



PANEL METERS ANALOG X-SERIES

TECHNICAL INFORMATION



EQX ... Strom



EQX ... Spannung



EQX/U6



EQX/2



DQX ... Normsignal



DQX ... Direkt



DQX ...-250 Normsig.



DQX ...-250 Direkt

Types DPX available soon!
Please send your inquiry!

DPX ...

DPX ...



MOX ... an Wandler



MEQX ... an Wandler



LQX ...



FOX ...



FZQX ...



FOX/2 ...



SQX 96



NV ...



TSH ...

Panel meters analog

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2 Mains and limit monitoring

3 Energy meters

Panel meters digital

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5.1 Panel meters analog X-series

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Analog panel meters for alternating and direct current X-Series



Application

Moving-iron measuring instruments are mainly used in heavy-current installation for the measurement of alternating currents and alternating voltages (direct measurement or via current or voltage transformer). Moving-iron measuring instruments also indicate the rms value in case of non-sinusoidal quantities within a frequency range of 50 - 60 Hz.

With direct current and direct voltage, additional indication errors of approx. 1 % may occur due to magnetization errors inside the iron. As compared to moving-coil measuring instruments, the energy consumption is relatively high ranging between 0.6 VA and 2 VA. They are thus not suited for measuring small currents or voltages, like e.g. at shunts, speed sensor, thermoelements, measuring transducers.

Moving-coil measuring instruments serve for measuring direct current and direct voltage. For extending the measuring range, shunts, series resistors or voltage dividers are used. The energy consumption of moving-coil measuring instruments is very low; they may thus be connected to shunts, speed sensors, thermocouples, measuring transducers or similar. In case of non-sinusoidal variables, an rms-value rectifier is provided. It is able to still process crest factors of max. 8 without problem. The max. error amounts to less than 1% in this case.

Advantages of the X-series

- Robust plastic housing made of polycarbonate, self-extinguishing acc. to UL 94-V0
- Easily exchangeable scale
- Front frame and front glass easily to exchange
- Low glare front glass (clear glass optionally)
- Screw connections with clamps
- Simple mounting and fastening with lock clips
- Screw fastening with screw clamps possible
- Overall terminal cover included
- Protection class IP 52 on the front, IP 54 possible with accessories



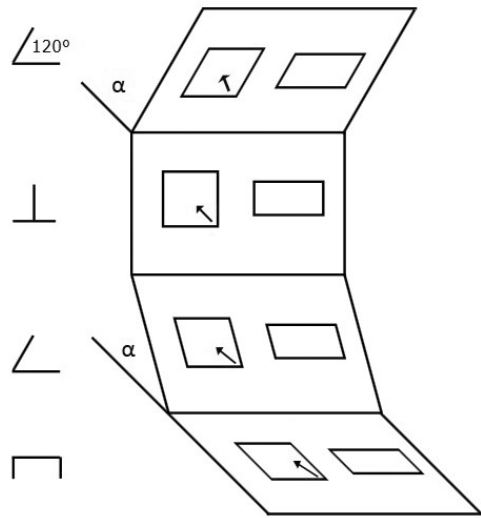
Technical data

Front frame	Dimensions acc. to DIN 43 718. The front frames are delivered als light frames in black colour for all types.
Scale, pointer	Execution acc. to DIN 43 802. The graduation is carried out as coarse graduation, the pointers as knife bar pointers.
Front glass	low glare glass
Zero point correction	All types have a zero point correction.
Connection	Screw connection with clamps
Accuracy	Acc. to DIN EN 60 051. It is defined under reference conditions, based on the measuring range end value. If the zero point is offset, the sum of the two full-scale values applies. In the case of power factor measuring devices and resistance measuring devices (scale curve strongly non-linear), the measurement error is related to the scale length.
Reference conditions	Temperature 20°C ± 2K, nominal position of use ± 1°
Influencing variables	Usage position normal vertical ± 5°, if the usage position deviates, the angle from the horizontal must be indicated. Influence of temperature, unless otherwise stated, the additional error is ≤ 1.5% at 20 °C ± 10 K ambient temperature. Ferromagnetic switchboards have no influence on the measurement accuracy.
Operating temperatur	All types work in a temperature range from -25 °C to + 55 °C (if not otherwise specified, trouble-free).
Relative humidity	75% annual mean, no condensation
Installation location	Interior, max. height of 2000 m above sea level
IP code	IP 52 on front side, IP 20 at terminals with terminal cover
	acc. to DIN EN 60529
Internal resistance	DC-voltmeters: 1000 Ω / V, higher internal resistance possible on request DC-ammeters: 0,6 to 250 Ω
Test voltage	5,3 kV AC for 1 min at 50 Hz acc. to IEC 61010-1
Vibrating resistance	1,5 g at 50 Hz
Impact resistance	15 g for 11 ms
EMC	EMC acc. to DIN EN 61 326
Overload behavior	Moving-iron meters: 2-, 5-, 6-fold overload (depending on type) continuous 10-fold overload for 2 seconds only once in lifetime Moving-coil meters: without overload Bimetall meters: 1,2-fold overload continuous



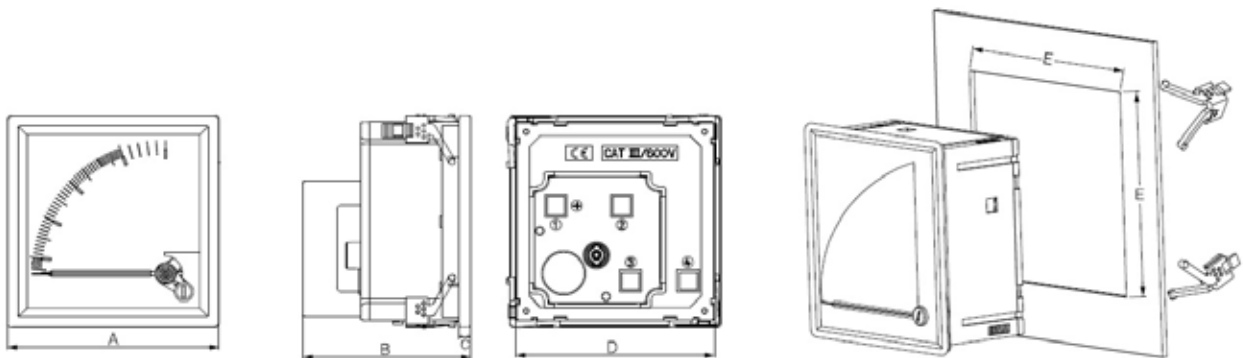
Operating position

In general, the operating position is indicated by a position symbol. For instruments without a position symbol, the reference area is any operating position between horizontal and vertical. The nominal operating position is 1° in each direction from the reference operating position, whereby the influencing effect (in addition to the display error) must not be greater than 50% of the corresponding class error.



