schaffner

SCHAFFNER AHF

Spare Parts and Maintenance Schedule

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1. Schaffner AHF Maintenance & Spare Parts

1.1. Coverage:

These **Spare Parts and Maintenance Schedules** cover Active Harmonic Filter of FN3420 and FN3430 product series of Schaffner AG.

1.2. Personnel qualification

For Maintenance and Repair work on the SCHAFFNER AHF systems, the Maintenance and Repair personnel has to be a skilled electrician and must be familiar with the instructions in the **Installation and Operation Manual** as well as the **Maintenance and Repair Manual.**

1.3. Maintenance Schedule

This schedule gives recommendations for maintenance when operating the active harmonic filter under typical conditions

- devices (30-120A) mounted in a cabinet with air inlet filter
- ambient temperature appr. 25 degr. C
- symmetrical 3phase load in steady state operation
- typical device output 60%
- max. 1 power off/power on per month

In other cases the maintenance interval has to be adapted.

The following conditions are able to shorten the lifetime of individual components and consequently lead to shorter maintenance intervals.

- dust
- humidity
- aggressive air
- high ambient temperature
- periodically high load cycles

1.3.1. SCHAFFNER AHF 30/50-480-3 (3-wire)

Table 1: Maintenance Schedule 30/50A (3-wire) type

	year after start operation	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Product type AHF	**maintenance job**												
30/50 A 3-wire	**Check operation and clean fan guard** of main and enclosure fans	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Replace enclosure fans			✓			✓			✓			✓
	Replace main fan						✓						✓
	Replace DC bus fuses			✓			✓			✓			✓
	Perform DC-bus capacitance test			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Parts which are listed in the table below are suitable for an exchange at the customer site. Replacement of parts not listed in the table must be done at the factory.

Table 2: Wear- and Spare parts SCHAFFNER AHF 30/50-480-3

Recommended safety stock per 5 AHF	Description	Part #	Part-classification
1	Control box	811366	Spare module
1 set	Set incl. **3 pcs** of DC-bus fuse 1A / 1000VAC Ferraz-Shawmut | P075660X (FZK050: F6, F7)	811395	Wear part
1 set	Set incl. **2 pcs** of DC-bus pre-charge fuse 4A / 600VAC Ferraz-Shawmut | E083471J (FZK050: F1, F2)	811394	Spare part
	Set incl. **2 pcs** of DC-bus pre-charge fuse ATQ 6A 500VAC 10x38mm (FZK050: F1)	812997	Spare part
1 set	Set incl. **3 pcs** of voltage-measurement fuse 0,1A / 500V - Ferraz Shawmut | S211662J (FZK050: F3, F4, F5)	811393	Spare part
1 set	Main fan assembly Schaffner AHF-50 incl. 1 fan, fixing material and fan guard	811367	Wear part
1 set	Enclosure fan assembly AHF-50, incl. 2 fans and fixing material	811341	Wear part

1.3.2. SCHAFFNER AHF 30/60-400-4 (4-wire)

Table 3: Maintenance Schedule for 30/60A (4-wire) type

	year after start operation	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Product type AHF	**maintenance job**												
30/60 A 4-wire	**Check operation and clean fan guards** of main and enclosure fans	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Replace enclosure fans			✓			✓			✓			✓
	Replace main fan						✓						✓
	Replace DC bus fuses			✓			✓			✓			✓
	Perform DC-bus capacitance test			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Parts which are listed in the table below are suitable for an exchange at the customer site. Replacement of parts not listed in the table must be done at the factory.

Table 4: Wear- and Spare parts SCHAFFNER AHF 30/60-400-4

Recommended safety stock per 5 AHF	Description	Part #	Part-classification
1	Control box	811366	Spare module
1 set	Set incl. **3 pcs** of DC-bus fuse 1A 1000VAC Ferraz-Shawmut | P075660X (ZK-060: F1 & F2)	811395	Wear part
1 set	Set incl. **2 pcs** of DC-bus pre-charge fuse 5A 500V 6,3x32mm (FI-060: F4)	811401	Spare part
1 set	Set incl. **3 pcs** of voltage-measurement fuse 0,1A 500V 6,3x32mm (FI-060: F1, F2, F3)	811400	Spare part
1 set	Main fan assembly Schaffner AHF-60 incl. 1 fan, fixing material and fan guard	811968	Wear part
1 set	Enclosure fan assembly AHF-60, incl. 2 fans, fixing material and fan guards	811628	Wear part

