

## Basic Series • Square Panel Meters

### Features – Benefits

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- **Worldwide sales and service**

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- **All panel meters can be supplied ex stock<sup>1)</sup>**  
**Shunt resistors without protective cover (nominal current up to 1.5 kA)**  
**ASK 31.3 / ASK 412.4 current transformers (Class 1. 50-60 Hz)**  
<sup>1)</sup> "Conditions of delivery for manufactures and performances of electrical industry" are applied

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- **Moving-iron panel meters: lower measuring range value equal to 20% of upper measuring range value**

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- **Power meters, power factor meters and frequency meters include built in electronic converters**  
Allows for precise power measurement even for 3-phase four-wire systems with unbalanced load

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- **Interchangeable scales for all panel meters**  
Scale replacement is quick and simple with no loss of accuracy

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- **Interchangeable front frame and windows for all panel meters**

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- **Anti-glare glass and terminal cover is included as standard equipment with all panel meters**  
Back of hand and finger contact safety in accordance with BGV A3

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- **Screw terminals with self-lifting terminal clips for all panel meters, screws can be turned with cross-head or standard screw drivers**

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## Basic Series • Square Panel Meters

### Technical Description



Square panel meters per DIN 43 700 with quadrant scale, matt black or matt gray (RAL 7037) front frame per DIN 43 718

#### Available Models:

Front Dimensions	48 x 48	72 x 72	96 x 96
		see page	
Moving-iron panel meters	10	10	10
Bimetal-ammeters	12	12	12
Moving-iron bimetal ammeters	–	14	14
Moving coil panel meters for DC	16	16	16
Power meters	20	20	18
Power factor meters	–	–	22
Pointer-type frequency meters	–	24	24

#### Interchangeable Scale

Scale replacement is quick and simple with no loss of accuracy. The permanently affixed closure flap need to be opened, and the scale can be pulled out and removed.

#### Terminal Connection

M4 screw terminals with self-lifting terminal clips simplify clamping of connector wires. Terminal screws can be turned with cross-head or with standard screw drivers.

#### Housing

The rugged polycarbonate housing is self-extinguishing and drip-proof per UL94V-0.

Window material: anti-glare silicate glass.

Front frame and window can be easily replaced.

#### Mounting

All mounting fasteners are resistant to excessive vibration and shock.

#### Safety Precautions

- ⇒ Instruments with damaged front frame or window must be disconnected from the mains.
- ⇒ Adequate safety clearance must be maintained to control panel fasteners and to sheet metal housings if non-insulated (stripped) connector wires are used.
- ⇒ The terminal block cover must be snapped into place after the connector wires have been clamped in order to assure back of hand and finger contact safety in accordance with BGV A3.
- ⇒ Scale may only be replaced under voltage-free conditions.
- ⇒ Front frames and windows may only be replaced under voltage-free conditions.

**Basic Series • Square Panel Meters**  
 Technical Description - Measuring Systems

	<b>Moving-Coil Movement</b>	<b>Moving-Iron Movement</b>	<b>Bimetal Movement</b>
<b>Application</b>	Measurement of direct current or direct voltage Precision measurement of average value  Power and power factor cos phi	Measurement of alternating current or alternating voltage True RMS measurement	Measurement of alternating current and direct current True RMS measurement  The integrated slave pointer indicates the highest attained value
<b>Bearings</b>	Rugged pivot bearings with spring-loaded jewels	Rugged pivot bearings with spring-loaded jewels	Rugged bronze bearings
<b>Damping</b>  • Overshoot • Response Time	Eddy-current damping  ≤ 15 % of scale length ≤ 1 s per DIN EN 60 051-1	Viscous damping  ≤ 15 % of scale length ≤ 2 s per DIN EN 60 051-1	Thermal, time-delayed, for display of mean effective value  15 min.. alternatively 8 min.
<b>Reference Conditions</b>  • Frequency	45 Hz ... 65 Hz	45 Hz ... 65 Hz	45 Hz ... 65 Hz
<b>Nominal Range of Use</b>  • Frequency		Ammeter: 45 Hz ... 65 Hz Voltmeter: 45 Hz ... 65 Hz	≤ 400 Hz
<b>Scale Characteristics</b>	nearly linear	Lower measuring range value is approx. 20% of upper measuring range value. Ammeters with double overload scale	
<b>Measuring Range</b>	see technical data	see technical data	see technical data
<b>Overload Capacity</b>  • Continuous • Short Term: Current Measurement  Voltage Measurement	1.2 x rated value  10 x rated value, 1 s  2 x U <sub>N</sub> , 5 s	1.2 x rated value  10 x I <sub>N</sub> , 1 s (I <sub>max</sub> = 50 A)  2 x U <sub>N</sub> , 5 s	1.2 x rated value  10 x I <sub>N</sub> , 1 s (I <sub>max</sub> = 50 A)
<b>Connection</b>	Screws M4 Bolt M6 if measuring input > 15 A and ≤ 40 A	Screws M4 Bolt M6 if measuring input > 15 A and ≤ 40 A Bolt M8 if measuring input > 40 A and ≤ 60 A	Screws M4
<b>Power Consumption</b>	see technical data	Ammeters: approx. 0.65 VA (5 A) Voltmeters: approx. 2.5 VA (250 V)	1 A : ≤ 1.5 VA 5 A : ≤ 2.5 VA

See individual technical data for technical description of frequency meters, active and reactive power meters and power factor meters

**Please request data sheets if required  
 for products and options not included in this catalog.**



## Basic Series • Square Panel Meters

For Alternating Current or Voltage 45 ... 50 ... 60 ... 65 Hz



EQB 72

### Description

Analog Panel Meter with Moving-Iron Movement and Spring-Loaded Pivot Bearings

### Display

Scale Division Coarse-fine

Pointer Knife-edge pointer per DIN

### Mechanical Design

Housing Material Polycarbonate, self-extinguishing and drip-proof per UL94V-0

Mounting Fasteners Screw Clamp

Scale Interchangeable scales  
⇒ Scales may only be replaced under voltage-free conditions!

Replaceable Front frames and glass windows  
⇒ Scales may only be replaced under voltage-free conditions!