Dimensions

for square measuring instruments



Types	Baugröße	„A“ mm	„B“ mm	„C“ mm	„D“ mm	„E“ mm
EQX, EQX-nL, DQX, DQX-250, FQX	48	48	71	5,5	44,2	45,0
EQX, EQX-nL, EQX/U6, DQX, DQX-250, MQX, MEQX, Lw(d)QX, FQX, FZQX	72	72	76	5,5	67,0	68,5
EQX, EQX-nL, EQX/U6, EQX/2, DQX, DQX-250, MQX, MEQX, Lw(d)QX, FQX, FQX/2, FZQX, FZDQX, SQX	96	96	76	5,5	90,5	92,0

1 Measuring transducers

2 Mains and limit monitoring

3 Energy meters

4 Panel meters digital

5.1 Panel meters analog X-series

6 Meas. instruments for top hat rail mounting

7 Universal measuring instruments

8 Current transformers

9 Shunts

10 Test apparatus



Special designs

Special designs			
Moving-iron	extended overload (range on request)		*
	changed measuring range		*
	* for special designs refer to WQ ... DIN - Series		
	Moving-coil		
	changed measuring range		X
	extended internal resistance		X
	central 0-point for 90° meters (if possible)		X
	General		
	red marking on scale (each)		X
	colored sector on scale (each)		X
Companies logo (one time fixed price)		X	
additional labeling up to 15 characters		X	
additional labeling of more than 15 characters		X	
additional numbering		X	
additional division and numbering		X	
illumination 24V DC (not for all types available)		X	
LED-illumination 24V DC (not for all types available)		X	
Accessories		IP code	
	IP code IP54 for sizes 48, 72 and 96		X
Fixing		Set of fixing clamps	X
	Metal screw clamps		X
	Leaf spring fastening for size 48 only (2 leaf springs)		X
General		blanc scale size 48	X
	blanc scale size 72		X
	blanc scale size 96		X
	blanc scale for DPX rectangular meters (all sizes)		X
	printed scale size 48		X
	printed scale size 72		X
	printed scale size 96		X
	printed scale for DPX rectangular meters (all sizes)		X
Replacement parts		Front glasses	
	Low glare glas size 48		X
	Low glare glas size 72		X
	Low glare glas size 96		X
	Low-glare gals for DPX rectangular meters (all sizes)		X
	Clear glas size 48		X
	Clear glas size 72		X
	Clear glas size 96		X
	Clear glas for DPX rectangular meters (all sizes)		X
	Low glare glas with adjustable red pointer size 72		X
	Low glare glas with adjustable red pointer size 96		X
Front frames		Front frame size 48	X
	Front frame size 72		X
	Front frame size 96		X
	Front frame for DPX rectangular meters (all sizes)		X
Terminal covers		Terminal cover size 48	X
	Terminal cover size 72		X
	Terminal cover size 96		X
	Terminal cover for DPX rectangular meters (all sizes)		X

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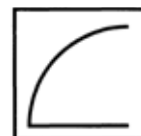


Moving-iron measuring instruments

for alternating current and alternating voltage

Type:
EQX

Square cut-out
45-65 Hz
EQX 48 class 2,5
EQX 72 / 96 class 1,5
Ammeter with 2-fold overload scale



Type	EQX 48	EQX 72	EQX 96
Front frame	48 x 48 mm	72 x 72 mm	96 x 96 mm
Cut-out	45 x 45 mm	68 x 68 mm	92 x 92 mm
Scale length	42 mm	62 mm	90 mm
Weight	0,1 kg	0,2 kg	0,25 kg



Types and variants

Alternating current direct measurement				
Measuring ranges				
mA	100 400 800	X	X	X
A	1 1,5 2,5 4 5 6 10 15 20 25 40 60	X	X	X
Other measuring ranges on request!				
Alternating current for use with current transformer				
Measuring ranges .../5 A				
.../5 A	50/5 0 - 50/100 A 60/5 0 - 60/120 A 100/5 0 - 100/200 A 150/5 0 - 150/300 A 200/5 0 - 200/400 A 250/5 0 - 250/500 A 300/5 0 - 300/600 A 400/5 0 - 400/800 A 500/5 0 - 500/1000 A 600/5 0 - 600/1200 A 800/5 0 - 800/1600 A 1000/5 0 - 1000/2000 A 1500/5 0 - 1500/3000 A 2000/5 0 - 2000/4000 A	X	X	X
Other scale ranges to be specified!				



Moving-iron measuring instruments

for alternating current and alternating voltage

Type:
EQX

1 Measuring transducers

2 Mains and limit monitoring

3 Energy meters

4 Panel meters digital

5.1 Panel meters analog X-series

6 Meas. instruments for top hat rail mounting

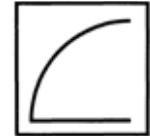
7 Universal measuring instruments

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Square cut-out
45-65 Hz
EQX 48 class 2,5
EQX 72 / 96 class 1,5
Ammeter with 2-fold overload scale



Type	EQX 48	EQX 72	EQX 96
Front frame	48 x 48 mm	72 x 72 mm	96 x 96 mm
Cut-out	45 x 45 mm	68 x 68 mm	92 x 92 mm
Scale length	42 mm	62 mm	90 mm
Weight	0,1 kg	0,2 kg	0,25 kg



Types and variants

Alternating current for use with current transformer					
Measuring ranges .../1 A					
.../1 A	50/1	0 - 50/100 A			
	60/1	0 - 60/120 A			
	100/1	0 - 100/200 A			
	150/1	0 - 150/300 A			
	200/1	0 - 200/400 A			
	250/1	0 - 250/500 A			
	300/1	0 - 300/600 A	X	X	X
	400/1	0 - 400/800 A			
	500/1	0 - 500/1000 A			
	600/1	0 - 600/1200 A			
	800/1	0 - 800/1600 A			
	1000/1	0 - 1000/2000 A			
	1500/1	0 - 1500/3000 A			
	2000/1	0 - 2000/4000 A			
Other scale ranges to be specified!					
Alternating voltage direct measurement					
Measuring ranges (without overload)					
V	30				
	60				
	100				
	110				
	150		X	X	X
	250				
	300				
	500				
	600		-		
Other measuring ranges on request!					
Alternating voltage for use with voltage transformers					
Measuring ranges (1,2-fold overload)					
.../... V	.../100		X	X	X
	.../110				
Scale ranges to be specified!					

Price group X

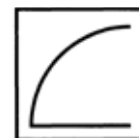


Moving-iron measuring instruments

for alternating current
with extended overload range

Type:
EQX-nL

Square cut-out
45-65 Hz
EQX 48 class 2,5
EQX 72 / 96 class 1,5
nL = n-fold overload



Type	EQX 48-nL	EQX 72-nL	EQX 96-nL
Front frame	48 x 48 mm	72 x 72 mm	96 x 96 mm
Cut-out	45 x 45 mm	68 x 68 mm	92 x 92 mm
Scale length	42 mm	62 mm	90 mm
Weight	0,1 kg	0,2 kg	0,25 kg



Types and variants

Alternating current for use with current transformer

Measuring ranges .../5 A
with 5-fold overload

.../5 A	0 - 50/250 A	0 - 60/300 A	0 - 100/500 A	0 - 150/750 A	0 - 200/1000 A	0 - 250/1250 A	0 - 300/1500 A	0 - 400/2000 A	0 - 500/2500 A	0 - 600/3000 A	0 - 800/4000 A	0 - 1000/5000 A	0 - 1500/7500 A	0 - 2000/10000 A
50/5														
60/5														
100/5														
150/5														
200/5														
250/5														
300/5														
400/5														
500/5														
600/5														
800/5														
1000/5														
1500/5														
2000/5														

Other scale ranges to be specified!

Measuring ranges .../5 A
with 6-fold overload

.../5 A	0 - 50/300 A	0 - 60/360 A	0 - 100/600 A	0 - 150/900 A	0 - 200/1200 A	0 - 250/1500 A	0 - 300/1800 A	0 - 400/2400 A	0 - 500/3000 A	0 - 600/3600 A	0 - 800/4800 A	0 - 1000/6000 A	0 - 1500/9000 A	0 - 2000/12000 A
50/5														
60/5														
100/5														
150/5														
200/5														
250/5														
300/5														
400/5														
500/5														
600/5														
800/5														
1000/5														
1500/5														
2000/5														

Other scale ranges to be specified!



