The master is the control and communication center in a cluster. It carries out the following tasks:

- Master clusters with the loads and the power generators within a stand-alone grid.
- Communicating with the multicluster Box
- Starting and stopping the multicluster system
- Controlling and monitoring the slaves, e.g., regulating frequency and voltage
- Switching slaves on and off
- Displaying system values and system states
- Central control of user interfaces

The Multicluster Box is the main AC distribution board in the multicluster system and a component of the SMA multicluster technology. The Multicluster Box connects the Sunny Island clusters with the loads and the power generators within a stand-alone grid.

A cluster is made up of three Sunny Island inverters and one battery. One Sunny Island inverter per line conductor, i.e., three Sunny Island inverters in total, are connected to form a three-phase stand-alone grid. Within the cluster, one Sunny Island is the master, while the other two are slaves.

A multicluster system is made up of several clusters connected in parallel. The power of the multicluster system increases with the number of clusters. The clusters are connected in parallel via a Multicluster Box. The size of the Multicluster Box is determined when the system is designed depending on the power requirement.

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## Terms used in SMA multicluster technology

### Stand-alone grid
A stand-alone grid is a utility grid which is independent of the public energy supply. A stand-alone grid with Sunny Island is designed as a single-phase or threephase AC grid which integrates various kinds of power generators (e.g., PV systems, small wind turbine systems and diesel generators). Batteries for energy storage are also an integral part of stand-alone grids. The Sunny Island battery inverter forms a stand-alone grid and maintains a stable energy supply by regulating all processes.

### Cluster
A cluster is made up of three Sunny Island inverters and one battery. One Sunny Island inverter per line conductor, i.e., three Sunny Island inverters in total, are connected to form a three-phase stand-alone grid. Within the cluster, one Sunny Island is the master, while the other two are slaves.

### Multicluster system
A multicluster system is made up of several clusters connected in parallel. The power of the multicluster system increases with the number of clusters. The clusters are connected in parallel via a Multicluster Box. The size of the Multicluster Box is determined when the system is designed depending on the power requirement.

### Multicluster Box
The Multicluster Box is the main AC distribution board in the multicluster system and a component of the SMA multicluster technology. The Multicluster Box connects the Sunny Island clusters with the loads and the power generators within a stand-alone grid.

## Power

### Number of Sunny Island inverters

<table>
<thead>
<tr>
<th>Power</th>
<th>SIB.0H</th>
<th>SIB.0H</th>
<th>SIS048</th>
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<tbody>
<tr>
<td>102 kW</td>
<td>6</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>108 kW</td>
<td>9</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>114 kW</td>
<td>12</td>
<td>3</td>
<td>-</td>
</tr>
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<td>15</td>
<td>-</td>
<td>-</td>
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<td>9</td>
<td>-</td>
</tr>
<tr>
<td>132 kW</td>
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<td>-</td>
</tr>
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<tr>
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<td>6</td>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
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<td>6</td>
<td>-</td>
</tr>
<tr>
<td>234 kW</td>
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</tr>
<tr>
<td>240 kW</td>
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<td>-</td>
</tr>
<tr>
<td>246 kW</td>
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</tr>
<tr>
<td>252 kW</td>
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<td>6</td>
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</tr>
<tr>
<td>258 kW</td>
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<tr>
<td>264 kW</td>
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<tr>
<td>276 kW</td>
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<tr>
<td>282 kW</td>
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<tr>
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<td>-</td>
</tr>
<tr>
<td>294 kW</td>
<td>39</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>114 kW***</td>
<td>-</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>144 kW***</td>
<td>3</td>
<td>6</td>
<td>12</td>
</tr>
</tbody>
</table>

* Power of the Sunny Island inverters for 30 minutes at 25°C
** 1 battery per cluster
*** Power of the Sunny Island inverters for 30 minutes at 25°C

## Communication principle

### Main cluster
The main cluster is the leading cluster within a Multicluster system. The master of the main cluster is the central user interface for the main cluster and all extension clusters of a stand-alone grid. The master of the main cluster is superior to the masters of the extension clusters. The tasks performed by the master of the main cluster include the following:

- Stealing and stopping the multicluster system
- Controlling and monitoring the masters of the extension clusters
- Communicating with the multicluster Box
- Starting and stopping the multicluster system
- Controlling and monitoring the masters of the extension clusters
- Communicating with the multicluster Box
- Storing cluster and battery data on SD memory card
- Controlling and monitoring the slaves, e.g., regulating frequency and voltage
- Switching slaves on and off
- Displaying system values and system states
- Central control of user interfaces

### Extension cluster
An extension cluster is a cluster within the multicluster system which is subordinated to the main cluster. The master of the extension cluster follows the instructions issued by the master of the main cluster.

### Slave
A slave is a functional unit subordinated to the master. A slave receives its configuration settings, current firmware updates and start/stop commands from the master. It transmits its operating data to the master and executes commands issued by the master.

## Installation - Circuitry Overview

### Multicluster Box 36

### Multicluster system

- LV/HRC 3 Generator
- LV/HRC 3 Loads
- Circuit breaker C40 Sunny Island
- Generator
- Data cable for installation of the clusters
- Data cable for multicluster communication
- Speedwire
- Terminator

### SCHEMATIC DIAGRAM FOR MULTICLUSTER-BOX

### Legend

- Line conductor
- Neutral conductor
- Grounding conductor
- Control and measurement signal cable
- Data cable for internal communication of the clusters
- Data cable for multicluster communication
- Speedwire
- Terminator

### Fuse types

- F1 1U/HRC 3 Generator
- F2 1U/HRC 3 Inverter
- F4 Circuit breaker C40 Sunny Island
- F5 D01 / 6 A K10, Q10 L1 internal
- F6 D01 / 6 A K5, Q5 L1 generator
- F7 D01 / 6 A K10, Q10 L1 Sunny Island
- F8 D01 / 6 A K10, Q10 L1 internal
* Ground the Multicluster system outside the box on either the generator side or the load side.

** If no lithium-ion batteries are connected, the terminator must be plugged in.