Terminals M4 screw terminals with self-lifting terminal clips. Screws can be turned with cross-head or standard screw drivers.  
Bolt M6 if measuring input > 15 A and ≤ 40 A  
Bolt M8 if measuring input > 40 A and ≤ 60 A

Contact Protection Finger-safe terminal cover included

Moving-Iron Movement, 90° scale white, imprint black

Narrow front frame matt black per DIN 43 718, anti-glare glass

Front Dimensions mm Type	48 x 48 EQB 48	72 x 72 EQB 72	96 x 96 EQB 96
Scale length mm	42	63	97
Accuracy Class	1.5	1.5	1.5
Max. Weight (Standard Model)	0.1 kg	0.2 kg	0.25 kg
Max. Operating Voltage	300 V	600 V	600 V
Test Voltage	3.5 kV	5.8 kV	5.8 kV
Front Housing-Panel Protection	IP 52	IP 52	IP 52

### Power Consumption

Connection	Measuring Input	Power Consumption
direct	Current	1 A ... 10 A
direct	Current	≥ 15 A
to transformer	Current	sec.: 1 A or 5 A
		approx. 0.6 VA
		approx. 0.8 VA
		approx. 0.6 VA
direct	Voltage	10 V ... 600 V
to transformer	Voltage	sec.: 100 V or 110 V
		approx. 2.5 VA
		approx. 2.5 VA

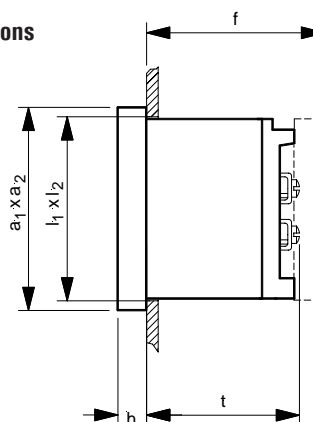
### Reference Conditions

Reference Quantities	Reference Conditions
Ambient Temperature	23°C ± 2°C
Position of Use	control panel vertical ± 1°
Frequency	45 ... 65 Hz
Other	DIN EN 60051

### Nominal Range of Use Limits

Frequency	for alternating Current 45 ... 65 Hz for alternating Voltage 45 ... 65 Hz
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### Basic Dimensions



Front in mm	Nominal Dimensions		Cutout Dimensions, mm l <sub>1</sub> x l <sub>2</sub>	Installation Depth Including Terminals (t), mm M4	Installation Depth Including Full Cover (f), mm
	a <sub>1</sub> x a <sub>2</sub>	h			
48 x 48	48 x 48	5.5	45 <sup>+0.6</sup> x 45 <sup>+0.6</sup>	53	66
72 x 72	72 x 72	5.5	68 <sup>+0.7</sup> x 68 <sup>+0.7</sup>	53	66
96 x 96	96 x 96	5.5	92 <sup>+0.8</sup> x 92 <sup>+0.8</sup>	53	66



## Basic Series • Square Panel Meters

For Alternating Current or Voltage 45 ... 50 ... 60 ... 65 Hz

Moving-iron movement, 90° scale white, imprint black  
Narrow front frame matt black per DIN 43 718, anti-glare glass

Range	Scale <sup>1)</sup>	Type Order No.	EQB 48 ↓	EQB 72 ↓	EQB 96 ↓
1.5 / 3 A	1.5 / 3 A		48015 30000 B	72015 30000 B	96015 30000 B
2.5 / 5 A	2.5 / 5 A		48025 50000 B	72025 50000 B	—
4 / 8 A	4 / 8 A		48048 00000 B	72048 00000 B	—
6 / 12 A	6 / 12 A		48612 00000 B	72612 00000 B	96612 00000 B
10 / 20 A	10 / 20 A		48102 00000 B	72102 00000 B	96102 00000 B
15 / 30 A	15 / 30 A		48153 00000 B	72153 00000 B	96153 00000 B
20 / 40 A	20 / 40 A		—	72204 00000 B	—
25 / 50 A	25 / 50 A		48255 00000 B	72255 00000 B	96255 00000 B
30 / 60 A	30 / 60 A		—	72306 00000 B	—
40 / 80 A	40 / 80 A		—	72408 00000 B	96408 00000 B
50 / 100 A	50 / 100 A		—	72501 00000 B	—
60 / 120 A	60 / 120 A		—	72601 20000 B	96601 20000 B
1 / 2 A	0 – 50 / 100 A		48125 01000 B	72120 50100 B	96120 50100 B
1 / 2 A	0 – 60 / 120 A		48126 01200 B	72120 60120 B	96120 60120 B
1 / 2 A	0 – 100 / 200 A		48121 00200 B	72120 10020 B	96120 10020 B
1 / 2 A	0 – 150 / 300 A		48121 50300 B	72120 15030 B	96120 15030 B
1 / 2 A	0 – 200 / 400 A		48122 00400 B	72120 20040 B	96120 20040 B
1 / 2 A	0 – 250 / 500 A		48122 50500 B	72120 25050 B	96120 25050 B
1 / 2 A	0 – 400 / 800 A		48124 00800 B	72120 40080 B	96120 40080 B
1 / 2 A	0 – 600 / 1200 A		48126 00120 B	72120 60012 B	96120 60012 B
1 / 2 A	0 – 800 / 1600 A		48128 00160 B	72120 80016 B	96120 80016 B
1 / 2 A	0 – 1000 / 2000 A		48121 00020 B	72120 10002 B	96120 10002 B
1 / 2 A	0 – 1200 / 2400 A		48121 20024 B	72120 12002 B	96120 12002 B
1 / 2 A	0 – 1500 / 3000 A		48121 50030 B	72120 15003 B	96120 15003 B
1 / 2 A	0 – 2000 / 4000 A		48122 00040 B	72120 20004 B	96120 20004 B
5 / 10 A	0 – 50 / 100 A		48510 50100 B	72510 50100 B	96510 50100 B
5 / 10 A	0 – 60 / 120 A		48510 60120 B	72510 60120 B	96510 60120 B
5 / 10 A	0 – 100 / 200 A		48510 10020 B	72510 10020 B	96510 10020 B
5 / 10 A	0 – 150 / 300 A		48510 15030 B	72510 15030 B	96510 15030 B
5 / 10 A	0 – 200 / 400 A		48510 20040 B	72510 20040 B	96510 20040 B
5 / 10 A	0 – 250 / 500 A		48510 25050 B	72510 25050 B	96510 25050 B
5 / 10 A	0 – 400 / 800 A		48510 40080 B	72510 40080 B	96510 40080 B
5 / 10 A	0 – 600 / 1200 A		48510 60012 B	72510 60012 B	96510 60012 B
5 / 10 A	0 – 800 / 1600 A		48510 80016 B	72510 80016 B	96510 80016 B
5 / 10 A	0 – 1000 / 2000 A		48510 10002 B	72510 10002 B	96510 10002 B
5 / 10 A	0 – 1200 / 2400 A		48510 12002 B	72510 12002 B	96510 12002 B
5 / 10 A	0 – 1500 / 3000 A		48510 15003 B	72510 15003 B	96510 15003 B
5 / 10 A	0 – 2000 / 4000 A		48510 20004 B	72510 20004 B	96510 20004 B
10 V	10 V		—	72000 00010 B	96000 00010 B
60 V	60 V		—	72000 00060 B	96000 00060 B
100 V	100 V		48000 00100 B	72000 00100 B	96100 00000 B
120 V	120 V		—	72120 00000 B	96120 00000 B
150 V	150 V		48150 00000 B	—	—
250 V	250 V		48250 00000 B	72250 00000 B	96250 00000 B
500 V	500 V		48500 00000 B <sup>2)</sup>	72500 00000 B	96500 00000 B
600 V	600 V		—	72600 00000 B	96600 00000 B

