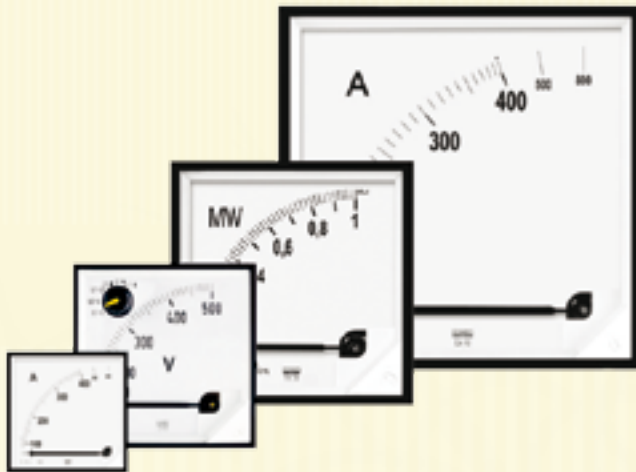




ANALOG METERS SHUNTS CURRENT TRANSFORMERS



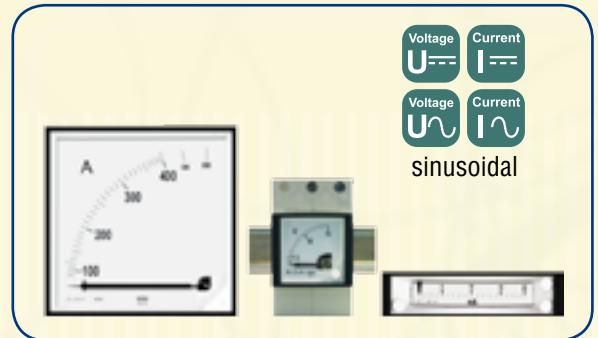
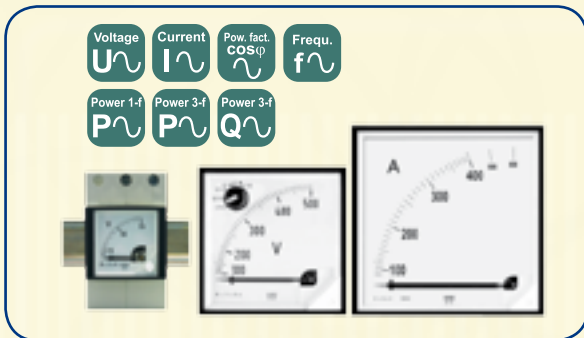
Application:

- industrial supply systems
- power engineering (switching stations, generators, turbines)
- heat engineering (thermal-electric power stations, boiler rooms)
- shipyard industry (supply systems on ships)
- mimic panels (visualization of physical quantities converted into an analog signal)

Moving-iron measuring elements

IP65!

Moving-coil measuring elements



Power network
Current transformers
Voltage transformers



Shunts
Transducers
Recorders
PLC controllers



Selected features:

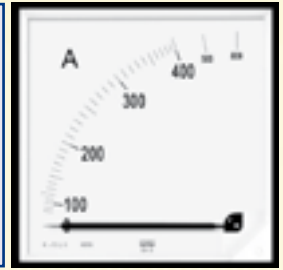
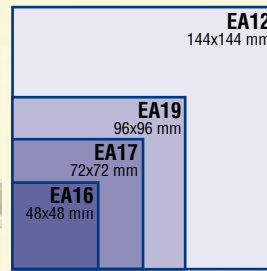
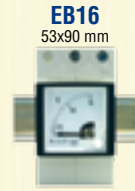
- **protection grade IP65 (optional)** – dustproof and waterproof front frame ensuring the meter reliability and safety of service in rugged operation conditions
- **direct and indirect measurements** – co-operation with current and voltage transformers, and shunts
- **overload scales** – extension of ammeter indication ranges (twice or six-times) and voltmeters
- **interchangeable scales** – simple change of indication ranges in meters for indirect measurements
- **extra red pointer** – possible setting on the scale in any position, makes it easier to read measuring results (optional)
- **red division on the scale** – makes it easier to read measuring results (optional)
- **memory of maximal value** – the “memory” pointer remains in maximal position and enables the readout of the maximal load current without a continuous meter observation, possible return of the pointer to the value 0 (BA and BE meters)
- **various working positions** – meters are calibrated considering individual working position (optional)
- **front window material** – glass

A.C. Ammeters and A.C. Voltmeters EA16, EA17, EA19, EA12, EB16



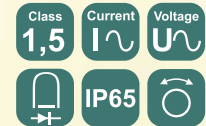
Moving-iron meters

- measurement of a.c. current or a.c. voltage rms value
- direct or indirect measurement (through current or voltage transformers)
- interchangeable scales (EA16, EA17, EA19)
- mounting in a panel (EA) or on a DIN rail (EB16)
- ammeters with twice or six-times overload



