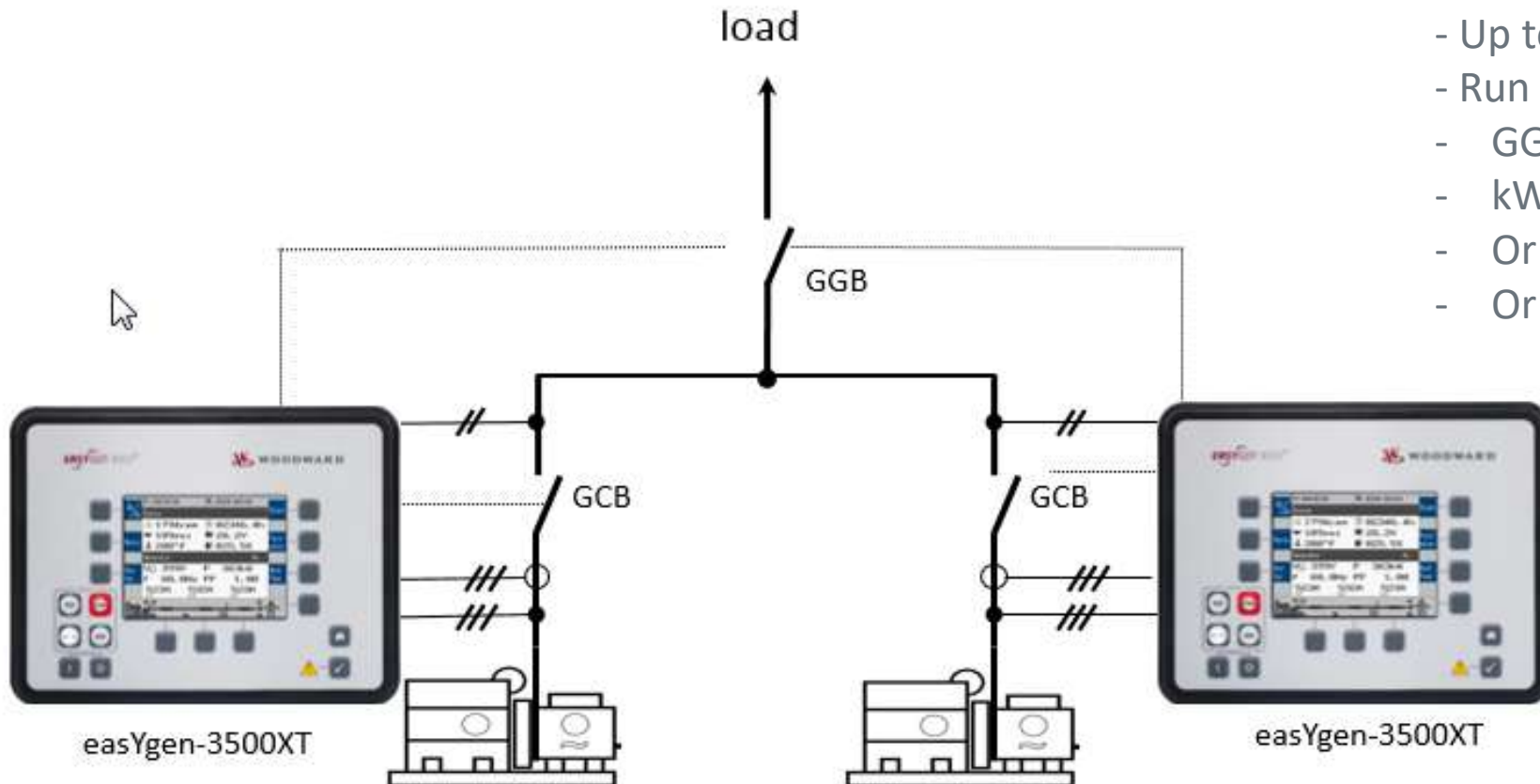
- A05 GCB/GGB n+1 generators island operation only GCB & GGB operation
- A06 GCB/GGB/MCB n+1 generators island/one mains operation GCB & GGB & MCB operation
- A08 GCB/L-MCB n+1 generators island/one mains operation GCB L-MCB with LS511/521
- A09 GCB/GGB/L-MCB n+1 generators island/one mains GCB, GGB, L-MCB with LS511/521
- A10 GCB/L-GGB n+1 generators island operation only GCB, L-GGB with LS511/521
- A11 GCB/L-GGB/L-MCB n+1 generators island/one mains only GCB, L-GGB and L-MCB with LS511/521
- A12 GCB/L-GGBMCB n+1 generators island/one mains operation GCB, L-GGBMCB with LS512/522

• In above App Modes all the segmenting is already pre configured

- A07 GCB/LSx n+1 generators island and/or **n+1 mains** operation LS511/512/521/522/LS6XT
- A13 GCB/GC GC-3400XTP1
- Segmenting must be done individual according the application
- Every breaker which must be synchronized requires a LS5 controller
- 2 breaker LS512/522, the load must be always between the two LS5x2 breakers, It is not allowed to receive power (source) between the two breaker



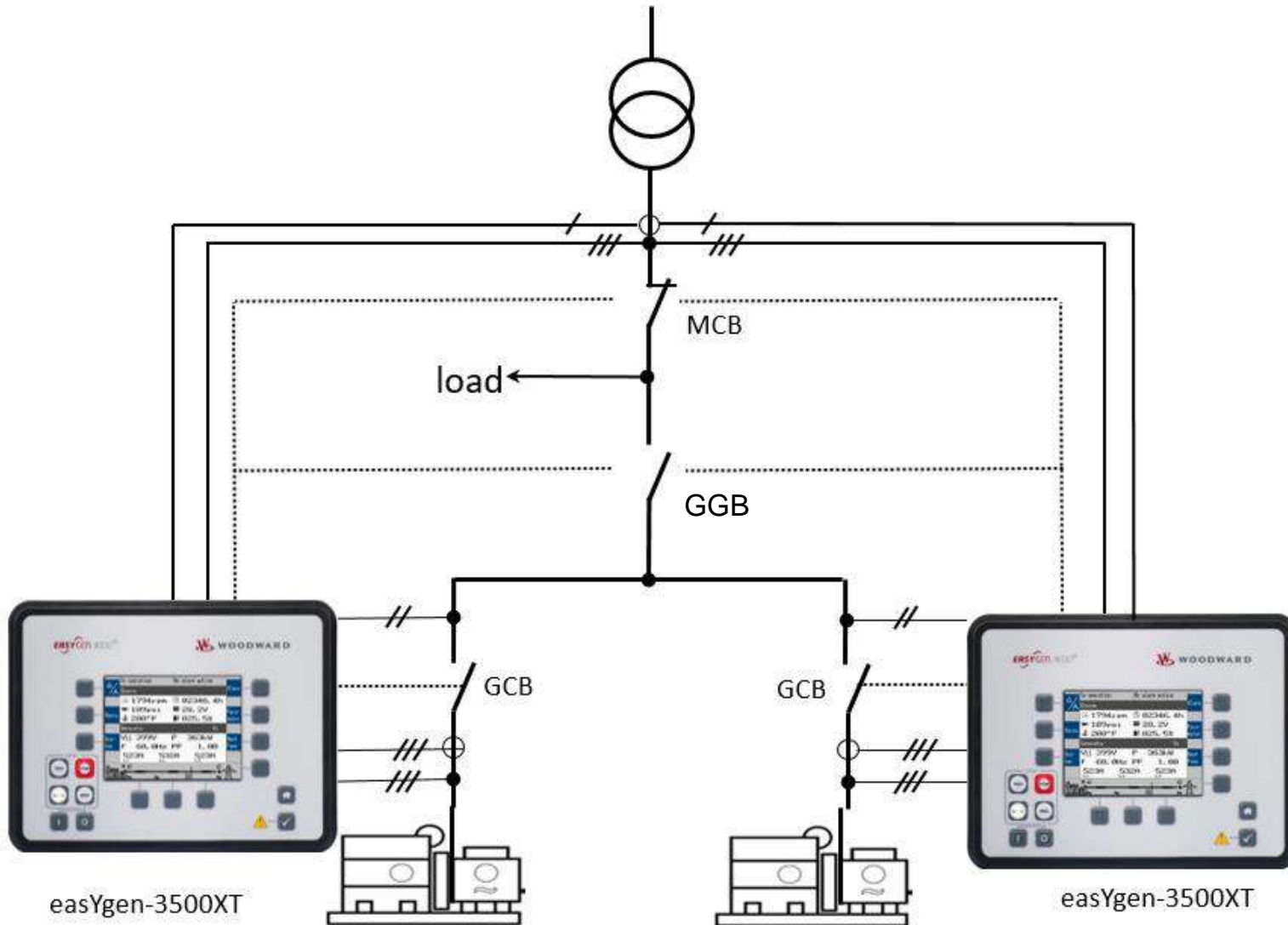
easYgen-3500XT GGB Support Island Mode



- Up to 32 gensets
- Run up synch or traditional synch
- GGB can be open/close by easYgen HMI
- kW/kVAR Loadsharing via CANopen
- Or redundant E-Net
- Or CANopen/E-Net

