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Solar VSD
IP21 + IP65

Motors | Pumps | VSD's | Solar | Service

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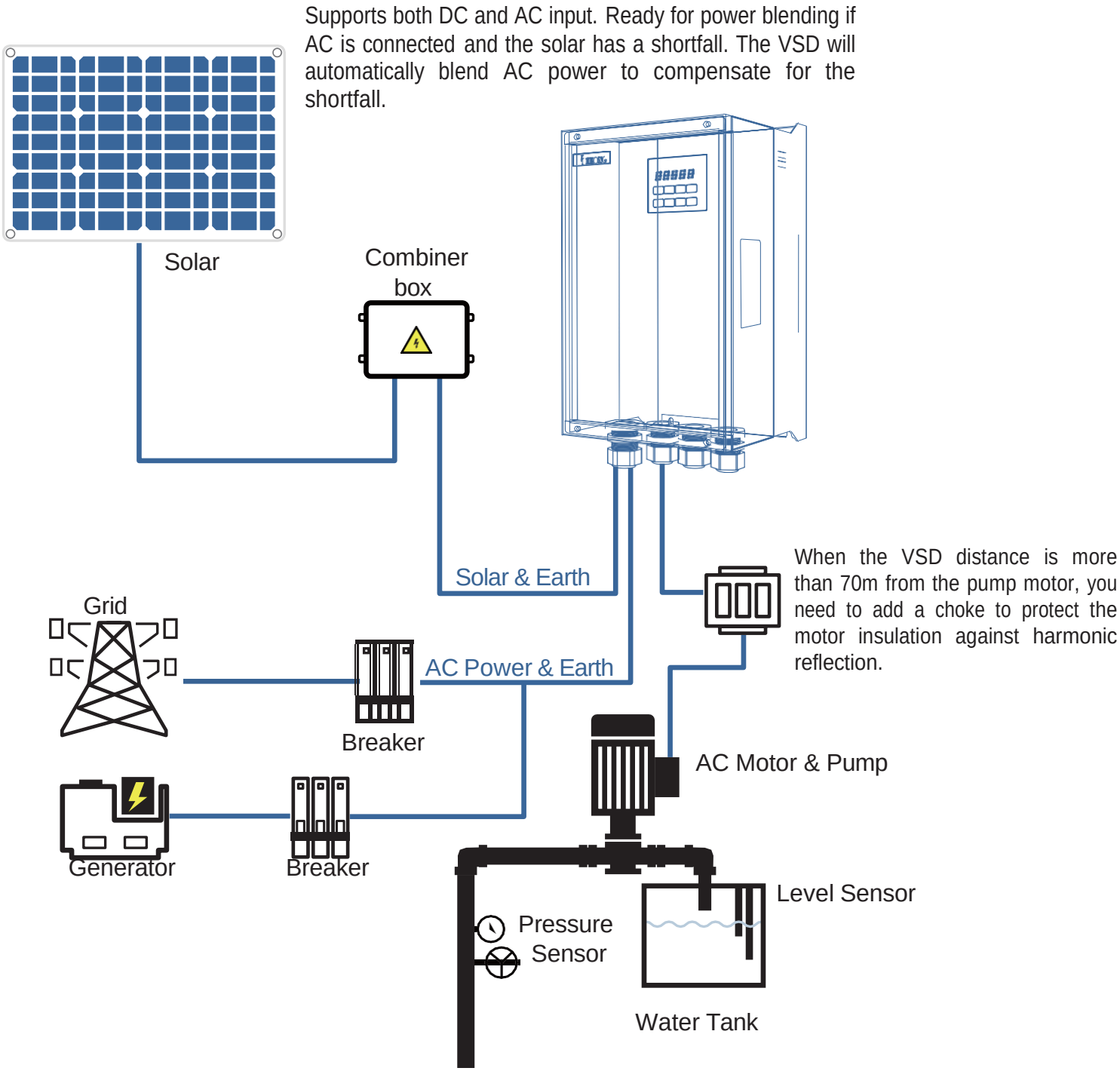
Introduction

SAWA500/510-PV Solar VFD range is a high-performance DC, AC & Hybrid VSD for water pump applications or general use. The Hybrid design means that it can be powered by utility and solar at the same time, if required. Alternatively, the VSD can send a start or change-over command should the solar be insufficient to run and an alternative supply can be used. The VSD has maximum power point tracking (MPPT) to adapt to any weather condition to get maximum power and water output.