Moving-iron measuring instruments

for alternating current with extended overload range

Type:
EQX-nL

Square cut-out
45-65 Hz
EQX 48 class 2,5
EQX 72 / 96 class 1,5
nL = n-fold overload



Type	EQX 48-nL	EQX 72-nL	EQX 96-nL
Front frame	48 x 48 mm	72 x 72 mm	96 x 96 mm
Cut-out	45 x 45 mm	68 x 68 mm	92 x 92 mm
Scale length	42 mm	62 mm	90 mm
Weight	0,1 kg	0,2 kg	0,25 kg



Types and variants

Alternating current for use with current transformer				
Measuring ranges .../1 A with 5-fold overload		-5L	-5L	-5L
.../1 A	50/1	0 - 50/250 A		
	60/1	0 - 60/300 A		
	100/1	0 - 100/500 A		
	150/1	0 - 150/750 A		
	200/1	0 - 200/1000 A		
	250/1	0 - 250/1250 A		
	300/1	0 - 300/1500 A	X	X
	400/1	0 - 400/2000 A		
	500/1	0 - 500/2500 A		
	600/1	0 - 600/3000 A		
	800/1	0 - 800/4000 A		
	1000/1	0 - 1000/5000 A		
	1500/1	0 - 1500/7500 A		
	2000/1	0 - 2000/10000 A		
Other scale ranges to be specified!				
Measuring ranges .../1 A with 6-fold overload		-6L	-6L	-6L
.../1 A	50/1	0 - 50/300 A		
	60/1	0 - 60/360 A		
	100/1	0 - 100/600 A		
	150/1	0 - 150/900 A		
	200/1	0 - 200/1200 A		
	250/1	0 - 250/1500 A		
	300/1	0 - 300/1800 A	X	X
	400/1	0 - 400/2400 A		
	500/1	0 - 500/3000 A		
	600/1	0 - 600/3600 A		
	800/1	0 - 800/4800 A		
	1000/1	0 - 1000/6000 A		
	1500/1	0 - 1500/9000 A		
	2000/1	0 - 2000/12000 A		
Other scale ranges to be specified!				



Moving-iron measuring instruments

with integrated selector switch for measurement of alternating voltage in three-phase power systems phase against phase as well as phase against neutral with 6 switching positions

Type:
EQX/U6

Square cut-out
45-65 Hz
Class 1,5



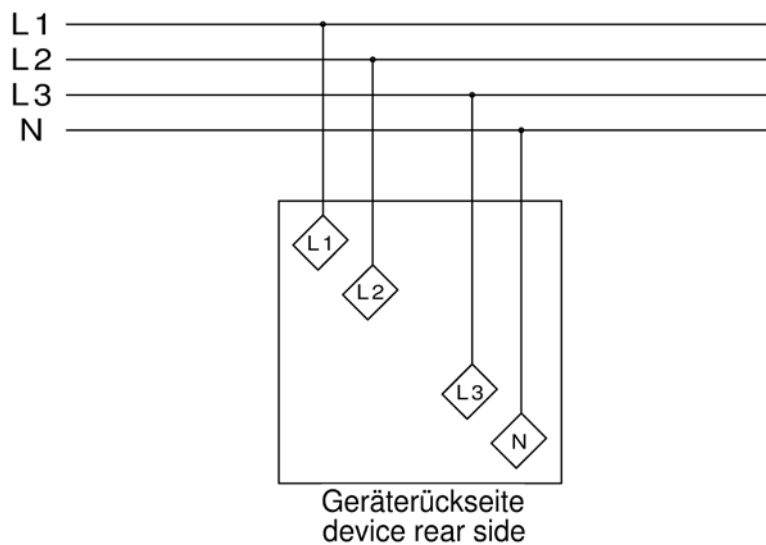
Type	EQX 72/U6	EQX 96/U6
Front frame	72 x 72 mm	96 x 96 mm
Cut-out	68 x 68 mm	92 x 92 mm
Scale length	62 mm	90 mm
Weight	0,2 kg	0,25 kg



Types and variants

Alternating voltage direct measurement			
Measuring range			
V	500	X	X
Other measuring ranges on request!			

Connection diagram EQX / U6





Moving-iron measuring instruments

double voltmeters with diagonal gauges

Type:
EQX/2

Square cut-out
45-65 Hz
Class 1,5



Type	EQX/2 96	EQX/2 144
Front frame	96 x 96 mm	144 x 144 mm
Cut-out	92 x 92 mm	138 x 138 mm
Scale length	--	--
Weight	0,4 kg	0,7 kg



Types and variants

Alternativ voltage direct measurement			
Measuring range (without overload)			
V	2 x 100 2 x 250 (230) 2 x 400 2 x 500 2 x 600	X	X
Scales ranges acc. to measuring range			
Alternating voltage with voltage transformer			
Measuring range (1,2-fold overload)			
... kV(V)/... V	2 x .../100V(120V) 2 x .../100V//√3(120V)√3 2 x .../110V(132V) 2 x .../110V//√3(132V) √3	X X X X	X X X X
Scale ranges to be specified with order			

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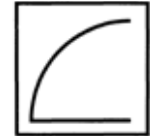


Moving-coil measuring instruments

for standard signals and connection to shunts resistors

Type:
DQX

Square cut-out
DQX 48 class 2,5
DQX 72 / 96 class 1,5



Type	DQX 48	DQX 72	DQX 96
Front frame	48 x 48 mm	72 x 72 mm	96 x 96 mm
Cut-out	45 x 45 mm	68 x 68 mm	92 x 92 mm
Scale length	42 mm	62 mm	90 mm
Weight	0,1 kg	0,2 kg	0,25 kg



Types and variants

Standard signals			
Measuring ranges			
V - „0“ left	0-10	X	X
V - „0“ at center	10-0-10	--	X
mA - „0“ left	0-20	X	X
mA - „0“ at center	20-0-20	--	X
mA	4-20	X	X

Please specify scale value and measured variable when order. If no values are specified the scale is executed with 0 - 100%.

Shunt resistors			
Measuring ranges			
mV - „0“ left	60 100 150 250	X	X
mV - „0“ at center	60-0-60 100-0-100 150-0-150 250-0-250	--	X

Please specify scale value and measured variable when order. If no values are specified, the scale is executed with the full scale value!

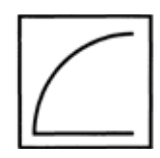


Moving-coil measuring instruments

for direct current

Type:
DQX

Square cut-out
DQX 48 class 2,5
DQX 72 / 96 class 1,5



Type	DQX 48	DQX 72	DQX 96
Front frame	48 x 48 mm	72 x 72 mm	96 x 96 mm
Cut-out	45 x 45 mm	68 x 68 mm	92 x 92 mm
Scale length	42 mm	62 mm	90 mm
Weight	0,1 kg	0,2 kg	0,25 kg



Types and variants

Direct current direct measurement				
Measuring ranges				
μA	50			
	100			
	150	X	X	X
	200			
	400			
	600			
mA	1			
	2,5			
	4			
	6			
	10			
	15			
	25			
	40	X	X	X
	60			
	100			
	150			
	250			
A	1			
	1,5			
	2,5			
	4			
	6			
	10	X	X	X
	15			
	25			
	30			
	40			
50	--			
60	--			
Other measuring ranges on request!				

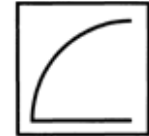


Moving-coil measuring instruments

for direct voltage

Type:
DQX

Square cut-out
DQX 48 class 2,5
DQX 72 / 96 class 1,5



Type	DQX 48	DQX 72	DQX 96
Front frame	48 x 48 mm	72 x 72 mm	96 x 96 mm
Cut-out	45 x 45 mm	68 x 68 mm	92 x 92 mm
Scale length	42 mm	62 mm	90 mm
Weight	0,1 kg	0,2 kg	0,25 kg



Types and variants

Direct voltage direct measurement				
Measuring ranges				
mV	50			
	100			
	150			
	200	X	X	X
	250			
	400			
	500			
	600			
V	1			
	1,5			
	2,5			
	4			
	6			
	10			
	15			
	25	X	X	X
	40			
	60			
	100			
	150			
	250			
	400			
	500			
600				
Other measuring ranges on request!				