easYgen App Mode A05
GCB/GGB

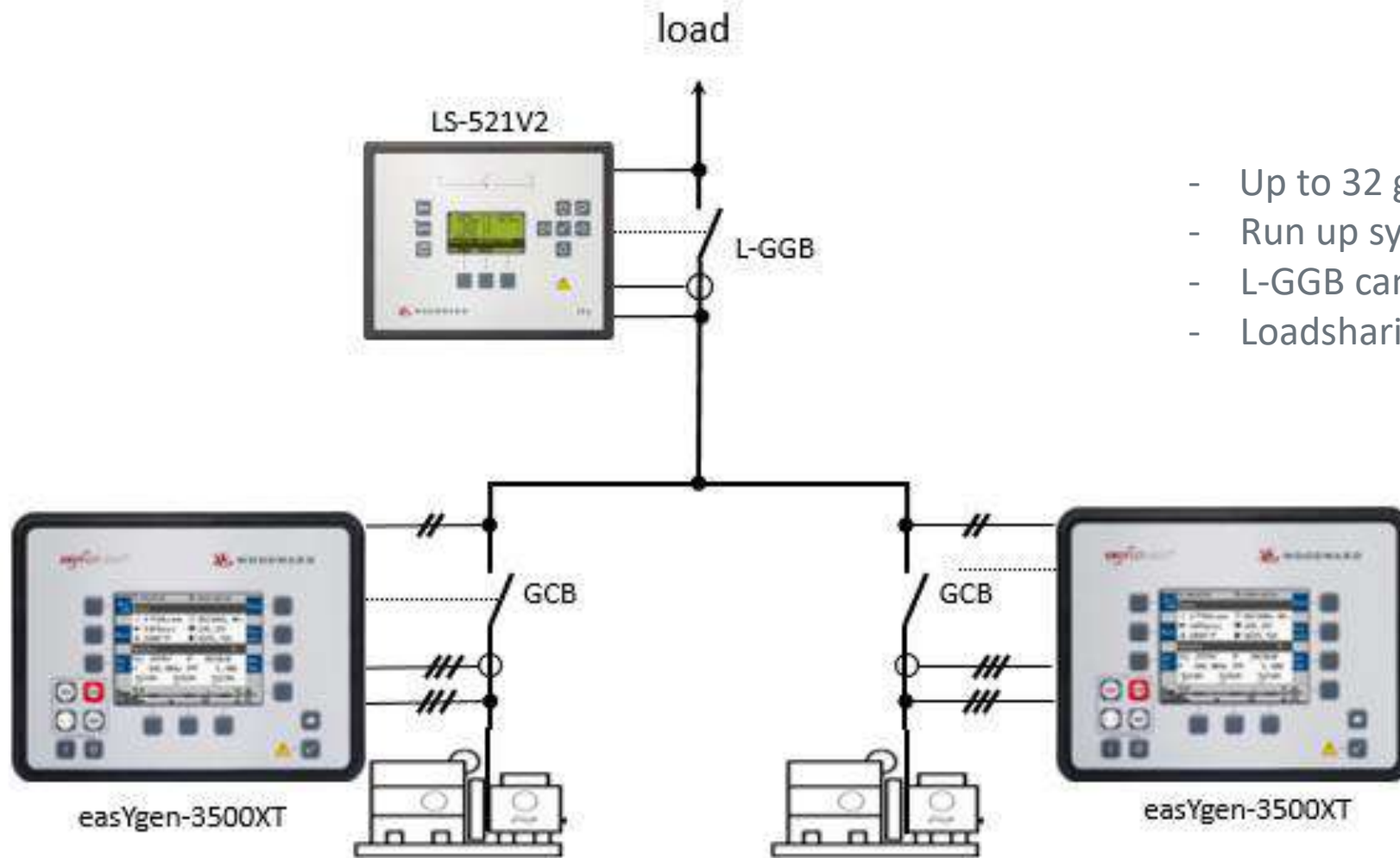
easYgen-3500XT GGB Support Island & Mains Mode



easYgen App Mode A06 GCB/GGB/MCB

- Up to 32 gensets
- Run up synch or traditional synch
- kW/kVAR Loadsharing via CANopen
- Or redundant E-Net
- Or CANopen/E-Net

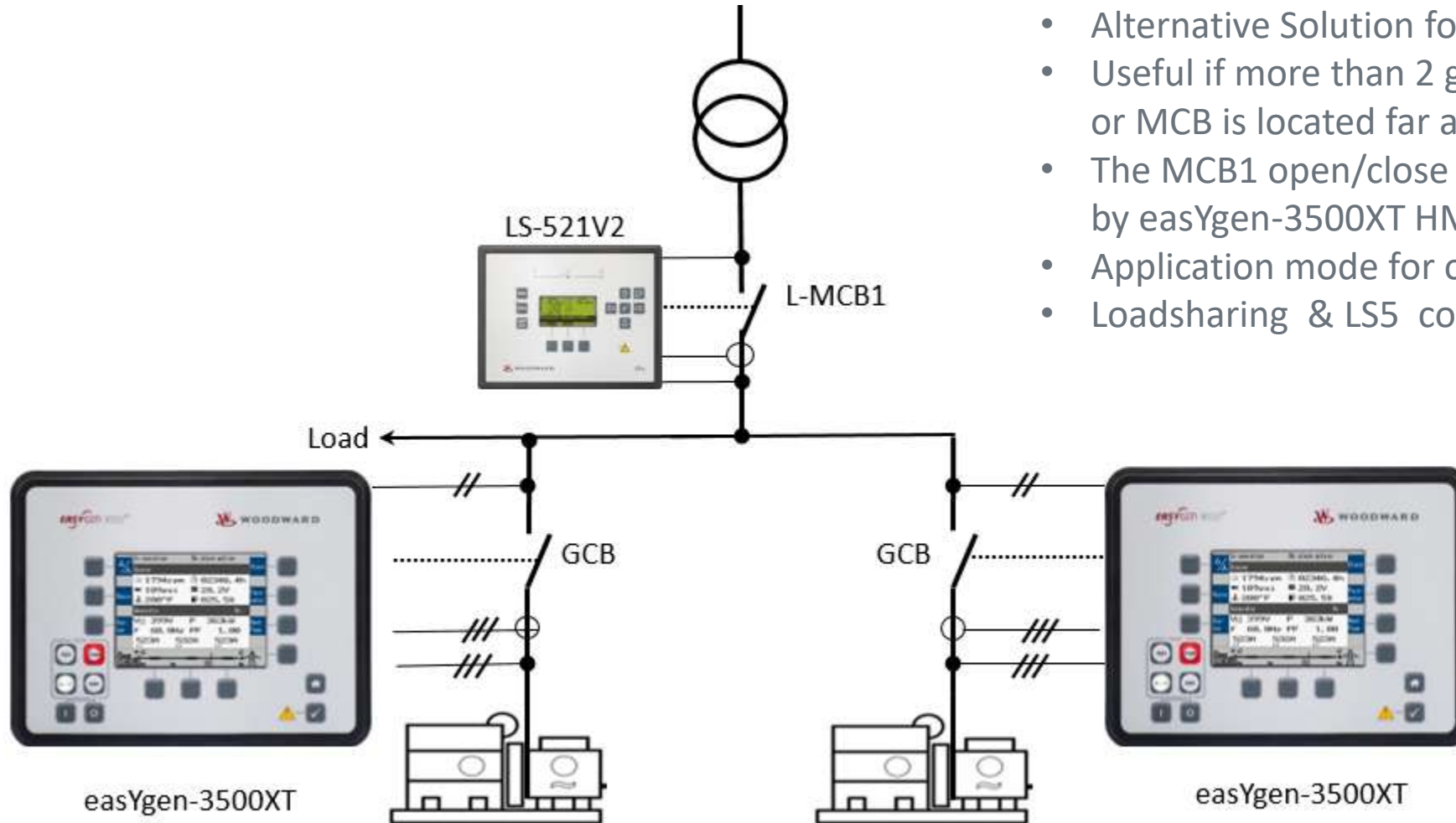
Multiple gensets island mode GGB



- Up to 32 gensets
- Run up synch or traditional synch
- L-GGB can be operated via easYgen HMI
- Loadsharing & LS5 connection via CAN Open

easYgen App Mode A10
GCB/L-GGB

Multiple Gensets only one MCB

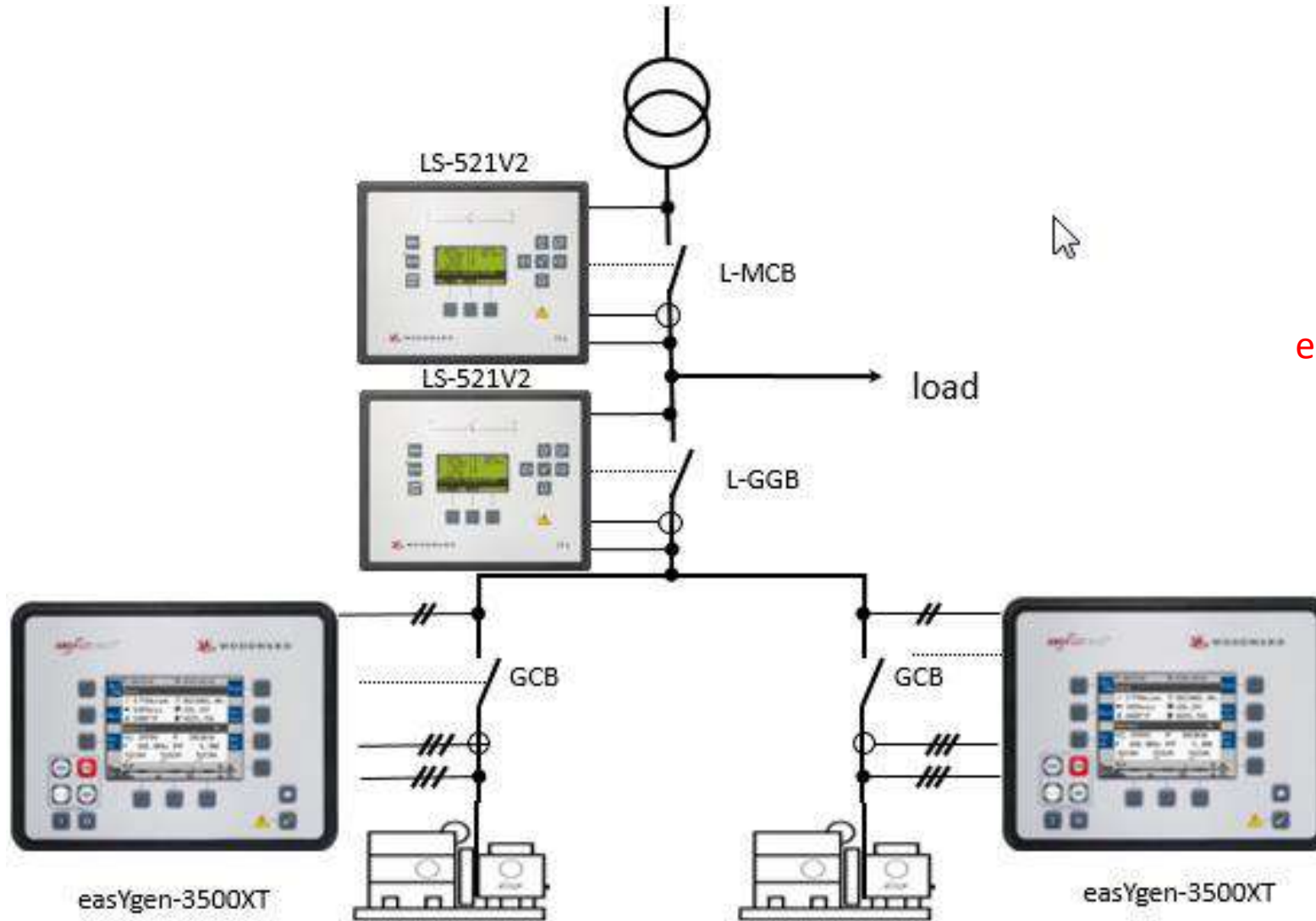


- Alternative Solution for App Mode A04, e.g.
- Useful if more than 2 genset controls have to serve MCB or MCB is located far away from the Genset Control Panel
- The MCB1 open/close can be operated in manual mode by easYgen-3500XT HMI
- Application mode for only one incoming Mains
- Loadsharing & LS5 connection via CAN Open

Up to 32 gensets and 1 LS5V2

Application Mode A08 (GCB/L-MCB)

