



# Product Guide

K Series  
400.U.101.04

## Analog Panel Meters in thermoplastic cases with slide-in-dials

### K Series

PQ



with Moving-Coil Movement

VQ



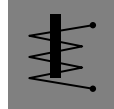
with Moving-Coil Rectifier  
Movement

LSP  
LSG



with Moving-Coil /  
Moving-Coil Rectifier  
Movement 240°- Dial

EQ



with Moving-Iron Movement

ZQ  
LSZ



Pointer-Type Frequency Meters

BIQ  
BIEQ



Maximum Demand Indicators with  
Bimetallic /  
Bimetallic-Moving Iron Movements

CQ  
LSC



Power Factor Meters  
electronic circuit integrated

LQ  
LSL



Watt and VAR Meters  
electronic circuit integrated





## General Data

### Analog Panel Meters in thermoplastic cases with slide-in-dials

#### Application

for standard applications in switchboard, generating set and control panel production

<b>for mounting in</b>	switchboards machine tools mosaic grid panels
<b>for measuring</b>	DC current or DC voltage, AC current or AC voltage, frequency, thermal maximum demand, power factor, active / reactive power
<b>connection</b>	direct or for use on transducers/shunts/transformers

#### Technical Data

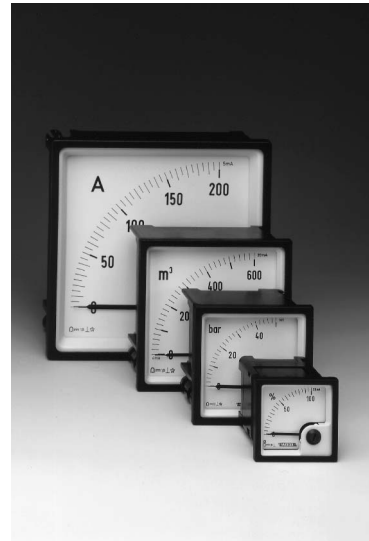
<b>dial</b>	interchangeable lettering possible to special order			
<b>pointer</b>	bar / knife-edge pointer			
pointer (LS.)	bold bar pointer (with knife-edge for class 1.0)			
pointer deflection	0 ... 90° (all meters except LS.) 0 ... 240° (LS.)			
<b>case</b>	according to DIN 43 700 square form stackable suitable for use in mosaic grid panels polycarbonate, flame-retardant			
window	exchangeable glass or non-glaring glass option			
bezel	detachable, black or gray option			
position of use	vertical, horizontal option or to be specified between 15 to 165°			
panel fixing	swivel screw clamps, spring clamps (except size 144)			
terminal protection	protective sleeves or full sized rear cover option			
marine application option	non-certified or "Germanischer Lloyd" approbated option (except size 48)			
<b>dimensions</b> (in mm)	<b>.Q 48 K</b>	<b>.Q 72 K</b>	<b>.Q 96 K</b>	<b>.Q 144 K</b>
bezel	□ 48	□ 72	□ 96	□ 144
case	□ 42.5	□ 66	□ 90	□ 136
panel cutout	□ 45 <sup>+0.6</sup>	□ 68 <sup>+0.7</sup>	□ 92 <sup>+0.8</sup>	□ 138 <sup>+1</sup>
panel thickness	≤40 mm on all meter sizes			
<b>climatic suitability</b>	climatic class 3 according to VDE/VDI 3540 sheet 2			
operating temperature range	-10°C ... +23°C ... +55°C			
storage temperature range	-25 ... +65°C			
relative humidity	≤75% annual average, non-condensing			
<b>mechanical load</b>				
shock	15 g, 11 ms			
vibration	2.5 g, 5 ... 55 Hz			



## Short Form Data

### Analog Meters with Moving-Coil Movement 90°-Dial

**PQ 48 K**  
**PQ 72 K**  
**PQ 96 K**  
**PQ 144 K**



#### Functional Principle

pivot and jewel moving-coil movement, core-magnet system

#### Measuring Ranges

<b>DC current</b>	0 ... 100 µA up to 0 ... 40 A
<b>DC voltage</b>	0 ... 60 mV up to 0 ... 600 V
for use on <b>transducer</b>	4 ... 20 mA (mechanically suppressed zero, no zero adjustment)
for use with external <b>shunt</b>	0 ... 60 mV or 0 ... 150 mV (scaling to DIN series)
accuracy	class 1.5 acc. to DIN EN 60 051

