

Application Note - SolarEdge Inverters, Power Control Options

Version History

- Version 8 (April 2020)
 - Modified Ramp rate description
- Version 7 (September 2019)
 - Modified Phase balancing description
 - Modified Phase balancing inverter CPU version
- Version 6 (June 2019)
 - Removed Appendix B
 - Aligned values notation
- Version 5 (December 2018)
 - Q Configuration Appendix update
- Version 4 (November 2018)
 - Added SetApp menus
 - Added Diesel Generator menu options
 - Active Power ramp-up firmware information
 - Phase balancing – supporting firmware information
- Version 3 (December 2017)
 - Added Active Power ramp-up option
 - Added new active power phase balancing feature
- Version 2 (November 2017)
 - Added Demand Response Enabling Device (DRED) connectivity option
 - Clarified correct cosphi(p) setting
 - Removed Active Power phase balance option
 - Removed country defaults list
 - New appendix with explanation of cosphi
- Version 1 (December 2012)

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Introduction

To improve grid stability, many electric utilities are introducing advanced grid limitations, requiring control of the active and reactive power of the inverter by various mechanisms.

SolarEdge inverters with CPU version 2.337 and later support these requirements (some features may require later versions; refer to the relevant feature for details). These inverters include default settings per country, based on the specific requirements in that country, as well as the ability to configure these settings (settings may have to be configured according to installation size or utility requirements).

This document details the available power control configuration options in the inverters, and explains how to adjust these settings if such changes are required, using:

- [SetApp](#)
- [The inverter display \(LCD\)](#)

Installation Note for Three Phase Inverters

If power control is enabled, the order of connection of grid lines to the inverter is important. A 120-degree phase difference between L1 and L2 and between L2 and L3 should be maintained (L1-L2-L3 and not, for example, L1-L3-L2). If the grid lines are not in this order, the error message "Error 112 – Wrong AC Connection" will be displayed on the LCD screen and the inverter will not generate power.

Power Control Hierarchy

Multiple control modes can be used to control inverter active and reactive power. This section details the mode hierarchy in case multiple modes are active.

Reactive Power Control

The following scenarios describe reactive power control conditions:

- If RRCR is disabled, and "Reactive Pwr. Conf → Mode" is not set to RRCR, the RRCR points will be ignored.
- If RRCR is enabled, and "Reactive Pwr. Conf → Mode" is set to RRCR, the RRCR points will control active power and reactive power.
- If RRCR is enabled, and "Reactive Pwr. Conf → Mode" is not set to RRCR, the RRCR points will control only active power, and reactive power will be controlled by the selected mode.

Active Power Control

The following modes can control the active output power of the inverter:

- RRCR
- Power Limit <%>
- Current Limit <A>
- Wakeup Gradient
- P(f)
- P(V)

If several control modes are active, the output power of the inverter will be the minimum power. For example, if an RRCR point is configured to "Pwr Reduce=60%" and "Active Power Conf. → Power Limit=70%", the output power will be limited to 60% of Pnom.

Power Control Options

The inverter power control options are described in the following sections:

- Grid Control
- Energy Manager
- RRCR Configuration
- Reactive Power Configuration
- Active Power Configuration
- Phase Balancing
- Wakeup Configuration
- Advanced
- Load Defaults



NOTE

CosPhi Value notations:

- Setting positive CosPhi will lead to inductive / current lagging voltage / sinking behaviour.
- Setting negative CosPhi will lead to capacitive / current leading voltage / sourcing behaviour.



NOTE

Q Value notations:

- Setting positive Q will lead to capacitive / current leading voltage / sourcing behaviour
- Setting negative Q will lead to inductive / current lagging voltage / sinking behaviour.

Grid Control

The Grid Control feature may be enabled or disabled by default, depending on the country setting. When disabled, the following menus do not appear:

- Reactive Pwr Conf.
- Active Pwr Conf.
- Wakeup Conf.
- Advanced

To show these menus, enable Grid Control.

To configure the Grid Control solution using SetApp, click [here](#).

To configure the Grid Control solution using the LCD screen, click [here](#).

Energy Manager

SolarEdge offers the *Smart Energy Management* solution for increasing the self-consumption of a site. One method used for this purpose is limiting the export power: The inverter dynamically adjusts the PV power production in order to ensure that export power to the grid does not exceed a preconfigured limit. To enable this functionality, an energy meter that measures export or consumption must be installed at the site.

To configure the Smart Energy Management solution using SetApp, click [here](#).

To configure the Smart Energy Management solution using the LCD screen, click [here](#).

RRCR Configuration

SolarEdge inverters can connect to an external device, which can control active and reactive power according to commands sent by the grid operator (examples, RRCR – Radio Ripple Control Receiver, DRED – Demand Response Enabling Device).

Use the RRCR Conf. menu to enable this control and to configure up to 16 control states. Each control state is composed from the following three fields:

- **AC output power limit** – limits the inverter’s output power to a certain percentage of its rated power with the range of 0 to 100 (% of nominal active power).
- **CosPhi** – sets the ratio of active to reactive power. The Reactive Power Conf. Mode must be set to RRCR when using this control mode. The CosPhi range is from 0.8 leading to 0.8 lagging.
- **Enable/Disable** – enables or disables control according to the specific state.

For information on RRCR connectivity, refer to the *Power Reduction Control application note* for details:

<http://www.solaredge.com/sites/default/files/power-reduction-control-application-note.pdf>.

For information on DRED connection in Australia, refer to the application note, *Connecting a Demand Response Enabling Device (DRED) to a SolarEdge Inverter*: <https://www.solaredge.com/sites/default/files/dred-connection-application-note.pdf>.

To control active and reactive power with the RRCR function using SetApp, click [here](#).

To control active and reactive power with the RRCR function using the LCD screen, click [here](#).