Type	EB16	EA16	EA17	EA19	EA12
Measuring ranges					
- current:		100 mA ... 25 A xA/5 A; xA/1 A		100 mA ... 100 A xA/5 A; xA/1A	
(on request, with twice or six-times overload)					
- voltage:		6 V ... 600 V xV/100 V; xV/110 V		6 V ... 1000 V xV/100 V; xV/110 V	
Frequency of measured value		40...45...65...72 Hz			
Protection grade ensured by:					
- casing	IP52		IP50 (optionally IP65)		IP50 (optionally IP54)
- terminals	IP20		IP20		IP20
Climate versions:		normal or tropical		normal, tropical or similar to marine	

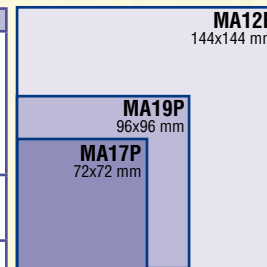
A.C. Ammeters and A.C. Voltmeters MA17P, MA19P, MA12P



Moving-coil meters with rectifiers

- measurement of current or voltage rms values (sinusoidal signals)
- interchangeable scales (MA17P, MA19P)

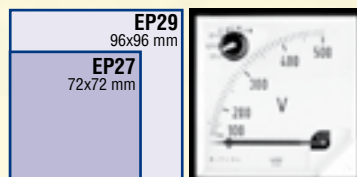
Type	MA17P	MA19P	MA12P
Direct measuring ranges:			
- current:	400 µA...1 A (30...1000...10 000 Hz) 1 A...6 A (49...50...51 Hz)		400 µA...1 A (30...1000...10 000 Hz)
- voltage:	60 mV...1,5 V (49...50...51 Hz) 2,5 V...600 V (30...1000...10 000 Hz)		2,5 V...600 V (30...1000...10 000 Hz)
Protection grade ensuring by:			
- casing	IP50 (optionally IP65)		IP50 (optionally IP54)
- terminals	IP20		IP20
Climate versions:		normal, tropical or similar to marine	



A.C. Voltmeters EP27, EP29

Moving-iron meters with a change-over switch

- measurement of a.c. voltage rms values in six various points of a 3-phase, 4-wire power network
- built-in phase switch
- direct or indirect measurement

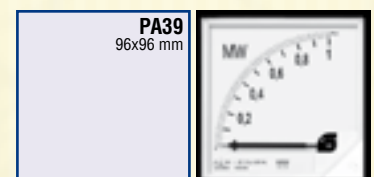
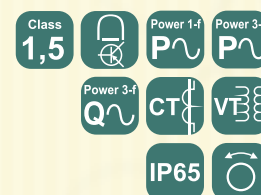


Type	EP27	EP29
Voltage measuring ranges:		
- direct phase-to-phase:		500 V
- trough a transformer:		xV/100 V; xV/110 V
Frequency of measured value		40...45...65...72 Hz
Protection grade ensured through:		
- casing		IP50
- terminals		IP20
Climate versions:		normal, tropical or similar to marine

Power Meters PA39

Moving-iron meters with transducer

- measurement of active power (1-phase, 3-phase) or reactive (3-phase)
- direct, semi-indirect or indirect measurement
- zero on the left side or in the middle of scale (unidirectional or bidirectional measurement of the power flow)



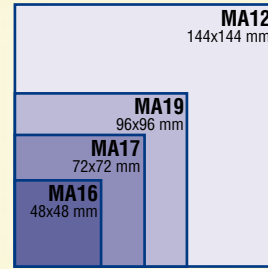
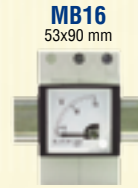
Type	PA39
Power measuring ranges::	50 W...1000 MW or 50 var...1000 Mvar acc. to the table 3
Frequency of measured value	50 Hz, 60 Hz or 400 Hz
Protection grade ensured through:	
- casing	IP50 (optionally IP65)
- terminals	IP20
Climate versions:	normal, tropical or similar to marine

D.C. Ammeters and D.C. Voltmeters MA16, MA17, MA19, MA12, MB16



Moving-coil meters

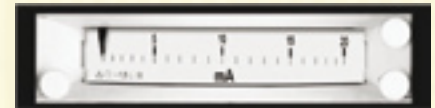
- measurement of d.c. current and d.c. voltage or other physical quantities converted into a d.c. current signal
- direct or indirect measurement (through a shunt)
- zero at the side or in the middle of the scale
- interchangeable scales (MA16, MA17, MA19)
- mounting in a panel or on a DIN rail (MB16)
- optionally, a scale different than the measuring range



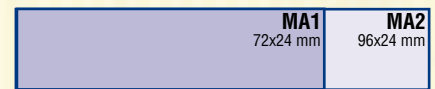
Type	MB16	MA16	MA17	MA19	MA12
Measuring ranges:					
- current:					
· direct measurement		40 μ A...25 A		100 μ A...25 A	
· indirect measurement (through a shunt)		1 A...15 kA		1 A...15 kA	
- voltage:					
· direct measurement		60 mV...1000 V		60 mV...1000 V	
Protection grade ensured through:					
- casing	IP52		IP50 (optionally IP65)		IP50 (optionally IP54)
- terminals	IP20		IP20		IP20
Climate versions:	normal or tropical		normal, tropical or similar to marine		
Rated operational conditions:					
- ambient temperature			5...23...55°C		
- relative air humidity			25...85%		

