



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



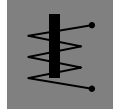
with Moving-Coil Rectifier
Movement

LSP
LSG



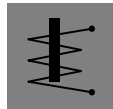
with Moving-Coil /
Moving-Coil Rectifier
Movement 240°- Dial

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

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

Technical Data

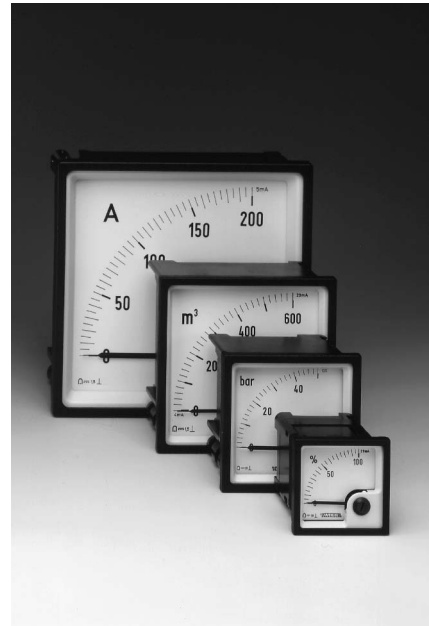
dial	interchangeable lettering possible to special order			
pointer	bar / knife-edge pointer			
pointer (LS.)	bold bar pointer (with knife-edge for class 1.0)			
pointer deflection	0 ... 90° (all meters except LS.) 0 ... 240° (LS.)			
case	according to DIN IEC 61 554 square form stackable suitable for 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)			
dimensions (in mm)	.Q 48 K	.Q 72 K	.Q 96 K	.Q 144 K
bezel	□ 48	□ 72	□ 96	□ 144
case	□ 42.5	□ 66	□ 90	□ 136
panel cutout	□ 45 ^{+0.6}	□ 68 ^{+0.7}	□ 92 ^{+0.8}	□ 138 ⁺¹
panel thickness	≤40 mm on all meter sizes			
climatic suitability	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			
mechanical load				
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

DC current	0 ... 100 µA up to 0 ... 100 A (PQ 48 K up to 0 ... 25 A)
DC voltage	0 ... 60 mV up to 0 ... 600 V (PQ 48/72 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)
accuracy	class 1.5 acc. to DIN EN 60 051-1

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
additional options				
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)

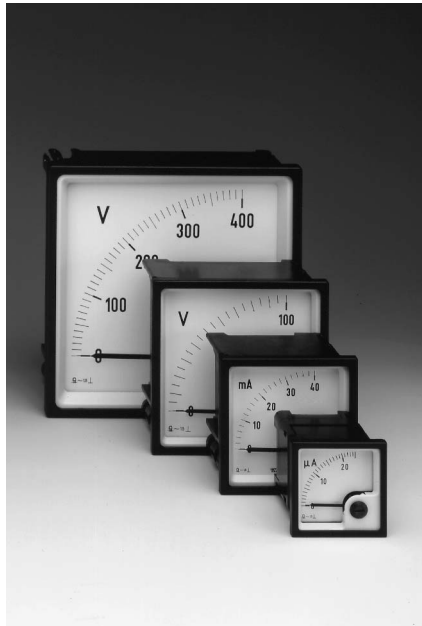
refer to Data Sheet No. 010.D.301.##



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

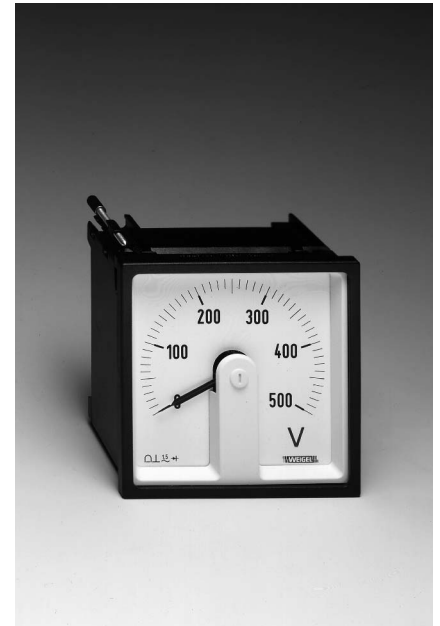
additional data refer to Data Sheet No. 415.D.101.##
additional meters with moving-coil rectifier movement
GSQ 48, GQ 72/96/144 RS
 (M-Series, 90°-Dial)
 refer to Data Sheet No. 015.D.101.##
LSG 48/72/96/144 (M-Series, 240°-Dial)
 refer to Data Sheet No. 016.D.101.##
G 48/72/96/144 PrS (edgewise meters)
 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 ^{*)}
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 ^{*)}
^{*)} 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.##



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

AC current	0 ... 1 / 2 A up to 0 ... 100 / 200 A (EQ 48 K up to 0 ... 25 / 50 A) *) **)
for use on CT	0 ... N / 1 / 2 A or 0 ... N / 5 / 10 A *) **)
AC voltage	0 ... 60 V up to 0 ... 600 V (EQ 48 K up to 0 ... 500 V)
for use on VT	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 ² /3 ... 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

AC voltage	0 ... 500 V	
for use on VT	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 ² /3 ... 100 Hz	
accuracy	class 1.5 acc. to DIN EN 60 051 - 1	
switch positions in a 4-wire 3-phase system		
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

AC current	
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

type	E	single phase AC system
	D	3 phase 3 wire balanced load
measuring ranges (cos ψ)		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 [*]) up to 500 V
rated current		1 or 5 A [*])
		[*]) 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
others		
mounting depth		104 mm
weight approx.		CQ 96 K CQ 144 K LSC 96 K 0.55 kg 0.75 kg 0.55 kg
additional option		
index marking pointer		red, front adjustable

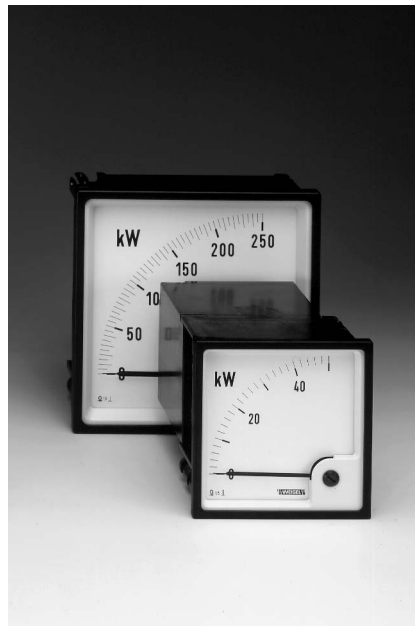
additional data refer to Data Sheet No. 460.D.101.##
additional power factor meters **LFUQ 96/144** (M-Series, 90°-Dial)
refer to Data Sheet No. 060.D.101.##



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		EW 1 EB 1
3 phase 3 wire balanced load		DW 1 DB 1
3 phase 4 wire balanced load		VW 1 VB 1
3 phase 3 wire unbalanced load		DW 2 DB 2
3 phase 4 wire unbalanced load		VW 3 VB 3
		select full-scale values 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 [*]) 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 - 1
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.##
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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