1) Specify unlisted scales in clear text

2) Max. operating voltage above earth 300 V

**Ammeters without overload scale on request.**

**Ammeters with overload scale on request for 1.2 times, three, five or six times rated current.**

## Basic Series • Square Panel Meters

For Alternating Current



MQB 72

**Bimetal-movement, 90° scale white, imprint black**  
**Narrow front frame matt black per DIN 43 718, anti-glare glass**

Front Dimensions mm	48 x 48	72 x 72	96 x 96
Type	MQB 48	MQB 72	MQB 96
Scale Length mm	42	63	97
Accuracy Class	3	3	3
Max. Weight (standrad model)	0.1 kg	0.2 kg	0.25 kg
Max. Operating Voltage	300 V	600 V	600 V
Test Voltage	3.5 kV	5.8 kV	5.8 kV
Front Housing Panel Protection	IP 52	IP 52	IP 52

### Description

Analog Panel Meter with Bimetal Movement

### Display

Scale Division Coarse-fine

Pointer Beam pointer with knife-edge  
 Red slave pointer for display of maximum value  
 Reset button for slave pointer can be locked

### Mechanical Design

Housing Material Polycarbonate, self extinguishing and drip-proof per UL94V-0

Mounting Fasteners Screw Clamp

Scale Interchangeable Scales  
 ⇒ Scales may only be replaced under voltage-free conditions!

Replaceable Front frames and glass windows  
 ⇒ May only be replaced under voltage-free conditions!

Terminals M4 screw terminals with self-lifting terminal clips.  
 Screws can be turned with cross-head or standard screw drivers.

Contact Protection Finger-safe terminal cover included

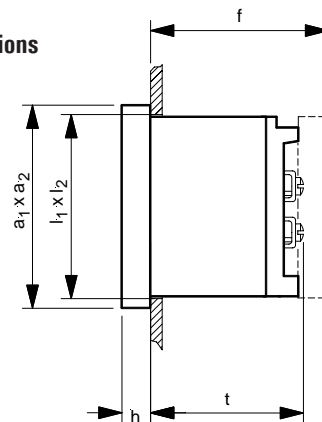
### Power Consumption

Connection	Measuring Input		Power Consumption
to transformer	Current	sec.: 1 A or 5 A	approx. 2.2 VA

### Reference Conditions

Reference Quantities	Reference Conditions
Ambient Temperature	23°C ± 2°C
Position of Use	control panel vertical ± 1°
Other	DIN EN 60051

### Basic Dimensions



Front in mm	Nominal Dimensions		Cutout Dimensions, mm l <sub>1</sub> x l <sub>2</sub>	Installation Depth Including Terminals (t), mm M4	Installation Depth Including Full Cover (f), mm
	a <sub>1</sub> x a <sub>2</sub>	h			
48 x 48	48 x 48	5.5	45 <sup>+0.6</sup> x 45 <sup>+0.6</sup>	53	66
72 x 72	72 x 72	5.5	68 <sup>+0.7</sup> x 68 <sup>+0.7</sup>	53	66
96 x 96	96 x 96	5.5	92 <sup>+0.8</sup> x 92 <sup>+0.8</sup>	53	66



## Basic Series • Square Panel Meters

For Alternating Current

**Bimetal-movement, 90° scale white, imprint black**  
**Narrow front frame matt black per DIN 43 718, anti-glare glass**

Range	Scale <sup>1)</sup>	Type Order No.	MQB 48 ↓	MQB 72 ↓	MQB 96 ↓
5 / 6 A, 8 or 15 min.	0 – 50 / 60 A				
5 / 6 A, 8 or 15 min.	0 – 60 / 72 A				
5 / 6 A, 8 or 15 min.	0 – 100 / 120 A				
5 / 6 A, 8 or 15 min.	0 – 150 / 180 A				
5 / 6 A, 8 or 15 min.	0 – 200 / 240 A				
5 / 6 A, 8 or 15 min.	0 – 250 / 300 A				
5 / 6 A, 8 or 15 min.	0 – 400 / 480 A				
5 / 6 A, 8 or 15 min.	0 – 600 / 720 A				
5 / 6 A, 8 or 15 min.	0 – 800 / 960 A				
5 / 6 A, 8 or 15 min.	0 – 1000 / 1200 A				
5 / 6 A, 8 or 15 min.	0 – 1200 / 1440 A				
5 / 6 A, 8 or 15 min.	0 – 1500 / 1800 A				
All panel meters available with the following configurations: Front Dimensions: 48 x 48, 72 x 72, 96 x 96 Connected to 1 / 1.2 A or 5 / 6 A transformer Response Time: 8 min. or 15 min. Scale as requested					
<b>Please note ordering example below:</b>					
1 / 1.2 A, 8 or 15 min.	0 – 50 / 60 A				
1 / 1.2 A, 8 or 15 min.	0 – 60 / 72 A				
1 / 1.2 A, 8 or 15 min.	0 – 100 / 120 A				
1 / 1.2 A, 8 or 15 min.	0 – 150 / 180 A				
1 / 1.2 A, 8 or 15 min.	0 – 200 / 240 A				
1 / 1.2 A, 8 or 15 min.	0 – 250 / 300 A				
1 / 1.2 A, 8 or 15 min.	0 – 400 / 480 A				
1 / 1.2 A, 8 or 15 min.	0 – 600 / 720 A				
1 / 1.2 A, 8 or 15 min.	0 – 800 / 960 A				
1 / 1.2 A, 8 or 15 min.	0 – 1000 / 1200 A				
1 / 1.2 A, 8 or 15 min.	0 – 1200 / 1440 A				
1 / 1.2 A, 8 or 15 min.	0 – 1500 / 1800 A				