Reactive Power Configuration

Use the Reactive Power menu to select one of the reactive power control modes listed below, and to configure the various modes:

- **CosPhi** – sets a constant CosPhi, regardless of other parameters. Range: from 0.8 leading to 0.8 lagging.
- **CosPhi(P)** – sets a graph of CosPhi to active power (P). CosPhi(P) has a 6-point graph setup. P can be set to any value between 0 and 100 [% of nominal active power], and should increase from P(0) to P(5). CosPhi can be set to any value between “0.8 leading” and “0.8 lagging”. Each point includes the following fields: < % of nominal active power, CosPhi >.
- **Q** – sets constant reactive power (Q).
Range: -100 to 100 (% of nominal reactive power).
- **Q(U)+Q(P)** – sets a graph of reactive power (Q) to grid voltage (U) and to active power (P); this mode can be used when Q(U) control is required, by setting Q(P) to zero, and vice versa. Q(U) and Q(P) have 6-point graph setups. Refer to *Appendix A – Q Configuration* on page 22 for additional configuration instructions.
 - U: 0 to 200 [% of nominal voltage].
 - P: 0 to 100 [% of nominal active power]
- **RRCR** – enables CosPhi control through the RRCR. RRCR must be enabled when using this control mode.
- **Unom** – The Reactive Power menu is also used to set Unom, a reference grid voltage, when required for installation testing.
Range: 0 to 500 [V].

To control reactive power using SetApp, click [here](#).

To control reactive power using the LCD screen, click [here](#).

Active Power Configuration

Use the Active Power menu to control the inverter active power:

- **Power Limit** – limits the inverter maximum output power. The power limit can be set to any value between 0-100 [% of nominal active power].
- **Current Lim** – Current Limit: limits the inverter's maximum output current (available from inverter CPU version 2.549). The current limit can be set to any value between 0 and the inverter's max AC current [A] (the LCD will allow setting to a higher value but the inverter will never exceed its maximum AC current).
- **Wakeup Grad** – Wakeup Gradient: enables gradual power production when it begins operation after a fault or an inverter reset. For gradual power production during normal operation, use the Ramp Rate option.
- **Grad Time** – Gradient Time: The wakeup time setting. This line is displayed only if the Wakeup Gradient is enabled. Can be set to any value between 1 and 9999 seconds.
- **P(f)** – Power Frequency: This is used when frequency-based power reduction is required. This defines a linear graph set by two points. The inverter de-rates power according to the defined graph, until the frequency reaches the trip value and the inverter disconnects (the trip point is preset per country therefore does not need to be defined as one of the two points).
- **P(V)** – Power Voltage: This is used when voltage-based power reduction is required. This defines a linear graph set by six points (available from inverter CPU version 3.1808). The inverter de-rates power according to the defined graph, until the voltage reaches the trip value and the inverter disconnects.
- **Ramp Rate** – enables gradual power production during normal operation (available from inverter CPU version 3.22xx). Can be set to any value between 0-100%/sec with 0.1% resolution. A ramp rate of 0 means that the production increase is immediate.

To control active power using SetApp, click [here](#).

To control active power using the LCD screen, click [here](#).

Phase Balancing

The phase balancing feature is used to connect up to 3 single phase inverters to two or three phase grid in cases where phase balancing is required by the utility.

- Supported by inverters with a maximum 21.7A AC output current
- Supported from inverter CPU version 3.22xx and CPU version 4.5.xx

NOTE

The phase balancing feature is *not* supported in sites in which both single phase inverters and three phase inverters are installed.

When phase balancing is enabled, if any inverter in the system disconnects, the other inverters disconnect within 2 seconds. Disconnect occurs under the following conditions:

- Loss of communications between any of the inverters
- Grid protection trip
- Inverter receives a zero-production command from an external device

In the event of a communications loss, the following message is displayed: "Phase balancer communication error"

In the event of a grid protection trip or zero-production command, the following message is displayed: "Phase balancer imbalance protection"

To control phase balancing using the LCD screen, click [here](#).

Wakeup Configuration

Use the Wakeup menu to set the minimum and maximum grid frequencies and grid voltages between which the inverter can begin power production. This menu does not set the inverter disconnection values, which are pre-set per country.

The ranges for Wakeup parameters are:

- Frequency: 0 to 100 [Hz]
- Voltage 0 to 500 [V]

To configure wakeup settings using SetApp, click [here](#).

To configure wakeup settings using the LCD screen, click [here](#).

Diesel Generator Configuration

Advanced

Use the Advanced menu to configure the following settings:

- **K-Factor.** For BDEW-MVGC certification in Germany. It is set to a default value of 2.
- **FRT-K.** The range for the FRT-K parameter is 0 to 16.

To configure advanced using SetApp, click [here](#).

To configure advanced using the LCD screen, click [here](#).

