



# 技术规格/Technical Data Sheet

E-40 HF DF-151SB-T L

## MONOBLOCK E-40 HF DF-151SB-T L

编码 / CODE: **30.34.002.007**

S/N: **HF**

IEC601-1: **Class I Type B**

**TOSHIBA DF-151SBR X-RAY TUBE**

编码 / CODE: **61.18.013.005**

S/N:

小焦点 / SMALL FILAMENT: **0.5 mm**

大焦点 / LARGE FILAMENT: **1.5 mm**

灯丝电源 / FILAMENT POWER SUPPLY: **400 Hz**



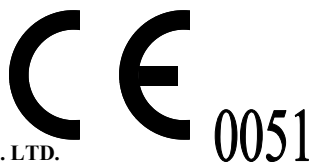
## 注意/ CAUTION

如果3个月未使用时, 请按照如下条件进行老练:

- 1- 从40 kV到110kV (每挡10kV) , 1 mA, 5 秒透视, 5 秒停止; 完成后休息1分钟
- 2- 90 kV, 5 mA, 15秒透视 + 5分钟休息; 110 kV, 5 mA, 15秒透视 + 5分钟休息  
如出现不稳定, 停止操作, 休息5分钟, 然后从第一步开始重新进行。

WHEN NOT USED, AFTER 3 MONTH PERIOD, PROCEED TO INSERT RESTORATION FOLLOWING THIS CHART:

- 1- FLUORO: FROM 40 kV to 110kV(step 10kV), 1 mA, 5 SEC ON + 5 SEC OFF; PAUSE 5 MIN
- 2- 90 kV, 5 mA, 15 sec. ON + 5 min. OFF; 110 kV, 5 mA, 15 SEC ON + 5 min OFF  
IF INSTABILITIES OCCUR, PLEASE STOP THE PROCESS, WAIT 5 MINUTES AND RESUME THE PROCEDURE FROM THE BEGINNING.



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# Technical Data Sheet/技术规格



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## X射线管组件 / X-Ray Tube Assembly

### IMD MONOBLOCK MOD. E-40 HF DF-151SB-T L

高压纹波频率最高为200kHz（依赖使用的逆变器的型号）  
HIGH VOLTAGE RIPPLE UP TO 200 KHz (DEPENDING ON INVERTER TYPE)

压铸铝外壳 / ALUMINIUM CASTING HOUSING

最大功率 / MAXIMUM POWER (100 kV - 32 mA)	3.2 kW
最高管电压 / MAXIMUM VOLTAGE TO X-RAY TUBE	110 kV
阴极对地 / CATHODE TO GROUND	55 kV
阳极对地 / ANODE TO GROUND	55 kV
最大管电流 / MAXIMUM CURRENT TO X-RAY TUBE	60 mA
最大功率时纹波 / RIPPLE AT MAXIMUM POWER	< 1 %
最大功率时kV上升时间/ RISE TIME TO MAXIMUM POWER	< 1 ms

### X射线管组件性能 / PERFORMANCE OF MONOBLOCK

请参照所使用的X射线管的功率曲线/IN ACCORDANCE WITH X-RAY TUBE RATING CHARTS.

### 管组件特性 / FEATURES OF THE SHEATH

80 kV下的最小固有滤过 <sup>(1)</sup> INHERENT FILTRATION MINIMUM <sup>(1)</sup> @ 80 kV	2.0 mm Al
外形尺寸(参见附图) / DIMENSIONS (CF. FIGURE)	
重量/ WEIGHT	15.1 kg