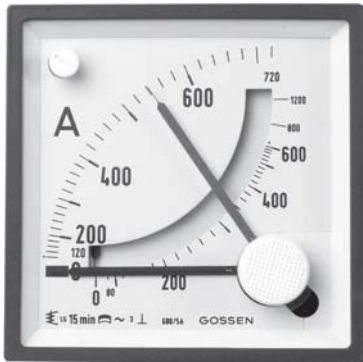
1) Specify unlisted scales in clear text

### Ordering Example:

<b>Type</b> <b>MQB 96</b>	<b>Text for purchase order:</b> <b>Range 5 / 6 A, Scale 0 – 100 / 120 A, 15 min.</b>
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## Basic Series • Square Panel Meters

For Alternating Current



MEQB 96

**Moving-iron bimetal movement, 90° scale white, imprint black**  
**Narrow front frame matt black per DIN 43 718, anti-glare glass**

Front Dimensions mm		72 x 72	96 x 96
Type		MEQB 72	MEQB 96
Scale Length mm	Moving-Iron Movement	63	97
	Bimetal-Movement	42	72
Accuracy Class	Moving-Iron / Bimetal Movement	1.5 / 3	1.5 / 3
Max. Weight (standard model)		0.2 kg	0.29 kg
Max. Operating Voltage		600 V	600 V
Test Voltage		5.8 kV	5.8 kV
Front Housing-Panel Protection		IP 52	IP 52

### Description

Analog Panel Meter with Moving-Iron and Bimetal Movements

### Display

Scale Division Coarse-fine

Pointer Beam pointer with knife-edge  
 Red slave pointer for display of maximum value  
 Reset button for slave pointer can be locked

### Mechanical Design

Housing Material Polycarbonate, self-extinguishing and drip-proof per UL94V-0

Mounting Fasteners Screw Clamp

Scale Interchangeable scales  
 ⇒ Scales may only be replaced under voltage-free conditions!

Replaceable Front frames and glass windows  
 ⇒ May only be replaced under voltage-free conditions!

Terminals M4 screw terminals with self lifting terminal clips.  
 Screws can be turned with cross-head or standard screw drivers.

Contact Protection Finger-safe terminal cover included

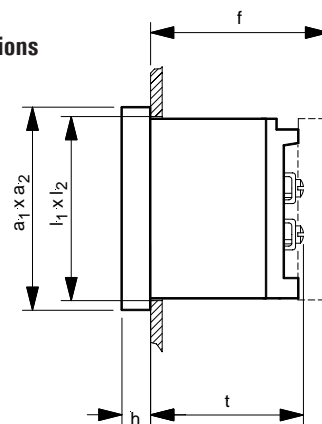
### Power Consumption

Connection	Measuring input		Power Consumption
to transformer	Current	sec.: 1 A or 5 A	approx. 2.6 VA

### Reference Conditions

Reference Quantities	Reference Conditions
Ambient Temperature	23°C ± 2°C
Position of Use	control panel vertical ± 1°
Other	DIN EN 60051

### Basic Dimensions



Front in mm	Nominal Dimensions		Cutout Dimensions, mm $l_1 \times l_2$	Installation Depth Including Terminals (t), mmM4	Installation Depth Including Full Cover (f), mm
	$a_1 \times a_2$	h			
72 x 72	72 x 72	5.5	$68^{+0.7} \times 68^{+0.7}$	53	66
96 x 96	96 x 96	5.5	$92^{+0.8} \times 92^{+0.8}$	53	66

## Basic Series • Square Panel Meters

For Alternating Current



Moving-iron bimetal movement, 90° scale white, imprint black  
Narrow front frame matt black per DIN 43 718, anti-glare glass

Range	Scale <sup>1)</sup>	Type Order No.	MEQB 72 ↓	MEQB 96 ↓
5 / 6 A, 8 or 15 min.	0 – 50 / 60 A			
5 / 6 A, 8 or 15 min.	0 – 60 / 72 A			
5 / 6 A, 8 or 15 min.	0 – 100 / 120 A			
5 / 6 A, 8 or 15 min.	0 – 150 / 180 A			
5 / 6 A, 8 or 15 min.	0 – 200 / 240 A			
5 / 6 A, 8 or 15 min.	0 – 250 / 300 A			
5 / 6 A, 8 or 15 min.	0 – 400 / 480 A			
5 / 6 A, 8 or 15 min.	0 – 600 / 720 A			
5 / 6 A, 8 or 15 min.	0 – 800 / 960 A			
5 / 6 A, 8 or 15 min.	0 – 1000 / 1200 A			
5 / 6 A, 8 or 15 min.	0 – 1200 / 1440 A			
5 / 6 A, 8 or 15 min.	0 – 1500 / 1800 A			
1 / 1.2 A, 8 or 15 min.	0 – 100 / 120 A			
1 / 1.2 A, 8 or 15 min.	0 – 150 / 180 A			
1 / 1.2 A, 8 or 15 min.	0 – 200 / 240 A			
1 / 1.2 A, 8 or 15 min.	0 – 250 / 300 A			
1 / 1.2 A, 8 or 15 min.	0 – 400 / 480 A			
1 / 1.2 A, 8 or 15 min.	0 – 600 / 720 A			
1 / 1.2 A, 8 or 15 min.	0 – 1000 / 1200 A			

All panel meters available with the following configurations:  
Front Dimensions: 72 x 72, 96 x 96  
Connected to 1 / 1.2 A or 5 / 6 A transformer  
Response Time: 8 min. or 15 min.  
Scale as requested

**Please note ordering example below:**

1) Specify unlieste scales in clear text

### Ordering Example:

Type <b>MEQB 72</b>	Text for purchase order <b>Range 5 / 6 A, Scale 0 – 800 / 960 A, 15 min.</b>
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## Basic Series • Square Panel Meters

For Direct Current or Direct Voltage



DQB 96

### Description

Analog Panel Meter with Core-Magnet Moving-Coil Movement and Spring-Loaded Pivot Bearings

### Display

Scale Division Coarse-fine

Pointer Beam pointer with knife-edge

### Mechanical Design

Housing Material Polycarbonate, self-extinguishing and drip-proof per UL94V-0

Mounting Fasteners Screw Clamp

Scale Interchangeable Scales  
⇒ Scales may only be replaced under voltage-free conditions!

Replaceable Front frames and glass windows  
⇒ May only be replaced under voltage-free conditions!

