

In addition to this guide, read and obey the safety and installation information in the product manual. Use the unit only as described in the documentation. Failure to do so can cause a risk

Power and productivity for a better world™



Mount the

inverter

to dust and

such as The unit can produce noise or vibration. Consider this when you select the

harmful gase



2



Do not install

direct sunlight.

from ice and

Protect the unit



The installation area must be cooled adequately for all of the equipment

all labels on

always visible.





area must be accessible in emergencies

The supporting

structure and

must support

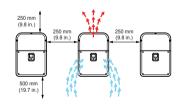
the weight of

the unit and be

fastenings

Make sure that:

- You obey the minimum installation clearances.
- There is sufficient cooling airflow.
 The cooling fans can be accessed for maintenance.
- · The inverter labels can be read.



- If it is possible, install several inverters in one row, not on top of each other.
- · Leave as much space between several inverters as possible. Install inverters as low as possible.
- · When you install inverters on top of each other, obey the minimum



approximately 67 kg (148 lbs) and it is top heavy. Mechanical installation procedure

1.Examine the delivery for damage 2.Unpack the delivery. 3. Make sure that the delivery has the correct items.

• Pilot securing point, Ø 8.5 mm

4 Make sure that the installation area is ready. 5.Install the wall-mounting plate.

6. Move the unit to the installation area 7.Lift the unit onto the wall-mounting plate 8.Lock the unit to the wall-mounting plate.

Wall-mounting plate (a) Wall-mounting plate (place behind inverter)

WARNING! ABB recommends that you use a hoist to lift the heavy unit. Obey local working safety regulations. The unit weighs

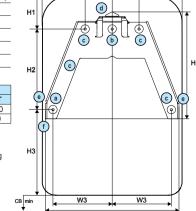
- © Wall securing points, 4 pcs, Ø 8.5 mm d Cantilever support to hang inverted
- Securing point to inverter, 2 pcs
- Slot for padlock

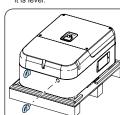
mm 395 128 300 319 497 162 inches 15.55 5.04 11.81 12.56 19.57 6.38

To install the wall-mounting plate position of the wall-mounting plate.

- 1.Use the pilot securing point (b) to mark the
- 2. Make a hole in the surface and install a plug, if it is necessary.
- 3.Install the pilot screw, but do not tighten it. 4.Let the wall-mounting plate hang from the pilot screw or use a spirit level to make sure
- 5. Mark the remaining 4 securing points (c).
- 6.If it is necessary, make holes in the mounting
- surface and install plugs. 7. Fasten the wall-mounting plate to the
- mounting surface.

 8. Tighten the pilot securing screw



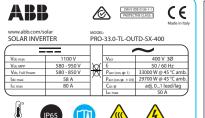


Move the unit Move the unit to the installation area.

To use a hoist: 1.Install the 2 eye bolts (M12) to the top of

- the inverter.
- 2.Attach the lifting hooks to both eye bolts. 3.Lift the inverter carefully and steady it manually
- To move the inverter by hand: At least two persons are required (obey local
- occupational safety regulations).
- Lift the inverter upright carefully Use the handholds on the bottom of the inverter.

The labels on the unit contain the primary technical data and identify the equipment and manufacturer.



PRO-33.0-TL-OUTD-SX-400 • P/N:PPPPPPPPPPPPPPP ● WO:XXXXXX ·Inverter serial numbe SO:SXXXXXXXX Q1/ SN:YYWWSSSSSS WK:WWYY

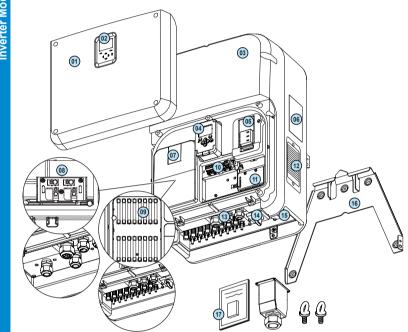
Inverter model

Do not remove, hide, cover or damage any labels that are attached to the unit.

The warnings and symbols used in this document and on the equipment:						
Refer to the instructions	Risk of danger	Risk of electric shock	Hot surface			
IP65 Ingress protection rating	Operating temperature range	No isolation transformer	Direct current Alternating current			
+ - Positive and negative poles for DC input	Use safety clothing and personal safety equipment	Protective ground terminal	Risk of electric shock for the indicated time after equipment isolation			
	<u> </u>					

Mode Description PRO-33.0-TL-OUTD-400 1 DC input connection with screw terminals to an external string combiner box PRO-33.0-TL-OUTD-S-400 Standard model specification with an added integrated DC switch which isolates the PV array from the electrical grid. Advanced integrated string combiner box with · Integrated DC switch, which isolates the PV array from the electrical grid.