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Square cut-out
DQX-250 48 class 2,5
DQX-250 72 / 96 class 1,5



Moving-coil measuring instruments

for standard signals and connection to shunt resistors
with scale 240°

Type:
DQX-250

Type	DQX-250 48	DQX-250 72	DQX-250 96
Front frame	48 x 48 mm	72 x 72 mm	96 x 96 mm
Cut-out	645 x 45 mm	68 x 68 mm	92 x 92 mm
Scale length	70 mm	105 mm	150 mm
Weight	0,2 kg	0,2 kg	0,25 kg



Types and variants

Standard signals			
Measuring ranges			
V - „0“ left	0-10	on request	X
V - „0“ at center	10-0-10	on request	X
mA - „0“ left	0-20	on request	X
mA - „0“ at center	20-0-20	on request	X
mA	0/4-20	on request	X

Please specify scale value and measured variable when order. If no values are specified the scale is executed with 0 - 100% (100 - 0 - 100%).

Shunt resistors			
Measuring ranges			
mV - „0“ left	60	on request	X
	100	on request	X
	150	on request	on request
	250	on request	on request
mV - „0“ at center	60-0-60	on request	X
	100-0-100	on request	on request
	150-0-150	on request	on request
	250-0-250	on request	on request

Please specify scale value and measured variable when order. If no values are specified, the scale is executed with the full scale value!



Moving-coil measuring instruments

for direct current with scale 240°

Type:
DQX-250

Square cut-out
DQX-250 48 class 2,5
DQX-250 72 / 96 class 1,5



Type	DQX-250 48	DQX-250 72	DQX-250 96
Front frame	48 x 48 mm	72 x 72 mm	96 x 96 mm
Cut-out	645 x 45 mm	68 x 68 mm	92 x 92 mm
Scale length	70 mm	105 mm	150 mm
Weight	0,2 kg	0,2 kg	0,25 kg



Types and variants

Direct current direct measurement		€	€	€
Measuring ranges				
μA	100	on request	on request	on request
	150			
	200			
	400			
	600			
mA	1	on request	X	X
	2,5			
	4			
	6			
	10			
	15			
	25			
	40			
	60			
	100			
	150			
A	1	on request	on request	on request
	1,5			
	2,5			
	4			
	6			
	10			
	15			
Other measuring ranges on request!				

1 Measuring transducers

2 Mains and limit monitoring

3 Energy meters

4 Panel meters digital

5.1 Panel meters analog X-series

6 Meas. instruments for top hat rail mounting

7 Universal measuring instruments

8 Current transformers

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10 Test apparatus



Moving-coil measuring instruments

for direct voltage with scale 240°

Type:
DQX-250

Square cut-out
DQX-250 48 class 2,5
DQX-250 72 / 96 class 1,5



Type	DQX-250 48	DQX-250 72	DQX-250 96
Front frame	48 x 48 mm	72 x 72 mm	96 x 96 mm
Cut-out	645 x 45 mm	68 x 68 mm	92 x 92 mm
Scale length	70 mm	105 mm	150 mm
Weight	0,2 kg	0,2 kg	0,25 kg



Types and variants

Direct voltage direct measurement		€	€	€
Measuring ranges				
mV	50	on request	X	x
	100			
	150			
	200			
	250			
	400			
	500			
	600			
V	1	on request	X	x
	1,5			
	2,5			
	4			
	6			
	10			
	15			
	25			
	40			
	60			
	100			
	150			
	250			
	400			
	500			
	600			
Other measuring ranges on request!				

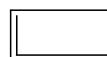
Types DPX available soon!
Please send your inquiry!

Moving-coil rectangular panel meters

for standard signals and connection to shunt resistors

Type:
DPX ...

Rectangular cut-out
Class 1,5 (DPX 4824 class 3)



Type	DPX-Q(H) 4824	DPX-Q(H) 7236	DPX-Q(H) 9624
Front frame	48 x 24 mm	72 x 36 mm	96 x 24 mm
Cut-out	45 x 22 mm	68 x 34 mm	92 x 22 mm
Scale length	32 mm	52 mm	60 mm
Weight	0,08 kg	0,12 kg	0,15 kg



Types and variants

Standard signals				
Measuring range landscape format		DPX-Q 4824	DPX-Q 7236	DPX-Q 9624
V - „0“ left	0-10	X	X	X
V - „0“ at center	10-0-10	X	X	X
mA - „0“ left	0-20	X	X	X
mA - „0“ at center	20-0-20	X	X	X
mA	0/4-20	X	X	X
Measuring range portrait format		DPX-H 4824	DPX-H 7236	DPX-H 9624
V - „0“ left	0-10	X	X	X
V - „0“ at center	10-0-10	X	X	X
mA - „0“ left	0-20	X	X	X
mA - „0“ at center	20-0-20	X	X	X
mA	0/4-20	X	X	X

Please specify scale value and measured variable when order. If no values are specified the scale is executed with 0 - 100% (100 - 0 - 100%).

Shunt resistors				
Measuring range landscape format		DPX-Q 4824	DPX-Q 7236	DPX-Q 9624
mV - „0“ left	60	X	X	X
	100	X	X	X
mV - „0“ at center	60-0-60	X	X	X
	100-0-100	X	X	X
Measuring range portrait format		DPX-H 4824	DPX-H 7236	DPX-H 9624
mV - „0“ below	60	X	X	X
	100	X	X	X
mV - „0“ at center	60-0-60	X	X	X
	100-0-100	X	X	X

Please specify scale value and measured variable when order. If no values are specified, the scale is executed with the full scale value!

Types DPX available soon!
Please send your inquiry!

Moving-coil rectangular panel meters

for direct voltage

Type:
DPX ...

1 Measuring transducers

2 Mains and limit monitoring

3 Energy meters

4 Panel meters digital

5.1 Panel meters analog X-series

6 Meas. instruments for top hat rail mounting

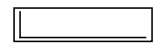
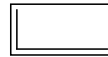
7 Universal measuring instruments

8 Current transformers

9 Shunts

10 Test apparatus

Rectangular cut-out
Class 1,5 (DPX 4824 class 3)



Type	DPX-Q(H) 4824	DPX-Q(H) 7236	DPX-Q(H) 9624
Front frame	48 x 24 mm	72 x 36 mm	96 x 24 mm
Cut-out	45 x 22 mm	68 x 34 mm	92 x 22 mm
Scale length	32 mm	52 mm	60 mm
Weight	0,08 kg	0,12 kg	0,15 kg



Types and variants

Direct voltage direct measurement		€		€		
Measuring range landscape or portrait forma		DPX-Q 4824 DPX-H 4824 (please specify when ordering)	DPX-Q 7236 DPX-H 7236 (please specify when ordering)	DPX-Q 9624 DPX-H 9624 (please specify when ordering)		
mV	0-50					
	0-150					
	0-200					
	0-250	X		X		X
	0-400					
	0-500					
	0-600					
V	0-1					
	0-1,5					
	0-2,5					
	0-4					
	0-6					
	0-10					
	0-15	X		X		X
	0-25					
	0-40					
	0-60					
	0-100					
	0-150					
	0-250					
	0-400					
0-500						
0-600						

Standard version ALWAYS with "0" left (DPX-Q) or below (DPX-H). Offset "0" on request.
Others measuring ranges on request!