Terminals M4 screw terminals with self-lifting terminal clips.  
Screws can be turned with a cross-head or standard screw drivers.  
Bolt M6 if Measuring input > 15 A and ≤ 40 A

Contact Protection Finger-safe terminal cover included

Moving-coil movement, 90° scale white, imprint black  
Narrow front frame per DIN 43 718, anti-galre glass

Front Dimensions mm Type	48 x 48 DQB 48	72 x 72 DQB 72	96 x 96 DQB 96
Scale Length mm	42	63	97
Accuracy Class	1.5	1.5	1.5
Max. Weight (standard model)	0.1 kg	0.2 kg	0.25 kg
Max. Operating Voltage	300 V	600 V	600 V
Test Voltage	3.5 kV	5.8 kV	5.8 kV
Front Housing-Panel Protection	IP 52	IP 52	IP 52

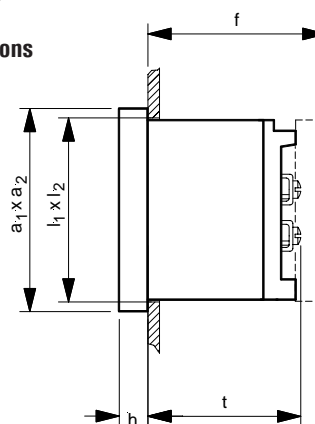
### Internal Resistance / Voltage Drop / Power Consumption

Measuring Input	Ri			Tolerance
	DQB 48	DQB 72	DQB 96	
1 mA	250 Ω	150 Ω	150 Ω	± 10 %
20 mA	2 Ω	1.5 Ω	1.5 Ω	± 10 %
4 ... 20 mA	180 Ω ... 60 Ω			
Connection to shunt	Power consumption approx. 7 mA Lead resistance 0.06 Ω (calibrated)			± 10 % ± 10 %
1 A ... 60 A	Voltage Drop approx. 60 mV			± 10 %
≥ 1 V	approx. 1000 Ω/V			± 10 %

### Reference Conditions

Reference Quantities	Reference Conditions
Ambient Temperature	23°C ± 2°C
Position of Use	control panel vertical ± 1°
Other	DIN EN 60051

### Basic Dimensions



Front in mm	Nominal Dimensions		Cutout Dimensions, mm I <sub>1</sub> x I <sub>2</sub>	Installation Depth Including Terminals (t), mmM4	Installation Depth Including Full Covers (f), mm
	a <sub>1</sub> x a <sub>2</sub>	h			
48 x 48	48 x 48	5.5	45 <sup>+0.6</sup> x 45 <sup>+0.6</sup>	53	66
72 x 72	72 x 72	5.5	68 <sup>+0.7</sup> x 68 <sup>+0.7</sup>	53	66
96 x 96	96 x 96	5.5	92 <sup>+0.8</sup> x 92 <sup>+0.8</sup>	53	66



## Basic Series • Square Panel Meters

For Direct Current or Direct Voltage

Moving-coil movement, 90° scale white, imprint black

Narrow front frame per DIN 43 718, anti-glare glass

Range	Scale <sup>1)</sup>	Type Order No.	DQB 48 ↓	DQB 72 ↓	DQB 96 ↓
1 mA	0 – 100 % <sup>2)</sup>		48010 00000 B	72010 00000 B	96010 00000 B
1 – 0 – 1 mA	100 – 0 – 100 % <sup>2)</sup>		48101 00000 B	72101 00000 B	96101 00000 B
20 mA	0 – 100 % <sup>2)</sup>		48200 00000 B	72002 00100 B	96002 00100 B
0/4 – 20 mA	0 – 100 % <sup>2)</sup>		48420 00000 B	72420 00000 B	96420 00000 B
15 A	15 A		–	72015 00000 B	96015 00000 B
25 A	25 A		–	72025 00000 B	96025 00000 B
40 A	40 A		–	72040 00000 B	96040 00000 B
Connection to shunt ... A/60 mV <sup>3)</sup>					
60 mV	0 – 10 A		48006 00010 B	72006 00010 B	96006 00010 B
60 mV	0 – 15 A		48006 00015 B	72006 00015 B	96006 00015 B
60 mV	0 – 25 A		48006 00025 B	72006 00025 B	96006 00025 B
60 mV	0 – 40 A		48006 00040 B	72006 00040 B	96006 00040 B
60 mV	0 – 60 A		48006 00060 B	72006 00060 B	96006 00060 B
60 mV	0 – 100 A		48006 00100 B	72006 00100 B	96006 00100 B
60 mV	0 – 150 A		48006 00150 B	72006 00150 B	96006 00150 B
60 mV	0 – 200 A		48006 00200 B	72006 00200 B	96006 00200 B
60 mV	0 – 250 A		48006 00250 B	72006 00250 B	96006 00250 B
60 mV	0 – 400 A		48006 00400 B	72006 00400 B	96006 00400 B
60 mV	0 – 600 A		48006 00600 B	72006 00600 B	96006 00600 B
60 mV	0 – 1000 A		48006 01000 B	72006 01000 B	96006 01000 B
60 mV	0 – 1200 A		48006 01200 B	72006 01200 B	96006 01200 B
60 – 0 – 60 mV	60 – 0 – 60 A		48600 60600 B	72600 60600 B	96600 60600 B
60 – 0 – 60 mV	100 – 0 – 100 A		48600 60100 B	72600 60100 B	96600 60100 B
10 V	10 V		48101 01010 B	72001 00000 B	96001 00000 B
25 V	25 V		48252 52525 B	72002 50000 B	96002 50000 B
40 V	40 V		48404 04040 B	72004 00000 B	96004 00000 B
60 V	60 V		48606 06060 B	72006 00000 B	96006 00000 B
500 V	500 V		–	72050 00000 B	96050 00000 B

1) Specify unlisted scales in clear text

2) Scales with special design available for an extra charge

3) Connection to shunt ... A/150 mV with measuring range 150 mV or 150 · 0 · 150 mV also available (plus extra charge for special measuring range);  
Specify in clear text in order designation

## Basic Series • Square Panel Meters

For Active Power or Reactive Power



DLMQB 96

Moving-coil movement, 90° scale white, imprint black  
Narrow front frame matt black per DIN 43718, anti-glare glass

Front Dimensions mm Type	96 x 96 DLMQB 96
Scale Length mm Accuracy Class Max. Weight (standard model) Max. Operating Voltage Test Voltage Front Housing-Panel Protection Input Meter	97 1.5 0.56 kg 600 V 5.8 kV IP 52 1 mA

### Description

Analog panel meter with core-magnet moving-coil movement and built in power converter for active and reactive power. Depending upon type of system and power, the power converter consists of one, two or three multipliers. The multipliers function in accordance with the TDM process (time division multiplier). The output signals from the multipliers are added and fed to the moving coil mechanism.