### 热性能参数 / THERMAL CHARACTERISTICS

热容量 / THERMAL CAPACITY	820 kJ
热保护 / THERMAL SAFETY	60 °C ± 3 °C
热保护开关 (常闭) / THERMAL SWITCH (NORMALLY CLOSED)	
膨胀鼓 / RUBBER LUNG	0.45 dm <sup>3</sup>
连续散热功率 CONTINUOUS THERMAL DISSIPATION	75 W
组件表面最高温度（无附加外壳情况下） / MAXIMUM SHEATH TEMPERATURE (WITHOUT COVERS)	48°C
组件表面最高温度（有附加外壳情况下） / MAXIMUM SHEATH TEMPERATURE (WITH COVERS)	60°C

### 灯丝电源 / FILAMENT POWER SUPPLY

IMD 400 Hz灯丝板 / IMD 400 Hz CARD OR EQUIVALENT	
灯丝板最大输出电流（有效值） / MAX. OUTPUT CURRENT(RMS)	900 mA



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## 高压变压器电源 / H.V. TRANSFORMER POWER SUPPLY

IMD逆变器E-9040-5 HF 或 E-9040-5HF-V/ IMD INVERTER E-9040-5 HF OR E-9040-5 HF-V

	E-9040-5 HF	E-9040-5 HF-V
工作频率 / OPERATING FREQUENCY	20KHZ	MAX. 100 KHZ
最高峰值输入电压 (X和Y之间) MAXIMUM INPUT PEAK VOLTAGE (X AND Y CONNECTIONS)	MAX. 350 VAC	
最大峰值输入电流 (约为) MAXIMUM INPUT PEAK CURRENT (APPROX.)	MAX. 130 A	

## 输出信号 / OUTPUT SIGNALS

<b>kV+</b> (模拟信号 / ANALOG SIGNAL)	0 ÷ 5,5 V
<b>kV-</b> (模拟信号 / ANALOG SIGNAL)	0 ÷ 5,5 V
<b>mA+</b> AND <b>mA-</b> (模拟信号 / ANALOG SIGNAL)	0 ÷ 60 mA
热保护 - 常闭 - (逻辑信号) / THERMAL SECURITY - NORMALLY CLOSED - (LOGICAL SIGNAL)	

(1) 符合USA N.C.P.R. - PART 33的要求 / IN ACCORDANCE WITH : USA N.C.P.R. - PART 33

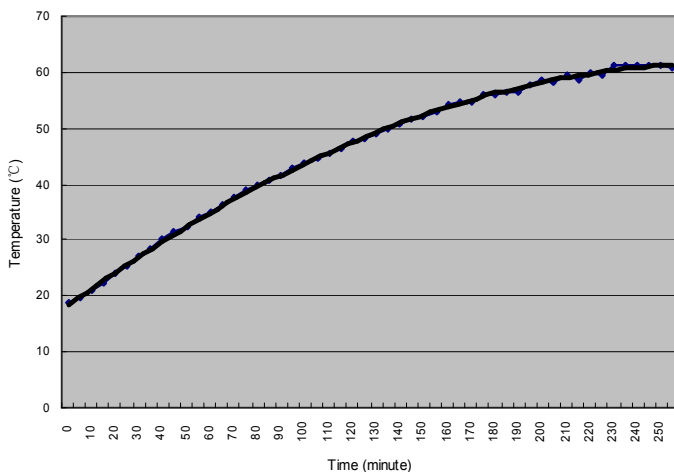
## 泄漏辐射 / LEAKAGE RADIATION

在透视模式下 (110kV,3mA), 泄漏辐射小于0.3mGy/小时, 符合 IEC 601-1-3 (PAR. 12.4)

LESS THAN 0.3mGy IN ONE HOUR (110 kV, 3mA) IN FLUOROSCOPY MODE  
ACCORDING TO IEC 601-1-3 APPLICABLE STANDARD (PAR. 12.4)

