

• 15P00SDB100 •

SOLARDRIVE PLUS*SOLAR SUPPLIED INVERTER**FOR PUMPING APPLICATIONS***USER MANUAL****- INSTALLATION GUIDE -**

Updated: 30/06/2020

Rev. 01

English

- This manual is integrant and essential to the product. Carefully read the instructions contained herein as they provide important hints for use and maintenance safety.
- This product is to be used only for the purposes it has been designed to. Other uses should be considered improper and dangerous. The manufacturer is not responsible for possible damages caused by improper, erroneous and irrational uses.
- Enertronica Santerno is responsible for the product in its original setting.
- Any changes to the structure or operating cycle of the product must be performed or authorized by Enertronica Santerno.
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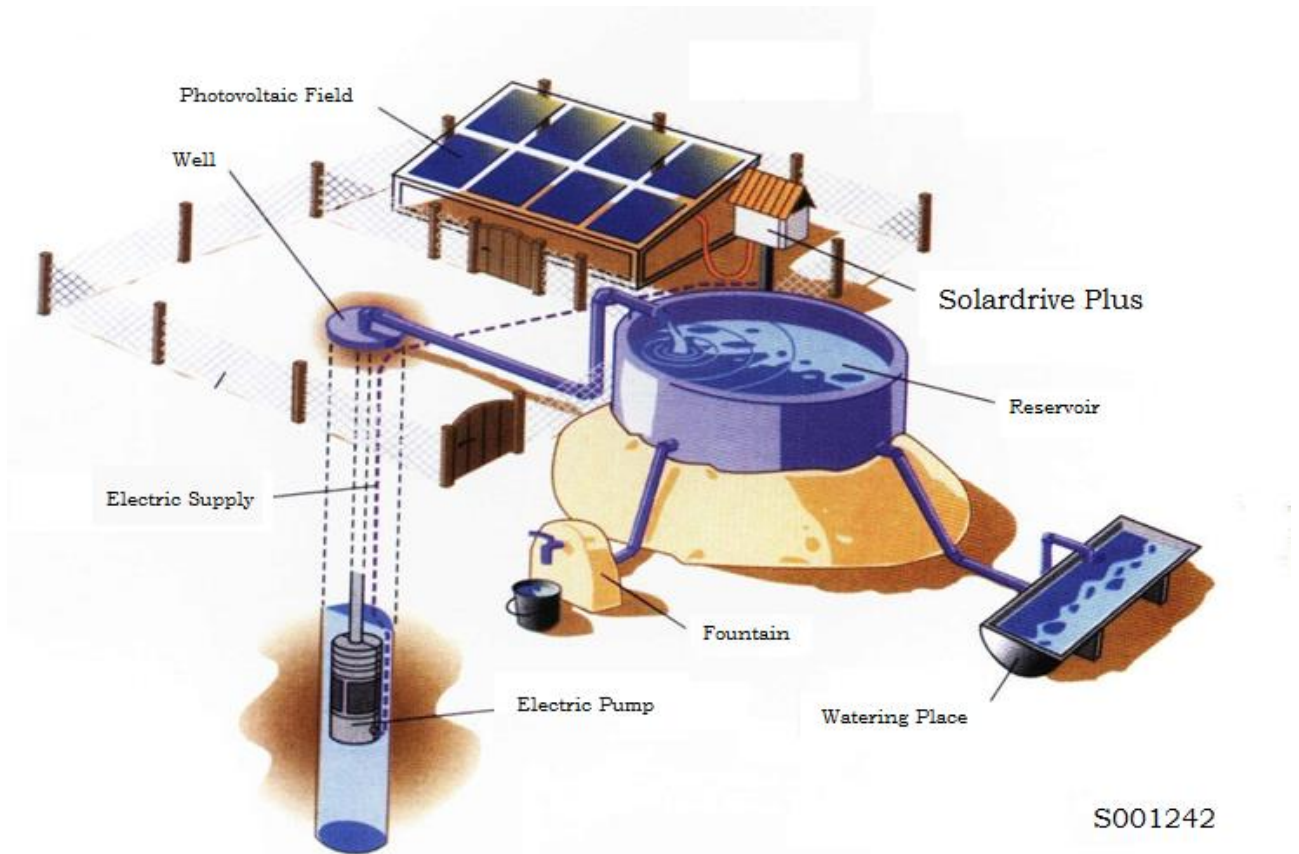
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1. GENERAL INFORMATION

The **Solardrive Plus** drives are designed to be utilized in pumping applications exploiting the energy produced by a PV field.

