DAC60000 DUAL
48/60VDC Modular Inverters

2 x 1500VA inverter modules in 19" 1.5U
System power 1.5kVA …30kVA,
Redundant n+1 system, hot swap plug-in modules
Both On-line and Off-line applications

30kVA and 7.5kVA static switch and manual bypass
Total Systems solutions with AC- and DC-distribution
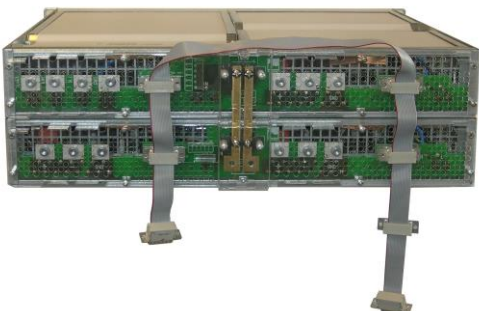
INVERTER MODULES AND POWERFRAMES (sub-racks)

Type	DC input Range	Nominal AC output	Nominal Power	Cooling	Dimensions Without handles	Weight
DAC62434FR	40…72VDC	230VAC, 50Hz	1500VA/1200W	Forced, fan	220 x 64 x 409 mm	4,4kg

19" 1.5U Power frames	
MSR8170	Sub-rack for two inverter modules, 19" x 1.5U x 480mm, weight 4.3kg
ADU68130	Sub-rack including AC-distribution 6xMCB and position for one inverter module, 19" x 1.5U x 480mm
ADU68131	Sub-rack including AC-distribution 2xschuko and position for one inverter module, 19" x 1.5U x 480mm
8169274	Cover plate set for empty module space in 19" 1.5U sub rack

7.5kVA STATIC SWITCH MODULES and POWERFRAMES (sub-racks)

Type	Description
Plug-in static switch modules	
BPU69230FR	External static switch, 7500VA 230VAC, 220mm x 64mm x 409mm module, weight 3.3kg
19" 1.5U Power frames	
MSR8180	Sub-rack for inverter and static switch, 19" x 1.5U x 480mm, weight 4.3kg
MBP68300	Sub-rack including manual bypass and position for static switch (separate datasheet), weight 6.5kg
MBP68360	Sub-rack incl. manual bypass, AC-distr. and position for static switch, see separate datasheet for fuse types, weight 6.7kg

30kVA STATIC SWITCH MODULES and POWERFRAMES (sub-racks)

Type	Description
Plug-in static switch modules	
BPU69430FR	External static switch, 30kVA 230VAC, 220 x 131 x 400 mm module, weight 8.4 kg
19" 3U Power frame	
MBP68400	Sub-rack including manual bypass and position for static switch, 19" x 3U x 480mm, weight 11.6kg

CABLES AND ACCESSORIES

Type	Description
All systems	
8781832	RemoteMonitor software in CD and RS-232 cable between DAC60000 inverter and Computer
88818008	AC bus bars to connect 2-4 power frames in parallel, includes 6mm^2 and 10mm^2 ring terminals
88817008	Rear panel protection cover 19" 1.5U (included in MSR8170, MSR8180, MBP68300, MBP68360, ADU68130)
88684008	Rear panel protection cover 19" 3U (included in MBP68400)
88683008	Rear panel protection cover 19" 4.5U
88683009	Rear panel protection cover 19" 6U
Inverter systems with 7.5kVA static switch or systems without static switch	
8781830	Communication system bus cable for 1-2 modules
8781831	Communication system bus cable for 1-6 modules
8781833	Communication system bus cable for 1-8 modules
Inverter systems with 30kVA static switch or systems without static switch	
8768432	Communication system bus cable for 1-10 modules (1-8 inverters and 30kVA bypass)
8768433	Communication system bus cable for 1-14 modules (1-12 inverters and 30kVA bypass)
8768434	Communication system bus cable for 1-18 modules (1-16 inverters and 30kVA bypass)
8768435	Communication system bus cable for 1-22 modules (1-20 inverters and 30kVA bypass)
8768436	10mm2 1.5m wires between MSR8170 Inverter AC output and MBP68400 Inverter AC input terminals

Ring terminals for connecting DC-, AC- and GND- cables are included with power frames and AC bus bars delivery.

