High Precision Current Transducers

- *Three to six channels*
- *Models from 200 A_{pk} to 1000 A_{pk}*
- *High linearity*
- *Low offset*
- *High bandwidth*
- *Low phase error*

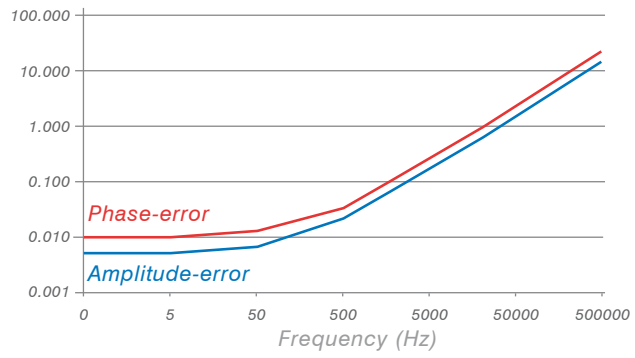
Power supply PM-MCTS

Model overview 60 A - 1000 A

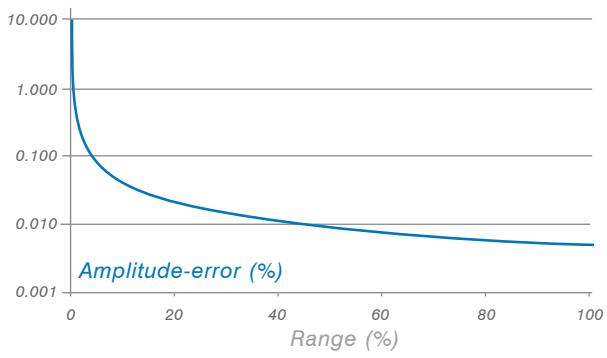
Specifications

Model	PM-MCTC 60	PM-MCTS 200	PM-MCTS 400	PM-MCTS 700	PM-MCTS 1000
Transducer	PM-867-60I	PM-867-200I	PM-867-400I	PM-867-700I	PM-867-1000IHF
Primary Current Range					
DC, Peak	60 A	200 A	400 A	700 A	1000 A
RMS Sinus	40 A	140 A	280 A	500 A	700 A
Overload Ability					
Normal Operation	110 % (220 A_{pk})	110 % (220 A_{pk})	110 % (440 A_{pk})	110 % (770 A_{pk})	110 % (1100 A_{pk})
Short Time (100 mS)	500 % (1000 A_{pk})	500 % (1000 A_{pk})	500 % (2000 A_{pk})	500 % (3500 A_{pk})	500 % (5000 A_{pk})
Bandwidth	DC … 1 MHz	DC … 1 MHz	DC … 500 kHz	DC … 250 kHz	DC … 1 MHz
Temperature Influence	1 ppm/K	1 ppm/K	1 ppm/K	1 ppm/K	1 ppm/K
Output Ratio	200 mA_{pk} bei 60 A_{pk}	200 mA_{pk} bei 200 A_{pk}	200m A_{pk} bei 400 A_{pk}	400 mA_{pk} bei 700 A_{pk}	1 A_{pk} bei 1000 A_{pk}
Linearity	0.001 %	0.001 %	0.001 %	0.001 %	0.001 %
Offset	0.004 %	0.004 %	0.004 %	0.004 %	0.004 %
Frequency Influence	0.03 %/kHz	0.03 %/kHz	0.06 %/kHz	0.12 %/kHz	0.03 %/kHz
Angular Influence	0.01° + 0.045°/kHz	0.01° + 0.045°/kHz	0.01° + 0.06°/kHz	0.01° + 0.12°/kHz	0.01° + 0.045°/kHz
Shunt	PM-MCTS-BR5	PM-MCTS-BR5	PM-MCTS-BR5	PM-MCTS-BR5	PM-MCTS-BR1

Amplitude-/ phase-error depending on frequency



Amplitude-error depending on range (DC)