They may be powered directly from a DC current PV field or the three-phase grid, or from an AC genset. They control an electric submersible pump (ESP).



The **Solardrive Plus** line includes the following products:

- **Solardrive Plus (stand alone)**
- **Solardrive Plus Box**
- **Solardrive Plus Cabinet**

1.1. *Scope of this Manual*

This manual covers:

- All products of the **Solardrive Plus** line.

1.2. *For whom this Manual is intended*

This manual must be read by:

- Installers
- Operators
- Plant manager

1.3. *Electrical ratings*

Voltage class	AC Aux Supply (Genset) *	PV Field		Motors	
		V _{MPP}	V _{OC}	Voltage	Power
	V _{ac}	V _{dc}	V _{dc}	V _{ac}	kW
2T	200÷240	270÷360	440	230	3÷200
4T	380÷500	450÷780	830	400	3÷400**
6T	575÷690	550÷900	1200	400÷690	3÷630***



CAUTION [*] The PC Field must be opened in case of AC supply.

** up to 2.1 MW on demand

*** up to 3 MW on demand

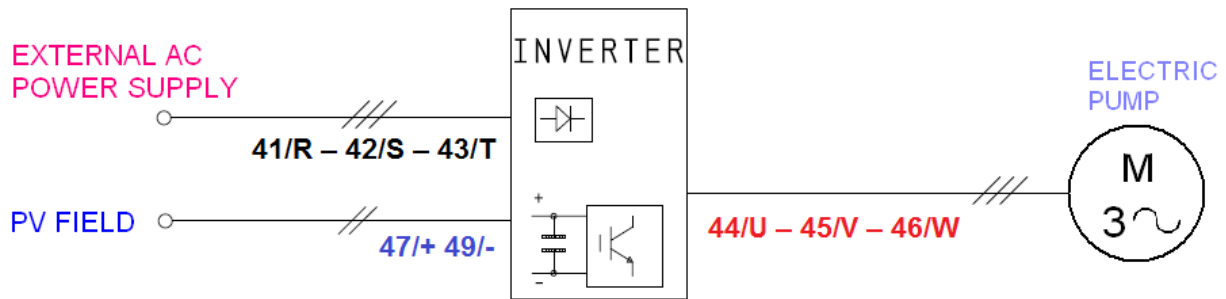
The Solardrive Plus and systems are designed and manufactured in Italy by Enertronica Santerno S.p.A.

2. SOLARDRIVE PLUS (STAND ALONE)

These stand-alone inverters must be mounted inside a box or cabinet by the customer together with

- all the safety devices,
- the components required for the connection to the PV field and
- the components required for the connection to the pump.

2.1. *Single line diagram*



CAUTION The customer must provide the external necessary components.



CAUTION The PC Field must be opened in case of AC supply.



NOTE

The actual positions of the 41/R 42/S 43/T, 47/+ 49/- and 44/U 45/V 46/W terminals in the inverter are described in the Power Terminals section under SOLARDRIVE PLUS (STAND ALONE) – INSTALLATION AND COMMISSIONING

