# **EXAMPLES FOR MULTICLUSTER SYSTEMS**

D	Numb	Number of		
Power*	SI8.0H	SI6.0H	SI5048	Number of batteries**
102 kW	6	9	-	5
108 kW	9	6	-	
114 kW	12	3	-	
120 kW	15	-	-	
126 kW	9	9	-	6
132 kW	12	6	-	
138 kW	15	3	-	
144 kW	18	-	-	
150 kW	12	9	-	
156 kW	15	6	-	
162 kW	18	3	-	
222 kW	21	9	-	10
228 kW	24	6	-	
234 kW	27	3	-	
240 kW	30	-	-	
246 kW	24	9	-	
252 kW	27	6	-	11
258 kW	30	3	-	
264 kW	33	-	-	
270 kW	27	9	-	
276 kW	30	6	-	12
282 kW	33	3	-	
288 kW	36	-	-	
98 kW***	-	-	15	5
114 kW***	_	6	12	6
144 kW***	3	6	12	7

\* Power of the Sunny Island inverters for 30 minutes at 25°C

\*\* 1 battery per cluster

\*\*\* Power of the SI5048 for 30 minutes at 25°C: 6,500 W

## 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 standalone grid with Sunny Island is designed as a single-phase or three-phase 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.

#### Master

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

- Switching slaves on and off
- Controlling and monitoring the slaves, e.g., regulating frequency and voltage
- Controlling battery charge and discharge
- Monitoring battery capacity and state of charge
- Storing cluster and battery data on SD memory card
- Requesting diesel generator
- Exchanging data with the masters of other clusters
- Updating both slaves after firmware updates
- Displaying system values and system states
- Central capture of user entries

#### 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.

#### 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:

- Starting and stopping the multicluster system
- Controlling and monitoring the masters of the extension cluster
- Communicating with the multicluster Box

If the master of the main cluster stops operation, the entire multicluster system shuts down. If a diesel generator is integrated in the stand-alone grid, it will take over the power supply to the loads in this case.

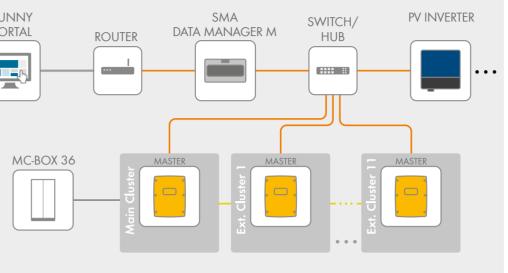
#### **Extension cluster**

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. The master of the extension cluster sends the operating data of its cluster to the master of the main cluster. If the master of an extension cluster stops operation, then only this cluster shuts down. The multicluster system continues to operate with reduced power.

