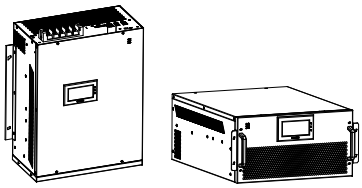
ACTIVE HARMONIC FILTER

User Manual



3P 400V AHF 35~150A

Xi'an Noker Electric Co.,Ltd.

ACTIVE HARMONIC FILTER
User Manual

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Contents

Preface

This device utilities the advanced DSP as main controller, and IGBTs to form NPC topology to achieve better performance.

Unpacking and Inspection

Upon unpacking, please check for:

Any damage occurred during transportation;

Check whether the rated values on the nameplate of the drive are in accordance with your order.

Our product is manufactured and packed at the factory with great care. If there is any error, please contact any of our distributors or us.

The user manual is subjected to change without notifying the customers due to the continuous process of product improvements.

1 Safety information

1.1 Danger and Warning Definitions

	Contains information, which is necessary for avoiding a risk of damage to the product or other equipment.
	Contains information, which is essential for avoiding a safety hazard.

1.2 Notes for Installations

Please read the manual carefully before installation.

The debugging and maintenance of AHF shall be conducted by engineer(s) appointed by the manufacturer or the agent, otherwise personal injury and device damages might be caused; the maker shall not be responsible for such kinds of damages.

AHF is only for commercial/industrial use, it can't be used as energy-saving equipment related with any

Life-support devices.

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Please connect the ground wire correctly before connecting the equipment to the power supply. The leakage current to ground shall be in the range of 3.5 mA-1,000mA. The steady state and transient state leakage currents produced when starting shall be taken into consideration when you choose instantaneous release RCCB and RCD components. It's advised to select residual current circuit breakers (RCCBs) that is not sensitive to unidirectional DC pulse (A-grade) and transient current pulse. The leakage current to the ground flows through RCCB or RCD too. The protective ground (earth) of the equipment must meet local electric regulations


There are AC capacitors & DC capacitors connected inside this filter. Before performing any maintenance work, please short and ground the three line terminals. The DC capacitor needs 10 mins to discharge after disconnection. Please wait for this duration before touching any live parts or maintaining AHF, even after discharging the AC capacitors, to avoid electrical shock. Never discharge DC capacitors through short circuit.

1.3 Disposing

When disposing, pay attention to the following factors:

The capacitors may explode when they are burnt.

Poisonous gas may be generated when the plastic parts like front covers are burnt.

Disposing method: Please dispose the Drive as industrial waste.

2 Specifications

2.1 Electrical Specifications

Tab. 2-1 Specifications

Item		Description
Electrical	Rated voltage	380/400Vac
	Wiring	3P3W/3P4W
	Frequency	50Hz/60Hz
	Rated current	50A~150A(According to model type)
	Current limit	50A~150A(According to model type)
	Efficiency	Up to 97.5%
	CT ratio	150:5~6000:5
Terminals	Relay output	2
	Digital input	2
	Communication	RS485
Environment	Operating environment	In-door, free from moisture, dust, corrodent or flammable gases, oil mist, vapor, water leakage or salt water.
	Altitude	<1500m, use as per GB/ T3859.2 above 1500m
	Work temperature	-10℃~+40℃(derating is required from 40℃ to 50℃, increase every 1℃ above 40℃, derate 2%, highest temperature allowed: 50℃)
	Humidity	Less than 95%RH, no condensing
	Storage temperature	-40℃~+70℃
	Vibration	Less than 5.9m/s2 (0.6g)
Enclosure	Protection degree	IP20
	Colour	7035 grey
	Size	According to model type
	Weight	22~51kg(According to model type)
	Cooling	Fan cooling

2.2 AHF dimensions

Rack mounted type dimensions is shown in figure 2-1.

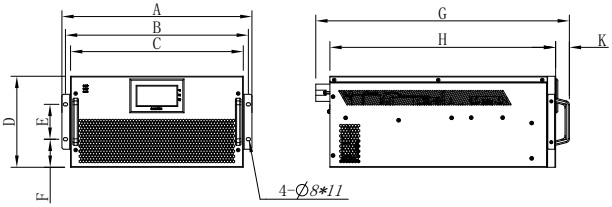

Fig.2-1 Dimensions of rack mounted type

Wall mounted type dimensions is shown in figure 2-2.