2.2. *Applicable motors – 2T Voltage class*

Frame size	Model	Nominal current		Applicable motor power			
		at 40 °C	at 50 °C	at 40 °C		at 50 °C	
		A	A	kW	HP	kW	HP
S05	0007	12.5	12.5	3	4	3	4
	0008	15	15	3.7	5	3.7	5
	0010	17	17	4	5.5	4	5.5
	0013	19	19	4.5	6	4.5	6
	0015	23	23	5.5	7.5	5.5	7.5
	0016	27	24	7.5	10		
S12	0020	30	24	9.2	12.5		
	0023	38	38	11	15	11	15
	0033	51	46	15	20		
S15	0037	65	52	18.5	25	15	20
	0040	72	58	22	30	15	20
	0049	80	64	25	35	18.5	25
S20	0060	88	80	28	38	22	30
	0067	103	82	30	40	25	35
	0074	120	108	37	50	30	40
	0086	145	116	45	60	37	50
S30	0113	180	162	55	75	45	60
	0129	195	162	65	90		
	0150	215	192	70	95	65	90
	0162	240	192	75	100		
S41	0180	300	270	90	125	90	125
	0202	345	276	110	150		
	0217	375	338	120	165	110	150
	0260	445	356	132	180		
S51	0313	480	480	160	220	160	220
	0367	550	550	185	250	185	250
	0402	680	550	200	270		

2.3. *Applicable motors – 4T Voltage class*

Frame size	Model	Nominal current		Applicable motor power (380÷415 V)			
		at 40 °C	at 50 °C	at 40 °C		at 50 °C	
		A	A	kW	HP	kW	HP
S05	0005	10.5	10.5	4.5	6	4.5	6
	0007	12.5	12.5	5.5	7.5	5.5	7.5
	0009	16.5	13.2	7.5	10		
	0011	16.5	13.2	7.5	10		
	0014	16.5	13.2	7.5	10		
S12	0016	27	24	11	15	11	15
	0017	30	24	15	20		
	0020	30	24	15	20		
	0025	41	33	22	30	15	20
	0030	45	36	22	30	18.5	25
	0034	57	46	30	40	22	30
	0036	60	48	30	40	25	35
S15	0040	72	58	37	50	30	40
	0049	80	64	45	60		
S20	0060	88	80	50	70	45	60
	0067	103	82	55	75		
	0074	120	108	65	90	55	75
	0086	145	116	75	100	65	90
S30	0113	180	162	100	135	75	100
	0129	195	162	110	150	90	125
	0150	215	192	120	165	110	150
	0162	240	192	132	180		
S41	0180	300	270	160	220	160	220
	0202	345	276	200	270		
	0217	375	338	220	300	185	250
	0260	445	356	250	340	200	270
S51	0313	480	480	280	380	280	380
	0367	550	550	315	430	315	430
	0402	680	550	400	550		

2.4. *Applicable motors – 6T Voltage class*

Frame size	Model	Nominal current		Applicable motor power			
		at 40 °C	at 50 °C	at 40 °C		at 50 °C	
		A	A	kW	HP	kW	HP
S14	0003	7	7	5.5	7.5	5.5	7.5
	0004	9	9	7.5	10	7.5	10
	0006	11	11	9.2	12.5	9.2	12.5
	0012	13	13	11	15	11	15
	0018	17	14	15	20		
	0019	21	21	18.5	25	18.5	25
	0021	25	25	22	30	22	30
	0022	33	33	30	40	30	40
	0024	40	40	37	50	37	50
	0032	52	42	45	60		
S22	0042	60	60	55	75	55	75
	0051	80	72	75	100		
	0062	85	76	75	100	75	100
	0069	105	84	90	125		
S32	0076	125	125	110	150	110	150
	0088	150	150	132	180	132	180
	0131	190	171	160	220	160	220
	0164	230	184	220	300		
S42	0181	305	305	250	340	250	340
	0201	330	305	315	430		
	0218	360	324	355	485	315	430
	0259	400	324	400	550		
	0290	450	450	450	610	450	610
S52	0314	500	500	500	680	500	680
	0368	560	504	560	770		
	0401	640	512	630	860		

3. SOLARDRIVE PLUS (STAND ALONE) – INSTALLATION AND COMMISSIONING

3.1. Power Terminals

Decisive voltage class C according to EN 61800-5-1

DESCRIPTION	
41/R – 42/S – 43/T	Inputs for three-phase supply (the phase sequence is not important).
44/U – 45/V – 46/W	Three-phase motor outputs.
47/+	PV field, panel strings, positive pole. Each fuse input must be connected to no more than one string wire.
47/D	When fitted, it must be short-circuited to terminal 47/+ using a cable/bar having the same cross-section as the cables used for power supply (factory setting).
49/–	PV field, panel strings, negative pole. Each fuse input must be connected to no more than one string wire.