# **COMMUNICATION PRINCIPLE**





International SMA Service Line

00800 SMA SERVICE (+800 762 7378423)

SCHEMATIC DIAGRAM FOR MULTICLUSTER-BOX



## LEGEND

_			-
_			
-	-	-	-
_			
_	_	_	_
•		_	٩



ENGLISH

## Installation - Circuitry Overview **MULTICLUSTER-BOX 36**



SMA Solar Technology AG

SMA Online Service Center: www.SMA-Service.com

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

Terminator

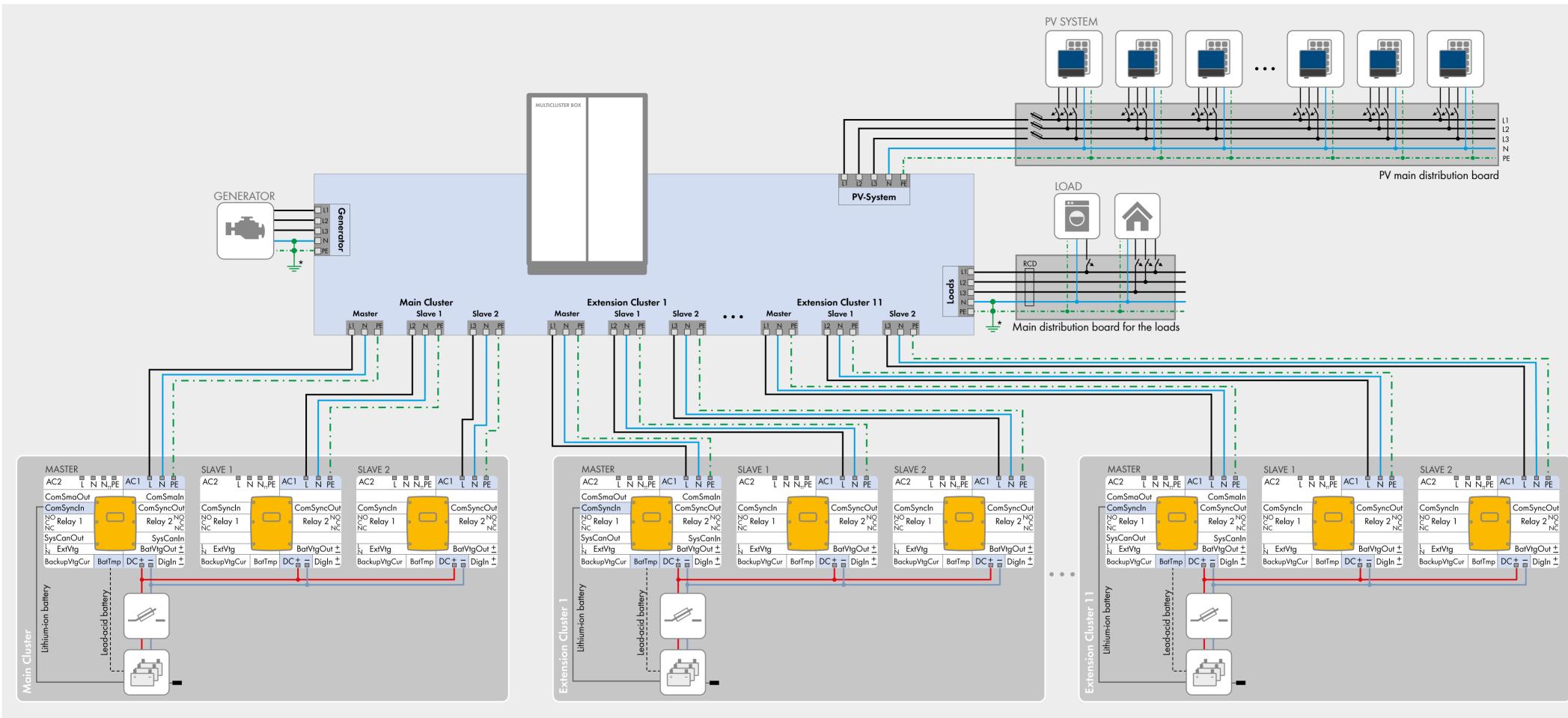
Sunny Island

K10 Q10 MC-X3 MC-X2 F2 L1 12 PV plan 4 PE K5 Q5 MC-X1 F 1 кл 🛛 🗠 🖓 🗌 - 1 F6 F7 F4 2 F5 ent, control Controller assembly SIBUCTRL 🔚 ComSyncOut 🛓 方 Voltage supply ComSyncIn MCX10 L1 N PE MCX10 L2 N PE MCX10 L3 N P Slave 1 Slave 2 Master

