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Email : balteau@balteau-ndt.com

Quality system according to ISO 9001

BALTOSPOT WITH CF2000 CONTROL UNIT

OPERATING AND MAINTENANCE MANUAL

Balteau NDT
X Ray Solutions
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BALTEAU NDT ACTIVITIES

65 years serving the X-Ray users :

Located in Belgium, close to the German and the Dutch border, BALTEAU NDT SA is specialized in the manufacture of X-Ray generators designed for the quality control of industrial products. More than 12.500 X-Ray generators are in use or have been used worldwide. This figure makes BALTEAU NDT SA a leader in the field of NDT. With its range of high power or light weight constant potential X-Ray generators, gas insulated, BALTEAU NDT SA became a specialist in manual and automatic systems for radiography and radioscopy (RTR). Many different industrial inspection systems have been installed and are now used in a variety of fields : automobile, aeronautic, oil industry, casting work, gas bottles manufacturer, pipes manufacturer, shell dismantling ...

BALTEAU NDT Product range is :

BALTEAU NDT SA is a leader in the NDT field thanks to its large range of X-Ray generators and custom designed quality control equipment consisting of :

The BALTOSPOT portable range : the light portable X-Ray generators, gas insulated 160, 200, 235, 250, 300 kV, directional or panoramic.

The BALTOSPOT for crawlers range : extremely small X-Ray generators, gas insulated, for the inspection pipes down to 6 inches diameter up to large pipe diameter needing 300 kV generators.

The BALTOGRAPH constant potential range : X-Ray generators, gas insulated, high frequency, 100, 160, 225, 320, 420 and 450 kV.

The BALTOMATIC custom made real time radiography (RTR) systems : designed to meet the customer's specific requirements, even on production lines.

BALTEAU NDT History :

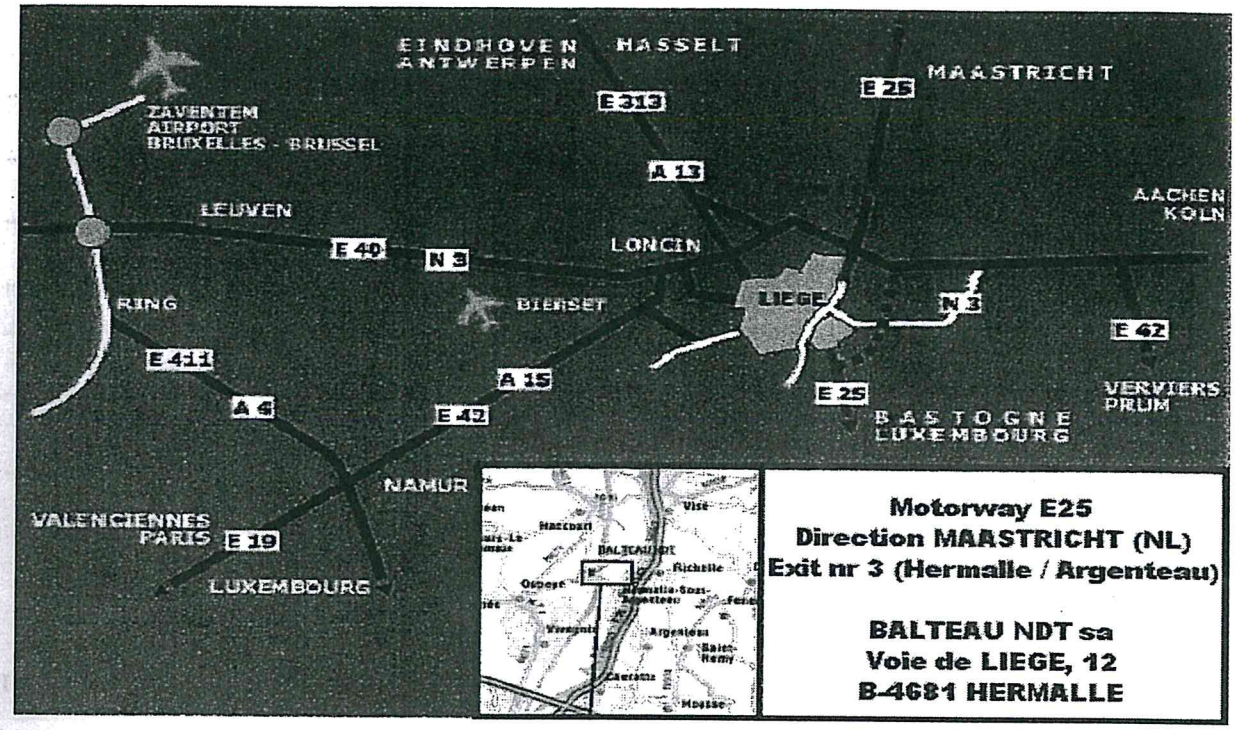
1919	►	Creation of BALTEAU S.A.
1936	►	Creation of non destructive testing (NDT) department.
1958	►	First portable gas insulated 300 kV generator.
1981	►	First light weight portable generators type **BALTOSPOT** GF.
1995	►	Light weight constant potential generator type **BALTOGRAPH** CLD160.
1996	►	Introduction of the constant potential X-Ray generator **CSD225** and **CSD450** series.
1997	►	**BALTOSPOT CERAM35**, ceramic technology on portable generator.
1999	►	Hand-X power control desk with the revolutionary patented wireless remote control **Hand-X**.
2000	►	BALTEAU NDT becomes a member of the **SONATEST-PLC** Group.
2001	►	New **CF2000** control panel.

...

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LOCATION MAP



De l'aéroport Bruxelles National (Zaventem)

Voiture :
Emprunter l'autoroute E40 en suivant les indications Liège (Luik). A l'échangeur de Cheratte prendre la E25, direction Maastricht jusqu'à la sortie n°3 (Hermalle). – Tourner à gauche – Passer la rivière Meuse puis le Canal Albert – Au rond point prendre la première à droite puis la 1ère à droite

Autobus et chemin de fer :
Des bus et des trains font la liaison Aéroport vers Liège gare Guillemins, prendre ensuite le Bus ou le train en direction de Visé

De l'aéroport de Liège (Bierset)

Emprunter l'autoroute E42 en suivant les indications Aachen/Liège. A l'échangeur de Cheratte prendre la E25, direction Maastricht jusqu'à la sortie n°3 (Hermalle). – Tourner à gauche – Passer la rivière Meuse puis le Canal Albert – Au rond point prendre la première à droite puis la 1ère à droite.

Si vous voyagez en voiture

En provenance de l'Allemagne via Aachen :
Emprunter l'autoroute E40 jusqu'à l'échangeur de Cheratte – Prendre la direction E25 Maastricht jusqu'à la sortie n°3 (Hermalle). – Tourner à gauche – Passer la rivière Meuse puis le Canal Albert – Au rond point prendre la première à droite puis la 1ère à droite.

En provenance de la Hollande:
Emprunter l'autoroute E25 dans la direction de Liège sortir à la sortie 3 (Hermalle). Tourner à droite, passer la Meuse puis le Canal Albert – Au rond point prendre la 1ère à droite puis la 1ère à doite.

En provenance de la France via Valenciennes :
Emprunter l'autoroute E19 E42 dans la direction Namur-Liège. Contourner la ville de Liège et suivre la direction Aachen sur l'E40. A l'écahngeur de Cheratte, prendre la E25 en direction de Maastricht, prendre la sortie 3 (Hermalle), tourner à gauche, passer la Meuse puis le Canal Albert, au rond point prendre la 1ère à droite puis la 1ère à droite.

From BRUSSELS National airport (Zaventem)

By car :
Take the motorway E40 following the signs for Liège/Aachen. At Junction Cheratte, take Motorway E25, take exit 3 (Hermalle), take left, cross the River MEUSE then Canal Albert, at the roundabout take 1st right then again 1st right.

By bus and rail :
Buses and trains connect between the airport and Vise railway station.

From Liège airport (Bierset)

Take the E42 motorway following the signs "Aachen". At Junction Cheratte, take Motorway E25, take exit 3 (Hermalle), take left, cross the River MEUSE then Canal Albert, at the roundabout take 1st right then again 1st right.

If you are travelling by car

From Germany via Aachen :
Take the E40 motorway as far as the Cheratte Junction. Take E25 Mortorway (E25) direction Maastricht

From Holland :
Take the E313 or E25 motorway towards Liège , take Exit 3 (Hermalle) – Turn right, cross the river MEUSE, cross Albert Canal – At the roundabout, take 1st right then 1st right again.

From France via Valenciennes :
Take the E19 E42 motorway in the direction of Namur-Liège. Bypass the city of Liège by following the signs Aachen on the E40. Take ***Motorway*** E25 at Junction Cheratte, direction MAASTRICHT, take Exit nr 3 - take left, cross the River MEUSE then Canal Albert, at the roundabout take 1st right then again 1st right.

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USER'S GUIDE ISSUES :

Reference 06301860 – Basic French version.
Reference 06301850 – Basic English version.
Reference 06302030 – Version II English.

MODIFICATION NOTES			
ISSUE	**REFERENCE**	**DATE**	**COMMENTS**
0	06301850	October 1997	Preliminary version
1		December 1997	Revision
2		April 1998	Revision 3-26-27
3		September 2000	File format changes
4	06302030	June 2002	GFD 165-2 and GFC305-2 added
5		May 2004	General revision
6	06302030	April 2004	Technical revision

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INTRODUCTION

We thank you for entrusting us with this order to which we have devoted our greatest care.
We know this equipment will give you full satisfaction during its service which will certainly last very long.
We hope your new equipment has reached you safely. If it is not the case please refer to § "damage".
This manual will greatly help you to make the most of vast capabilities of this equipment and operate it safely.

TECHNICAL ASSISTANCE

This equipment is the product of BALTEAU NDT S.A., having many years of experience in the manufacture of advanced X-ray equipment. Should you wish to have further information or technical data concerning BALTEAU NDT equipments, please do not hesitate to contact us.

DAMAGE DURING TRANSIT

Equipment may have been damaged during transport, in spite of all packaging and transport precautions. On receipt of your new BALTEAU NDT generator please unpack and examine it carefully to ensure it is complete and has not been damaged in transit to you. In the unlikely event of there being damaged or a shortage please notify the carrier and equipment supplier within 3 days of receipt giving full details in writing.

When writing or faxing to us about this equipment, please quote the following references, so that we may reply promptly and efficiently.

- Type and generator serial number :
- Type and control serial number :
- BALTEAU NDT contract number :
- Year of construction :

If the fault has been identified, a simple description of the symptoms and circumstances when this appeared.

IN CASE OF RETURNING THE EQUIPMENT

In order to return your equipment to Balteau NDT S.A. in the fastest and cheapest way, please contact our shipping department which will provide you with the complete "**shipping air procedure**".

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CALIBRATION

Your BALTOSPOT has been calibrated in the factory. Such equipment used for quality inspection can be considered as a measurement tool and therefore request regular inspection and calibration as stated by your quality procedures and your customer requirements. BALTEAU NDT is at your disposal for any kind of recalibration.

BALTEAU NDT is therefore recommending at least a calibration after each operation of servicing at BALTEAU NDT if any or every two years as a minimum.

This help us to answer your enquiry with the minimum of delay.

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This unit has been developed in order to meet your requirements. Nevertheless we ask you to read this manual in order to be able to benefit from all the advantages offered by this unit.

MANUFACTURING PROGRAM

INDUSTRIAL RADIOLOGY

→ The BALTOSPOT portable range :
the light portable X-Ray generators, gas insulated 160, 200, 235, 250 and 300 kV.

→ The BALTOSPOT for crawlers range :
extremely small X-Ray generators, gas insulated 140, 160, 200 and 300 kV for crawlers (mobile units used for the detection of cracks in pipe-line welds).

→ The BALTOGRAPH constant potential range :
X-Ray generators, gas insulated, high frequency 100, 160, 225, 320, 420 and 450 kV.

→ BALTOMATIC custom made real time radiography (RTR) systems :
designed to meet the customer's specific requirement (even on production lines).

→ High stability X-Ray generators :
for on line measurement of thickness as a replacement of ISOTOPES sources in same critical condition of environment.

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IMPORTANT WARNINGS

WARNING - IONISING RADIATIONS

When power is applied to this equipment, it generates ionizing radiations that can cause health damage.

Operators should therefore fully be acquainted with all operating conditions before switching on the equipment.

- *This equipment should be used only as specified in the operating manual.*
- *No person other than a suitably qualified competent operator should use this equipment.*
- *Persons using this equipment should be registered as "classified" under the "Ionizing Radiation's Regulations" and carry a personal radiation dosimeter at all times when using it.*
- *Leakage radiation of equipment should be measured at least once a year.*

WARNING - OPERATING CONDITIONS

- *This equipment should be used as specified in the operating manual.*
- *No person other than a suitably qualified competent operator should use this equipment.*
- *General maintenance instructions for the equipment are contained in* ***chapter XIII*** *of this manual.*
- *Before carrying out any maintenance to the generator and its control panel the power switches must be set to OFF (O) and the main supply isolated from the equipment.*
- *Suitably qualified technicians only should carry out maintenance on this equipment.*
- *All applicable safety requirements must be observed when working on this equipment.*
- *Failure to observe these conditions could result in harm to persons and damage to the equipment. The manufacturer or this agent cannot be responsible for accidents if this equipment is used in a manner that contravenes health and safety regulations.*

WARNING - BERYLLIUM WINDOW X-RAY TUBES (CERAM series)

- *The X-ray tube used in the CERAM range generator has a Beryllium output window. This is only accessible when the safety covers are removed.*
- *Beryllium is highly toxic and may cause serious health hazard if handled incorrectly.*
- *Disposal of a X-ray tube must comply with national and local authority instructions for toxic waste.*
- *INGESTION OF BERYLLIUM CAN BE FATAL. In the case of human skin contact with Beryllium the affected area must be thoroughly washed in running water and soap. SEEK MEDICAL ATTENTION IMMEDIATELY.*
- *In the case of Beryllium coming into contact with the eyes, wash them with sterile or clean running water and SEEK MEDICAL ATTENTION IMMEDIATELY.*

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DATA SHEETS

BALTOSPOT PORTABLE RANGE

Operator's are requesting

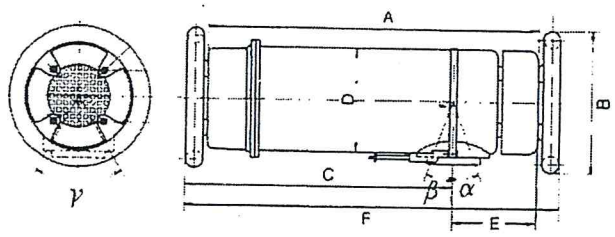
"...We want to use a Light, robust and reliable generator with a heavy duty cycle, designed for difficult on-site applications, preheating and dead times must be as short as possible, the Safety is also one major point as you can imagine....".

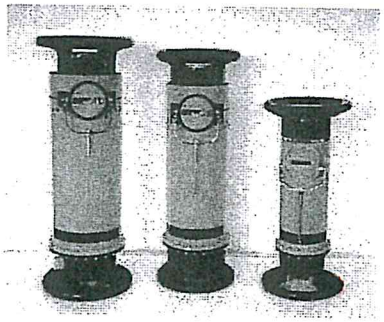
The BALTOSPOT range is answering all these expectations and more.