S05 (2T) Power Terminal board:

41/R	42/S	43/T	44/U	45/V	46/W	47/+	47/D	48/ nu	49/–
-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	---------------	-------------



CAUTION Power terminals **47/D** and **47/+** are short-circuited as a factory setting.

S05 (4T)–S15–S20 Power terminal board:

41/R	42/S	43/T	44/U	45/V	46/W	47/+	48/nu	49/–
-------------	-------------	-------------	-------------	-------------	-------------	-------------	--------------	-------------

S12 (2T-4T)–S14 Power terminal board:

41/R	42/S	43/T	47/+	47/D	48/ nu	49/–	44/U	45/V	46/W
-------------	-------------	-------------	-------------	-------------	---------------	-------------	-------------	-------------	-------------



CAUTION Power terminals **47/D** and **47/+** are short-circuited as a factory setting.

S22–S32 Power terminal board:

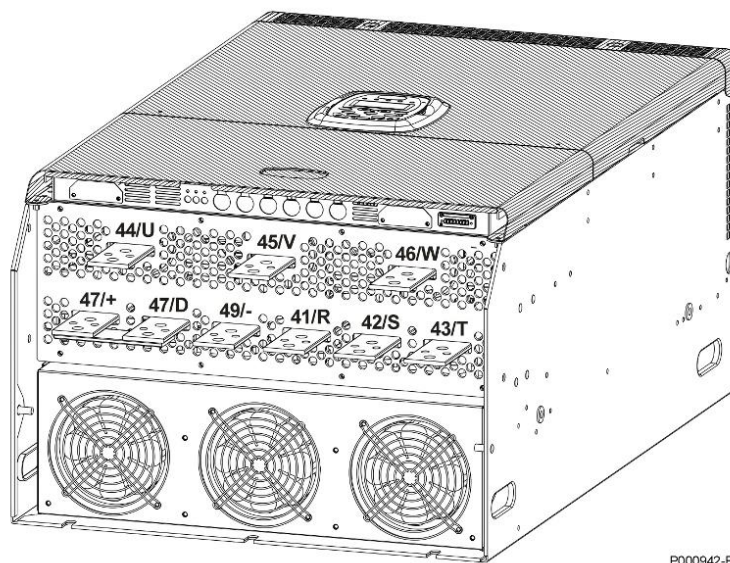
48/nu	50/nu	47/D	47/+	49/–	41/R	42/S	43/T	44/U	45/V	46/W
-------	-------	------	------	------	------	------	------	------	------	------

**CAUTION**Power terminals **47/D** and **47/+** are short-circuited as a factory setting.**S30 Power terminal board:**

41/R	42/S	43/T	44/U	45/V	46/W	47/+	49/–	48/ nu	50/nu
------	------	------	------	------	------	------	------	--------	-------

S41–S42–S51–S52 Power connection bars:

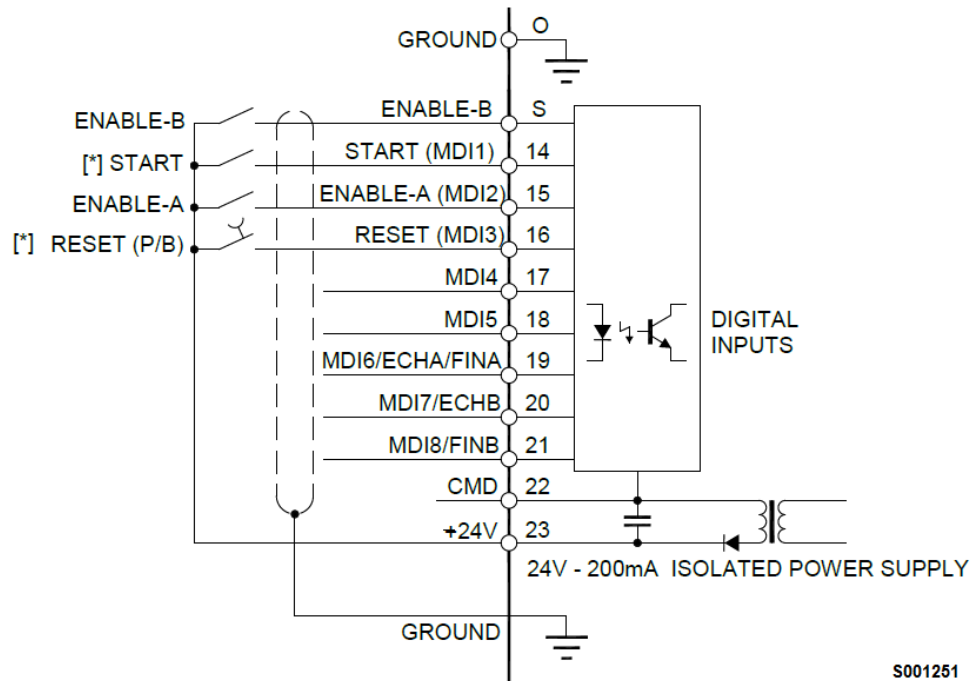
			44/U	45/V	46/W					
47/+	47/D	49/–	41/R	42/S	43/T					

