



INSTALLATION AND USERS MANUAL

# MASTERSWITCH 0

Automatic AC transfer switch



CE

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v 4.0. November 2006

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# 1 GENERAL INFORMATION

The MASTERVOLT *Masterswitch 0* is the heart of the AC installation. The *Masterswitch 0* is designed to take over manual switching between two different power sources. The *Masterswitch 0* automatically transfers the available AC power source to the output. Automatic switching between the power sources doesn't only offer you more comfort; it also improves the safety on board. The switching between the power sources which is done by means of a relay, assures that no short-circuiting will occur. The *Masterswitch 0* has two inputs and one output.

## 1.1 USE OF THIS MANUAL

This manual serves as a guideline for the safe and effective operation, installation, maintenance and possible correction of minor malfunctions of the *Masterswitch 0*.

It is therefore obligatory that every person who works with the *Masterswitch 0* must be completely familiar with the contents of this manual, and that he / she carefully follows the instructions contained herein.

Installation of, and work on the *Masterswitch 0*, may be carried out only by qualified, authorised and trained personnel, consistent with the locally applicable standards and taking into consideration the safety guidelines and measures (chapter 2 of this manual).

The manual must be immediately accessible to the user.

This manual has 7 chapters.

Keep this manual at a secure place!

## 1.2 GUARANTEE SPECIFICATIONS

Mastervolt guarantees that this unit has been built according to the legally applicable standards and specifications. Should work take place, which is not in accordance with the guidelines, instructions and specifications contained in this users manual, then damage may occur and/or the unit may not fulfil its specifications. All of these matters may mean that the guarantee becomes invalid.

The guarantee is limited to the costs of repair and/or replacement of the product. Costs for installation labor or shipping of the defective parts are not covered by this guarantee.

## 1.3 QUALITY

During their production and prior to their delivery, all of our units are exhaustively tested and inspected. The standard guarantee period is two years after date of purchase.

## 1.4 VALIDITY OF THIS MANUAL

All of the specifications, provisions and instructions contained in this manual apply solely to standard versions of the *Masterswitch 0* delivered by Mastervolt.

This manual is valid for the following models:

Part number	Description
55006010	Masterswitch 0 - 5kW 230V/20A
55006015	Masterswitch 0 - 10kW 230V/40A
55106000	Masterswitch 0 – 3.5kW 117V/32A
55106100	Masterswitch 0 – 7kW 117V/60A
55106200	Masterswitch 0–9kW 117V/80A

## 1.5 LIABILITY

MASTERVOLT can accept no liability for:

- Consequential damage due to use of the *Masterswitch 0*.
- Possible errors in the manuals and the results thereof.

## 1.6 IDENTIFICATION LABEL



### CAREFUL!

Never remove the identification label.

Important technical information required for service, maintenance and delivery of parts can be found on the identification label

## 2 SAFETY GUIDELINES AND MEASURES

### 2.1 WARNINGS AND SYMBOLS

Safety instructions and warnings are marked in this manual by the following pictograms:



A procedure, circumstance, etc which deserves extra attention.



#### **CAUTION!**

Special data, restrictions and rules with regard to preventing damage.



#### **WARNING**

A WARNING refers to possible injury to the user or significant material damage to the charger if the user does not (carefully) follow the procedures.

### 2.2 USE FOR INTENDED PURPOSE

- 1 The Masterswitch 0 is constructed as per the applicable safety-technical guidelines.
- 2 Use the Masterswitch 0 only:
  - in a technical correct condition;
  - observing the instructions in the users manual.



#### **WARNING**

Never use the Masterswitch 0 in situations where there is danger of gas or dust explosion or potentially flammable products!

- 3 Use of the Masterswitch 0 other than mentioned in point 2 is not considered to be consistent with the intended purpose. Mastervolt is not liable for any damage resulting from the above.

### 2.3 ORGANIZATIONAL MEASURES

The user must always:

- have access to the user's manual;
- be familiar with the contents of this manual. This applies in particular to chapter 2, Safety Guidelines and Measures.