The robust hardware is designed with high reliability and user-friendly operation in mind. The SAWA500/510-PV solar VSDs can be used with any standard induction motor system, be it for pump or fan application. The off-grid capability means it can be applied in areas with sunshine and a lack of electricity, especially suitable for occasions that have strict requirements on system cost, reliability, and use environment.



Technical Specification

	220V	400V
Max input DC voltage (VOC)	**450v**	**800v**
DC voltage range	**200-450v DC**	**350-800V DC**
Recommended DC input voltage range (Vmpp)	**200v-400v**	**450v-600v**
Recommended Input Operation Voltage	**325v (Vmpp)**	**565v (Vmpp)**
MPPT efficiency	**>99 %**	
Rated output voltage	**1/3-phase 220V AC**	**3-phase 380-480V AC**
Output frequency range	**50 / 60 Hz**	
Max efficiency of the machine	**97 %**	
Ambient temperature range	**-10°C~50°C, derate if the temperature is above 40°C**	
Cooling method	**Air Cooling**	
Protection degree	**IP 65**	
Altitude	**Below 1000m; derate 1% for every additional 100m**	
Standard	**CE / ROHS**	

Typical solar sizing

We suggest that the solar panel power should be 1.5-1.65 times higher than the motor P_1 with

$$P_1 = \sqrt{3} \times I_n \times V_n \times PF$$

Where:
P_1 = electrical motor power
I_n = nominal motor current
V_n = nominal voltage
PF = power factor or $\cos\varphi$

And then accounting for the local solar radiation available

$$P_{Solar} = \frac{P_1 \times f_n}{DNI_{avg}}$$

4 - 5											10	14
5 - 6	281	85							8	231	533	569
6 - 7	667	596	457	297	77	14	17	153	459	642	716	751
7 - 8	776	725	684	638	579	526	551	605	687	757	817	853
8 - 9	860	815	781	731	697	673	706	729	784	836	888	925
9 - 10	915	873	846	783	752	739	775	797	844	883	927	964
10 - 11	936	890	862	799	776	778	804	826	870	903	935	972
11 - 12	901	868	847	797	792	798	818	842	882	901	923	946
12 - 13	854	831	804	782	787	797	822	840	872	866	908	907
13 - 14	807	784	761	743	753	763	791	810	834	820	861	866
14 - 15	752	728	698	683	679	693	732	748	773	761	802	811
15 - 16	696	665	632	599	554	541	606	642	681	683	733	745
16 - 17	625	585	473	188	23	22	34	123	375	489	633	666
17 - 18	372	257	17							17	114	322
18 - 19												

Using the above oversizing typically leads to solar days of 6 hours for fixed frame and 10hours for tracking installations.

Select the VSD for maximum motor current.

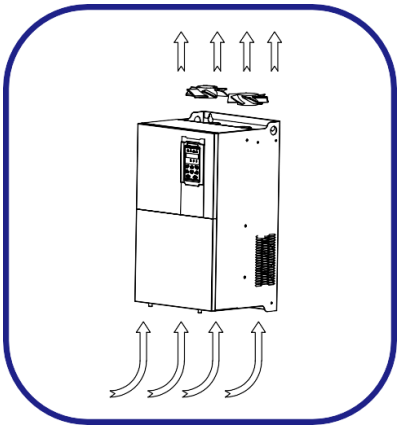
Do not simply use the rated motor shaft power for sizing the VSD.

