

# KS3 SYNCHRONIZING UNIT

## FEATURES:

**MOD  
BUS**

Password  
protection

**VT**

## INPUTS:

**AC**

## OUTPUTS:

2x

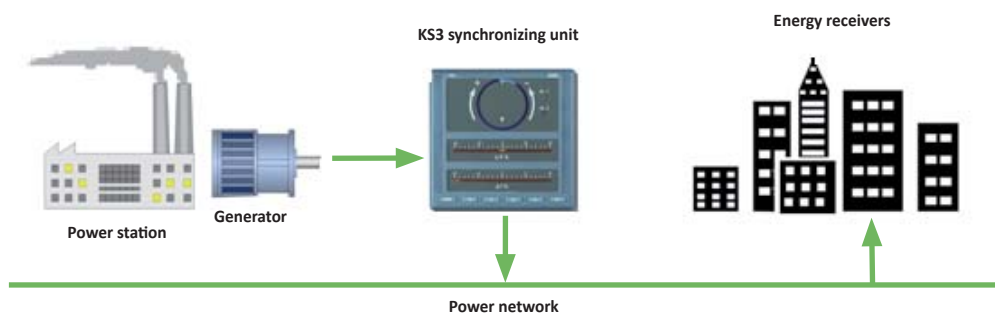
**RS  
485**

## GALVANIC ISOLATION:



- Destined to automatic synchronizing of three-phase generators connected in parallel with power networks of 50 or 60 Hz rated frequency.
- Measurement through voltage transformers.
- Measurement and visualization of phase, frequency and voltage differences.
- Signaling of the synchronizing conditions (AI1) – programmable parameters.
- Signaling of the generator and network voltage value beyond the 80-120% rated range value (AI2).
- RS-485 interface with MODBUS protocol.
- Measurement of minimum and maximum voltage and frequency values.

## EXAMPLE OF APPLICATION



## MEASURED PARAMETERS AND ADMISSIBLE ERRORS

Measured value	Range	Basic error	Remarks
Voltage $U_i^*$	100.0 V (Ku=1) 110.0 V (Ku=1) 240.0 V (Ku=1) 400.0 V (Ku=1)	$\pm (0.2\% \text{ m.v} + 0.1\% \text{ range})$	Ku=1...4000 (max. 400 kV)
Frequency $f^*$	15.0...500.0 Hz	$\pm (0.5\% \text{ m.v} + 2c)$	
Voltage difference	-20...0...20%	KS3.1: $\pm (0.5\% \text{ m.v.} + 2c)$ KS3.2: $\pm (0.5\% \text{ range} + 1 \text{ segment})$	KS3.2: resolution 0.6%
Frequency difference	-10...0...10%	KS3.1: $\pm (0.5\% \text{ m.v} + 2c)$ KS3.2: $\pm (0.2\% \text{ range} + 1 \text{ segment})$	KS3.2: resolution 0.3%
Phase shift	0..360°	$\pm 1^\circ$	in KS3.2: resolution 5° for the circle, $\pm 2$ for zero indication $357 < \varphi < 3$

in KS3.2, the value monitoring is available through the interface. Ku - voltage transformer ratio, m.v.-measured value, range-measured range, C - the less significant display digit

## OUTPUTS

Output type	Properties
Relay	• Voltageless NO contacts, load capacity: 0.5 A a.c./250 V a.c.

## DIGITAL INTERFACE

Interface type	Transmission protocols	Mode	Baud rate
RS-485	MODBUS RTU and ASCII	8N2, 8E1, 8O1, 8N1, 7E1, 7O2	4,8; 9,6; 19,2 kbit/s

## EXTERNAL FEATURES

Readout field	KS3.1: 4 x 5 LED digits, 14 mm, red colour	KS3.2: synchroscope: circle with 72 diodes; voltmeter and differential frequency meter: bargraph with zero in the middle (68 diodes)
Overall dimensions	144 x 144 x 77 mm	Panel cut-out : $138^{+0.5} \times 138^{+0.5}$ mm
Weight	0.8 kg	with packing
Protection grade	from frontal side: IP40	from terminal side: IP10

Export department:  
English: +48 68 32 95  
302 / 321 / 276 / 386 / 233  
German: +48 68 32 95 305  
French: +48 68 32 95 304  
Russian: +48 68 32 95 321  
Fax: +48 68 32 54 091  
e-mail: export@lumel.com.pl