1.3.3. SCHAFFNER AHF 100/120-480-3 (3-wire)

Table 5: Maintenance Schedule for 100/120A (3-wire) type

	year after start operation	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Product type AHF	**maintenance job**												
100/120 A	**Check operation and clean fan guards** of main and enclosure fans	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Replace enclosure fans			✓			✓			✓			✓
	Replace main fans						✓						✓
	Replace DC bus fuses F1 & F2 on ZKsym PCB			✓			✓			✓			✓
	Perform DC-bus capacitance test			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Parts which are listed in the table below are suitable for an exchange at the customer site. Replacement of parts not listed in the table must be done at the factory.

Table 6: Wear- and Spare parts SCHAFFNER AHF 100/120-480-3

Recommended safety stock per 5 AHF	Description	Part #	Part-classification
1	Control box	811366	Spare module
1 set	Set incl. **3 pcs** of DC-bus fuse 1A / 1000VAC Ferraz-Shawmut | P075660X (ZK-Symm: F1 & F2)	811395	Wear part
1 set	Set incl. **2 pcs** of DC-bus pre-charge fuse 6A 6JX6 500VAC Ferraz-Shawmut | B082686 (6A) (FI-100-x: F1 & F2)	811398	Spare part
	Set incl. **2 pcs** of DC-bus pre-charge fuse ATQ 8A 500VAC 10x38mm (FI-100-x: F1 & F2)	812996	Spare part
1 set	Set incl. **3 pcs** of voltage-measurement fuse 0,1A 500V Ferraz Shawmut | S211662J (FI-100-x: F3, F4, F5)	811393	Spare part
1 set	Main fan assembly Schaffner AHF-100/120 incl. 2 fans, fixing material and fan guards	811368	Wear part
1 set	Enclosure fan assembly Schaffner AHF-100/120 incl. 2 fans, fixing material and fan guards	811369	Wear part

1.3.4. SCHAFFNER AHF 100/120-400-4 (4-wire)

Table 7: Maintenance Schedule for 100/120A (4-wire) type

	year after start operation	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Product type AHF	**maintenance job**												
100/120 A 4-wire	**Check operation and clean fan guards** of main and enclosure fans	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Replace enclosure fans			✓			✓			✓			✓
	Replace main fans						✓						✓
	Replace the neutral-choke module fans			✓			✓			✓			✓
	Replace DC bus fuses F1 & F2 on ZKsym PCB			✓			✓			✓			✓
	Perform DC-bus capacitance test			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Parts which are listed in the table below are suitable for an exchange at the customer site. Replacement of parts not listed in the table must be done at the factory.

Table 8: Wear- and Spare parts SCHAFFNER AHF 100/120-400-4

Recommended safety stock per 5 AHF	Description	Part #	Part-classification
1	Control box	811366	Spare module
1 set	Set incl. **3 pcs** of DC-bus fuse 1A 1000VAC Ferraz-Shawmut | P075660X (ZK-Symm: F1 & F2)	811395	Wear part
1 set	Set incl. **2 pcs** of DC-bus pre-charge fuse 6A 6JX6 500VAC Ferraz-Shawmut | B082686 (6A) (FI-100-x: F1 & F2)	811398	Spare part
	Set incl. **2 pcs** of DC-bus pre-charge fuse ATQ 6A 500VAC 10x38mm (FI-100-x: F1)	812997	Spare part
1 set	Set incl. **3 pcs** of voltage-measurement fuse 0,1A 500V Ferraz Shawmut | S211662J (FI-100-x: F3, F4, F5)	811393	Spare part
1 set	Main fan assembly Schaffner AHF-100/120 incl. 2 fans, fixing material and fan guards	811368	Wear part
1 set	Enclosure fan assembly Schaffner AHF-100/120 incl. 2 fans, fixing material and fan guards	811369	Wear part
1 set	Neutral-choke module fan assembly Schaffner AHF 100/120-400-4 incl. 2 fans, fixing material and fan guards	811337	Wear part