**CAUTION**Power bars **47/D** and **47/+** are short-circuited as a factory setting.

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Figure 1: connection bars in S41–S51

3.2. Wire Connection Terminal Board



S001251

ENABLE-A and ENABLE-B terminals shall be linked to +24 V (factory setting)

START terminal shall be linked to +24 V (factory setting). [*] In case an external start switch is provided (for example, a tank level switch), the link between the two terminals must be removed and the switch must be connected.

[*] RESET terminal (pushbutton) can be used to reset a fault (if any).

4. SOLARDRIVE PLUS BOX

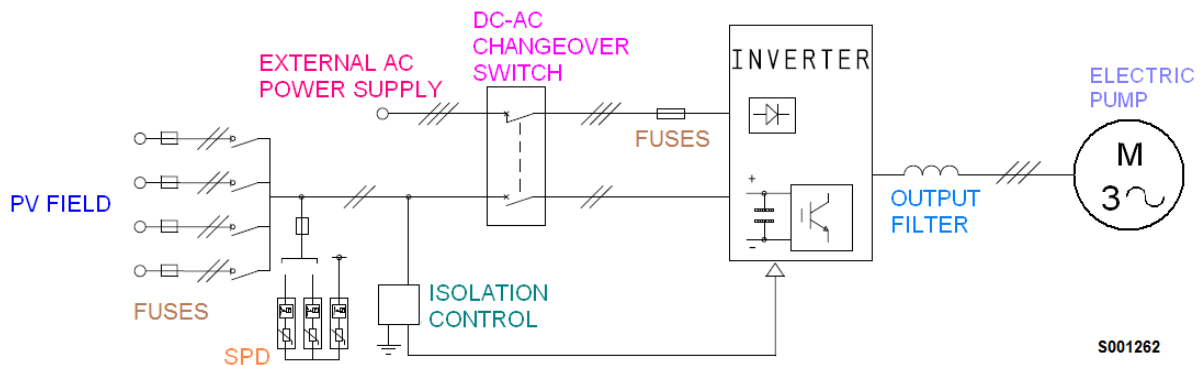
The **Solardrive Plus Box** models consist of a **Solardrive Plus** housed in a box.

This is a complete solution for medium-low power ranges, comprising the drive and all the safety devices, the components required for the connection to the PV field and the components required for the connection to the pump.



Figure 2: Solardrive Plus Box

4.1. Single line diagram



NOTE

Some of the additional components are optional and shall be specified in the purchase order.



NOTE

Please refer to Wire Connection Terminal Board in the SOLARDRIVE PLUS BOX / CABINET – INSTALLATION AND COMMISSIONING section for the connection of PV Field, Electric Pump and optional External AC Power Supply.

4.2. *Applicable motors*

The **Solardrive Plus Box product** line is suitable for motor mechanical power ratings ranging from 5.5 to 22 kW, with nominal currents up to 52 A and output voltages up to 415 Vac 60 Hz.