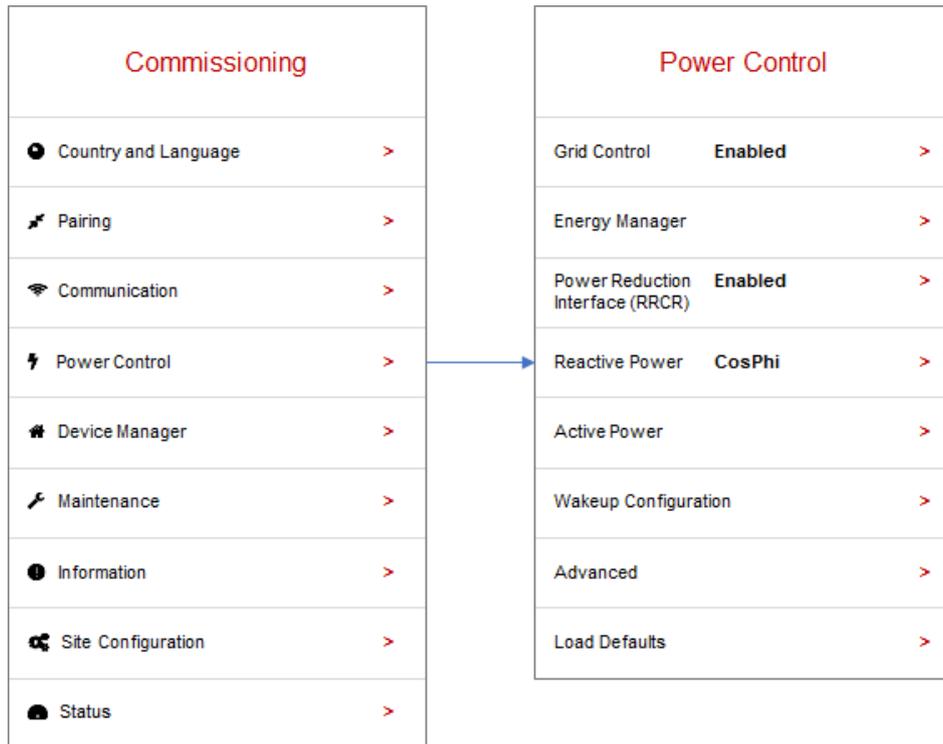
Load Defaults

Use the Load Defaults menu to restore the default Power Control settings of the country to which the inverter is set, according to the settings detailed below. The following configurations are *not* reset when you select the Load Defaults option:

- Energy Manager
- Power Reduction Interface / RRCRConf.

Power Control Configuration using SetApp

Access SetApp from your mobile device and select **Commissioning** → **Power Control**.



The sections below describe how to configure of each of these menu options.

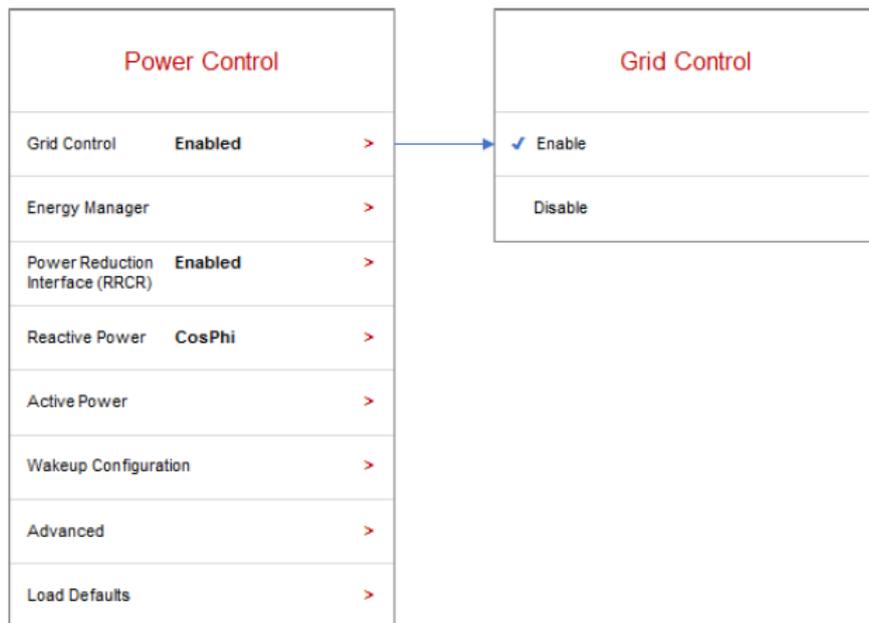


NOTE

The actual menus in the SetApp may differ from the drawings herein.

Grid Control

The Grid Control menu options appear in the figure below.



→ **To enable/disable Grid control:**

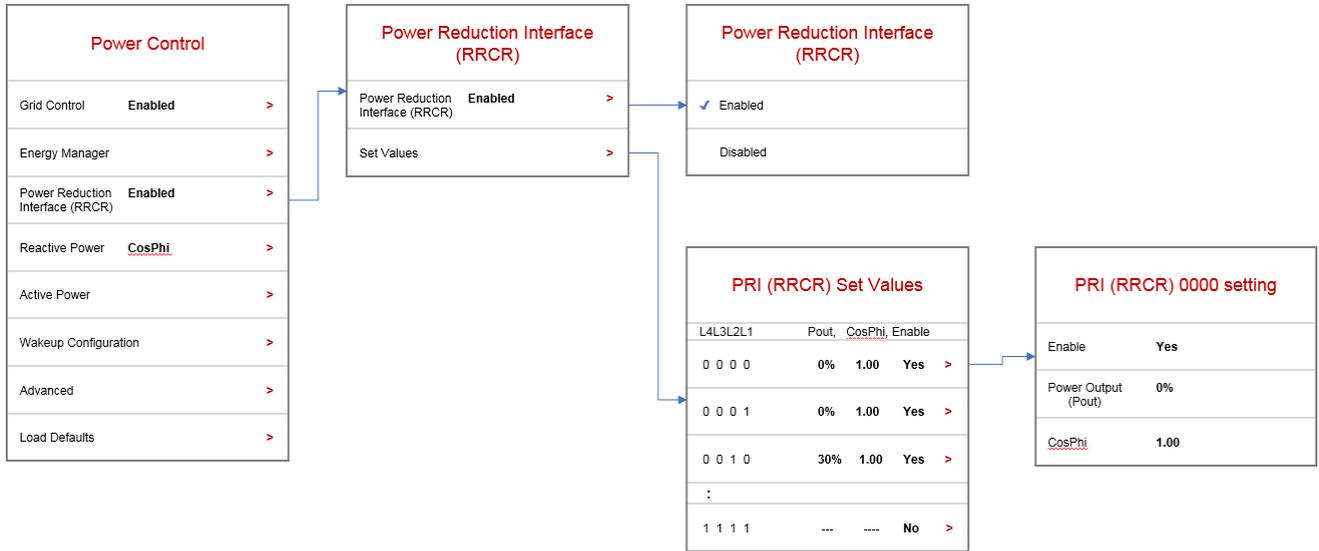
1. From the Power Control Menu, select **Grid Control** and select **Enable** or **Disable**.