*The complete range can be driven either by the **Hand-x** remote control or by the **CF2000** control unit.(see specific documentation).*

MAIN SPECIFICATIONS

		A	B	C	D	E	F	α	β	γ
GFD165	mm	538	269	442	160	138	628	20°	27°30'	55°
GFC165	mm	538	269	442	160	138	628	20°	20°	360°
GFC205	mm	628	275	521	206	155	751	20°	25°	360°
CERAM 235	mm	712	275	594	205	134	780	20°	25°	50°
CERAM 35	mm	726	310	625	231	140	821	20°	20°	50°
GFC305	mm	729	310	598	231	193	839	20°	20°	360°





		GFL150	GFD165	GFC165	GFC205	CERAM 235	CERAM 35	GFC305
High voltage range	kV	50-150	50-160	50-160	70-200	70-235	100-300	140-300
Tube current range	mA	0,1-10	0,1-5	0,1-5	0,1-5	0,1-5	0,1-5	1-5
Beam angle	(°)	360 x 40	55	360 x 40	360 x 45	40	40	360 x 40
Focal spot size (IEC 336)	mm²	Ø 6	1,5 x 1,5	Ø 4 x 0,9	Ø 5 x 1,2	2 x 2	2.5 x 2.5	Ø 5 x 1,3
Inherent filtration (Al)	mm	Ni 0,3	6	7	9,1	1 Be	1 Be	6 + 1,2 Cu
Duty cycle *	%	100*	100*	100*	100*	100	100	100*
Maxim. operating temp	(C°)	70	70	70	70	70	70	70
Insulation	gas	SF6	SF6	SF6	SF6	SF6	SF6	SF6
Weight without rings	Kg	34	12	12,3	25,5	27	29	35
Anode cooling type		water	air	air	air	air	air	air

*** at a temperature of 86 °F (30 °C) reduced mA**

ACCESSORIES

- Lead obturator.
- Warning light.
- Warning light repeater.
- Bag for accessories.
- Transport case.
- Cradle.
- Support stand.
- Hydraulic stand
- 100-260V adapter

GENERATOR EQUIPMENT

- Internal pressure gauge
- Heavy duty lock type connector
- 20 m connecting cable
- Quick release SF6 valve
- Heavy duty rubber coated hand rings
- Holder for centring device filter and diaphragm

Conformity to French, German and European standards

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Balteau NDT
X Ray Solutions

Quality system according to ISO 9001

BALTOSPOT CF2000

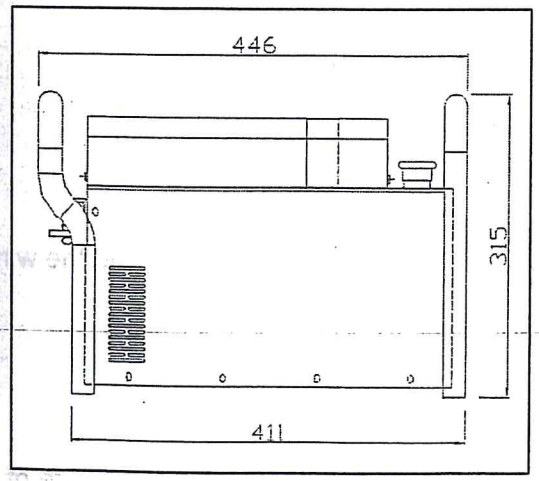
Compact Control Desk for BALTOSPOT portable unit

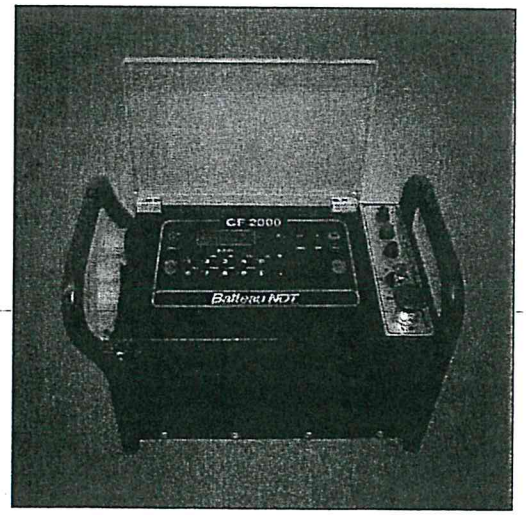
The CF2000 is designed to drive the BALTOSPOT GF and CERAM range, it provides flexibility and wide mains range.
Extended maintenance feature for fast tracking on field, military type connectors.
Ergonomic and safety design ready to comply with the most stringent rules
Clear and large display with backlight, waterproof and anti scratch keypad, cover for extra protection.
Specially designed to work on any power generator.

MAIN SPECIFICATIONS

Control Unit (CF2000) characteristics		
Mains supply	(v)AC	170 to 260 (100V to 260V option)
Frequency	Hz	45 to 100
Duty cycle		100 %
Operating temperature	°C	-10 to +50
Dimensions (L x l x h)	mm	446 x 243 x 315
Weight	kg	12
Connectors		CANON military type with additional earthing screw when required
Warning lights and safety device		Mains ON, X Ray ON, Failure EMERGENCY STOP switch (CE), 3 positions key switch BUZZER for audible warning
Casing		Aluminium, rough construction with protective handles and cover for control panel
Protection (water and dust)		IP 54

mA setting	mA	1 to 10 (depending on the tubehead)
KV selection		1 kV/step
Time		Step of 1 second, up to 90 min.
Intelligent preheating		YES (90 sec first day + 60 sec/each additional day
Automatic exposure calculation		YES (manual or automatic) (Option)
Keypad		24 keys with embossed touch, anti scratch, long life surface treatment
Display		4 lines, crystal clear, green back lighting, adjustable contrast
Warning display		Alphanumeric messages and DEL for major actions, Emergency stop design key
Interface		RS232 with maintenance and report capabilities (OPTION)





0303

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CHAPTER I : PRESENTATION

EQUIPMENT PRESENTATION

The complete BALTOSPOT X-ray set consists of:

- an X-Ray generator,
- a control panel,
- a cable from the generator to the control panel,
- a main power cable,

The control panel, CF2000 or HAND-X, uses a microprocessor to control the operating parameters of the equipment thus giving greater reliability of operation. The panel is designed for use with all BALTEAU NDT tubeheads of the series. No specific settings are necessary because the µ-processor is able to recognize the connected equipment when you initiate the system. Please note that no change of unit can be done without completely stopping the control panel to reset the original settings and because of safety issues.

EQUIPMENT IDENTIFICATION

All connected parts (except the cables) are identified by a silver metallic label which indicates at least:

- Manufacturer's name and phone number + Email
- Model and serial number of the part
- Manufacturing date

The control panel label is also indicating:

- Mains power and power consumption

The generator label is also indicating:

- Tube type
- Focal spot
- Max kV and mA

Plugs receptacle and connections are clearly identified regarding the function and the wiring diagram mentioned in the operating manual.

STAFF AND END USER QUALIFICATIONS

The use of an X-Ray generators should be entrusted to fully qualified staff only, aware of the Regulations regarding the safety procedure about radiation hazards.

BALTEAU NDT S.A. organizes scheduled training courses for X-Ray operators. Information regarding these training courses may be obtained from our Head Office in Belgium or from associated companies.

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CHAPTER II : GENERAL DESCRIPTION

BALTOSPOT CERAM235

Portable X-Ray generator : 235kV-5mA directional
27 kg - 100 % duty cycle
Metal-ceramic tubehead - Berylium window
Focal spot size : 2 x 2 mm
CF 2000 control unit

Standard unit comprising :

- **CERAM235 X-Ray generator with guard rings**
- Centring rod and diaphragm holder
- Diaphragm 10 x 48 mm
- Telescopic centring rod
- **CF2000 control unit**
- Mains cable (10 m)
- Warning flashing light with 20 m cable
- Connection cable (20m)
- Bag for cables and accessories
- Maintenance and user's guide
- Quality test report

Options :

Spare parts kit (fuses, bulbs, keys,...)
Kit warning light assembled on the generator
Protective cradle
Pair of trunnions
Support with wheels (protective cradle requested)
Transport case
Hydraulic stand with yoke and cradle
Warning flashing light repeater without cable
Lead obturator
Laser centring device
X-ray leakage certificate (Stückprüfung)
Focus size certificate
AQX07 - Calibration certificate (incl. focus size certificate)
BALTOGAGE II - All metals thickness gage
with 5 MHz tranducer and couplant
Inspection by third party

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BALTOSPOT CERAM35

Portable X-Ray generator : 300kV-5mA directional
29 kg - 100 % duty cycle
Metal-ceramic tubehead - Berylium window
Focal spot size : 2.5 x 2.5 mm
CF 2000 control unit

Standard unit comprising :

- **CERAM35 X-Ray generator with guard rings**
- Centring and diaphragm holder
- Diaphragm 10 x 48 mm
- Telescopic centring rod
- **CF2000 control unit**
- Mains cable (10 m)
- Warning flashing light with 20 m cable
- Connection cable (20m)
- Bag for cables and accessories
- Maintenance and user's guide
- Quality test report

Options :

Spare parts kit (fuses, bulbs, keys,...)
Kit warning light assembled on the generator
Protective cradle
Pair of trunnions
Support with wheels (protective cradle requested)
Transport case
Hydraulic stand with yoke and cradle
Warning flashing light repeater without cable
Lead obturator
Laser centring device
X-ray leakage certificate (Stückprüfung)
Focus size certificate
AQX07 - Calibration certificate (incl. focus size certificate)
BALTOGAGE II - All metals thickness gage
with 5 MHz tranducer and couplant
Inspection by third party

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BALTOSPOT GFD165

Portable X-Ray generator : 160kV-5mA directional.
CF 2000 control unit

Standard unit comprising:

- **GFD165X-Ray generator with guard rings**
- Centring rod and diaphragm holder
- Diaphragm 10 X 48 mm
- Telescopic centring rod
- **CF2000 control unit**
- Mains cable (10 m)
- Warning flashing light with 20m cable
- Connection cable (20m)
- Bag for cables and accessories
- Maintenance and user's guide
- Quality test report

Options:

Spare parts kit (fuses, bulbs, keys,...)
Kit warning light assembled on the generator
Protective cradle
Support with wheels (protective cradle requested)
Pair of trunnions to fix the support with weels
Transport case
Hydraulic stand with yoke and cradle
Warning flashing repeater without cable
Lead obturator
X-ray leakage certificate (Stückprüfung)
Focus size certificate
AQX07 - Calibration certificate (incl. focus size certificate)
BALTOGAGE II - All metals thickness gage
with 5 MHz tranducer and couplant
Inspection by third party

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BALTOSPOT GFC165

Portable X-Ray generator : 160kV-5mA panoramic true radial beam.
CF 2000 control unit

Standard unit comprising:

- **GFC165 X-Ray generator with guard rings**
- Ring lead screen allowing directional shot
- 4 telescopic centring rods
- **CF2000 control unit**
- Mains cable (10 m)
- warning flashing light with 20 m cable
- Connection cable (20m)
- Bag for cables and accessories
- Maintenance and user's guide
- quality test report

Options:

Spare parts kit (fuses, bulbs, keys,...)
Kit warning light assembled on the generator
Pairs of trunnions holder
Support with wheels (protective cradle requested)
Pair of trunnions to fix the support with weels
Transport case
Hydraulic stand with yoke and cradle
Warning flashing repeater without cable
X-ray leakage certificate (Stückprüfung)
Focus size certificate
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BALTOSPOT GFC205

Portable X-Ray generator : 200kV-5mA panoramic true radial beam.
CF 2000 control unit

Standard unit comprising

- **GFC205 X-Ray generator with guard rings**
- Ring lead screen allowing directional shot
- Set of centring rod holders
- Centring rod holder
- 4 telescopic centring rods
- **CF2000 control unit**
- Mains cable (10 m)
- Warning flashing light with 20m cable
- Connection cable (20m)
- Bag for cables and accessories
- Maintenance and user's guide
- Quality test report

Options :

Spare parts kit (fuses, bulbs, keys,...)
Kit warning light assembled on the generator
Pair of trunnions
Pair of trunnions holders
Support with wheels (trunnions holders requested)
Transport case
Hydraulic stand with yoke and cradle
Warning flashing light repeater without cable
X-ray leakage certificate (Stückprüfung)
Focus size certificate
AQX07 - Calibration certificate (incl. focus size certificate)
BALTOGAGE II - All metals thickness gage
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BALTOSPOT GFC255

Portable X-Ray generator : 250kV-5mA panoramic true radial beam.
CF 2000 control unit

Standard unit comprising

- **GFC255 X-Ray generator with guard rings**
- Ring lead screen allowing directional shot
- Set of centring rod holders
- 4 telescopic centring rods
- **CF2000 control unit**
- Mains cable (10 m)
- Warning flashing light with 20 m cable
- Connection cable (20m)
- Bag for cables and accessories
- Maintenance and user's guide
- Quality test report

Options :

Spare parts kit (fuses, bulbs, keys,...)
Kit warning light assembled on the generator
Pair of trunnions holders
Pair of trunions
Support with wheels
Transport case
Hydraulic stand with yoke and cradle
Warning flashing light repeater without cable
Laser centring device
X-ray leakage certificate (Stückprüfung)
AQX07 - Calibration certificate (incl. focus size certificate)
Focus size certificate
BALTOGAGE II - All metals thickness gage
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BALTOSPOT GFC305

Portable X-Ray generator : 300kV-5mA panoramic true radial beam.
CF 2000 control unit

Standard unit comprising

- **GFC305 X-Ray generator with guard rings**
- Ring lead screen allowing directional shot
- Set of centring rod holders
- 4 telescopic centring rods
- **CF2000 control unit**
- Mains cable (10 m)
- Warning flashing light with 20 m cable
- Connection cable (20m)
- Bag for cables and accessories
- Maintenance and user's guide
- Quality test report

Options :

Spare parts kit (fuses, bulbs, keys,...)
Kit warning light assembled on the generator
Pair of trunnions holders
Pair of trunions
Support with wheels
Transport case
Hydraulic stand with yoke and cradle
Warning flashing light repeater without cable
Laser centring device
X-ray leakage certificate (Stückprüfung)
AQX07 - Calibration certificate (incl. focus size certificate)
Focus size certificate
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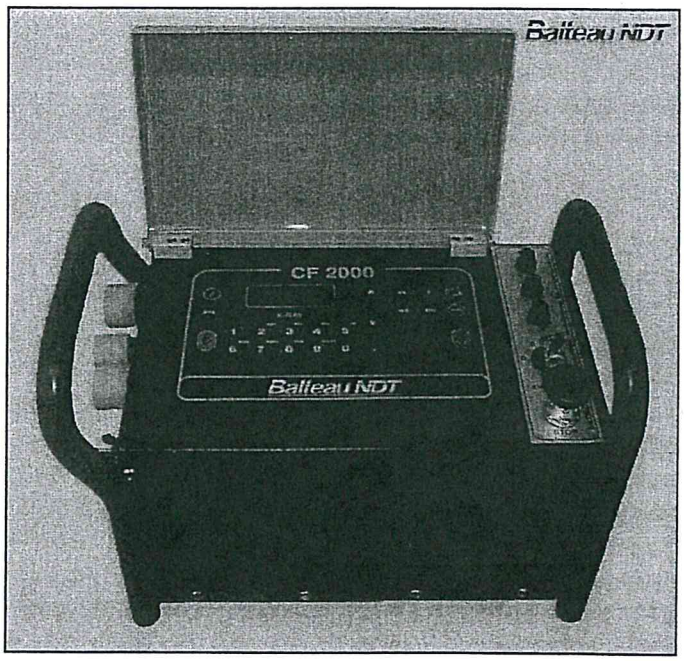
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SUB-UNIT IDENTIFICATION

- THE X-RAY GENERATOR

  On the top cover of the x-ray generator, near the interconnecting plug, you will find identification labels – those labels contain serial numbers and important specifications of the x-ray generator.