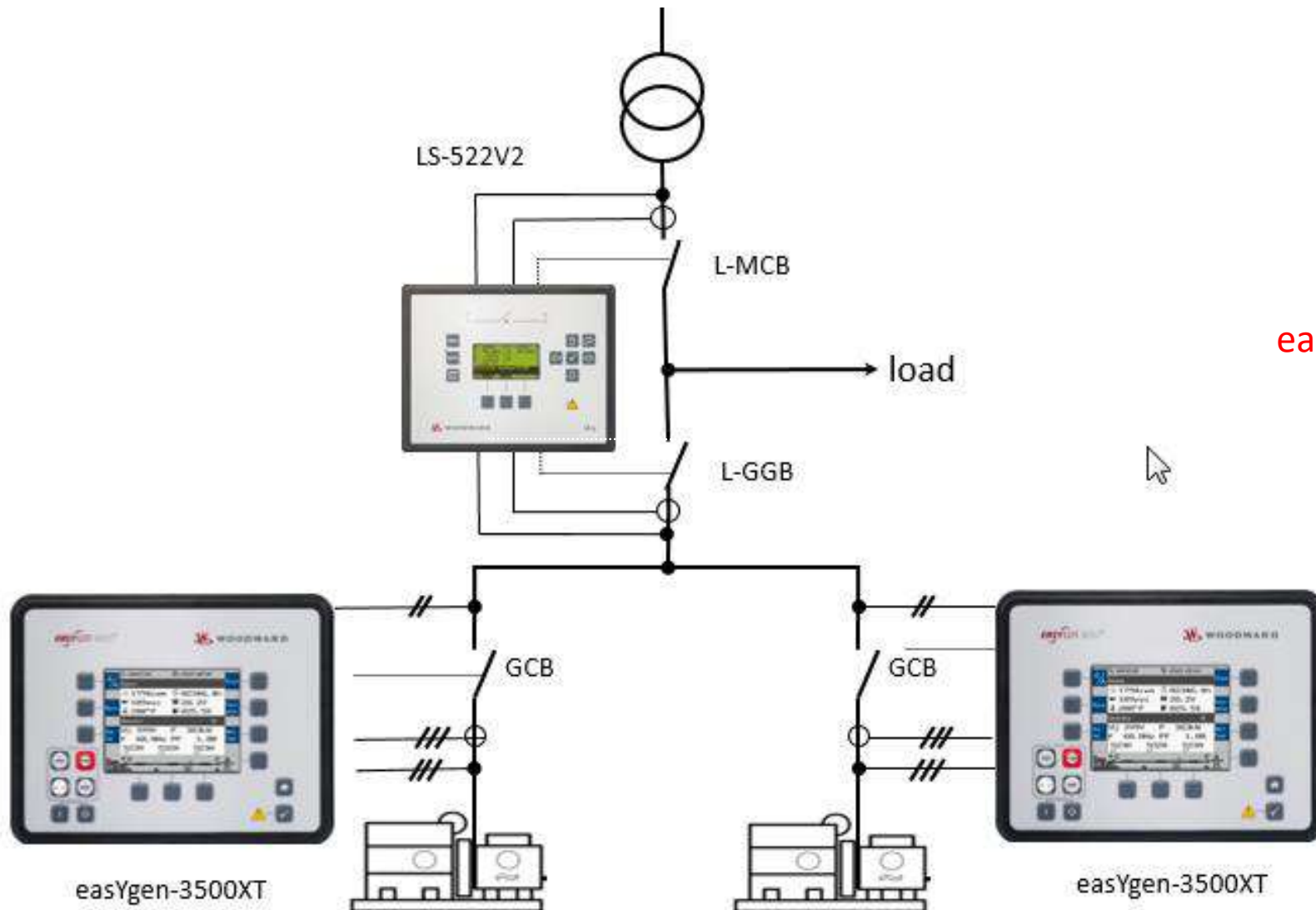
easYgen-3500XT GGB Support Island & Mains Mode



easYgen App Mode A11 GCB/L-GGB/L-MCB

- Up to 32 gensets
- Run up synch or traditional synch
- For one Mains, L-MCB and L-GGB can be operated by easYgen HMI
- Loadsharing & LS5 connection via CAN Open

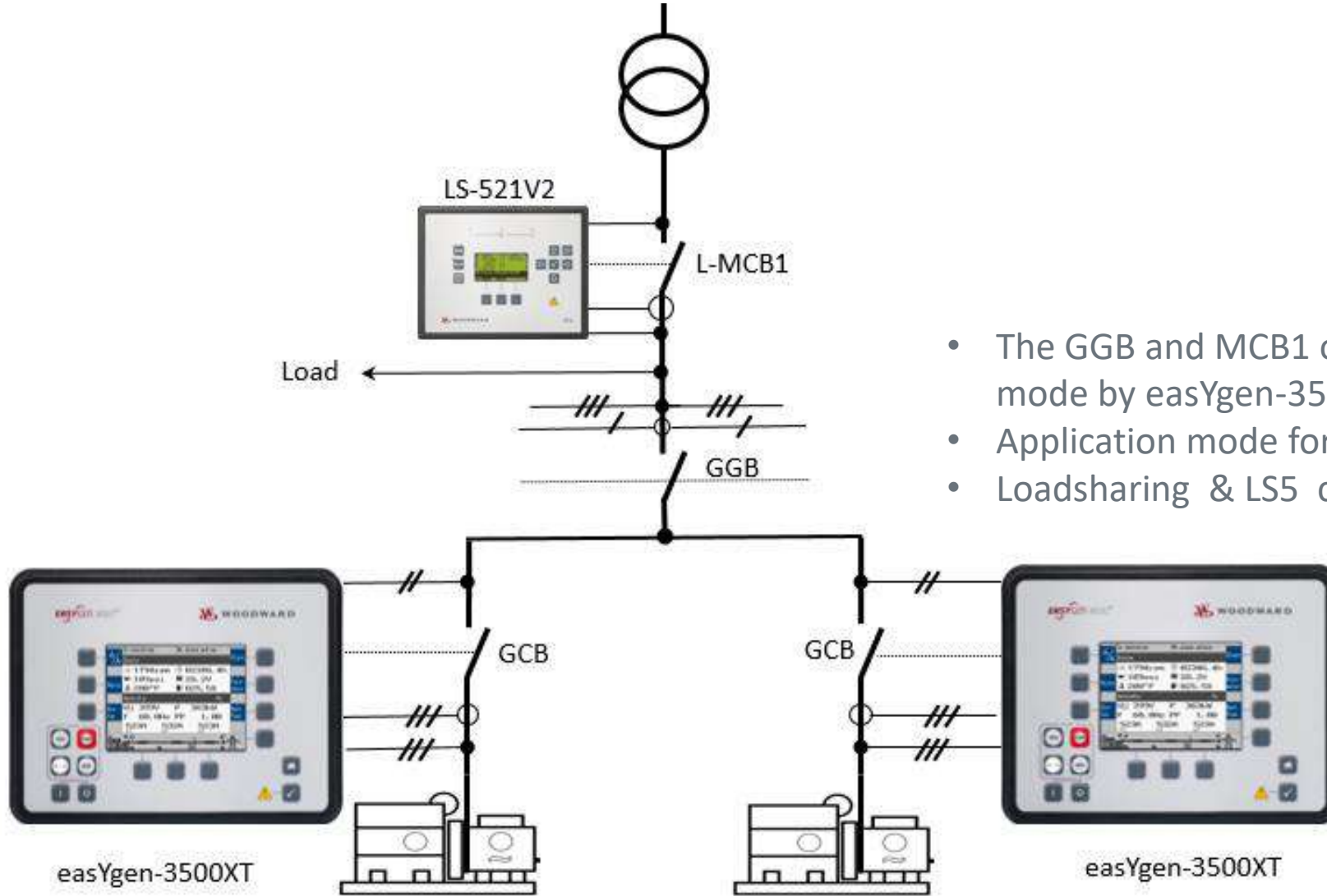
easYgen-3500XT GGB Support Island & Mains Mode



easYgen App Mode A12 GCB/L-GGBMCB

- Up to 32 gensets
- Run up synch or traditional synch
- For one Mains, L-MCB and L-GGB can be operated by easYgen HMI
- Loadsharing & LS5 connection via CAN Open

Multiple Gensets only one MCB & one GGB



- The GGB and MCB1 open/close can be operated in manual mode by easYgen-3500XT HMI
- Application mode for only one incoming Mains
- Loadsharing & LS5 connection via CAN Open

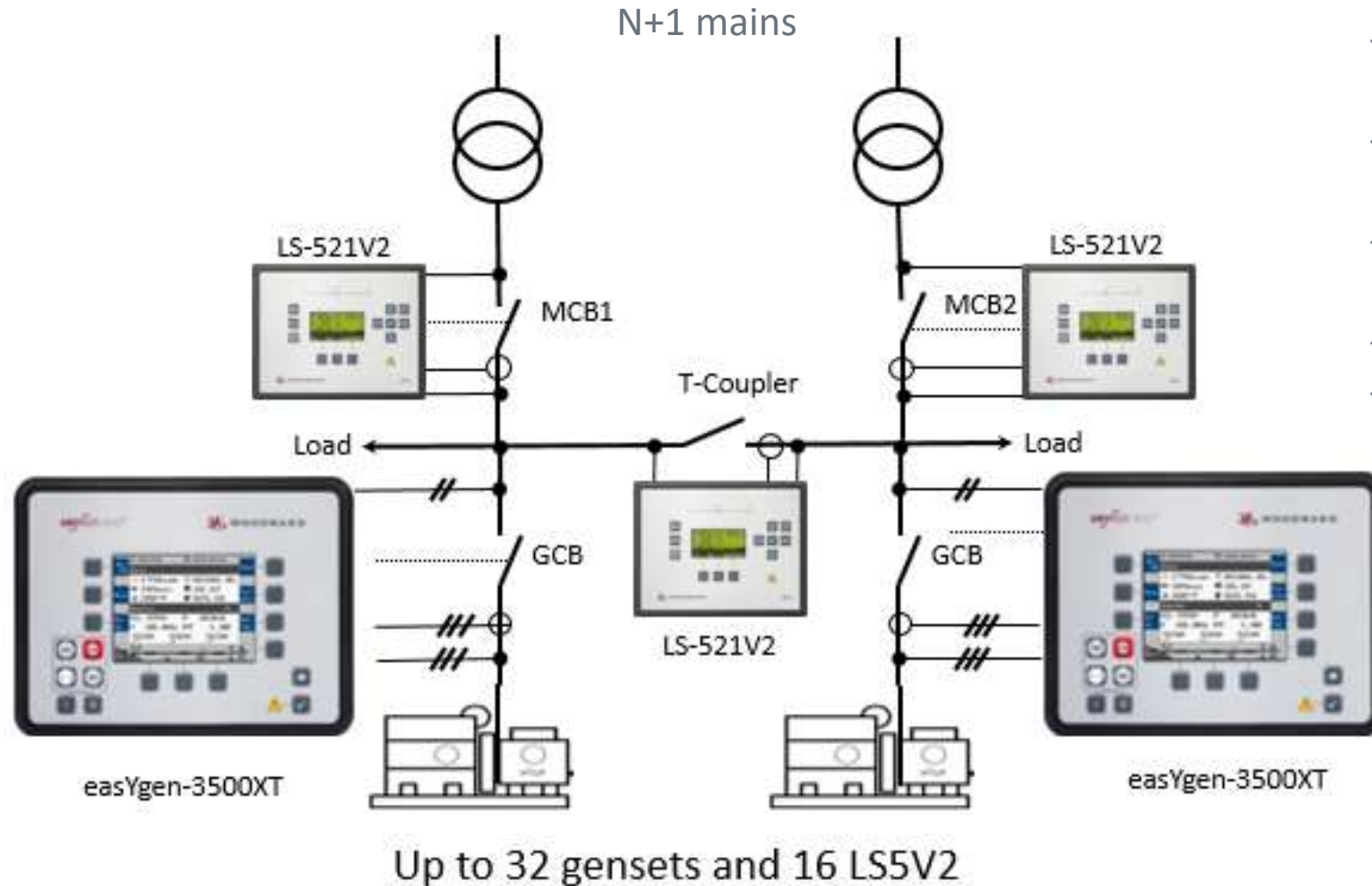
**Application Mode A09
(GCB/GGB/L-MCB)**

easYgen-3500XT

easYgen-3500XT

Up to 32 gensets and 1 LS5V2

easYgen-3500XT Multiple breaker application



- Up to 48 controls total possible with the network
 - easYgen and LS5 are communicating by CANopen
 - It is as well possible to use only one genset and up to 47 LS5's
 - easYgen is only serving GCB
 - Every other breaker to be synchronized is equipped with a LS5 control
- App Mode for LS511/512/512/522 & GC-3400XTP1 GroupController Application Loadsharing & LS5 connection via CAN Open