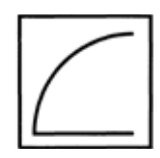


Bimetal measuring instruments

for alternating current with slave pointer (maximum current ammeter)

Type: **MQX**

Square cut-out
45-65 Hz, class 3
Ammeter with 1,2-fold overload scale
Delay time 15 min, 8 min on request with reset button



Type	MQX 48	MQX 72	MQX 96
Front frame	48 x 48 mm	72 x 72 mm	96 x 96 mm
Cut-out	45 x 45 mm	68 x 68 mm	92 x 92 mm
Scale length	42 mm	62 mm	90 mm
Weight	0,1 kg	0,2 kg	0,25 kg



Types and variants

Alternating current for use with current transformer					
Measuring ranges					
.../5 A	50/5	0 - 50/100 A			
	60/5	0 - 60/120 A			
	100/5	0 - 100/200 A			
	150/5	0 - 150/300 A			
	200/5	0 - 200/400 A			
	250/5	0 - 250/500 A			
	300/5	0 - 300/600 A	X	X	X
	400/5	0 - 400/800 A			
	500/5	0 - 500/1000 A			
	600/5	0 - 600/1200 A			
	800/5	0 - 800/1600 A			
	1000/5	0 - 1000/2000 A			
	1500/5	0 - 1500/3000 A			
	2000/5	0 - 2000/4000 A			
.../1 A	50/1	0 - 50/60 A			
	60/1	0 - 60/72 A			
	100/1	0 - 100/120 A			
	150/1	0 - 150/180 A			
	200/1	0 - 200/240 A			
	250/1	0 - 250/300 A			
	300/1	0 - 300/360 A	X	X	X
	400/1	0 - 400/480 A			
	500/1	0 - 500/600 A			
	600/1	0 - 600/720 A			
	800/1	0 - 800/960 A			
	1000/1	0 - 1000/1200 A			
	1500/1	0 - 1500/1800 A			
	2000/1	0 - 2000/2400 A			
Other scale ranges to be specified!					



Bimetal measuring instruments

with slave pointer, combined with moving-iron ammeter
(maximum and instantaneous current ammeter)

Type:
MEQX

1 Measuring transducers

2 Mains and limit monitoring

3 Energy meters

4 Panel meters digital

5.1 Panel meters analog X-series

6 Meas. instruments for top hat rail mounting

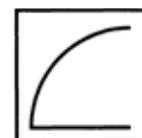
7 Universal measuring instruments

8 Current transformers

9 Shunts

10 Test apparatus

Square cut-out, 45-65 Hz
cl. 3 (Bimetal) / cl. 1,5 (Moving-iron)
1,2-fold OL(Bimetal) / 2-fold OL (Moving iron)
Delay 15 min, 8 min on request, with reset button



Type	MEQX 72	MEQX 96
Front frame	72 x 72 mm	96 x 96 mm
Cut-out	68 x 68 mm	92 x 92 mm
Scale length	62/43 mm	90/70 mm
Weight	0,2 kg	0,25 kg



Types and variants

Alternating current for use with current transformer			
Measuring ranges		Scale	
.../5 A	50/5	0 - 50/60/100 A	
	60/5	0 - 60/72/120 A	
	100/5	0 - 100/120/200 A	
	150/5	0 - 150/180/300 A	
	200/5	0 - 200/240/400 A	
	250/5	0 - 250/300/500 A	
	300/5	0 - 300/360/600 A	X
	400/5	0 - 400/480/800 A	
	500/5	0 - 500/600/1000 A	
	600/5	0 - 600/720/1200 A	
	800/5	0 - 800/960/1600 A	
	1000/5	0 - 1000/1200/2000 A	
	1500/5	0 - 1500/1800/3000 A	
	2000/5	0 - 2000/2400/4000 A	
.../1 A	50/1	0 - 50/60/100 A	
	60/1	0 - 60/72/120 A	
	100/1	0 - 100/120/200 A	
	150/1	0 - 150/180/300 A	
	200/1	0 - 200/240/400 A	
	250/1	0 - 250/300/500 A	
	300/1	0 - 300/360/600 A	X
	400/1	0 - 400/480/800 A	
	500/1	0 - 500/600/1000 A	
	600/1	0 - 600/720/1200 A	
	800/1	0 - 800/960/1600 A	
	1000/1	0 - 1000/1200/2000 A	
	1500/1	0 - 1500/1800/3000 A	
	2000/1	0 - 2000/2400/4000 A	

Other scale ranges to be specified!

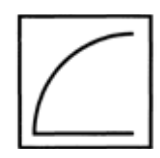


Power factor meters

for alternating and three-phase current

Type:
LwQX / LdQX

Square cut-out
50 Hz, class 2,5
Lw = alternating current
Ld = three-phase current



Type	L..QX 72	L..QX 96
Front frame	72 x 72 mm	96 x 96 mm
Cut-out	68 x 68 mm	92 x 92 mm
Scale length	62 mm	90 mm
Weight	0,25 kg	0,35 kg



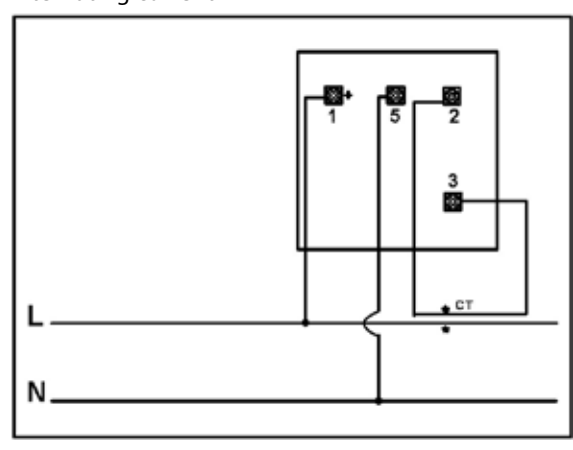
Types and variants

Alternating current		LwQX 72	LwQX 96
Measuring ranges		Scale	
5 A	230 V	0,5 cap. - 1 - 0,5 ind.	53,40
1 A	230 V	0,5 cap. - 1 - 0,5 ind.	53,40

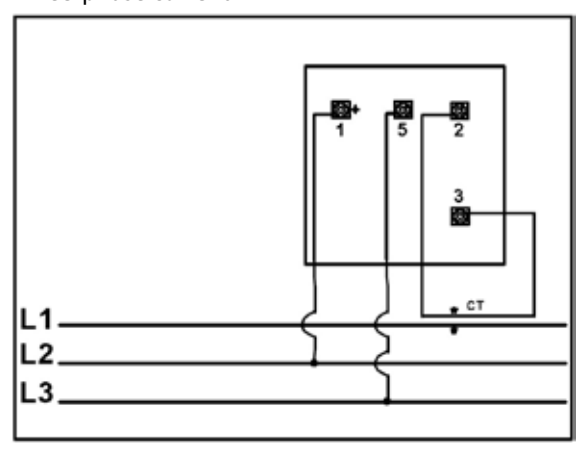
Three-phase current		LdQX 72	LdQX 96
Measuring ranges		Scale	
5 A	230 V 400 V	0,5 cap. - 1 - 0,5 ind. 0,5 cap. - 1 - 0,5 ind.	53,40
1 A	230 V 400 V	0,5 cap. - 1 - 0,5 ind. 0,5 cap. - 1 - 0,5 ind.	53,40

Connection diagrams

Alternating current



Three-phase current



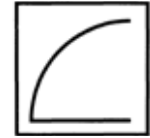


Frequency meters

Pointer frequency meters

Type:
FQX

Square cut-out
FQX 48 class 2,5
FQX 72 / 96 class 1,5



Type	FQX 48	FQX 72	FQX 96
Front frame	48 x 48 mm	72 x 72 mm	96 x 96 mm
Cut-out	45 x 45 mm	68 x 68 mm	92 x 92 mm
Scale length	42 mm	62 mm	90 mm
Weight	0,2 kg	0,35 kg	0,45 kg



Types and variants

Frequency / voltage				
Measuring range				
45 - 55 Hz	100 V	38,20	38,20	38,20
	230 V			
	400 V			
55 - 65 Hz	100 V	38,20	38,20	38,20
	230 V			
	400 V			
45 - 65 Hz	100 V	38,20	38,20	38,20
	230 V			
	400 V			

Other frequency and voltage range possible with type FZQ 72 / 96 DIN.