### 2.4 WARNING OF SPECIAL DANGERS

- Check the wiring at least once a year. Defects such as loose connections, burned cables etc. must be corrected immediately.
- Connection and protection must be done in accordance with local standards.
- Do not work on the Masterswitch 0 or system if it is still connected to a power source. Only allow changes in your electrical system to be carried out by qualified electricians.

### 3 HOW IT WORKS

#### 3.1 SOURCE PRIORITY

The Masterswitch 0 switches the right AC power source to the output. Therefore the Masterswitch 0 is equipped with a source priority. If more than one AC power source is available, the source with the highest priority is switched to the output.

#### 3.2 INPUT 1: GENERATOR OR SHORE INPUT

See figure 1. INPUT 1 has the highest priority, which means that the output is connected to INPUT 1 when grid is available on INPUT 1. At the same time, INPUT 2 is denied. The generator or the shore power should be connected to INPUT 1.

When power is available on INPUT 1, the output is transferred to INPUT 1 after a delay of approximately 10 seconds. The 10 seconds delay time provides an 'easy start up' for the generator. In normal situations the generator is stabilized after app. 3 sec. To make sure no

voltage and frequency variations will occur the delay time is set to 10 sec. This increases the generator's lifetime

If INPUT 1 is used to connect the shore, the delay time can be adjusted to 0 seconds. See chapter 4.6

#### 3.3 INPUT 2: INVERTER INPUT

INPUT 2 has the second priority. If there is no power available on INPUT 1, the output is transferred to INPUT 2. INPUT 2 is used to connect the inverter.

In this case, the Masterswitch 0 is in a neutral state and consumes no energy itself.



**CAUTION!**

During transfer between one of the power-sources, users are not supplied with power for a short time. Because of this, computers etc. connected to this group might loose data.

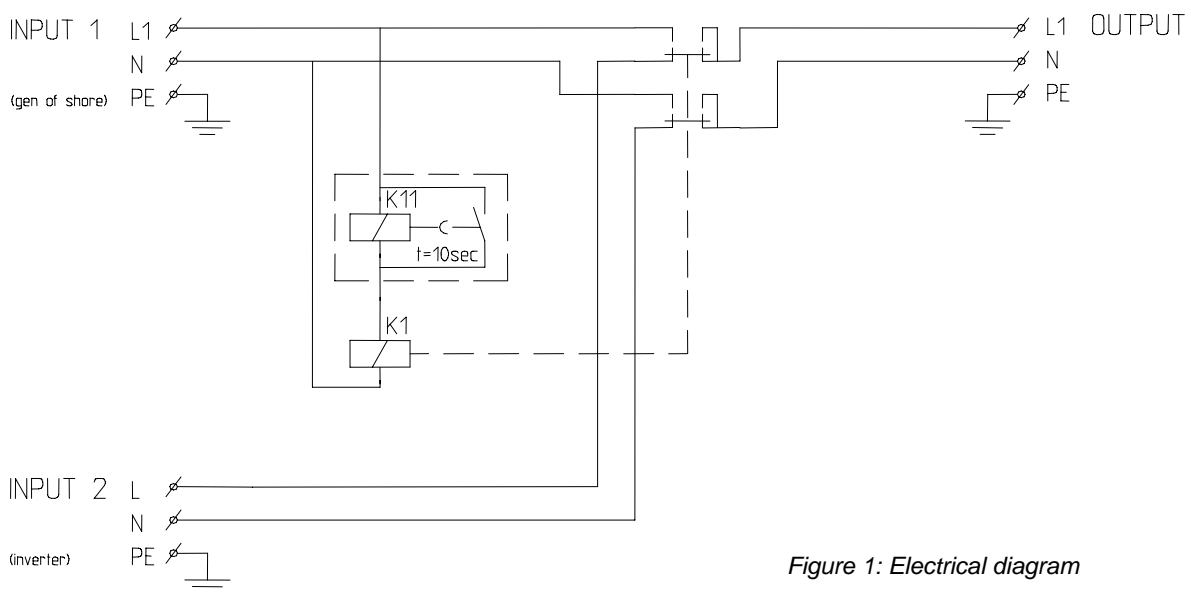


Figure 1: Electrical diagram

## 4 INSTALLATION



**WARNING**

Be sure that all AC power sources are switched off or disconnected during installation.