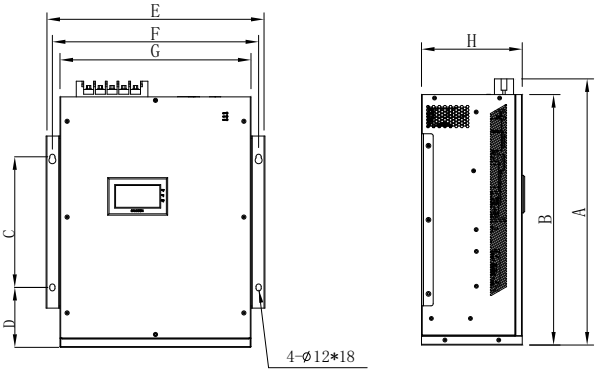

Fig.2-2 Dimensions of wall mounted type

Tab. 2-2 Model dimensions

mm	Rack mounted				Wall mounted			
	35A/50A	75A	100A	150A	35A/50A	75A	100A	150A
A	359	399	484	554	521.5	545	611	621
B	341	381	466	536	500	520	575	585
C	315	355	440	510	300	360	300	300
D	200	200	232	250	120.5	85.5	137.5	142.5
E	89	89	89	89	379	419	500	570
F	55.5	55.5	71.5	80.5	350	390	475	545
G	556.5	611.5	646	656	315	355	440	510
H	500	555	575	585	200	200	232	250
K	35	35	35	35				
Weight (kg)	23	28	38	47	23	28	38	47

2.3 AHF terminals

Power connectors (A, B, C, N, N) and control connectors in AHF100A are shown as Fig. 2-3。

Note:

The AC supply to AHF' power connectors must be installed with suitable protection against overload and short circuits. Failure to observe this requirement will cause risk of fire or damage to other equipment.

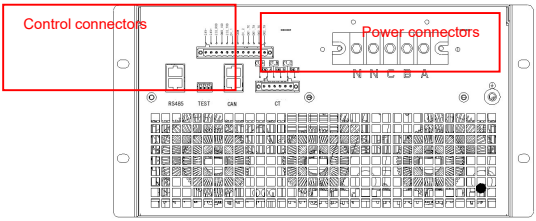

Fig.2-3 Connectors

Tab. 2-3 Power connectors

Mark	Definition
A/B/C	3-phase AC connectors
N	3P4W Neutral connectors
PE	Protective earth

Control connectors is shown as Fig2-3. RS485 and CAN are used for communication during parallel operation. TEST is used for debugging of AHF. CT is used for load current acquisition. There are 2 digital inputs and relay outputs respectively, DI1~2 and DO1~2.

Note:

1. DO1,DO2,DI1,DI2 terminals are optional.
2. Relay of DO1 is set up as a status relay, NC contacts (DO1_TB) is opened and NO contact (DO1_TC) is closed when AHF is tripped.
3. TEST should be only used by authorized personnel of the supplier.

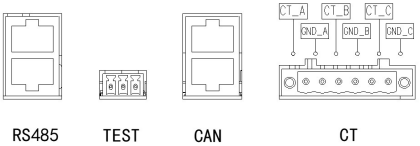

Fig.2-4 Control connectors and definition

Tab. 2-4 Control connectors and definition

	Mark	Definition
CT	CT_A	Connect to S1 of phase A CT
	GND_A	Connect to S2 of phase A CT
	CT_B	Connect to S1 of phase B CT
	GND_B	Connect to S2 of phase B CT
	CT_C	Connect to S1 of phase C CT
	GND_C	Connect to S2 of phase C CT
RS485	RS485	Connector for remote monitor
CAN	CAN	Connector for model parallel
TEST	TEST	Connector for user debug

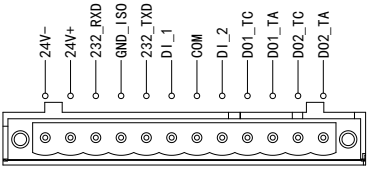

Fig.2-5 Optional control connectors and definition

Tab. 2-5 Optional control connectors and definition

	Mark	Definition
DO	DO1_TA	Common contacts of status relay1
	DO1_TC	Normally open contacts of status relay1
	DO2_TA	Common contacts of status relay2
	DO2_TC	Normally open contacts of status relay2
DI	DI_1	Digital input channel 1 (9~30V)
	COM	Digital input 0V common
	DI_2	Digital input channel 2 (9~30V)
RS232	232_TXD	RS232 transmit data
	GND_ISO	RS232 0V common
	232_RXD	RS232 receive data
24V OUT	24V+	24V output positive(<500mA)
	24V-	24V output negative(<500mA)

3 Electrical Installation

3.1 Electrical Installation

100A AHF can be installed individually (one-set) or parallelly (multi-set). Installation of one-set type is included in this guide. For multi-set installation, please contact the supplier.