Nominal Current Range	Basic Three Channel System	Additional Current Channel	Optional Shunt
60 A (Transducer PM-867-60I)	PM-MCTS-60	PM-CM-60	PM-MCTS-BR5
200 A (Transducer PM-867-200I)	PM-MCTS-200	PM-CM-200	PM-MCTS-BR5
400 A (Transducer PM-867-400I)	PM-MCTS-400	PM-CM-400	PM-MCTS-BR5
700 A (Transducer PM-867-700I)	PM-MCTS-700	PM-CM-700	PM-MCTS-BR5
1000 A (Transducer PM-867-1000IHF)	PM-MCTS-1000	PM-CM-1000	PM-MCTS-BR1

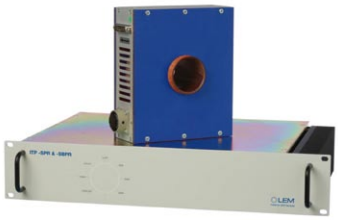
Optional Shunts	PM-MCTS-BR1	PM-MCTS-BR2.5	PM-MCTS-BR5
	1 A / 1 Ω / 1 W Shunt for MCTS 1000	800 mA / 2,5 Ω / 1 W Shunt for MCTS 700	400 mA / 5 Ω / 1 W Shunt for MCTS 200/400
Amplitude Accuracy	0.1 %	0.05 %	0.05 %
Angular Accuracy	1° at 100 kHz	1° at 100 kHz	1° at 100 kHz
Frequency Range	300 kHz / 0.5 dB	300 kHz / 0.5 dB	300 kHz / 0.5 dB

- MCTS Rack	- 1 internal Power Supply	- 1 Plug-On Shunt
- 3 internal Power Supplies	- 1 Transducer Head	
- 3 Transducer Heads	- 1 Connection Cable	
- 3 Connection Cables 10 m		
- Power Cord		