- THE CONTROL UNIT CF2000



The serial number and most important specifications are located on the side panel.

- INTERCONNECTING CABLE

  at least three cables :
  - power supply cable;
  - interconnecting cable;
  - warning light
  - optionally other cables can be joined

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CERAM RANGE

Beam

The CERAM generators have directional beam. The x-ray tube is made of metal ceramic with outside anode. The beam goes through a Beryllium window located in the centre of the centring accessories. One aluminium removable disk protects the Beryllium window. One lead stopper can be mounted into the window to stop x-ray emission during preheating. One collimator can be assembled into the window to collimate the output beam. The beam angle is 40°.

Focal spot

The focal spot is located in the centre of the Beryllium window and in the x-ray generator axis. A black line around the unit indicates the focal spot position.

GF RANGE

Beam

The GF series contain GFD165 directional beam
GFC165 panoramic beam
GFC205 panoramic beam
GFC255 panoramic beam
GFC305 panoramic beam

X-ray tubes are glass type with grounded anode for better heat exchange.
One lead stopper can be mounted into the window to stop x-ray emission during preheating.
One collimator can be assembled into the window to collimate the output beam.

GF AND CERAM RANGE

Telescopic centring device

The telescopic centring device will help you to get the beam on the area you want to inspect.
The telescopic centring device can be replaced by a laser centring device (optionally).

Manometer

Located on the top side of the x-ray generator, the manometer indicates the internal SF6 gas pressure. This pressure is supposed to range from 4,5 and 5 kg/cm² at 20°C.

Ventilator

The x-ray tube anode is cooled by forced air. Any disturbance to the air flow will reduce the performance of the unit. Air access should always be free from any obstruction.

Interconnecting plug

The plug is protected by a cap. Be always sure that all the contacts are absolutely clean and that no connector pin is bent or damaged.

Red flashing bulb (option)

One red flashing bulb can be fitted on the cover as an option, indicating the emission of X-rays.

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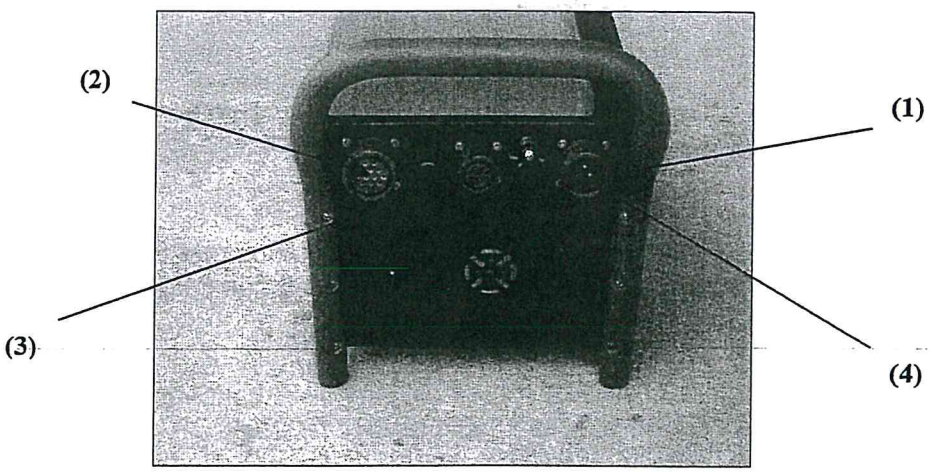
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CONTROL PANEL CF2000

The CF2000 contains the electronical devices for security and regulation of the X-Ray generator parameter.

Technical Features

- All field mains from 170 to 260V. (optional 110V) – 45Hz to 66Hz
- Power consumption less than 10 amps
- Can drive all GF and CERAM Series
- Rough, Ergonomic, Waterproof keypad with colour tagging for friendly use
- 4 lines clear display with backlight
- Operators most used functions only
- Enhanced full automatic preheating function
- Memory of 100 last exposures and additional parameters
- Manual or automatic time and exposure calculation (optional)
- Built in RS 232 interface
- Compact sized
- Interconnecting plugs
  (1) to the power supply
  (2) to the X-Ray generator
  (3) to the safety accessories
  (4) to the ground



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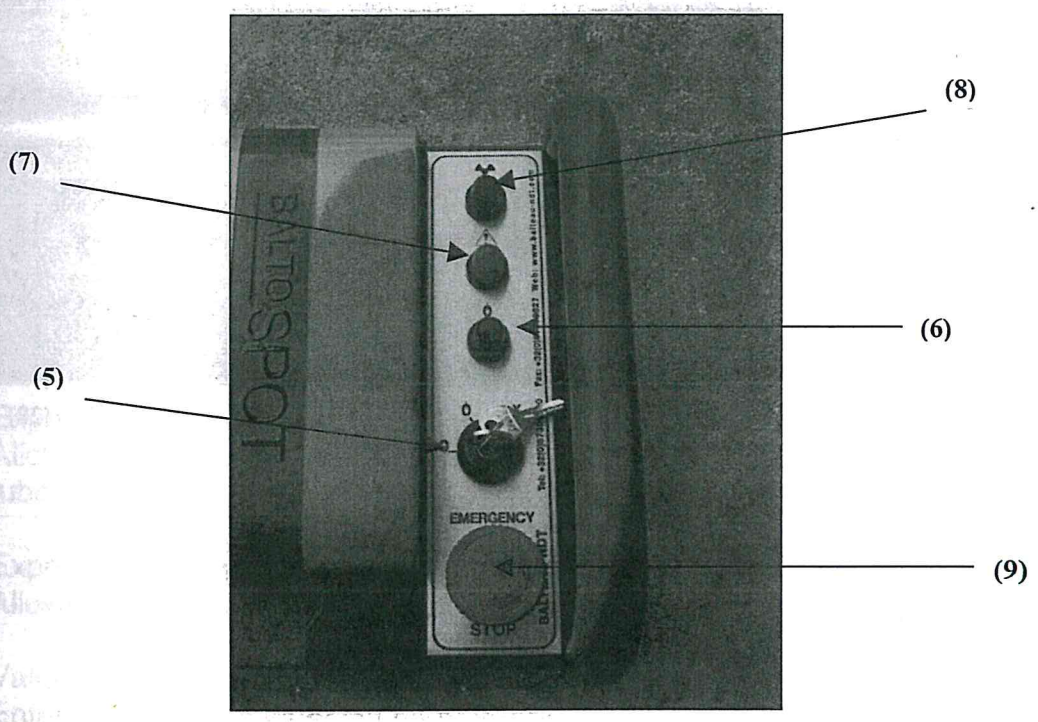
- Switches and lamp

3 positions key switch (5):

– Position 0	The power unit if OFF
– Position 1	The power unit is ON but impossibility to start X-Ray
– Position X	The power unit is ready to start X-Ray if requested
– In position 0 and 1	The key can be removed.

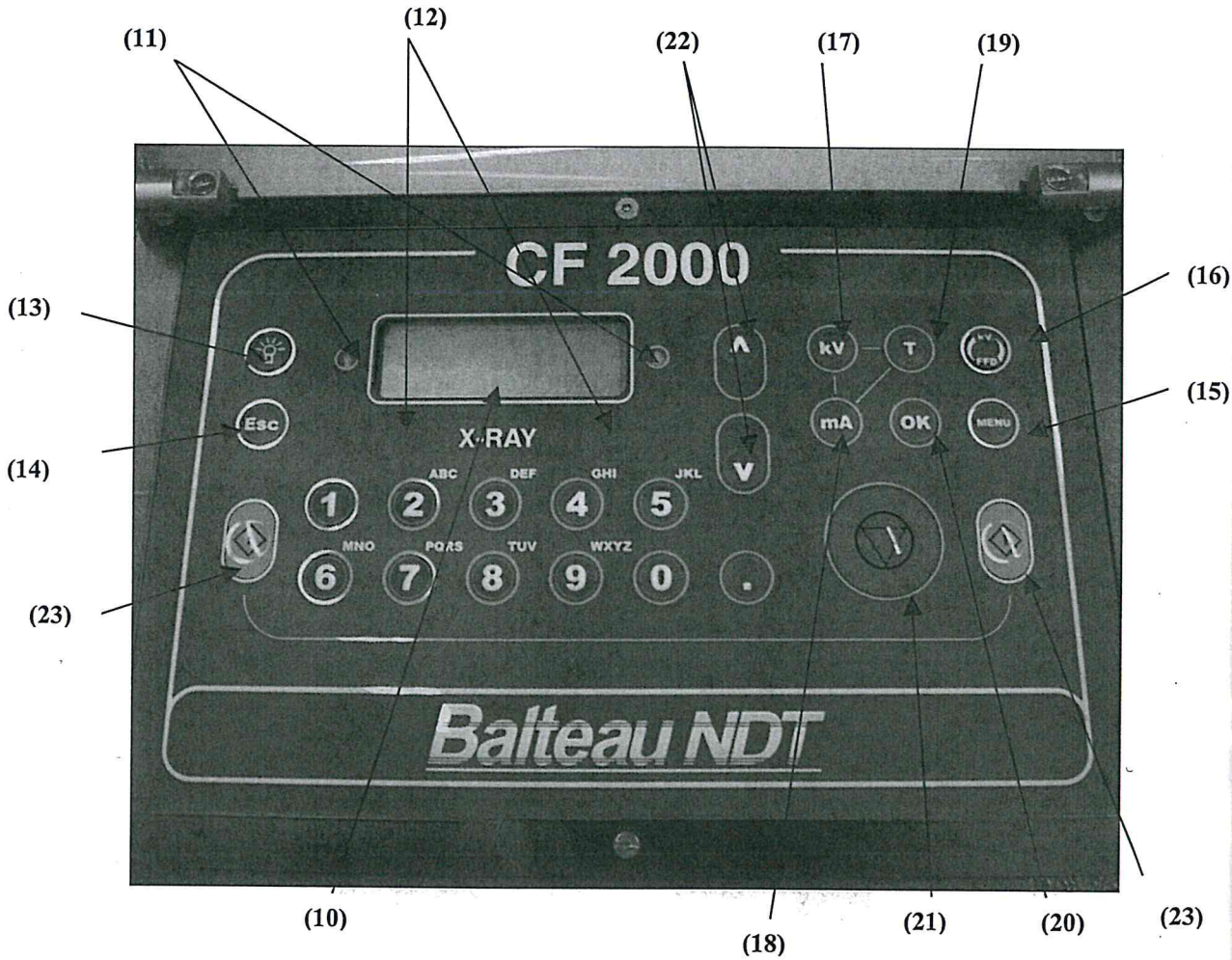
Lamps:

– Green lamp (6)	The power unit is ON
– Orange lamp (7)	Activated during pre alarm time before each picture
– Red lamp (8)	Flashing during pre alarm time and during each picture
– Emergency witch (9)	If pressed stop the X-Ray.



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KEYS DESCRIPTION

(10) LCD display
4 lines display for requested messages.

(11) Connection Pilot LED
LED ON means OK
LED OFF means connection is lost.

(12) X-Ray ON PILOT LED
ON during pre-alarm time and X-Ray emitting period.

(13) Display back light ON/OFF
Key to select the back light ON or OFF.

(14) Escape key
Allows to quit the different menu or escape some selected value, you do not want.

(15) Menu selection key
Allows to access to different menus.

(16) Exposure chart calculation
Access to a program to help the calculation of exposure time.

(17) Exposure kV selection
Allows to select kV value according to the possibility of each X-Ray tube.

(18) Exposure mA selection
Allows to select different mA values according to the possibility of each X-Ray tube.

(19) Exposure time selection
Allows to introduce the T from the exposure.

(20) Validation key
Enter and valid the selected parameters.

(21) Stop Key
- allows to emergency stop of X-Ray;
- if pressed more than 5sec, will cut off the control unit.

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(22) Scrolling keys
Scrolling stored information up and down on the display.
Those keys are activated only if display shows scrolling sign on right corner.

(23) Double start buttons
Those two keys have to be pressed at the same time, at least 1 sec to switch ON X-RAY.

(24)
Internal buzzer
Activated during the pre-alarm time before each exposure.

Error bip
Activated if wrong parameter selected.

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CHOPPER AND ASSOCIATED ELECTRONICAL DEVICES

The electronical devices are powered by one independent power supply. Two PCB assembled on a heat exchanger are regulating the kV and mA. This heat exchanger is cooled by forced air.
The regulation and control of the different element are assembled into the last PCB.

INTERCONNECTING CABLES

Power supply cable	- length : 10 m - 2 cores + ground
Interconnecting cable	- length : 20 m - special core adjustment with different cross section - 10 cores – plugs 12 poles - high quality plugs
Flashing lamp	- flashing lamp 24V assembled into red cap - cable length 20 m, 10 cores - possibility to interconnect the door switch, an external buzzer, a pre-alarm lamp (24V 5W max), a power ON lamp (24V, 5W max) - the equipment cannot run if the flashing lamp is not connected or failed

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CHAPTER III – INTERCONNECTION – START UP

ADVISE BEFORE INTERCONNECTION

- Check all cables, connectors, male contact, females pin.
- Check a ground connection is available on the plug, before connecting the CF2000 power main cable. The ground connection is necessary for your safety and for the good performance of the unit. This ground connection is also necessary if you are working on a power generator.
- Check the voltage from the power supply is 230 V +/- 10 % (50 or 60 Hz, automatic selection). The requested power is +/- 1800 W.
- Check the general key switch is on 0.
- Check the gas pressure inside the X-Ray generator is between 4,5 and 5 kg/cm² at 20°C.
- Check the airflow from the cooling is not obstructed in the X-Ray generator and in the CF2000.

INTERCONNECTION

- The power cable has to be connected to the 3 poles socket (1).
- The cable from the X-Ray generator has to be connected to the 12-pole socket (2).
- If flashing light or door switch is requested, connect it into the 10-pole socket (3) ref to drawing 5811246 and chapter XIII maintenance and spare parts.
- If necessary on intro ground wire has to be connected to the ground connection (4).
- The Hand-X has to be correctly clamped on the Hand-X Power.

START UP

- During the main key (5) in position "stand by", the green lamp is ON (6) and the fans are running. To do X-Ray the key switch has to be in "X" position and the emergency switch has to be rebased.
- The display will first show the soft version and then that the equipment is ready.
- The second and third line of the display is the exposure parameter.
- The fourth line are the messages (refer to chapter XIII for message meaning).
- During the starting up, the CF2000 make the full recognition of the X-Ray generator and of all of its parameters. This operation called "Pairing" must be repeated each time one of the sub unit is exchanged (CF2000 or X-Ray generator).
- The CF2000 can only be used if this "pairing" has been done.
- To start the X-Ray emission you must press both buttons (23) simultaneously.