Rear panel 4.5kVA system with static switch
MSR8170 power frame for 2 x inverters,
MSR8180 for 1 x inverter and 7.5kVA static switch

Rear panel 9kVA system with static switch/manual bypass
3 x MSR8170 power frame for 6 x inverters,
MBP68400 for 30kVA static switch and manual bypass

EXAMPLES OF ORDERING INVERTER SYSTEMS

6kVA system without static switch (4.5kVA n+1) 19" 3U

Type	Description	pcs per system
DAC62434FR	Inverter 48VDC/230VAC 1.5kVA/1.2kW	4
MSR8170	Power frame 19" 1.5U, 2 x Inverter	2
8169274	Cover plate for empty module place	0
8781832	RS-232 Remote monitoring cable, Inverter – Computer	1
8781831	Communication cable for 3…6 modules	1
88818008	AC bus bars to connect 2-4 power frames in parallel	1

4.5kVA system with 7.5kVA static switch (3kVA n+1) 19" 3U

Type	Description	pcs per system
DAC62434FR	Inverter 48VDC/230VAC 1.5kVA/1.2kW	3
BPU69230FR	Static Switch 7.5kVA	1
MSR8180	Power frame 19" 1.5U Inverter + Static switch	1
MSR8170	Power frame 19" 1.5U, 2 x Inverter	1
8169274	Cover plate for empty module place	0
8781832	RS-232 Remote monitoring cable, Inverter – Computer	1
8781831	Communication cable for 3…6 modules	1
88818008	AC bus bars to connect 2-4 power frames in parallel	1

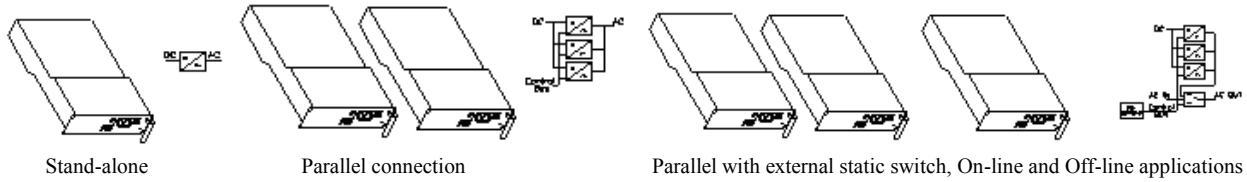### 6kVA (4.5kVA n+1) system with 7.5kVA static switch and manual bypass and AC-Distr. 19" 4.5U

Type	Description	pcs per system
DAC62434FR	Inverter 48VDC/230VAC 1.5kVA/1.2kW	4
BPU69230FR	Static Switch 7.5kVA	1
MBP68360	Manual bypass/AC-distr 19" 1.5U + Power frame for Static switch	1
MSR8170	Power frame 19" 1.5U, 2 x Inverter	2
8169274	Cover plate for empty module place	0
8781832	RS-232 Remote monitoring cable, Inverter – Computer	1
8781831	Communication cable for 3…6 modules	1
88818008	AC bus bars to connect 2-4 power frames in parallel	1

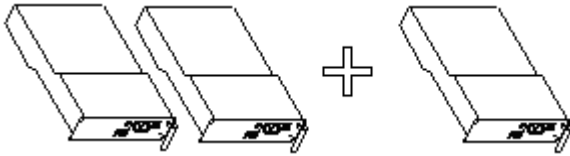### 12kVA (10.5kVA n+1) system with 30kVA static switch and manual bypass 19" 9U

Type	Description	pcs per system
DAC62434FR	Inverter 48VDC/230VAC 1.5kVA/1.2kW	8
BPU69430FR	Static Switch 30kVA	1
MBP68400	Manual bypass 19" 3U + Power frame for Static switch	1
MSR8170	Power frame 19" 1.5U, 2 x Inverter	4
8169274	Cover plate for empty module place	0
8781832	RS-232 Remote monitoring cable, Inverter – Computer	1
8768433	Communication cable for 1-12 inverters and 30kVA bypass	1
88818008	AC bus bars to connect 2-4 power frames in parallel	1
8768436	Inverter AC input 10mm2 1.5m wires, MSR8170 - MBP68400	1