Energy Manager

For details on how to use the Export Limitation feature, refer to the Export Limitation application note at https://www.solaredge.com/sites/default/files/feed-in_limitation_application_note.pdf.

RRCR Configuration

The RRCR menu options appear in the figure below.



→ **To enable/disable RRCR control:**

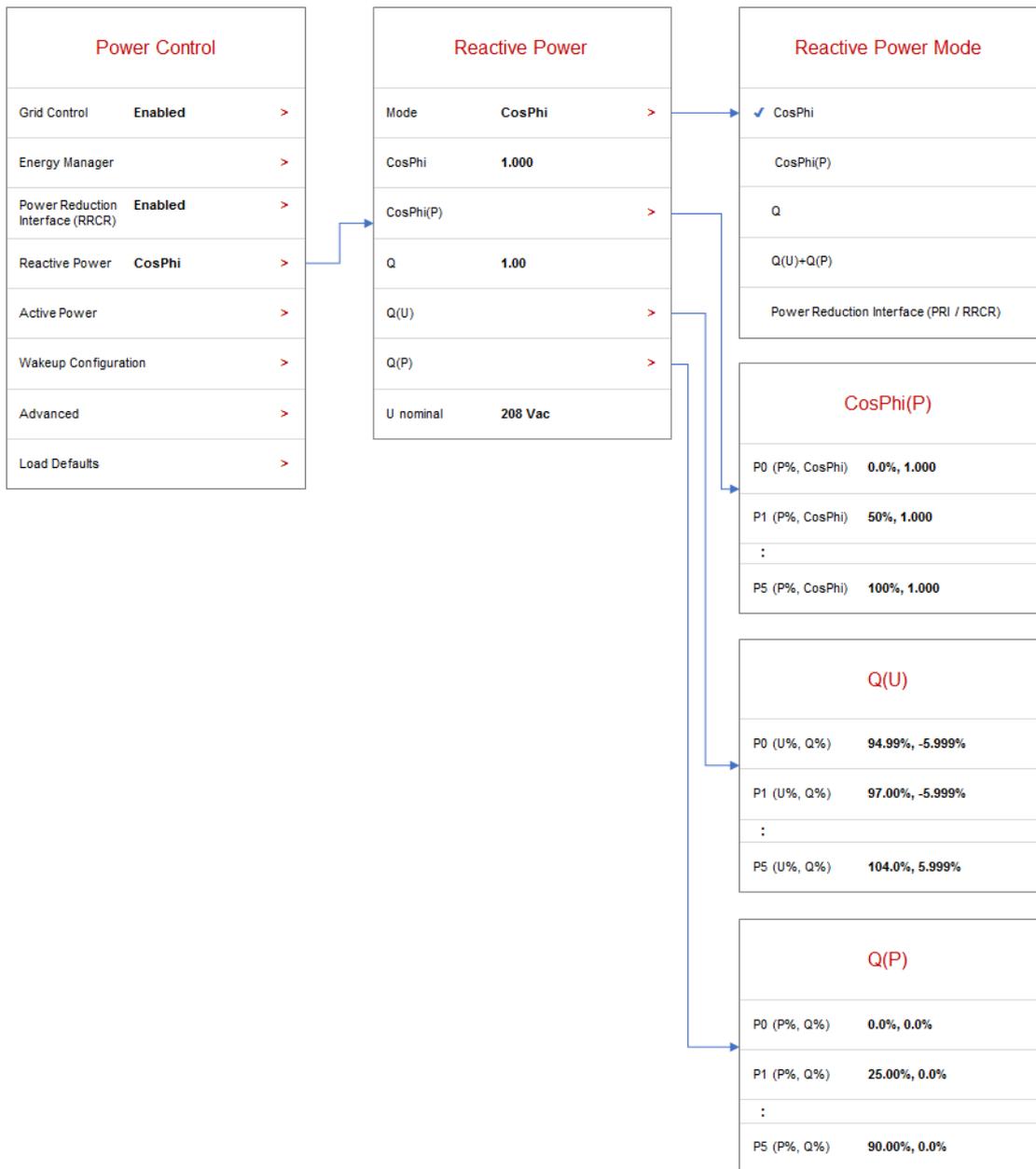
2. Make sure the inverter is connected to a power reduction device.
3. From the Power Control Menu, select **Power Reduction Interface (RRCR)** → **Power Reduction Interface (RRCR)** → Select **Enable** or **Disable**

→ **To enable/disable any of the 16 states and set its values:**

1. From the Power Control Menu, select **Power Reduction Interface (RRCR)** → **Set Values**. Select one of the 16 states to edit.
2. In the PRI (RRCR) Setting screen, set the following values as required:
 - Select **Enable** or **Disable**.
 - In the Power Output (Pout) field, enter the output power as a percentage of rated power.

Reactive Power Configuration

The Reactive Power menu options are depicted in the figure below.



