

Technical Data

On-Line UPS-system MLM 10 - 20

On-Line UPS-system in double conversion technology according to DIN EN 62040-3 (VFI-SS-111) with sinusoidal output voltage in each operation mode, LCD display, RS232 interface, USB connection, alarm contacts, emergency stop function, shutdown-software for Windows NT/2000/XP/2003/ Vista, Novell und Linux system software.



Optionally up to 6 systems may be switched in parallel.

The operation modes on-line, line-interactive, smart active or emergency supply (Standby) can be adjusted with the means of the display.

Back-up time of the system can be increased by connecting additional external battery modules.

model	MLM 10	MLM 12	MLM 15	MLM 20
nominal rating in kVA	10	12	15	20
nominal rating in kW	8	9,6	12	16

back-up time in minutes with standard batteries	MLM 10	MLM 12	MLM 15	MLM 20
100 % load	12	9	5	5
50% load	27	22	16	16

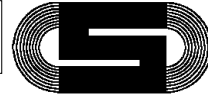
input rectifier	MLM 10	MLM 12	MLM 15	MLM 20
number of phases	3 + N			
nominal voltage	380 / 400 / 415 V			
tolerance of input voltage by 100 % load	± 20% (320 – 480 V at 400 V nominal voltage)			
tolerance of input voltage by 50 % load	- 40% / +20% (240 – 480 V at 400 V nominal voltage)			
nominal frequency	50 or 60 Hz automatic recognition			
tolerance of frequency	± 20% 40 – 72 Hz			
nominal input current [3-phase]	15	17	22	29
maximum inrush current [3-phase]	20	24	29	38
inrush current	< I _n (Softstart)			
power factor (cos φ)	≥ 0,99			
harmonical distortion THDI	≤ 3 %			



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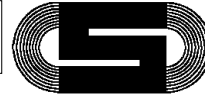
model	MLM 10	MLM 12	MLM 15	MLM 20
„Hold-Up time“ back-up time without switching on battery – no interruption of the output voltage occurs	20 ms			
output				
number of phases	single phase			
nominal voltage	220 / 230 / 240 V			
wave form of output voltage	sinus			
tolerance of output voltage [static]	± 1%			
tolerance of output voltage [dynamic] (load impact 0 to 100%)	± 3%			
voltage reset after dynamic variation	< 10ms			
voltage distortion at linear load	≤ 1%			
voltage distortion at non-linear load	≤ 3%			
nominal frequency	50 or 60 Hz			
tolerance of frequency at nominal operation	±2 % (adjustable from ± 1% to ± 5%)			
rate of frequency adjustment	2 Hz /second			
tolerance of frequency at battery operation	50 or 60 Hz ± 0,01%			
crest factor by nominal rating (I_{max}/I_{rms})	3 : 1			
short-circuit current	1,5 x In for 0,5 sec			
efficiency				
system at 100% load	93,3 %	93,5 %	93,8 %	94,0 %
power loss in kW	0,58	0,69	0,79	1,02
effectiveness in Line-Interactiv operation				
load 100%	98 %			
overload				
inverter by power factor (cos φ) 0,8	110 %: for 10 minutes 133 % for 1 minute 150 % for 1 second > 150 % for 0,5 seconds			



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Bypass (static)				
nominal rating in kVA	10	12	15	20
nominal voltage	220 / 230 / 240 V			
number of phases	Single phase			
accepted voltage range	180 till 264 V			
Range of input frequency	± 5 % (selectable from ± 0,25 % till ± 10 %)			
bypass overload	110 % endless 133 % for 60 minutes 150 % for 10 minutes > 150 % for 2 seconds			
Bypass (manuell)				
Manual button to carry out maintenance work at the UPS without interrupting the power supply to the load.	Ja			
battery				
nominal voltage	480			
number of modules	40			
nominal capacity per module	7 Ah	7 Ah	7 Ah	9 Ah
configuration	Series connection with center tapping			
type	Closed maintenance free lead acid battery			
type of recharge	Temperature compensated charge			
charge current by rated load	6 A			
charging time	3 - 6 hours			
LCD display				
Big graphic LCD display	information, measured values, operation- and alarm status can be displayed in five different languages. The last 120 messages are stored.			
LED display				
icons with LED's for	<ul style="list-style-type: none"> - mains operation - battery operation - load on bypass - standby / alarm - exchange battery - ECO-modus 			
operational elements				
power switch / fuses	<ul style="list-style-type: none"> - mains input (SWIN) - output inverter (SWOUT) - Manual bypass (SWMB) - battery safety disconnecter 			
buttons for LCD display	4 buttons for fast access on data			