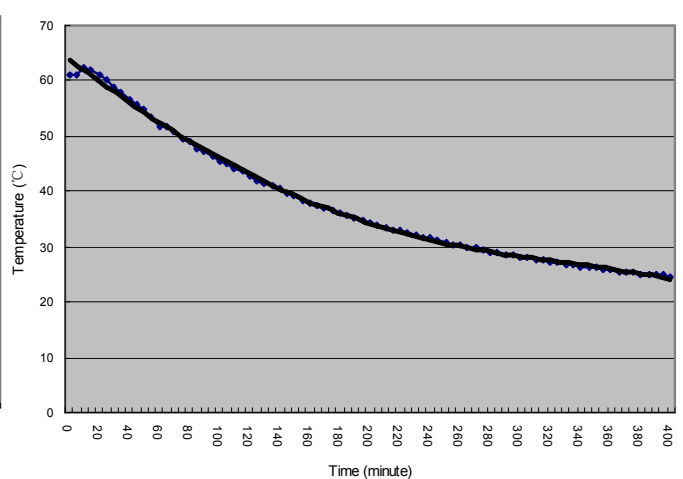
### 升温曲线

#### HEATING CURVE (75 kV, 1mA)



### 冷却曲线

#### COOLING CURVE



## X射线管参数 / Insert Data

### TOSHIBA X-RAY TUBE MOD. DF-151SBR

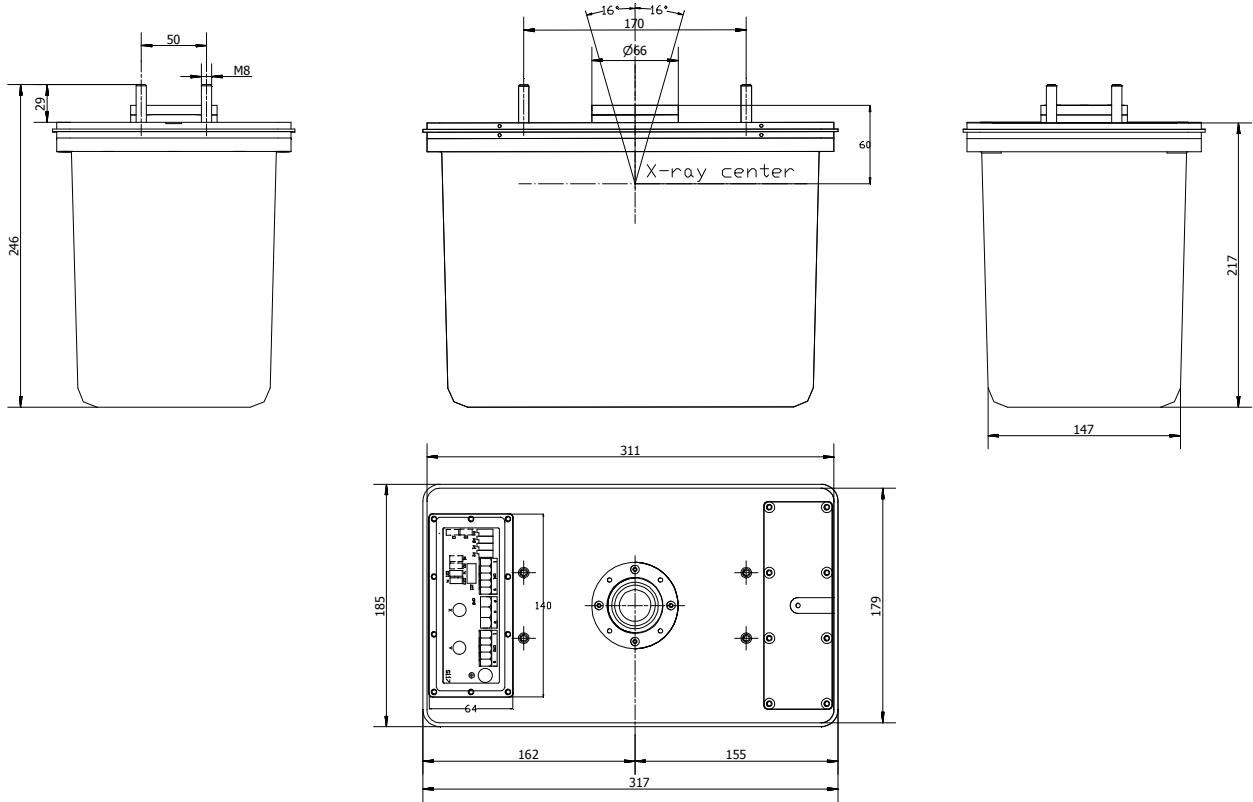
详细信息请参见X射线管技术资料  
FOR INFORMATION CF. TUBE TECHNICAL DATA SHEET

