

GSE CONTROL 400

GSE CONTROL 400 is a transformerless inverter designed for direct connection of an inverter or arbitrary number of parallel ranged inverters on the primary side of the grid transformer with ratio **0,4/XX kV**. Advanced control features, built-in BMS system together with additional peripherals allow effective control of energy between the battery and the grid, making four-quadrant control of both active and reactive power possible.

GSE CONTROL 400 serves as a battery-fed bidirectional inverter for 400V three-phase power system. VONSCH GSE CONTROL is the ideal product to provide the following:

- **Peak-shaving**
with a proper control, GSE CONTROL can be used to reduce maximum power peaks
- **Reactive power compensation**
thanks to the measurement of currents and load voltages, the total reactive power of the system can be continuously and quickly controlled
- **Frequency control**
Frequency control is only relevant in small island networks called "microgrid", where surplus or lack of power is reflected in an increase or decrease of the grid frequency (droop control)
- **Charging / discharging and forming the battery**
Thanks to the fast control of the DC current (battery current), the inverters can be used to charge and recharge batteries with very high efficiency
- **Off-grid operation**
GSE CONTROL inverters allow operation in off-grid mode (optional). Off-grid mode of operation is a prerequisite for using GSE CONTROL in UPS systems.



Advantages

- Increases the reliability of the electric system and the reliability of grid connected devices

Features

- High efficiency
- Fast start-up
- Fast reaction time to step change of load
- Long durability of device
- Ecological device – minimal consumption in standby

TECHNICAL DATA	GSE CONTROL 400 / 10	GSE CONTROL 400 / 20	GSE CONTROL 400 / 33	GSE CONTROL 400 / 100	GSE CONTROL 400 / 125
AC side (output)					
Rated AC power P_{nom}	10 kVA	20 kVA	33 kVA	100 kVA	125 kVA
Rated output current I_{nom}	14.5 A	29 A	48 A	145 A	180 A
Maximum output current I_{max} (2s every 30s)	21.25 A	43.5 A	72 A	217 A	270 A
DC input					
Rated input voltage U_{BATnom}	650 V _{DC}	650 V _{DC}	650 V _{DC}	650 V _{DC}	650 V _{DC}
Min. input voltage U_{BATmin}	620 V _{DC}	620 V _{DC}	620 V _{DC}	620 V _{DC}	620 V _{DC}
Max. input voltage U_{BATmax}	820 V _{DC}	820 V _{DC}	820 V _{DC}	820 V _{DC}	820 V _{DC}
Rated input current I_{INnom} (at U_{BATnom})	16.4 A	33 A	55 A	164 A	205 A
Dimensions (w x h x d)	600x800x350 mm	600x1100x400 mm	800x1300x500 mm	1000x2100x500 mm	1000x2100x500 mm
Weight	75 kg	150 kg	200 kg	380 kg	380 kg

TECHNICAL SPECIFICATION	GSE CONTROL 400 xxx
Output voltage	3 x 400 V $\pm 10\%$
Efficiency	$\geq 96,8\%$
Output frequency	50 Hz
Power factor $\cos \phi$	$\cos \phi = -1$ (Power supply into grid) $\cos \phi = 1$ (Consumption from the grid at battery charging) or adjustable between 0.9 capacitive and 0.9 inductive
Total harmonic distortion of the output current	THDi - Max. 3 % at P_{nom}
RFI filter	Inbuilt input DC RFI filter and output AC RFI filter
Control system	32 bit. μP DSP
Communication interface	RS 485, USB, CAN
Communication modules	Modbus RTU, options - Profibus DP, Ethernet, GSM
Contactor on AC side	YES
Main switch on AC side	YES
AC side fusing	YES

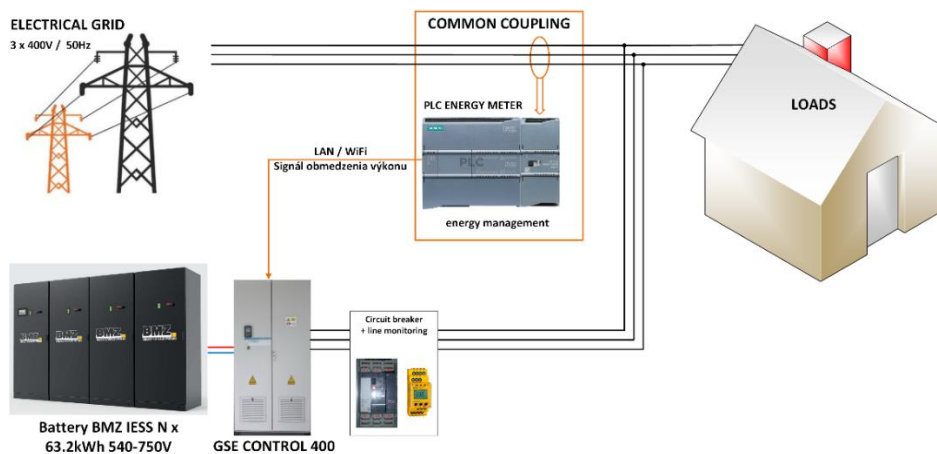
Battery insulation status check	YES
Number of DC inputs	1
DC side fusing	YES
DC side switch	YES
Time of disconnection from grid at grid failure	≤ 10 ms
Control panel	graphical, detachable, programmable
Analog inputs	4x / 0 (4) – 20 mA / 0 (2) – 10 V
Analog outputs	3x / 0 (4) – 20 mA / 0 (2) – 10 V
Relay outputs	3 programmable relay outputs
Protections	current overloading, grid overvoltage, grid undervoltage, ground fault protection, short circuit on the AC side protection, overheating of the inverter
Cooling	Forced air cooling by built-in fan
Absolute altitude of the permitted usage	≤ 1000 m above the sea, 1% reduction of power for every 100 m above 1000 m. The installation site altitude in operation is from 0 to 2500 m.
Relative humidity of the air	≤ 95 % without corrosive and explosive gases, without water vapor and condensates
Ambient working temperature	+ 0 °C to + 40 °C (-20 °C to + 40 °C with optional tempering)
Storage ambient temperature	- 25 °C to + 50 °C
Cover	IP 54
Standards compliance	Safety EN 50 178 EMC immunity, emissions STN EN 61000-6-1,3 Harmonic distortion STN EN 61000 – 3 – 11 STN EN 61000 – 3 – 12
Instructions EEC	2004/108/EEC, 2006/ 95/EEC