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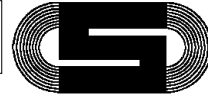
model	MLM 10	MLM 12	MLM 15	MLM 20
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interfaces				
Sub-D 9 Pin female connector	RS232 interfaces			
USB-female connector	serial interfaces			
Sub-D 15 Pin female connector	potential-free alarm interface for: <ul style="list-style-type: none"> - mains failure (changer) - low battery (changer) - system on bypass (changer) - auxiliary supply (12V/100mA) for long distance signal - input for long distance signal (Stop inverter) - input for long distance signal (Stop UPS) 			
2 Slots	2 slots for communication cards			
Emergency Stop	clamps			

connections				
minimum diameter, dimension in mm ²				
input L1	10	16	16	25
input L2, L3	2,5	4	4	6
input N	10	16	16	25
input PE	10	16	16	25
output L	10	16	16	25
output N	10	16	16	25
output PE	10	16	16	25
battery +/-	4	6	6	10
battery N	4	6	6	10
battery PE	4	6	6	10
Size of the clamps in mm ²	10	10	10	10
Low heat device socket with 10 A	2 x IEC 320			

protection	
protections	<ul style="list-style-type: none"> - overload of battery - overload of inverter (peak value) - voltage of inverter out of the tolerance range - deep discharge protection of the batteries - short-circuit - high temperature - failure by-pass
surge voltage stability	IEC 801-5 6 KV 1.2 / 50 μsec; 3 KA 8/20 μsec
vibration stability	< 2 g

norms	
safety	EN 62040-1-1; EEC regulation 73/23/EEC; 93/68/EEC
EMV / RFI	EN 62040-2 cl A; regulation 2004/108/EEC, 93/68/EEC and 89/336/EEC
operation requirements	EN 62040 – 3 VFI-SS-111



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environmental conditions				
operation temperature	0 till 40 °C			
recommended environmental temperature	20 till 25°C			
maximum relative humidity	95 % (without condensation)			
maximum installation height	Bis 1000 m at nominal load (-1% for each 100 Meter above 1000 m) - max. 4000 m			
cooling	forced air circulation (load-dependent arranged)			
noise in 1m distance (depending on load and temperature)	≤ 48		≤ 52	

cabinet	
material	sheet steal
colour	RAL 7016 (Anthrazit grey)
protection class	IP 20
the rear side of the system must at least have a distance to the wall of 40 cm	

dimensions	
dimensions (H x B x T) in mm	930 x 320 x 840

weight				
UPS-system without battery	80	82	90	95
UPS-system with standard battery	180	182	190	200

included in delivery	
guide in German	yes
RS232 connection cable	yes
Shutdown-Software for Windows NT / 2000 / 2003 / XP, Vista, Novell and Linux.	yes

options

MLT with output transformer	MLM 10-OT	MLM 12-OT	MLM 15-OT	MLM 20-OT
Separation transformer is built in the cabinet, instead of the internal batteries for the galvanical separation from the mains.			X	
Weight of the UPS with output transformer in kg	145	165	190	215

MLT with 6 A additional charger	MLM 10-AC	MLM 12-AC	MLM 15-AC	MLM 20-AC
Additional charger is built in the cabinet, instead of internal batteries			X	
Weight of the UPS with additional charger in kg	145	165	190	215