**WARNING**

External fuses and earth leakage switches must be integrated in the wiring of all inputs and outputs of the *Masterswitch 0*.

### 4.1 GENERAL

During installation and commissioning of the *Masterswitch 0* the Safety Guidelines and Measurements are applicable at all times. See chapter 2 of this manual.

After unpacking, check the *Masterswitch 0* for possible damage. Do not use the *Masterswitch 0* if the cabinet is damaged.

Check from the type number plate whether the AC voltage of the power sources is equal to the input voltage of the *Masterswitch 0*.

Use the provide cable-glands to pass the cables through the cabinet.

### 4.2 CABLE DIAMETER

For a safe installation the correct wire cross section must be applied. Don't use a cross section that is smaller than indicated. See table below to select the appropriate cross section for the AC wiring:

AC-Current	Minimum cross section:	
	in mm <sup>2</sup>	AWG
0-16 Amp	2.5 mm <sup>2</sup>	AWG 13
16-32 Amp	4 mm <sup>2</sup>	AWG 11
32-48 Amp	6 mm <sup>2</sup>	AWG 9
48-80 Amp	10 mm <sup>2</sup>	AWG 7




**WARNING**

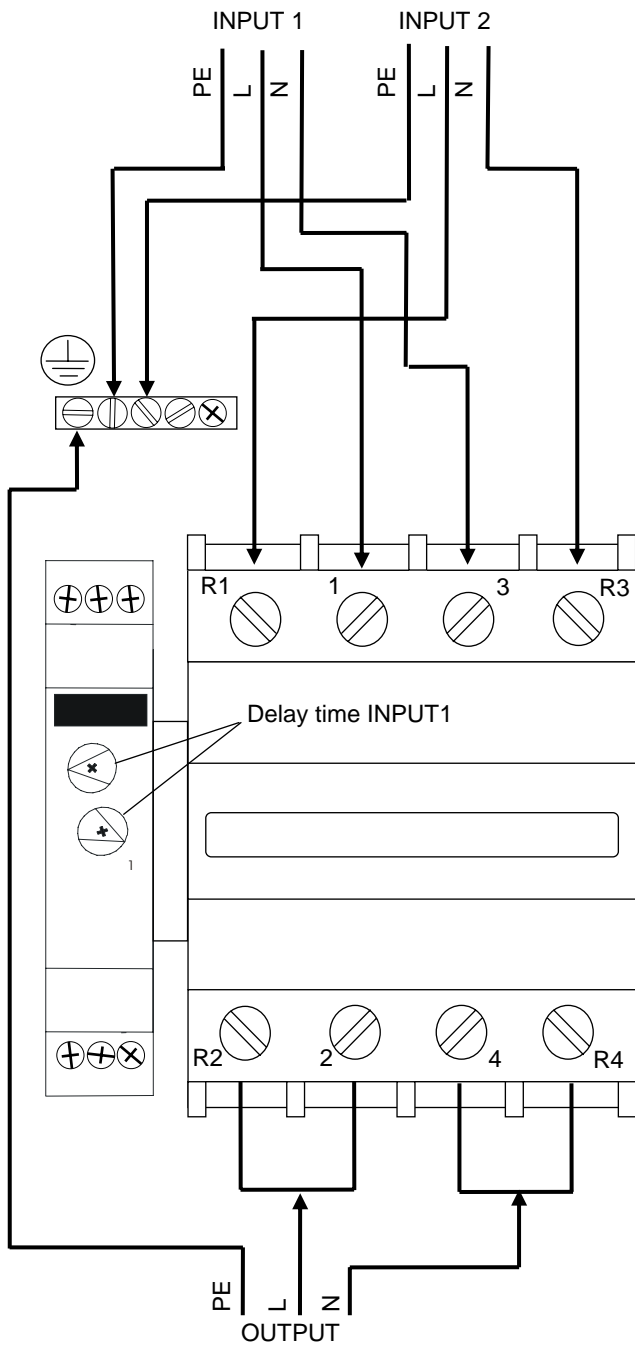
Use cable with the right cable diameter!