→ **To select a reactive power control-mode:**

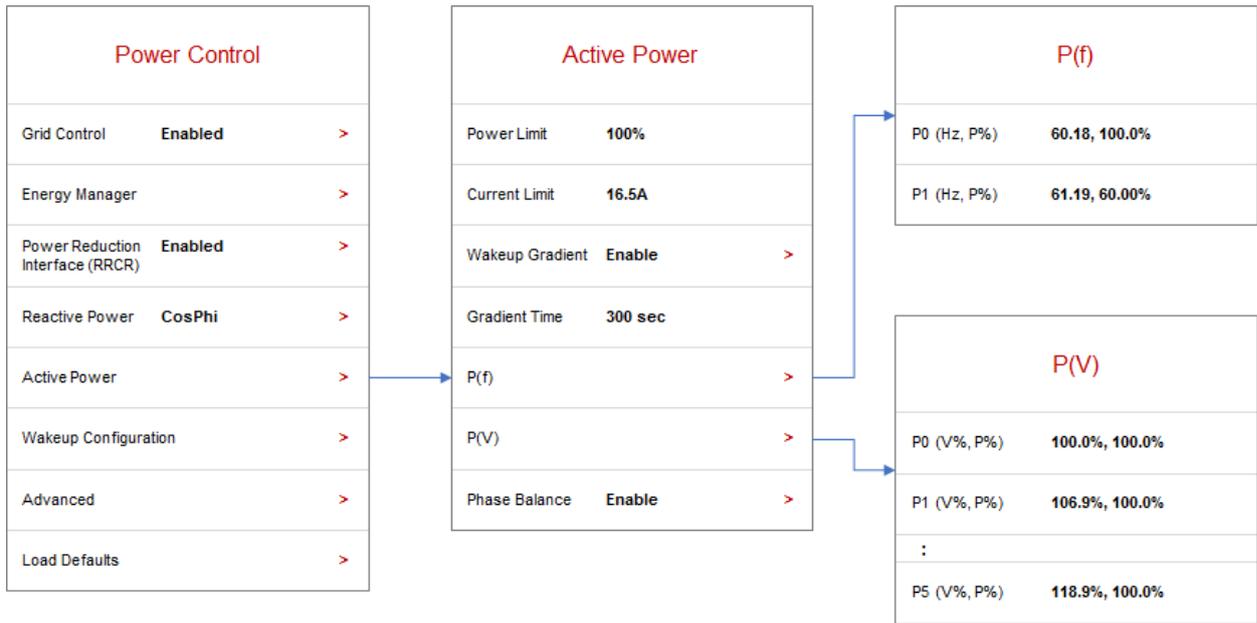
1. From the Power Control menu, select **Reactive Power** → **Mode**.
3. Select a mode from the Reactive Power Mode menu.

→ **To set the values of a reactive power control-mode:**

1. From the Power Control menu, select **Reactive Power**.
4. Scroll the Reactive Power menu, and select the mode you wish to configure.
5. Enter the mode's settings.

Active Power Configuration

The Active Power menu options are depicted in the figure below.



→ **To change the power or current limit:**

1. From the Power Control menu, select **Active Power** → **Mode**
6. Choose **Power Limit** or **Current Limit** and enter the required setting.

→ **To set gradual power production:**

1. From the Power Control menu, select **Active Power** → **Wakeup Gradient** → **Enable**
2. Select **Gradient Time** and enter the gradient time in seconds.

→ **To set P(f) and change the P or f values:**

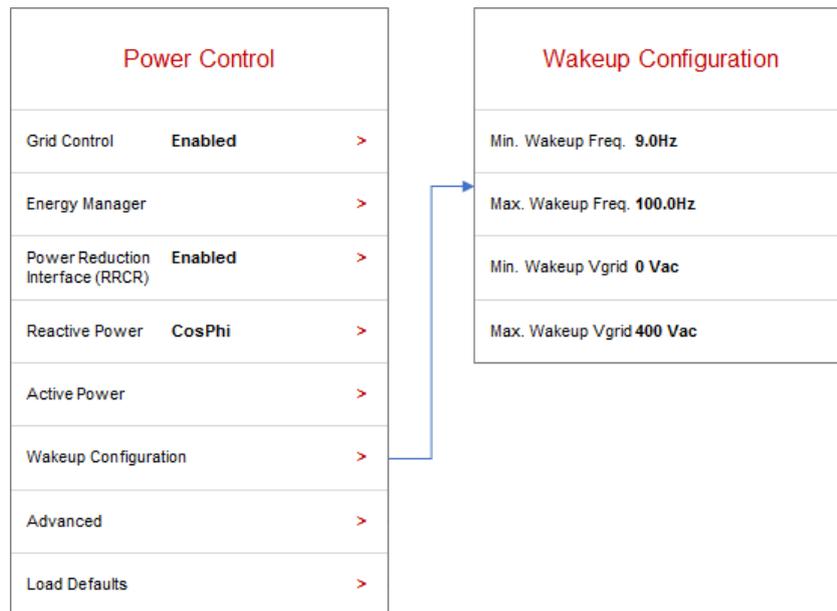
1. From the Power Control menu, select **Active Power** → **P(f)**
7. In the P(f) menu, enter Frequency (Hz) and P (% of nominal active power) values for P0 and P1.

→ **To set P(V) and change the P or V values:**

1. From the Power Control menu, select **Active Power** → **P(V)**
8. In the P(V) menu, enter Voltage (V) and P (% of nominal active power) values for points P0 to P5.

Wakeup Configuration

The Wakeup menu options are depicted in the figure below.



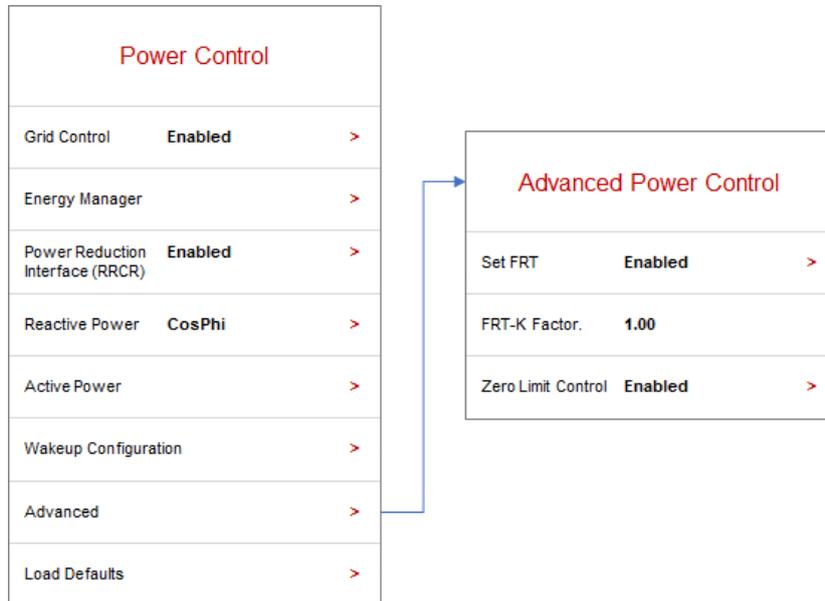
→ To change the wakeup frequency or voltage values:

1. From the Power Control menu, select **Wakeup Configuration**
9. In the Wakeup Configuration screen, set the values for following the following parameters:
 - Minimum wakeup frequency [Hz]
 - Maximum wakeup frequency [Hz]
 - Minimum wakeup voltage – Vgrid [Vac]
 - Maximum wakeup voltage – Vgrid [Vac]

Diesel Generator Configuration

Advanced

The Advanced function menu options are depicted in the figure below.