 8 string inputs with PV quick connectors.
 Monitored string fuses (16 pcs) for both positive and negative inputs. PRO-33.0-TL-OUTD-SX-400 String current monitoring with configurable alarm limit.
 Replaceable monitored surge protection device for DC input, Type II.



Main components 61) First cover Display and keypad 04 Control unit Monitored input surge protection devices (-SX) 66 Type designation label 07 DC input cover DC input (standard & -S): Screw terminals and cable glands DC input (-SX): PV quick (9) connectors and monitored string fuses, 16 pcs 10 Control board terminals 11 Internal fan External fans, 2 pcs (one on

(3) DCS M DC switch (-S & -SX)

each side)

- (5) AC output terminal (6) Wall mounting plate
- Supplied accessories
- ① Documentation and installation accessories

Cable glands for control cables

Lift the inverter onto the wall-mounting plate

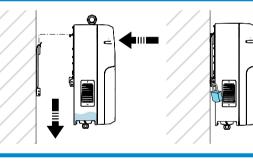
- 1.Lift the inverter vertically from the 4. Install and tighten the 2 M5x20 lifting positions on the sides of the connection area.
- 2. Move the inverter so that it is slightly above and that it touches the wall-mounting plate.
- S.Lower the inverter on to the wall-mounting plate.

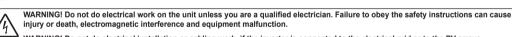
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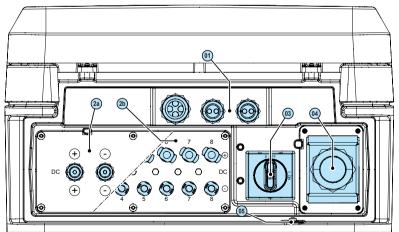
Elec

- (T25) screws (one on each side) to secure the inverter to the wallmounting plate.
 5.Place a padlock to prevent
- unauthorized removal of the





WARNING! Do not do electrical installation or cabling work, if the inverter is connected to the electrical grid or to the PV arrays.



SX model: DC inputs with PV quick connectors (16 pcs)

Connection area layout

Cable glands for control cables: 1x M32 with a plug insert with four 8 mm holes and plugs.

2x M25 with a plug insert with two 6 mm holes and plugs.

Standard and -S models: DC (a) input cable glands 2x M20 for cable diameters 6...12 mm

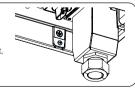
(3) DC switch (-S & -SX)

AC output connection

Position for additional PE cable and cable lug, M5 thread

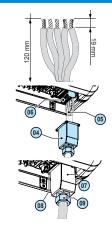
Connection procedure

- 1. Connect the AC cabling.
- 2.If it is necessary, install a protective earth (PE) connection to the auxiliary PE point.
- 3.Connect the DC input cables to
- 4.Install the control cables
- 5.Install the option modules and 6. Make sure that all wiring is correct,
- safe and secure.



AC cabling connection

- (i) Isolate the inverter from all power sources.
- @ Remove 120 mm of the outer insulation jacket from the AC cable
- Remove 19 mm of the insulation jacket of each conductor. Use only non-insulated wire-end sleeves (3) Insulated sleeves can cause damage to the AC connector. If a cable screen/shield is used as a PE
- conductor, mark the screen with yellow/green insulation tape. Put the AC cable through the AC connector body and rubber grommet
- (5) Install the conductors in the correct L3, L2, L1, N and PE terminals.
- 66 Tighten the terminal screws to 4...4.5 N⋅m with a 1.0x5.5 flat screwdriver. Put the connector housing over the terminals in the correct orientation. Make sure that the rubber seal of
- Put the connector housing is in position. 108 Tighten the 4 screws to 4 N m (T25).
- (9) Tighten the cable gland of the connector housing to 7.5 N·m.
- 1 If it is necessary, attach an additional PE connector with a cable lug to the second PE connection point.



8.

9.

12.

13

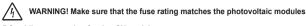
14.

WARNING! Before you connect the DC input cables, make sure that their polarity is correct. WARNING! When the photovoltaic array is exposed to light, it supplies a DC voltage to the inverter.

