



## DATA SHEET



### Voltmeters and Ammeters, Moving Coil (type DQ)

- Q48, Q72, Q96, Q144
- 90° or 240° pointer
- Accuracy class 1.5
- Exchangeable scale (type -x)

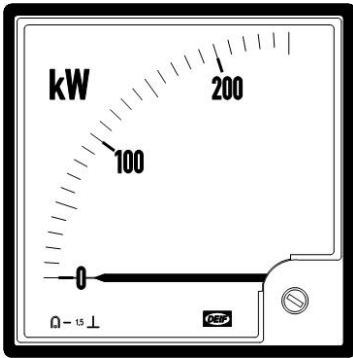


**Application:**

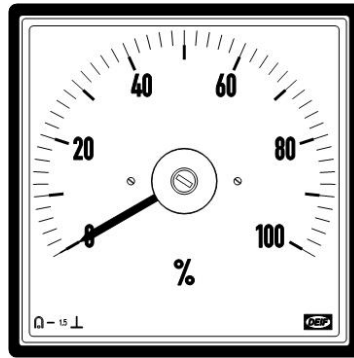
Moving-coil instruments are intended for installation in panels of power distribution or wherever AC current or AC voltages are to be measured.

DQ is applied to measure low power DC signals or AC voltage and current.

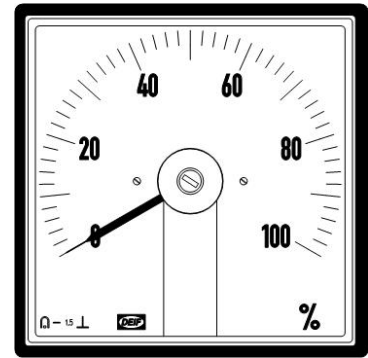
Type VDQ is a moving coil meter with rectifier applied for R.M.S. measurement of AC currents or AC voltages where low meter consumption is required.



DQ96-x (exchangeable scale), 90°



DQ96-c (non-exchangeable scale), 240°



DQ96-xc (exchangeable scale), 240°

**Variants**

Moving Coil	Q48 48 x 48 mm	Q72 72 x 72 mm	Q96 96 x 96 mm	Q144 144 x 144 mm
90°	DQ48-x	DQ72-x	DQ96-x	DQ144-x
240°	DQ48-c DQ48-xc	DQ72-c DQ72-xc	DQ96-c DQ96-xc	DQ144-c DQ144-xc
- with rectifier 90°		VDQ72-x	VDQ96-x	VDQ144-x
- with rectifier 240°		VDQ72-c VDQ72-xc	VDQ96-c VDQ96-xc	VDQ144-c VDQ144-xc

**Custom variants**

<b>Options</b>	Anti-glare glass
	IP54 from front (incl. rubber gasket)
	Adjustable red pointer (types Q48-x, Q72-x, Q96-x, Q144-x) (IP52)
	Other measuring ranges than those stated in this data sheet: ask for availability
<b>Scale design</b>	Optional graphics <ul style="list-style-type: none"> <li>- Coloured lines (red, green, yellow)</li> <li>- Coloured section (red, yellow, green)</li> <li>- Coloured figures (red, green, yellow)</li> <li>- Application text (black, red, green, yellow)</li> <li>- Single scale with double row of figures</li> <li>- Double scale with 2 rows of figures</li> <li>- Single scale with fine divisions for standard pointer</li> </ul>
	New scale design
<b>Measurement</b>	Suppressed zero (DQ.-x/DQ.-c/-xc: max. 20 %)
	Zero at centre of scale or the like
	Integrated adjustment potentiometer ( $\pm 10$ % standard, up to $\pm 50$ % on request)
	Adjusted to accuracy class 1.0 (not possible for type Q48)

## DQ technical specifications

DQ, moving coil instruments					Standards
Type:	Q48	Q72	Q96	Q144	DIN 43700
Scale	Linear				
Burden (voltmeter):	1 mA, R <sub>i</sub> : 1 kΩ/V DC				
Burden (ammeter):	60 mV DC to 0.6 V DC, 4 to 20 mA DC: 1.6 V DC for -x and 1.80 V DC for -c at 20 mA DC (electrically suppressed)				