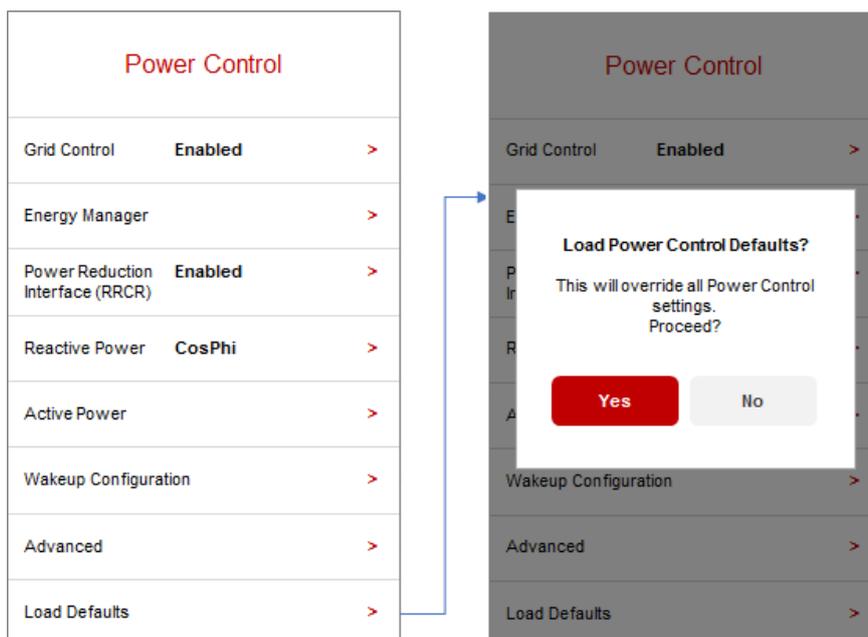


→ **To set FRT-K:**

- From the Power Control menu, select **Advanced**.
- In the Advanced Power Control screen select **Set FRT** and select **Enable** or **Disable**.
- If FRT was enabled, select **FRT-K Factor**, and input the required value.

Load Defaults

The Load Defaults function is depicted in the figure below.



→ **To restore country default power control settings:**

- From the Power Control menu, select **Load Defaults**.

12. When prompted to confirm, select **Yes**.

13.

Power Control Status

Power control status information appears in the Status screen shown in the figure below.

Status		
Inverter SN 07318000C		
Power 7.60 kW	Voltage 240 Vac	Frequency 60.9 Hz
P_OK: 30 of 30 Optimizers Connected		S_OK Server Connected (LAN)
Status Production		Switch ON
Cos Phi 1.00	Limit No Limit	Country USA2
Voltage 380 Vdc	Temp. 156 F	Fan OK
Communication		
LAN Connected	RS485-1 SE Slave NC	RS485-2 Modbus 2 of 2
Cellular NA	Wi-Fi NC	ZigBee NC
Inverter Energy		
Today 45 kWh	This Month 1.14 MWh	This Year 13.68 MWh
Total: 41.03 MWh		

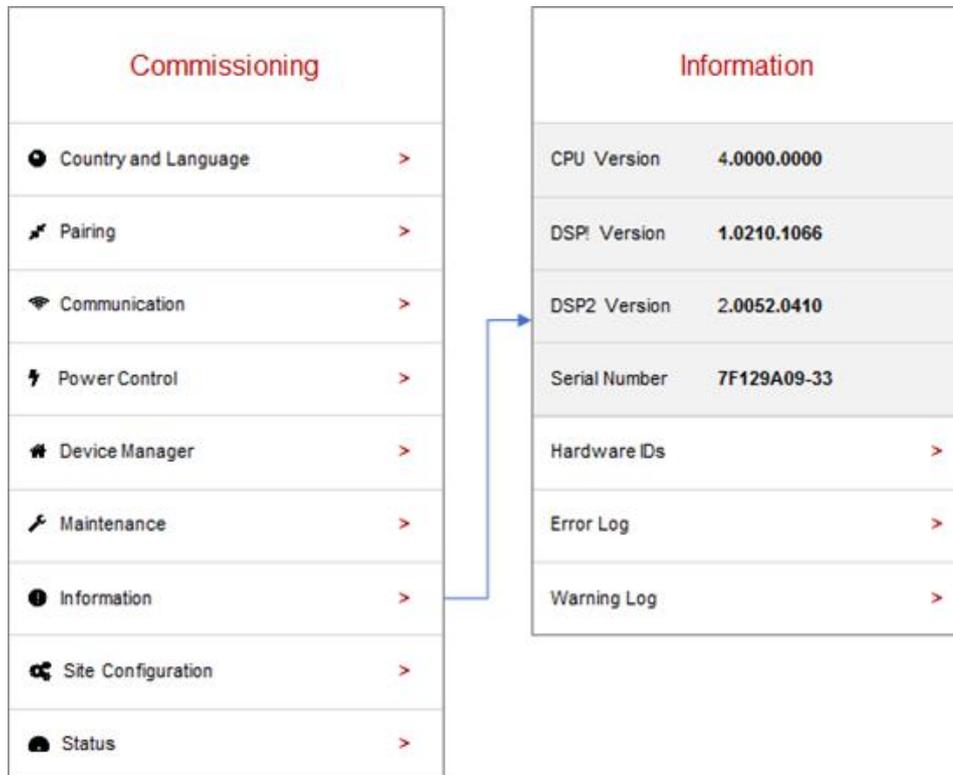
The following power control fields appear in the Status screen:

- **Cos Phi:** The ratio between active to reactive power
- **Limit:** The inverter maximum output power set by the smart energy manager
- **Inverter Energy:** The power produced by the inverter during the current day, month, year, and overall.