POWERNET

SPECIFICATION INVERTERS	
ELECTRICAL	
Input voltage	40-72 VDC
	User programmable (PC/RS-232) start-up and shut down voltage limits and delays
Input current	35 Amax (continuous), 50 Amax (5 s)
Inrush current	< 20 A
Output voltage	Nominal 230 VAC sine wave, user programmable 200-240V, floating output
Output frequency	Nominal 50 Hz, user programmable 40 - 70 Hz, crystal locked
Nominal output power	1500VA / 1200W
Output current	Nominal 6.5A
	Short circuit max 13 A / 5 sec
Efficiency	90 %
Load power factor range	Full power rating from 100% inductive to 100% capacitive
Total harmonic distortion, resistive load	< 2 %
Crest factor	Up to 2.5
Static regulation, 0…100% load	+/-3%
Transient recovery	< 0.3 ms
Psofometric noise, input	< 2 mV
Isolation	Input-Chassis 1500 VAC (2000 VCD)
	Input-Output 3000 VAC (4000 VDC)
	Output-Chassis 1500 VAC (2000 VDC)
Overload	140 % (1700 W) / 5 seconds
	Max time can be limited shorter, 110% /60 s is always available
	Number of restart attempts and delays are user programmable
Protection	Output current limiting
	Overload and short circuit proof
	Input and output fuses
	External fuse max C40A must be used in supply of each inverter module
STANDARDS	
Safety	EN62368-1:2014
EMC	Inverters: EN61000-6-4:2006, EN61000-6-2:2007 + A1:2011
	Static Switch: As inverters except immunity:
	EN61000-4-3 radiated immunity according to EN61000-6-1, other immunity standards EN61000-6-2
ALARMS, INDICATIONS AND CONTROLS	
LED-Indications	Input ON
	Output ON
	Output loading, 4 levels: >5%, >30%, >50%, >80%
	Overload / Fault
Relay alarms	2 relay contacts:
	Fault in system summary alarm (module failure, DC input low etc)
	Primary supply failure (system with bypass) or Output ON indication (system without bypass)
	Relay contact rating: 60VDC/1A
Remote monitoring through RS-232	Status information: Input and output voltage, power, temperature, faults, etc.
(Remote monitoring software)	Parameter adjustment: Input voltage limits, output voltage, over load, faults, etc.
MECHANICAL	
Dimensions	See first page
Connectors in modules rear panel	plug-in connectors DIN41612 F48, DIN41612 H15
Connectors in sub-racks rear panel	MSR8170 sub-rack: (see separate datasheets for other racks)
	- DC input and GND M5 screw for cable clamp, 2 per power frame
	- AC output M4 screw for cable clamp, 1 per power frame
	88818008 AC bus bars M6 screws for cable clamp
	Connectors are shielded from hazardous contact
Enclosure	Steel casing IP20
ENVIRONMENTAL	
Operating temperature	0…40 C full power, 40…60 C reduced power, derating -2%/C typically
Cooling	Forced cooling front to rear, 2 fans inside the module.
	Fans are redundant, one fan is enough for cooling in normal conditions.
Humidity	5…95%, non-condensing
Altitude	Full power up to 2000m, derating -2% / 100m, max altitude 3000m

CONFIGURATIONS

Stand-alone   Parallel connection   Parallel with external static switch, On-line and Off-line applications

EXPANDING SYSTEM

More power needed or unit replacement
No need to shut down the system if there is free module positions available in power frame
1) Plug new inverter module into the power frame
2) Turn new unit on
- Automatically enters system
- Automatically adapts system parameters (voltage, frequency etc.)
- Automatically turns output on if the system output is on
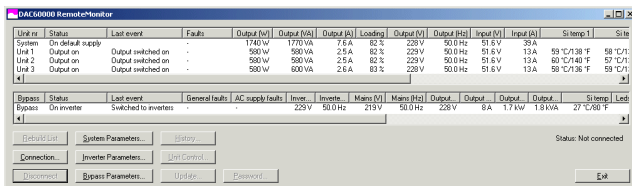
RS-232 AND SYSTEM BUS
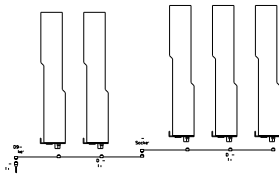
Single 15 pin female D-connector
- Standard 4 pins for RS-232 for communication and firmware updates with a PC
- 2 pins for internal system communication

Single 15-pin flat cable
- male D-connectors for inverters
- one female connector for connecting PC adapter cable

REMOTE MONITORING SOFTWARE

Continuous status information from all units:
- Output on/standby, voltage, current, power, loading per cent
- Input voltage and current
- Internal temperatures, led and button status, faults

Parameter adjustment (without turning system output off):
- Inverter start up and shut down input voltage limits, reaction delays
- Output voltage and frequency, restart attempts after overload shut down
- Bypass synchronizing frequency range, accepted mains voltage range etc.

History file reading for last 30-40 events per module
Unit control to remote control or to read diagnostics

INCREASED SYSTEM AVAILABILITY

Real redundancy - No single point of failure may fail the system
No external controller
- No other master slave dependence than synchronizing
- If synchronizing master fails, next unit starts sending the synchronizing data

Rugged system bus structure with galvanic isolation
Automatic bus address configuring
- No need for address setup by user
- No malfunctions because of wrong setup

Self tests and diagnostics
- Full automatic power stage test every time inverter is started
- Continuous monitoring of internal operations
- Error counters (RS-232) for troubleshooting
- Recognizing of wrong connections (cable not connected, wrong AC bus polarity)

Recovery and monitoring procedures in hardware and software
- Stands disturbances in system bus
- Stands accidental system bus disconnecting for seconds
- Stands wrong connections of cables
- If one unit fails other units alarm
- Voting procedures for recognizing and filtering wrong operation

Automatic fast shut down of failed unit
- Disconnecting from AC bus in 10 ms
- Automatic watch dog restart if processor hangs up
- Unit automatically turns output off if synchronizing lost for too long time

Internal history file in each inverter, last 30-40 system and unit specific events

SYSTEM SOLUTIONS AND AC-DISTRIBUTION

Dual System 19" n x 1.5U

1-20 inverters up to 30kVA
Static Switch, manual bypass
AC- and DC-distribution
1-pole MCBs, 2-pole MCBs,
Schuko outlets, RCD

Please contact Powernet for customized
inverter system configurations