DQ type	Size (mm)	Measuring range – V DC <sup>1) 2)</sup>	Measuring ranges – A DC <sup>1) 2)</sup>	
DQ48-x	48 x 48	60 mV to 300 V	1 mA to 600 mA,	4 to 20 mA <sup>3)</sup>
DQ72-x	72 x 72	60 mV to 300 V	1 mA to 5-7.5 A, 10-22.5 A, 25-37.5 A and 40-50 A <sup>4)</sup>	4 to 20 mA <sup>3)</sup>
DQ96-x	96 x 96	60 mV to 300 V	1 mA to 5-7.5 A, 10-22.5 A, 25-37.5 A and 40-50 A <sup>4)</sup>	4 to 20 mA <sup>3)</sup>
DQ144-x	144 x 144	60 mV to 300 V	1 mA to 5-7.5 A, 10-22.5 A, 25-37.5 A and 40-50 A <sup>4)</sup>	4 to 20 mA <sup>3)</sup>
DQ48-xc/DQ48-c	48 x 48	60 mV to 300 V	1 mA to 600 mA,	4 to 20 mA <sup>3)</sup>
DQ72-xc/DQ72-c	72 x 72	60 mV to 300 V	1 mA to 5-7.5 A, 10-22.5 A, 25-37.5 A and 40-50 A <sup>4)</sup>	4 to 20 mA <sup>3)</sup>
DQ96-xc/DQ96-c	96 x 96	60 mV to 300 V	1 mA to 5-7.5 A, 10-22.5 A, 25-37.5 A and 40-50 A <sup>4)</sup>	4 to 20 mA <sup>3)</sup>
DQ144-xc/DQ144-c	144 x 144	60 mV to 300 V	1 mA to 5-7.5 A, 10-22.5 A, 25-37.5 A and 40-50 A <sup>4)</sup>	4 to 20 mA <sup>3)</sup>

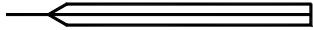
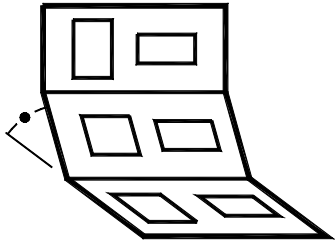
- 1) Standard measuring ranges: 1 - 1.2 - 1.5 - 2 - 2.5 - 3 - 4 - 5 - 6 - 8 and multiples of 10 thereof
- 2) Safety: Cat. III 300 V max. (515 V ph-ph (300 x √3))
- 3) 4 to 20 mA: Electrically suppressed, voltage drop at 20 mA = 1.6 V for -x and 1.80 V for -c/-xc
- 4) Higher measuring ranges: For use with standard shunt: 60 mV DC or 150 mV DC  
Supplied with shunt lead, 2 x 1 m – 1 mm<sup>2</sup> (0.035 Ω)

## VDQ technical specifications

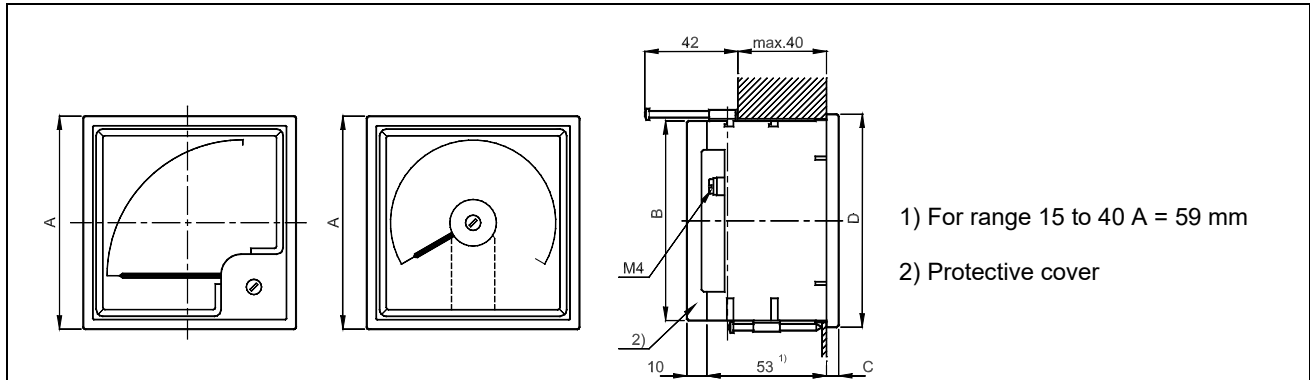
VDQ, moving coil instruments with rectifier				Standards
Type:	Q72	Q96	Q144	DIN 43700
Scale	Non-linear			
Voltmeter	25 to 300 V AC <sup>1)</sup>			
Internal resistance	R <sub>i</sub> : Approx. 1 kΩ/V AC			
Ammeter	1 to 600 mA AC			
Burden	Voltage drop: approx. 1.2 V AC			