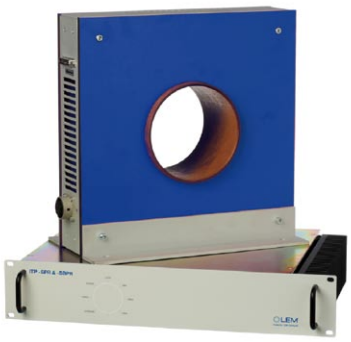
2000 A - 5000 A

ULTRASTAB SATURN	Current Output		Voltage Output	
	PM-SATURN-2000IHF	PM-SATURN-5000I-140	PM-SATURN-2000U	PM-SATURN-5000U-140
Primary Nominal current (Ipn) Programmable in steps of	2000 A 125 A	5000 A 250 A	2000 A 125 A	5000 A 250 A
Polarity	Bipolar		Bipolar	
Nom. output range	± 1.0 A	± 2.0 A	±10 V	
Max. output load	1.5 Ω	0.75 Ω	5 mA	
Overload capacity (normal operation)	15 %	15 %	15 %	15 %
Overload capacity (fault)	500 % (0.1 s)	1000 % (0.1 s)	500 % (0.1 s)	1000 % (0.1 s)
Absolute calibration (23 ºC amb.)	-	-	< 50 ppm	< 50 ppm
Linearity error	< 2 ppm	< 3 ppm	< 4 ppm	< 5 ppm
Gain accuracy	< 4 ppm	< 6 ppm	-	-
Measuring/ratio stability Vs. temp. Vs. time	 < 1 ppm/ºC < 1 ppm/month	 < 1 ppm/ºC < 1 ppm/month	 ≤ 2 ppm/ºC < 2 ppm/month	 ≤ 2 ppm/ºC < 2 ppm/month
Offset Initial Drift vs. temperature Drift vs. time	 < 2 ppm (adj.) < 0.5 ppm/ºC < 1 ppm/month	 < 2 ppm (adj.) < 0.5 ppm/ºC < 1 ppm/month	 < 2 ppm (adj.) < 0.6 ppm/ºC < 1 ppm/month	 < 2 ppm (adj.) < 0.6 ppm/ºC < 1 ppm/month
Output noise (RMS) DC - 10 Hz DC - 10 kHz DC - 50 kHz	 < 0.1 ppm < 2 ppm < 4 ppm	 < 0.1 ppm < 2 ppm < 4 ppm	 < 0.1 ppm < 2 ppm < 4 ppm	 < 0.1 ppm < 2 ppm < 4 ppm
Noise feedback to main conductor DC – 100 kHz (RMS)	 < 10 µV	 < 10 µV	 < 10 µV	 < 10 µV
Dynamic response correctly followed to 0.1%	 > 20 A / µS	 > 20 A / µS	 > 20 A / µS	 > 20 A / µS
Delay time	< 1 uS	< 1 uS	< 1 uS	< 1 uS
Bandwidth (3 dB, small signal 0.5%)	0 – 300 kHz (<5 % of Ip)	0 – 50 kHz (<5 % of Ip)	0 – 300 kHz (<5 % of Ip)	0 – 50 kHz (<5 % of Ip)
Test voltages	5 KV AC_{RMS}		5 KV AC_{RMS}	
Operating temperature Electronics Measuring heads	 10 - 40 ºC 0 - 55 ºC		 10 - 40 ºC 0 - 55 ºC	
Supply voltages	100 / 115 / 230 V_{AC}, +/-10 % -50/60 Hz		100 / 115 / 230 V_{AC}, +/-10 % - 50/60 Hz	
Supply current/power	50 VA	100 VA	50 VA	100 VA
Busbar free zone to be within linearity spec. Cylinder shape (diameter x length)	 ø 220 x 220 mm (8.6 x 8.6 in.)	 T.B.D	 ø 220 x 220 mm (8.6 x 8.6 in.)	 T.B.D
Cable length Standard Optional	 2.5 m 30 m	 2.5 m 30 m	 2.5 m 30 m	 2.5 m 30 m
Electronics Dimension Weight	 Rack mount 483 x 89 x 371 mm (19 x 3.5 x 14.6 in.) 5 kg (11.1 lb.)		 Rack mount 483 x 89 x 371 mm (19 x 3.5 x 14.6 in.) 5 kg (11.1 lb.)	
Transducer heads Dimension Weight	 With ø50 hole 165 x 200 x 50 mm (6.5 x 7.9 x 2 in.) 3.5 kg (7.72 lb.)	 With ø150 hole 350 x 350 x 92 mm (13.8 x 13.8 x 3.6 in.) 17 kg (30.86 lb.)	 With ø50 hole 165 x 200 x 50 mm (6.5 x 7.9 x 2 in.) 3.5 kg (7.72 lb.)	 With ø150 hole 350 x 350 x 92 mm (13.8 x 13.8 x 3.6 in.) 17 kg (30.86 lb.)

2 models of current transducer systems



2000 A



5000 A

Clamps & Ampflex

PNA-CLAMP-5

AC input range	0.04 to 6 A				
Output	60 mV/A				
% accuracy	0.04 to 6 A	≤ 0.5 %	Phase shift	0.04 to 6 A	≤ 0.5°
Bandwidth	40 Hz ... 10 kHz				
Working temperature	-10° to +55°C		Temperature drift	≤ 0.2 % of output signal per 10K	
Connector type	C16-1, 6+PE				
Fits to following systems	DEWE-5xx-PNA				

PNA-CLAMP-10

AC input range	0.01 to 12 A				
Output	100 mV/A				
% accuracy	0.01 to 0.1 A	≤ 3 % +0.1 mV	Phase shift	0.01 to 0.1 A	not specified
	0.1 to 1 A	≤ 2.5 %		0.1 to 1 A	≤ 5°
	1 to 5 A	≤ 1 %		1 to 5 A	≤ 3°
	5 to 12 A	≤ 1 %		5 to 12 A	≤ 3°
Bandwidth	40 Hz ... 10 kHz				
Working temperature	-10° to +55°C		Temperature drift	≤ 0.2 % of output signal per 10K	
Connector type	C16-1, 6+PE				
Fits to following systems	DEWE-5xx-PNA				