Application Mode A07 (GCB/LSx)

LS612-XT

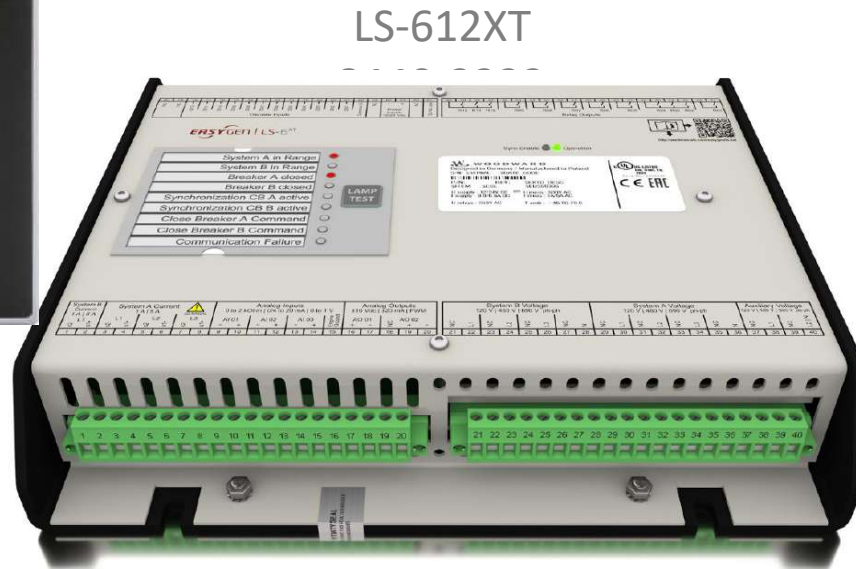
A LS6XT controller is a smart Synchronizer transferring U+/- & f+/- commands via redundant E-net to the easYgen-3400/3500XT genset controllers taking care of GCB and providing this information then to engine and generator controls to parallel other circuit breakers (MCB's, GGB's-T-couplers) within the application.

As well LS6XT's and easYgen controllers taking care of segmentation.

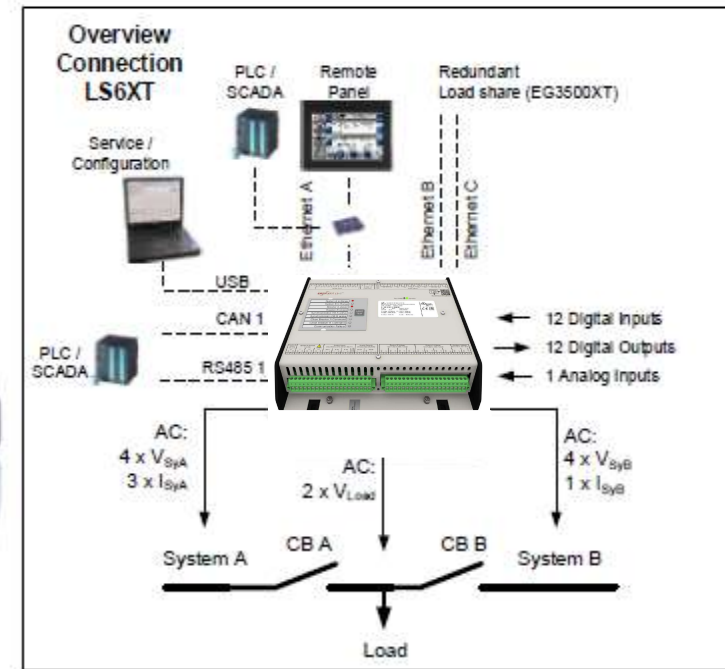
LS6XT has three measurement system: System A, auxiliary voltage and System B capable to serve one or two breakers.



