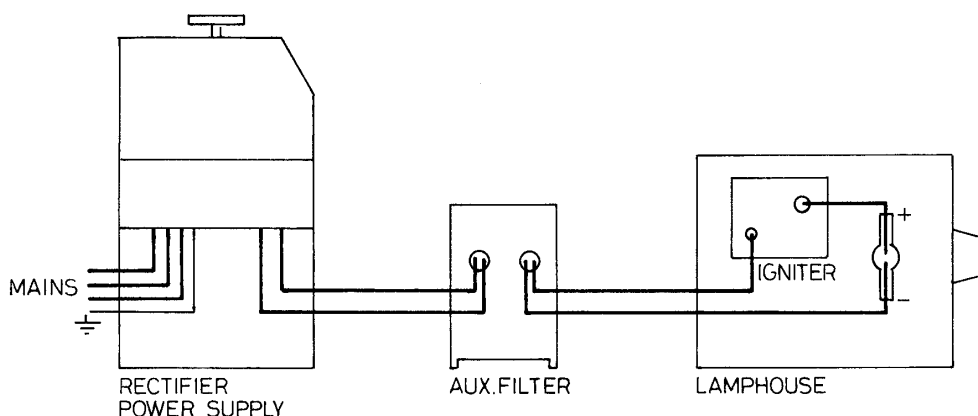


AF series auxiliary filters

Introduction

This special type of **filter** has been expressly designed to be connected between the rectifier power supply N3-X or G3-X series and the discharge Xenon lamp. It reduces the current ripple of the lamp, thus improving both the arc stability and the lamp life.

Block diagram



Characteristics

Max. input voltage
Input voltage (lamp ON)
Input current
Load type
Lamp output current ripple
Efficiency (full load)
Ambient temperature

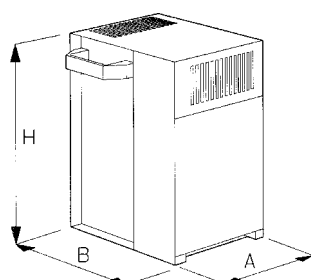
AFU/110

115V DC
40V DC approx.
45-110A DC
lamp current up to 110A
less than 5% peak-to-peak
98%
-20°C to +40°C

AFU/200

170V DC
50V DC approx.
120-200A DC
lamp current up to 160A
less than 5% peak-to-peak
98%
-20°C to +40°C

Outline drawing



Model	Dimensions [mm]		
	A	B	C
AFU/110 (*)	355	220	230
AFU/200 (*)	375	240	230

(*) handles and rubber feet included

**AUXILIARY FILTER UNIT (AFU) ASSEMBLED ON MAGNETIC RECTIFIERS
TECHNICAL INFORMATION****1.1 Current ripple reduction**

The rectifier output voltage is never perfectly direct: it has a residual pulsation value called ripple. This is also true for the output current.

When a XBO lamp is operating, its cathode is subject to erosion. This phenomenon causes the bulb blackening and also a rise in the distance between the electrodes (this involves a higher restrike voltage).

When a Xenon lamp is fed by a true DC source, the cathode wear-out is reduced to the minimum. When the lamp is fed by a power supply, the delivered current is not perfectly DC: so the cathode is subject to a wear-out and some flickering occurs. Consequently the lamp useful life is shorten. For this reason, the current ripple must be as low as possible.

The current ripple may be defined by the ratio:

$$ri = (I_{max} - I_{min}) / I_{max} \times 100 [\%]$$

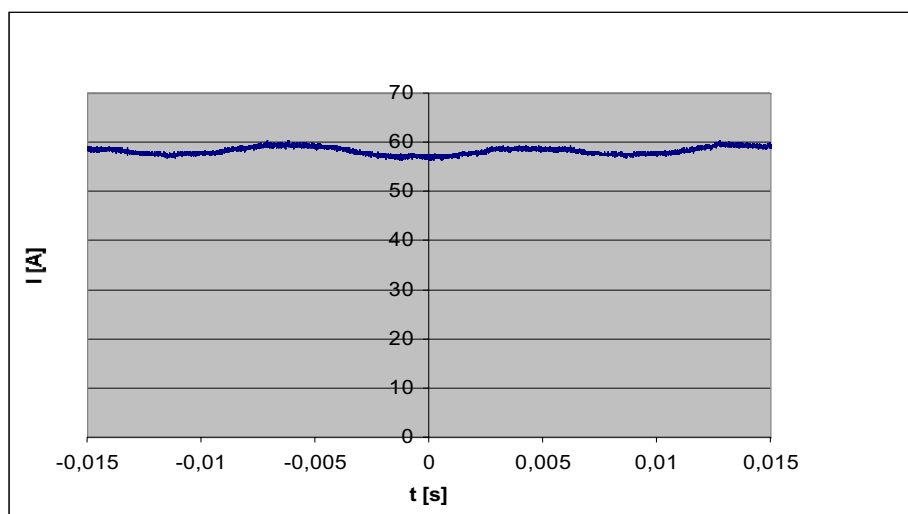
where: I_{max} = current maximum value

I_{min} = current minimum value

IREM preventive steps to reduce the ripple to the minimum are: a filtering block composed by a capacitor connected in parallel to the rectifier output and an auxiliary filtering block (AFU) composed by an inductance connected in series to the rectifier.