- 1) Range <50 V AC: Max. 515 V derived from voltages with max. 300 V to earth (300 V – cat. III/600 V cat. II)

General technical specifications

Instruments are designed according to below mentioned standards					Standards
Accuracy	Class 1.5 (-10 to 15 to 30 to 55°C) ±1.5 % of full scale value (FS)				EN 60051
Sizes:	Q48	Q72	Q96	Q144	DIN 43700
Scale length -x:	48 x 48 mm	72 x 72 mm	96 x 96 mm	144 x 144 mm	
Scale length -xc:	41 mm	62 mm	92 mm	135 mm	
Scale length -xc:	75 mm	113 mm	151 mm	230 mm	
Bezels	Slim bezels				DIN 43718
Scale/pointer	 Standard pointer				DIN 43802
Mounting angle	Standard: Vertical (90 ±5°) Other angles: Specify angle to horizontal  ⊥ vertical mounting ∠ <sub>60°</sub> 60° to horizontal (e.g.) □ horizontal mounting For edgewise instruments only, furthermore specify: Horizontal or vertical scale				DIN 16257
Measuring ranges	Others on request.				DIN 43701
Protection	Standard version		IP54 version*		*) Marked with label: "IP54 from front only when rubber gasket is mounted"
(Housings)	From front	From rear	From front	From rear	
	IP52	IP52	IP54	IP52	
(Terminals)	Quadratic	Edgewise	Quadratic	Edgewise	
	IP20	IP00	IP20	IP00	EN 60529
Climate	Class HUE, short-term condensing allowed Max. 95 % RH: Max. 30 days per year Max. 85 % RH: Remaining days Max. 75 % RH: Average per year				DIN 40040
Temperature	-10 to 55°C (nominal) -25 to 60°C (operating) -25 to 65°C (storage)				EN 60051
Panel influence	The accuracy is affected neither by the material nor by the thickness of the panel				EN 60051
Shock test	15 g - 6 times - 3 directions 50 g/6 ms 22 g/20 ms				IEC 68-2-27, Test: Ea
Vibrations	3 to 13.2 Hz: 3 mm 13.2 to 100 Hz: 1 g				GL + LR: Test 1 DNV: Class A
Materials	All plastic materials are self-extinguishing				UL94 (V0)
Safety	For detailed information: please see the individual types Pollution deg. 2 Quadratic instruments are supplied with protective cover fitted over terminals				EN 61010-1
EMC	CE-classified for residential, commercial and light industry plus industrial environment				EN 61000-6-3/4 EN 61000-6-1/2