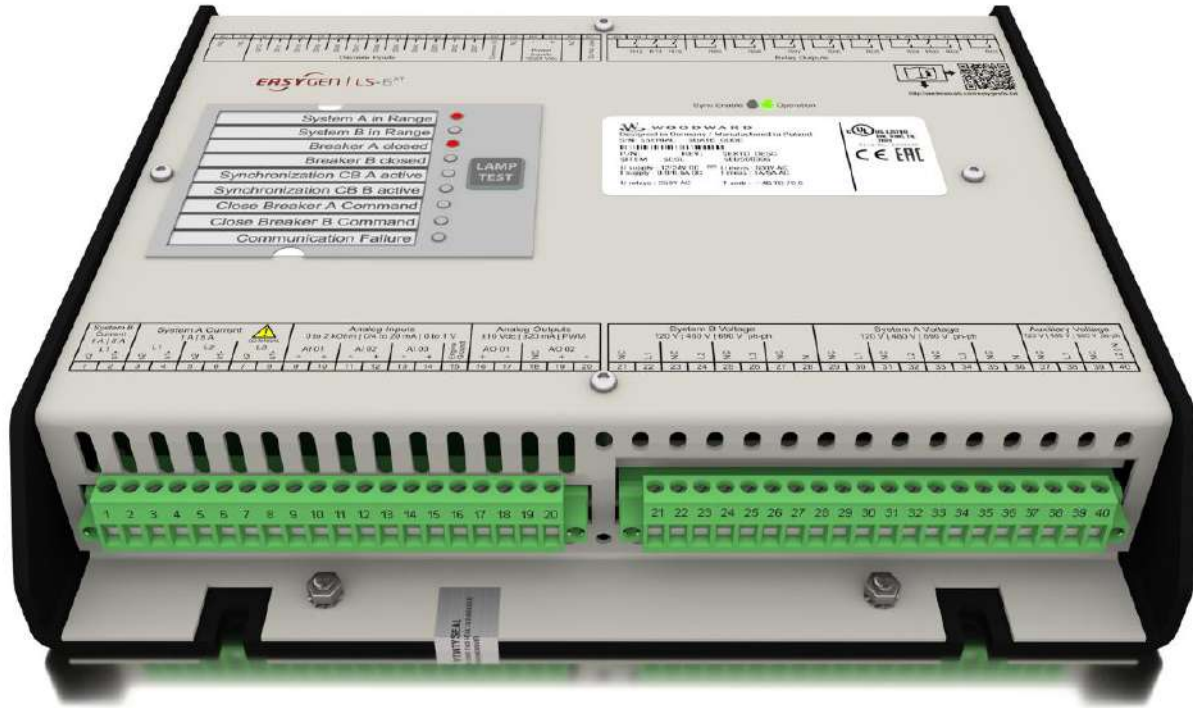
RP-3000XT
8446-1068



8440-2222



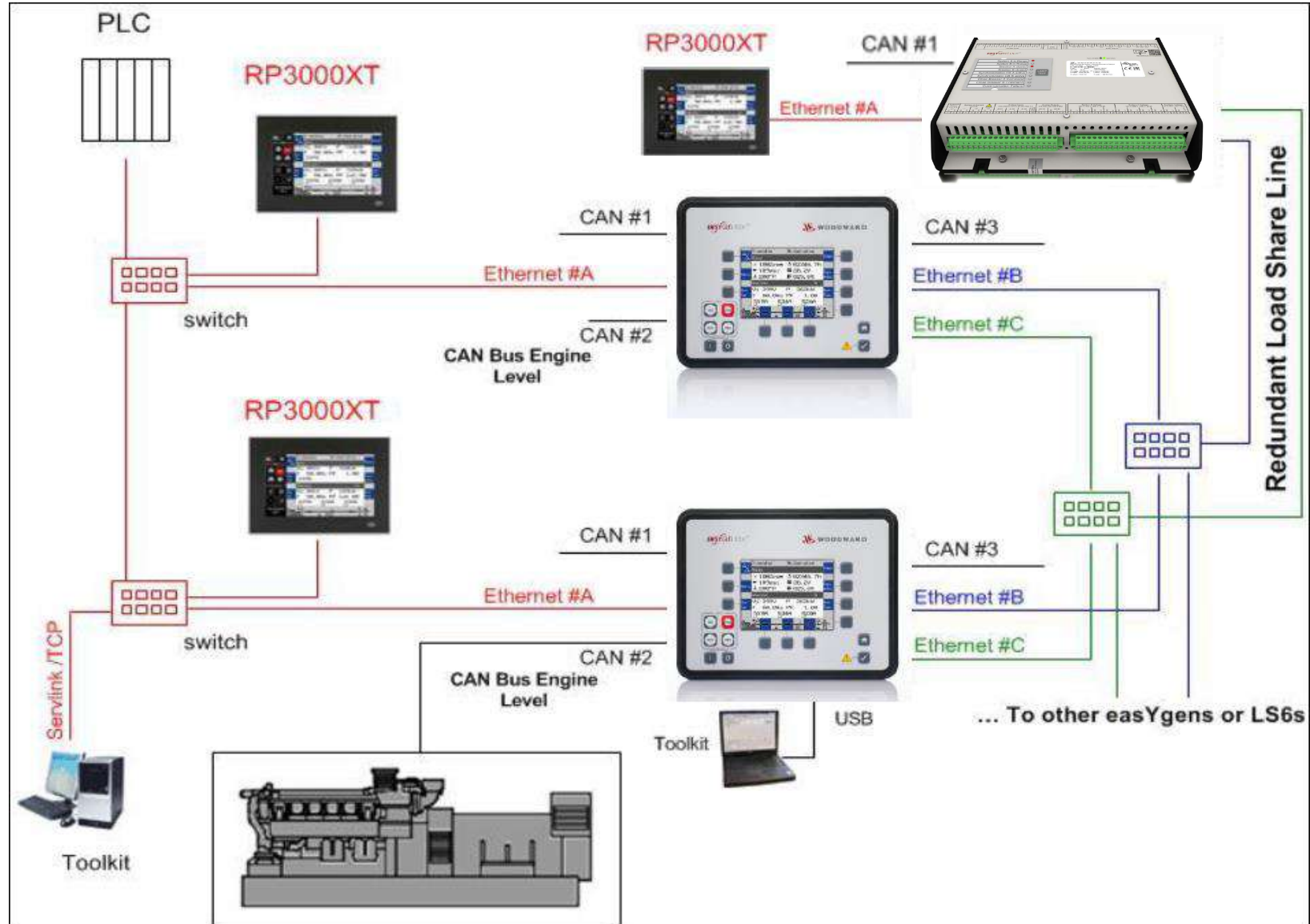
LS612-XT I/O Set



LS-612XT
8440-2222

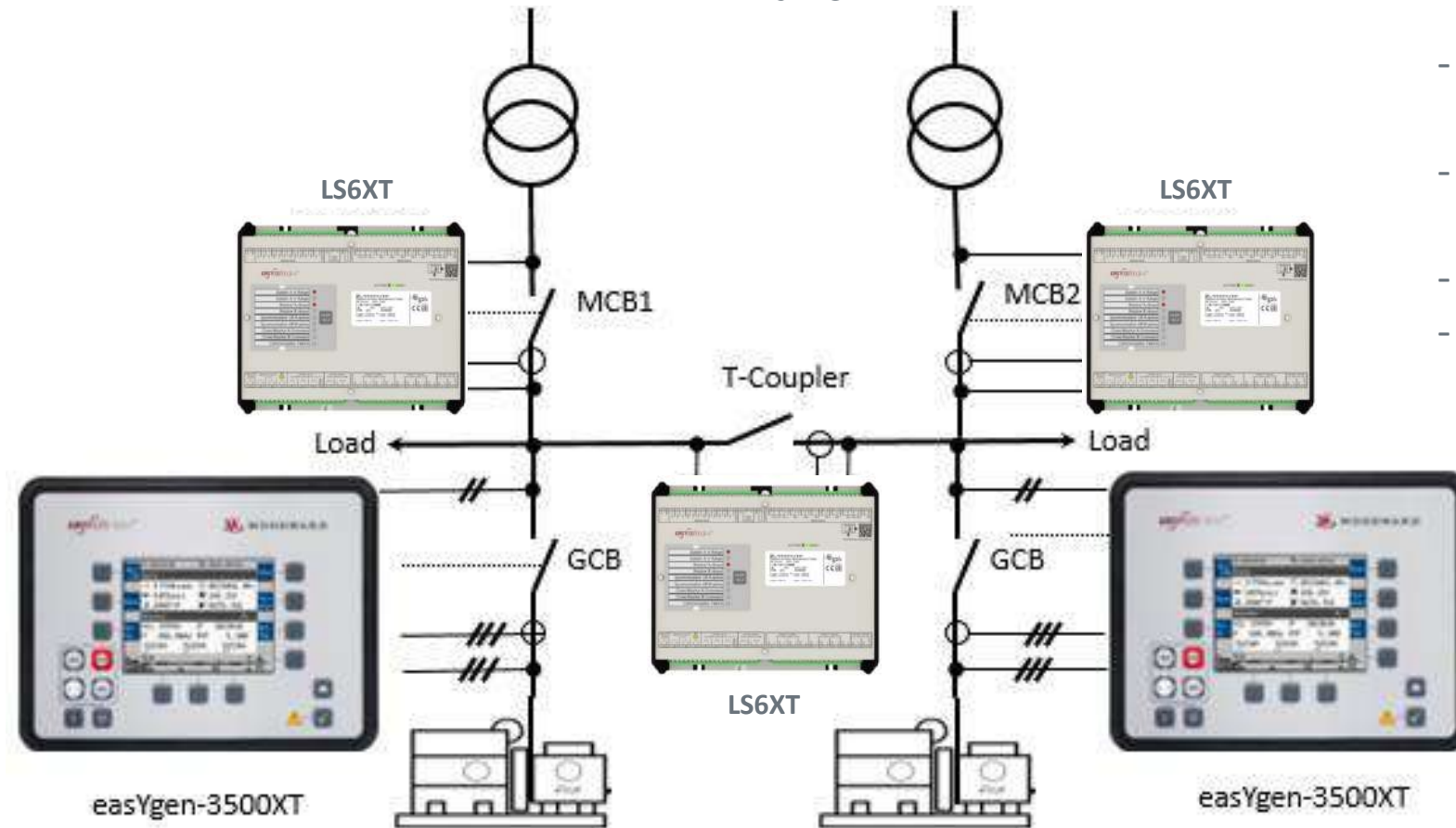
- Measurement:
 - 3phase Voltage System A (100-690VAC)
 - 3phase Current System A (./1 & ./5A)
 - 3phase Voltage System B (100-690VAC)
 - 1phase Current System B (./1A & ./5A)
 - 3-phase Angle System A <-> System B
 - 1-phase auxiliary voltage (CBA/CBB mode) for plausibility check
- I/Os
 - 12 DI & 12 DO , LED Annunciator
 - 1 Analog input 0/4 to 20mA active power system A or system B
 - AO1, AO2 driven by AM, primarily used for active and reactive power signal to PLC
 - AI 01, AI 02 ,AI 03 (free use) driven by AM, primarily AI 01 used for active power and AI 02 for reactive power from provided by PLC . AI 03 for free use
- Interfaces
 - Ethernet A,B,C ModbusTCP
 - USB
 - CAN Open CAN1 (redundant with ETH A)
 - RS485 Modbus RTU

LS612-XT Application Overview



easYgen-3500XT Multiple breaker application

N+1 mains



- Control up to 32 breakers in up to 128 segments
- easYgen and LS6XT are communicating by redundant hot swap E-Net
- easYgen is only serving GCB
- Every other breaker to be synchronized is equipped with a LS6XT control

Application Mode A07 (GCB/LSx)

All previous applications can be realized with LS6XT as well

Up to 32 easYgen-3400XT/3500XT controls and up to 32 LS6XT controls

You have requirement to control&manage

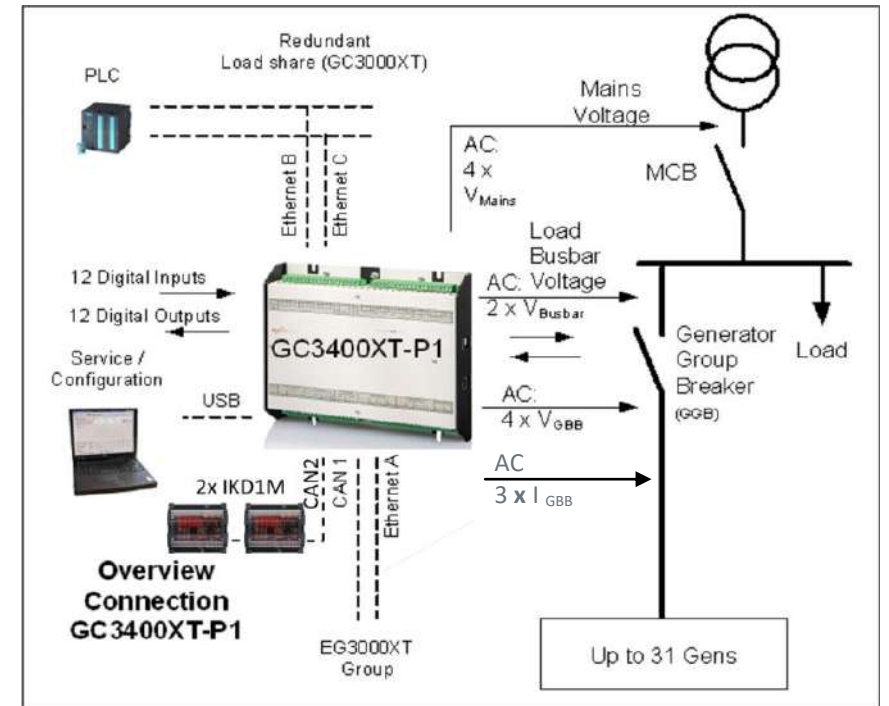
- **more than 32 generators**
- **more than 32 breakers**
- **more than 64 Segments?**

Then Group Controller GC3400XT is a solution

GC3400XT-P1 Group Controller



8440-2267



Allows you to **standardize** on one solution to fit a multitude of applications. Runup-Sync and E-Net Modbus Master supported
Proven system for managing **large** power generation systems

multiple generators (>2.0) up to 496 generators supported in 16 groups each up to 31 generators)

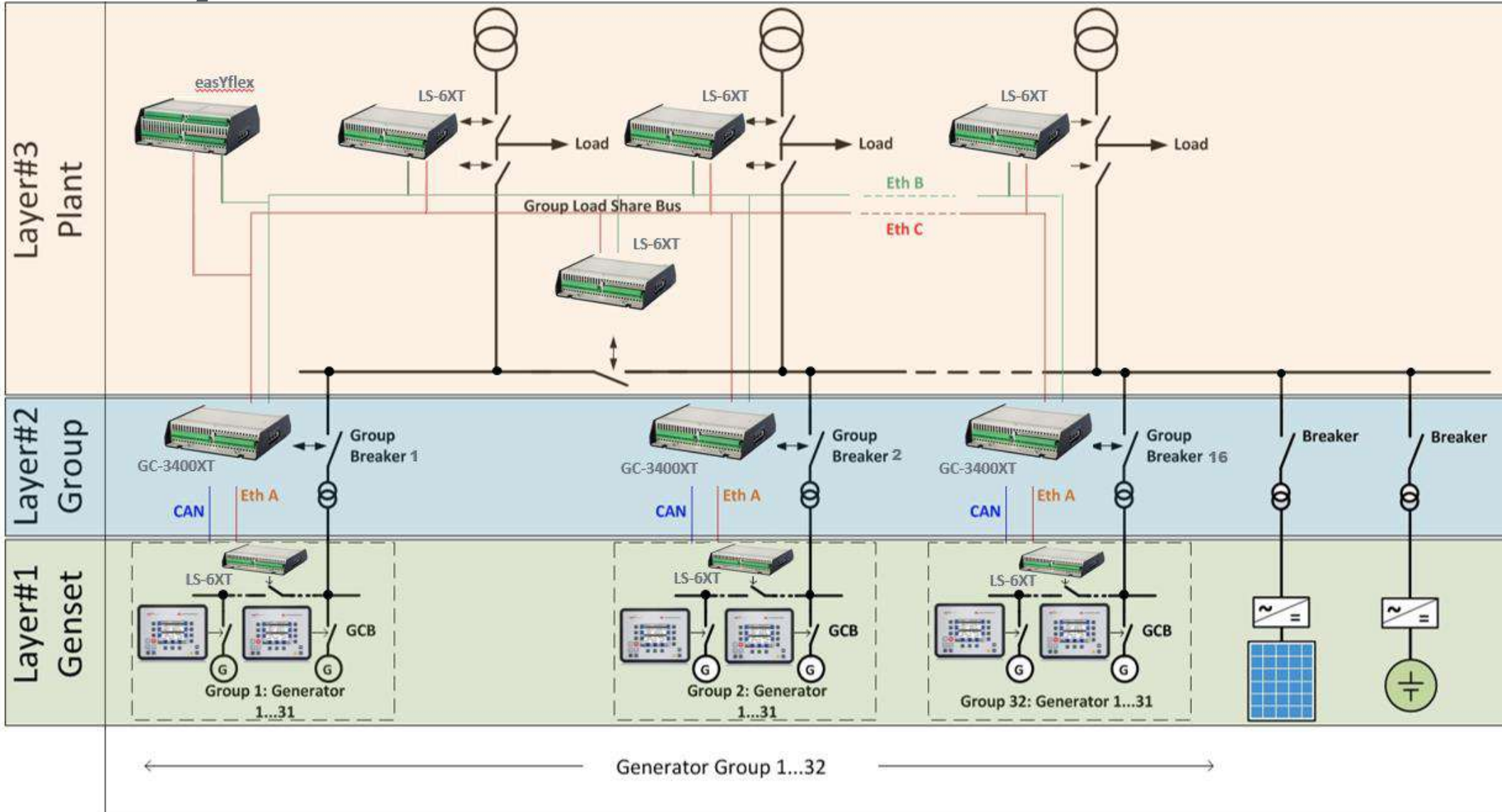
In a group of (up to 31) or less for modularity