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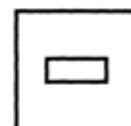
Square cut-out
Vibrating reed movement
Energy consumption 1 - 4 VA
FZQX and FZDQX 72 / 96 class 1,5

Frequency meters

Vibrating reed frequency meters

Vibrating reed double frequency meters

Type:
FZQX / FZDQX



Type	FZQX / FZDQX 72	FZQX / FZDQX 96
Front frame	72 x 72 mm	96 x 96 mm
Cut-out	68 x 68 mm	92 x 92 mm
Scale length	--	--
Weight	0,35 kg	0,45 kg



Types and variants

Other frequency and voltage ranges on request!			FZQX 72	FZQX 96
Measuring ranges		No. of reeds		
45 - 55 Hz	100 V	11		
	230 V	11	X	X
	400 V	11		
47 - 53 Hz	100 V	13		
	230 V	13	X	X
	400 V	13		
55 - 65 Hz	100 V	11		
	230 V	11	X	X
	400 V	11		
57 - 63 Hz	100 V	13		
	230 V	13	X	X
	400 V	13		
Other frequency and voltage ranges on request!				

Frequency / voltage for 2 frequencies			FZDQX 72	FZDQX 96
Measuring ranges		No. of reeds		
2 x 45 - 55 Hz	100 V	2 x 11		
	230 V	2 x 11	-	X
	400 V	2 x 11		
2 x 47 - 53 Hz	100 V	2 x 13		
	230 V	2 x 13	-	X
	400 V	2 x 13		
2 x 55 - 65 Hz	100 V	2 x 11		
	230 V	2 x 11	-	X
	400 V	2 x 11		
2 x 57 - 63 Hz	100 V	2 x 13		
	230 V	2 x 13	-	X
	400 V	2 x 13		
Other frequency and voltage ranges on request!				



Square cut-out class 0,5

Frequency meters

Double pointer frequency meters with diagonal gauges

Type:
FQX/2



Type	FQX/2 96	FQX/2 144
Front frame	96 x 96 mm	144 x 144 mm
Cut-out	92 x 92 mm	138 x 138 mm
Scale length	--	--
Weight	0,4 kg	0,7 kg



Types and variants

Frequency / voltage for 2 frequencies		FQX/2 96	FQX/2 144
Measuring ranges			
2 x 45 - 55 Hz	57 - 110 V	X	on request
	230 V	X	on request
	400 V	X	on request
	500 V	X	on request
2 x 48 - 52 Hz	57 - 110 V	X	on request
	230 V	X	on request
	400 V	X	on request
	500 V	X	on request
2 x 45 - 65 Hz	57 - 110 V	X	on request
	230 V	X	on request
	400 V	X	on request
	500 V	X	on request
2 x 55 - 65 Hz	57 - 110 V	X	on request
	230 V	X	on request
	400 V	X	on request
	500 V	X	on request
2 x 58 - 62 Hz	57 - 110 V	X	on request
	230 V	X	on request
	400 V	X	on request
	500 V	X	on request

Other frequency and voltage ranges on request!

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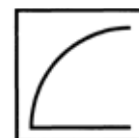


Power meters

for standard signals in connection with measuring transducers for active power or reactive power

Type:
DQX

Square cut-out
DQX 48 class 2,5
DQX 72 / 96 class 1,5



Type	DQX 48	DQX 72	DQX 96
Front frame	48 x 48 mm	72 x 72 mm	96 x 96 mm
Cut-out	45 x 45 mm	68 x 68 mm	92 x 92 mm
Scale length	42 mm	62 mm	90 mm
Weight	0,1 kg	0,2 kg	0,25 kg



Types and variants

Standard signal	€	€	€
Measuring ranges			
mA - „0“ left 0-20	X-	X	XX
mA - „0“ at center 20-0-20		X	

Standard values active power							
U [V]	I [A]	P [W/kW]	CT second.	Scale	Type of current	Load	Type Transducer
230	1	230 W	-	0-230 W	Alternating current	--	Pw-MU
	5	1,15 kW	-	0-1,15 kW			
	10	2,3 kW	-	0-2,3 kW			
	50	11,5 kW	1 / 5	0-11,5 kW			
	100	23 kW	1 / 5	0-23 kW			
400	1	692 W	-	0-700 W	3-wire 3phase current	same load	Pnz-MU
	5	3,46 kW	-	0-3,5 kW			
	10	6,92 kW	-	0-7 kW			
	50	34,6 kW	1 / 5	0-35 kW			
	100	69,2 kW	1 / 5	0-70 kW			
400	1	692 W	-	0-700 W	3-wire 3phase current	any load	Pd-MU
	5	3,46 kW	-	0-3,5 kW			
	10	6,92 kW	-	0-7 kW			
	50	34,6 kW	1 / 5	0-35 kW			
	100	69,2 kW	1 / 5	0-70 kW			
400	1	692 W	-	0-700 W	4-wire 3phase current	same load	Pz-MU
	5	3,46 kW	-	0-3,5 kW			
	10	10,38 kW	-	0-10,5 kW			
	50	34,6 kW	1 / 5	0-35 kW			
	100	69,2 kW	1 / 5	0-70 kW			
400	1	692 W	-	0-700 W	4-wire 3phase current	any load	Pdr-MU
	5	3,46 kW	-	0-3,5 kW			
	15	10,38 kW	-	0-10,5 kW			
	50	34,6 kW	1 / 5	0-35 kW			
	100	69,2 kW	1 / 5	0-70 kW			

Higher current / load values to be specified!

General information on power meters

The analog power meters are operated in combination with power measuring transducers. The power meters have a measuring input of 0-20 mA, which if fed via terminals 13 and 14 of the corresponding transducer. The combination is available for both alternating current and three-phase current. Up to 10 A a direct measurement can be carried out via the transducer, with current >10 A the use of current transformers is necessary. The power meters are also available for reactive power on request. The analog power meters can be designed with center zero-point (-20..0..20 mA) via the appropriate design of the transducer for bidirectional energy direction.



Further product information and technical data for measuring transducers for active power and reactive power can be found in the catalog from page 28.

