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June 1990

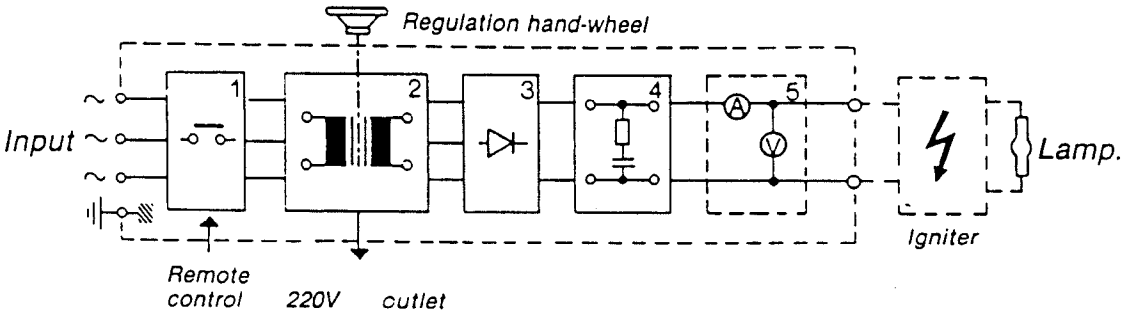
IREM

RECTIFIER N3-X75DM

INSTRUCTION MANUAL

10050 S. ANTONINO (TO) ITALY- Tel. 11/9649133 - Fax 11/9649933

Three phase AC rectifiers expressly designed to meet the recommendations of Xenon bulbs manufacturers and to ensure correct operation and long life to the lamps.
This rectifier is equipped with a special high reactance transformer with adjustable magnetic shunt allowing the continuous output regulation by means of a small hand-wheel.
The special design ensures low current ripple, a negligible starting energy and the ON-OFF remote control. A 220V AC 300W auxiliary outlet provides power to the igniter when the unit is on.



1. Main switch for remote control - 2. Special transformer with magnetic shunt - 3. Silicon rectifier - 4. Filter and starting peak suppression circuit - 5. Voltmeter and ammeter (on request, only) -

CHARACTERISTICS

Model	N3-X75DM (*)
Xenon lamp capacity	1600 to 2000 W
AC Input	three phase 380V 50Hz
Max input power	4000 VA
DC no-load voltage	78 V
DC current range	45 to 75 A (at ± 10% input voltage)
DC voltage	22 to 32 V
Output adjustment	stepless in all the range
Peak-to-peak current ripple	8% max
Starting energy (Q max)	less than 1 A x sec.
Ambient temperature	0°C to +40°C
Cooling	free convection
Net weight	Kg 97

(*) This model is suitable for carbon arc lamps, too.

DATE 22-06-90 REF. RC/sb	**RECTIFIER N3-X75DM**
N3-X75DM Handbook	

The N3 series rectifiers have been expressly designed to power carbon arc and Xenon lamps.
The rectifier consists in a stray-flux transformer with adjustable magnetic shunt, a rectifying unit mounted on a heatsink and leveling filter.
The transformer is formed by three identical single phase transformers "T1, T2, T3" (5) whose primaries are star-connected.
The use of three single phase units "T1, T2, T3" (5) permits to get a balanced magnetic circuit such to reduce the ripple of the rectified output current.
The magnetic shunt "MS" (14), operated by the hand-wheel "H" (11), permits to adjst the output current according to the lamp manufacturers' specifications, even in case of ± 10% input voltage variations.
The transformer secondary windings, provided with central tap, power the diode assembly "D1, D2, D3, D4, D5, D6" (12), center-tap connected, and protected by "C1, C2, C3, C4, C5, C6" capacitors (13).
An electrolytic capacitor "C7" (4) is connected in parallel across the output, working as a filter to reduce the residual ripple down to 8% peak-to-peak.
The "RA" relay (3) limits the inrush current to the lamp, caused by the discharge of "C7" capacitor (4), and operates a resistor in series to "C7" at the ignition.
The main switch "B" (6) may be remotely operated by a push button connected to the "MO" terminal board.
On the "MO" terminal board, there are the "R, S, T" input terminals (8), "+ and -" output terminals (10), to be connected to the lamp, and the auxiliary terminals "B, H, A" (9), used to operate the main switch coil "B" (6).
On request, these rectifiers can be supplied equiped with voltmeter (19) with push button (18), to read the lamp operating voltage, ammeter (16) and pilot lamp (17).
The cabinet, equiped with carrying handles, permits a perfect free convextion cooling and an easy inspection of the inside components.