1.3.5. SCHAFFNER AHF 200/250/300-480-3 (3-wire)

Table 9: Maintenance Schedule 200/250/300A (3-wire) type

	year after start operation	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Product type AHF	**maintenance job**												
200/250/300A (3-wire)	**Check operation of main fan (on rooftop) and DC-bus fan and clean fan guards** of cooling-system air-intake, main fan exhaust (on top of unit) as well as air-intake and exhaust of air/air heat-exchanger (all on front of the unit)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check coolant pressure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check coolant pump for any signs of coolant-leakage. If leakage is found, replace coolant-pump	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Replace inverter fan (DC bus fan) **assembly**			✓			✓			✓			✓
	Replace main fan (located on top of the unit)						✓						✓
	Replace DC bus fuses F1 & F2 on ZKsym PCB			✓			✓			✓			✓
	Replace cooling system power supply fuses. F1, F2, F3 on ACLS-300 PCB			✓			✓			✓			✓
	Replace cooling system control unit fuses in control unit of water/air heat exchanger			✓			✓			✓			✓
	Replace airconditioning fuses (air/air cooling system in front door cooling unit). F11 & F12 of Interior air/air cooling-system SK330x.140			✓			✓			✓			✓
	Replace phase monitoring fuses (only in UL version). F4, F5, F6			✓			✓			✓			✓
	Replace grid input power fuses F1, F2, F3 input power fuses 400A			✓			✓			✓			✓
	Perform DC-bus capacitance test			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Parts which are listed in the table below are suitable for an exchange at the customer site. Replacement of parts not listed in the table must be done at the factory.

Table 10: Wear- and Spare parts SCHAFFNER AHF 200/250/300-480-3

Recommended safety stock per 3 AHF	Description	Part #	Part-classification
1	Control box	811366	Spare module
1	Cooling-system input-power board ACLS300	811361	Spare module
1	Interface board IAF0601-300.UL (Caution: 2 different firmware versions for 3- and 4-wire units, to be checked on start-up)	811362	Spare module
3	AC-line fuse NH2 400A 500VAC SIBA.| NH2 400A gG 500VAC 2000413.400 (F1, F2, F3)	811399	Spare part
	Required only for UL-listed units AC-line fuse (UL) 400A 500VAC Littelfuse | JLLS 400 (F1, F2, F3)	811396	Spare part
1 set	Required only for UL-listed units Set incl. **3 pcs** of voltage-measurement fuse 0,1A 500V Ferraz Shawmut | S211662J (next to CT-terminals: F4, F5, F6)	811393	Spare part
1 set	Set incl. **3 pcs** of DC-bus fuse 1A / 1000VAC Ferraz-Shawmut | P075660X (ZK-Symm: F1, F2)	811395	Wear part
1 set	Set incl. **2 pcs** of DC-bus pre-charge fuse 9A 500VAC Ferraz-Shawmut ATQ9 (Filter board FI-300: F1)	811402	Spare part
1 set	Set incl. **3 pcs** of voltage-measurement fuse 0,1A 500V Ferraz Shawmut | S211662J (Filter board FI-300: F2) or (FI-300-Ux: F3; FI-300-Wx: F3)	811393	Spare part
1 set	Cooling-system input-power board fuse ATQ10 10A 500V Ferraz Shawmut | R213708 (Power board ACLS300: F1, F2, F3)	811397	Spare part
1 set	Set incl. **3 pcs** of SK3300.007 fan fuse T4A 500V (F4, F5) (up to AHF production week 52/2010 with Rittal SK3300.007 water/air heat exchanger, first generation)	811403	Spare part
	Set incl. **3 pcs** of fan fuse ATQ4 500V (F1, F2) Schaffner water/air heat exchanger (second generation)	811394	Spare part
1 set	Set incl. **3 pcs** of SK3300.007 transformer prim. fuse M0,5A 500V (F1, F2) (up to AHF production week 52/2010 with Rittal SK3300.007 water/air heat exchanger, first generation)	811404	Spare part
	Set incl. **2 pcs** of transformer prim. fuse T3,15A 500V 6,3x32mm SIBA (F3) Schaffner water/air heat exchanger (second generation)	812999	Spare part
1 set	Set incl. **2 pcs** of SK3300.007 transformer sec. fuse M2A 500V (F3, F6) (up to AHF production week 52/2010 with Rittal SK3300.007 water/air heat exchanger, first generation)	811405	Spare part