Slim Edgewise Moving-coil Ammeters and Voltmeters MA1, MA2

Moving-coil meters



Moving-coil meters with rectifiers



- measurement of d.c. current or d.c. voltage or other physical quantities converted into a d.c. current signal (moving-coil element)
- measurement of rms a.c. current or voltage for sinusoidal signals (moving-coil element with a rectifier)
- direct and indirect measurement (through a shunt)
- mounting in a panel
- optionally, a scale different than the measuring range

Type	MA1	MA2
Measuring ranges:		
- d.c. current:		
· direct	60 μ A...4 A	
· indirect through a shunt	1 A...15 kA	
- d.c. voltage:		
· direct	60 mV...600 V	
- a.c. current:		
· direct	250 μ A...600 mA (30...1000...10 000 Hz)	
- a.c. voltage:		
· direct	2,5 V...600 V (30...1000...10 000 Hz)	
Protection grade ensured through:		
- casing	IP40	
- terminals	IP00	
Climate versions:	normal or tropical	



- Moving-iron element



- Moving-coil element



- Moving-coil element with built-in rectifier



- Moving-coil element with built-in measurement transducer



- Bimetallic element



- Bimetallic and moving-coil elements



- Protection grade ensured by casing



- Accuracy class



- Measurement of a.c. voltage



- Measurement of a.c. current



- Indirect measurement through current transformers



- Indirect measurement through voltage transformers



- Indirect measurement through shunts



- Zero adjuster



- Measurement of d.c. voltage



- Measurement of d.c. current



- Measurement of 1-phase active power



- Measurement of 3-phase active power



- Measurement of 3-phase reactive power



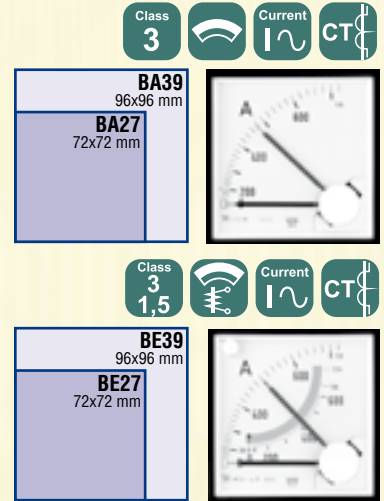
- Measurement of power factor $\cos\phi$



- Measurement of voltage frequency in power networks

Max demand Ammeters - Bimetalic BA27, BA39 - Bimetalic and Moving-iron BE27, BE39

- measurement of the mean load current value during 8 or 15 minutes
- application for load measurements of power lines, generators, electrical motors, etc.
- memory of maximal values thanks to the red pointer, which remains in the maximal position
- possible „memory erasing”
- measurement of the current actual value (second measuring element in BE27 and BE39)
- direct or indirect measurement (through current transformers)

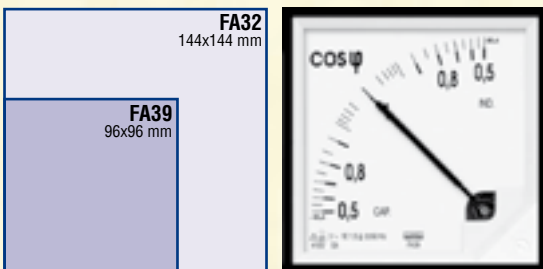


Type	BA27	BA39	BE27	BE39
Measuring ranges of current: - bimetalic element: - direct measurement - indirect measurement (through transformers) - moving-iron element: - direct measurement - indirect measurement (through transformers)	0...1,2 A or 0...6 A 0..1,2(x) A x/1 A or 0...1,2(x) A x/5 A		0...1,2 A or 0...6 A 1,2(x) A x/1 A or 1,2(x) A x/5 A	0...1/2 A or 0...5/10 A 0...2(x) A x/1 A or 0...2(x) A x/5 A
Protection grade ensured through: - casing - terminals			IP50 IP20	
Climate versions:	normal, tropical or similar to marine			

Power Factor Meters FA39, FA32

Moving-coil meters with a transducer

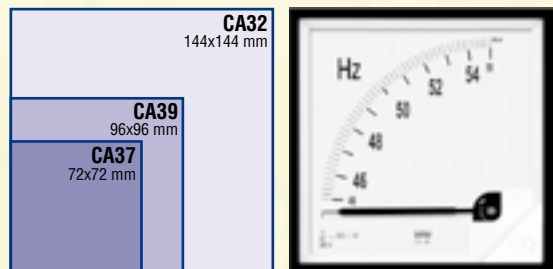
- measurement of the power factor ($\cos\phi$) in 1-phase or 3-phase power networks (balanced load)
- direct or indirect measurement (through current and voltage transformers)



