



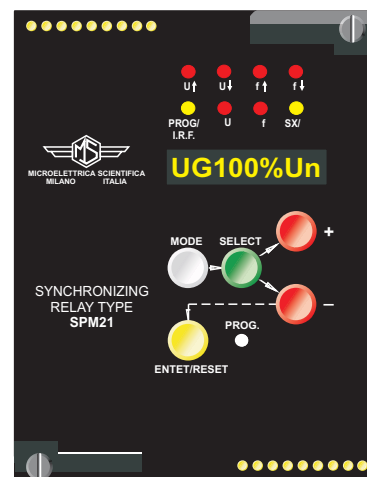
SPM21

nc.N21-R1

GENERATOR SYNCHRONIZING RELAY

25, 27, 59, 81, 90

Automatic Synchronization and Synchrocheck
Fast proportional Voltage and Frequency regulation
Phase displacement checking with circuit breaker's closing time control
Antimotoring
Kicker pulse
Event Recording
Modbus Communication Protocol
UL / CSA listed



The SPM21 numerical synchronising relay measures voltage and frequency of two inputs; the voltage, frequency and phase angle of the Generator input (G) are individually compared with those of the Bus input (B) considered as reference. The relay includes the following programmable functions:

Synchronising of the generator with the reference bus

- Normal/Dead Bus operation modes
- Adjustable Operate time delay
- Adjustable Max Voltage difference
- Automatic Adjusting of phase angle for circuit breaker close
- Adjustable Max Frequency difference
- Adjustable Increase/Decrease pulses to speed regulator
- Adjustable Max Phase displacement
- Adjustable Increase/Decrease pulses to voltage regulator
- Adjustable Min/Max Bus voltage for synchronising operation
- Antimotoring control
- Adjustable Min/Max Bus frequency for synchronising operation
- Kicker pulse control on steady phase displacement
- Fast synchronisation with control pulses proportional to speed and voltage difference
- 3 Digital Inputs optically isolated 2kV

Real Time Measurements = UG - UB - HzG - HzB - U - f -

Programmable Input Quantities

Fn = System frequency : (50 - 60)Hz
Un = Rated input voltage : (100 - 125)V, step 1V

Digital Inputs

- **SX** (Terminals 1-2) : status of CB (closed when 1-2 shorted)
- **BR** (Terminals 1-3) : operation lockout of relays R2,R3,R4,R5
- **BX** (Terminals 1-14) : operation lockout of relay R1

Main Setting Variable

U< = Minimum Bus operational voltage level	: (15 - 120)%Un, step 1%
U> = Max Bus operational voltage level	: (20 - 150)%Un, step 1%
f< = Minimum Bus operational frequency level	: (45 - 60)Hz, step 0.1Hz
f> = Max Bus operational frequency level	: (50 - 65 / Dis)Hz, step 0.1Hz
DB = Dead Bus operation mode	: (ON / OFF)
U = Generator/Bus Max voltage difference	: (1 - 20)%U _B , step 1%
f = Generator/Bus Max frequency difference	: (0.05 - 0.60)Hz, step 0.01Hz
	= Generator/Bus Max phase difference
	: (3 - 30)°, step 1°
t_s = Max operate time delay	: (0 - 60)s, step 0.01s
t_{cb} = Circuit Breaker Operate time	: (0.01-0.5-Dis)s step 0,01s
t_o = Minimum reclosing time delay	: (0 - 600)s, step 1s

Speed Regulator Control

- Tf = Period of pulses	: (0.5 - 60)s, step 0.1s
- tf< = Minimum pulse duration	: (0.1 - 30)s, step 0.1s
- tf> = Max pulse duration	: (0.1 - 30)s, step 0.1s
- tf = Duration of pulse	: = ([tf<] + [Gf] x f) [tf]
- Gf = Pulse duration gain	: = (0.0 - 9.9)s/Hz, step 0,1s/Hz

Voltage Regulator Control

- Tu = Period of pulses	: (0.5 - 60)s, step 0.1s
- tu< = Minimum pulse duration	: (0.1 - 60)s, step 0.1s
- tu> = Max pulse duration	: (0.1 - 60)s, step 0.1s
- tu = Duration of pulse	: = ([tv<] + [Gv] x u)[tu>]
- Gv = Pulse duration gain	: = (0.0 - 9.9)s/V, step 0.1s/V