Identifying the Inverter's CPU Version

This section describes how to identify the inverter CPU version.

→ To obtain the CPU version information using SetApp.



Power Control Configuration using the Display

The Power Control menu is accessible from the inverter LCD main menu. Refer to the “Inverter User Interface” chapter in the *SolarEdge Installation Guide* for LCD navigation instructions. The Power Control menu contains the following options:

```
Grid Control <En>
Energy Manager
RRCR Conf. <En>
Reactive Pwr Conf
Active Pwr Conf
Wakeup Conf
P(f)
Advanced
Load Defaults
```

The sections below describe how to configure each of these menu options.

Grid Control

→ **To enable/disable Grid Control:**

Select **Grid Control** → Choose **Enable** or **Disable** → Press **Enter**

Energy Manager

For details on how to use the Export Limitation feature, refer to the Export Limitation application note at https://www.solaredge.com/sites/default/files/feed-in_limitation_application_note.pdf.

RRCR Conf.

The RRCR menu includes the following options:

```
RRCR <Dis>
Set Values
```



```
> 0 0 0 0 ---, ---, N
0 0 0 1 0, 1.00, Y
0 0 1 0 30, 1.00, Y
0 0 1 1 ---, ---, N
0 1 0 0 60, 1.00, Y
0 1 0 1 ---, , N
0 1 1 0 ---, , N
0 1 1 1 ---, , N
1 0 0 0 100, 1.00, Y
1 0 0 1 ---, ---, N
1 0 1 0 ---, ---, N
```

1 0 1 1	- - - , - - - , N
1 1 0 0	- - - , - - - , N
1 1 0 1	- - - , - - - , N
1 1 1 0	- - - , - - - , N
1 1 1 1	- - - , - - - , N

Use the RRCR Conf. menu to enable this control and to configure up to 16 control states. Each control state is a combination of the following three fields:

- **AC output power limit** – limits the inverter’s output power to a certain percentage of its rated power with the range of 0 to 100 (% of nominal active power).
- **CosPhi** – sets the ratio of active to reactive power. The Reactive Power Conf. Mode must be set to RRCR when using this control mode. The CosPhi range is from 0.8 leading to 0.8 lagging.
- **Enable/Disable** – enables or disables control according to the specific state.

→ **To enable/disable RRCR control:**

Select **RRCR** → Choose **Enable** or **Disable** → Press **Enter**

In addition to enabling this option, the inverter must be connected to a power reduction device.

For RRCR connectivity, refer to the *Power Reduction Control application note* for details:

<http://www.solaredge.com/sites/default/files/power-reduction-control-application-note.pdf>.

For DRED connection in Australia, refer to the application note, *Connecting a Demand Response Enabling Device (DRED) to a SolarEdge Inverter*. <https://www.solaredge.com/sites/default/files/dred-connection-application-note.pdf>.

→ **To enable/disable any of the 16 states:**

When you select a disabled state, only one line is displayed. After you enable it, three lines are displayed: `enable <yes>`, `power reduce` and `cosphi`.

Select **Set Values** → Scroll to the relevant state → Press **Enter** → Select **Enable** → Choose **Yes** or **No** → Press **Enter**

Now you can select either `cosphi` or `power reduce` and set their value.

→ **To set the values of an enabled state:**

Select **Set Values** → Scroll to the relevant state → Press **Enter** → Scroll to the relevant value → Input the required setting → Press **Enter**

Reactive Power Conf.

The Reactive Power menu includes the following options:

```
> Mode < CosPhi >
CosPhi < 1.00 >
CosPhi (P)
Q < 0 >
Q < U >
Q < P >
Unom < 230 >
```

Mode:

```
> CosPhi
CosPhi(P)
Q
Q(U) + Q(P)
RRCR
```

→ **To select a reactive power control-mode:**

Enter the **Mode** menu → Scroll to the required mode → Press **Enter**

→ **To set the values of a reactive power control-mode:**

Scroll to the relevant mode → Press **Enter** → Input the required setting → Press **Enter**

Active Power Conf.

The Active Power menu includes the following options:

```
Power Limit < 100 % >
Current Lim < 15.7 A >
Wakeup Grad < En >
Grad Time < xxxxs >
P(f)
P(V)
Ramp Rate < % / sec >
```

→ **To change the power or current limit:**

Select **Power Limit** or **Current Lim** → Press **Enter** → Input the required setting → Press **Enter**

→ **To set gradual power production:**

1. Select **Wakeup Gradient** → Select **Enable** → Press **Enter**

14. Select **Grad Time** → Press **Enter** → Input the required setting → Press **Enter**

→ **To set P(f) and change the P or f values:**

Each point includes the following fields: <frequency, % of nominal active power>.

```
P 0 < 5 0 . 2 0 , 1 0 0 . 0 >
P 1 < 5 1 . 2 0 , 6 0 . 0 0 >
```

The ranges for P(f) parameters are:

- Frequency: 0 to 100 [Hz]
- P: 0 to 100 [% of nominal active power].