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NOTE

The external clignotix have to be connected in order to start the exposure (safety rule).
If the clignotix is in failure or not connected, in order to work you have to deactivate the clignotix watching safety system by going into the menu (see specific chapter) to disable it.
After any reset of the CF2000 the watching safety system has to be again disabled.

kV – mA - T SET UP

Ref. Chapter V, operating mode, § menu.

RESTRICTIONS

Shut OFF

The CF2000 can be shut off with key (5) in position 0. Nevertheless the fans have to run 2 or 3 min after the end of the exposure.

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CHAPTER IV – PREHEATING

PRINCIPLE

Every day, the first starting of X-Ray must be done with gradually kV increase. This time or operation is called preheating. This curve has been memorized into the CF2000 software for each X-Ray generator and rest time. This preheating will be requested automatically after a rest time specific for each X-Ray tube.

PREHEATING

If requested, the CF2000 will ask you to proceed to the preheating. The CF2000 will show you the needed time.
By pressing the two start buttons (23), you will start the preheating sequence, the display shows the remaining time and the kV reached. If you stop the preheating process, it will only be possible to work below the reached level (90 % after cutting down the CF2000). If you select higher kV value, preheating will again be requested.

Preheating can also be requested manually through the menu, this manual preheating will never be shorter than the automatic one.

During the preheating, the X-Ray generator is producing X-Ray, always position the output window in a way that prevents any hazardous exposure or place an appropriate shutter to keep the dose at an acceptable level.

PREHEATING DURATION

For the CERAM235 and 35, the minimum time will be 1 minute after 10 hours rest. This time will be increased of 90 seconds for each rest day with a maximum of 45 minutes.
For the GFD165 - GFC165 – GFC205 – GFC305 the minimum time will be 10 minutes after hours rest. This time will be increased by 2 minutes for each rest day, with a maximum of 45 minutes.

END OF PREHEATING

At the end of the preheating, the display will return to the normal operating. The CF2000 is now ready for normal operation.

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CHAPTER V– OPERATING MODE

PARAMETER SELECTION

kV selection

- Press the kV key (17), the kV value on the display is blinking.
- Introduce the requested kV through the key pad and press OK (20).
- The "mA" value will then be blinking.

mA selection

- introduce the requested mA value.
- press OK (20).
- the "T" will then be blinking.

T selection

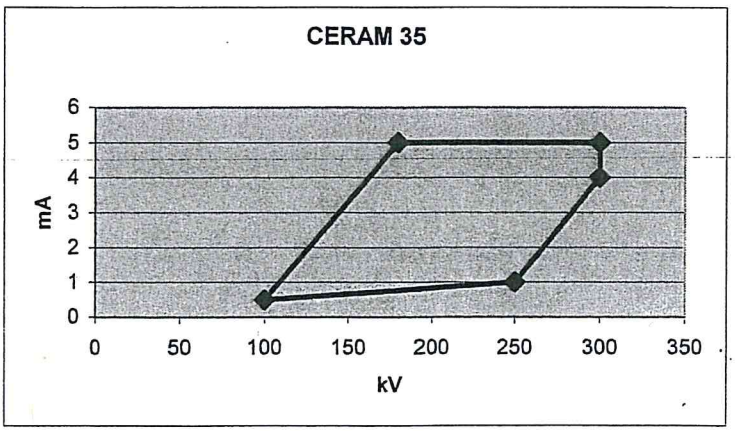
- introduce the requested time (minute, point, second)
- press OK (20).

The "Esc" (Escape) key allows you to cancel and re-enter a new value.

kV – mA – Time– LIMITATIONS

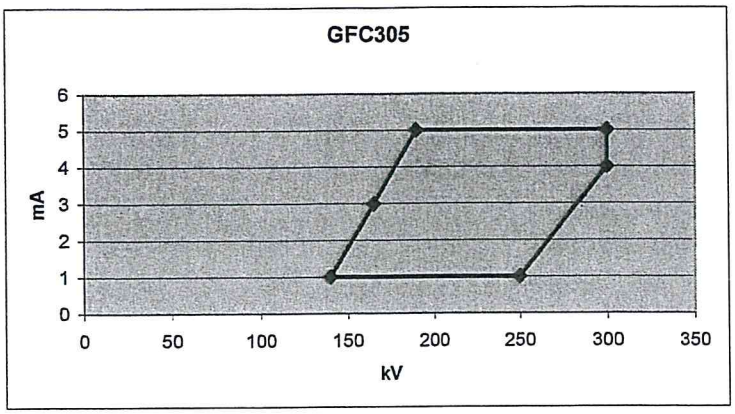
kV - mA:
In the graphic here below, you find the kV and mA limits for each X-Ray generator. If you select value located outside this graphic, they will automatically be adjusted to the nearest value with kV priority.

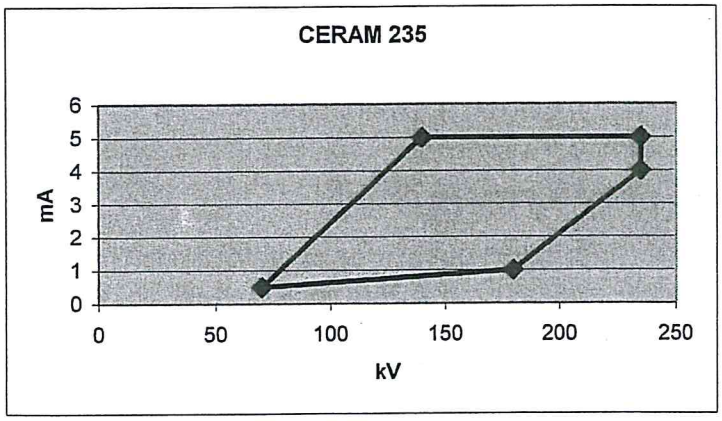
Before X-Ray start, a pre-alarm time with flashing red light, buzzer activated can be adjusted.

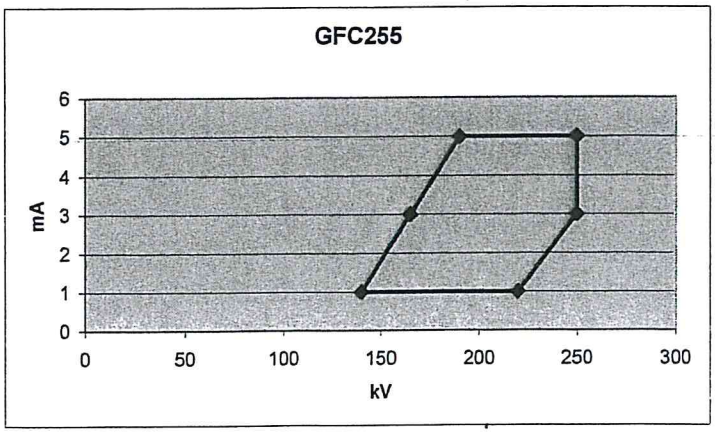


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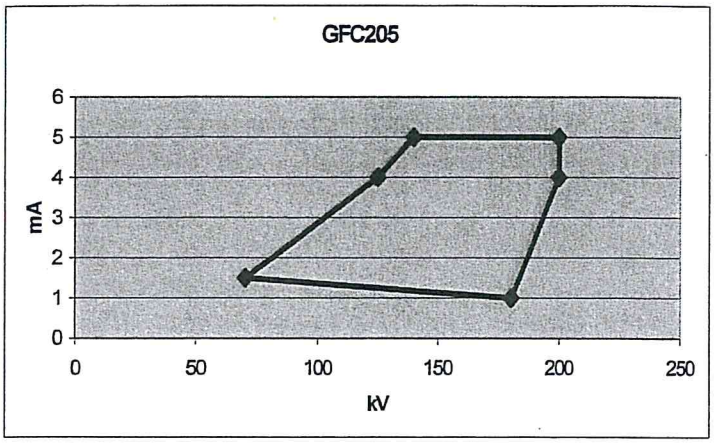


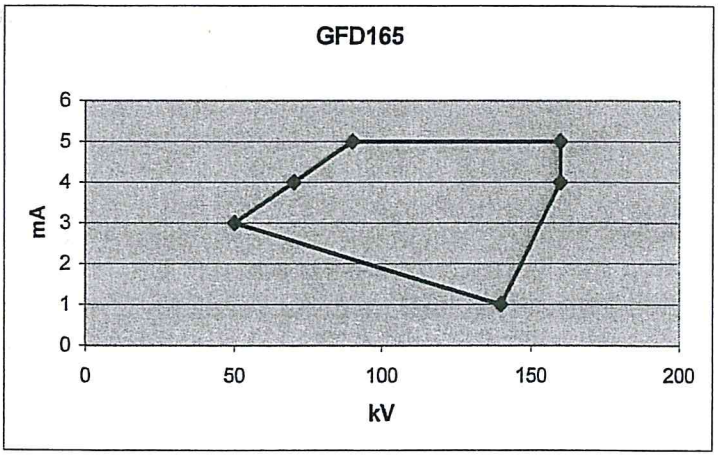


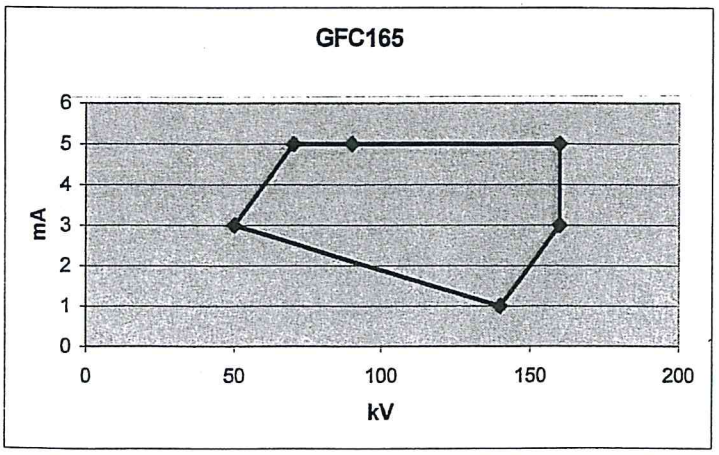


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Time:

Despite this unit is a 100% duty cycle (only Ceram type) unit, time limitation is given by the displaying capacity which allows a maximum settable time of 99 min (enter 99, point, zero zero).

Considering a ramping up function is necessary to give the maximum High Tension to the tubehead, the minimum time should be higher than 10 sec (enter zero, point, one, zero). If necessary adapt the mA or kV accordingly but increase the exposure time for a better repeatability in exposures.

X-RAY START

The start of the X-Ray emission is done by pressing simultaneously the TWO GREEN KEYS (23) for 2 seconds at least.

If the start cannot be done, a message will appear on the fourth line from the display (refer to message in chapter Maintenance).

The timer will show the remaining time and will stop the X-Ray emission automatically when this time will be zero. The originally selected parameter are then displayed back on the display at the end of the X-Ray emission.
To change those parameters, press escape key and enter new values.

X-RAY STOP

At any time, you may stop the X-Ray by pressing either:

- the STOP button from the CF2000 (normal operation)
- the emergency push button (9) on the CF2000 (emergency case)
- or turn the key off (5) on the CF2000 .

When you need to definitively stop your exposures and will pack the equipment at the end of your job, if the equipment is still in hot condition (place your hand on the tubehead and appreciate the need of a cooling), we are recommending you to allow the cooling fans working in standby for 2 to 3 minutes before disconnecting the mains from the unit. Because heat production is very high when generating X-Rays, the components are fragile if submitted to chocks (transport, ...) when they are in hot conditions.
This can greatly extend the lifetime of your unit.

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Comfort functions

MENU

The menu key (15) gives you access to the menu and sub-menus.

- Menu 1: exposure mode
- Menu 2: memory access – a table can be read or filled with X-Ray exposure parameters
- Menu 3: utility
- Menu 4: software versions

To access to one of these menu mode, select the number then press OK (20).
Exit by pressing "ESC".

MENU 1 **Exposure mode (X-ray operation)**
This mode is automatically selected when you start the CF2000.
It gives access to the exposure parameters and to the production of X-rays.

MENU 2 **Memory mode (User memory)**
Give you access to sub menu

Sub menu 1 Display the 100 last exposure parameters by scrolling the table line by line.
Sub menu 2 Allows to store or restore one of the exposure with all parameters.

To store the exposure parameter :
- select menu 2 memory;
- select sub menu 2, memory parameter
- select 1 save in memory
- the display will give you the last empty memory (which can be replaced by selected one) then press enter

To recall one memory :
- select 2 – Memory
- then submenu 2 - Memory parameter
- select 2, restore memory.

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MENU 3 Utility mode

This mode will give you access to sub menus. Some of those sub menus are used to set up your unit, others are used to give maintenance and servicing indications.

Sub menu 1 allows to call a manual preheating.
Sub menu 2 shows the Pressure State of the X-Ray generator;
either 1 or 0 if the X-Ray generator is mounted with pressiostat;
pressure value if the X-Ray generator is mounted with pressure meter.
Sub menu 3 pre-alarm time adjustment;
can be adjusted from 3 to 30 sec.
Sub menu 4 language selection for the displayed and menu messages.
Sub menu 5 allows to adjust the display contrast. Position 110 is a median position used in most circumstances. At low temperature, this level can be adjusted.
Sub menu 6 shows the main power.

MENU 4 Maintenance mode

This mode shows each software version.

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CHAPTER VI - TECHNICAL SPECIFICATIONS AND PERFORMANCES

CF2000

Power supply	AC from +/- 170 to 260 V (120 VAC optional)
Frequency	+/- 47 to 72 Hz
Requested power (+/-10%)	max 1800 W
Cos Phy	better than 0,8
Fuses	2 pc 16 amp (AT) 6 x 32 mm
3 positions key switch	
X-Ray ON	Red lamp
Power ON	Green lamp
Pre-alarm	Orange lamp
Emergency	Switch to stop X-Ray
Working conditions	-10°C to 40°C (95 % humidity)
Storage conditions	-30°C to 55°C
Weight	15 kg
Weather conditions	IP64
Panel X-ray ON signal	2 separate red leds

TIMER
Exposure time selection through key pad from 10 sec to 99 min, second by second. The timer is starting value kV are at 75 % from the selected kV value.