Frequency Meters CA37, CA39, CA32

Moving-coil meters with a transducer

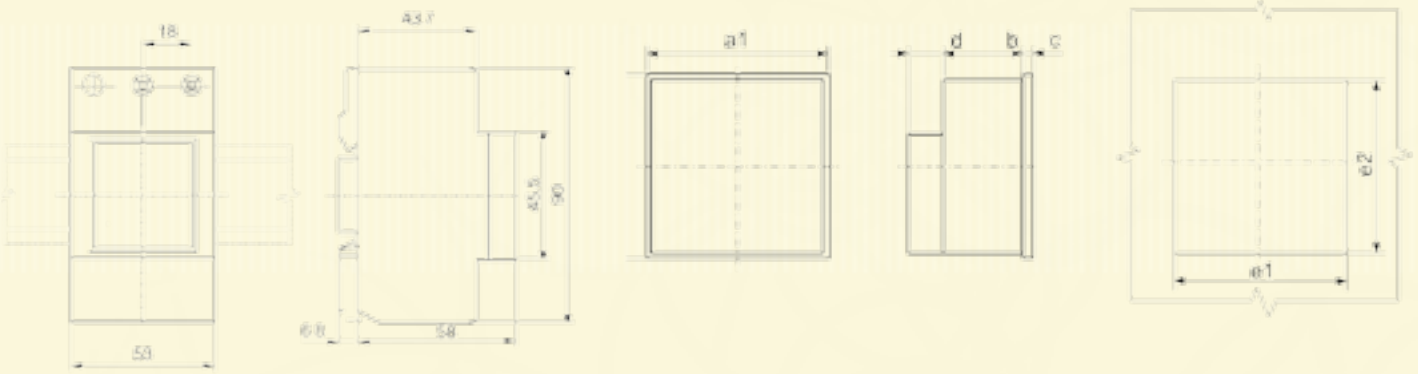
- measurement of voltage frequency in a.c. power networks
- direct or indirect measurement (through current and voltage transformers)



Type	FA39	FA32	CA37	CA39	CA32
Measuring ranges:	0.5 _{cap} ...1...0.5 _{ind.} 0.8 _{cap} ...1...0.2 _{ind.} 0.85 _{cap} ...1...0.85 _{ind.} 0 _{ind.} ...1		Class 0.5: 45...55 Hz; 45...65 Hz; 55...65 Hz; 360...440 Hz; Class 0.2: 48...52 Hz; 58...62 Hz; 140...160 Hz; 180...220 Hz; 380...420 Hz		
Frequency of input quantities:	45...50...60...65 Hz		-		
Protection grade ensured through: - casing - terminals	IP50 (optionally IP65) IP20	IP50 (optionally IP54) IP20	IP50 (optionally IP65) IP20		IP50 (optionally IP54) IP20
Climate versions:	normal, tropical or similar to marine				

Additional information

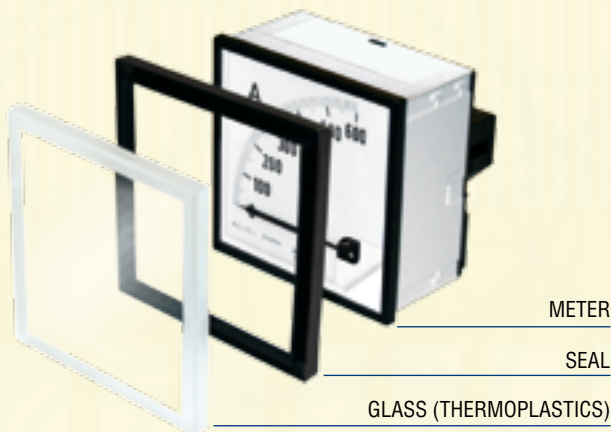
Overall dimensions and panel cut-out dimensions



Meter type	a1 (mm)	a2 (mm)	b (mm)	c (mm)	d (mm)	e1 (mm)	e2 (mm)
MA16, EA16	48	48	48	5	18	45 ^{+0,6}	45 ^{+0,6}
MA16, EA16 (IP65)	58	58	48	11	18	47,2 ^{+0,6}	47,2 ^{+0,6}
MA17, MA17P, EA17, EP27, BA27, BE27, CA37	72	72	45	5	22	68 ^{+0,7}	68 ^{+0,7}
MA17, MA17P, EA17, CA37 (IP65)	81	81	45	11	22	70,2 ^{+0,7}	70,2 ^{+0,7}
MA19, MA19P, EA19, PA39, BA39, BE39, BE39, CA39, FA39	96	96	45	5	22	92 ^{+0,8}	92 ^{+0,8}
MA19, MA19P, EA19, PA39, CA39, FA39 (IP65)	105	105	45	11	22	94,2 ^{+0,8}	94,2 ^{+0,8}
MA12, MA12P, EA12, FA32	144	144	48	6	22	138 ^{+1,0}	138 ^{+1,0}
MA1	72	24	84	5	91	68 ^{+0,7}	68 ^{+0,7}
MA2	96	23	110	5	91	92 ^{+0,8}	92 ^{+0,8}