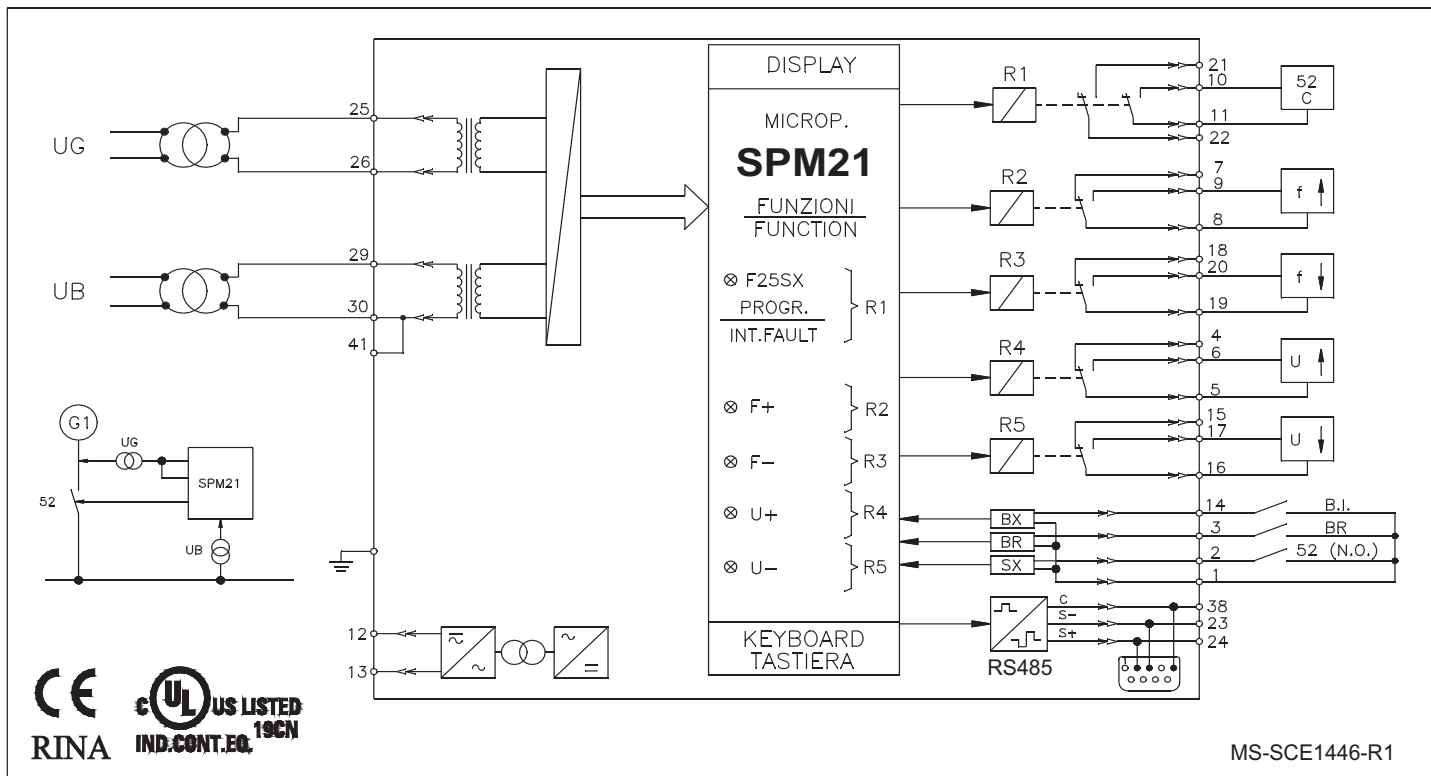
Output Relays

- R1 = Circuit breaker close control: any internal fault of SPM21 blocks operation of R1.
- R2 = Increase speed control
- R3 = Decrease speed control
- R4 = Increase voltage control
- R5 = Decrease voltage control

Digital Inputs

- SX (Terminals 1-2)	: status of CB (closed when 1-2 shorted)
- BR (Terminals 1-3)	: operation lockout of relays R2,R3,R4,R5
- BX (Terminals 1-14)	: operation lockout of relay R1

Connexion Diagram



Ordering data

Power supply

- ☐ Type 1 : 24 à 100 Vac et 24 à 125 Vdc $\pm 20\%$.
- ☐ Type 2 : 80 à 220 Vac et 90 à 250 Vdc $\pm 20\%$.

Execution

- ☐ Flush mounting
- ☐ Surface mounting
- ☐ Standard rack 19"3U

Rated input

- ☒ Un = 100 V à 125 V

Special request _____

Quantity _____



MicroEner