#### Others

mounting depth	53 mm			
weight approx.	PQ 48 K	PQ 72 K	PQ 96 K	PQ 144 K
	0.11 kg	0.15 kg	0.2 kg	0.25 kg

<b>additional options</b>	
index marking pointer	red, front adjustable
zero position	centre zero or off-set zero
increased sensitivity	to 4 kΩ/V for voltmeters 1 ... 600 V to 10 kΩ/V for voltmeters 1.5 ... 150 V

<i>additional data</i>	refer to Data Sheet No. 410.D.101.##
<i>prices</i>	refer to Price Sheet No. 410.P.101.##
<i>additional meters with moving-coil movement</i>	<b>PSQ 48, PQ 72/96/144 RS</b> (M-Series, 90°-Dial) refer to Data Sheet No. 010.D.101.## <b>LSP 48/72/96/144</b> (M-Series, 240°-Dial) refer to Data Sheet No. 011.D.101.## <b>P 48/72/96/144 PrS</b> (edgewise meters) refer to Data Sheet No. 010.D.201.## <b>MP 48x24/72x24/96x24, P 144x36</b> (slim edgewise meters) refer to Data Sheet No. 010.D.301.##



## Short Form Data

### Analog Meters with Moving - Coil Rectifier Movement 90°- Dial

VQ 48 K  
 VQ 72 K  
 VQ 96 K  
 VQ 144 K



## Functional Principle

pivot and jewel moving-coil movement;  
 series-connected rectifier incorporated

## Measuring Ranges

**AC current** 0 ... 10 mA up to 0 ... 100 mA  
**AC voltage** 0 ... 6 V up to 0 ... 600 V  
 frequency range 40 Hz ... 50 Hz ... 10 kHz  
 accuracy class 1.5 acc. to DIN EN 60 051

## Others

same as PQ 48/72/96/144 K

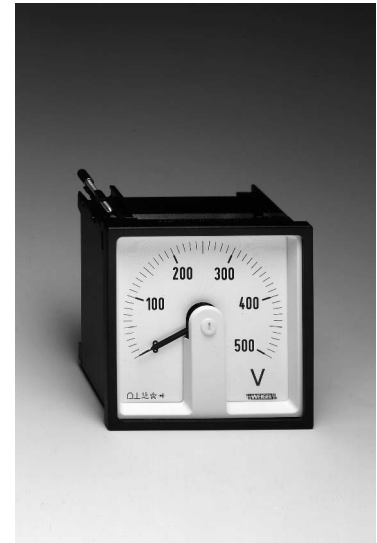
*additional data* refer to Data Sheet No. 415.D.101.##  
*prices* refer to Price Sheet No. 415.P.101.##  
*additional meters with moving-coil rectifier movement*  
**GSQ 48, GQ 72/96/144 RS** (M-Series, 90°-Dial)  
 refer to Data Sheet No. 015.D.101.##  
**LSG 48/72/96/144** (M-Series, 240°-Dial)  
 refer to Data Sheet No. 016.D.101.##  
**G 48/72/96/144 PrS** (edgewise meters)  
 refer to Data Sheet No. 015.D.201.##  
**MG 48x24/72x24/96x24, G 144x36**  
 (slim edgewise meters)  
 refer to Data Sheet No. 015.D.301.##



## Short Form Data

### Analog Meters with Moving - Coil / Moving - Coil Rectifier Movement 240°- Dial

LSP 72 K  
 LSP 96 K  
 LSG 72 K  
 LSG 96 K



## Functional Principle

**LSP**: pivot and jewel moving-coil movement, swivel-coil system  
**LSG**: ~ rectifier incorporated

## Measuring Ranges

**LSP 72/96 K**  
**DC current** 0 ... 100 μA up to 0 ... 4 A  
**DC voltage** 0 ... 60 mV up to 0 ... 600 V  
 for use on **transducer** 4 ... 20 mA (electrically suppressed zero, with zero adjustment)  
 for use with external **shunt** 0 ... 60 mV or 0 ... 150 mV (scaling to DIN series)