¹⁾ MA1 and MA2 meters do not have terminals covers

IP65 frame



Meter working positions

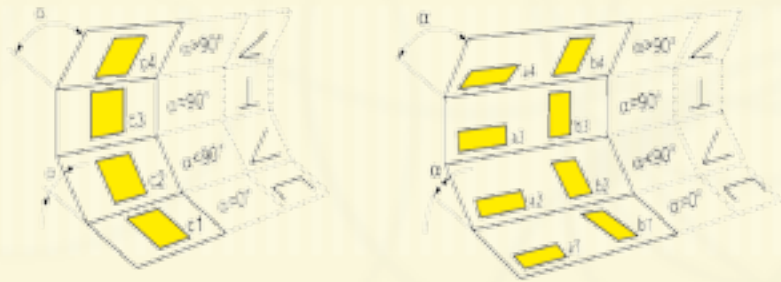


Table 1

Work position	Code			
	EB16	MB16	MA16 EA16	other meters
c3, $\alpha = 90^\circ$	A	A	A	O
c1, $\alpha = 0^\circ$		B	B	A
c2, $\alpha = 15^\circ$			C	B
c2, $\alpha = 30^\circ$			D	C
c2, $\alpha = 45^\circ$			E	D
c2, $\alpha = 60^\circ$			F	E
c2, $\alpha = 75^\circ$			G	F
c4, $\alpha = 105^\circ$			H	H
c4, $\alpha = 120^\circ$			I	I

Table 2

Work position	Code
	MA1 MA2
a3, $\alpha = 90^\circ$	O
a1, $\alpha = 0^\circ$	A
a2, $\alpha = 15^\circ$	B
a2, $\alpha = 30^\circ$	C
a2, $\alpha = 45^\circ$	D
a2, $\alpha = 60^\circ$	E
a2, $\alpha = 75^\circ$	F
b1, $\alpha = 0^\circ$	K
b2, $\alpha = 15^\circ$	L
b2, $\alpha = 30^\circ$	M
b2, $\alpha = 45^\circ$	N
b2, $\alpha = 60^\circ$	U
b2, $\alpha = 75^\circ$	P
b2, $\alpha = 90^\circ$	R

Extra options

Extra options	All meters	EA16	EA17 EA19	EA12	MA16	MA17 MA19	MA12	EB16 MB16	MA1 MA2	CA37 CA39 FA39 PA39	CA32 FA32	BA27 BA39 BE27 BE39	EP27 EP29
scale different than the measuring range ²⁾	•												
working position and angle different than 90° ²⁾	•												
red mark on the scale	•												
scale and/or digits in color ²⁾	•												
double scale ²⁾	•												
non-standard measuring range ²⁾	•												
interchangeable scales (in meters for transformers and shunts)		•	•		•	•							
overload version x2 (in amperes)		•	•										
overload version x6 (in amperes) ²⁾		•	•	•									
scale on a black background, descriptions and pointer in white ²⁾		•	•	•	•	•	•						
external backlight - scale on a black background, yellow descriptions and pointer ²⁾			•			•							
extra red pointer			•			•							
protection grade IP54				•			•				•		
protection grade IP65		•	•		•	•				•	•		
version similar to marine			•	•		•	•			•	•		•
tropical version		•	•	•	•	•	•	•		•	•	•	•

²⁾ after agreeing with the manufacturer

How to order

D.C. Ammeters and D.C. Voltmeters EA and EB

D.C. and A.C. Ammeters and Voltmeters MA and MB

Please, specify in the order:

- name and meter type
- measuring range
- overload value – only for current ranges
- parameters of measuring transformers – if the meter is foreseen to co-operate with transformers
- working position
- meter climate version - only for tropical versions or similar to marine
- extra requirements if necessary

Ordering example: voltmeter of EA17 type, 500 V range, direct measurement, vertical 90° working position, scale consistent to the range, without extra requirements.

A.C. Voltmeters EP

Please, specify in the order:

- name and meter type
- measuring range
- parameters of measuring transformers – if the meter is foreseen to co-operate with transformers
- working position
- meter climate version - only for tropical versions or similar to marine
- extra requirements if necessary

Ordering example: voltmeter of EP27 type, 500 V range, direct measurement, vertical 90° working position, scale according to the range, without extra requirements.

Please, specify in the order:

- name and meter type
- measuring range
- parameters of the shunt – if the meter is foreseen to co-operate with an interchangeable shunt
- working position
- meter climate version - only for tropical versions or similar to marine
- extra requirements if necessary

One must order the shunt separately.

When ordering meters for a.c. current or voltage, add „with rectifier” to the meter name.

Ordering example: ammeter of MA16 type, 40 A range, to co-operate with shunt of B2 40 A/60 mV type, vertical 90° working position, scale consistent to the range, without extra requirements. If the shunt has to be delivered with the meter, one must place it in the order as a separate item, e.g. shunt B2 40 A/60 mV.