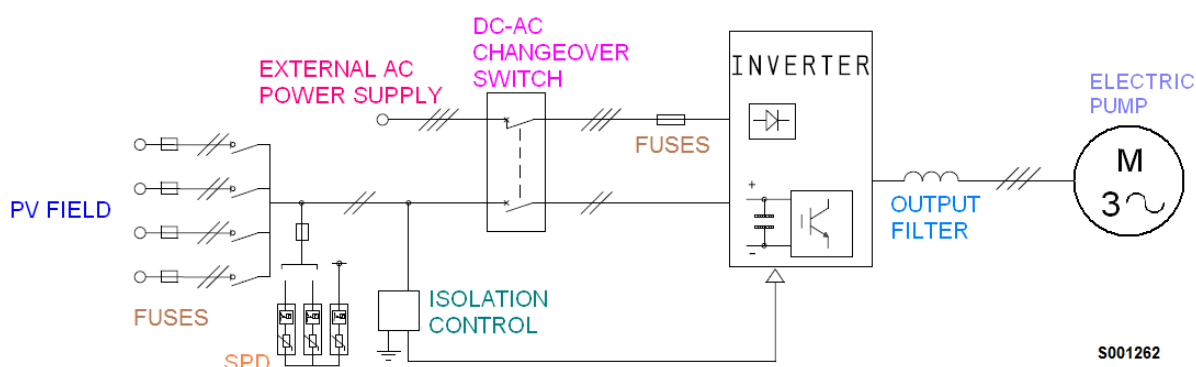
Model	Nominal current		Applicable motor power			
	at 40 °C	at 50 °C	at 40 °C		at 50 °C	
	A	A	kW	HP	kW	HP
0018	17	13.6	5.5	7.5	4	5.5
0021	25	25	11	15	11	15
0024	40	40	15	20	15	20
0032	52	41.6	22	30	18.5	25

5. SOLARDRIVE PLUS CABINET

The **Solardrive Plus Cabinet** models consist of a **Solardrive Plus** housed in a cabinet.

This is a complete solution for large power ranges, comprising the drive and all the safety devices, the components required for the connection to the PV field and the components required for the connection to the pump.

5.1. Single line diagram



NOTE

Some of the additional components are optional and shall be specified in the purchase order.



NOTE

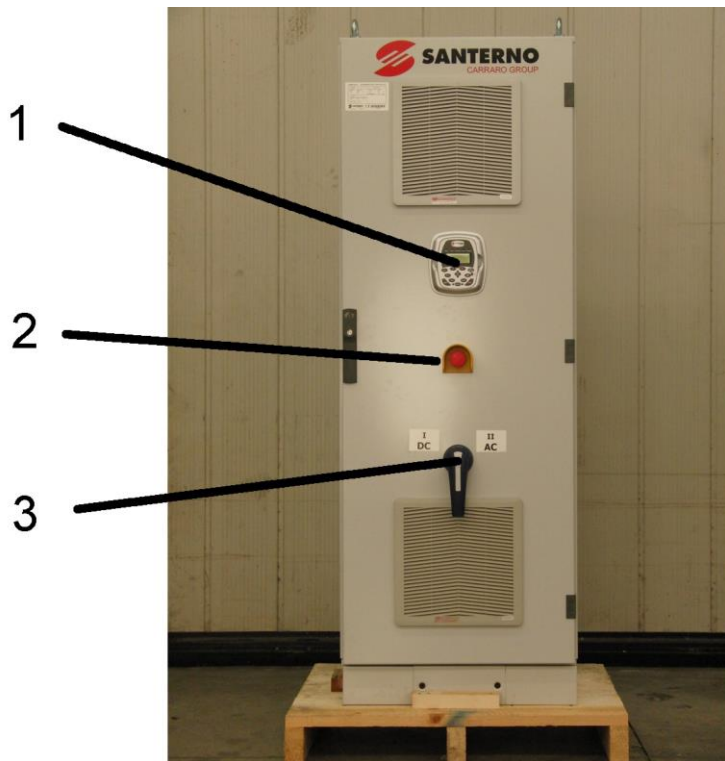
Please refer to Wire Connection Terminal Board in the SOLARDRIVE PLUS BOX / CABINET – INSTALLATION AND COMMISSIONING section for the connection of PV Field, Electric Pump and optional External AC Power Supply.