Measuring transducers for active power

Alternating current and three-phase current

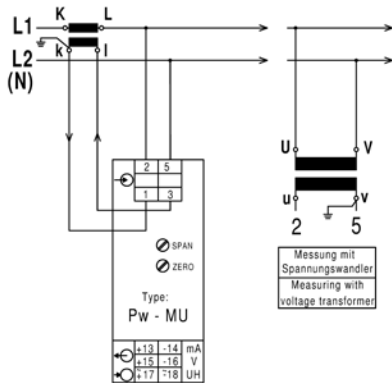
Type: **Pw-MU, Pnz-MU, Pz-MU, Pd-MU, Pdr-MU**

Input	50-150 % of the apparent power, 100 / 110 / 230 / 400 / 500 or 600 V 1 A or 5 A (primary current to be specified) Direct connection up to max. 10 A on request! Ausgang 0-20 mA und 0-10 V (auxiliary voltage not requested!)	
Output	Type	System
	Pw-MU	Alternating current system
	Pz-MU	4-wire 3-phase power system of same load
	Pnz-MU	3-wire 3-phase power system of same load
	Pd-MU	3-wire 3-phase power system of any load
	Pdr-MU	4-wire 3-phase power system of any load
	Option	bidirectional energy direction 20-0-20 mA and 10-0-10 V

Connection measuring transducers

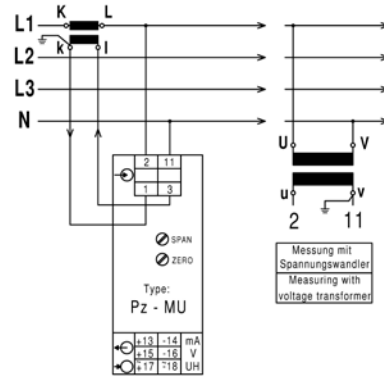
Type Pw-MU (Alternating current)

Working voltage up to 300 V (phase to neutral L - N)



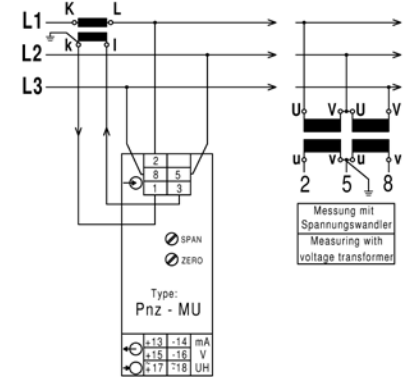
Type Pz-MU (4-wire 3-phase current, same load)

Working voltage up to 300 V (phase to neutral L - N)



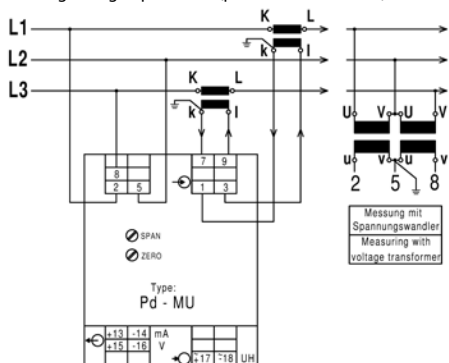
Type Pnz-MU (3-wire 3-phase current, same load)

Working voltage up to 300 V (phase to neutral L - N)



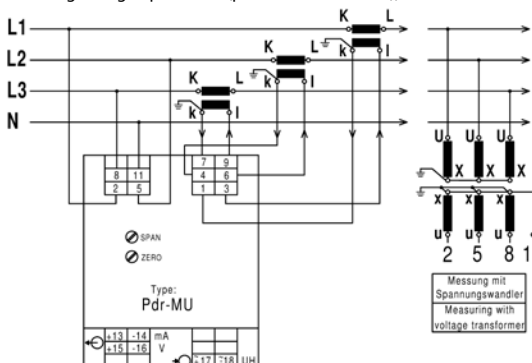
Type Pd-MU (3-wire 3-phase current, any load)

Working voltage up to 300 V (phase to neutral L - N)



Type Pdr-MU (4-wire 3-phase current, any load)

Working voltage up to 300 V (phase to neutral L - N)



Digital synchronoscope X-serie with or without display



Application

The SQX 96 without display is a microprocessor-controlled synchronoscope. It is supplied purely as a display and is used for manual or semi-automatic synchronizations. The integrated enable relay is activated as soon as the set synchronizing conditions are met. The connection is made via a terminal strip on the back of the device.

The SQX 96 with display is also equipped with an LC display. The LC display is used to show the mains voltage and the generator voltage and their frequencies. This allows two separate voltmeters and two frequency meters to be replaced.

The functions are identical to those of the SQX 96 without a display.



Function

The instrument has 24 LEDs arranged in a circle, which are used to display the instantaneous phase difference with a resolution of 20°. In the synchronization range between -20° and +20° the resolution is increased (5° el. degrees).

The green SYNC. LED lights up when synchronization conditions are met. A red ΔU LED lights up when the voltage difference exceeds the set value.

On the back of the instrument there are three potentiometers for setting the synchronization conditions:

- for setting the permissible phase difference $\Delta\varphi$
- for setting the permissible voltage difference ΔU
- for setting the switch-on delay of the relay (DELAY)

The enabling relay is activated (permanent contact) when the phase difference and the voltage difference are within the set ranges for the duration of the set delay time. The permanent contact opens again if only one value is outside this range. Activation of the relay is indicated by the instrument's SYNC LED.



Technical Data

Input values

Rated voltage Un	57 V (100 V/V $\sqrt{3}$), 63,5 V (110 V/V $\sqrt{3}$), 100 V, 110 V, 230 V, 400 V, 500 V, 600 V
Voltage range	+/- 10%
Frequency range	45 to 65 Hz
Power consumption (bus bar side)	< 4 VA
Overload conditions	1,2-fold Un continuous; 2-fold Un up to 3 sec.
Accuracy	2,5 %

LED-Display

Resolution phase difference display	20 °el. degrees
Loupe area	+/- 20 °el. degrees
Loupe area resolution	5 °el. degrees
Accuracy at $\Delta\varphi = 0$	+/- 3 °el degrees

Relay

Switching function	Permanent contact
Contact rating	10A/125V AC or 3A/250V AC or 5A/30V DC
Reaction time	< 10 ms

Synchronization settings

Voltage difference range ΔU	1 to 10%
Phase difference area $\Delta\varphi$	2 to 20 ° el. degrees
Switch-on delay of the relay	0,1 to 1,0 s

LC display

Display line 1	Mains (bus bar) voltage and mains frequency
Display line 2	Generator voltage and generator frequency

General data

Working temperature range	0 to 50 °C
Storage temperature range	-20 to 70 °C
Degree of protection	Housing IP52, terminals IP20
Position of use	vertical +/- 5°
Security	acc. to EN 61010-1, 400V CAT III, degree of pollution 2
Housing material	Hardly inflammable, self-extinguishing acc. to UL 94 V-0
Front dimensions	96 x 96 mm
Installation depth	80 mm
Panel cutout	90 x 90 mm +0,5 mm
Fixing	by snap-in clamps



Digital Synchronoscopes X-serie

with or without display

Type:
SQX 96

1 Measuring transducers

2 Mains and limit monitoring

3 Energy meters

4 Panel meters digital

5.1 Panel meters analog X-series

6 Meas. instruments for top hat rail mounting

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Square cut-out
Class 2,5



Type	SQX 96 without display	SQX 96 with display
Front frame	96 x 96 mm	96 x 96 mm
Cut-out	92 x 92 mm	92 x 92 mm
Weight	0,4 kg	0,4 kg



Types and variants

Input values				
Rated voltage +/- 10%	Frequency range			
100V/ $\sqrt{3}$ (57 V) 110V/ $\sqrt{3}$ (63,5 V) on voltage transf.	45 - 65 Hz		X	X
100 V 110 V on voltage transf.	45 - 65 Hz		X	X
230 V 400 V 500 V 600 V	45 - 65 Hz		X	X


Other voltages and frequency ranges on request!



Operating hour counter

for alternating and direct current

Type:
BWQ / BGQ

Square cut-out				
Type				B..Q 48
Front frame				48 x 48 mm
Cut-out				42 x 42 mm
Digit height				4,4 mm
Weight				0,1 kg



Types and variants

Alternating current				BWQ 48
Voltage range	Tolerance	Display	Accuracy	
230 V, 50 Hz	+/- 15%	99.999 h	0,01 h	X
Other voltage ranges on request!				

Direct current				BGQ 48
Voltage range	Tolerance	Display	Accuracy	
12 - 48 V	+/- 10%	999.999 h	0,1 h	X
Other voltage ranges on request!				