NOTE: To reduce the risk of high frequency interference at lamp ignition, "C8 and C9" capacitors have been added on the DC output.

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INSTALLATION - USE

Install the rectifier in a dry and not dusty site, possibly laying it on felt or rubber strips to insulate the unit from the floor and reduce the noise due to resonance.
Be sure that there is a free air circulation for cooling.
Before connecting the rectifier, check that it has not suffered for damages during transport.

Check for the presence of "C8-C9" high frequency filter capacitors, placed behind "MO" terminal board.
Connect the input and output lines to the "MO" terminal board, input terminals "R,S, T" (8), output terminals "+ and -" (10), by means of wires having proper section (max current density 3÷4 A per sq/mm.) and the ground wire to "G" terminal (7).

If the remote operation is required, connect the wires of the ON-OFF push bùtton (see drawing no. 33691) to terminals marked "B, H, A" of the terminal board (9).
On the same terminal board (9), there is also a 220V 2A outlet to power the igniter.
After connecting the unit, switch on the rectifier by means of the ON-OFF switch (2) or the remote control , if installed.

When the lamp is on, adjust the current by means of "H" adjustment hand-wheel (11).
On the units equiped with meters, you can read the current value on the ammeter (16) and the voltage on the voltmter (19) by pressing the push button (18).

NOTE: The voltage check can only be performed when the lamp is on because, when no load is connected, the voltage value is higher than the one accepted by the voltmeter.

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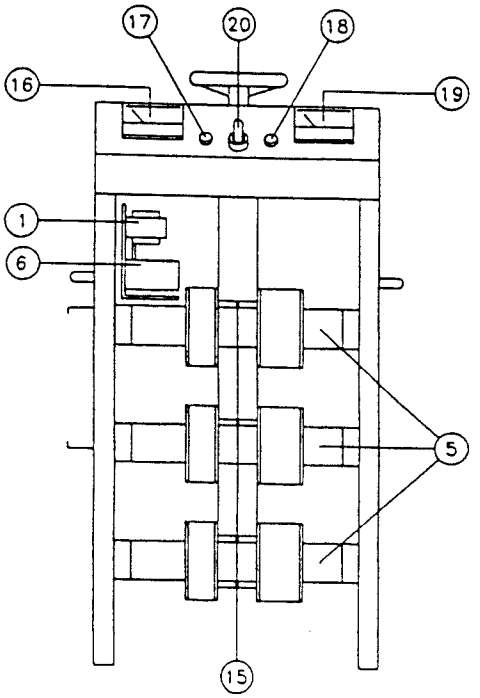
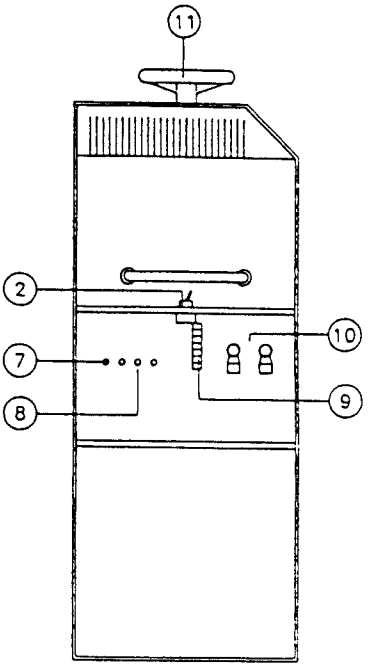
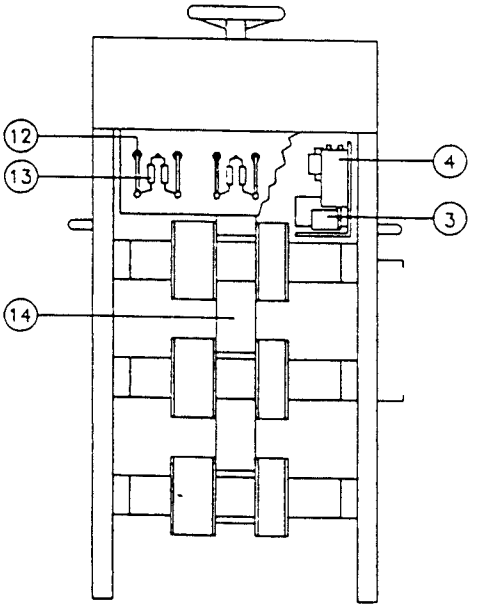