PNA-CLAMP-20 / PNA-CLAMP-20-B

AC input range	0.1 to 24 A		selectable	0.5 to 240 A	
Output	100 mV/A			10 mV/A	
% accuracy	0.1 to 20 A	≤ 1 % +50 mV		0.5 to 10 A	≤ 3 % +5 mV
				10 to 40 A	≤ 2.5 % +5mV
				40 to 100 A	≤ 2 % +5mV
				100 to 240 A	≤ 1 % +5mV
Bandwidth	40 Hz ... 10 kHz				
Phase shift	0.1 to 20 A	not specified		0.5 to 10 A	not specified
				10 to 40 A	≤ 5°
				40 to 100 A	≤ 3°
				100 to 240 A	≤ 2.5°
Working temperature	-10° to +55°C		Temperature drift	≤ 0.15 % of output signal per 10K	
Connector type	C16-1, 6+PE for PNA-CLAMP-20		Safety banana sockets (4 mm) for CLAMP-20-B		
Fits to following systems	DEWE-5xx-PNA, DEWE-5xx-PNA-1MS for PNA-CLAMP-20				
	All systems with DAQ series amplifiers for PNA-CLAMP-20-B				

PNA-CLAMP-150-DC

Current range	300 A_{DC} or AC_{peak}	Power supply OPTION for * DEWE-2600/2602: * For others:	±15 V ±10 %, external 0.5U-CLAMP-DC-POWER-4/-8 CLAMP-DC-POWER-4/-8
Cont. current measurement	150 A_{DC} or AC_{RMS}		
Overload capability	500 A_{DC} (for 1 min)		
Output sensitivity	20 mV/A (w.r.t. 0 V)	Connector	SUB $D_{(TED)}$; (SUBD modules required for TEDS support) Supply (LEMO; incl. jaws status); Adapter SUB D-banana included
Accuracy (+ 25 °C)	±1 % of reading ±2 mA		
Resolution	±1 mA		
Frequency Range	DC to 100 kHz (-1 dB)	Max. conductor size	32 mm diameter
Jaw status	0 V (Lo) / +15 V (Hi)	Relative zero correction	Auto zero at switch on

PNA-CLAMP-1000

AC input range	0.001 to 1200 A				
Output	1 mA/A				
% accuracy	1 to 100 mA	≤ 3 % +5 µA	Phase shift	1 to 100 mA	not specified
	0.1 to 1 A	≤ 2 % +3 µA		0.1 to 1 A	not specified
	1 to 10 A	≤ 1 %		1 to 10 A	≤ 2°
	10 to 100 A	≤ 0.5 %		10 to 100 A	≤ 1°
	100 to 1200 A	≤ 0.3 %		100 to 1200 A	≤ 0.7°
Bandwidth	30 Hz ... 5 kHz				
Working temperature	-10° to +50°C		Temperature drift	≤ 0.2 % of output signal per 10K	
Connector type	C16-1, 6+PE				
Fits to following systems	DEWE-5xx-PNA				

PNA-A100-200-45 / PNA-A100-200-80						
	AC input range	0.5 to 200 A		selectable	0.5 to 2000 A	
	Output	10 mV/A			1 mV/A	
	% accuracy	0.5 to 5 A	not specified		0.5 to 5 A	not specified
		5 to 200 A	≤ 1 %		5 to 2000 A	≤ 1 %
	Bandwidth	10 Hz ... 20 kHz				
	Phase shift	0.5 to 5 A	≤ 0.7°		0.5 to 5 A	≤ 0.7°
		5 to 200 A	≤ 0.7°		5 to 2000 A	≤ 0.7°
	Working temperature	-10° to +55°C (maximum temperature for sensor is 90°C)				
	Temperature drift	≤ 0.5 % of output signal per 10K				
	Connector type	Safty banana jacks (4 mm)		Length of coil	45 cm for PNA-A100-200-45	
	Fits to following systems	All systems with DAQ series amplifiers			80 cm for PNA-A100-200-80	