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model	MLM 10	MLM 12	MLM 15	MLM 20
options				
external service by-pass				
manual by-pass switches the load from the inverter to the mains power supply without interrupting the output power supply in case of maintenance.				
dimension (H x B x T) in mm	400 x 300 x 210	500 x 500 x 310		
weight	20 kg	30 kg		
Parallel connection				
	Up to 6 UPS-systems with the same rating can be switched in parallel to increase the safety or to increase the rating.			
SNMP Interfacebox				
for direkt connection to a network	X			
Software				
network version of PowerShield3 Shutdown-Software for Windows NT/2000/2003/XP, Vista, Novell, UNIX and Linux system software.	X			
RS232 Multiplexer				
Multicom 352 Interface-card for the duplication of the existing interfaces	X			
MODBUS / JBUS connection				
Multicom 302 Interface-card for the connection at MODBUS / JBUS	X			
ProfiBUS Converter				
ProfiBUS Converter The connection is realized on Multicom 301 or 302, which is also needed additionally	X			
Relais card				
Multicom 382 Interface card with relay outputs (3A / 230V DC) and emergency Stop connection	X			



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options				
Remote display				
Multi Panel: Remote display with a graphical screen			X	
Multi I/O				
8 programmable relay outputs 8 digital/analogue inputs (0 to 5V DC) 1 RS232 interface to the UPS system 1 RS232 interface for control 1 RS232/RS485 interface for control			X	
AS/400				
Cable set for the connection at AS/400 systems			X	



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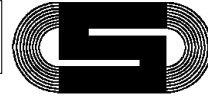
Extended back-up time

Model	Back-up time in minutes	dimensions In mm	weight in kg
MLM 10 kVA	0'	930 x 320 x 840	80
	12'	930 x 320 x 840	180
	15'	930 x 320 x 840	185
	35'	2 x 930 x 320 x 840	180 + 150
	60'	2 x 930 x 320 x 840	185 + 270
	120'	930 x 320 x 840 + 1600 x 650 x 750	80 + 730
	195'	930 x 320 x 840 + 1600 x 650 x 750	80 + 1100

MLM 12 kVA	0'	930 x 320 x 840	82
	9'	930 x 320 x 840	182
	12'	930 x 320 x 840	187
	30'	2 x 930 x 320 x 840	187 + 150
	50'	2 x 930 x 320 x 840	187 + 270
	105'	930 x 320 x 840 + 1600 x 650 x 750	82 + 730
	165'	930 x 320 x 840 + 1600 x 650 x 750	82 + 1100

MLM 15 kVA	0'	930 x 320 x 840	90
	5'	930 x 320 x 840	190
	8'	930 x 320 x 840	195
	20'	2 x 930 x 320 x 840	195 + 150
	32'	2 x 930 x 320 x 840	195 + 270
	60'	930 x 320 x 840 + 1600 x 650 x 750	90 + 730
	120'	930 x 320 x 840 + 1600 x 650 x 750	90 + 1100

