

### DESCRIPTION

Bravo TSI 48/120 is a compact modular inverter that converts a 48VDC power source into 120VAC and provides a pure sine wave. By using several modules, we can offer solutions for two-phase (2 x 120Vac + N) or three-phase (3 x 208VAC + N) infrastructures.

The extra AC input ensures a high overall efficiency (up to 95%) which results in a reduction of energy loss and heat dissipation.

This module has a modularity from 2.5kVA to up to 30kVA in order to be able to evolve with your needs. The hot swap feature makes maintenance easier and reduces the risk of errors.

The low ripple voltage avoids any disturbances on DC loads and batteries.

BRAVO TSI 48/120 systems can be configured for operation in split phase and three phase applications using a combination of shelves.

Integration with Aspiro and Guardian DC Power Systems is achieved using a translator board that enables the ACX Advanced controller to monitor key parameters.

### FEATURES

- ◆ Extra AC input for increased efficiency
- ◆ Compact design
- ◆ Up to 30 kVA
- ◆ Multiple phase options:
  - 1-phase L-N
  - 2-phase L1-L2-N
  - 3-phase L1-L2-L3-N
- ◆ No disturbances on DC loads & batteries

### TWO-YEAR WARRANTY

### SAFETY CERTIFICATION

cUL1778 Recognized

[www.unipowerco.com](http://www.unipowerco.com)

North America & CALA: +1 954-346-2442 • EMEA: +1 561-990-3830 • [sales@unipowerco.com](mailto:sales@unipowerco.com)



### SYSTEM COMPONENTS

DESCRIPTION	UNIPOWER PART NUMBER
Inverter Module (4 per shelf max.)	105.5724.48
Management Module (T2S ETH)	105.5701.2448
Power Shelf: 19" x 2RU	105.5719.00
Rear Protection Cover for Shelf	105.5720.02
Relay Rack Mid-Mount Kit	385.6400.5719
19" to 23" / 600mm fixing kit	385.6300.2302
BUS Cable Kit: 2-shelf	105.5720.03
BUS Cable Kit: 3-Shelf	105.5720.04
Inverter Module Blank	385.6401.5719
Management Module Blank	105.5701.01
BRAVO to ACX Translator	001-5301-0000

[To configure a system see the guide on page 6](#)

### INDUSTRIES & APPLICATIONS

All business critical applications and all types of AC loads.

The design is modular and scalable with hot-swappable inverter modules which ensures low Mean Time to Repair (MTTR), reduction in service costs and meets the changing needs for future expansion.



Telecom



Cable



Utilities



Government



Industrial

## SPECIFICATIONS

### GENERAL

Part Number   UNIPOWER Order Code	T321330201   105.5724.48
EMC (Immunity)	IEC 1000-4
EMC (Emission) (class)	FCC part 15
Safety	cUL 1778 Recognized
Cooling	Forced
Isolation	Double
MTBF	240 000 hrs (MIL-217-F)
Efficiency (Typical)	Enhanced Power Conversion On-Line
	95% 91%
Dielectric Strength DC/AC	4300 Vdc
True Redundant Systems – compliant	3 disconnection levels on AC out and DC in power ports 4 disconnection levels on AC in port
RoHS	Compliant
Vibration - GR63	Office Vibration Transport Vibration
	0 to 100Hz - 0.1g 5 to 100Hz - 0.5g, 100 to 500Hz - 1.5 g Drop test
Operating Ambiance   Ingress Protection	Free from dust and corrosive materials   NEMA 1
Altitude Above Sea Derating	<1500m >1500m
	None 0.8% / 100m
Operating Temperature Range	-20 to 50°C
Storage Temperature Range	-40 to 70°C
Relative Humidity, max.	95%, non-condensing
Case Material	Coated Steel-ALU ZINC

### AC OUTPUT POWER

Nominal Output Power	2500VA   2000W
Overload Capacity	150% (15 seconds) 110% permanent within operating temperature range
Admissible Load Power Factor	Full power rating from 0 inductive to 0 capacitive
Internal Temperature Management and Switch Off	2% / °C, derating beyond 50°C with cut-off at 65°C

### DC INPUT

Nominal Voltage	48Vdc
Voltage Range	40 to 60Vdc
Nominal Current	56A (at 40Vdc and 2000W output)
Maximum input current (for 15 second)	84A
Voltage Ripple	<2mV Psophometric
Input Voltage Boundaries	User selectable with T2S interface

### AC INPUT

Nominal Voltage	120Vac (120/240V or 120/208V with combination of shelves)
Voltage Range	100-138Vac (without derating) (can be disabled)
Brownout	80-100Vac, use DC source contribution if needed (can be disabled) 2000VA/1600W @ 150Vac
Conformity Range Before Transfer to DC	Adjustable
Power Factor	>99%
Frequency range (selectable)   synchronization range	50 - 60Hz   range 47– 53Hz / 57– 63Hz