Under-sized cables and/or loose connections can cause dangerous overheating of the cables and/or terminals. Therefore use the proper size and tighten all connections well, in order to limit transition resistance as far as possible. See chapter 5 for recommended torques.

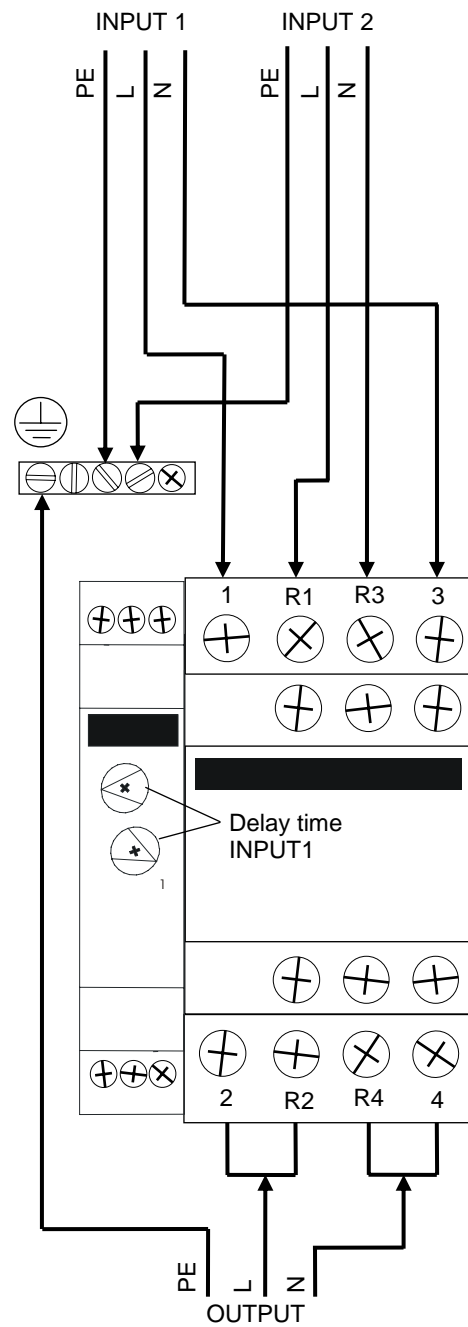
### 4.3 GROUND CONNECTIONS

For safety reasons it is very important that all ground connections of the power sources and power consumers are connected to the central ground connection of the ship. Improper ground connections might lead to life treating situations. A reliable ground connection is made by connecting the sources and the consumers to the ground terminal  of the *Masterswitch 0*. This ground terminal must be connected to the central ground connection of the ship, which is connected to the hull of the ship.

When the ship lies in sea water (salt) while using shore power, corrosion can occur. This corrosion is caused by potential differences between shore ground and ships ground. Using an isolation transformer will solve this problem. Mastervolt can provide a suitable transformer



Masterswitch 0 – 7kW 117V/60A  
Masterswitch 0-9kW 117V/80A



Masterswitch 0 - 5kW 230V/20A  
Masterswitch 0 - 10kW 230V/40A  
Masterswitch 0 – 3.5kW 117V/32A

Figure 2: Installation of the Masterswitch 0

#### 4.4 INPUTS

See figure 2 and figure 3 to connect the AC power sources.