Blenden / Einbaurahmen Panels / mounting frames

fortType		55 x 55 mm	72 x 72 mm	
BWQ 48		3,10	3,10	
BGQ 48		3,10	3,10	

Design panels / mounting frames

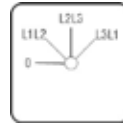




Voltmeter selector switch

Type:
NV

4-hole panel mouting



Type	NV 3	NV 6
Front plate	48 x 48 mm	48 x 48 mm
Fixing dimensions	36 x 36 mm	36 x 36 mm
No. of switching positions	4	7
Weight	0,15	0,15 kg



Types and variants

Wechselstrom				
No. of positions	Rated current	kW-rating	Switching positions	Type
NV 3 4 positions	25 A	7,5 kW	0 L1-L2 L2-L3 L3-L1	X
NV 6 7 positions	25 A	7,5 kW	L3-L1 L2-L3 L1-L2 0 L1-N L2-N L3-N	X

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Mounting kits

for analog meters

Type:
TSH-X



Application

The TSH-X mounting kit for analog meters is used to mount the devices of sizes 48, 72 and 96 on TH 25 top-hat rails in accordance with DIN EN 60715.



Function

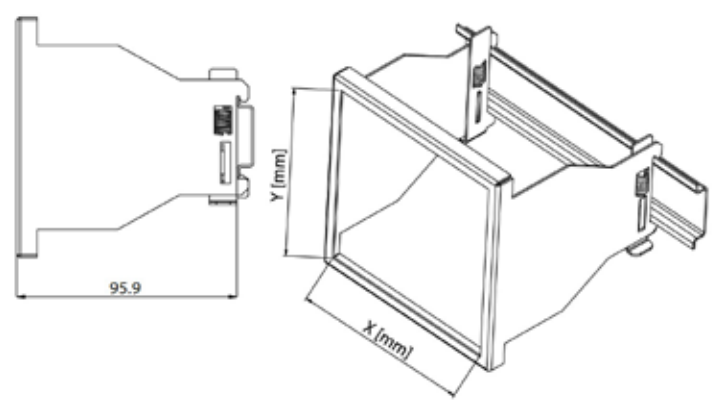
The analog device is attached to the TSH-X mounting kit with a form B screw mounting, DIN 43 835. The unit can now be snapped onto a top hat rail.

Types and variants

Type	TSH-X 48	TSH-X 72	TSH-X 96
for device size (X x Y)	48 x 48 mm	72 x 72 mm	96 x 96 mm
Total height from top of hat rail	95,9 mm	95,9 mm	96,9 mm
max. installation depth of analog device	85 mm	85 mm	85 mm
Material	Galvanized steel sheet		
Number of screw fixings	2	2	2
	X	X	X

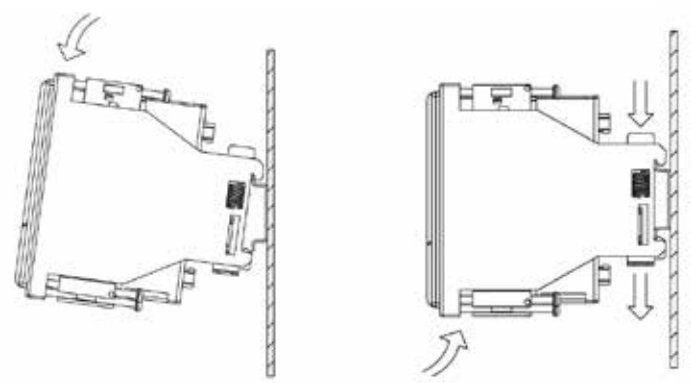


Dimensions / Mounting

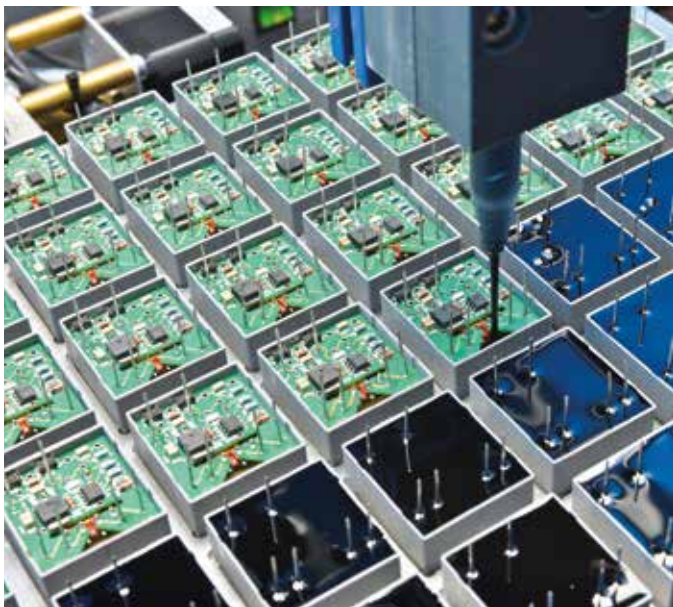
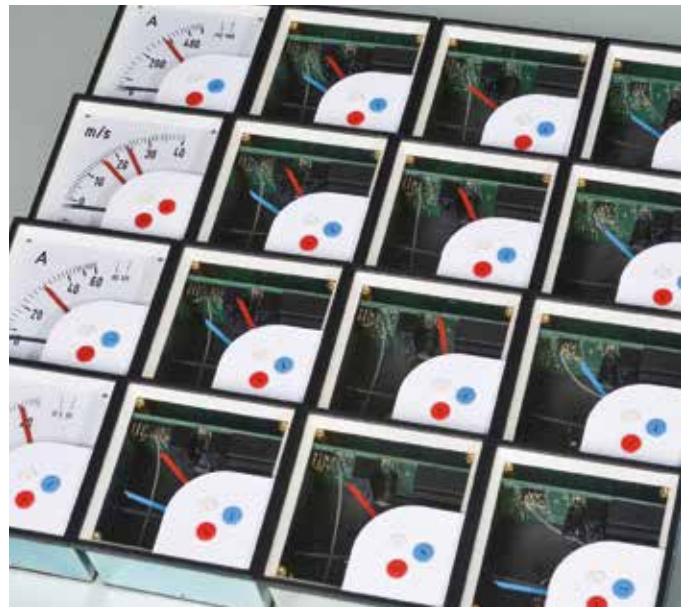
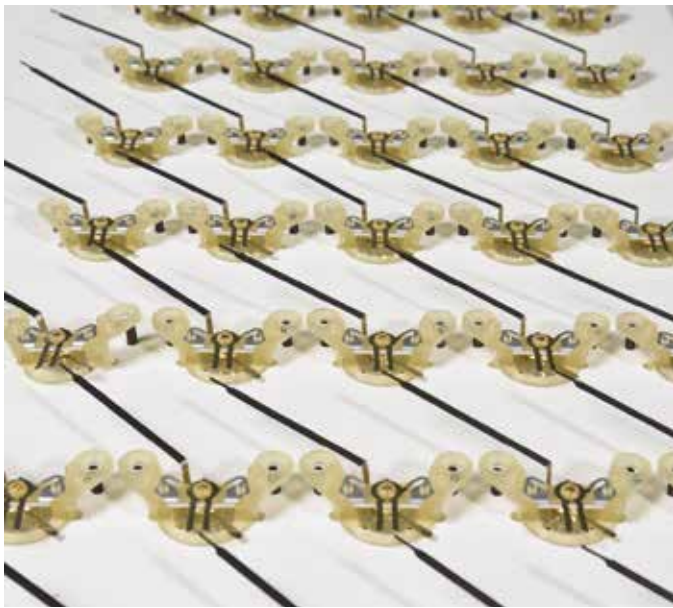


Assembly

Disassembly



Precision and service are the measure of all things





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