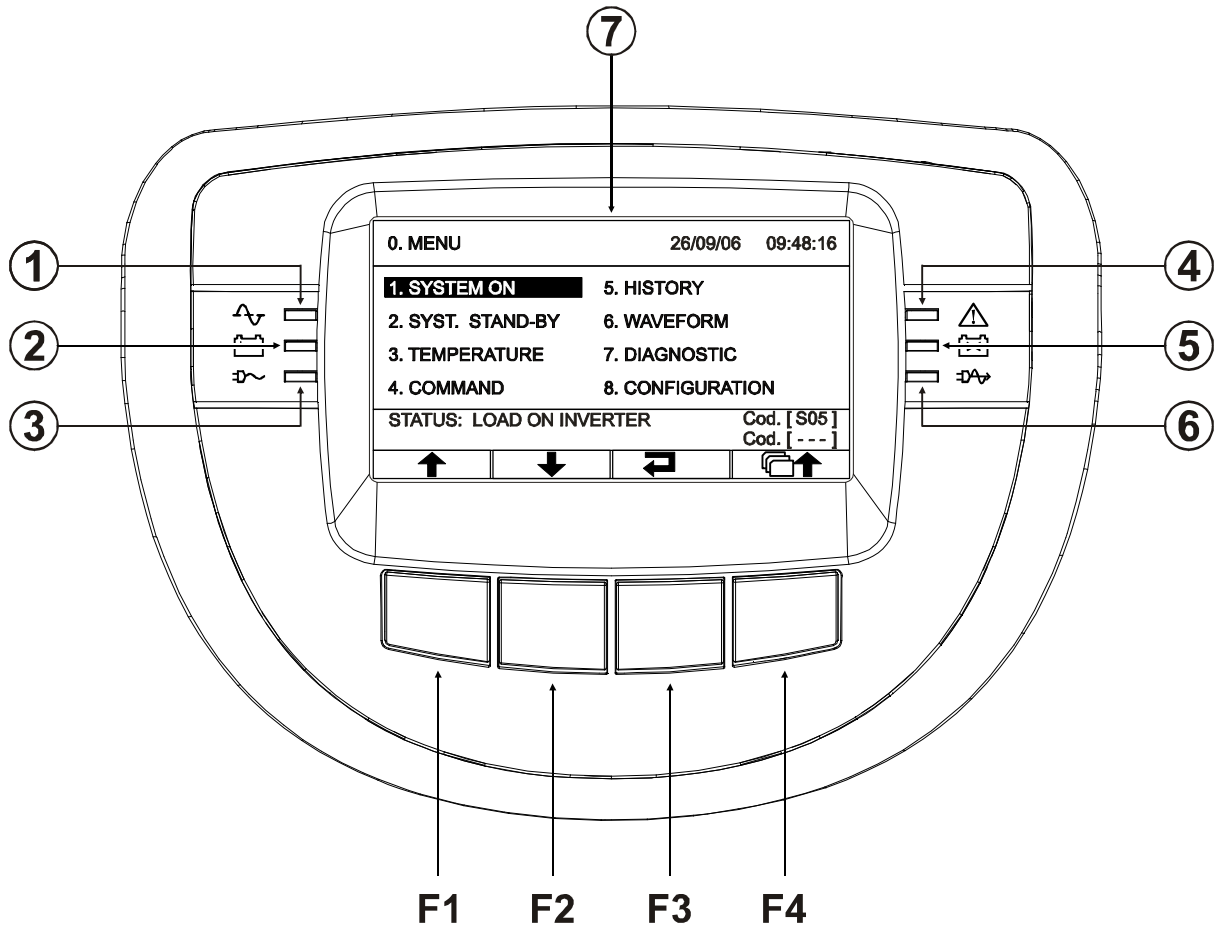
MLM 20 kVA	0'	930 x 320 x 840	95
	5'	930 x 320 x 840	200
	15'	2 x 930 x 320 x 840	200 + 150
	26'	2 x 930 x 320 x 840	200 + 270
	40'	930 x 320 x 840 + 1600 x 650 x 750	95 + 730
	73'	930 x 320 x 840 + 1600 x 650 x 750	95 + 1100



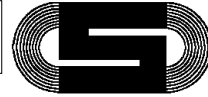
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indication- and control panel



