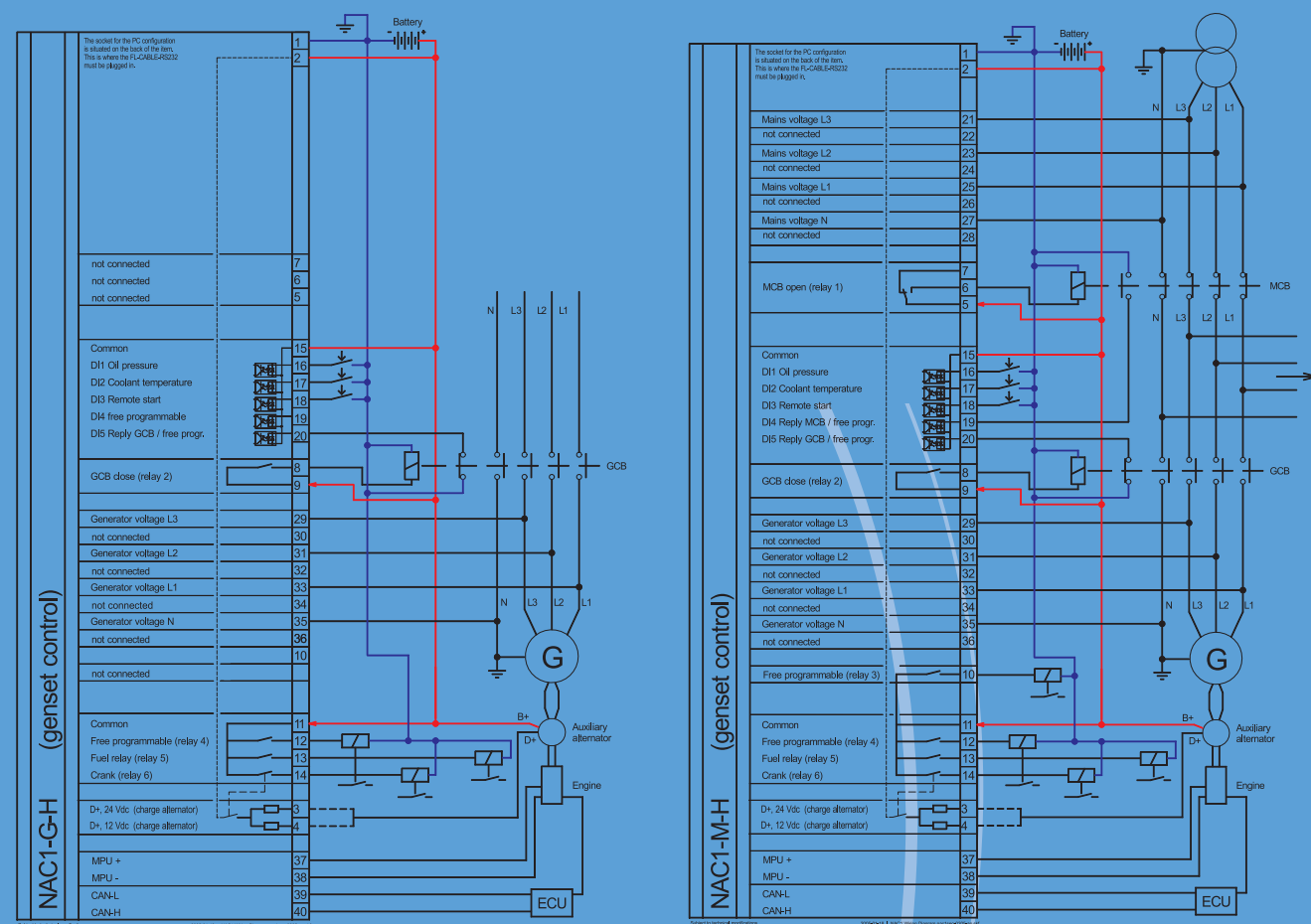


Features Overview

NAC1		NAC1-G-L	NAC1-G-H	NAC1-M-L	NAC1-M-H
Measuring					
Generator voltage	rated 277/480 Vac max. 346/600 Vac	1p-2w	configurable ^{#1}	1p-2w	configurable ^{#1}
- true rms					
Mains voltage	rated 277/480 Vac max. 346/600 Vac			3p-4w	configurable ^{#1}
- true rms					
Control					
Push-buttons to operate the unit		•	•	•	•
Isolated single-unit operation		•	•	•	•
AMF (auto mains failure operation)			•	•	•
Stand-by operation		•	•	•	•
Open transition (break-before-make)				•	•
ATS (automatic transfer switching)				•	
Accessories					
6digit 7segment LED (display of values and alarms)		•	•	•	•
Global multi-lingual use with customised paper strip		•	•	•	•
Start/Stop logic for Diesel engines		•	•	•	•
Operating hours/service hours/start counter		•	•	•	•
15 entry event logger		•	•	•	•
Configuration via front panel		•	•	•	•
Configuration via PC ^{#2}		•	•	•	•
Protection					
Engine: over-/underspeed			•	•	•
Generator: voltage/frequency		•	•	•	•
I/O's					
MPU input (magnetic/switching; Pickup)			•		•
D+ (charge alternator input/output)		•	•	•	•
Discrete alarm inputs (fixed)		2	2	2	2
Discrete remote start input (fixed)		1	1	1	1
Discrete alarm inputs (configurable) ^{#3}		2	2	2	2
Relay outputs (fixed)		3	3	4	4
Relay outputs (configurable)		1	1	2	2
CAN bus communication ^{#4}			•		•
Listings/Approvals					
CE Marked		•	•	•	•
Shock and vibration test approval		•	•	•	•