5.2. Applicable motors

The **Solardrive Plus Cabinet** line is suitable for motor mechanical power ratings ranging from 37 to 315 kW, with nominal currents up to 640 A and output voltages up to 415 Vac 60 Hz.

Model	Nominal current		Applicable motor power			
	at 40 °C	at 50 °C	at 40 °C		at 50 °C	
	A	A	kW	HP	kW	HP
0051	80	72	37	50	30	40
0069	105	84	51	70	37	50
0088	150	150	75	100	75	100
0164	230	184	110	150	92	125
0201	330	264	170	230	132	180
0259	400	320	190	260	170	230
0401	640	512	315	430	240	330

6. SOLARDRIVE PLUS BOX / CABINET – PRODUCT CONFIGURATION



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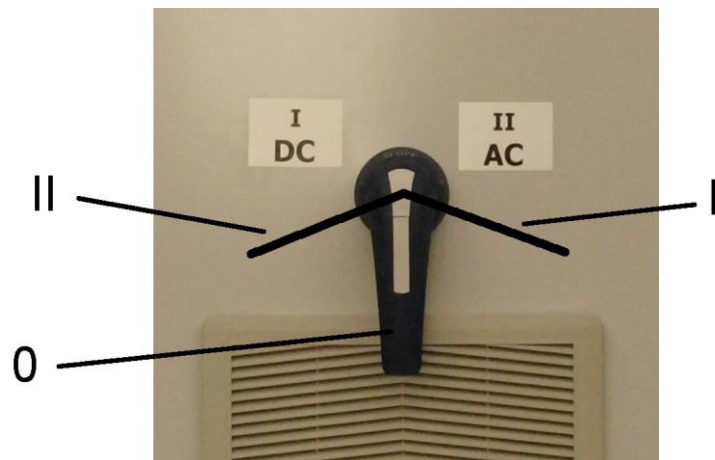
Figure 3: cabinet front panel

On box/cabinet front panel, the following devices are present (referring to Figure 3):

Item	Type	Function
1	Display/Keypad	Display/keypad of the inverter. Refer to Sinus Penta User Manual - Programming Instructions.
2	Emergency button	Emergency button provides an emergency safe stop of the motor.
3	Changeover switch	Three position switch: DC supply, switch off, AC supply.

Table 1: front panel devices

6.1. *Changeover switch*



S000504

Figure 4: changeover switch

Changeover switch handle positions (referring to Figure 4):

Item	Type	Function
0	Off	Both AC and DC power supplies off
I	DC mode	DC power supply from PV field on
II	AC mode	AC power supply on

Table 2: changeover switch handle positions

7. SOLARDRIVE PLUS BOX / CABINET – INSTALLATION AND COMMISSIONING



S000500

Figure 5: internal view of the SOLARDRIVE PLUS CABINET

The following paragraphs provide information on power and signal cable connection.