Redundant load share communication at each level, 2 x IKD1M can connected to CAN2

Purpose-built to **minimize your effort** commanding your power generation assets

Reduced point-to-point wiring CAN/ETH communication line between all units

System Architecture



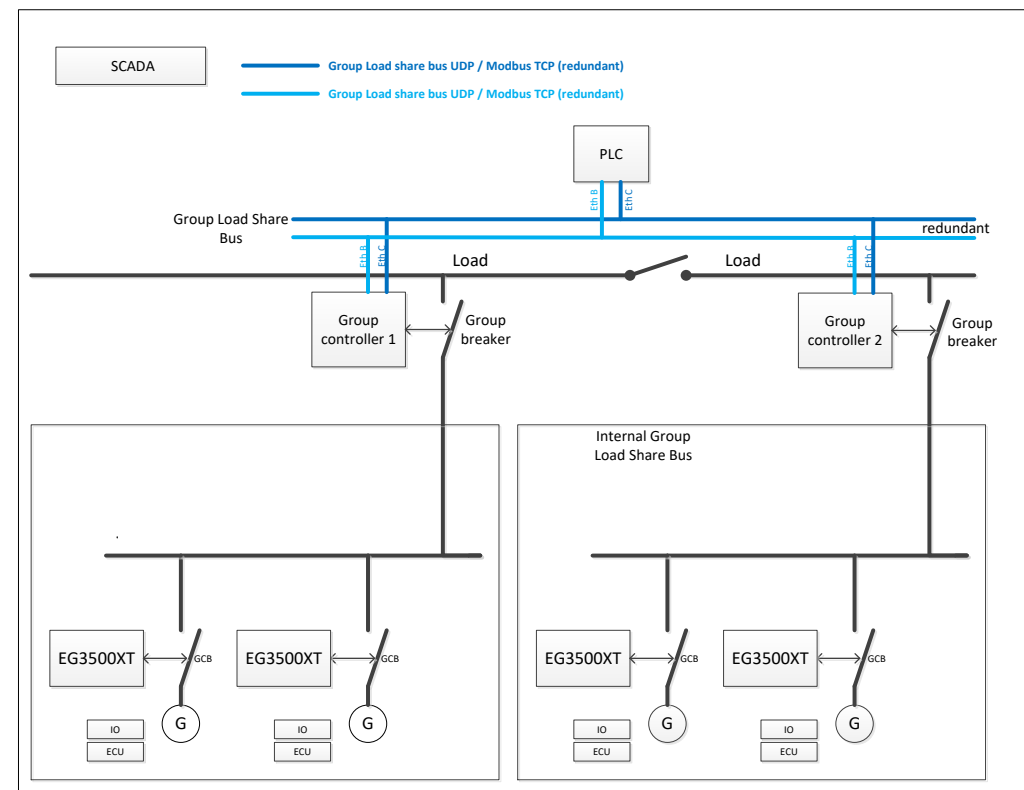
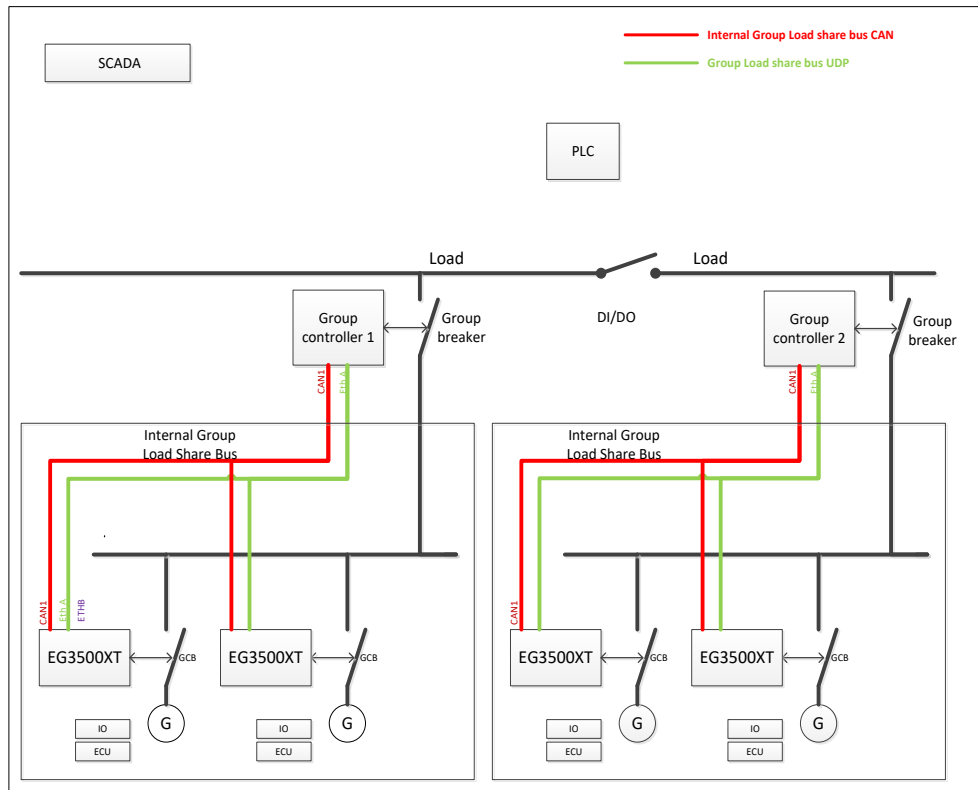
- up to
- 128 Segments on Layer 3
 - 64 LS6XT's total Layer 3

- up to
- 16 GC-3400XT's

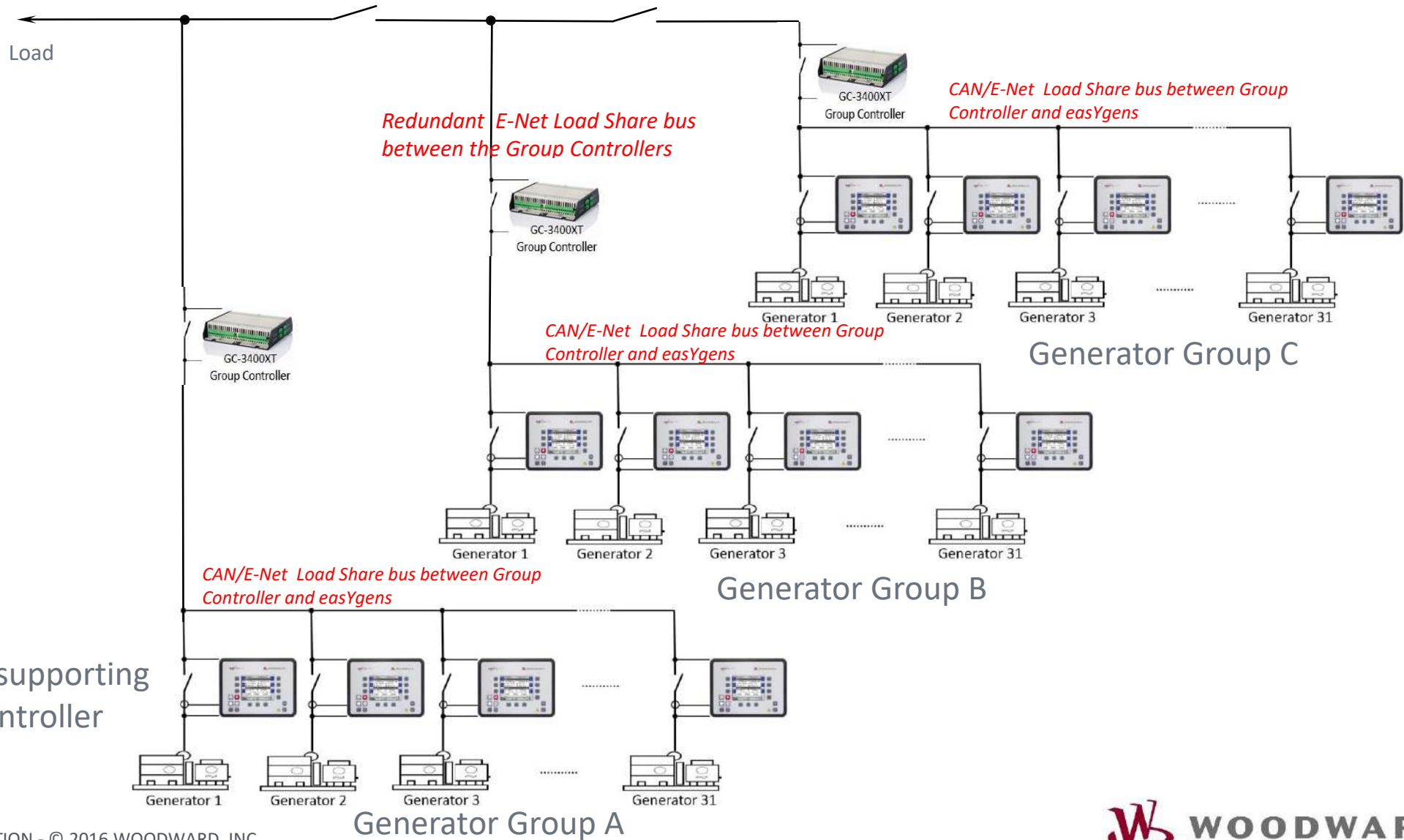
- Up to:
- 64 Segments on Layer 1
 - 31 LS6XT's in each GC-3400XT Group

GC/easYgen Control System Application

- Internal group communication (redundant CAN/ETH)
- Across group communication (redundant ETH)