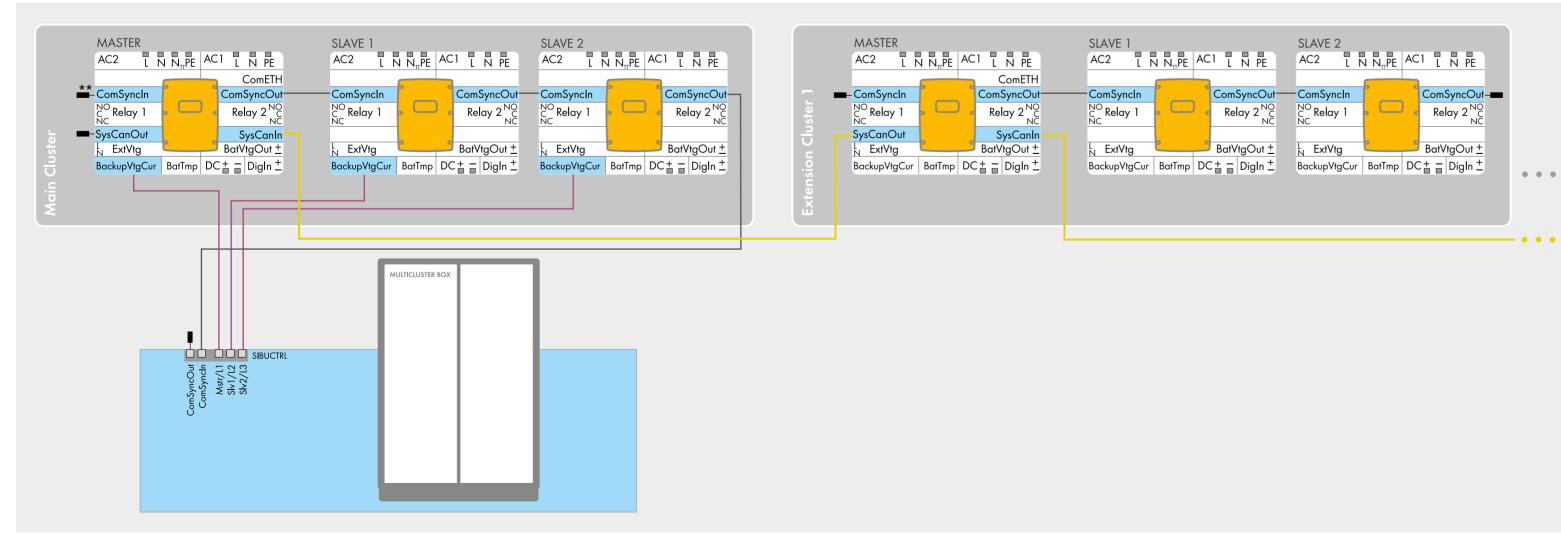
MC-BOX-36-IAA-en-21 | Version 2.1

Fuse	Fuse type	Application	Supply line from
Fl	LV/HRC 3	Generator	-
F2	LV/HRC 3	Loads	-
F4	Circuit breaker C40	Sunny Island	-
F5	D01/6A	Controller assembly K7, Q7	L1 Sunny Island
F6	D01/6A	K10, Q10	L1 internal
F7	D01/6A	K5, Q5	L1 generator

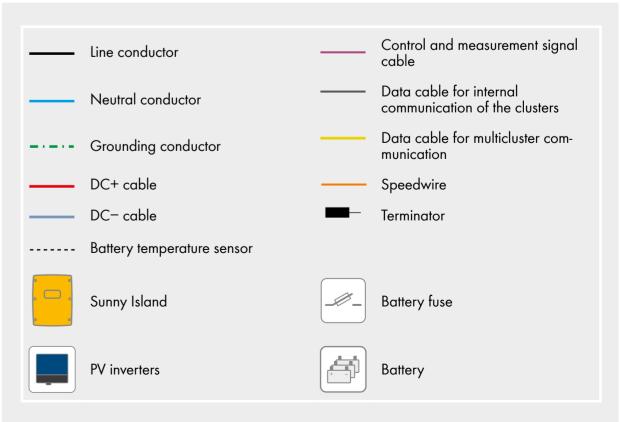
# Line conductor Neutral conductor



# DATA- AND CONTROL CABLE CIRCUITRY



LEGEND



\* 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.