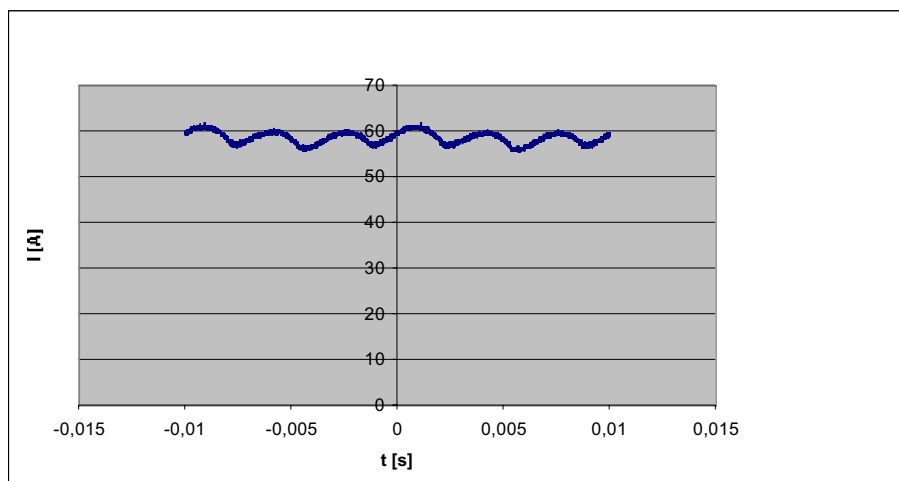
Pictures A1 and A2 show the oscillograms of the current ripple values of a rectifier feeding a XBO lamp. Measurements have been performed with AFU and then this device has been removed.

Pict. A1 - current waveform with AFU.



Current ripple: < 3%

Pict. A2 - current waveform without AFU.



Current ripple: < 8%

1.2 Final remarks

As shown in the diagrams no. A1 and A2, AFU permits to reduce the current ripple from 8% down to 3%.

AFU auxiliary filter unit may be assembled on all **IREM** magnetic rectifiers.

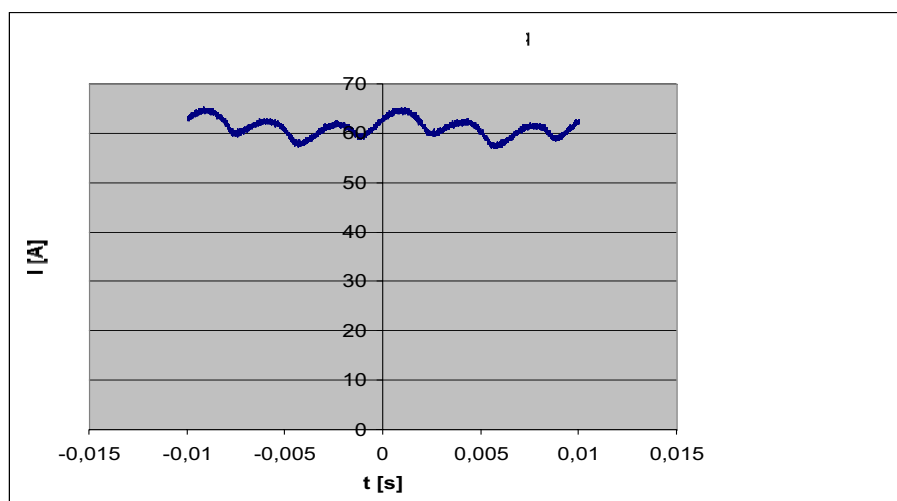
2.1 Supply voltage unbalances

The use of AFU also involves another advantage: if the three-phase power line is "slightly" unbalanced, the inductive filter permits to reduce the current ripple of the rectifier, this being caused by the input phase unbalance.

Pictures B1 and B2 show the waveforms of the lamp currents obtained with the use and without the use of AFU.

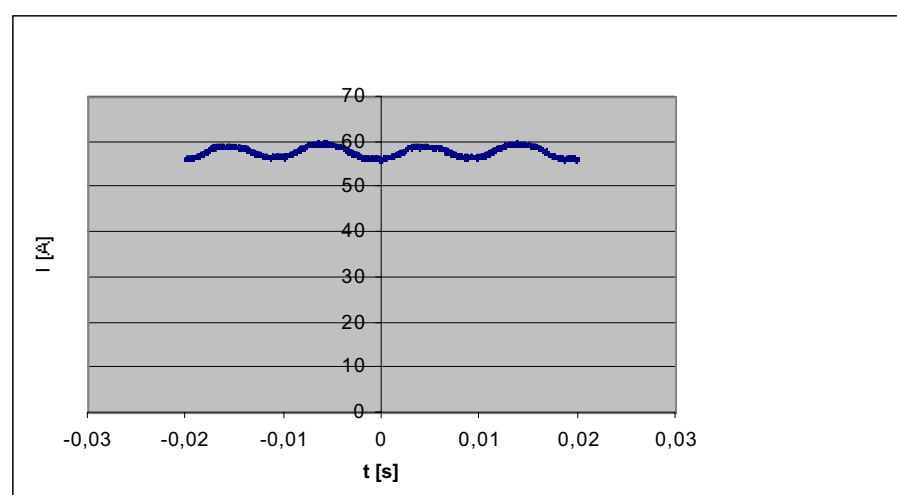
The rectifier has been supplied through a three-phase power line having an unbalance of 1.5% (expressed as per Standard CEI EN 50160-2.10, as ratio between the component at direct sequence and the component at reverse sequence of the supply voltage).

Pict. B1: current waveform with unbalanced input voltage - without AFU.



Current ripple: ~ 10%

Pict. B2: current waveform with unbalanced input voltage - with AFU.



Current ripple: ~6%

2.2 Final remarks

As shown in the diagrams no. B1 and B2, AFU permits to reduce the current ripple even if the rectifier power line is not perfectly balanced.

AFU auxiliary filter unit may be assembled on all **IREM** magnetic rectifiers.