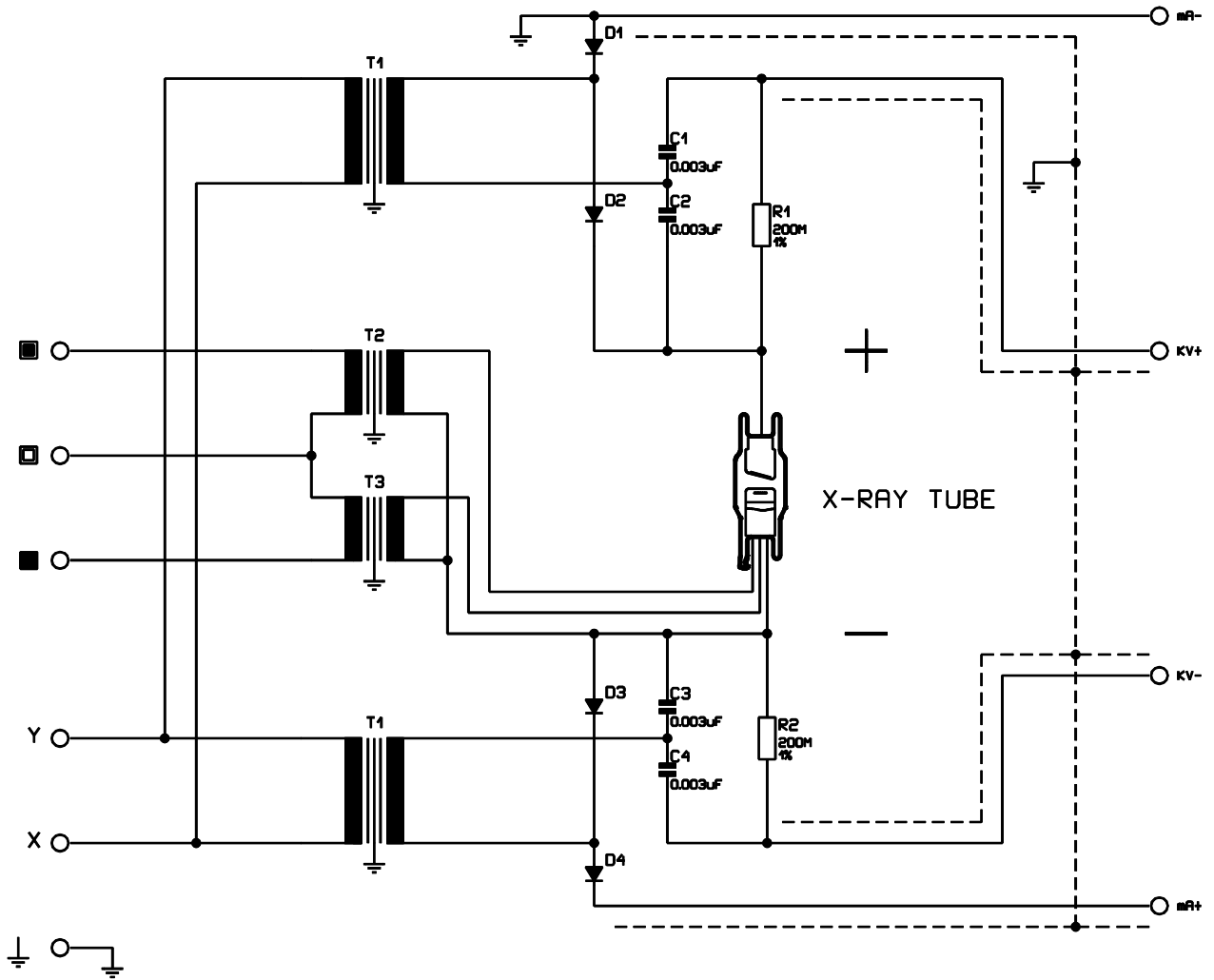
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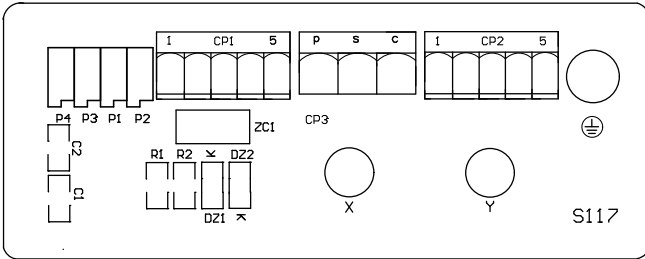