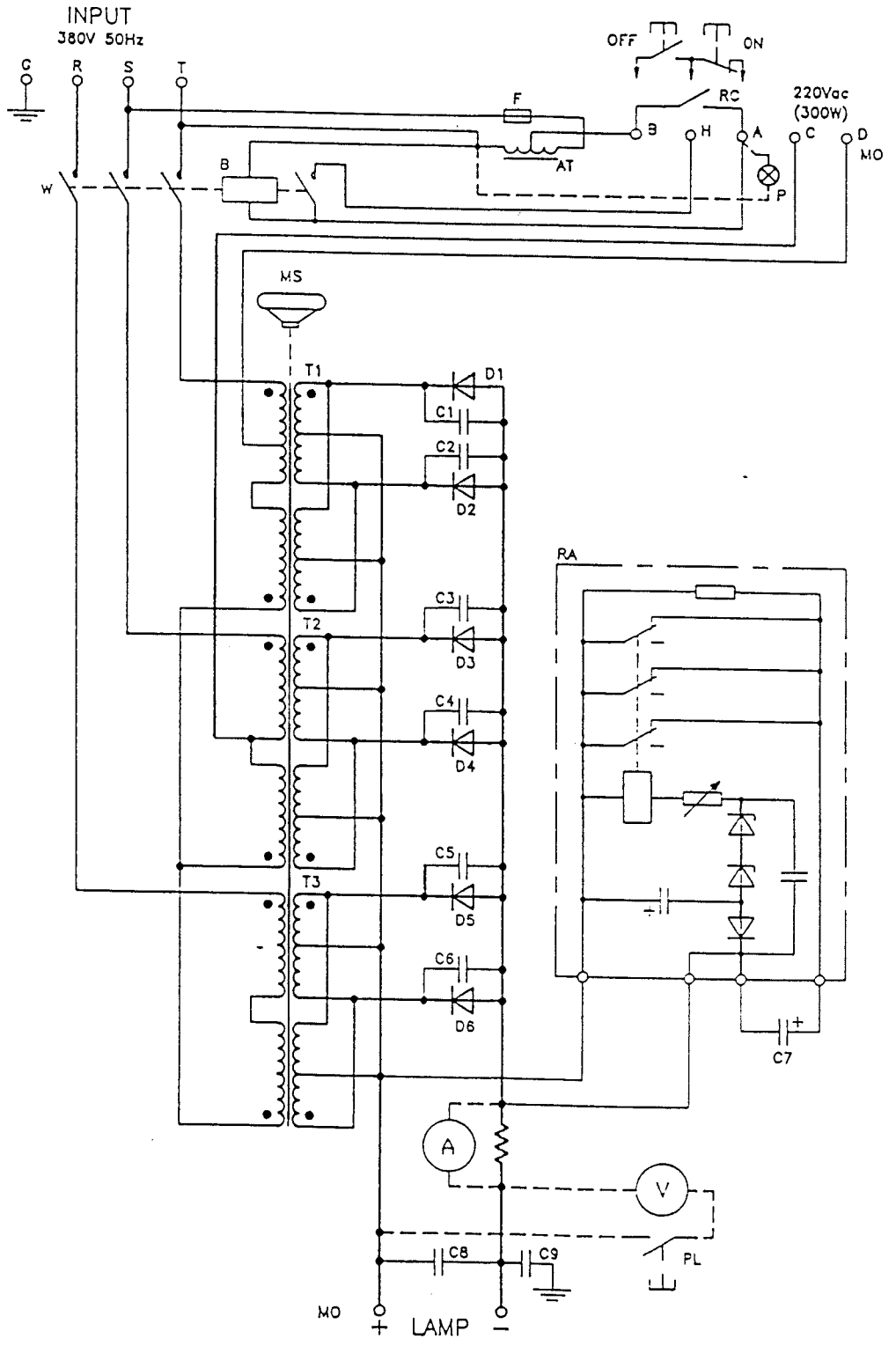


1) Main switch transformer
2) ON-OFF switch (RC)
3) Ignition relay (RA)
4) Output filter capacitor (C7)
5) Transformer (T1, T2, T3)
6) Main switch (B)
7) Ground terminal (G)
8) Input terminals (R, S, T)
9) Remote control and 220V 2A auxiliary outlet terminal board
10) Output terminal (+ and -)
11) Adjustment hand-wheel (H)
12) Silicon diodes (D1 ÷ D6)
13) Protection capacitors (C1 + C6)
14) Magnetic shunt (MS)
15) Magnetic shunt adjustment

* 16) Ammeter
* 17) Pilot lamp P
* 18) Voltmeter push button (PL)
* 19) Voltmeter
* 20) ON-OFF switch (RC)

(*) On units equipped with meters, only.

DATE 22-06-90 REF. RC/sb	**N3 RECTIFIERS** **COMPONENTS ARRANGEMENT**
N3-X75DM Handbook	



IREM SPA S.ANTONINO (TO) ITALY

Denominazione:

Raddrizzatore al silicio (silicon rectifier) mod:

N3-X50DM N3-X75DM N3-X75/95DM
N3-X95/150DM N3-X180DM
G3-X75DM G3-X95DM

380V 50Hz

Data: 24 GEN 92
Dis.:
Cont.:

S 33691

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RIF./Des.	DESCRIZIONE/Description	TIPO/Type	Q.	CODICE/Code
MS	DEVIATORE MAGNETICO Magnetic shunt	N3	1	62000900
AT	AUTOTRASFORMATORE Autotransformer	AT	1	63010141
T1	TRASFORMATORE CON PRESA Transformer with tap		1	63017011