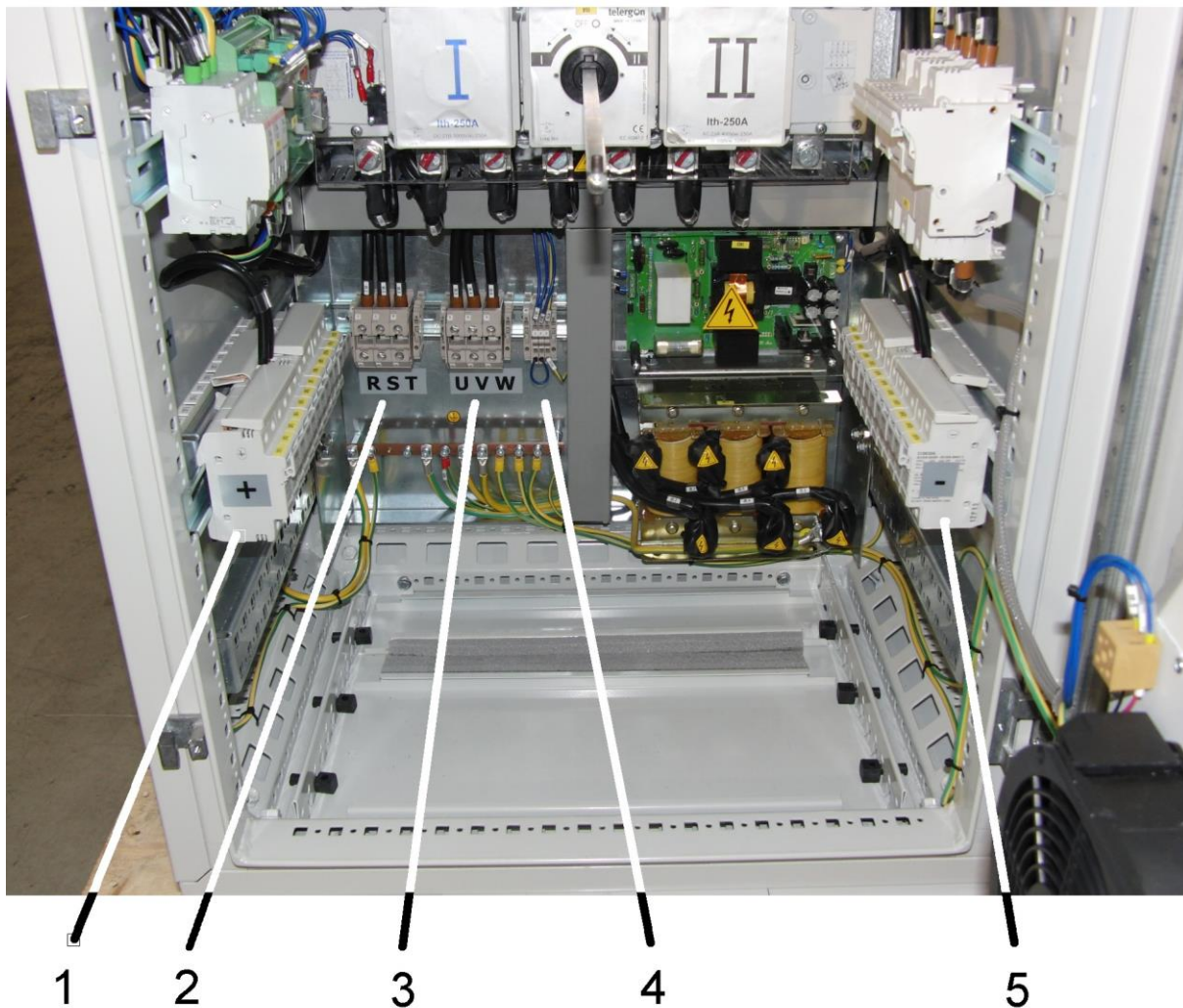


Figure 6: view of Connection Terminals

7.1. Wire Connection Terminal Board

Referring to Figure 6, power and signal connections are as follows:

Item	Terminal	Type	Function
1	+	Power	PV field, panel strings, positive pole. Each fuse input must be connected to no more than one string wire.
2	RST	Power	Inputs for three-phase supply (the phase sequence is not important).
3	UVW	Power	Three-phase motor output
4		Signals	External Start Signal (*)
5	-	Power	PV field, panel strings, negative pole. Each fuse input must be connected to no more than one string wire

Table 3: Wire Connection Terminal Board

(*) In case an external start switch is provided (for example, a tank level switch), the jumper between the two terminals must be removed, and the switch must be connected. Refer to the electrical scheme for further details.

**DANGER**

BEFORE WORKING ON THE EQUIPMENT, MAKE SURE THAT THE EQUIPMENT IS ISOLATED. USE APPROPRIATE TOOLS AND WEAR APPROPRIATE PROTECTIVE EQUIPMENT.

USE APPROPRIATE WARNING SIGNS TO MAKE THE OPERATION SAFE.

ONLY QUALIFIED PERSONS CAN ACCESS THE INTERNAL PARTS OF THE EQUIPMENT.

7.2. *Connecting Earth Cables*

Earth cables must be connected to the grounding copper bar, as shown in Figure 7.



Figure 7: view of grounding copper bar

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