### Display

Scale Division      Coarse-fine  
Pointer                Beam pointer with edge-knife

### Mechanical Design

Housing Material    Polycarbonate, self-extinguishing and drip-proof per UL94V-0  
Mounting Fasteners   Screw Clamp  
Scale                    Interchangeable Scales  
                              ⇒ Scales may only be replaced under voltage-free conditions!  
Replaceable            Front frames and glass windows  
                              ⇒ May only be replaced under voltage-free conditions  
Terminals              M4 screw terminals with self-lifting terminal clips. Screws can be turned with a cross-head or standard screw drivers.  
Contact Protection    Finger-safe terminal cover included

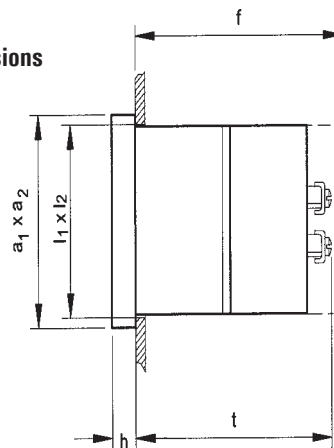
### Power Consumption

Connection	Power Consumption
Current Path Voltage Path	approx. 0.2 VA ≤ 4.3 VA

### Reference Conditions

Reference Quantities	Reference Conditions
Ambient Temperature Position of Use Frequency Current Components Voltage Components Warm-Up Time Other	23°C ± 2°C control panel vertical ± 1° 50 Hz ± 2 % 20 ... 120% of rated value 98 ... 102% of rated value ≥ 5 min. DIN EN 60051

### Basic Dimensions



Front in mm	Nominal Dimensions		Cutout Dimensions, mm $l_1 \times l_2$	Installation Depth Including Terminals (t), mm M4	Installation Depth Including Full Covers (f), mm
	$a_1 \times a_2$	h			
96 x 96	96 x 96	5.5	$92^{+0.8} \times 92^{+0.8}$	117	126



## Basic Series • Square Panel Meter

For Active Power or Reactive Power



DQB 72

Moving-coil movement, 90° scale white, imprint black

Narrow front frame matt black per DIN 43718, anti-glare glass

Front Dimensions mm Type	48 x 48 DQB 48	72 x 72 DQB 72	96 x 96 DQB 96
Scale Length mm	42	63	97
Accuracy Class	1.5	1.5	1.5
Max. Weight (standard model)	0.1 kg	0.2 kg	0.25 kg
Max. Operating Voltage	300 V	600 V	600 V
Test Voltage	3.5 kV	5.8 kV	5.8 kV
Front Housing-Panel Protection	IP 52	IP 52	IP 52
Input Meter	1 mA	1 mA	1 mA

### Description

Analog panel meter with 1mA core-magnet moving-coil movement and **separate measuring converter** for active and reactive power in a separate housing. Depending upon type of system and power the measuring converter consists of one, two or three multipliers. The multipliers function in accordance with the TDM process (time division multiplier). The output signals from the multipliers are added and fed to the moving coil mechanism.

### Display

Scale Division Coarse-fine

Pointer Beam pointer with edge-knife

### Mechanical Design

Housing Material Polycarbonate, self-extinguishing and drip-proof per UL94V-0

Mounting Fasteners Screw clamp

Scale Interchangeable scales  
⇒ Scales may only be replaced under voltage-free conditions!

Replaceable Front frames and glass windows  
⇒ May only be replaced under voltage-free conditions!

Terminals M4 screw terminals with self-lifting terminal clips. Screws can be turned with a cross-head or standard screw drivers

Contact Protection Finger-safe terminal cover included

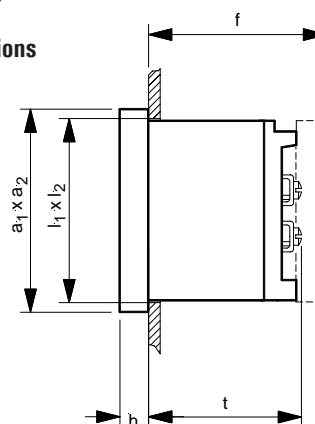
### Power Consumption

Connection	Power Consumption
Current Path	approx. 0.2 VA
Voltage Path	≤ 4.3 VA

### Reference Conditions

Reference Quantities	Reference Conditions
Ambient Temperature	23°C ± 2°C
Position of Use	control panel vertical ± 1°
Frequency	50 Hz ± 2 %
Current Components	20 ... 120% of rated value
Voltage Components	98 ... 102% of rated value
Warm-Up Time	≥ 5 min.
Other	DIN EN 60051

### Basic Dimensions




Front in mm	Nominal Dimensions		Cutout Dimensions, mm l <sub>1</sub> x l <sub>2</sub>	Installation Depth Including Terminals (t), mm M4	Installation Depth Including Full Covers (f)mm
	a <sub>1</sub> x a <sub>2</sub>	h			
48 x 48	48 x 48	5.5	45 <sup>+0.6</sup> x 45 <sup>+0.6</sup>	53	66
72 x 72	72 x 72	5.5	68 <sup>+0.7</sup> x 68 <sup>+0.7</sup>	53	66
96 x 96	96 x 96	5.5	92 <sup>+0.8</sup> x 92 <sup>+0.8</sup>	53	66

## Basic Series • Square Panel Meters

For Active Power or Reactive Power



Moving-coil movement, 90° Scale white, imprint black  
Narrow front frame matt black per DIN 43718, anti-glare glass

Type	Order No. for separate measuring converter	Front Dimensions
DQB. . . . MV-P1 W	41004 73100 B	 <p>DOB 96 96 x 96 mm</p>
DQB. . . . MV-P3 Wg	41004 73110 B	
DQB. . . . MV-P3 Wu	41004 73120 B	
DQB. . . . MV-P4 Wg	41004 73130 B	
DQB. . . . MV-P4 Wu	41004 73140 B	
DQB. . . . MV-P1 B	41004 73150 B	
DQB. . . . MV-P3 Bg	41004 73160 B	
DQB. . . . MV-P3 Bu	41004 73170 B	
DQB. . . . MV-P4 Bg	41004 73180 B	
DQB. . . . MV-P4 Bu	41004 73190 B	