Motor supply cables longer than 70m should be used with a choke on the output of the VSD

Key Features

- Operates without grid directly from photovoltaic (PV)
- Maximizing power generation efficiency of solar modules with the use of advanced MPPT control technology and automatic MPPT voltage tracking
- PID operation whilst solar MPPT is active
- Adjust water outflow of pumps quickly on basis of sunlight intensity change
- Automatic Hibernation/sleep and wake up
  - Hibernate at high water level and wake up at low water level
  - Hibernate at sunrise and sunset and wake up at strong sunlight
- Built-in C3 EMC filter and DSP technology and Infineon PIM design, IGBT, dry run, low voltage, over current, over voltage and over temperature warning and protection
- Sensor-less pump flow calculation LCD monitoring display
- Automatic running without any commissioning in keypad control and GPRS monitoring option (as option)
- Dual supply capability with changeover switch activation or hybrid operation – Solar and grid compatible
- Default Macros for setup
- Induction motor and permanent magnet motor compatible

Independent duct Design



- Independent air duct design, effectively preventing dust entering the inverter, causing short-circuit and other faults and improving reliability
- Use bigger air volume and a long-life cooling fan effectively reduces the internal temperature rise of the inverter and ensures reliable and stable operation of the inverter

Perfect Protection System

- Conformal epoxy coated PCB as standard
- Designed for 10 years of maintenance-free operation[1]
- Cooling Fan, capacitors, relays and IGBTs have been carefully selected and designed for a life expectancy up to 10 years[1]

[1]Assumes the drive is running continuously for 24hours a day at 80% load with an ambient temperature of 40

Model Range

IP 21

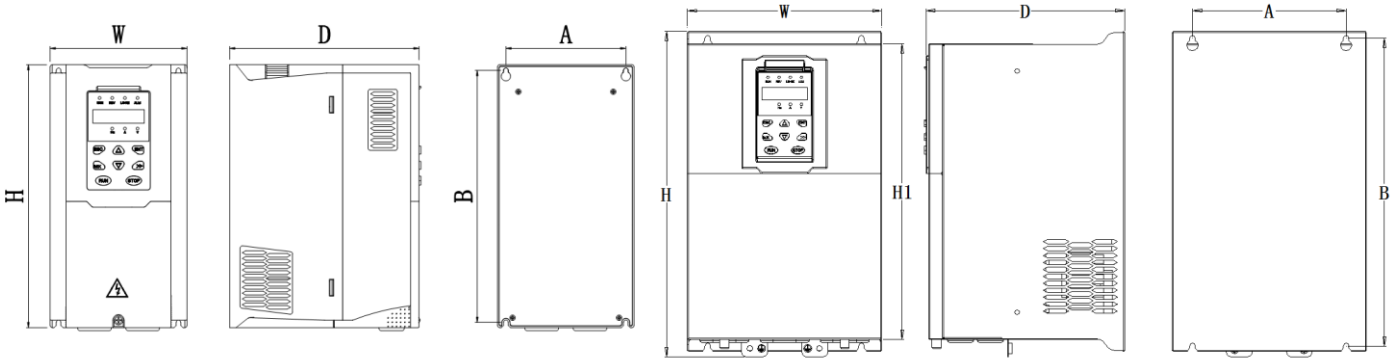
Drive Model	Max DC input current (A)	Max DC input voltage (V)	Related output current (A)	Applicable water pump (kW)	Size	VSD Photos
220V 1ph or 3ph						
SAWA500-20T00150-PV	9.9	450	7	1.5	Size A	
SAWA500-20T00220-PV	14.1	450	10.6	2.2	Size A	
SAWA500-20T00400-PV	22.6	450	17	4	Size B	
SAWA500-20T00550-PV	30	450	25	5.5	Size C	
SAWA500-20T00750-PV	40	450	32	7.5	Size C	
400V 3ph						
SAWA500-40T00150-PV	9	800	4.2	1.5	Size A	
SAWA500-40T00220-PV	12	800	5.6	2.2	Size A	
SAWA500-40T00400-PV	16.5	800	9.4	4	Size A	
SAWA500-40T00550-PV	23.9	800	13	5.5	Size B	
SAWA500-40T00750-PV	30.6	800	17	7.5	Size B	
SAWA500-40T01100-PV	39.2	800	25	11	Size C	
SAWA500-40T01500-PV	49	800	32	15	Size C	
SAWA500-40T01850-PV	50	800	38	18.5	Size D	
SAWA500-40T02200-PV	60	800	46	22	Size D	
SAWA500-40T03000-PV	81	800	60	30	Size E	
SAWA500-40T03700-PV	90	800	75	37	Size E	
SAWA500-40T04500-PV	130	800	96	45	Size F	
SAWA500-40T05500-PV	150	800	112	55	Size F	
SAWA500-40T07500-PV	200	800	150	75	Size G	
SAWA500-40T09000-PV	250	800	176	90	Size G	
SAWA500-40T11000-PV	300	800	210	110	Size H	
SAWA500-40T13200-PV	360	800	253	132	Size I	
SAWA500-40T16000-PV	430	800	304	160	Size I	
SAWA500-40T18500-PV	500	800	360	185	Size J	
SAWA500-40T20000-PV	550	800	380	200	Size J	
SAWA500-40T22000-PV	620	800	426	220	Floor	
SAWA500-40T25000-PV	680	800	465	250	Floor	