WARNING! Do not use PV modules that require grounded DC+ or DC- conductors. The DC side and AC grid are not galvanically

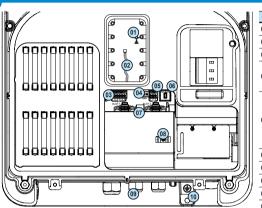
DC cabling connection for standard and -S models

- 1 Set the DC switch to off on the inverter (-S model) and isolate the inverter from all power sources.
- (12) Make sure that the strings are compatible with the inverter
- Make sure that the polarity of the strings and the cable markings are correct. Isolate the DC input cabling from the PV array.
- (6) Remove the DC input cover.
- 66 Remove the cable gland sealing plugs.
- Remove 16 mm of the insulation from the cables
- Put the string cables through the cable glands (cable diameter 6...12 mm).
- Put the conductors into the correct screw terminals according to their polarity. 10 Tighten the screw terminals (with a 1.0x5.5 flat or PZ2 driver) to 2.4...4.0 N·m.
- 11) Make sure that the wires are secure and cannot be pulled from the terminals
- (12) Make sure that the cables are routed tidily and have no sharp bends.
- 13 Tighten the cable glands.
- 4 Attach the DC input cover.



DC cabling connection for the -SX model

- 1.Set the DC switch to OFF on the inverter and isolate the inverter from all power sources
- 2. Isolate the DC input cables from the PV modules.
 3. Install the PV quick connectors to the DC input cables.
- 4. Make sure that the DC cables have permanent string number and polarity markings
- 5. Measure that the polarity of the strings at the DC connectors is correct
- 6.Remove the sealing caps from the applicable connectors at the inverter. Keep the unused sealing caps at the installation site
- 7.Connect the strings to the inverter one string at a time. Start with connectors DC1+ and DC1-. Do not make sharp bends in the cables.
 8.Attach the cables to suitable supports outside the inverter.

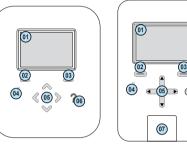


Control connections

- Status LEDs on control board
- X8 RJ45 data type 8P8C plug connector, RS-485 interface for control unit. (3) X1 remote control unit spring terminal (RS-485 interface)
- S1:1 Selector switch, not in use, default always OFF.
- 4 S1:2 Selector switch for embedded fieldbus network termination (ON), default OFF.

X2 remote monitoring spring terminal.				
	Pin	Name	Description	
05)	X2:1	Data+	Inverter RS-485 transmit data	
	X2:2	Data-	Inverter RS-485 receive data	
	X2:3	GND_A	Functional ground, isolated	

- 66 Connector for internal fan. (Int. Fan)
- (iii) SLOT 1 and SLOT 2 for Fieldbus option modules.
- Clamp connectors to connect cable shields to protective earth
- (9) Cable glands for control cables (1x M32 and 2x M25)
- 40 Additional PE terminal.



Control unit component 61 Graphical display

- Left softkey: Select the action on the lower left of the display. Usually cancels or returns
- Right softkey: Select the action on the lower right of the display. Usually confirms
- Status LED, dual color green or red: Monitor the status of the inverter. Up/Down/Left/Right arrow keys: Navigate menus, move cursor and change values.
- To set a parameter to the default value, push and hold the up and down arrow keys at the same time.
- 66 Help key: Open the context sensitive help view.
- USB connector and lid (for service use only)

To isolate the inverter from external power sources

- Open the main disconnector and circuit breaker(s) at the AC distribution board. -S and -SX model: Set the DC switch to the OFF position (-S and -SX models).
- WARNING! The DC switch does not isolate the DC input connectors or fuses from the PV array.
- Open the DC switches and circuit breakers between the inverter and PV array. (4) Disconnect the AC cable from the inverter to ensure complete isolation from the electrical grid.
- (65) Wait at least 5 minutes for the internal capacitors to discharge Disconnect the DC cables from the inverter to ensure complete isolation from the PV array(s).
- WARNING! Do not disconnect the DC connectors while they are under load.

PV quick connectors (-SX model):

- a) Make sure that the DC cables have the correct markings
- b) Put a flat screwdriver into the locking slot. c) Pull the connectors apart.
- d) Put protective caps on the connectors
- Screw terminals (standard and -S model) a) Remove the first cover.
 - b) Remove the DC input cover
 - c) Make sure that the DC cables have the correct markings.

 - d) Use a multimeter to make sure that there is no voltage between DC input terminals (DC+ and DC-), and no voltage between DC input terminals and ground (DC+ and PE terminal or DC- and PE terminal
 - e) Loosen the terminal screws.
 - f) Loosen the cable glands.