Ordering Example:	
DQB 72	MV P4 Wu 0-60 kW 400 V 100/5 A
Type	Measuring Converter
Power 4-Wire	Unbalanced Load Active Power (Unbalanced Load Reactive Power)
Range	Nominal Voltage
Transformer	

DOB 72	72 x 72 mm
DOB 48	48 x 48 mm

### Notes concerning the Determination of Measuring Ranges

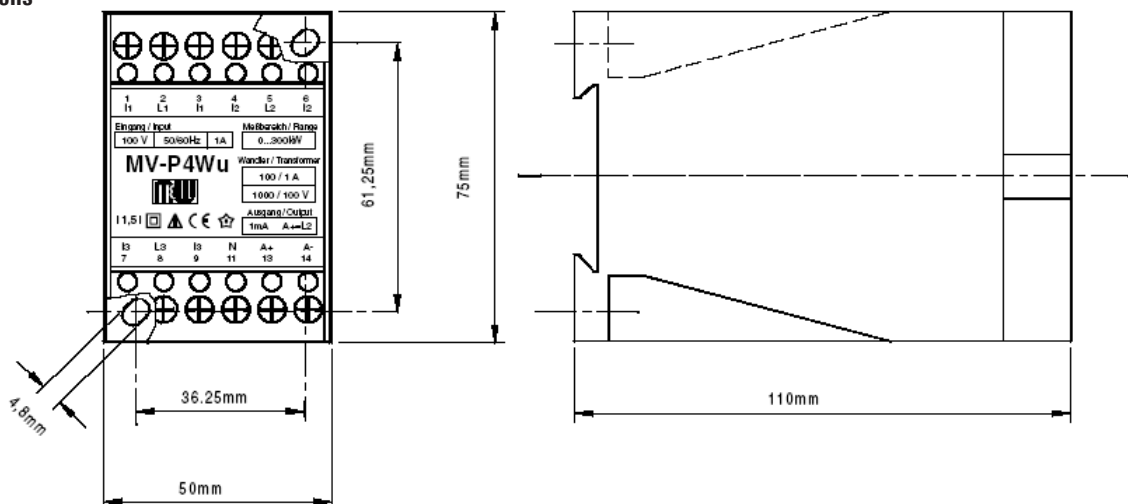
The upper measuring range should be a standard value per DIN 43 701: 1 – 1.2 – 1.5 – 2 – 2.5 – 3 – 4 – 5 – 6 – 7.5 – 8 and corresponding powers of ten. The upper measuring range value must lie within a range of 0.5 to 1.2 times apparent power. Apparent power  $P_s$  is calculated from the primary values from the current and voltage transformers:

- Single-Phase AC  $P_s = U \times I$
- Three Phase  $P_s = U \times I \times \sqrt{3}$

where U equals phase-to-phase voltage.

### Separate Measuring Converter

#### Basic Dimensions



## Basic Series • Square Panel Meter

For Power Factor



DLQB 96

### Description

Analog panel meter with core-magnet moving-coil movement and built in power factor converter. The power factor converter determines the phase angle between current and voltage.  $\cos \phi$  is displayed at the moving-coil movement.

### Display

Measuring Range CAP 0.5 ... 1 ... 0.5 IND

Scale Division Coarse-fine

Pointer Beam pointer with edge-knife

### Mechanical Design

Housing Material Polycarbonate, self-extinguishing and drip-proof per UL94V-0

Mounting Fasteners Screw clamp

Scale Interchangeable scales  
 ⇒ Scales may only be replaced under voltage-free conditions!

Replaceable Front frames and glass windows  
 ⇒ May only be replaced under voltage-free conditions!

Terminals M4 screw terminals with self-lifting terminal clips. Screws can be turned with a cross-head or standard screw drivers

Contact Protection Finger-safe terminal cover included

Moving-coil movement, 90° scale white, imprint black

Narrow front frame matt black per DIN 43 718, anti-glare glass

Front Dimensions mm	96 x 96
Type	DLQB 96
Scale Length mm	97
Accuracy Class*	2.5
Ma.Weight (standard model).	0.32 kg
Max. Operating Voltage	600 V
Test Voltage	3.5 kV
Front Housing-Panel Protection	IP 52

\*referred to measuring range

### Power Consumption

Connection	Power Consumption
Current Path	≤ 0.5 VA
Voltage Path	≤ 2.5 VA

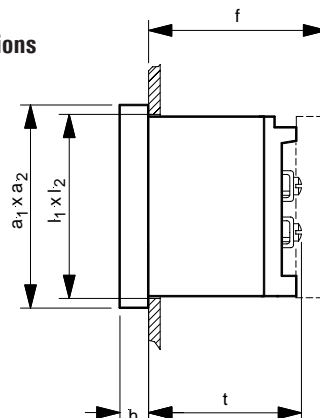
### Reference Conditions

Reference Quantities	Reference Conditions
Ambient Temperature	23 °C ± 2 °C
Position of Use	control panel vertical ± 1°
Frequency	50 Hz ± 0.1 Hz
Current Components	95 ... 100 % of rated value
Voltage Components	98 ... 102 % of rated value
Waveshape	sine. distortion factor ≤ 1%
Warm-Up Time	≥ 5 min.
Other	DIN EN 60051

### Nominal Range of Use Limits

Frequency	single phase AC 3-wire system	49 Hz ... 51 Hz 45 Hz ... 65 Hz

### Basic Dimensions



Front in mm	Nominal Dimensons		Cutout Dimensions, mm l <sub>1</sub> x l <sub>2</sub>	Installation Depth Including Terminals (t), mm M4	Installation Depth Including Full Covers (f), mm
	a <sub>1</sub> x a <sub>2</sub>	h			
96 x 96	96 x 96	5.5	92 <sup>+0.8</sup> x 92 <sup>+0.8</sup>	53	66

## Basic Series • Square Panel Meter

For Power Factor

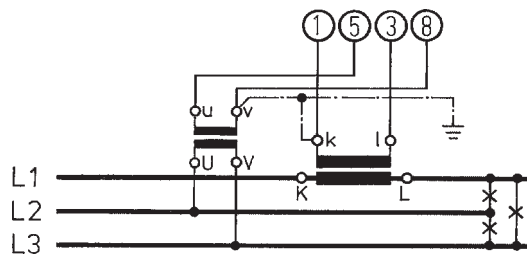


Moving-coil movement, 90° scale white, imprint black  
Narrow front frame matt black per DIN 43 718, anti-glare glass