DEFAULT PARAMETERS

- climate version: normal
- protection grade: IP50 (IP52 for EB16/MB16, IP40 for MA1/MA2)
- working position: 90°
- scale according to the measuring range
- without an inspection certificate and extra requirements

Power meters PA39

Table 3

PANEL POWER METER PA39									
PA39 -	X	X	X	X	X	X	XX	X	
Kind of measured power and measuring element:									
measurement of active power in 1-phase network	A								
measurement of active power in a 3-phase network, 3-wire balanced network	B								
measurement of active power in a 3-phase network, 3-wire unbalanced network	C								
measurement of active power in a 3-phase network, 4-wire balanced network	D								
measurement of active power in a 3-phase network, 4-wire unbalanced network	E								
measurement of reactive power in a 3-phase network, 3-wire balanced network	F								
measurement of reactive power in a 3-phase network, 3-wire unbalanced network	G								
measurement of reactive power in a 3-phase network, 4-wire balanced network	H								
measurement of reactive power in a 3-phase network, 4-wire unbalanced network	K								
Input voltage:									
write in the range code Un from the table 3	X								
Frequency of the input voltage:									
50 Hz								0	
60 Hz								1	
400 Hz								2	
Input current:									
write in the range code In from the table 3	X								
Power flow direction:									
unidirectional, zero on the left side of the scale									0
bidirectional, zero in the middle side of the scale									1
Working position:									
write in the position code from the table 1	X								
Version code:									
standard									00
custom-made									XX
Acceptance tests:									
without extra requirements									8
with an extra quality inspection certificate									7
other requirements									X

In/x	IN Code	Power unit	Un Code																			
			T	U	A	V	W	B	C	D	E	F	G	H	I	K	L	M	N	P	R	S
1	— A1	W	50	100	200	250	400	400	600	800	1.2	5	10	15	25	30	50	80	100	200	400	800
5, 5/x	B5 B1	W	250	500	1	1.2	2	2	3	4	6	25	50	60	120	150	250	400	500	1	2	4
10/x	C5 C1	W	500	1	2	2.5	4	4	6	8	12	50	100	150	250	300	500	800	1	2	4	8
15/x	D5 D1	W	800	1.5	3	4	6	8	10	12	15	80	150	250	400	500	800	1.2	1.5	2.5	5	12
20/x	E5 E1	W	1.2	2	4	6	8	8	12	15	20	100	200	300	500	600	1	1.5	2	4	8	15
30/x	F5 F1	W	1.5	3	6	8	12	12	20	25	30	150	300	500	800	1	1.5	2	3	5	10	20
50/x	G5 G1	W	20	30	40	50	250	500	800	1.2	1.5	2.5	4	5	8	10	20	40	80	150	200	400
75/x	H5 H1	W	30	50	60	80	400	800	1.2	2	2.5	4	5	8	15	25	50	100	200	400	800	
100/x	I5 I1	W	40	60	80	100	500	1	1.5	2.5	3	5	8	10	20	40	80	150	200	400	800	
150/x	J5 J1	W	60	100	120	150	800	1.5	2.5	4	5	8	12	15	25	50	100	200	400	800	1500	
200/x	K5 K1	W	80	120	150	200	1	2	3	5	6	10	15	20	40	80	150	200	400	800	1500	
300/x	L5 L1	W	120	200	250	300	1.5	3	5	8	10	15	20	30	40	80	150	200	400	800	1500	
400/x	M5 M1	W	150	250	300	400	2	4	6	10	12	20	30	40	80	150	200	400	800	1500	3000	
600/x	N5 N1	W	200	400	500	600	3	6	10	15	20	30	40	60	100	200	400	800	1500	3000	6000	
800/x	P5 P1	W	300	500	600	800	4	8	12	20	25	40	60	80	150	200	400	800	1500	3000	6000	
1000/x	R5 R1	W	400	600	800	1	5	10	15	25	30	50	80	100	200	400	800	1500	3000	6000	10000	
1200/x	S5 S1	W	500	800	1	1.2	6	12	20	30	40	60	100	120	250	500	1000	1500	3000	6000	10000	
1500/x	T5 T1	W	600	1	1.2	1.5	8	15	25	40	50	80	120	150	300	600	1000	1500	3000	6000	10000	
2000/x	U5 U1	W	800	1.2	1.5	2	10	20	30	50	60	100	150	200	400	800	1500	3000	6000	10000	20000	
3000/x	V5 V1	W	1.2	2	2.5	3	15	30	50	80	100	150	200	300	600	1000	1500	3000	6000	10000	20000	
4000/x	W5 W1	W	1.5	2.5	3	20	20	40	60	100	120	200	300	400	800	1500	3000	6000	10000	20000	40000	
6000/x	X5 X1	W	2	4	5	6	30	60	100	150	200	300	400	600	1000	1500	3000	6000	10000	20000	40000	
10000/x	Y5 Y1	W	4	6	8	10	50	100	150	250	300	500	800	1000	1500	3000	6000	10000	20000	40000	80000	
20000/x	Z5 Z1	W	8	12	15	20	100	200	300	500	600	1000	1500	3000	6000	10000	20000	40000	80000	100000	200000	

Ordering Example:

The code PA39-H-F-0-L5-0-0-00-8 means: a varmeter operating in a 3-phase 4-wire balanced network, frequency 50 Hz, co-operating with external transformers: voltage 3000/100/√3V, current: 300/5 A, unidirectional measurement, working position C3 (90°), standard version, without extra requirements.