SECURITY	Message on the display
DISPLAY	LCD 4 lines of 20 characters
BUZZER	(pre-alarm time) – adjustable by the user

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GENERATOR INSULATED WITH SF6

- **Monobloc X-ray generator insulated with SF6**
  Minimum pressure +/- 3,9 kg/cm²
  Nominal pressure 4,5 to 5 kg/cm²
  Protected if loss of pressure

- **Main characteristics**

	GFD165	GFC165	GFC205	GFC255	CERAM235	CERAM35	GFC305	Un
Dose rate	1,80	1,60	1,08		Not available	20,00	2,25	Gy/h @
CDA (1st)	6 mm Al	6,5 mm Cu	1,1 mm Cu	2,6 mm Al		2,5 mm Al	2,6 mm Al	-
Weigth	13,2	13,2	26,5	35	27	31	35	Kg
Sizes	268-630	268-630	275-759	309-839	269-780	309-823	309-839	(Ø - L)
Shielding	Internal Shielding – X-ray leakage < 0,5					**<10	<10	MGy/h
Tube type	Glass	Glass	Glass	Glass	Ceramic	Ceramic	Glass	-
SF6	4,5 - 5							Kg,c
Low press.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-
kV	50-160	50-160	70-200	140-250	80-235	100-300	140-300	kV
Duty cycle 25°C 5 mA 25°C 3 mA	 50 100	 50 100	 50 100	 50 100	 100 100	 100 100	 50 100	%
Therm.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-
Cooling	Forced Air							-
Weather	IP64							-

* without guard rings
** can be reduced < 0,5 on request

- **Focal Spot**

	GFD165	GFC165	GFC205	GFC255	CERAM235	CERAM35	GFC305	Un
Focal Spot	d =2,8	Ø 4 x 0,9	Ø 5 x 1	Ø 5,5 x 1,3	d =2	D=2,5	Ø 5,5 x 1,3	EN12
Focal Spot	1,5 x 1,5	-	-	-	0,9 x 0,9	1,2 x 1,2	Ø 5,5 x 1,3	IEC
Beam Angle	55 x 40	360 x 40	360 x 40	360 x 40	40	40	360 x 40	°

- **Exposure performance**

	GFD165	GFC165	GFC205	GFC255	CERAM235	CERAM35	GFC305	Un
Tension	160	160	200	250	235	300	300	kV
Curent	5	5	5	5	5	5	5	m
Time	10							Minu
SFD	700							M
Film type	D7 or equivalent							-
Penetration Fe	19	13,5	29	37	44	56	49	m

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CHAPTER VII – EXPOSURE CHART

CERAM35

CERAM235

GFD 165

GFC165

GFC205

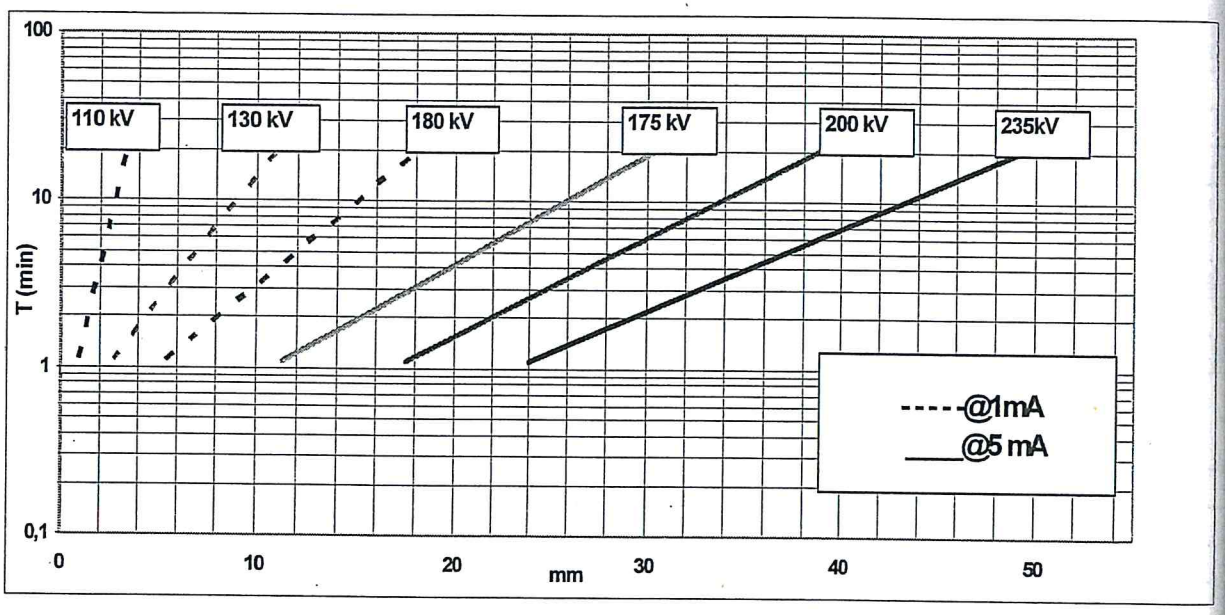
GFC 305

NOTE: For the GFC255, use the GFC305 exposure chart

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Abaque d'exposition pour Fe **Exposure chart for Fe** **Belichtungsdiagramm für Fe** **Bestralingsgrafiek voor Fe**	**BALTOSPOT CERAM 235**	**REFERENCES** FILM: KODAK Ax — With screens pb 0,1 mm FFD: 700 mm Density: 2



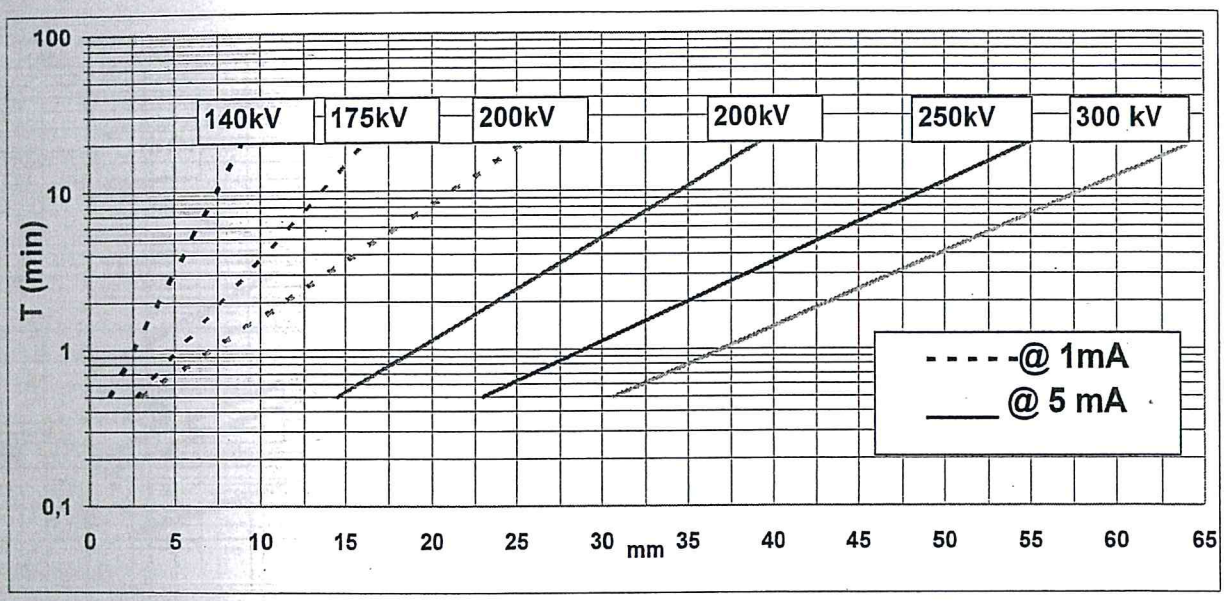
FILM			
D7 => (T) x	0,9	KODAK Mx => (T) x	2
D4 => (T) x	2,4	KODAK R => (T) x	8,5
KODAK Ax => (T) x	1		

FFD	
350mm - 14 inches => T (FFD) x	0,25
500 mm - 20 inches =>T (FFD) x	0,5
1000 mm - 40 inches => T (FFD) x	2
1400 mm - 55 inches => T (FFD) x	4

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Abaque d'exposition pour Fe **Exposure chart for Fe** **Belichtungsdiagramm für Fe** **Bestralingsgrafiek voor Fe**	**BALTOSPOT CERAM 35**	**REFERENCES** FILM: KODAK Ax — With screens pb 0,1 mm FFD: 700 mm Density: 2



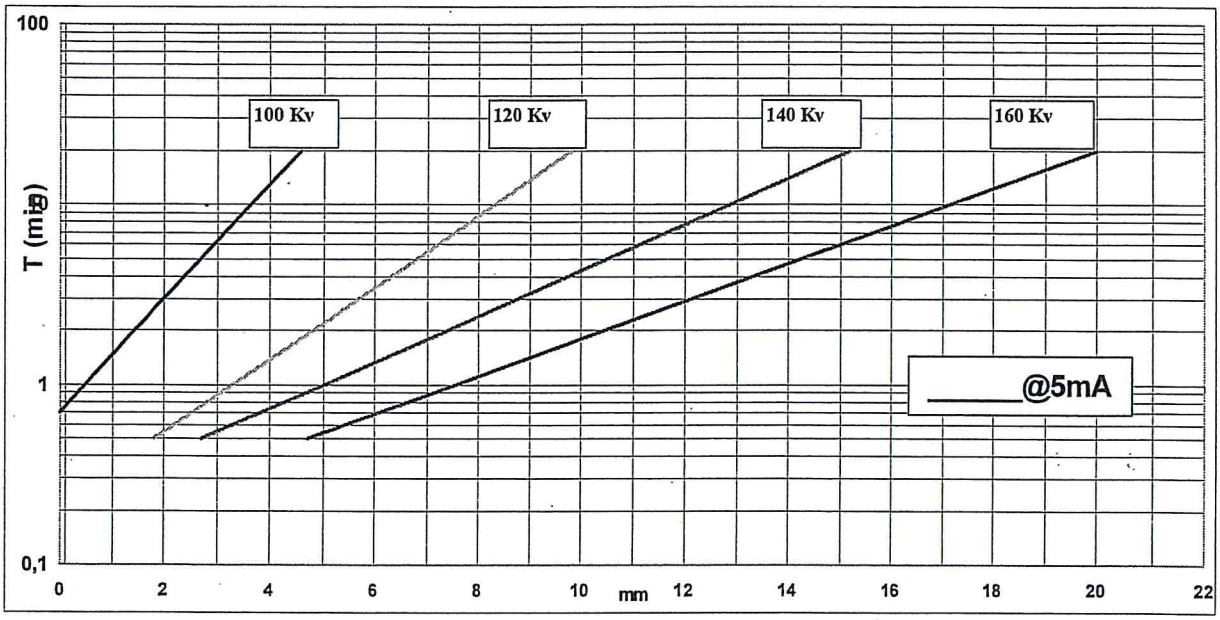
FILM			
D7 => (T) x	0,9	KODAK Mx => (T) x	2
D4 => (T) x	2,4	KODAK R => (T) x	8,5
KODAK Ax => (T) x	1		

FFD	
350mm - 14 inches => T (FFD) x	0,25
500 mm - 20 inches =>T (FFD) x	0,5
1000 mm - 40 inches => T (FFD) x	2
1400 mm - 55 inches => T (FFD) x	4

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Abaque d'exposition pour Fe **Exposure chart for Fe** **Belichtungsdiagramm für Fe** **Bestralingsgrafiek voor Fe**	**BALTOSPOT GFD 165**	**REFERENCES** FILM: KODAK Ax — With screens pb 0,1 mm FFD: 700 mm Density: 2



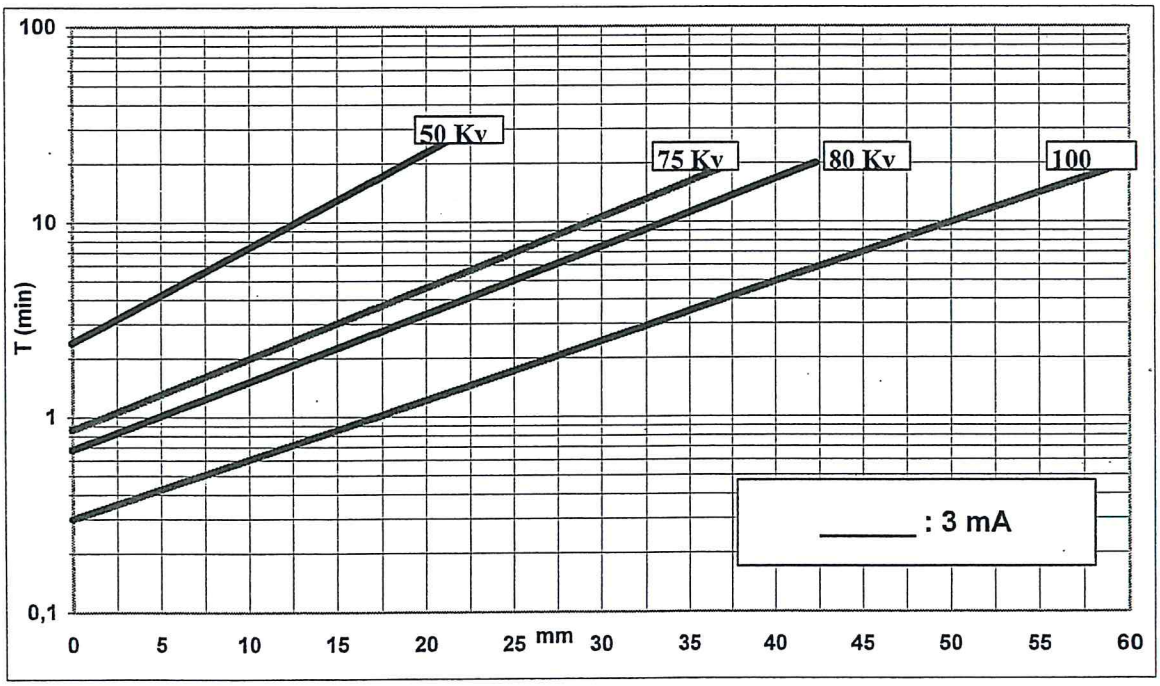
FILM			
D7 => (T) x	0,9	KODAK Mx => (T) x	2
D4 => (T) x	2,4	KODAK R => (T) x	9
KODAK Ax => (T) x	1		

FFD	
350mm - 14 inches => T (FFD) x	0,25
500 mm - 20 inches =>T (FFD) x	0,5
1000 mm - 40 inches => T (FFD) x	2
1400 mm - 55 inches => T (FFD) x	4

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Abaque d'exposition pour Al **Exposure chart for Al** **Belichtungsdiagramm für Al** **Bestralingsgrafiek voor Al**	**BALTOSPOT GFD 165**	**REFERENCES**		
		FILM	KODAK Ax	Without lead screens
		FFD	700 mm	
		Density	2	