PNA-A100-300-45 / PNA-A100-300-80						
	AC input range	0.5 to 200 A		selectable	0.5 to 2000 A	
	Output	10 mV/A			1 mV/A	
	% accuracy	0.5 to 5 A	not specified		0.5 to 5 A	not specified
		5 to 200 A	≤ 1 %		5 to 2000 A	≤ 1 %
	Bandwidth	10 Hz ... 20 kHz				
	Phase shift	0.5 to 5 A	≤ 0.7°		0.5 to 5 A	≤ 0.7°
		5 to 200 A	≤ 0.7°		5 to 2000 A	≤ 0.7°
	Working temperature	-10° to +55°C (maximum temperature for sensor is 90°C)				
	Temperature drift	≤ 0.5 % of output signal per 10K				
	Connector type	Safty banana jacks (4mm)		Length of coil	45 cm for PNA-A100-300-45	
	Fits to following systems	All systems with DAQ series amplifiers			80 cm for PNA-A100-300-80	

PNA-A100-1000-120						
	AC input range	0.5 to 1000 A		selectable	0.5 to 10000 A	
	Output	10 mV/A			1 mV/A	
	% accuracy	0.5 to 5 A	not specified		0.5 to 5 A	not specified
		5 to 1000 A	≤1 %		5 to10000 A	≤ 1 %
	Bandwidth	10 Hz ... [45 ... 65] ... 20 kHz				
	Phase shift	0.5 to 5 A	≤ 0,5°		0.5 to 5 A	≤ 0,5°
		5 to 1000 A	≤ 0,5°		5 to10000 A	≤ 0,5°
	Working temperature	-10° to +55°C (maximum temperature for sensor is 90°C)				
	Temperature drift	≤ 0.5 % of output signal per 10K				
	Connector type	Safty banana jacks (4 mm)		Length of coil	120 cm	
	Fits to following systems	All systems with DAQ series amplifiers				

PNA-FLEX-MINI-300-70						
	AC input range	0.5 to 300 A		selectable	0.5 to 3000 A	
	Output	10 mV/A			1 mV/A	
	% accuracy	0.5 to 5 A	not specified		0.5 to 5 A	not specified
		5 to 300 A	≤ 1 %		5 to 3000 A	≤ 1 %
	Bandwidth	10 Hz ... 20 kHz				
	Phase shift	0.5 to 5 A	≤ 0.7°		0.5 to 5 A	≤ 0.7°
		5 to 300 A	≤ 0.7°		5 to 3000 A	≤ 0.7°
	Working temperature	-10° to +55°C (maximum temperature for sensor is 90°C)				
	Temperature drift	≤ 0.5 % of output signal per 10K				
	Connector type	C16-1, 6+PE		Length of coil	69 cm	
	Fits to following systems	DEWE-5xx-PNA DEWE-5xx-PNA-1MS				

PNA-FLEX-300-45 / PNA-FLEX-300-45						
	AC input range	0.5 to 300 A		selectable	0.5 to 3000 A	
	Output	10 mV/A			1 mV/A	
	% accuracy	0.5 to 5 A	not specified		0.5 to 5 A	not specified
		5 to 300 A	≤ 1 %		5 to 3000 A	≤ 1 %
	Bandwidth	10 Hz ... 20 kHz				
	Phase shift	0.5 to 5 A	≤ 0.7°		0.5 to 5 A	≤ 0.7°
		5 to 300 A	≤ 0.7°		5 to 3000 A	≤ 0.7°
	Working temperature	-10° to +55°C (maximum temperature for sensor is 90°C)				
	Temperature drift	≤ 0.5 % of output signal per 10K				
	Connector type	C16-1, 6+PE		Length of coil	45 cm for PNA-FLEX-300-45	
	Fits to following systems	DEWE-5xx-PNA DEWE-5xx-PNA-1MS			80 cm for PNA-FLEX-300-80	