IP 65

Drive Model	Max DC input current (A)	Max DC input Voltage (V)	Related output current (A)	Applicable water pump (kW)	Size	VSD Photos
400V 3ph						
SAWA510-40T00400-PV	16.5	800	9.4	4	Size A	
SAWA510-40T00550-PV	23.9	800	13	5.5	Size A	
SAWA510-40T00750-PV	30.6	800	17	7.5	Size B	
SAWA510-40T01100-PV	39.2	800	25	11	Size B	

Appearance and Mounting Hole Dimensions

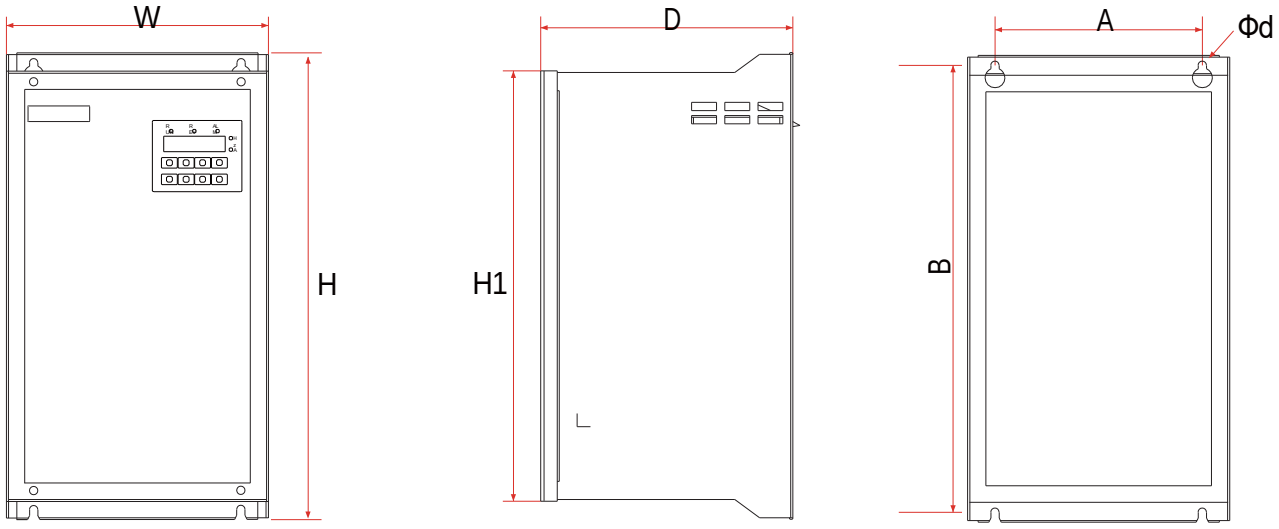
IP 21



Size	Appearance and installation dimensions							
	A	B	H	H1	W	D	ϕd	Mounting Screws
Size A	87	206.5	215	/	100	170	ϕ5.0	M4x16
Size B	114	239.5	250	/	130	180	ϕ5.0	M4x16
Size C	159	298	310	/	180	193	ϕ6.0	M5x20
Size D	165	350	365		210	205	ϕ7.0	M5x20
Size E	170	437	452.5		260	230	ϕ7.0	M6x16
Size F	250	535	555		310	275	ϕ10.0	M8x20
Size G	280	620	640		350	290	ϕ10.0	M8x20