Wire	INPUT 1	INPUT 2
L (phase)	1	R1
N (neutral)	3	R3
PE (ground)		

Figure 3:  
Connections to the AC sources

#### 4.5 OUTPUTS

Connect the load to the terminals as indicated in figure 2 and figure 4.


Wire	OUTPUT
L (phase)	2 + R2
N (neutral)	R4 + 4
PE (ground)	

Figure 4:  
Connections to the AC output

#### 4.6 SETTINGS

Under normal circumstances adjustment of the *Masterswitch 0* is not recommended: after installation the *Masterswitch 0* is immediately ready for use. However specific circumstances may require adjustment of the switch-on delay time of INPUT 1.

See figure 2. Use a small flat blade screw driver to adjust the delay time

#### 4.7 COMMISSIONING AFTER INSTALLATION

Follow the steps described below to switch on the *Masterswitch 0*.

1. Tighten all cable glands to ensure the pull relief
2. Check all wiring and connections.
3. Close the cabinet.
4. Switch on the AC power sources.

#### 4.8 DECOMMISSIONING

If it is necessary to put the *Masterswitch 0* out of operation, follow the instructions in order of succession as described below:

1. Switch off all loads
2. Switch off the AC power sources. These power sources should be secured against unexpected and unintended switching on.
3. Open the casing of the *Masterswitch 0*
4. Check with a suitable voltage meter whether the inputs of the *Masterswitch 0* are voltage free.
5. Disconnect all the wiring

Now the *Masterswitch 0* can be demounted in a safe way.

#### 4.9 TRANSPORTATION

Always use the original packing for transportation. Contact your local Mastervolt Service Centre for further details if you want to return the apparatus for repair.

#### 4.10 RE-INSTALLATION

To reinstall the *Masterswitch 0*, follow the instructions as described in chapter 4