Notes: the power range results from the given rated values of current and voltage transformers, acc. to the table 3 (e.g. for the given example, the power range is 1,5 Mvar).

How to order

Max demand ammeters BA and BE

Table 4

BIMETALLIC METERS BA27, BE27, BA39, BE39							
BA27, BE27, BA39, BE39 - X X XXXX X X X X							
Version:							
standard, to fix in a panel	1						
direct fixing on the transformer (only BA27)	2						
custom-made version ¹⁾	X						
Climatic categories:							
standard version		N					
tropical version		T					
custom-made version ²⁾	X						
Ranges:							
acc. to the table 4 (write the code, e.g.: F205)			XXXX				
Setting time of the bimetallic element:							
15 minutes				0			
8 minutes				2			
Working position:							
acc. to the table 1						X	
Signs on the dial and markings:							
dial with a standard scale (consistent to the range)					0		
dial with the scale in %					1		
dial execution acc. to the order ³⁾						X	
Acceptance tests:							
without extra requirements							8
with an extra quality inspection certificate							7
other requirements ³⁾							X

- 1) - the code number is established by the manufacturer
 2), 3) - all extra requirements must be agreed with the manufacturer

Ordering examples:

- The code: **BE39 1-N-F205-0-0-0-8** means: a meter with two measuring elements - bimetallic and moving-iron, to fix in a panel, in moderate climatic conditions, range: 6 A, setting time: 15 minutes, without extra requirements.
- The code: **BA27 2-N-F205-0-0-0-8** means: a meter with a bimetallic measuring element, to fix on a transformer, in moderate climatic conditions, range: 6 A, setting time 15 minutes, without extra requirements.

Code range	Range description (measuring range)	Code range	Range description (measuring range)
F201	1,2 A	F366	1920 A 1,6k/1
F205	6 A	F4	1,2 XA X/5
F3	1,2X A X/1	F405	6 A 5/5
F301	1,2 A 1/1	F406	7,2 A 6/5
F305	6 A 5/1	F407	12 A 10/5
F306	7,2 A 6/1	F408	18 A 15/5
F307	12 A 10/1	F409	24 A 20/5
F308	18 A 15/1	F411	36 A 30/5
F309	24 A 20/1	F412	48 A 40/5
F311	36 A 30/1	F413	60 A 50/5
F312	48 A 40/ 1	F414	72 A 60/5
F313	60 A 50/1	F415	96 A 80/5
F314	72 A 60/1	F416	120 A 100/5
F315	96 A 80/1	F417	180 A 150/5
F316	120 A 100/1	F418	240 A 200/5
F317	180 A 150/1	F420	360 A 300/5
F318	240 A 200/1	F421	480 A 400/5
F320	360 A 300/1	F422	600 A 500/5
F321	480 A 400/1	F423	720 A 600/5
F322	600 A 500/1	F424	960 A 800/5
F323	720 A 600/1	F450	1200 A 1k/5
F324	960 A 800/1	F451	1800 A 1,5k/5
F350	1200 A 1k/1	F452	2400 A 2k/5
F351	1800 A 1,5k/1	F454	3600 A 3k/5
F352	2400 A 2k/1	F455	4800 A 4k/5
F354	3600 A 3k/1	F456	6000 A 5k/5
F355	4800 A 4k/1	F457	7200 A 6k/5
F356	6000 A 5k/1	F459	12000 A 10k/5
F357	7200 A 6k/1	F465	1440 A 1,2k/5
F359	12000 A 10k/1	F466	1920 A 1,6k/5
F365	1440 A 1,2k/1		

Power factor meters FA

PANEL POWER FACTOR METERS FA39 AND FA32							
FA39 AND FA32 - X X X XX X XX X							
Measurement of power factor in:							
1-phase system	1						
3-phase system, in a 3-phase balanced network	3						
Measuring range:							
0.5 cap ...1...0.5 ind			A				
0.8 cap ...1...0.2 ind			B				
0.85 cap ...1...0.85 ind			C				
0 _{cap} ...1			D				
Input current:							
1 A				1			
5 A				5			
Input voltage:							
60 V (only for measurement in a 1-phase system)					01		
100 V					02		
110 V					03		
230 V					04		
400 V					05		
415 V (only for measurement in a 3-phase system)					06		
440 V (only for measurement in a 3-phase system)					07		
500 V (only for measurement in a 3-phase system)					08		
on request - after agreeing with the manufacturer					XX		
Working position:							
acc. to the table 1						X	
Version:							
standard							00
custom-made ¹⁾							XX
Acceptance tests:							
without extra requirements							8
with an extra quality inspection certificate							7
other requirements ²⁾							X

- 1) - the code number is established by the manufacturer
 2) - all extra requirements must be agreed with the manufacturer

Ordering examples:

The code: **FA39-1-A-5-04-0-00-8** means: a power factor meter for measurements in a 1-phase network, measuring range: 0.5_{cap} ...1...0.5_{ind}, input current: 5 A, input voltage: 230 V, working position C3 (vertical), standard version without extra requirements.