Larger frame size dimensions can be found in the respective product manuals

IP 65

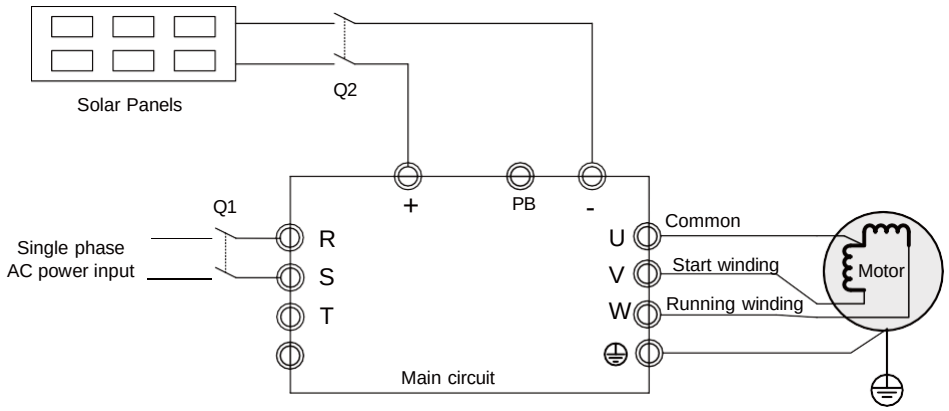


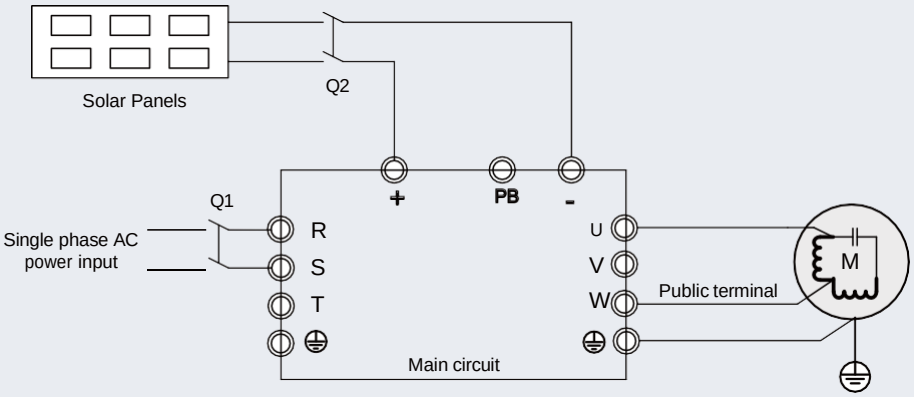
Size	Model	Appearance and installation dimensions							
		A	B	H	H1	W	D	ϕd	Mounting Screws
Size A	SAWA510-40T00400-PV	125	270	282	260	158	152	ϕ5.0	M4x16
	SAWA500-40T00550-PV								
Size B	SAWA500-40T00750-PV	120	305	318	292	170	170	ϕ5.0	M4x16
	SAWA500-40T01100-PV								