Solution for energy management with Li-ion system BMZ Poland IESS

VONSCH offers a complete solution for energy management with a Li-ion battery IESS system from BMZ Poland.

The solution consists of the following components

- GSE CONTROL inverter
- Control system VONSCH based on Siemens SIMATIC
- Industrial router eWON Flexy
- BMZ Poland IESS 180S01P battery system
 - 62.3 kWh, 540-750 V
 - Parallel coupling up to 80 units (5 MWh capacity)
 - 4000 cycles / 84 months warranty (70% EOL)
- Measurement of energy in point of common coupling (PCC), allowing to solve the complete energy management of the object
- Color touch display for simple system monitoring (optional)

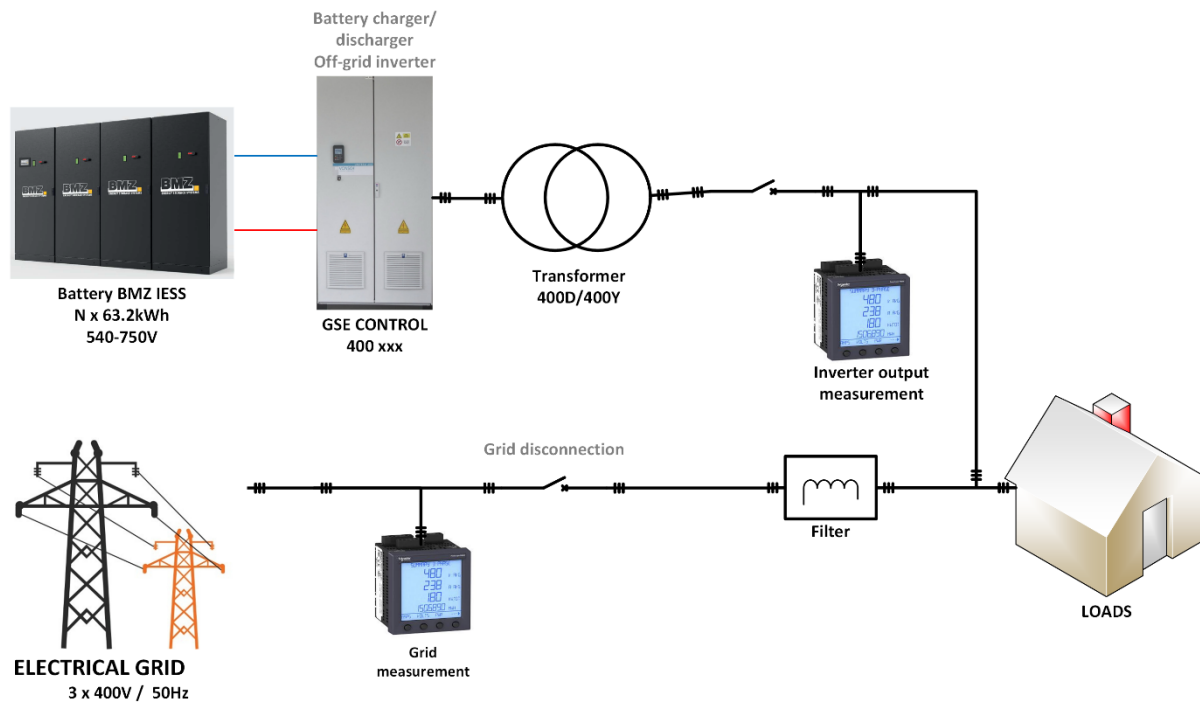


Application of GSE CONTROL for energy management

The solution is simple to control over MODBUS TCP and offers rich functionality

- Full system diagnostics
 - AC values
 - DC values (battery current, voltage, power ...)
 - State of battery (temperatures, unbalance, capacity, health...)
 - GSE CONTROL inverter diagnostics
- Active power setpoint
- Reactive power setpoint (compensation of other loads)
- Visualization, based on HTML, accessible over the internet
- Remote VONSCH support over the internet (product care, upgrades, custom modifications)

GSE CONTROL inverters can also be used in UPS-like applications, with "black start" functionality.
Note: When designing a back-up system, it is necessary to consider short-term peak currents which can be several times higher in the case of inductive loads such as transformers or motors.



Application of GSE CONTROL as backup power source

These solutions can be customized to fully meet customer requirements.