Range	Scale	Type Order No.	DLQB 96 ↓
400 V, 1 A	0.5 ... 1 ... 0.5 cos $\phi$		96051 05300 B
400 V, 5 A	0.5 ... 1 ... 0.5 cos $\phi$		96051 05400 B

### Schematic Diagram

3-Phase 3-Wire, Balanced Load



## Basic Series • Square Panel Meter

For Frequency (Pointer-Type Frequency Meters)



FQB 96

Moving-coil movement, 90° scale white, imprint black  
Narrow front frame matt black per DIN 43 718, anti-glare glass

Front Dimensions mm	72 x 72	96 x 96
Type	FQB 72	FQB 96
Scale Length mm	63	97
Accuracy Class*	0,5	0,5
Max. Weight (standard model)	0.20 kg	0.28 kg
Power Consumption approx.	5 mA	5 mA
Max. Operating Voltage	600 V	600 V
Test Voltage	5.8 kV	5.8 kV
Front Housing-Panel Protection	IP 52	IP 52

\*referred to upper measuring range

### Description

Analog panel meter with core-magnet moving-coil movement and built in frequency converter.

### Anzeige

Scale Division Coarse-fine

Pointer Beam pointer with edge-knife

### Mechanical Design

Housing Material Polycarbonate, self-extinguishing and drip-proof per UL94V-0

Mounting Fasteners Screw clamp

Scale Interchangeable scales  
⇒ Scales may only be replaced under voltage-free conditions!

Replaceable Front frames and glass windows  
⇒ May only be replaced under voltage-free conditions!

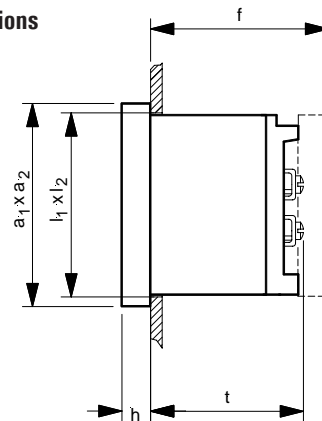
Terminals M4 screw terminals with self-lifting terminal clips. Screws can be turned with a cross-head or standard screw drivers

Contact Protection Finger-safe terminal cover included

### Reference Conditions

Reference Quantities	Reference Conditions
Ambient Temperature	23°C ± 2°C
Position of Use	control panel vertical ± 1°
Input Voltage	rated value of voltage
Waveshape	sine
Warm-Up Time	≥ 5 min.
Other	DIN EN 60051

### Basic Dimensions



Front in mm	Nominal Dimensions		Cutout Dimensions, mm l <sub>1</sub> x l <sub>2</sub>	Installation Depth Including Terminals (t), mm M4	Installation Depth Including Full Covers (f), mm
	a <sub>1</sub> x a <sub>2</sub>	h			
72 x 72	72 x 72	5.5	68 <sup>+0.7</sup> x 68 <sup>+0.7</sup>	53	66
96 x 96	96 x 96	5.5	92 <sup>+0.8</sup> x 92 <sup>+0.8</sup>	53	66

Range	Scale	Type	FQB 72	FQB 96
		Order No.	↓	↓
47 ... 50 ... 53 Hz	47 ... 50 ... 53 Hz (230 V)		72475 05313 B	96475 05312 B
57 ... 60 ... 63 Hz	57 ... 60 ... 63 Hz (230 V)		72576 35763 B	96576 35763 B
45 ... 50 ... 55 Hz	45 ... 50 ... 55 Hz (230 V)		—	96455 54555 B
55 ... 60 ... 65 Hz	55 ... 60 ... 65 Hz (230 V)		—	96556 55565 B

## Basic Series • Square Panel Meters

### Special Designs and Spare Parts

VARIANTS AND SPECIAL DESIGNS		
		<b>Identification / Order No.</b> + ↓
<b>GENERAL VARIANTS</b>		
<b>Heightened Requirements</b>		
Resistance to Vibration above 2.5 g to 5 g (only for measuring range $\geq 1$ mA and $\geq 400$ mV)		<b>LN58</b>
Tropic resistant		<b>LB4</b>
Frontpanel: IP 54, terminals: IP 00		<b>LH21</b>
<b>Special Measuring Range</b>		
Unlisted Measuring Range		<b>DC...</b>
<b>Housing Variants</b>		
<b>Front Frame</b>		
Front Frame available in grey tone (similar to RAL7037)		<b>MA11</b>
<b>Scale Variants</b>		
Scale Version 0-100 %		<b>GL310 / GMP02</b>
Standard Scale with other measured quantities (1-1.2-1.5-2-2.5-3-4-5-6-7.5 and corresponding powers of ten)		<b>GM999</b>
<b>Special Scale / Special Calibration</b>		
Special Scale (non standard range or calibration to chart or calibration curve)		<b>SD999</b>
One-off charge for special scale printing plate		<b>09000 00004</b>
<b>Marking</b>		
Red marker at: ...		<b>ST991</b>
Coloured Sectors in red, green or blue (other colours on request)		<b>SU991</b>
Additional Scale Inscription (15 characters max.)		<b>SM991</b>
Additional Numbering		<b>SK992</b>
<b>MOVING-COIL VARIANTS</b>		
<b>Zero Point</b>		
Zero point in the middle (except meters for direct current 15 A, 25 A, 40 A)		<b>BC2</b>
<b>Resistor Adjustment</b>		
Built in potentiometer for adjustment for voltmeters 1000 $\Omega$ from 6 V. Types QB 72 and QB 96		<b>MP1</b>
<b>SPARE PARTS</b>		
Interchangeable Scales with Standard Ranges	QB 48 QB 72 QB 96 MEQB 72 MEQB 96	<b>22098 86034 B</b> <b>22098 86035 B</b> <b>22098 86055 B</b> <b>22098 86036 B</b> <b>22098 86056 B</b>
Glass Window	QB 48 QB 72 QB 96 MEQB 72 MEQB 96 MQB 48 MQB 72 MQB 96 QB 72 U6 QB 96 U6	<b>00480 00000 B</b> <b>00720 00000 B</b> <b>00960 00000 B</b> <b>00072 00000 B</b> <b>00096 00000 B</b> <b>00004 80001 B</b> <b>00007 20001 B</b> <b>00009 60001 B</b> <b>72672 67267 B</b> <b>96696 69669 B</b>
Terminal Cover	QB 48 QB 72 QB 96	<b>48000 00000 B</b> <b>72000 00000 B</b> <b>96000 00000 B</b>