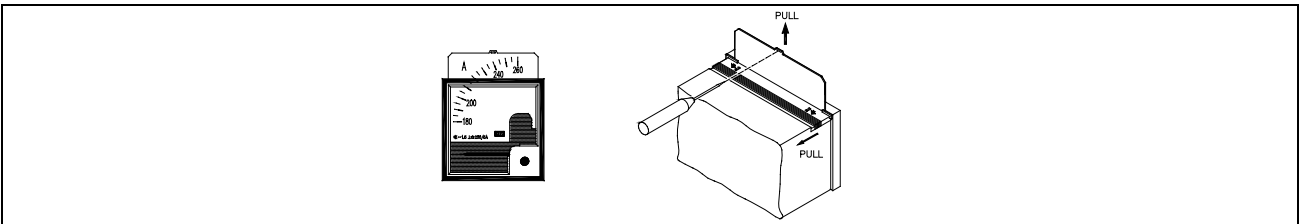
Dimensional details



All dimensions in mm

Type	A	C	B	Panel cut-out	Weight (approx.)
<b>90° instruments</b>					
Q48-x	48 x 48	5.0	42.8 x 48.8	45 x 45 +0.3	0.090 kg
Q72-x	72 x 72	5.5	66.5 x 66.5	68 x 68 +0.4	0.200 kg
Q96-x	96 x 96	5.5	90 x 90	92 x 92 +0.4	0.210 kg
Q144-x	144 x 144	8.0	136 x 136	138 x 138 +0.5	0.350 kg
<b>240° instruments</b>					
Q48-xc/c	48 x 48	5.0	42.8 x 48.8	45 x 45 +0.3	0.180 kg
Q72-xc/c	72 x 72	5.5	66.5 x 66.5	68 x 68 +0.4	0.220 kg
Q96-xc/c	96 x 96	5.5	90 x 90	92 x 92 +0.4	0.250 kg
Q144-xc/c	144 x 144	8.0	136 x 136	138 x 138 +0.5	0.400 kg

Exchange of scale



- 1) Press cover at top of instrument as shown.
- 2) Remove scale by means of a suitable tool (for example a screwdriver).
- 3) After exchange of scale: refit cover (press till it snaps into place). Calibration is not needed.

**Note:** Interrupt signal to terminals before exchanging the scale.

## Available variants

Item no.	Variant no.	Variant description
2961010420	01	DQ48-x all measuring inputs, without scale
2961010420	02	DQ48-x all measuring inputs, with standard scale
2961010420	03	DQ48-x measuring input 4 to 20 mA DC with customised scale and anti-glare glass
2961010420	04	DQ48-x with cos phi scale
2961060420	01	DQ48-c/-xc all measuring inputs, without scale
2961060420	02	DQ48-c/-xc all measuring inputs, with standard scale
2961060420	03	DQ48-c/-xc with cos phi scale
2961010720	01	DQ72-x all measuring inputs, without scale (except direct current >5 A DC)
2961010720	02	DQ72-x all measuring inputs, with standard scale (except direct current >5 A DC)
2961010720	03	DQ72-x direct current measurement with standard scale
2961010720	04	DQ72-x with cos phi scale
2961060720	01	DQ72-c/-xc all measuring inputs, without scale (except direct current >5 A)
2961060720	02	DQ72-c/-xc all measuring inputs, with standard scale (except direct current >5 A DC)
2961060720	03	DQ72-c/-xc direct current measurement with standard scale
2961060720	04	DQ72-c/-xc with cos phi scale
2961010920	01	DQ96-x all measuring inputs, without scale (except direct current >5 A DC)
2961010920	02	DQ96-x all measuring inputs, with standard scale (except direct current >5 A DC)
2961010920	03	DQ96-x direct current measurement with standard scale
2961010920	04	DQ96-x measuring input 4 to 20 mA DC with customised scale incl. anti-glare glass
2961010920	05	DQ96-x measuring input 4 to 20 mA DC with customised scale incl. anti-glare glass and red pointer in glass
2961010920	06	DQ96-x with cos phi scale
2961060920	01	DQ96-c/-xc all measuring inputs, without scale (except direct current >5 A DC)
2961060920	02	DQ96-c/-xc all measuring inputs, with standard scale (except direct current >5 A DC)
2961060920	04	DQ96-c/-xc direct current measurement with standard scale
2961060920	05	DQ96-c/-xc with cos phi scale
2961011420	01	DQ144-x all measuring inputs, without scale (except direct current >5 A DC)
2961011420	02	DQ144-x all measuring inputs, with standard scale (except direct current >5 A DC)
2961011420	03	DQ144-x direct current measurement with standard scale
2961011420	06	DQ144-x with cos phi scale
2961061420	01	DQ144-c/-xc all measuring inputs, without scale (except direct current >5 A DC)
2961061420	02	DQ144-c/-xc all measuring inputs, with standard scale (except direct current >5 A DC)
2961061420	03	DQ144-c/-xc direct current measurement with standard scale
2961061420	06	DQ144-c/-xc with cos phi scale

**Order specifications**

Variants:

Mandatory information					Additional options to the standard variant	
Item no.	Type	Variant no.	Measuring range	Scale	Option	Option

Example:

Mandatory information					Additional options to the standard variant	
Item no.	Type	Variant no.	Measuring range	Scale	Option	Option
2961060420-02	DQ48-c	02	0 to 10V DC	0 to 100 %	Glass w/red adjustable pointer	
2961010920-03	DQ96-x	03	0 to 40 A	0 to 40 A	IP54	

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