#1 Configurable: 1p-2w, 1p-3w, 3p-4w
 #2 Cable incl. software necessary FI-CABLE-RS232
 #3 Only available if breaker indication not used
 #4 fixed CAN J1939 (selected ECU manufacturers; request information)

Wiring Diagram



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PHI_NAC1_09.05_08



Function Line NAC1

The basic gen-set controllers

For single unit automatic mains failure/island operation



Control, supervision and protection made simple with our compact multi-functional solution



Function Line

The SEG Function Line devices include control, protection and supervision systems for the automation of power generating plant. This ensures power supply for a great number of applications: e.g. in hospitals, in the automotive industry, on oil platforms in the Arctic, on oil fields in the desert and in large public buildings.

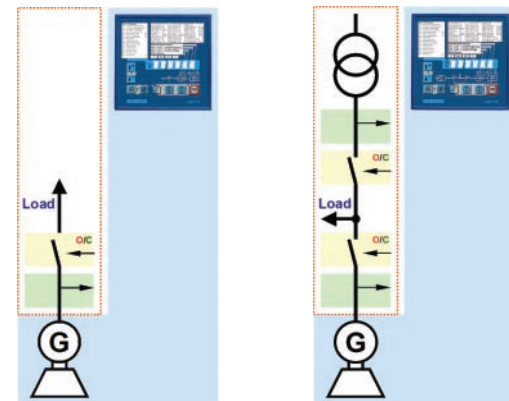


We develop, manufacture and sell high-quality protection and control devices. No matter whether you are looking for standard products or individual solutions – we and our employees rank among the best solution providers world-wide.

Applications

The NAC1-G offers local and remote automatic engine starting, stopping, metering and generator protection. The NAC1-M adds AMF control and transfer switching). The NAC1 series is designed for single unit operation.

The multi purpose 6digit 7segment LED offers the ability to display measured values and alarm messages. The CAN option adds the ability to display messages from an engine ECU.



NAC1-G-L and NAC1-M-L breaker applications

Isolated J1939 CAN bus permits long distance networks for selected ECU manufacturers. Our sales department can provide information regarding the selected ECU manufacturers.

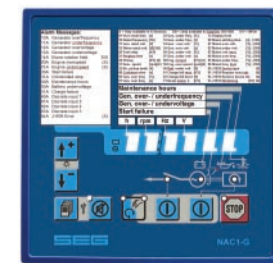
Description

Protection

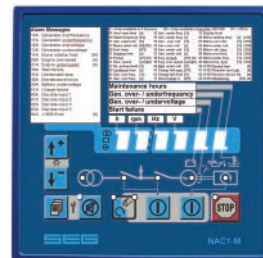
- Generator/Engine: Battery voltage, overspeed (12), underspeed (14), over-/undervoltage (59/27), over-/underfrequency (81 O/U), charge alternator failure,

I/O's

- 1 or 3 phase generator and mains true rms voltage, measuring inputs: 480 Vac (max. 600 Vac)
- Maximum 2 configurable discrete inputs
- Maximum 2 programmable relays
- D+ input (change alternator input/output)



Model "NAC1-G"



Model "NAC1-M"

Features

- Start/stop sequence for Diesel engines
- Pre-glow control
- Operating hours, service hours and start counters
- Configurable trip levels/delays/alarm classes
- 6digit 7segment LED for
 - display of measuring values (U, f, speed)
 - display of counters (see above)
 - display of alarms
 - display of ECU messages
- PC and/or front panel configurable (selection of parameters for front panel configuration)
- 15 entry event logger
- Customised display using paper-strips
- AMF/loss of mains auto start/stop
- Complete engine and generator protection in one unit
- True RMS sensing of voltage
- Freely configurable discrete inputs
- Freely programmable relay outputs
- 6.5 to 32.0 Vdc power supply
- Front panel-mounting
- Display of J1939 data
- D+ charge alternator input/output
- CE marked
- Shock and vibration test approved

Differentiation

- Model "NAC1-G": GCB operation only
- Model "NAC1-M": GCB and MCB operation
- Generator voltage measurement
 - 1phase-2wire
 - Option "H": 3phase-4wire, 3phase-3wire, 1phase-3wire and 1phase-2wire
- Mains voltage measurement
 - Model "NAC1-M-L": 3phase-4wire
 - Model "NAC1M-H": 3phase-4wire, 3phase-3wire, 1phase-3wire and 1phase-2wire
- Option "H"
 - Engine over-/underspeed protection
 - MPU-input
 - CAN-bus communication
 - Visualisation of J1939 messages