**LSG 72/96 K**  
**AC current** 0 ... 100 μA up to 0 ... 4 A  
 for use on **transformer** 0 ... 1 A or 0 ... 5 A \*) \*\*)\*)  
**AC voltage** 0 ... 1.5 V up to 0 ... 600 V  
 for use on **transformer** 0 ... 100 V or 0 ... 110 V \*)  
 \*) scaling to DIN series; no overload range  
 \*\*) optional: with overload range  
 frequency range voltage 40 Hz ... 50 Hz ... 10 kHz  
 current 50 Hz (others on request)  
 accuracy class 1.5 or as an option class 1.0

## Others

mounting depth 53 mm  
 weight approx. LSP/G 72 K LSP/G 96 K  
 0.25 kg 0.3 kg

### additional options

special measuring ranges, range adjustment, expanded scale, increased sensitivity, calibration to a firm internal resistance value or a lead resistance deviating from standard, off-set zero, coloured scales, dial illumination and others

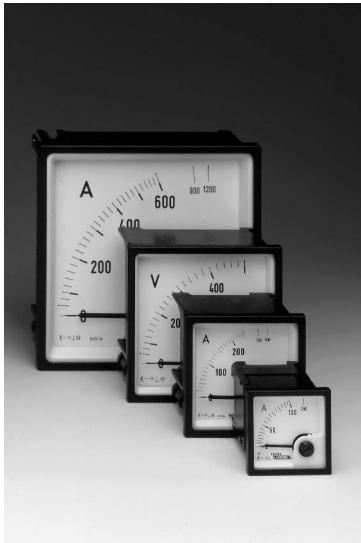
*additional data* refer to Data Sheet No. 411.D.101.##  
*prices* refer to Price Sheet No. 411.P.101.##



## Short Form Data

### Analog Meters with Moving - Iron Movement 90°- Dial

EQ 48 K  
EQ 72 K  
EQ 96 K  
EQ 144 K



## Functional Principle

pivot and jewel moving - iron movement, silicon oil damped

## Measuring Ranges

<b>AC current</b> for use on CT	0 ... 1 / 2 A up to 0 ... 100 / 200 A *) **)
<b>AC voltage</b> for use on VT	0 ... N / 1 / 2 A or 0 ... N / 5 / 10 A *) **)
	0 ... 60 V up to 0 ... 600 V
	0 ... 100 / 120 V or 0 ... 110 / 132 V *)
	*) scaling to DIN series with overload scaling
	**) optional: without overload range or with overload range 5 times rated current
power consumption	<4.5 VA (voltmeters) <0.5 VA (ammeters ≤15A) <0.8 VA (ammeters >15A)
frequency range	16 <sup>2</sup> /3 ... 50 ... 100 Hz
accuracy	class 1.5 acc. to DIN EN 60 051

## Others

mounting depth	53 mm
weight approx.	EQ 48 K   EQ 72 K   EQ 96 K   EQ 144 K 0.1 kg   0.15 kg   0.2 kg   0.25 kg

**additional option**  
index marking pointer red, front adjustable

*additional data* refer to Data Sheet No. 420.D.101.##  
*prices* refer to Price Sheet No. 420.P.101.##  
*additional meters with moving - iron movements*  
**WSQ 48, WQ 72/96/144 RS**  
(M-Series, 90°-Dial)  
refer to Data Sheet No. 020.D.101.##  
**W 72/96/144 PrS** (edgewise meters)  
refer to Data Sheet No. 020.D.201.##  
**WQ 96/144 /2S**  
(M-Series, 2 movements)  
refer to Data Sheet No. 023.D.101.##  
**W 192 RnS/RhS**  
(M-Series, triple combination meters)  
refer to Data Sheet No. 050.D.251.##