When changing values, scroll to the relevant point → Press **Enter** → Input the required value → Press **Enter**

→ **To set P(V) and change the P or V values:**

Each point includes the following fields: <voltage, % of nominal active power>.

```
Set Point
< V , P % >
```

The ranges for P(V) parameters are:

- Voltage: 0 to 200 [% of 230V].
- P: 0 to 100 [% of nominal active power].

```
P 0 < 2 0 0 . 0 , 1 0 0 . 0 >
P 1 < 1 0 0 . 0 , 1 0 0 . 0 >
P 2 < 1 0 0 . 0 , 1 0 0 . 0 >
P 3 < 1 2 0 . 4 , 1 0 0 . 0 >
P 4 < 1 0 0 . 0 , 1 0 0 . 0 >
P 5 < 1 0 0 . 0 , 1 0 0 . 0 >
```

When changing values, scroll to the relevant point → Press **Enter** → Input the required value → Press **Enter**

→ **To set a ramp rate:**

Select: **PowerControl** → **Active Pwr Conf.** → **Ramp Rate** → Input the required settings → Press **Enter**

- Resolution 0.1%
- Range 0-100%/sec
- 0 = disable (transition is immediate)

Phase Balancing



NOTE

The phase balancing configuration must be performed on *all* inverters.



NOTE

When enabling this option, the inverters must be connected on an RS485 bus.

→ **To enable/disable phase balancing:**

1. Select **Power Control** → **Phase Balance: Enable**
15. Select **Connection: RS485**

Wakeup Conf.

The Wakeup menu includes the following options:

```
Min Wakeup Freq.
Max Wakeup Freq.
Min Wakeup Vgrid
Max Wakeup Vgrid.
```

→ **To change the frequency or voltage values:**

Scroll to the relevant setting → Press **Enter** → Input the required value → Press **Enter**

Diesel Generator Configuration

Advanced

→ **To enable/disable FRT-K:**

Select **Set FRT** → Select Enable or Disable → Press **Enter**

→ **To change the value after enabling the K-Factor:**

Select **FRT-K** → Input the required value → Press **Enter**

Load Defaults

→ **To restore country default power control settings:**

Select **Load Defaults**.

Power Control Status

To access power control status information, short-press the external LCD button at the bottom of the inverter until the following screen appears:

```
PWR CTRL:  REMOTE
PWR Limit:  10.04kW  CosPhi:
0.9
Power Prod: 7000W
```

- PWR CTRL: The power control status:
 - REMOTE - Communication with the smart energy manager is confirmed/validated or the inverter power is controlled by an RRCR device.
 - LOCAL - The power is controlled locally (e.g. by a fixed limit), or this inverter limits the PV power production to its relative portion of the feed-in power limit, as a result of disconnected communication with the smart energy manager. If this status appears, check the communication to the smart energy manager or the communication to the meter.
- PWR Limit: The inverter maximum output power set by the smart energy manager
- Cos Phi: The ratio between active to reactive power
- Power Prod: The power produced by the inverter

Identifying the Inverter's CPU Version

This section describes how to identify the inverter CPU version.

Most inverters with previous CPU versions can be upgraded to the newest version:

- All three phase inverters can be upgraded
- All single phase inverters with DSP2 version 1.027 and above can be upgraded.

To upgrade the CPU version, refer to the upgrade instructions in the following document:

<http://www.solaredge.com/sites/default/files/application-note-upgrading-solaredge-inverter-fw.pdf>.

→ **To obtain the CPU version information using the inverter display:**

The CPU version can be verified by pressing the inverter LCD button several times until the ID Status window appears:

```
ID : # # # # # # # #  
DSP 1 / 2 : x . x x x x / x . x x x x  
CPU : 0 0 0 2 . 7 x x  
Country : X X X X X
```

Appendix A – Q Configuration

If the utility requires Q(U) control of the inverter, it will typically provide a linear graph including Umin, Umax, Q(Umin) and Q(Umax) values.



NOTE

Q controls are also valid for single phase inverters manufactured after week 44 2014.
 To check an inverter manufacturing week, check its serial number: the 3rd and 4th characters indicate the production week; 5th-6th characters indicate the year. For example, an inverter with serial number SJ5114A-07F004FE5-B3 was manufactured in week 51 2014.

To translate this graph into values to be configured in the inverter, follow the definitions and instructions below. Bold-face Q and U are the values that should be set in the inverter:

- **$Q_{max} = 1.0 * S_{max}$** – for the following inverter DSP1 versions, for all countries except Austria:
 - Single Phase Inverters with HD-Wave Technology: version 1.0.658 and above
 - Single Phase (non HD-Wave) Inverters should be upgraded to version 1.210.14xx or above
 - Three Phase Inverters with synergy technology: version 1.13.11xx and above

- **$Q_{max} = 0.6 * S_{max}$** – for the following inverter DSP1 versions:
 - Single Phase Inverters with HD-Wave Technology: versions lower than 1.0.658
 - Three Phase Inverters with synergy technology: versions lower than 1.13.11xx



NOTE

$Q_{max} = \sin\phi * S_{max} = \sin(\cos^{-1} \frac{P}{S}) * S_{max}$
 Optimally, CosPhi is set to a min/max value of -0.8/0.8 and therefore, $\sin(\cos^{-1} 0.8) = 0.6$



NOTE

After upgrading the DSP1 version in an inverter, you must re-select the country. This ensures that the Q value is correctly configured, with **$S_{max} = 100\%$** (**$S_{max} = 43.5\%$** in Austria).

Set the 6 points that create the linear Q(U) graph (see the table below) to the following values:

- Q values are in terms of Q/Qmax.
- U value are in terms of U/Unom.
-

Point	U	Q
P0	Umin	Q(Umin)
P1	Umin	Q(Umin)
P2	Umin	Q(Umin)
P3	Umax	Q(Umax)
P4	Umax	Q(Umax)
P5	Umax	Q(Umax)



NOTE

The inverter requires the entry of six points. If fewer than 6 points are provided by the utility, use the same Q (Y axis) value for different points in the graph.

If you have technical queries concerning our products, please contact us:

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DACH and Rest of Europe (+49)	089 454 59730	support@solaredge.de
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Before contact, make sure to have the following information at hand:

- Inverter and power optimizer model numbers
- Serial number of the product in question
- The error indicated on the inverter screen or on the SolarEdge monitoring portal, if there is such an indication.
- System configuration information, including the type and number of modules connected and the number and length of strings.
- The communication method to the SolarEdge monitoring portal, if the site is connected
- Inverter software version as appears in the ID status screen.