Recommended safety stock per 3 AHF	Description	Part #	Part-classification
	Set incl. **1 pcs** of Transformer secondary fuse T2A 250V 5x20mm SIBA (F4) Schaffner water/air heat exchanger (second generation)	812998	Spare part
1 set	DC-bus fan assembly, incl. 1 fan, fixing material and fan guard	811370	Wear part
1	Main fan AHF 200/250/300-xxx-3, on the rooftop (up to AHF production week 52/2010 with Rittal SK3300.007 water/air heat exchanger, first generation)	812276	Wear part
	Main fan AHF 200/250/300-xxx-3, on the rooftop Schaffner water/air heat exchanger (second generation)	812275	Wear part
1	1. Inverter module BW300-480-3	412091	Spare module
1	2. Filter module BW300-480-3	412092	Spare module
2*	2.1 Filter board FI-300	811910	Module board
5*	2.2 Damping resistor 2R2, 150W	812190	Module part
2*	2.3 Balancing resistor 2K2, 150W	812191	Module part
1 set	Set incl. **3 pcs** of SK3304.140 / SK3305.140 fuse T4A 500V (F11, F12)	811403	Spare part

* Part of Filter-module BW300-400-3

1.3.6. SCHAFFNER AHF 200/250/300-400-4 (4-wire)

Table 11: Maintenance Schedule 200/250/300A (4-wire) type

	year after start operation	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Product type AHF	**maintenance job**												
200/250/300A (3-wire)	**Check operation of main fan (on rooftop) and DC-bus fan and clean fan guards** of cooling-system air-intake, main fan exhaust (on top of unit) as well as air-intake and exhaust of air/air heat-exchanger (all on front of the unit)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check coolant pressure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Check coolant pump for any signs of coolant-leakage. If leakage is found, replace coolant-pump	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Replace inverter fan (DC bus fan) **assembly**			✓			✓			✓			✓
	Replace main fan (located on top of the unit)						✓						✓
	Replace DC bus fuses F1 & F2 on ZKsym PCB			✓			✓			✓			✓
	Replace cooling system power supply fuses. F1, F2, F3 on ACLS-300 PCB			✓			✓			✓			✓
	Replace cooling system control unit fuses in control unit of water/air heat exchanger			✓			✓			✓			✓
	Replace airconditioning fuses (air/air cooling system in front door cooling unit). F11 & F12 of Interior air/air cooling-system SK330x.140			✓			✓			✓			✓
	Replace grid input power fuses F1, F2, F3 input power fuses 400A			✓			✓			✓			✓
	Perform DC-bus capacitance test			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Parts which are listed in the table below are suitable for an exchange at the customer site. Replacement of parts not listed in the table must be done at the factory.