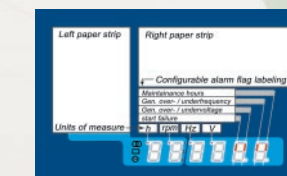
H = Only available in H-Versions
NAC1-M = Only available in NAC1-M-L/H

0/1	Off/On		
01	Horn reset time	[s]	
10	Rated frequency	[Hz]	
11	Generator rated voltage	[V]	(NAC1-M)
12	Mains rated voltage	[V]	
20	Fuel relay	[0/1]	
21	Pre-glow time	[s]	
30	Pickup	[0/1]	(H)
31	Nom. Speed	(rpm)	(H)
32	No. pickup teeth		(H)
40	Cool down time	[s]	
50	Generator overfrequency	[%]	
51	Generator overfrequency	[s]	
52	Generator underfrequency	[%]	
53	Generator underfrequency	[s]	
54	Generator overvoltage	[%]	
55	Generator overvoltage	[s]	
56	Generator undervoltage	[%]	
57	Generator undervoltage	[s]	
58	Engine overspeed monitoring	[0/1]	(H)
59	Engine overspeed	(rpm)	(H)
60	Battery undervoltage	[V]	
61	Charge fail monitoring	[0/1]	
62	Charge fail level	[V]	
71	Reset maintenance hours	[0/1]	
72	Display level		
80	Mains setting time	[s]	(NAC1-M)
81	Mains overvoltage	[%]	(NAC1-M)
82	Mains undervoltage	[%]	(NAC1-M)
83	Mains voltage hysteresis	[%]	(NAC1-M)
84	Mains overfrequency	[%]	(NAC1-M)
85	Mains underfrequency	[%]	(NAC1-M)
86	Mains frequency hysteresis	[%]	(NAC1-M)
90	J1939 Device type		(H)
91	J1939 Request send address		(H)
92	J1939 Receive device No.		(H)
93	J1939 Monitoring	[0/1]	(H)

Alarm Messages:			
10A	Generator overfrequency		
11A	Generator underfrequency		
12A	Generator overvoltage		
13A	Generator undervoltage		
14A	Mains rotation field		(NAC1-M)
20A	Engine overspeed		(H)
21A	Engine underspeed		(H)
30A	Start failure		
31A	Unintended stop		
40A	Maintenance hours		
50A	Battery undervoltage		
51A	Charge failure		
60A	Discrete input 1		
61A	Discrete input 2		
62A	Discrete input 4		
63A	Discrete input 5		
64A	J1939 Error		(H)

The control unit comes with a printed paper strip in English and Word templates in various languages for customising and printing your own paper strips.

Example for customisable paper strips:



Specification

Power supply		12/24 Vdc (6.5..32.0 Vdc)
Intrinsic consumption		max. 10 W
Ambient temperature	(operation)	-20..70°C/-4..158°F
	(storage)	-20..85°C/-4..185°F
Ambient humidity		95%, non-condensing
Voltage		(Y/Δ)
480 Vac	Rated (Un)	277/480 Vac
	max.	346/600 Vac
Accuracy		class 1
Setting range	primary	50...480 Vac
Measuring frequency		40 (mains) or 15 (generator) to 85 Hz
Input resistance		2.0 MΩ
Max. power consumption per path		<0.15 W
Speed input		capacitive isolated
Input impedance		min. approx. 17 kΩ
Input voltage		875 mV eff.
D+ input/output		capacitive isolated
Max. exciter current	12 V dc (terminal 4)	0.11 A
	24 V dc (terminal 3)	0.11 A
Discrete inputs		isolated
Input range		12/24 Vdc (6.5..32.0 Vdc)
Input resistance		ca. 6.7 kΩ
Relay outputs		isolated
Contact material		AgCdO
Load (GP)		2.00 Aac@250 Vac
		2.00 Adc@24 Vdc/0.36 Adc@125 Vdc/0.18 Adc@250 Vdc
Pilot duty (PD)		8300
		1.00 Adc@24 Vdc/0.22 Adc@125 Vdc/0.10 Adc@250 Vdc
Housing		Flush-mount
Dimensions		158x158x40 mm
Front cutout		138 [+1.0]x138[+1.0] mm
Connection		screw/plug terminals 2.5 mm ²
Tightening torque		0.5 Nm
Housing		insulating surface
Protection system		with proper installation
Weight		approx. 450 g
Disturbance test (CE)		tested according to applicable EN guidelines
Sinusoidal Vibration		4G, 5 to 100 Hz
Endurance Vibration		4G, 30 Hz, 1.5 h
Random Vibration		1.04 Grms, 10 to 500 Hz, 2 h
Shock		40G peak, 11 ms