组合机头原理图 / MONOBLOCK ELECTRIC DIAGRAM

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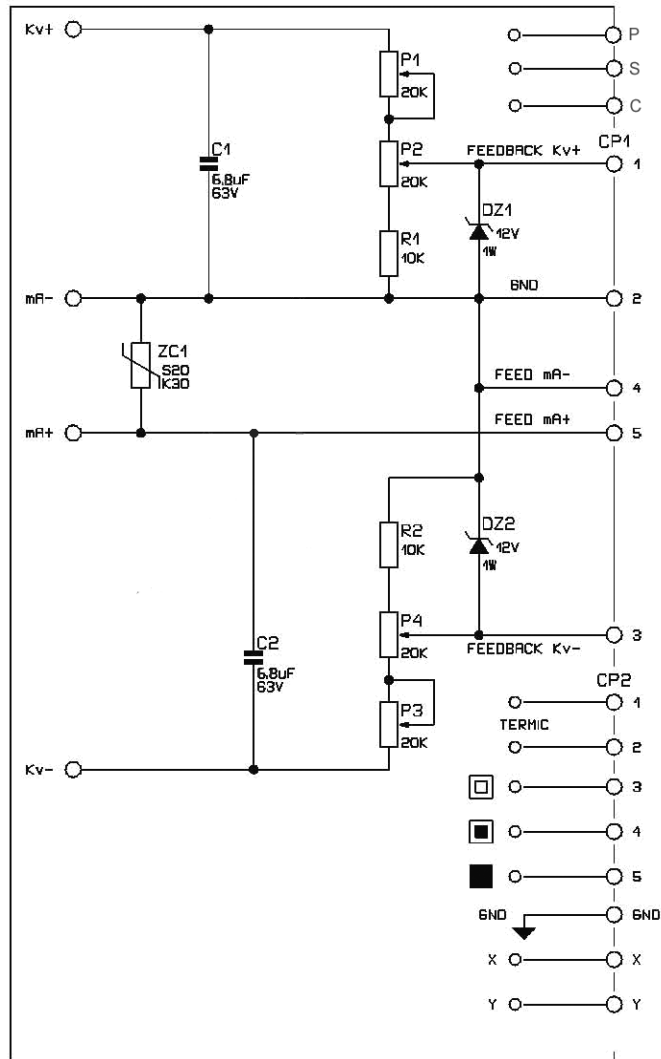


选项: 2片铝片(厚度为1mm), 铅圈(厚度为2 mm) 41/20及卡圈

Optionals: 2 disks of aluminium (thickness 1mm), 41/20 o 41/25 lead washer (thickness 2 mm) and seeger.