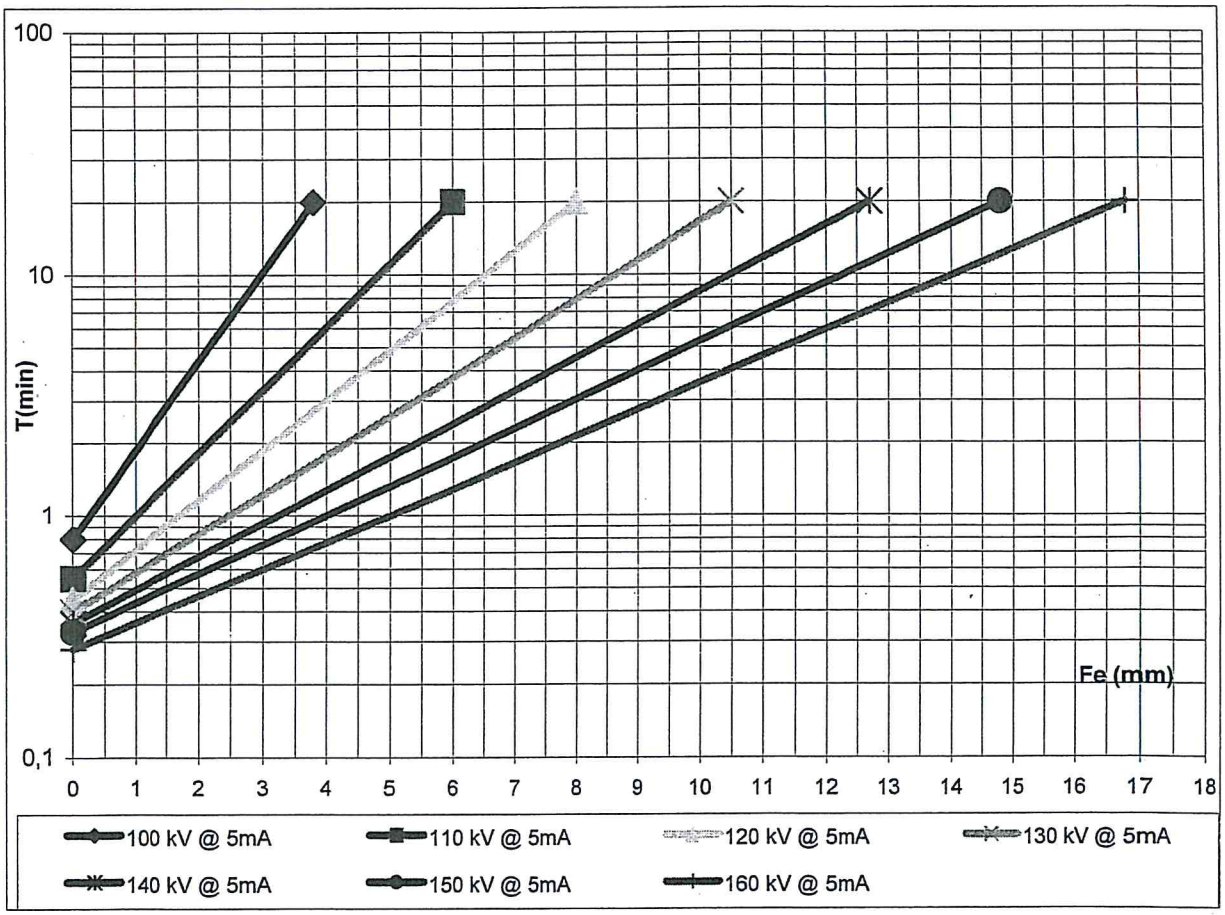
FILM			
D7 => (T) x	0,9	KODAK Mx => (T) x	2
D4 => (T) x	2,4	KODAK R => (T) x	9
KODAK Ax => (T) x	1		

FFD	
350mm - 14 inches => T (FFD) x	0,25
500 mm - 20 inches =>T (FFD) x	0,5
1000 mm - 40 inches => T (FFD) x	2
1400 mm - 55 inches => T (FFD) x	4

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Abaque d'exposition pour Fe **Exposure chart for Fe** **Belichtungsdiagramm für Fe** **Bestralingsgrafiek voor Fe**	**BALTOSPOT GFC165**	**REFERENCES**		
		FILM	KODAK Ax	With screens pb 0,1 mm
		FFD	700 mm	
		Density	2	



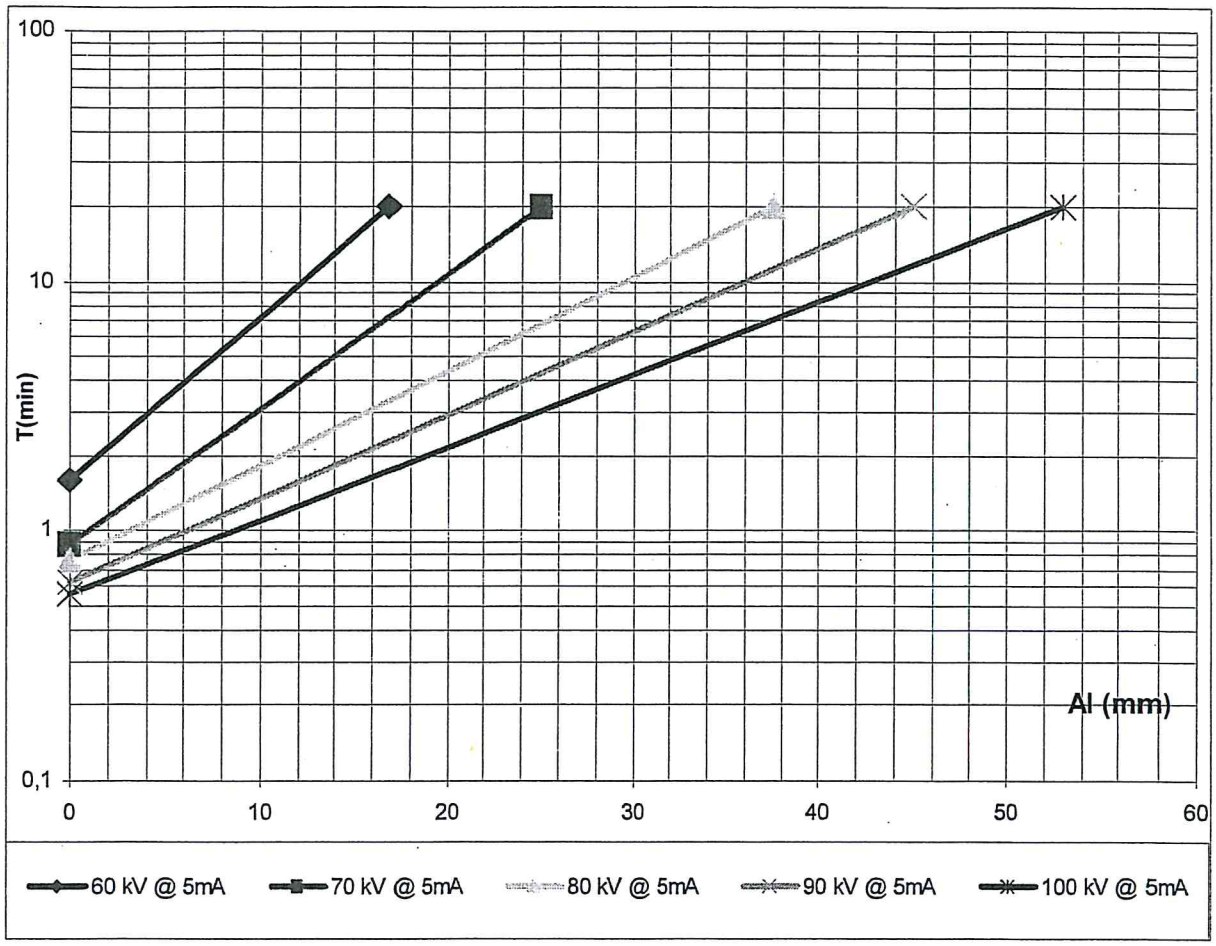
FILM			
D7 => (T) x	0,9	KODAK Mx => (T) x	2
D4 => (T) x	2,4	KODAK R => (T) x	9
KODAK Ax => (T) x	1		

FFD	
350mm - 14 inches => T (FFD) x	0,25
500 mm - 20 inches =>T (FFD) x	0,5
1000 mm - 40 inches => T (FFD) x	2
1400 mm - 55 inches => T (FFD) x	4

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Abaque d'exposition pour Al **Exposure chart for Al** **Belichtungsdiagramm für Al** **Bestralingsgrafiek voor Al**	**BALTOSPOT GFC 165**	**REFERENCES**		
		FILM	KODAK Ax	With screens pb 0,1 mm
		FFD	700 mm	
		Density	2	



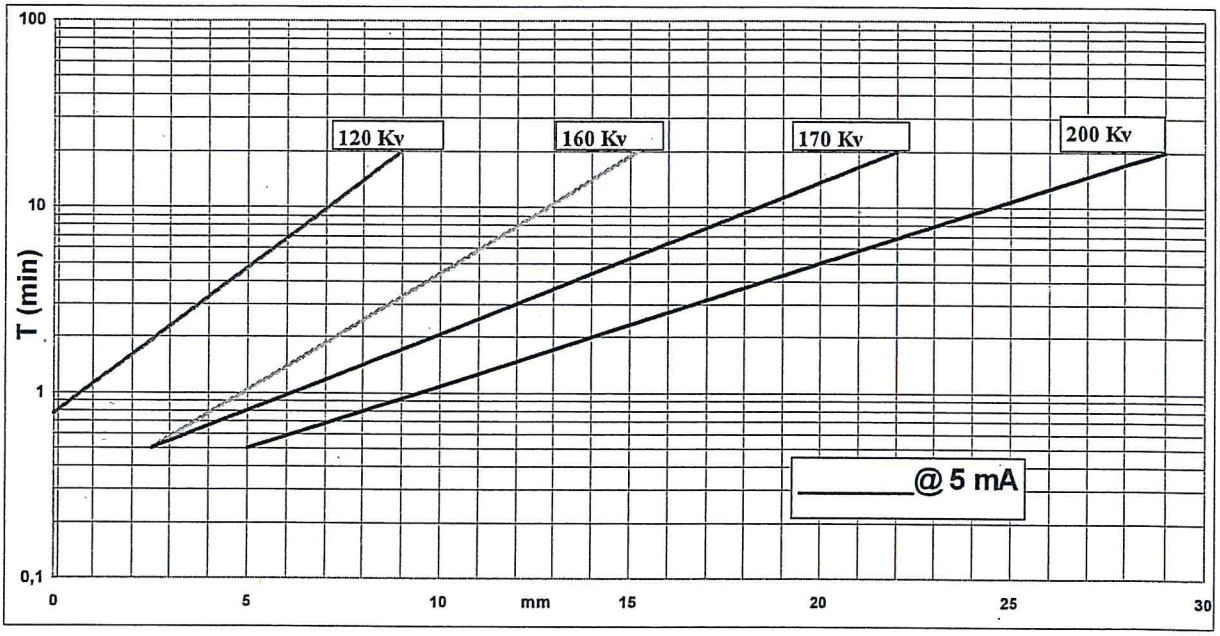
FILM			
D7 => (T) x	0,9	KODAK Mx => (T) x	2
D4 => (T) x	2,4	KODAK R => (T) x	9
KODAK Ax => (T) x	1		

FFD	
350mm - 14 inches => T (FFD) x	0,25
500 mm - 20 inches =>T (FFD) x	0,5
1000 mm - 40 inches => T (FFD) x	2
1400 mm - 55 inches => T (FFD) x	4

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Abaque d'exposition pour Fe **Exposure chart for Fe** **Belichtungsdiagramm für Fe** **Bestralingsgrafiek voor Fe**	**BALTOSPOT GFC 205**	**REFERENCES**		
		FILM	KODAK Ax	Without lead screens
		FFD	700 mm	
		Density	2	



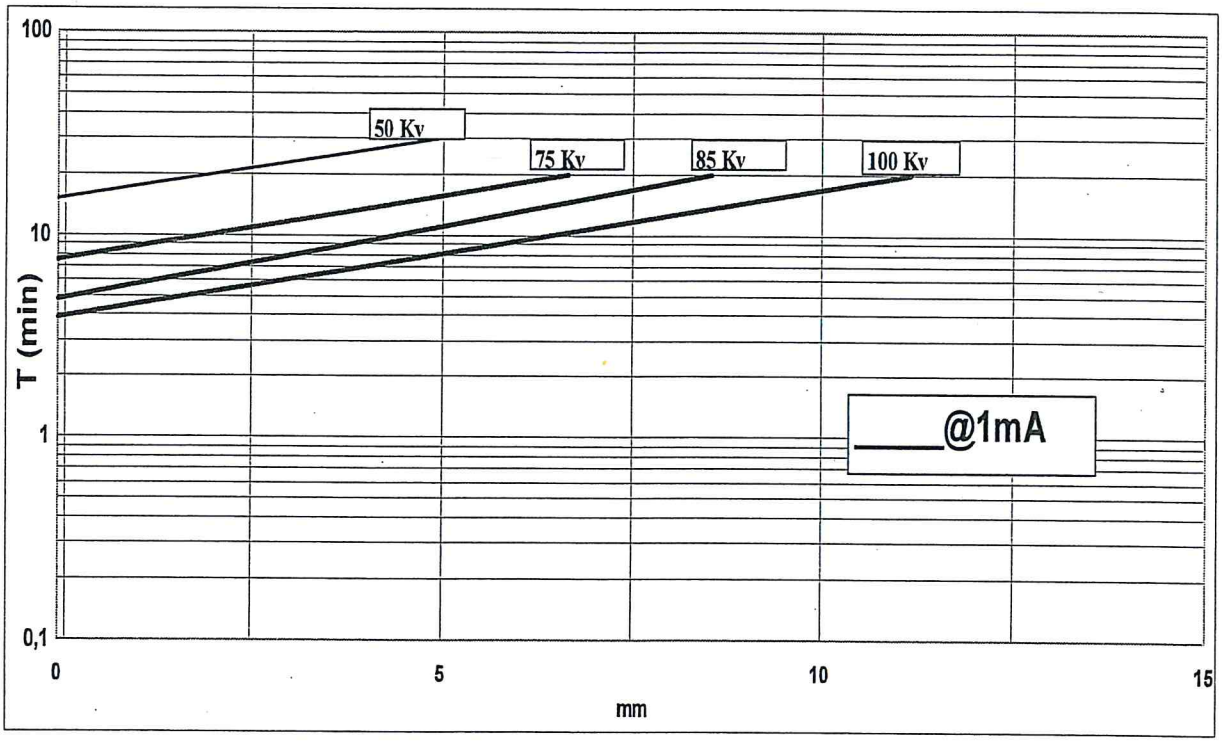
FILM			
D7 => (T) x	0,9	KODAK Mx => (T) x	2
D4 => (T) x	2,4	KODAK R => (T) x	8,5
KODAK Ax => (T) x	1		

FFD	
350mm - 14 inches => T (FFD) x	0,25
500 mm - 20 inches =>T (FFD) x	0,5
1000 mm - 40 inches => T (FFD) x	2
1400 mm - 55 inches => T (FFD) x	4

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Abaque d'exposition pour Al **Exposure chart for Al** **Belichtungsdiagramm für Al** **Bestralingsgrafiek voor Al**	**BALTOSPOT GFC205**	**REFERENCES**		
		FILM	KODAK Ax	Without lead screens
		FFD	700 mm	
		Density	2	