## Short Form Data

### Analog Meters Pointer - Type Frequency Meters 90°- or 240°- Dial

ZQ 96 K  
ZQ 144 K  
LSZ 96 K



## Functional Principle

pivot and jewel moving - coil movement with integrated electronic circuit

## Measuring Ranges

<b>frequency range</b>	45 ... 50 ... 55 Hz 48 ... 50 ... 52 Hz 55 ... 60 ... 65 Hz 58 ... 60 ... 62 Hz 180 ... 200 ... 220 Hz 360 ... 400 ... 440 Hz 380 ... 400 ... 420 Hz
rated voltage	57.8 V up to 500 V
admissible voltage variation	-15% ... +10%
power consumption	≤3 VA
accuracy	class 0.5 acc. to DIN EN 60 051

## Others

mounting depth	53 mm
weight approx.	ZQ 96 K   ZQ 144 K   LSZ 96 K 0.25 kg   0.3 kg   0.3 kg

**additional option**  
index marking pointer red, front adjustable

*additional data* refer to Data Sheet No. 432.D.101.##  
*prices* refer to Price Sheet No. 432.P.101.##  
*additional indicators for frequency*  
**FQ 48/72/96/144** (M-Series, vibrating reed frequency meters)  
refer to Data Sheet No. 030.D.101.##  
**FQ 96/144 /2** (M-Series, vibrating reed frequency meters with 2 movements)  
refer to Data Sheet No. 031.D.101.##



## Short Form Data

### Analog Meters Maximum Demand Indicators with Bimetallic / Bimetallic - Moving - Iron Movements

**BIQ 48 K**  
**BIEQ 72 K**  
**BIQ 72 K**  
**BIEQ 96 K**  
**BIQ 96 K**



### Functional Principle

**BIQ 48/72/96 K** Bimetallic movement with resettable slave pointer

**BIEQ 72/96 K** Bimetallic movement with resettable slave pointer  
+ pivot and jewel moving-iron movement

### Measuring Ranges

#### AC current

bimetallic 0 ... 1 / 1.2 A or 0 ... 5 / 6 A<sup>\*</sup>  
moving-iron 0 ... 1 / 2 A or 0 ... 5 / 10 A<sup>\*</sup>

for use on CT (scaling to DIN series)

bimetallic 0 ... N / 1 / 1.2 A or 0 ... N / 5 / 6 A<sup>\*</sup>  
moving-iron 0 ... N / 1 / 2 A or 0 ... N / 5 / 10 A<sup>\*</sup>

<sup>\*</sup>) scaling with overload range;  
optional: without overload range or  
with overload range 1.5 times rated current

thermal time lag (bimetallic) 8 min (standard for BIQ 48 K, BIEQ 72 K)  
15 min (standard for BIQ 72/96 K, BIEQ 96 K)

frequency range 50 ... 100 Hz or optional calibration  
to a definite frequency 100 ... 1000 Hz

accuracy acc. to DIN EN 60 051  
bimetallic class 3 (referred to slave pointer)  
moving-iron class 1.5

### Others

mounting depth	BIQ 48 K 48 mm	BIQ/BIEQ 72 K 53 mm	BIQ/BIEQ 96 K 60 mm
weight approx.	BIQ 48 K 0.1 kg	BIQ/BIEQ 72 K 0.2 kg	BIQ/BIEQ 96 K 0.3 kg

**accessories** saturating current transformers

*additional data* refer to Data Sheet No. 450.D.101.##

*prices* refer to Price Sheet No. 450.P.101.##

*additional meters with bimetallic movements* **BI 72/96/144, BIW 96/144, BIW 72/96/144 GD**  
(M-Series, 90°-Dial)  
refer to Data Sheet No. 050.D.101.##