*S117Card  
Wiring Harness*

*S117板接线图*





# 危险因素

恰当的使用X射线组合机头和遵守安全操作规程是制造商和使用者的责任。制造商提供有关产品的资料及其可能存在的风险，但是它对销售之后用户操作及使用的安全程序不承担任何责任。X射线组合机头寿命是有限的，并且会出现偶发的故障和性能下降。请遵守使用说明正确使用组合机头。

**任何使用组合机头或者装有组合机头装置的人员，应该注意保护自己不受射线侵害。**

**不要在不满足本资料提供的技术参数环境中或不满足制造商说明的条件下使用组合机头。**

### 组合机头使用的危险

#### 高压

所有组合机头都在高压条件下工作，该电压足以使人受到电击致死。设备在设计时应考虑到将操作者有效保护起来，避免与设备的直接接触。如需直接接触，应切断所有电源并将电容的电放掉。

#### 管球的爆裂

所有管球的内部均为真空。玻璃外壳有可能意外破裂造成管球的爆裂，使玻璃碎片飞出。处理时带安全眼镜（或面罩）、穿厚衣服并戴手套以保护自己。

#### X射线辐射

组合机头会根据加载量不同而产生不同剂量的X射线（参见产品使用说明书）。使用者应采用适当措施屏蔽。警告标识“射线 危害”不应被拿掉直至操作人员采取屏蔽措施保护自己。屏蔽措施应符合相关标准要求，一旦对此产生疑问，应立刻咨询该领域专业人士。

#### 热油

组合机头使用时，X射线管球阳极端会聚集大量热能，热量传递到组合机头内部的油里，然后会散到组合机头外壳周围。不正确地使用组合机头可能会在高温时导致组合机头外壳破损、漏油，导致烫伤。要注意避开。

#### 贮存和保管

为了保证产品的正常使用，建议贮存和使用本产品时满足如下环境要求：

湿度				温度				气压			
使用		贮存		使用		贮存		使用		贮存	
min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
30%	75%	10%	90%	10 °C	40 °C	-20 °C	70 °C	500hPa	1600hPa	500hPa	1600hPa



在抛弃含有绝缘油和/或铅的组合机头时应采取适当处理以符合所有适用的欧盟法规以及当地的法规要求。

建议将失效的产品返回原生产厂或者交给当地恰当的机构以保证正确的处理。



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# Hazards

PROPER USE AND SAFE OPERATING PRACTICES WITH RESPECT TO X-RAY MONOBLOCK GENERATORS ARE RESPONSIBILITY OF EQUIPMENT MANUFACTURERS AND USERS OF SUCH DEVICES. THE MANUFACTURER PROVIDES INFORMATION ON ITS PRODUCTS AND ASSOCIATED HAZARDS, BUT IT ASSUMES NO RESPONSIBILITY FOR AFTER-SALE OPERATING AND SAFETY PRACTICES. LIMITED LIFE, RANDOM FAILURE AND PERFORMANCE REDUCTION ARE INHERENT CHARACTERISTICS OF X-RAY MONOBLOCK GENERATORS. APPROPRIATE SAFE OPERATING PRACTICES SHOULD BE EMPLOYED.

**ALL PERSON WHO WORK WITH MONOBLOCK OR EQUIPMENT WHICH UTILIZES SUCH DEVICES MUST TAKE PRECAUTIONS TO PROTECT THEMSELVES AGAINST RADIATION EXPOSURE AND POSSIBLE SERIOUS BODILY INJURY.**

**DO NOT OPERATE THIS MONOBLOCK EXCEPT IN ACCORDANCE WITH INFORMATION INCLUDED IN THIS TECHNICAL DATA SHEET, THESE PRECAUTIONS, AND ANY ADDITIONAL INFORMATION PROVIDED BY THE MONOBLOCK MANUFACTURER AND/OR COMPETENT SAFETY AUTHORITIES.**

## X-RAY MONOBLOCK GENERATOR HAZARDS

### HIGH VOLTAGE

All X-Ray Monoblock Generators operate at voltages high enough to kill through electrical shock. Equipment designed should prevent personnel contact with high voltages. When direct access to the Monoblock is required, the primary circuits should be disabled and capacitors discharged.

