



# Product Guide

K Series  
400.U.101.06

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

### K Series

PQ



with Moving-Coil Movement

VQ



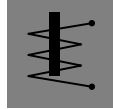
with Moving-Coil Rectifier  
Movement

LSP  
LSG



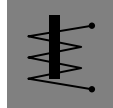
with Moving-Coil /  
Moving-Coil Rectifier  
Movement 240°- Dial

EQ



with Moving-Iron Movement

EQ  
SWT



with Moving-Iron Movement  
Switchable

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

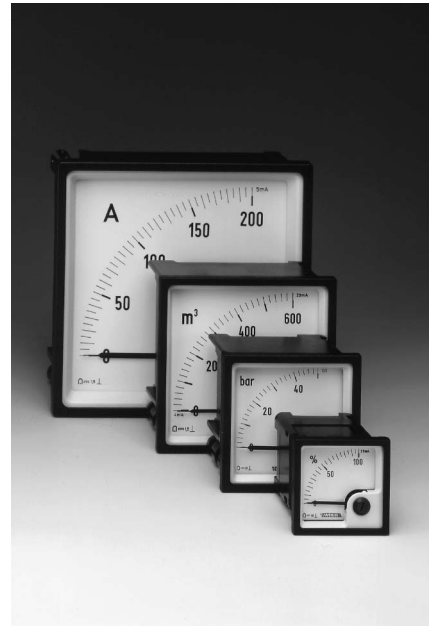
<b>dial</b>	interchangeable lettering possible to special order			
<b>pointer</b>	bar / knife-edge pointer			
pointer (LS.)	bold bar pointer (with knife-edge for class 1.0)			
pointer deflection	0 ... 90° (all meters except LS.) 0 ... 240° (LS.)			
<b>case</b>	according to DIN IEC 61 554 square form stackable suitable for use in mosaic grid panels polycarbonate, flame-retardant			
<b>window</b>	exchangeable glass or non-glaring glass option			
<b>bezel</b>	detachable, black or gray option			
<b>position of use</b>	vertical, horizontal option or to be specified between 15 to 165°			
<b>panel fixing</b>	swivel screw clamps, spring clamps (except size 144)			
<b>terminal protection</b>	protective sleeves or full sized rear cover option			
<b>marine application option</b>	non-certified or "Germanischer Lloyd" approbated option (except size 48)			
<b>dimensions (in mm)</b>	<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			
<b>operating temperature range</b>	-10°C ... +23°C ... +55°C			
<b>storage temperature range</b>	-25 ... +65°C			
<b>relative humidity</b>	≤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 ... 100 A (PQ 48 K up to 0 ... 25 A)
<b>DC voltage</b>	0 ... 60 mV up to 0 ... 600 V (PQ 48/72 K up to 0 ... 250 V)
<b>for use on transducer</b>	4 ... 20 mA mechanically suppressed zero, no zero adjustment 0/4 ... 20 mA electrically suppressed zero, with zero adjustment
<b>for use with external shunt</b>	0 ... 60 mV or 0 ... 150 mV (scaling to DIN series)
<b>accuracy</b>	class 1.5 acc. to DIN EN 60 051-1

#### Others

<b>mounting depth</b>	53 mm			
<b>weight approx.</b>	<b>PQ 48 K</b>	<b>PQ 72 K</b>	<b>PQ 96 K</b>	<b>PQ 144 K</b>
	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			

*additional data* refer to Data Sheet No. 410.D.101.##

*additional meters with moving-coil movement*

**PSQ 48, PQ 72/96/144 RS**

(M-Series, 90°-Dial)

refer to Data Sheet No. 010.D.101.##

**LSP 48/72/96/144** (M-Series, 240°-Dial)

refer to Data Sheet No. 011.D.101.##

**P 48/72/96/144 PrS** (edgewise meters)

refer to Data Sheet No. 010.D.201.##

**MP 48x24/72x24/96x24, P 144x36**

(slim edgewise meters)