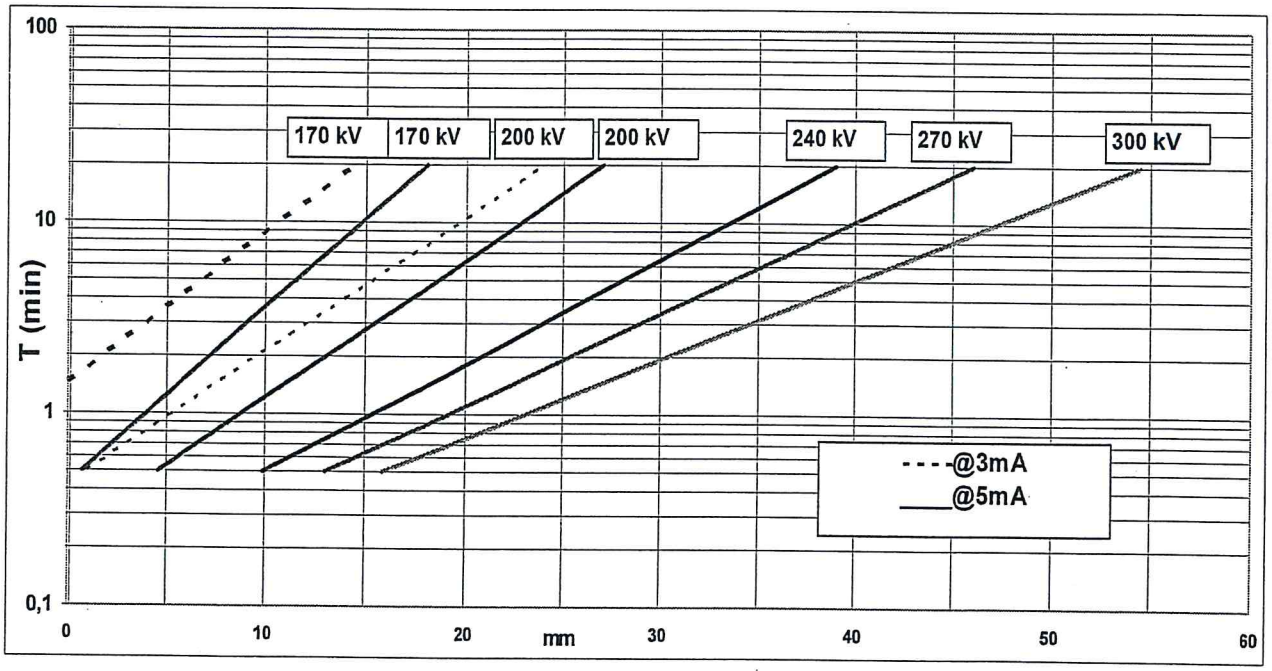
FILM			
D7 => (T) x	0,9	KODAK Mx => (T) x	2
D4 => (T) x	2,4	KODAK R => (T) x	9
KODAK Ax => (T) x	1		

FFD	
350mm - 14 inches => T (FFD) x	0,25
500 mm - 20 inches =>T (FFD) x	0,5
1000 mm - 40 inches => T (FFD) x	2
1400 mm - 55 inches => T (FFD) x	4

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Abaque d'exposition pour Fe **Exposure chart for Fe** **Belichtungsdiagramm für Fe** **Bestralingsgrafiek voor Fe**	**BALTOSPOT GFC 305**	**REFERENCES** FILM: KODAK Ax — Without lead screens FFD: 700 mm Density: 2



FILM			
D7 => (T) x	0,9	KODAK Mx => (T) x	2
D4 => (T) x	2,4	KODAK R => (T) x	8,5
KODAK Ax => (T) x	1		

FFD	
350mm - 14 inches => T (FFD) x	0,25
500 mm - 20 inches =>T (FFD) x	0,5
1000 mm - 40 inches => T (FFD) x	2
1400 mm - 55 inches => T (FFD) x	4

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CHAPTER VIII - CERTIFICATION

CEE conformity
Controlatom certificate

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CE

CERTIFICAT DE CONFORMITE
CONFORMITY CERTIFICATE

IDENTIFICATION : BALTOSPOT.....

Générateur type/ *Generator type*	BALTOSPOT
Unité de commande type / *Control unit type*	CF2000

We declare that the above mentioned material has been constructed according Europeans recommendations : 89/336/CEE - 91/31/CEE - 93/68/CEE - 73/23/CEE

Nous déclarons que le matériel repris ci dessus a été construit en conformité avec les recommandations européennes : 89/336/CEE - 91/31/CEE - 93/68/CEE - 73/23/CEE

Nevertheless the material has to be used for the purpose it has been designed and in conformity with the instructions included in the user manual. This material has been designed to be used only in industrial environment.

Cependant le matériel doit être utilisé aux fins pour lesquelles il a été conçu et en conformité avec les instructions reprises dans le mode d'emploi. Ce matériel est destiné à être utilisé exclusivement dans un milieu industriel.

Any damage to the material and accessories may change the original specifications.

Tout dommage à l'équipement ou à ses accessoires peut en changer les caractéristiques.

A. DUGAILLIEZ
Directeur de Production
Manufacturing Manager

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ORGANISME DE CONTROLE AGREE
Membre du GROUPE AIB-VINÇOTTE

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Tél. : +32(0)2 536 82 20 - Fax : +32(0)2 539 12 59 - E-Mail : av.controlatom@aib-vincotte.be

AIB VINÇOTTE
CONTROLATOM

BALTEAU X-RAY

Rue du Calvaire 40

4650 HERVE

Dossier : 25418/501/9400024F
Expert : D. GODECHAL Rapport : S4F9199003947/DG/am Date : 1999.07.13.

CERTIFICAT DE CONFORMITÉ

Identification

Matériel / Material :	Equipement RX industriel / Industrial X Ray equipment
Marque / Trademark :	BALTOSPOT
Type / Type :	CERAM235 - 235 kV - 5 mA
Test réalisé sur / Test performed on :	CERAM 235 Serial n° 8346 Comd tube : 115 338/1

Objet / Object :

Par ce document, nous certifions que le blindage du Baltospot CERAM235 est conforme aux normes suivantes :
By this document, we certify that the shielding of the Baltospot CERAM235 complies with the following standards :

Din 54113 part2 chap 3.2.2
NF 74C100 chap 6

Test

La mesure du rayonnement de fuite a été réalisée à 1 m du foyer et dans toutes les directions avec une chambre d'ionisation Babyline 81. Afin de ne mesurer que le rayonnement de fuite, le fenêtre de sortie du rayonnement a été obturée avec 15 mm de plomb.

* A 235 kV - 5 mA, en cycle de 100 %, le rayonnement de fuite est inférieur à 10 mSv/h (1000 mR/h) (2 mSv/h mesuré).
* A 200 kV - 5 mA, en cycle de 100 %, le rayonnement de fuite est inférieur à 2,5 mSv/h (250 mR/h) (0,6 mSv/h mesuré).

The leakage measurement has been performed at 1 m from the focal spot in any direction.
In order to measure the x ray leakage only, the window has been closed with 15 mm of lead.

* A 235 kV - 5 mA in cycle 100 %, leakage values are below 10 mSv/h (1000 mR/h) (2 mSv/h measured).
* A 200 kV - 5 mA in cycle 100 %, leakage values are below 2,5 mSv/h (250 mR/h) (0,6 mSv/h measured).

Conformité / Conformity :

L'équipement contrôlé est déclaré conforme.
The tested equipment is declared in accordance with the standards.

Dr Sc. C. Balteaux
Directeur

Ing. D. Godechal
Expert agréé

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X Ray Solutions
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ORGANISME DE CONTROLE AGREE
Membre du GROUPE AIB-VINÇOTTE

Siège social : Avenue du Roi, 157 - B 1190 Bruxelles
Téléphone (02) 536 82 20 - Télex 22550 - Téléfax (02) 539 12 59

BALTEAU X-RAY

Rue du Calvaire 40

4650 HERVE

Dossier : 25418/501/9400024F
Expert : A. HAVAUX Rapport : S4F9197004707/AH/am Date : 1997.11.13.

CERTIFICAT DE CONFORMITÉ

IDENTIFICATION

Matériel / Material :	INDUSTRIAL X-RAY EQUIPMENT
Marque / Trademark :	BALTOSPOT
Type / Type :	CERAM35 300 KV - 5 MA

Object / Objet :

By this document we certify that the shielding of the Baltospot CERAM 35 complies with the following standards :
Nous certifions que le blindage du Baltospot CERAM 35 est conforme aux normes suivantes :

Din 54113 part 2 chap. 3.2.2.
NP74C100 Chap 6

Test :

The leakage measurement has been performed at 1 m from the focal spot in any direction.
In order to measure the X-Ray leakage only, the window has been closed.
* At 300 kV 5 mA in cycle 100 % leakage values are below 10 mS/h (1000 mR/h)
* At 200 kV 5 mA in cycle 100 % leakage values are below 2,5 mS/h (250 mR/h).

La mesure du rayonnement de fuite a été réalisée à 1 m du foyer et dans toutes les directions.
Afin de ne mesurer que le rayonnement de fuite, la fenêtre de sortie du rayonnement a été obstruée.
** A 300 kV 5 mA en cycle de 100 % le rayonnement de fuite est inférieur à 10 mSv/h (1000 mR/h)*
** A 200 kV 5 mA en cycle de 100 % le rayonnement de fuite est inférieur à 2,5 mSv/h (250 mR/h).*

Conformity / Conformité

The tested equipment is declared in accordance with the standards.
L'équipement testé est déclaré conforme.

Dr Sc. C. Ballaux
Directeur

Ir. A. Havaux
Expert agréé

TVA: 407.933.795 Banques : 000-0203513-07 210-0411806-93 310-0591050-18 611-0032550-28

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2. Ausfertigung

Physikalisch-Technische Bundesanstalt

Prüfungsschein

Ergänzung zum Nr. 6.62 - T 128

Bauart:	Röntgenstrahler
Röntgenstrahler:	Type: GFD 165
Röntgenröhre:	Lohmann Type: 160/5 EP
Höchstbetriebswerte:	160 kV (Einpuls) 2,5 mA (Langzeitnennstrom) bzw. 5 mA bei einem Einschalt - Pausenverhältnis von 1:1
Verwendungszweck:	Röntgen-Grobstrukturuntersuchungen
Hersteller: und Antragsteller:	BALTEAU S.A. Rue du Calvaire, 40 B-4650 HERVE, Belgien

Die Strahlenschutzbauart des oben genannten Röntgenstrahlers wurde unter Beibehaltung der Typenbezeichnung geringfügig geändert. Die Änderung ist durch die Bauartzeichnung:

Nr. 480 7650 mit Änderung vom 01.12.1992 festgelegt.

Die Vorschriften über die Bauart von Röntgenstrahlern für nichtmedizinische Röntgenuntersuchungen nach Anlage III Ziffer 1.2 der Verordnung über den Schutz vor Schäden durch Röntgenstrahlen (Röntgenverordnung) vom 08.01.1987 (BGBl.I. S,114) sind für den derart geänderten Röntgenstrahler erfüllt.

Braunschweig, den 17.01.1994
Im Auftrage

Boese

(Balke)

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V15-320026 2.82

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2. Ausfertigung

Physikalisch-Technische Bundesanstalt

Prüfungsschein

Ergänzung zum

Nr. 6.62 - T 129

Bauart:	Röntgenstrahler
Röntgenstrahler:	Type: GFC 165
Röntgenröhre:	Lohmann Type: 160/5 KREP
Höchstbetriebswerte:	160 kV (Einpuls) 2,5 mA (Langzeitnennstrom) bzw. 5 mA bei einem Einschalt - Pausenverhältnis von 1:1
Verwendungszweck:	Röntgen-Grobstrukturuntersuchungen
Hersteller: und Antragsteller:	BALTEAU S.A. Rue du Calvaire, 40 B-4650 HERVE, Belgien

Die Strahlenschutzbauart des oben genannten Röntgenstrahlers wurde unter Beibehaltung der Typenbezeichnung geringfügig geändert. Die Änderung ist durch die Bauartzeichnung:

Nr. 480 7649 mit Änderung vom 29.11.1993 festgelegt.

Die Vorschriften über die Bauart von Röntgenstrahlern für nichtmedizinische Röntgenuntersuchungen nach Anlage III Ziffer 1.2 der Verordnung über den Schutz vor Schäden durch Röntgenstrahlen (Röntgenverordnung) vom 08.01.1987 (BGBl.I. S,114) sind für den derart geänderten Röntgenstrahler erfüllt.

Braunschweig, den 17.01.1994
Im Auftrage

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2. Ausfertigung

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

Prüfschein

Ergänzung zum

Nr. 6.62 - T 115

Bauart:	Röntgenstrahler
Röntgenstrahler:	Type: GFC 305
Röntgenröhre:	Lohmann Type: 300/5/KREP
Höchstbetriebswerte:*)	300 kV (Einpuls) 2,5 mA (Langzeitnennstrom) bzw. 5 mA bei einem Einschalt-Pausen-Verhältnis von 1 : 1
Verwendungszweck:	Röntgen-Grobstrukturuntersuchungen
Hersteller und Antragsteller:	Balteau S.A. Rue de Calvaire, 40 B-4650 Herve Belgien

Datum der Prüfung: 25.10.1995

Der o.g. Röntgenstrahler wurde unter Beibehaltung der Typenbezeichnung geändert.
Die Änderungen des Röhrenschutzgehäuses sind in der Bauartzeichnung Nr.: 3807257 vom 20.04.1993 mit letzter Änderung vom 30.05.1995 festgelegt. Der geänderte Röntgenstrahler wird in Verbindung mit der Röntgenröhre der Typenbezeichnung 305/C Panoramic (Bauartzeichnung Nr.: N561954/1 vom 30.05.1995) bei unveränderten Höchstbetriebswerten betrieben.
Nachmessungen am 25.10.1995 ergaben eine maximale Ortsdosisleistung in 1 m Abstand vom Brennfleck von 8,8 mSv/h.

*) nach Angaben des Antragstellers

- 2 -

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Physikalisch-Technische Bundesanstalt

Blatt 2 zur Ergänzung des PTB-Prüfscheins Nr. 6.62 -T 115

Die Vorschriften über die Bauart von Röntgenstrahlern für nicht-medizinische Zwecke nach Anlage III, Ziffer 1.2 der Röntgen-verordnung vom 08.Januar 1987 (BGBl.I,S.114) sind damit erfüllt.

Diese Vorschriften sind auch für die nachfolgend aufgeführten bauartgleichen Röntgenstrahler (Bauartzeichnung Nr.: 3807257 vom 20.04.1983 mit letzter Änderung vom 30.05.1995) in Verbindung mit den genannten Röntgenröhren erfüllt, deren wahlweise Kombination zulässig ist. Die Röntgenröhren des Herstellers Lohmann sind durch die Zeichnungen Nr.: DS127 und DS127j jeweils vom 21.09.1994 festgelegt.

Röntgenstrahler		Röntgenröhre	
Type	Hersteller	Type	Hersteller
GFC 305	Balteau	300/5 KREP	Lohmann
GFC 305/CS	Balteau	300/5 KREPJ	Lohmann
GFC 255	Balteau	305/C Panoramic	Balteau VERT

Braunschweig, 22.11.1995
Im Auftrage

Balke

(Balke)

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT

Z.14-755 320 17-09.83

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CHAPTER IX – ELECTRICAL POWER GENERATOR

CONNECTION

It is the most importance for the end user safety and to get the equipment to connect the unit to the ground (better than 10 Ohm).

This X-Ray equipment can work on most electrical power generator.

Nevertheless you should avoid install power generator. With our experience, the diesel electrical power generator are more stable.

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CHAPTER X - OPTIONS

EXTRA EXTERNAL BUZZER

An external buzzer can be interconnected to the security plug from the CF2000 or inside the flashing light box (refer to drawing 4811167).

INTERCONNECTING OF MORE FLASHING LIGHT

INTERCONNECTING CABLE

In standard the unit is delivered with 20 m length cable. Other length can be available on request. We advise you, this cable is a special one designed to get a free distribution communication between the CF2000 and the X-Ray generator. Any other cable used is forbidden and may destroy or damage the unit.

The max length is 75 m.

The performance of the unit is automatically adjusted if cable length is modified.

DOOR SWITCH

The door switch should have one NO contact with contact impedance better than 10 Ohm when closed. This contact has to be voltage free connection possible on the CF2000 security or in the flashing light box.