### X-RAY RADIATION

This Device produces X-Ray radiation that varies in quantity and energy level, depending upon the voltage and current used when energizing it. Refer to the operating instructions for the equipment. Operating personnel must be protected by appropriate shielding. X-Ray Caution signs or labels must be permanently attached to equipment directing operating personnel never to operate this device without X-Ray shielding. Shielding should be in accordance with applicable Norms. If there is any doubt as to the adequacy of shielding, an expert in this field should be contacted to perform an X-Ray survey.

### Storage and conservation

To guarantee the maintenance of integrity of the product is advised to use or to conserve the system in environments that respect the following climatic factors us.

Humidity				Temperature				Atmospheric pressure			
Use		Storage		Use		Storage		Use		Storage	
min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
30%	75%	10%	90%	10 °C	40 °C	-20 °C	70 °C	500hPa	1600hPa	500hPa	1600hPa



**PRECAUTION SHOULD BE TAKEN IN THE DISPOSAL OF X-RAY MONOBLOCK GENERATORS CONTAINING DIELECTRICAL OIL AND/OR LEAD IN ORDER TO COMPLY WITH ALL APPLICABLE EUROPEAN LAWS AND REGULATIONS. IT IS RECOMMENDED THAT FAILED DEVICES BE RETURNED TO THE MANUFACTURER OR AN APPROPRIATE FACILITY TO ENSURE PROPER HANDLING.**



## 组合机头上使用的符号 / SYMBOLISM UPON MONOBLOCK

	<p>固有滤过 <i>Inherent filtration</i></p>
	<p>请查看技术文件 <i>Consult The Technical Documentation</i></p>
	<p>电子及电气设备废弃物 WEEE Waste Electrical and Electronic Equipments</p>
	<p>电离辐射 <i>X Ray emission</i></p>
	<p>大焦点 <i>Large focus</i></p>
	<p>小焦点 <i>Small focus</i></p>
	<p>保护接地 <i>Protective earth (Ground)</i></p>
	<p>制造商 <i>Manufacturer</i></p>



## EU DECLARATION OF CONFORMITY (2011/65/EU)

According to Directive 2011/65/EU (RoHS-2), on restriction of the use of certain hazardous substances, the substances listed in Annex II., and the maximum concentration values tolerated by weight in homogeneous materials that are limited as follow:

Lead (0,1 %)

Mercury (0,1 %)

Cadmium (0,01 %)

Hexavalent chromium (0,1 %)

Polybrominated biphenyls (PBB) (0,1 %)

Polybrominated diphenyl ethers (PBDE) (0,1 %).

**The company**

**IMD CHINA Co., Ltd.**

**DECLARE**

under its sole responsibility that the supplied products are in compliance with the European Directive 2011/65/EU (RoHS-2) on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

This statement is based on the control of the internal processes and the evaluation of the reliability of suppliers and materials used for the construction, following the guidelines of the harmonized standard:

EN50581:2012 “Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances”.

For the realization of the product were applied the following exemptions:

Annex III “Applications exempted from the restriction in Article 4 (1)”

Exemption n° 6a: “Lead as an alloying element in steel for machining purposes and in galvanised steel containing up to 0,35 % lead by weight”

n° 6b: ” Lead as an alloying element in aluminium containing up to 0,4 % lead by weight”

n° 6c: “Copper alloy containing up to 4 % lead by weight

Annex IV “Applications exempted from the restriction in Article 4 (1) specific to medical devices and monitoring and control instruments”

Exemption n° 5: “Lead in shielding for ionizing radiation”

n° 13: “Lead in counterweights”

**General Manager**