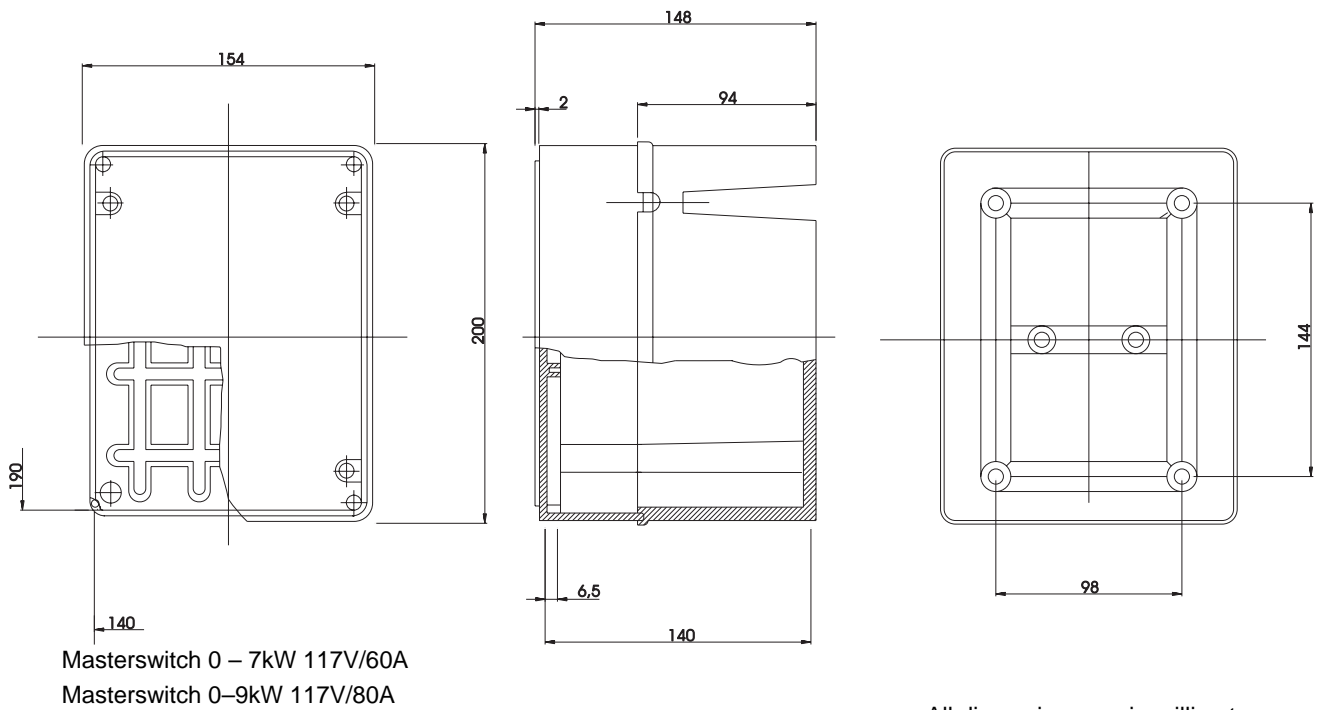
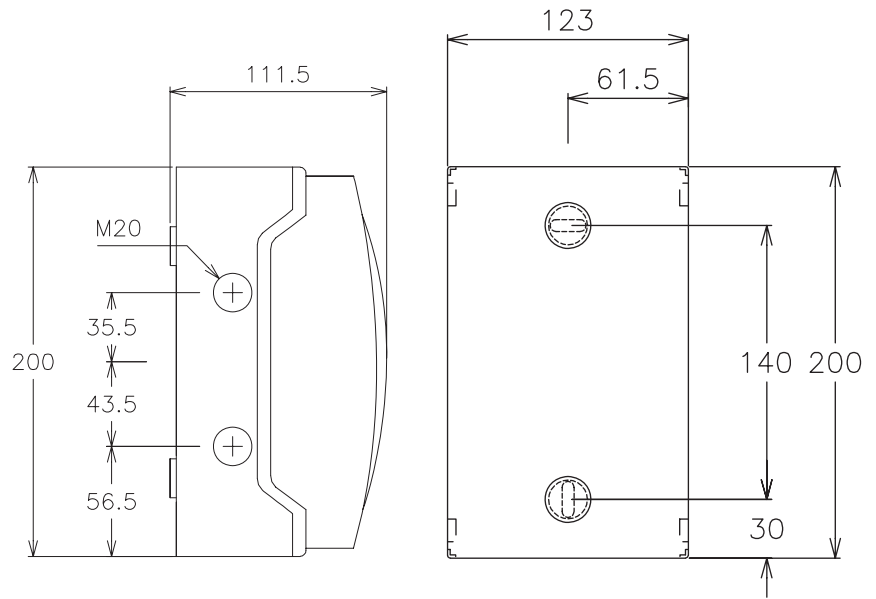