### AC OUTPUT

Nominal Voltage Operation within lower voltage networks leads to de-rating of power performances	120Vac
Frequency   Accuracy	50-60Hz   0.03%
Total Harmonic Distortion (Resistive Load)	<1.5%
Load Impact Recovery Time	0.4ms
Turn-on Delay	20s to 40s depending on the number of modules installed
Nominal Current. Protected against reverse current	21A
Crest Factor Nominal Power With Short Circuit Management and Protection	3 : 1
Short Circuit Clear-up Capacity	10 x I <sub>n</sub> for 20msec Available while Mains is available at AC input port With magnitude control and management
Short Circuit Current after Clear-up Capacity	2.1 x I <sub>n</sub> during 15s and 1.5 x I <sub>n</sub> after 15s

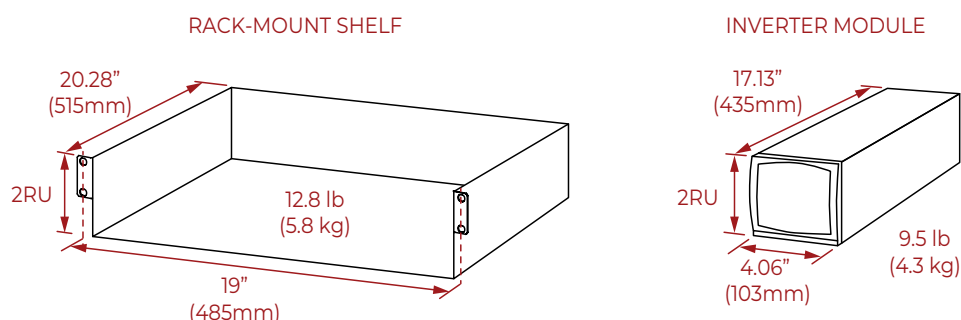
### IN TRANSFER PERFORMANCE

Max. Voltage Interruption	0s
Total Transient Voltage Duration (max)	0s

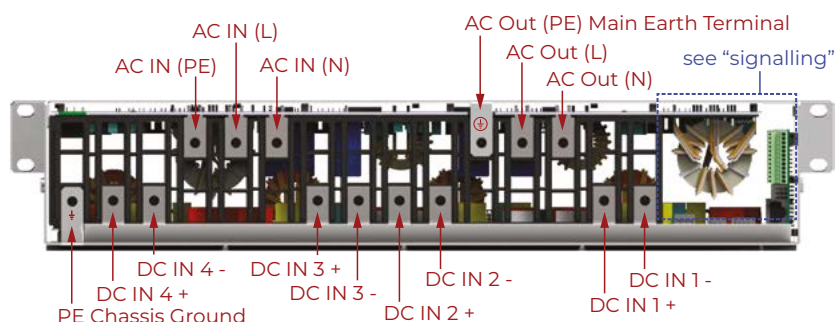
### SIGNALING & SUPERVISION

Display	Synoptic LED
Alarms Output & Supervision	Dry contacts on shelf / Standard USB port and MODBUS on T2S, optional : Candis Display / Candis TCP-IP
Remote on/off	on rear terminal of the shelf via T2S

### SHELF OUTLINE



### REAR VIEW

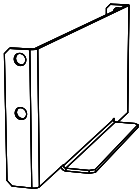


## RELAY RACK MID-MOUNTING

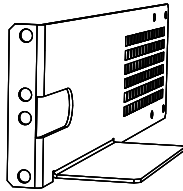
The BRAVO TSI shelf is provided with front face mounting brackets. To facilitate mid-mounting in an open relay rack UNIPOWER offers a mid-mount kit comprising the parts shown below.

### KIT COMPONENTS

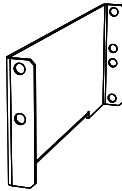
Left-front  
Support Bracket



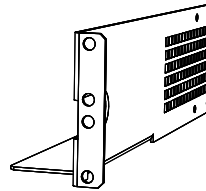
Left-rear  
Support Bracket



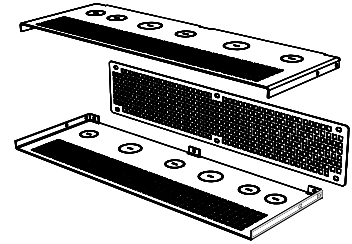
Right-front  
Support Bracket



Right-rear  
Support Bracket



Conduit box panels  
Top, Bottom & Rear



Hardware kit included:

10 x screws for mounting the support brackets to the rack.