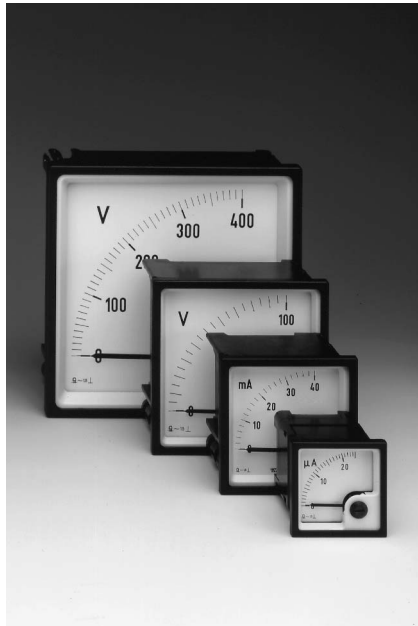
refer to Data Sheet No. 010.D.301.##



## 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  
 (VQ 48/72 K up to 0 ... 500 V)  
 frequency range 40 Hz ... 50 Hz ... 10 kHz  
 accuracy class 1.5 acc. to DIN EN 60 051 - 1

### Others

same as PQ 48/72/96/144 K

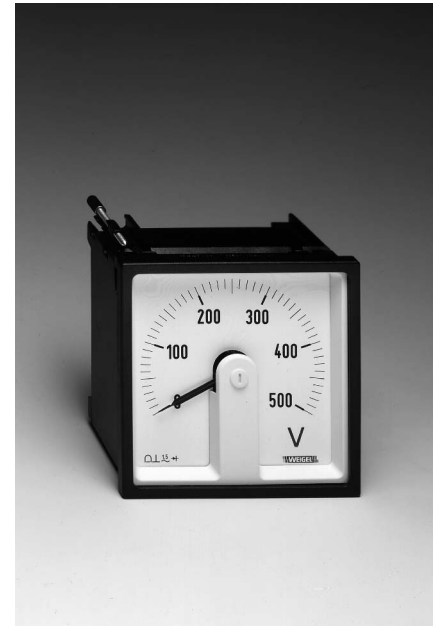
*additional data* refer to Data Sheet No. 415.D.101.##  
*additional meters with moving-coil rectifier movement*  
**GSQ 48, GQ 72/96/144 RS**  
 (M-Series, 90°-Dial)  
 refer to Data Sheet No. 015.D.101.##  
**LSG 48/72/96/144** (M-Series, 240°-Dial)  
 refer to Data Sheet No. 016.D.101.##  
**G 48/72/96/144 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  
 (LSP 72 K up to 0 ... 250 V)  
 for use on **transducer** 4 ... 20 mA mechanically suppressed zero,  
 no zero adjustment  
 0/4 ... 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 ... 5 A  
 for use on **transformer** 0 ... 1 A or 0 ... 5 A <sup>\*)</sup>  
**AC voltage** 0 ... 1.5 V up to 0 ... 600 V  
 (LSG 72 K up to 0 ... 500 V)  
 for use on **transformer** 0 ... 100 V or 0 ... 110 V <sup>\*)</sup>  
<sup>\*)</sup> scaling to DIN series; no overload range  
<sup>\*\*) optional: with overload range</sup>  
 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.##



## 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>	0 ... 1 / 2 A up to 0 ... 100 / 200 A (EQ 48 K up to 0 ... 25 / 50 A) *) **)
for use on <b>CT</b>	0 ... N / 1 / 2 A or 0 ... N / 5 / 10 A *) **)
<b>AC voltage</b>	0 ... 60 V up to 0 ... 600 V (EQ 48 K up to 0 ... 500 V)
for use on <b>VT</b>	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> / <sub>3</sub> ... 100 Hz
accuracy	class 1.5 acc. to DIN EN 60 051 - 1

## 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*  
*additional meters*  
*with moving-iron*  
*movements*

refer to Data Sheet No. 420.D.101.##  
**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

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

EQ 72 SWT  
EQ 96 SWT



## Functional Principle

pivot and jewel moving-iron movement, silicon oil damped

With the built-in 6 position switch, all voltages in a 4-wire 3-phase system can be measured.