Table 12: Wear- and Spare parts SCHAFFNER AHF 200/250/300-400-4

Recommended safety stock per 3 AHF	Description	Part #	Part-classification
1	Control box	811366	Spare module
1	Cooling-system input-power board ACLS300	811361	Spare module
1	Interface board IAF0601-300.UL (Caution: 2 different firmware versions for 3- and 4-wire units, to be checked on start-up)	811362	Spare module
3	AC-line fuse NH2 400A 500VAC SIBA.| NH2 400A gG 500VAC 2000413.400 (F1, F2, F3)	811399	Spare part
1 set	Set incl. **3 pcs** of DC-bus fuse 1A 1000VAC Ferraz-Shawmut | P075660X (ZK-Symm: F1, F2)	811395	Wear part
1 set	Set incl. **2 pcs** of DC-bus pre-charge fuse 9A 500VAC Ferraz-Shawmut ATQ9 (Filter board FI-300: F1)	811402	Spare part
1 set	Set incl. **3 pcs** of voltage-measurement fuse 0,1A 500V Ferraz Shawmut | S211662J (Filter board FI-300: F2) or (FI-300-Ux: F3; FI-300-Wx: F3)	811393	Spare part
1 set	Cooling-system input-power board fuse ATQ10 10A 500V Ferraz Shawmut | R213708 (Power board ACLS300: F1, F2, F3)	811397	Spare part
1 set	Set incl. **3 pcs** of SK3300.007 fan fuse T4A 500V (F4, F5) (up to AHF production week 52/2010 with Rittal SK3300.007 water/air heat exchanger, first generation)	811403	Spare part
	Set incl. **3 pcs** of fan fuse ATQ4 500V (F1, F2) Schaffner water/air heat exchanger (second generation)	811394	Spare part
1 set	Set incl. **3 pcs** of SK3300.007 transformer prim. fuse M0,5A 500V (F1, F2) (up to AHF production week 52/2010 with Rittal SK3300.007 water/air heat exchanger, first generation)	811404	Spare part
	Set incl. **2 pcs** of transformer prim. fuse T3,15A 500V 6,3x32mm SIBA (F3) Schaffner water/air heat exchanger (second generation)	812999	Spare part
1 set	Set incl. **2 pcs** of SK3300.007 transformer sec. fuse M2A 500V (F3, F6) (up to AHF production week 52/2010 with Rittal SK3300.007 water/air heat exchanger, first generation)	811405	Spare part
	Set incl. **1 pcs** of Transformer secondary fuse T2A 250V / 5x20mm / SIBA (F4) Schaffner water/air heat exchanger (second generation)	812998	Spare part
1 set	DC-bus fan assembly, incl. 1 fan, fixing material and fan guard	811370	Wear part

Recommended safety stock per 3 AHF	Description	Part #	Part-classification
1	Main fan AHF 200/250/300-xxx-4, on the rooftop	812275	Wear part
1	1. Inverter module BW300-400-4	412087	Spare module
1	2. Filter module BW300-400-4	412088	Spare module
2**	2.1 Filter board FI-300	811910	Module board
5**	2.2 Damping resistor 2R2, 150W	812190	Module part
2**	2.3 Balancing resistor 2K2, 150W	812191	Module part
1 set	Set incl. **3 pcs** of SK3304.140 / SK3305.140 fuse T4A 500V (F11, F12)	811403	Spare part

** Part of Filter-module BW300-400-4

1.4. Liquid cooling circuit maintenance tool

SCHAFFNER AHF 200/250/300A liquid cooling maintenance tool is required for maintenance of AHF units with inflated pressure cooling circuit SK3300.007 (first generation) **up to production week 52/2010** (example for type plate: Fig. 2).

Fig. 1: Fluid cooling circuit maintenance station

Production week (here: week 29/2011)

Fig. 2: Example for type plate of ECOsine™ Active

2. General technical data

Table 13: General technical data ECOsine™ Active filters

Characteristics	Value	Notes
Altitude	Up to 1000 m without derating of compensating current From 1000 up to 4000 m internal derating 1 % / 100 m	**Attention!** If the device is used in altitudes > 2000m, the transient voltages (1.2 µs / 50 µs) must not exceed the following values : 3000 m: max. 3.51 kV 4000 m: max. 3.10 kV
Environmental conditions according to **EN50178** ECOsine™ Active is designed according to overvoltage class III (EN50178)	**Degree of pollution 2** (table 2) **Climate conditions for operation class 3K3** (type B) Temperature range 0°C to +40°C Relative humidity < 95%, no condensation Atmospheric pressure 86kPa to 106 kPa	**Climate conditions for storage class 1K4 and 1K3** (type D) temperature range -25°C to +55°C Relative humidity < 95%, no condensation Atmospheric pressure 86kPa to 106 kPa **Climate conditions for transport class 2K3** (type E) Temperature range -25°C to +70°C Relative humidity < 95%, no condensation Atmospheric pressure 70kPa to 106 kPa
Installation	upright	The device has to be installed in upright position.
Current transformer	50:5 up to 50000:5	Adjustable in 1 A steps
Parallel operation	up to 5 units on **one** current transformer set	for more than 5 units use an additional set of current transformers
EMC	EN61000-6-4 EN61000-6-2 EN61800-3 (C2)	

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