Frequency meters CA

PANEL FREQUENCY METERS CA32, CA37, CA39							
CA32, CA37, CA39 - X X X XX X							
Frequency range:							
45...55 Hz						1	
45...65 Hz						2	
48...52 Hz						3	
55...65 Hz						4	
58...62 Hz						5	
140...160 Hz						6	
180...220 Hz						7	
360...440 Hz						8	
380...420 Hz						9	
Rated voltage:							
60 V							1
100 V							2
110 V							3
230 V							4
400 V							5
415 V							6
440 V							7
500 V							8
690 V							9
Working position:							
acc. to the table 1							X
Version:							
standard							00
custom-made ¹⁾							XX
Acceptance tests:							
without extra requirements							8
with an extra quality inspection certificate							7
other requirements ²⁾							X

- 1) - the code number is established by the manufacturer
 2) - all extra requirements must be agreed with the manufacturer

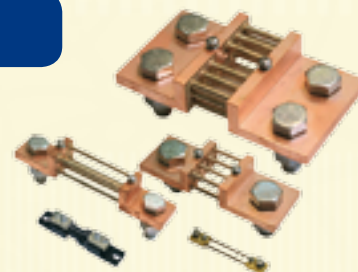
Ordering examples:

The code: **CA37-1-4-0-00-8** means: a frequency meter in a 72 x 72 mm casing, frequency range: 45...55 Hz, input voltage: 230 V, working position C3 (vertical), standard version, without extra requirements.

Shunts B2, B3, B4, B5, B6

Class
0,5

- they are destined to extend measuring ranges of d.c ammeters
- all shunts from 1 A to 25 A are fixed on insulating basis with the possibility to be mounted on a DIN rail
- shunts of other ranges are fixed directly on the DC rail or cable
- dimensions acc. to DIN 43703
- shunts are available on request:
 - shunts B2, B4 and B5 from 40 A to 150 A ranges, on a insulating basis
 - non-standard measuring ranges.



How to order

Please, specify in the order:

- name and type of the shunt
- rated voltage drop
- rated current
- climate version -only for tropical version

Ordering example: shunt B2 60 mV; 2.5 A.

Type	B2	B3	B4	B5	B6
Voltage drop	60 mV	150 mV	50 mV	75 mV	100 mV
Rated current	1 A...15 kA (1; 1.5; 2.5; 4; 6 and their decimal multiples)				

Current transformers ASR, ASK, KBU, WSK, SWMU

- ASR** - tube current transformers (for conductor or bar)
- ASK** - plug-in current transformers
- KBU** - split core current transformers
- WSK** - wound current transformers
- SWMU** - current transformers with a transducer



Class
1
OR
Class
0,5

Type	ASR 20.3	ASK 41.4	ASK 51.4	ASK 561.4	ASK 81.4	ASK 103.3	ASK 123.3	ASK 127.6	KBU 23	KBU 58	KBU 812
Primary current (A)	50...300	50...1000	100...1250	200...1250	400...2000	750...3000	750...4000	1000...6000	100...400	250...1000	250...1500
Hole diameter (mm)	21	32	44	44	55	85	100	-	-	-	-
window dimensions SZ x W (mm)	-	40 x 10 2 x 30 x 5	50 x 12 2 x 40 x 10	60 x 10 2 x 50 x 10	80 x 10 60 x 30 2 x 60 x 10	2 x 100 x 10 3 x 80 x 10	123 x 30 3 x 100 x 10	120 x 72	93 x 106	125 x 153	155 x 198

Type	WSK 30	WSK 40	WSK 40N	WSK 60	WSK 70.6N	SWMU 41.52	SWMU 41.51	SWMU 41.52	SWMU 41.51
Primary current (A)	1...20	1...30	30...50	5...60	25...100	1...10	15...800	1...5	30...800
Auxiliary voltage	-	-	-	-	-	230 V a.c. or 24 V d.c.		lack	
Continuous outputs	-	-	-	-	-	0...10 V or 2...10 V 0...20 mA or 4...20 mA		0..20 mA 0...10 V	

Measuring ranges: 5-10-15-20-25-30-40-50-60-75-100 A
and their decimal multiples

Rated secondary current: 5 A or 1 A

Accuracy class: 1 or 0.5

Frequency range: 50...60 Hz

Maximal working voltage: $U_n \leq 0.72$ kV

Safety factor:

- FS5 up to 1500 A of rated current
- FS10 from 1600 A of rated current

How to order

Please, specify in the order:

- name and type of the transformer
- rated primary and secondary current
- accuracy class
- admissible load of the secondary side (VA)

Ordering example:

transformer ASK 41.4 400/5 A; class 1; 2.5 VA

For datasheets and ordering codes
of other LUMEL's products please visit:

www.lumel.com.pl/en

or contact with our Export Department
- contact details can be found below.