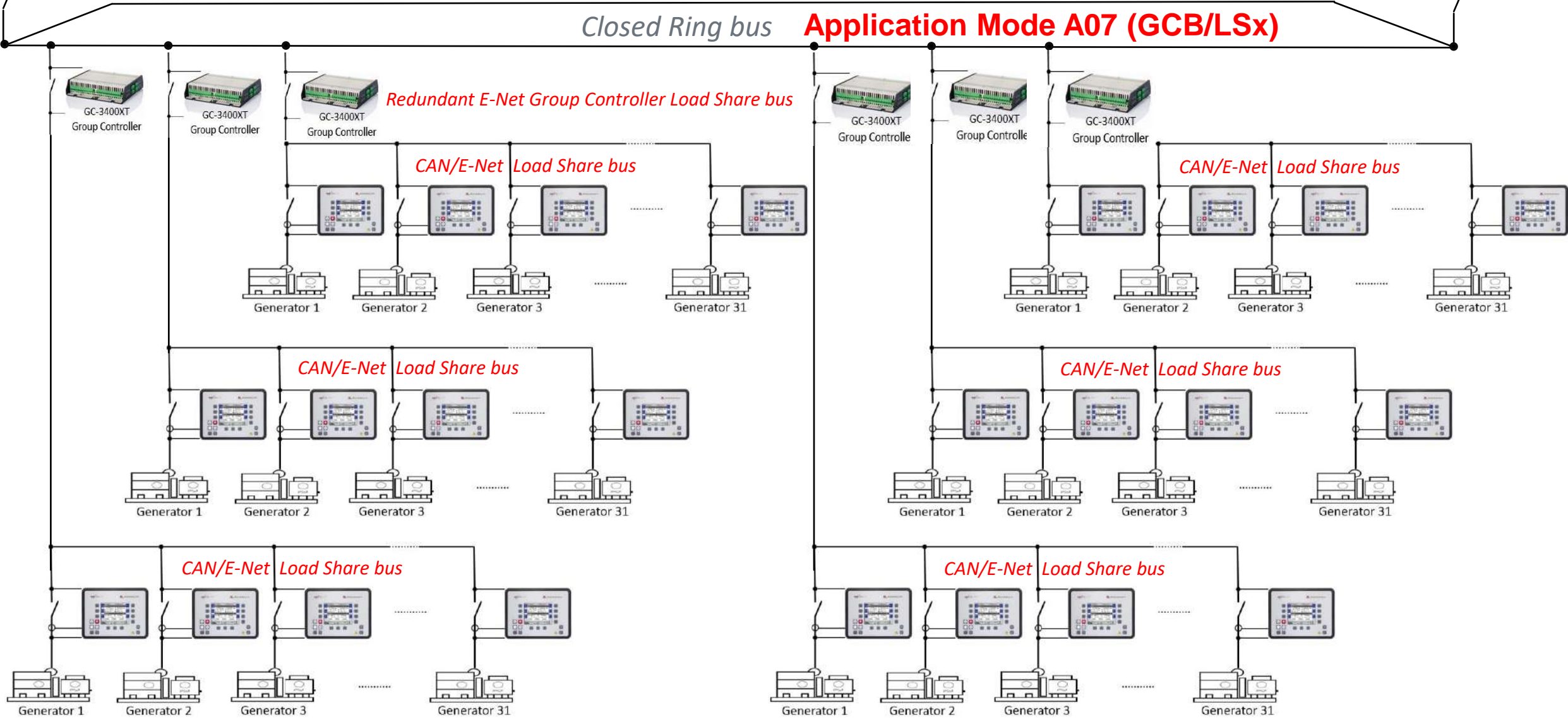


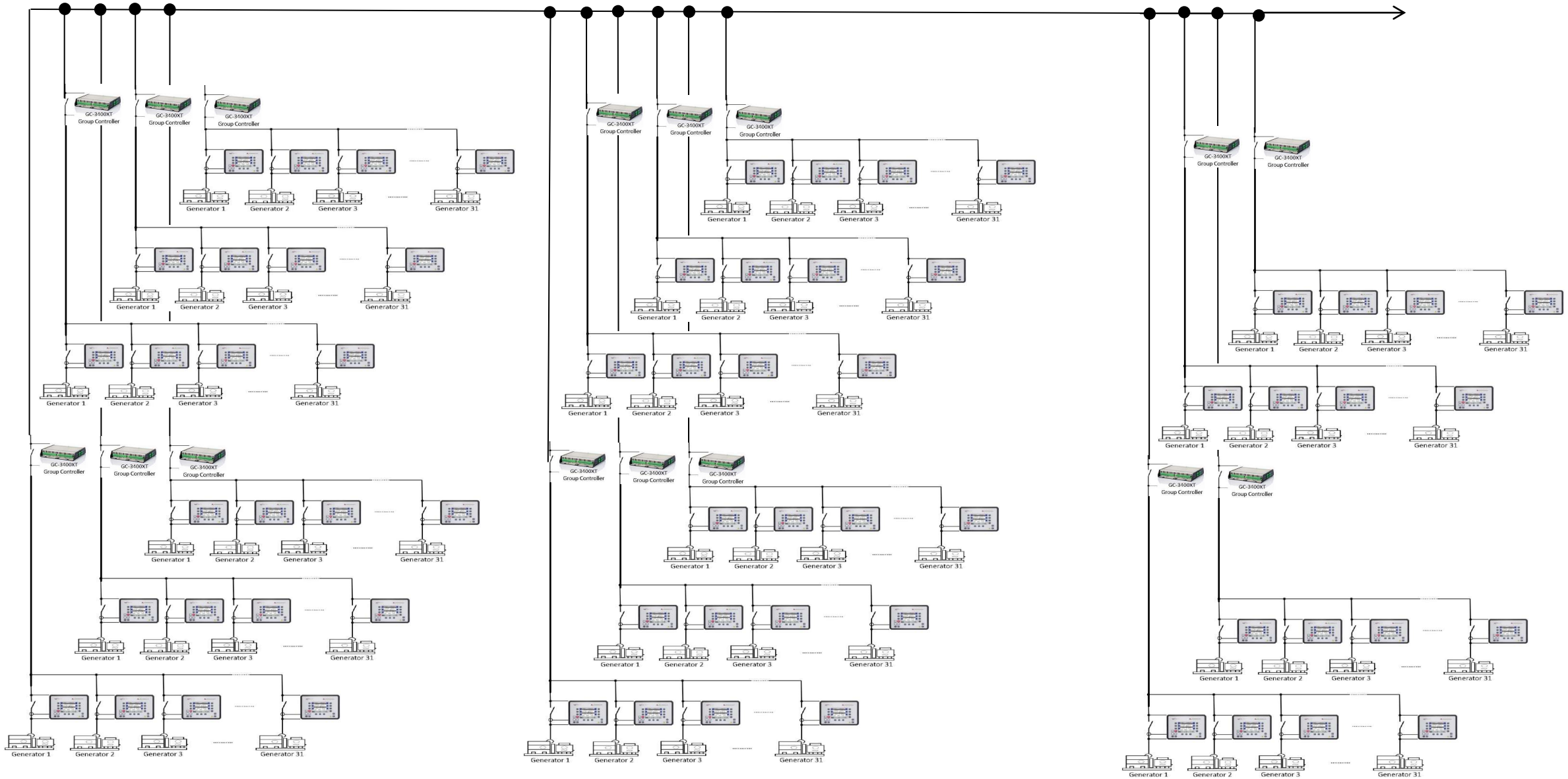
Critical Power Application



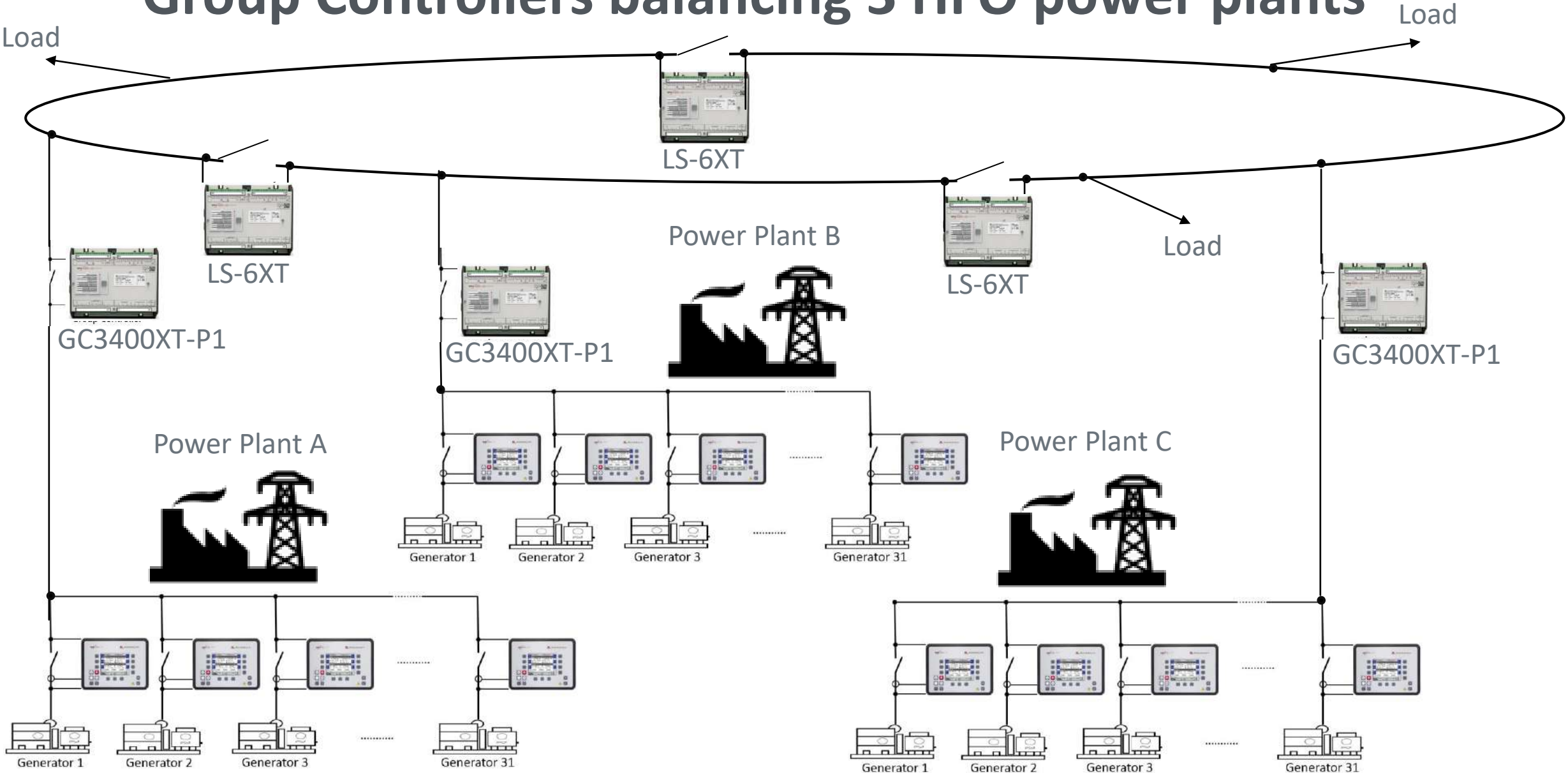
easYgen-3400/3500 supporting GC-3400XT GroupController