Rated output frequency (fR)

Output frequency range (fmin...fmax)

- g) Pull the DC cables through the cable glands. Disconnect any external power sources from the control connectors.

Maintenance For information on maintenance, refer to the PRO-33.0-TL Product manual.

input side	
Recommended maximum PV array power (PPV, max)	40000 Wp Recommended maximum input power
Absolute maximum DC input voltage (Vmax, abs)	1100 V Inverter does not start to operate at over 1000 VDC
Start-up DC input voltage (Vstart)	610 V
Operating DC input voltage range (VDC, minVDC, max)	580950 V
Rated DC input voltage (VDCR)	580 V
Rated DC input power (PDCR)	33700 W
Number of independent MPPTs	1
MPPT input voltage range (VMPPT, minVMPPT, max) at PACR	580850 V
Maximum DC input current (IDC, max)	58 A
Maximum input short-circuit current	80 A
DC connection type	Standard and -S model: Screw terminals (625 mm2)
	-SX model: 8 pairs of Phoenix SUNCLIX connectors

Cable connectors: DC+: PV-CF-S (1774674) DC-: PV-CM-S (1774687) Type of Photovoltaic modules connected to the input (IEC61730) Class A

Input protection

Reverse polarity protection	Inverter protection only, from limited current source, via short-circuit diode and for fused -SX model when more than 2 strings are connected.	
Input overvoltage protection (Std & -S)	3 varistors	
Input overvoltage protection (-SX)	3 plug-in modular surge arresters, Type II	
Photovoltaic array isolation control	According to local standard	
Insulation monitoring	Impedance measurement between DC terminals and ground	
DC switch rating and type (-S & -SX)	58 A / 1000 V, 50 A / 1200 V	
PV string fault current protection (-SX)	Solar string fuse, 10x85 mm, 1100 Vpc, all input terminals monitored	
PV string fuse rating (-SX)	15 A / 1100 V	
PV string fuse maximum rating (-SX)	20 A	
String current measurements (-SY)	Individual string current monitored, configurable alarm limit	

Solar string fuse, 10x85 mm, 1100 Vpc, all input terminals monitored	
15 A / 1100 V	
20 A	
Individual string current monitored, configurable alarm limit	
OVC II	
Three phase 3W or 4W + PE	
33000 W	
33000 VA	
400 V	
320480 V (Range varies according to the country grid standard.)	
47.8 A	
50.3 A	
< 50.3 A @ 3-cycle-RMS	
Negligible	

50 Hz / 60 Hz

47...53 Hz / 57...63 Hz (Range varies according to the country grid standard.)

Display layout Status Control unit LED Current view, date and Status **01** status icon. Not shown ON Red - Active fault that requires user action. in special screens Flashing Red (1 s ON, 2 s OFF) - Active warning. The 300 Date & time Current view contents output power may be limited Language 02 **02** Flashing Green (1 s ON, 2 s OFF) - The inverter is in e.g. menu, parameter, area Stand-by help text, etc. stand-by mode. CO2 Reduction Softkey commands Limited Flashing Green (3 s ON, 1 s OFF) - The inverter is in and the real-time -C- Screen operation power feed mode with limited power output. Softkey 03 clock, if enabled. The Normal ON Green - The inverter is in power feed mode commands depend on operation

10.

11.

- 1.Make sure that the mechanical and electrical installation of the inverter is correct.
- 2.Make sure that the mechanical and electrical installation of the rest of the photovoltaic (PV) system is finished and inspected 3. Make sure that the grid owner (or other local authority) is informed about the planned
- grid connection.

 4.Make sure that the PV array gets adequate sunlight during the start-up procedure.
- First start-up procedure
- Set the AC line circuit breaker to ON at the AC distribution board. @ After the unit starts up, select the user interface language.
- The First start assistant guides you through the set-up process. Use the softkeys and keypad to edit and confirm the settings.
- Set the date and time.
- To set the grid code settings, select the correct Country code if your country is not listed, contact your supplier.
- 6 After you confirm the settings, the "Energy: Today" view is shown.
- On the -S and -SX models, set the inverter DC switch to ON. Set the external DC switches or circuit breakers to ON.
- When there is adequate DC voltage, the inverter transfers power from the PV arrays. If the safety checks complete without errors, the inverter connects to the AC grid.
- 30.20 kWh 19.2 kW 12:00 18:00

Energy: Today

First start

assistant.