Wiring Diagrams

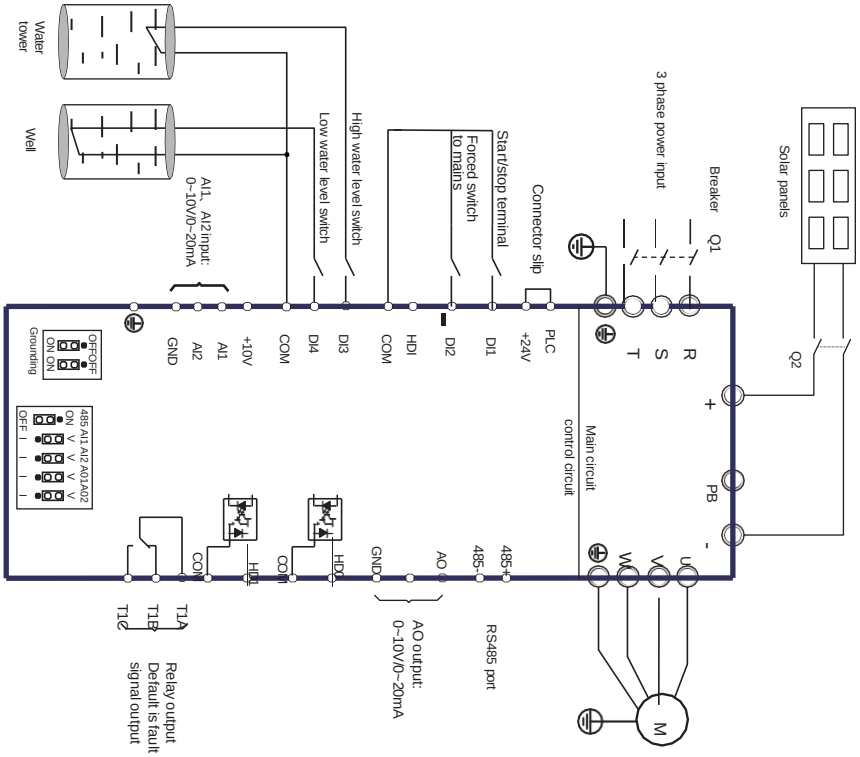
1. The solar array output should be connected to the terminal (+DC, -DC) of the drive, please pay attention to the polarity of the solar array
2. For control wires we recommend using shielded cable or shielded twisted pair
3. To do Start and Stop – Use a potential free contact
4. With the default carrier frequency, the maximum motor cable length is 100 meters. If the motor cable is longer than 70m, it is recommended to use an output reactor/choke

220v Single phase motor connection





Standard 3 phase wiring diagram



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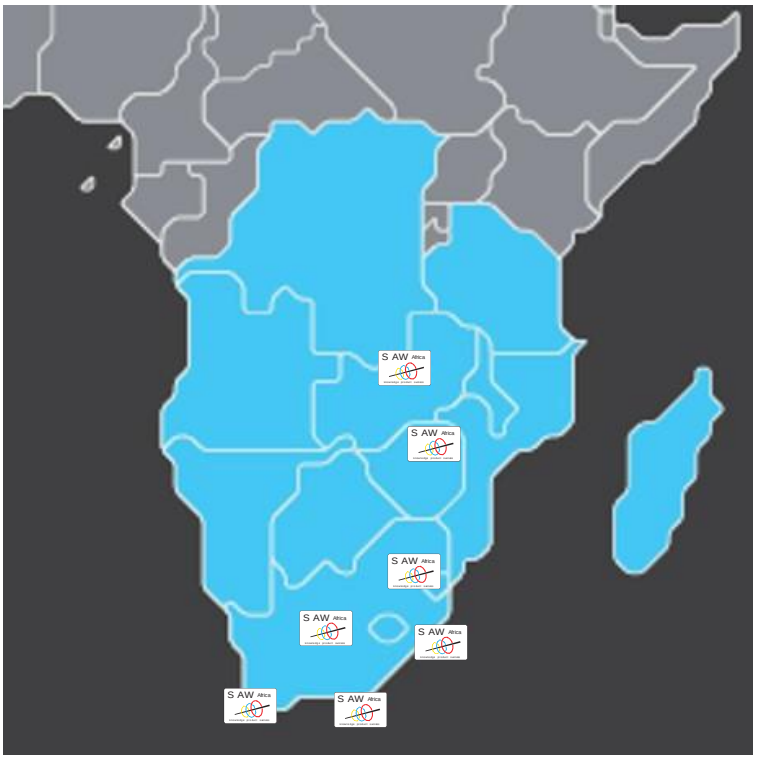

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