## 5 SPECIFICATIONS

<b>GENERAL</b>				
Function of the product:	Automatic transfer switch between two single phase AC power sources and one output. Additional external circuit breakers must be applied (installation dependent).			
Manufacturer:	Mastervolt, Amsterdam, the Netherlands			
Specified operation temperature	-5...+60 °C (will meet specified tolerances)			
Allowed operating temperature:	-40...+70 °C (may not meet all specified tolerances)			
None operating temperature:	-60...+80 °C (storage temperature)			
Relative humidity:	95% max., non-condensing			
Earth leakage breaker (RCCB):	N/A, must be applied externally (installation dependent)			
Automatic circuit breakers:	N/A, must be applied externally (installation dependent)			
<b>230V VERSIONS</b>		<b>Masterswitch 0 - 5kW 230V/20A</b>	<b>Masterswitch 0 - 10kW 230V/40A</b>	
Part number:	55006010	55006015		
Nominal voltage:	Single phase 200 – 250 VAC / 50-60Hz			
Nominal current INPUT 1:	20A	40A		
Nominal current INPUT 2:	20A	40A		
Nominal current OUTPUT:	20A	40A		
Switching current (I eff, IEC947):	250A	450A		
Power consumption: (AC available on INPUT 1)	7 VA ± 10%	7 VA ± 10%		
Power consumption: (only AC available on INPUT 2)	0 VA	0 VA		
Transfer time by making	12-22 msec	12-22 msec.		
Transfer time by braking	4-19 msec	4-19 msec.		
Delay time INPUT1:	Approximately 10 sec. (adjustable, see chapter 4.6)			
Dimensions, H x W x D: (see also chapter 6)	200 x 123 x 111.5 mm 7.9 x 4.8 x 4.4 inch.	200 x 123 x 111.5 mm 7.9 x 4.8 x 4.4 inch.		
Approximate weight:	1.2 kg / 2.6 Lbs ± 5%	1.3 kg / 2.9 Lbs ± 5%		
Protection degree:	IP55 (IEC-529)	IP55 (IEC-529)		
Recomm. torque connections:	1.7 Nm / 15 In-Lbs	2.5 Nm / 22 In-Lbs		
<b>117V VERSIONS</b>		<b>Masterswitch 0 – 3.5kW 117V/32A</b>	<b>Masterswitch 0 – 7kW 117V/60A</b>	<b>Masterswitch 0–9kW 117V/80A</b>
Part number:	55106000	55106100	55106200	
Nominal voltage:	Single phase 100 – 125 VAC / 50-60Hz			
Nominal current INPUT 1:	32A	60A	80A	
Nominal current INPUT 2:	32A	60A	80A	
Nominal current OUTPUT:	32A	60A	80A	
Switching current (I eff, IEC947):	300 A	1000 A	1000 A	
Power consumption: (AC available on INPUT 1)	7 VA ± 10%	26 VA ± 10%	26 VA ± 10%	
Power consumption: (only AC available on INPUT 2)	0 VA	0 VA	0 VA	
Transfer time by making	12-22 msec	20-26 msec	20-35 msec	
Transfer time by breaking	4-19 msec	8-12 msec	6-20 msec	
Delay time INPUT1:	Approximately 10 sec. (adjustable, see chapter 4.6)			
Dimensions, H x W x D: (see also chapter 6)	200 x 123 x 111.5 mm 7.9 x 4.8 x 4.4 inch.	214 x 162 x 128 mm 8.4 x 6.4 x 5.0 inch.	214 x 162 x 128 mm 8.4 x 6.4 x 5.0 inch.	
Approximate weight:	1.2 kg / 2.6 Lbs ± 5%	2.6 kg / 5.7 Lbs ± 5%	2.7 kg / 6.0 Lbs ± 5%	
Protection degree:	IP55 (IEC-529)	IP66 (IEC-529)	IP66 (IEC-529)	
Recomm. torque connections:	1.7 Nm / 15 In-Lbs	6 Nm / 53 In-Lbs	6 Nm / 53 In-Lbs	
All specifications are subject to change without prior notice.				

## 6 OUTLINE DRAWINGS

Masterswitch 0 - 5kW 230V/20A  
 Masterswitch 0 - 10kW 230V/40A  
 Masterswitch 0 - 3.5kW 117V/32A



All dimensions are in millimeters.

Figure 5: dimensions of the Masterswitch 0

## 7 EC DECLARATION OF CONFIRMITY



Herewith declares that:

Product:

55006010	Masterswitch 0 – 5kW 230V/20A
55006015	Masterswitch 0 – 10kW 230V/40A
55106000	Masterswitch 0 – 3.5kW 117V/32A
55106100	Masterswitch 0 – 7kW 117V/60A
55106200	Masterswitch 0 – 9kW 117V/80A

Is in conformity with the provision of the EC, EMC directive 89/336/EEC and amendments 92/31/EEC, 93/68/EEC

The following harmonized standards have been applied:

Generic emission standard EN 50081-1:1992,  
Generic immunity standard EN 50082-1:1997,

And the safety directive 73/23/EEC and amendment 93/68/EEC, with the following standard:

Low voltage standard EN 60950:2000,

Amsterdam,



R.J. ter Heide,  
General Manager MASTERVOLT