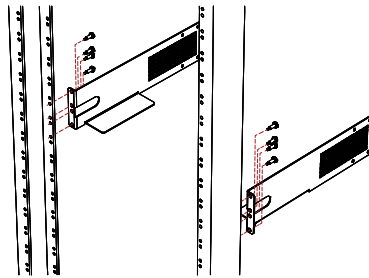
2 x nuts / bolts and 2 x screws for fixing the power shelf to the front brackets.

14 x screws for attaching the conduit box panels to the rear support brackets.

### QUICK INSTALLATION GUIDE

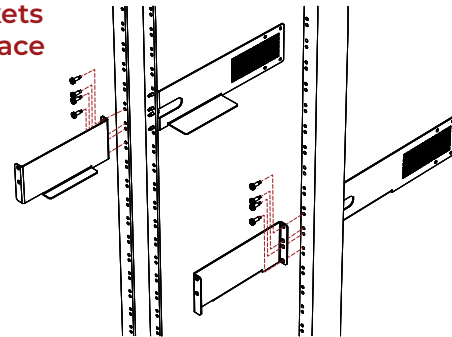
1

Fix brackets  
to rear face



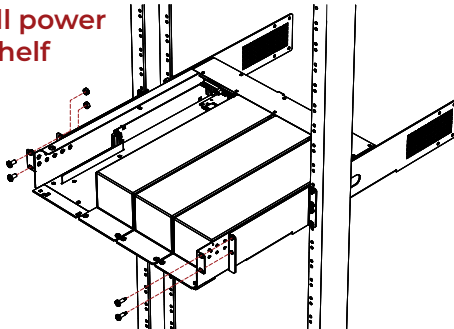
2

Fix brackets  
to front face



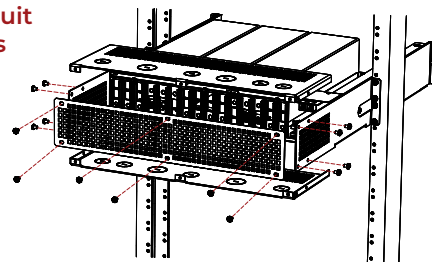
3

Install power  
shelf



4

Fit conduit  
covers



## MONITORING UNIT - T2S ETH

T2S ETH is a monitoring solution for the full TSI inverter range and is able to monitor up to 32 inverters through a friendly web base interface. T2S also supports Modbus Serial communication (RTU) and SNMP v1 Communication.

This monitoring device provides a graphical user interface, embeds a SNMPv2c/SNMP v3 agent and Modbus TCP support with Catena, if one needs a touch screen display Catena can be connected to T2S ETH and is Compatible. It also allows user to change the configuration of the system.



T2S ETH provides 3 LEDs:

- Red for major alarm signaling
- Orange for minor alarm signaling
- Green for power and network connection status

The RJ45 is a standard Ethernet connector that can be connected on any IPv4 network.

T2S ETH firmware can be upgrade using the Micro SD card.

## BRAVO to ACX Advanced Translator - 001-5301-0000

The BRAVO to ACX Advanced Translator provides communications between a UNIPOWER ACX controlled DC power system and a BRAVO inverter system. Relevant inverter data appears in the ACX controller under "SLI module data" and in the PowCom software under the inverter icons.

The ACX controller should have firmware v2.25 minimum (available for download from the website); configuration of BRAVO systems should not be required provided the default T2S-ETH and Modbus settings are used.

The translator mounts to standard 35mm DIN rail profiles.

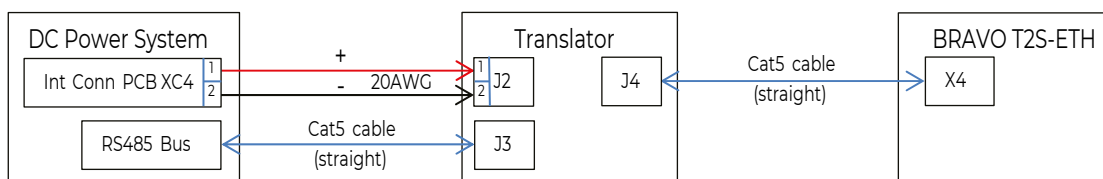


Top View of translator board



PowCom showing BRAVO data

## BLOCK DIAGRAM



## NON-STOCK CONFIGURATION GUIDE

(normally configured from stock 'base' units)