1/4 Instructions

Solar Inverter

To set up this unit, set date, time and

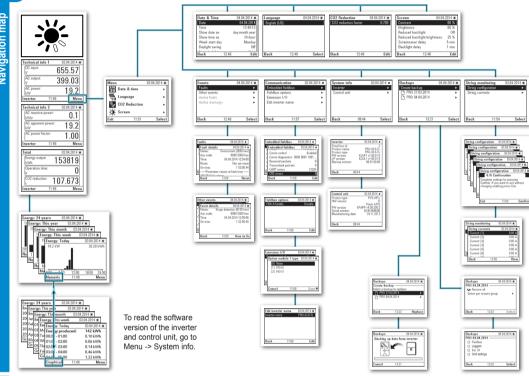
installation country in this First start

11:37

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Continue

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To read the software	Contract Contract	
Nominal power factor and adjustable range	>0.995, with Pacr = 33.0 kW, adj. ±0.9 with Pacr =	
Troninal power later and adjustable range	29.7 kW, adj. ± 01 with S = 33.0 kVA	
Total current harmonic distortion	< 3%	
AC connector type	Fixed plug, 4-pole + PE	
AC connector ratings	Conductor: 1025 mm2 / dia. 2232 mm / Max. current 125 A / Max. voltage 630 Vac	
Output protection		
Protection class	Class 1 (IEC 62103)	
Overvoltage category	OVC III	
Grid monitoring	Automatic grid relays, DC and AC sensitive residual current monitoring unit, anti- islanding functions according to IEC and VDE standards.	
Output overvoltage protection	5 varistors	
Recommended tripping curve type of external circuit breaker	Type B/C	
Minimum / (maximum) permitted nominal current rating of external circuit breaker	63 A / (80 A)	
RCD type of external use	If required by local regulations use Type A 300mA external RCD.	
Operating performance applying standard EN 50530		
Maximum efficiency (ŋmax)	98.3 %	
Weighted efficiency (EURO/CEC)	98.0% / 98.1%	
MPPT adjustment efficiency:		
Power range of Pac nominal <20%	99.5 %	
Power range of Pac nominal >20%	99.9 %	
Night-time consumption	< 1 W	
Standby consumption	< 20 W	
User interface and communication		
Control unit type	PVS-AP-L graphical display, detachable	
Control unit communication	ABB control unit protocol over EIA-485	
Remote monitoring communication	Modbus RTU protocol over EIA-485 or ABB control unit protocol over EIA-485	
Remote monitoring adapter type	VSN700 data logger (optional)	
Electrically isolated relay output	with FIO-01 accessory	
Environmental		
Environmental category	Outdoor, avoid installation subject to direct sunlight or rainwater	
Ingress protection class	IP65/IP54 monitored fans	
Ingress protection class with first cover open	IP20	
Pollution degree class	PD3	
Ambient temperature range allowed during operation	-25+60°C (-13+140°F) +45°C (+113°F)	
Maximum ambient temperature for nominal power output	Output current decreases according to the temperature rise rate in the inverter	
Ambient temperature range allowed during storage and transportation	-40+70°C (-40+158°F)	
Relative humidity level allowed, not condensing	0100%	
Maximum installation altitude above sea level	2000 m	
Installation clearances (Top/Sides/Bottom)	250/250/500 mm (9.8"/9.8"/19.7")	
A-weighted sound power level	70 dBA	
Physical		
Unit dimensions (Width/Height/Depth)	520/740/300 mm (29.1"/20.5"/11.8")	
Limit consists	Other deed 8, Other (440 lbs), OV, 107 lbs (440 lbs)	

Contact us

Unit weight

Safety Isolation level

Markings Safety and EMC

Package weight

Package dimensions (Width/Height/Depth)

www.abb.com/solarinverters

Certifications and approvals

PRO-33.0-TL Quick installation and start-up guide, EN Rev. A (3AUA0000123263) EFFECTIVE 2014-08-29
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Standard & -S: <66 kg (146 lbs) -SX: <67 kg (148 lbs)

600/800/571 mm (31.5"/23.6"/22.5")

<86 kg (190 lbs)

Transformerless CE according to LVD 2006/95/EC and EMCD 2004/108/EC

EN 62109-1:2010, EN 62109-2:2011, EN 61000-6-2, EN 61000-6-3, EN 61000-3-11, EN 61000-3-12 CEI0-21 CEI0-16 VDE 0126-1-1 VDE-AR-N 4105 G59/3 AS3100/AS4777 RD1699

RD661, VDE 0126-1-1/A1 VFR2014, ABNT NBR 16149, PPC Greece, MEA, PEA, IEC 61727, IEC 62116, EN50438 (check from sales for additional grid standards)



Specifications subject to change without notice