LUMEL S.A.  
ul. Sulechowska 1  
65-022 Zielona Góra  
POLAND  
[WWW.LUMEL.COM.PL](http://WWW.LUMEL.COM.PL)

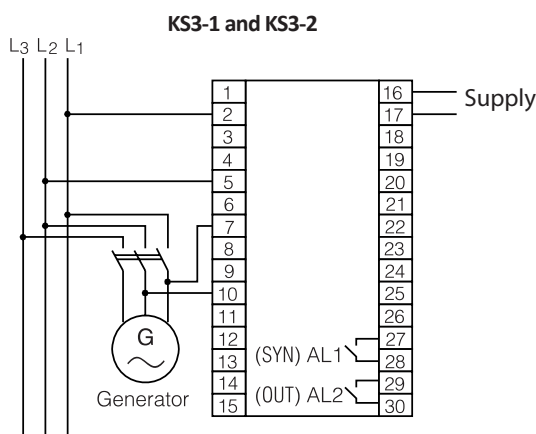
## RATED OPERATING CONDITIONS

Supply voltage	18...30 V d.c./a.c. 40...400 Hz	85...250 V d.c./a.c. 40...400 Hz
Input power	Supply circuit : ≤12 VA	Voltage circuit: ≤0.5 VA
Input signal	• 0...0.1...1.2 Un for voltage and frequency	• frequency 15...45...65...500 Hz; • sinusoidalny (THD ≤ 8%)
Temperature	ambient : 0...23...55°C	
Relative humidity	25...95%	inadmissible condensation
Operating position	any	
External magnetic field	0...40...400 A/m	
Short duration overload (5 sec)	2 Un (max. 1000 V)	
Admissible voltage peak factor	2	

## SAFETY AND COMPABILITY REQUIREMENTS

Electromagnetic compatibility	noise immunity	acc. to EN 61000-6-2
	noise emissions	acc. to EN 61000-6-4
Isolation ensured by the casing	double	acc. to EN 61010-1
Isolation between circuits	basic	
Polution level	2	
Installation category	III	
Maximum phase-to-earth operating voltage	600 V a.c.	
Altitude above sea level	< 2000 m	

## CONNECTIONS DIAGRAMS



## TYPES OF VERSIONS



**KS3-1 type**  
Synchronizing unit  
with digital indications



**KS3-2 type**  
Synchronizing unit with bargraph

## ORDERING

	KS3	X	XX	X	X	XX	X
<b>Kind of display:</b>							
LED digits		1					
bargraphs (diode lines)		2					
<b>Input voltages:</b>							
100 V			01				
110 V			02				
240 V			03				
400 V			04				
<b>Digital output:</b>							
without interface						0	
with RS-485 interface						1	
<b>Supply voltage:</b>							
85 ... 250 V d.c./a.c.							0
24 V d.c./a.c.							1
<b>Version:</b>							
standard							00
custom-made							xx
<b>Acceptance tests:</b>							
without additional quality requirements							8
with an extra inspection quality certificate							7
acc.to customer's request*							x

\* - only after agreeing with the manufacturer

### Order example 1:

The code: **KS3 - 1.04.1.0.00.8** means:

- KS3** - synchronizing unit of KS3 type
- 1** - with digital displays
- 04** - input voltage 400 V
- 1** - digital output with RS-485 interface
- 0** - supply voltage : 85...250 V d.c./a.c.
- 00** - standard version
- 8** - without additional quality requirements

### Order example 2:

The code: **KS3 - 2.04.1.0.00.8** means:

- KS3** - synchronizing unit of KS3 type
- 2** - with diode lines
- 04** - input voltage 400 V
- 1** - digital output with interface RS-485
- 0** - supply voltage 85...250 V d.c./a.c.
- 00** - standard version
- 1** - without additional quality requirements

SEE ALSO:



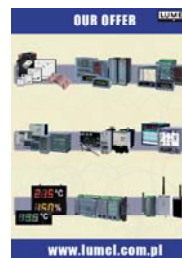
P43 - 3 - phase transistor of power network parameters



ND20 - meter of power network parameters



ND1 - analyser of power network parameters



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**e-mail:** export@lumel.com.pl

LUMEL S.A.  
 ul. Sulechowska 1  
 65-022 Zielona Góra  
 POLAND

[WWW.LUMEL.COM.PL](http://WWW.LUMEL.COM.PL)