Up to 31 genset in up to 32 groups = 992 gensets

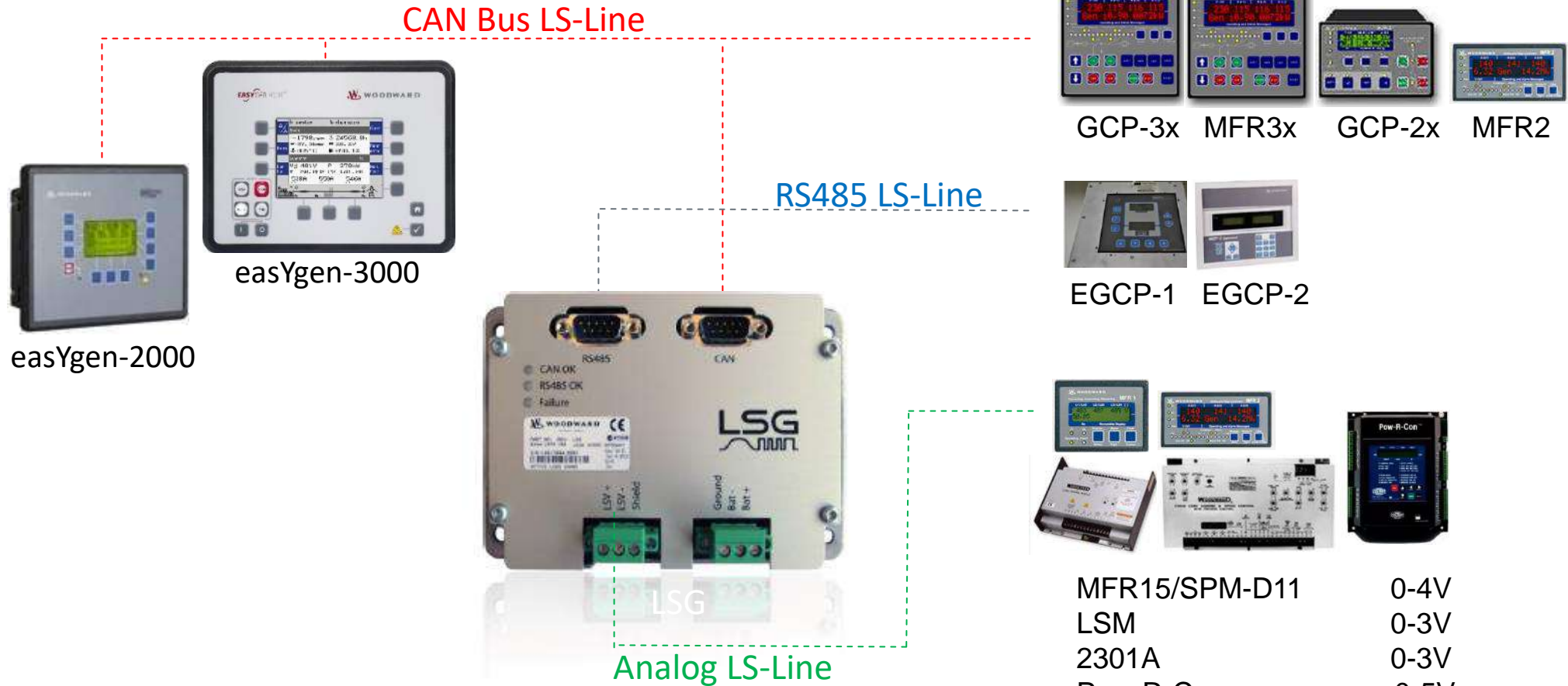




Group Controllers balancing 3 HFO power plants



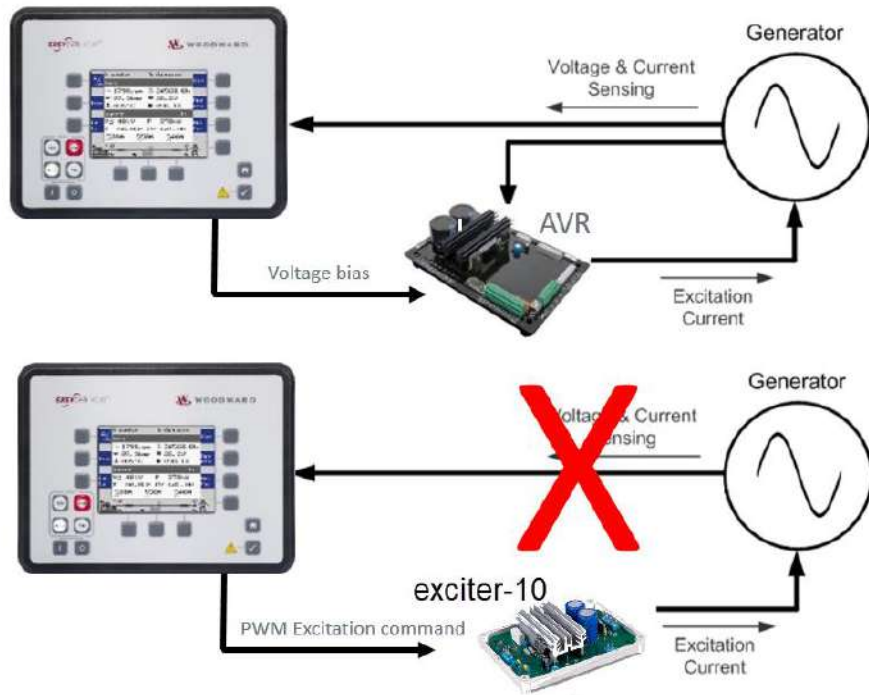
LSG Load Share Gateway



P/N 8444-1075 for kW- and P/N 8444-1074 for kVAr Load Sharing required for analogous Load share lines.

RS485 & CAN Lines only require one LSG for kW & kVAr sharing.

easYgen | exciter 10 - 4A continuous





Documentation Server

QR Codes route you to all kind of product related support documents

Power Generation Controls

All Documents test

✓	📁	Name	Modified	PGC Update Title and Modifier WF
	📁	Compliance_Certificates	... March 15, 2021	
	📁	DSLCL_MSLC_series	... December 7, 2021	Completed
	📁	DTSC_series	... March 15, 2021	
	📁	easYgen-100_series	... March 15, 2021	
	📁	easYgen-1000_series	... March 15, 2021	
	📁	easYgen-2000_series	... March 15, 2021	
	📁	easYgen-3000XT_series	... March 15, 2021	
	📁	easYlite-200	... March 15, 2021	
	📁	easYprotec_series	... June 23, 2021	
	📁	Legacy_Controllers	... March 15, 2021	
	📁	LS-5_series	... October 19, 2021	
	📁	MFR-x00_series	... June 23, 2021	
	📁	SW_Tools	... March 15, 2021	

Toolkit and Software Tools

[Toolkit](#)

[Toolkit manual](#)

[Configuration Files download](#)

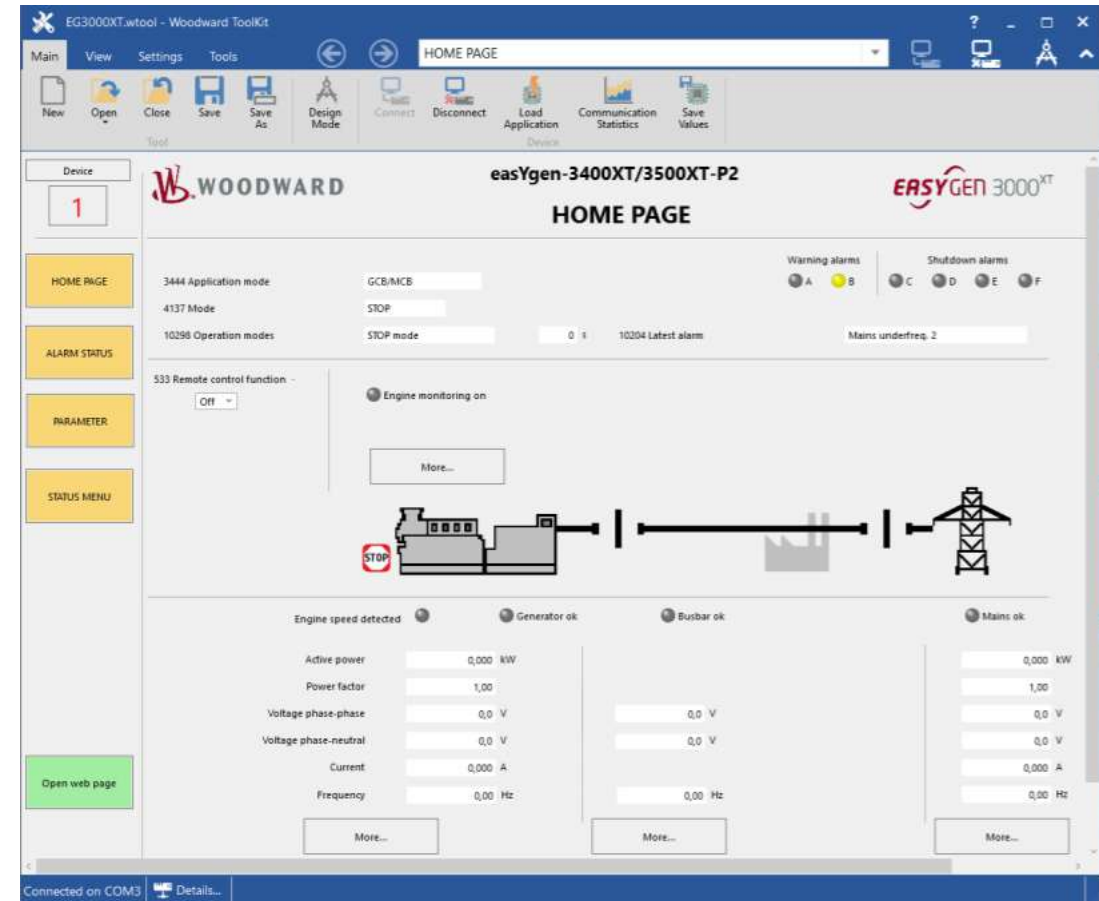
[HMI Localization Tool](#)

[LDSS Emulation Tool](#)

[ModbusMasterMapper](#)

[TelegramMapper](#)

[Woodward Powermanagement
Youtube Channel](#)



Power Management Controls Channel



GB

easygen power management



EASYGEN 3000^{XT}

TUTORIAL
Getting started with
easYgen-3000XT and ToolKit

0:04 / 5:21

Power Management Controls

Woodward, Inc. Training and Prod... - 1 / 7



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