Tab.3-1 Cable, breaker and CT reference

100A AHF	100A nominal current
Power Cable	Copper, A/B/C>35mm^2 N>50mm^2 PE>16mm^2
Breaker	>160A
CTcable	<15m：2.5mm^2 15~20mm：4mm^2
CT ratio	150:5~6000:5

3.2.1 Electrical Installation for one-set type

For installation of one-set type, please refer to Fig.3-1. CT connection is detailed in chapter 2.3. Please do remember the direction of CT is in accord with that shown in Fig.3-1. CTs are place between power supply and load, and P2 of CT is to load side and P1 of CT to supply side. S1 and S2 of each CT should be connected according to Tab. 2-3.

NOTE:

Make sure the direction and connection of CT are in accord with Fig.3-1, especially the direction, otherwise the harmonic would be enlarged.

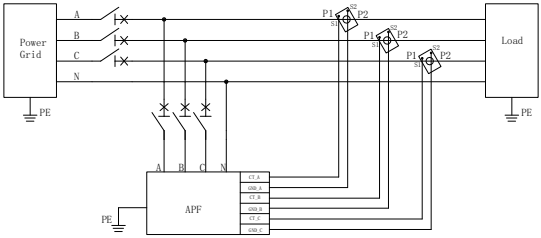

Fig.3-1 Quick start commissioning of AHF

4 Operation of AHF

This chapter introduces power ON/OFF steps and user interfaces of AHF.

4.1 Power ON/OFF of AHF

4.1.1 Power ON steps

It's applicable to the power-on operation when AHF is in power-off state.

1. Fix the power and control cables correctly.
2. Close the breaker between AHF and power supply.

At this moment, power LED at front panel is turned on (green). If AHF is tripped, FAULT LED would be light up (red).

Fig.4-1 Status LED of AHF

4.1.2 Power OFF steps

There are two kinds of power-off modes, first is to disconnect the breaker between AHF and power supply. In this mode, the AHF would be thoroughly powered off and then may carry out maintenance and setup work. Another one is to press the stop button on HMI panel. In this mode, AHF only stop compensating, but the power terminals are still live, so it's not allowed to carry out maintenance or setup work.

NOTE:

Please wait for at least 10 mins before touching any live parts or maintaining AHF.

4.2 Operation of HMI panel

AHF contains a 4.3 inch LCD panel as user interface, from which user can set parameters or read grid， load and output information etc.

Typical page of LCD is shown in Fig.4-1. It can be divided into 3 areas.

Main parameters of grid and AHF itself are displayed in area 2. Buttons in area 3 are for switching to other pages.

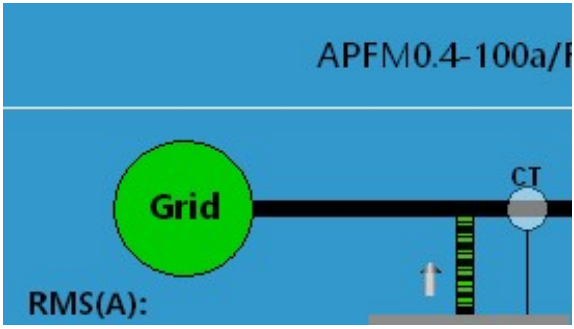

Fig.4-1 Main page of LCD

Fig.4-2 Typical page of LCD (OnOFF)

Note:

1. For simple use of one-set AHF, the only parameter needed to be set is CT ratio in Setting page.
2. If Auto mode is on, AHF would start automatically when power on.
3. When press start button, number beside it will increase every second, and AHF will run after 30 seconds, RUN LED will be light up meanwhile.
4. Use Cure Para button to save parameter i.e. CT ratio.
5. 4.3 inch LCD panel can be optional according to requirement.

4.2.1 Parameters displayed in LCD

All parameters displayed in LCD are listed in Tab.4-1.

Tab.4-1 Parameters and definition

Page	Parameter	Definition	Type
Main	Status	Ready, Run, Fault	R
	Login	If password is needed, input 1111	B
Data	Rate Voltage	Rate voltage of AHF	R
	Capacity	Nominal output current of AHF	R
	Phase A/B/C Volt	AC voltage of phase A B C	R
	DC bus Volt	Internal DC bus voltage of AHF	R
	IGBT Temp	Max temperature of IGBT in AHF	R
Settings	CT Ratio	Set the CT Ratio uses in load side	W
	Para. Capa.	Set the whole AHF capacity in multi-set mode	W
	MODBUS Addr	Set MODBUS address in multi-set mode	W
	Run Mode	Select auto or manual mode	B
	Next	To next page	B
	Save	Save changed parameter	B
Fault	Fault ID	All fault information are readable, if AHF is tripped please contact the supplier.	R
OnOFF	Start	Run AHF manually	B
	Stop	Stop AHF manually	B
	Reset	Clear the faults	B

Note:

R: Read; W: Write; B: Button