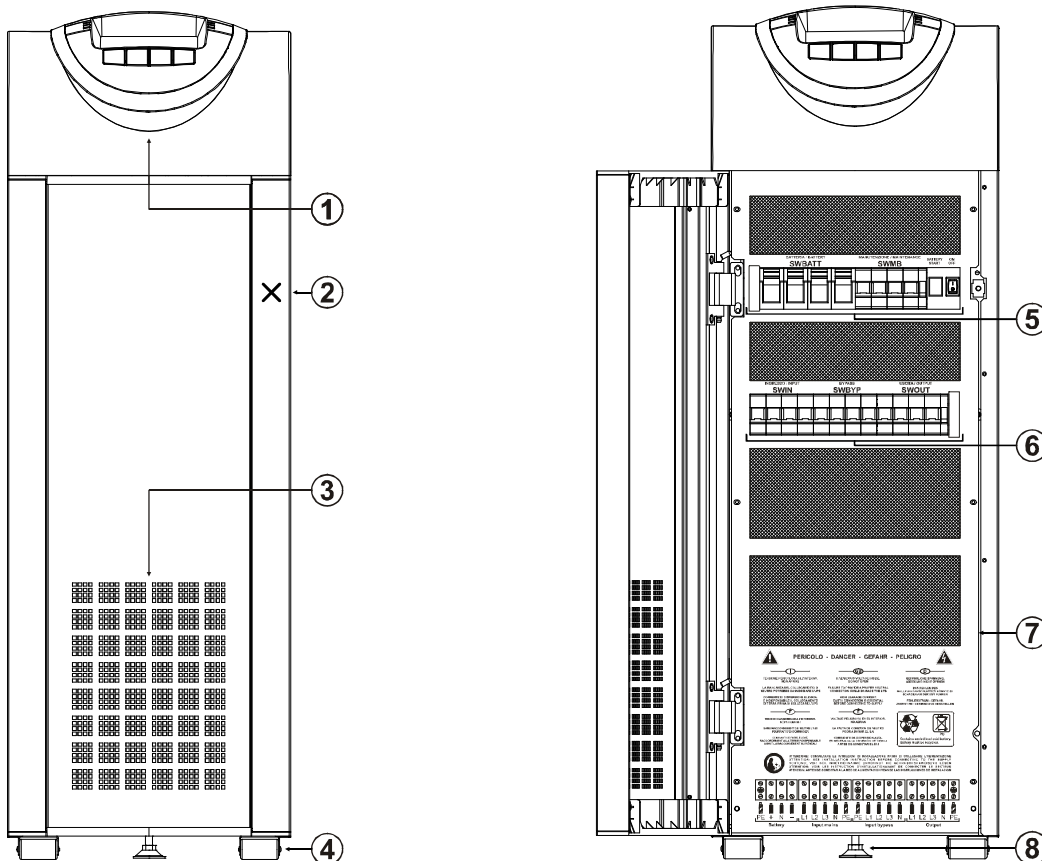
- | | |
|-------------------------|------------------------|
| ① LED mains operation | ⑤ LED exchange battery |
| ② LED battery operation | ⑥ LED ECO-modus |
| ③ LED load on bypass | ⑦ picture-display |
| ④ LED standby / alarm | |



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front elevation



① Panel with graphic display

② Front door (press it to open the door and loosen the part which is signed with a **X**)

③ Ventilation grill

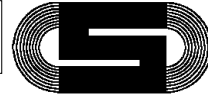
④ Rolls to forward the UPS

⑤ From left:
Separation switch, Battery safety fuse, manual bypass switch, button for start with battery (COLD START) /Mainswitch 1/0

⑥ From left:
Input switch / separated Bypass- switch (option) / output switch

⑦ Protective cover for the terminals with ventilation grill

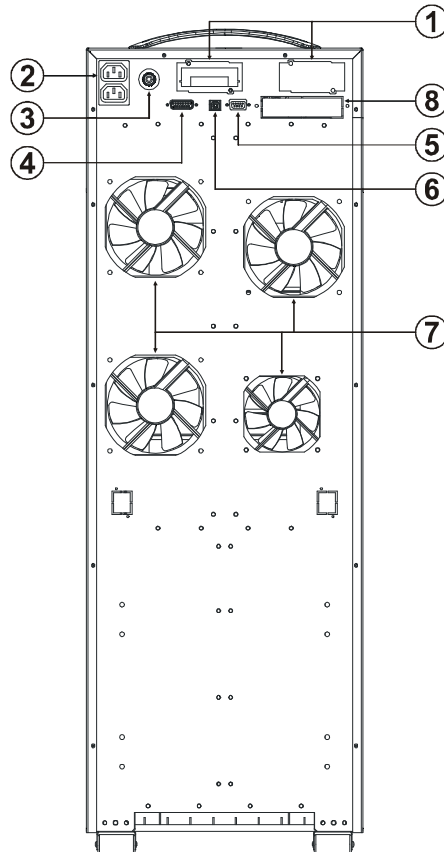
⑧ Brake foot



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Rear side



- | | |
|--|---|
| ① Slot for additional communication cards | ⑤ RS232 interface |
| ② IEC output sockets (Powershare)
(on both sockets together max. 10A) | ⑥ USB connection |
| ③ Thermal protection output sockets
Powershare (manual reset) | ⑦ Cooling ventilation |
| ④ contact interface | ⑧ Reserved for the parallel connection card
(option) |