T2-T3	TRASFORMATORE Transformer		2	63017012
M0	MORSETTIERA Terminal board	N3-A	1	64110050
RA	RELE' ACCENSIONE Ignition relay	LP/A	1	78800400
H	VOLANTINO REGOLAZIONE Regulation hand wheel		1	79009060
D1...D6	DIODO AL SILICIO Silicon diode	41 HAR 40	6	88111022
C1...C6-C8	CONDENSATORE 0,22µF Capacitor	630V	7	88310020
C7	CONDENSATORE 4200µF 75V Capacitor	ARX	1	88322060
C9	CONDENSATORE 0,022µF Capacitor	1500V	1	88310040
RC	INTERRUTTORE UNIPOLARE Single pole switch	3A 250V	1	88401103
W	TELERUTTORE 16A Power relay	B9-30-10	1	88471122
PF	PORTAFUSIBILE Fuse holder		1	88511016
F	FUSIBILE 6,3x32 Fuse	1AT	1	88526011
A	AMPEROMETRO Ammeter	120A	1	88612120
P	LAMPADA SPIA Pilot lamp	220V	1	88530210
	PORTALAMPADA Lamp holder		1	88530310
V	VOLTMETRO 60V Voltmeter		1	88622060
PL	PULSANTE VOLTMETRO Voltmeter pushbutton	NA 0,5A 250V	1	88401301

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local dealer.
Changes to IREM rectifiers are sometimes made to accomodate improved components as they become available and to give you the benefit of the latest circuit improvements developed in our R & D dept.
It is therefore necesssary, when ordering parts, to quote the following information in your order:

- part number
- rectifier model or number
- rectifier serial number.