PLEASE COMPLETE THE BELOW TABLE AND SUBMIT TO UNIPOWER FOR VERIFICATION AND CONF. NO. ALLOCATION (This form is fully interactive and may be completed electronically OR it can be printed and complete by hand)			
<b>STEP 1 - CUSTOMER DETAILS</b>			
Company: _____ Address: _____ Zip Code: _____ Country: _____	Contact Name: _____ Email Address: _____ Telephone: _____ Quantity for quotation: _____		
<b>STEP 2 - PHASE CONFIGURATION - Choose one only</b>			
1- Phase - 120VAC L-N 2-Phase - 240VAC L1-L2-N 3-Phase - 230VAC L1-L2-L3-N OR 208VAC L1-L2, L2-L3, L3-L1	1-Phase 2-Phase 3-Phase	go to step 3a go to step 3b go to step 3c	
<b>STEP 3a - OUTPUT CAPACITY - 1-phase</b>			
2.5kVA 5kVA 7.5kVA 10kVA 12.5kVA 15kVA 17.5kVA 20kVA 22.5kVA 25kVA 27.5kVA 30kVA	included parts: 1 x shelf, 1 x inverter Module, 3 x inverter blanks, 1 x management module. included parts: 1 x shelf, 2 x inverter Module, 2 x inverter blanks, 1 x management module. included parts: 1 x shelf, 3 x inverter Module, 1 x inverter blanks, 1 x management module. included parts: 1 x shelf, 4 x inverter Module, 1 x management module. included parts: 2 x shelf, 5 x inverter Module, 3 x inverter blanks, 1 x management module, 1 x management module blank & 1 x two-shelf cable. included parts: 2 x shelf, 6 x inverter Module, 2 x inverter blanks, 1 x management module, 1 x management module blank & 1 x two-shelf cable. included parts: 2 x shelf, 7 x inverter Module, 1 x inverter blanks, 1 x management module, 1 x management module blank & 1 x two-shelf cable. included parts: 2 x shelf, 8 x inverter Module, 1 x management module, 1 x management module blank & 1 x two-shelf cable. included parts: 3 x shelf, 9 x inverter Module, 3 x inverter blanks, 1 x management module, 2 x management module blanks & 1 x three-shelf cable. included parts: 3 x shelf, 10 x inverter Module, 2 x inverter blanks, 1 x management module, 2 x management module blanks & 1 x three-shelf cable. included parts: 3 x shelf, 11 x inverter Module, 1 x inverter blanks, 1 x management module, 2 x management module blanks & 1 x three-shelf cable. included parts: 3 x shelf, 12 x inverter Module, 1 x management module, 2 x management module blanks & 1 x three-shelf cable.		
<b>STEP 3b - OUTPUT CAPACITY - 2-phase</b>			
5kVA 10kVA 15kVA 20kVA	included parts: 2 x shelves, 2 x inverter Modules, 6 x inverter blanks, 1 x management module, 1 x management module blank & 1 x two-shelf cable. included parts: 2 x shelves, 4 x inverter Modules, 4 x inverter blanks, 1 x management module, 1 x management module blank & 1 x two-shelf cable. included parts: 2 x shelves, 6 x inverter Modules, 2 x inverter blanks, 1 x management module, 1 x management module blank & 1 x two-shelf cable. included parts: 2 x shelves, 8 x inverter Modules, 1 x management module, 1 x management module blank & 1 x two-shelf cable.		
<b>STEP 3c - OUTPUT CAPACITY - 3-phase</b>			
7.5kVA 15kVA 22.5kVA 30kVA	included parts: 3 x shelves, 3 x inverter Modules, 9 x inverter blanks, 1 x management module, 2 x management module blanks & 1 x three-shelf cable. included parts: 3 x shelves, 6 x inverter Modules, 6 x inverter blanks, 1 x management module, 2 x management module blanks & 1 x three-shelf cable. included parts: 3 x shelves, 9 x inverter Modules, 3 x inverter blanks, 1 x management module, 2 x management module blanks & 1 x three-shelf cable. included parts: 3 x shelves, 12 x inverter Modules, 1 x management module, 2 x management module blanks & 1 x three-shelf cable.		
<b>STEP 4 - SHELF OPTIONS [one will be included for each shelf when selected]</b>			
Shelf Protection Covers Mid-Mount Relay Rack Kit 19" to 23" Rack-Mount Adaptor Kit	YES YES YES	NO NO NO	[Not available with mid-mount relay rack kit] [Incorporates rear cover kit with conduit knockouts]
<b>STEP 5 - INTEGRATION WITH ASPIRO OR GUARDIAN DC POWER SYSTEM</b>			
Bravo to ACX Translator	YES	NO	
<b>STEP 6 - SUBMIT COMPLETED FORM TO UNIPOWER FOR CHECKING AND ALLOCATION OF CONFIGURATION PART NUMBER</b>			
Configuration Part Number: TSI-48/120-_____ (leave blank for completion by UNIPOWER)			