## Measuring Ranges

<b>AC voltage</b>	0 ... 500 V	
for use on <b>VT</b>	0 ... N/100 V *)	
	*) scaling to DIN series with overload scaling full scale value = 1.2 times rated value	
power consumption	<4.5 VA	
frequency range	16 <sup>2</sup> / <sub>3</sub> ... 100 Hz	
accuracy	class 1.5 acc. to DIN EN 60 051 - 1	
<b>switch positions in a 4-wire 3-phase system</b>		
6 switch positions	L1L3; L2L3; L1L2; L1N; L2N; L3N	

## Others

mounting depth	53 mm	
weight approx.	EQ 72 SWT	EQ 96 SWT
	0.19 kg	0.23 kg

*additional data*

refer to Data Sheet No. 421.D.101.##



## Short Form Data

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

ZQ 48 K  
ZQ 72 K  
ZQ 96 K  
ZQ 144 K  
LSZ 96 K



### Functional Principle

pivot and jewel moving - coil movement with integrated electronic circuit

### Measuring Ranges

frequency range	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 ZQ 48 K 110 V only)
admissible voltage variation	-15% ... +10%
power consumption	≤3 VA
accuracy	class 0.5 acc. to DIN EN 60 051 - 1

### Others

mounting depth	53 mm
weight approx.	ZQ 48 K   ZQ 72 K   ZQ 96 K   ZQ 144 K LSZ 96 K 0.13 kg   0.3 kg   0.3 kg   0.3 kg

**additional option**  
index marking pointer   red, front adjustable (ZQ 48/72/96/144 K only)

*additional data*   refer to Data Sheet No. 432.D.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

<b>AC current</b>	
bimetallic	0 ... 1 / 1.2 A   or   0 ... 5 / 6 A
moving-iron	0 ... 1 / 2 A   or   0 ... 5 / 10 A
for use on CT	(scaling to DIN series)
bimetallic	0 ... N / 1 / 1.2 A   or   0 ... N / 5 / 6 A
moving-iron	0 ... N / 1 / 2 A   or   0 ... N / 5 / 10 A
(scaling with overload range)	
thermal time lag (bimetallic)	15 min (standard) 8 min (optional))
frequency range	50 ... 100 Hz or optional calibration to a definite frequency 100 ... 1000 Hz
accuracy	acc. to DIN EN 60 051 - 1
bimetallic	class 3 (referred to slave pointer)
moving-iron	class 1.5

### Others

mounting depth	BIQ 48 K   BIQ/BIEQ 72 K   BIQ/BIEQ 96 K 48 mm   53 mm   60 mm
weight approx.	BIQ 48 K   BIQ/BIEQ 72 K   BIQ/BIEQ 96 K 0.1 kg   0.2 kg   0.26/0.3 kg

**accessories**   saturating current transformers

*additional data*   refer to Data Sheet No. 450.D.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>	single phase AC system
	<b>D</b>	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> )
		<sup>*</sup> ) also for use on transformers
frequency range		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 - 1
<b>others</b>		
mounting depth		104 mm
weight approx.		CQ 96 K      CQ 144 K      LSC 96 K 0.55 kg      0.75 kg      0.55 kg
<b>additional option</b>		
index marking pointer		red, front adjustable

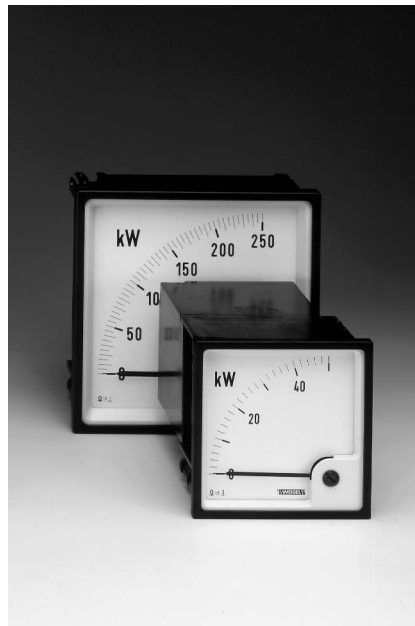
*additional data* refer to Data Sheet No. 460.D.101.##  
*additional* **LFUQ 96/144** (M-Series, 90°-Dial)  
*power factor meters* refer to Data Sheet No. 060.D.101.##



## 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

<b>type</b>		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 <b>full-scale values</b> between 0.6 and 1.2 times the calculated apparent power, preferably from standardized series 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 <sup>*</sup> ) up to 500 V
rated current		1 or 5 A <sup>*</sup> ) 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 - 1
<b>others</b>		
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
<b>additional option</b>		
index marking pointer		red, front adjustable

*additional data* refer to Data Sheet No. 470.D.101.##  
*additional* **LDQ 96/144** (M-Series, 90°-Dial,  
*Watt and VAR Meters* electrodynamic movement)  
refer to Data Sheet No. 070.D.101.##

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– specifications subject to change without notice; date of issue 05/11 –