**BI/BIW 192 RnS/RhS**  
(M-Series, triple combination meters)  
refer to Data Sheet No. 050.D.251.##



## Short Form Data

### Analog Meters Electronic Power Factor Meters 90°- or 240°- Dial

**CQ 96 K**  
**CQ 144 K**  
**LSC 96 K**



### Functional Principle

pivot and jewel moving-coil movement with integrated electronic circuit

### Measuring Ranges

<b>type</b>	<b>E</b> <b>D</b>	single phase AC system 3 phase 3 wire balanced load
<b>measuring ranges</b> (cos $\psi$ )		cap 0.5 ... 1 ... 0.5 ind cap 0.8 ... 1 ... 0.3 ind cap 0.8 ... 1 ... 0.8 ind
rated voltage		57.7 V ... 100; 110 V <sup>*</sup> ) up to 500 V
rated current		1 or 5 A <sup>*</sup> )
frequency range		<sup>*</sup> ) also for use on transformers 49 ... 50 ... 51 Hz (single phase AC system) 45 ... 50 ... 65 Hz (3 phase 3 wire system)
power consumption		≤0.1 VA (current circuit) ≤3.0 VA (voltage circuit)
accuracy		class 1.5 acc. to DIN EN 60 051

### Others

mounting depth	104 mm
weight approx.	CQ 96 K 0.55 kg CQ 144 K 0.75 kg LSC 96 K 0.55 kg

#### additional option

index marking pointer red, front adjustable

*additional data* refer to Data Sheet No. 460.D.101.##

*prices* refer to Price Sheet No. 460.P.101.##

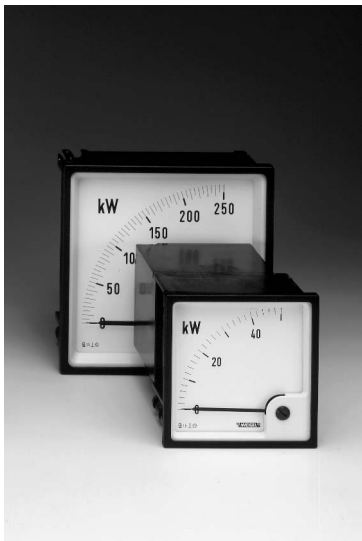
*additional power factor meters* **LFUQ 96/144** (M-Series, 90°-Dial)  
refer to Data Sheet No. 060.D.101.##



## Short Form Data

### Analog Meters Electronic Watt and VAR Meters 90°- or 240°- Dial

LQ 96 K  
LQ 144 K  
LSL 96 K



## Functional Principle

pivot and jewel moving - coil movement with integrated electronic circuit

## Measuring Ranges

type	active / reactive power	
single phase AC system	<b>EW 1</b>	<b>EB 1</b>
3 phase 3 wire balanced load	<b>DW 1</b>	<b>DB 1</b>
3 phase 4 wire balanced load	<b>VW 1</b>	<b>VB 1</b>
3 phase 3 wire unbalanced load	<b>DW 2</b>	<b>DB 2</b>
3 phase 4 wire unbalanced load	<b>VW 3</b>	<b>VB 3</b>

select **full-scale values** between 0.6 and 1.2 times the calculated apparent power, preferably from DIN series (acc. to DIN 43 701)  
1 – 1.2 – 1.5 – 2 – 2.5 – 3 – 4 – 5 – 6 – 7.5 – 8  
and any decimal multiple of these numbers.

rated voltage	57.7 V ... 100; 110 V * ) up to 500 V
rated current	1 or 5 A * ) also for use on transformers
power consumption	≤0.2 VA (on each current circuit) ≤3.0 ... 4.3 VA (on each voltage circuit)
accuracy	class 1.5 acc. to DIN EN 60 051

others	
mounting depth	104 mm (EW/B1, DW/B 1, VW/B 1, DW/B 2) 129 mm (VW/B 3, LSL 96 K all types)
weight approx.	1.1 kg

additional option	
index marking pointer	red, front adjustable

*additional data* refer to Data Sheet No. 470.D.101.##

*prices* refer to Price Sheet No. 470.P.101.##

*additional Watt and VAR Meters* **LDQ 96/144** (M-Series, 90°-Dial, electrodynamic movement)  
refer to Data Sheet No. 070.D.101.##

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– specifications subject to change without notice; date of issue 03/05 –