See drawing no. 33691 for electrical parts list.

RECOMMENDED SPARE PARTS

a.	Silicon diode type 41 HAR 40	code 88111022
b.	RA Ignition relay	code 78800400
c.	6.3 x 32 fuse	code 88526011
d.	C7 output filter capacitor	code 88322060

A. Operating the "ON" push button (2), the rectifier is not powered:

1) check the connection;
2) check that the powering voltage is the proper one and that no phase is lacking;
3) check the efficiency of "B" main switch; if damaged, replace it.

B. Operating the "ON" push button, the line protections blow:

1) check that there is no short circuit on the rectifier and, in particular, on the diodes "D1....D6", on the protection capacitors "C1....C6" of the rectifying heatsink and on "C7" capacitor .
   If one diode is shorted, replace it and lock the new one by a dynamometric wrench;
   - for rectifiers N3X-50 through N3X-95/150: wrench set at 0.3kgm;
   - for rectifiers N3X-180 and N3X-10K: wrench set at 1.8kgm.

C. The lamp does not ignite:

1) the lamp is damaged, replace it;
2) there is no high voltage discharge into the lamp: check the proper operation of the igniter and verify that there is no discharge towards earth inside the lamphouse.
3) if igniter and lamp are not damaged, check the efficiency of the rectifier: the no-load voltage must be 78 Volt approx.
   If the no-load voltage is low:
   - check that the powering voltage is the proper one and that no phase is lacking;
   - check the efficiency of the diodes; if some of them are damaged, replace them following the instructions as per point no. B1.

D. The output current has too a high ripple:

1) check that no phase is lacking;
2) check the efficiency of the diodes: should they be damaged, replace them following the instructions as per point no. B1;
3) check the efficiency of "C7" capacitor: if damaged, replace it;
4) check the efficiency of "RA" relay : if damaged, replace it.

E. When powering the lamp, the rectifier makes noise:

This inconvenience may due to electrical malfunction (lack of phase, interrupted or shorted diodes) or to mechanical cause. In this case, please refer to next page.

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In the N3 series rectifiers, the current regulation is made by the mobile magnetic shunt system. This system involves magnetic leaks due to the transformer and strong stresses on the magnetic shunt; this stress causes vibrations and consequent noise if locking of the various parts is not perfect.

Even if it is not possible to obtain, by this system, a perfectly quiet operation, the manufacturing of the unit keeps the unavoidable hum at a low level in order not to disturb.

It may happen, however, that some rectifier hums due to shoves suffered during transport or bedding of materials, and so it may cause disturb.

In this case, after checking that the disturb is not originated by some slackened screws of the cabinet, or by the fact that the unit is not well leant on the floor, it is necessary to adjust the magnetic shunt screws .

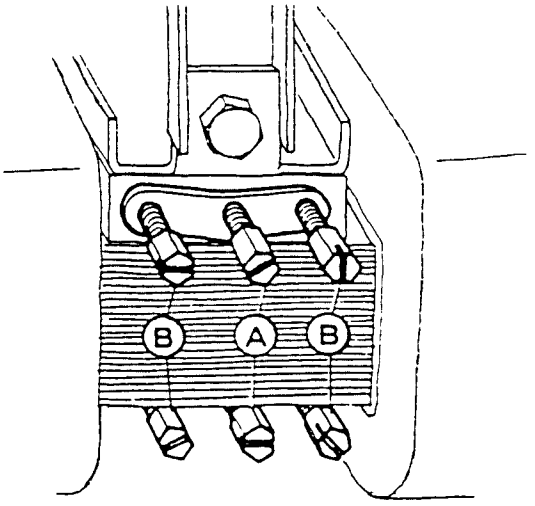
For this adjustment, it is necessary to proceed as follows:

1) Turn on the rectifier and bring it to the nominal current;
2) Remove the rectifier front panel (blue);
3) Loose all the central screws Ⓐ , whose function is to lock the adjustment screws Ⓑ ;
4) Starting from the low part of the unit, slightly turn clockwise or counter-clockwise the adjustment screws Ⓑ (a rotation of few degrees should be enough) till when the unit reaches the point of lowest humming. Check that the rotation of the regulation hand-wheel is not hardened;
5) After making the adjustment, tighten the central screws Ⓐ .

It is advisable to install the rectifier on rubber or felt stripes in order to insulate the unit from the floor.

Ⓐ clamping screws

Ⓑ adjustment screws



DATE 22-06-90 REF. RC/sb	N3 RECTIFIERS MOBILE MAGNETIC SHUNT ADJUSTMENT
P37161	

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POWER SUPPLY Model	DC OUTPUT Volt	DC OUTPUT Amp	INPUT VOLTAGE 3~	AC INPUT CURRENT No P.F. correction Amp	AC INPUT CURRENT P.F. correct. to ~ 0.9 Amp	CAPACITORS capacity µF	CAPACITORS power KVAR	Po (DC) W	Pi (AC) W	Pl (WAC)	η %
N3-X50DM	28	50	208-230/220	7.2	4.6	3 x 40	1.8	1400	1750	350	80
			240	6.6	4.0	3 x 35	1.9				
			380	4.2	2.6	3 x 15	2 ~				
			415	3.8	2.4	3 x 13	2.1				
			433-440	3.6	2.2	3 x 10	1.8				
N3-X75DM	32	75	208-230/220	10.2	7.4	3 x 60	2.6	2400	2800	400	85
			240	9.4	6.7	3 x 50	2.8				
			380	5.8	4.6	3 x 20	2.7				
			415	5.3	3.9	3 x 18	2.9				
			433-440	5.0	3.8	3 x 15	2.7				
N3-X75/95DM	37	95	208-230/220	16.0	11.0	3 x 90	4.1	3500	4150	650	84
			240	14.2	10.0	3 x 80	4.3				
			380	9.2	6.3	3 x 30	4.0				
			415	8.0	5.8	3 x 25	4.0				
			433-440	7.7	5.7	3 x 20	3.6				
N3-X95/150DM	40	150	208-230/220	28.0	18.5	3 x 150	6.8	5600	6525	925	86
			240	25.0	16.6	3 x 140	7.5				
			380	16.2	10.7	3 x 50	6.8				
			415	15.0	9.7	3 x 45	7.3				
			433-440	13.9	9.2	3 x 40	7.2				
N3-X180DM	47	180	208-230/220	33.0	21.5	3 x 180	8.2	7200	8200	1000	88
			240	30.0	19.0	3 x 160	8.6				
			380	19.0	12.5	3 x 70	9.5				
			415	17.5	11.5	3 x 60	9.7				
			433-440	16.5	11.0	3 x 50	9.1				
N3-X10KDM	59 ~	160	220/50Hz	45	31	3 x 180	8.2	9440	10540 - - 10440	1100 - - 1000	0.895 - - 0.905
			380	26	17.8	3 x 60	8.2				
			415	24	16.3	3 x 50	8.2				
			208-230/60Hz	45	30.5	3 x 150	8.2				

REMARKS:

Po : DC maximum output power

Pi : AC maximum input power

Pl : Power losses

µF : Capacitors are delta connected. They must be rated for the nominal voltage of rectifier plus 10% at least.

$Pl = Pi - Po$

$\eta\% = \frac{Po}{Pi} \cdot 100$ efficiency

DATE 20-09-90
REF. EC/vm

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N3 RECTIFIERS
POWER FACTOR CORRECTION