LASER CENTRING DEVICE

TRIPOD SUPPORT

Support to handle and position the X-Ray generator.

110 Volts AC ADAPTATION

Automatic selection 110V AC or 220V.

120 Volts AC power supply kit

The control panel CF2000 or HAND-X power can be connected to 120 V AC 50 or 60 HZ providing an optional kit is assembled on the bottom of the control panel.
This kit allows voltage from 90 V AC to 260 V AC. An automatic selection will be done at the interconnection to the main.

FFD Calculation

By entering the Fe thickness, all parameters are automatically selected according our penetration curve. OK key valid the selection and equipment is reading for the exposure.

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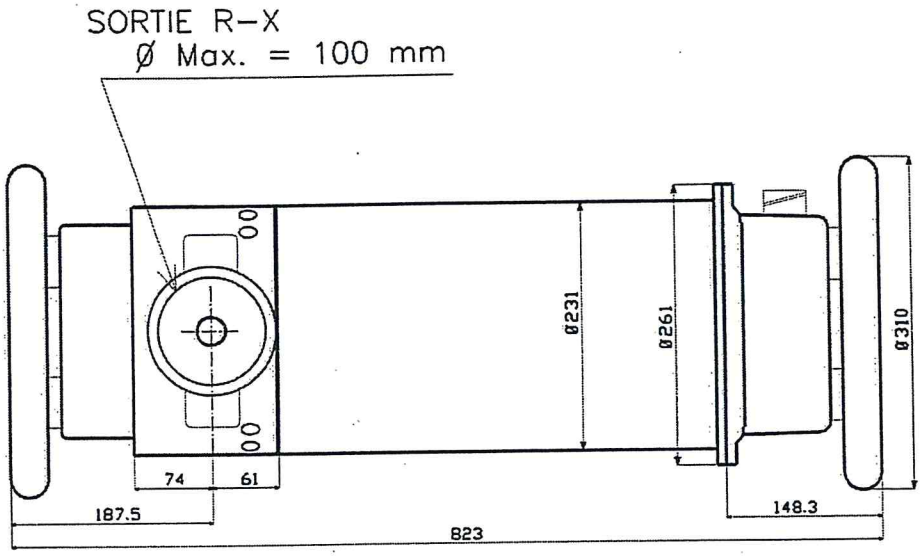
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CHAPTER XI – LAY OUT

- CERAM35	5.811.018
- CERAM235	5.811.193
- GFC305	5.807.340
- GFC205	5.806.613
- GFC165	5.807.620
- GFD165	5.807.521
- CF2000	

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POIDS SANS ANNEAUX DE GARDE ET PORTE CENTREUR = 31Kg

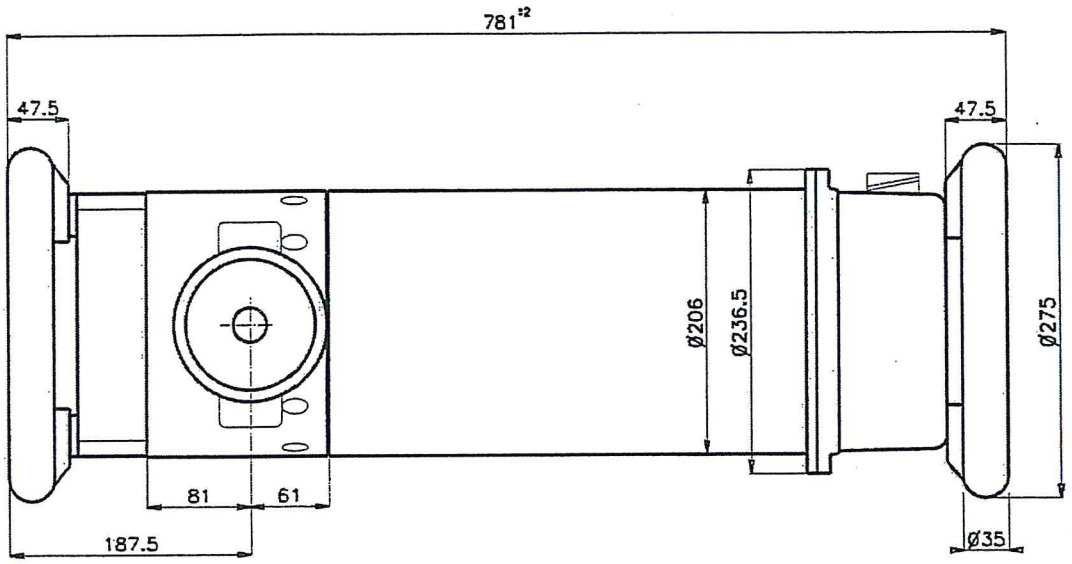
POIDS TOTAL = 34.9Kg

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BALTEAU	BALTOSPOT **CERAM 35** RX27				Echelle		
ENCOMBREMENT		Disk:	Date Revi : 25/1197		0	5.811.018	

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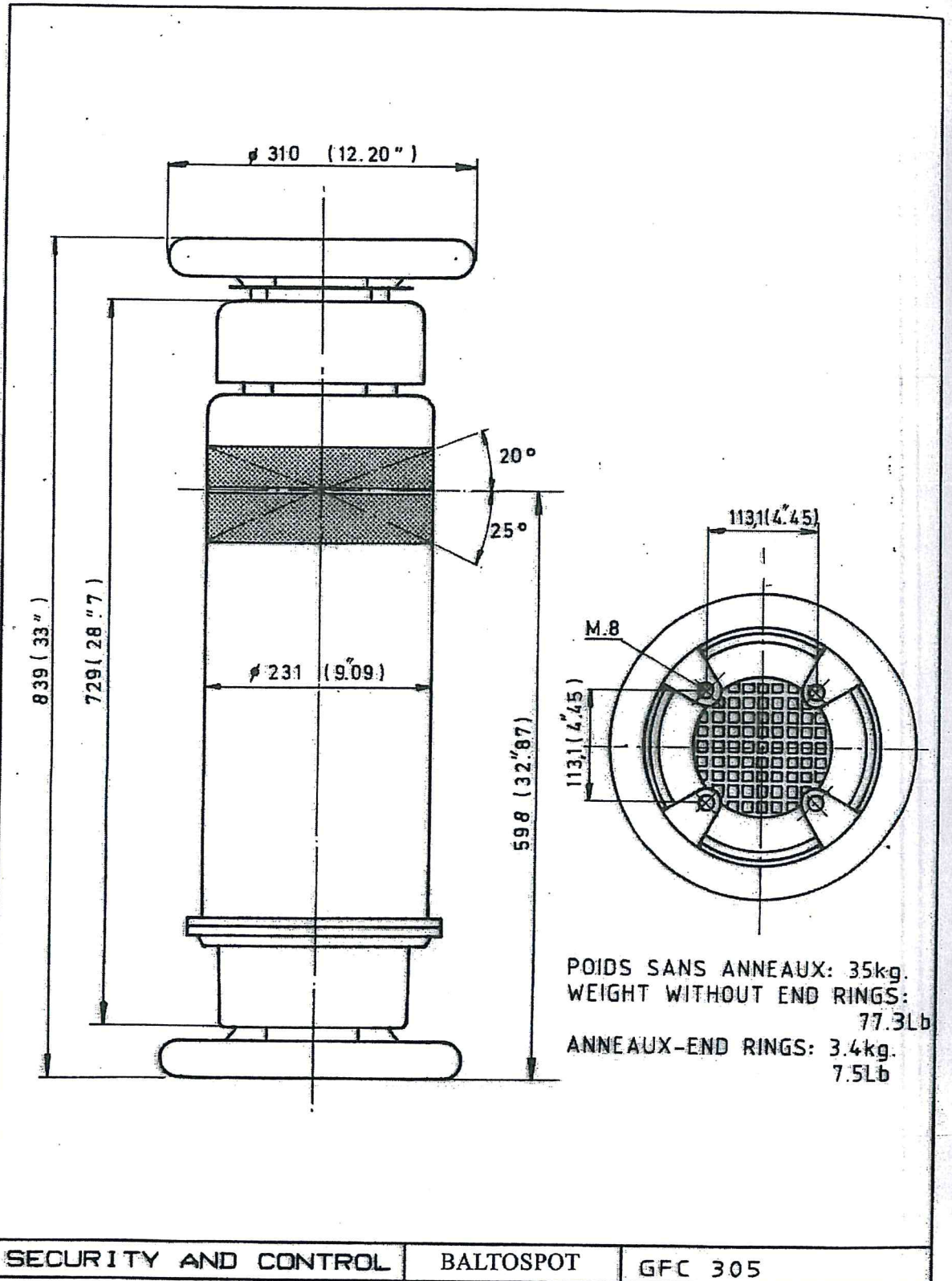
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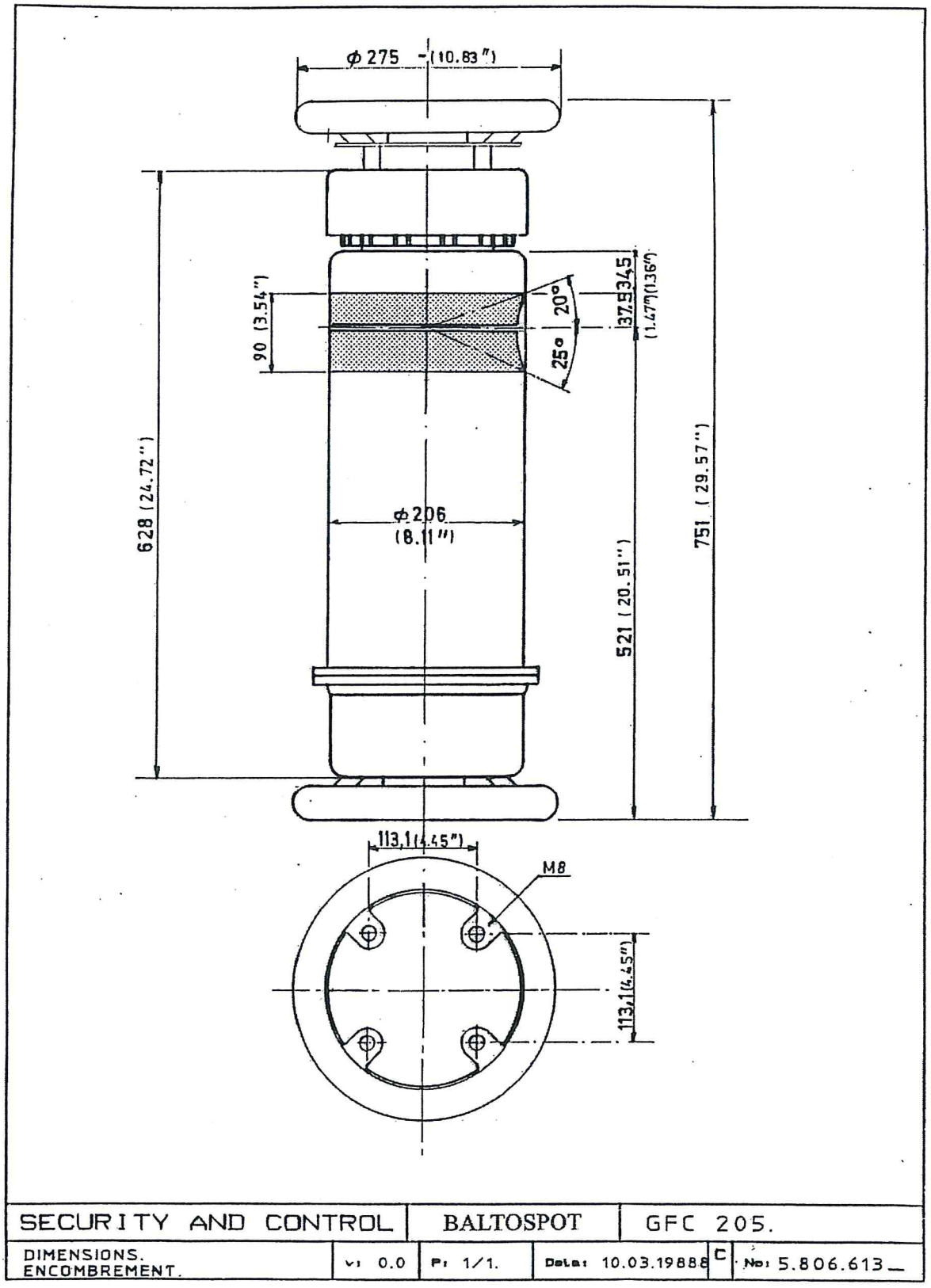


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DIMENSIONS. ENCOMBREMENT.	V: 0/0	P: 1/1	Date: 8.03.1988	C	No: 5.807.340

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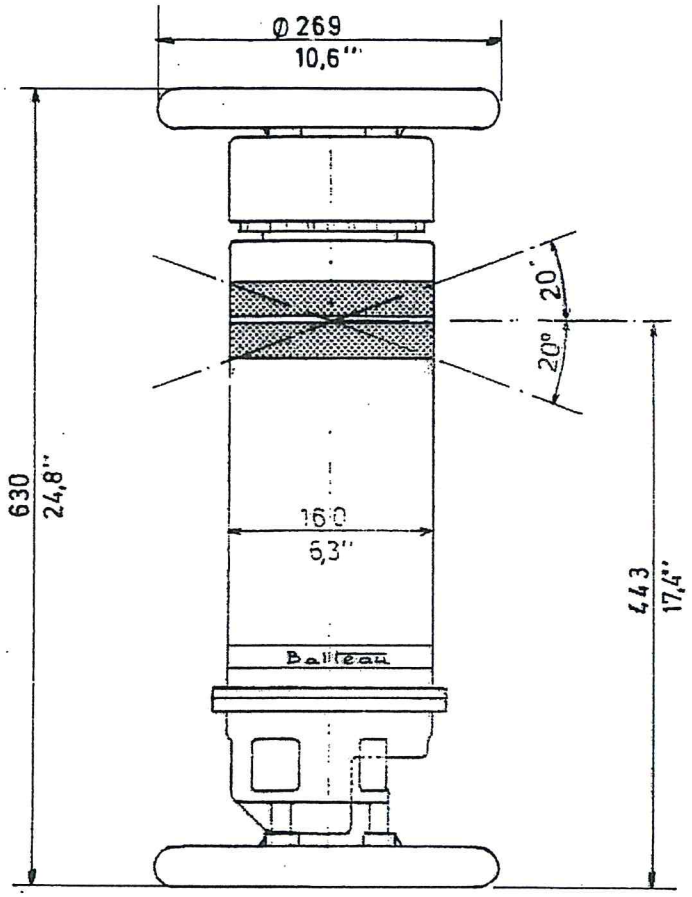


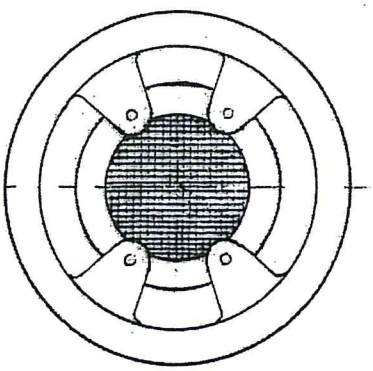
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POIDS SANS ANNEAUX 13,2 Kg
WEIGHT WITHOUT END RINGS 29,3 Lbs
ANNEAUX - END RINGS 2 Kg 4,4 Lbs

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Symbole ISO

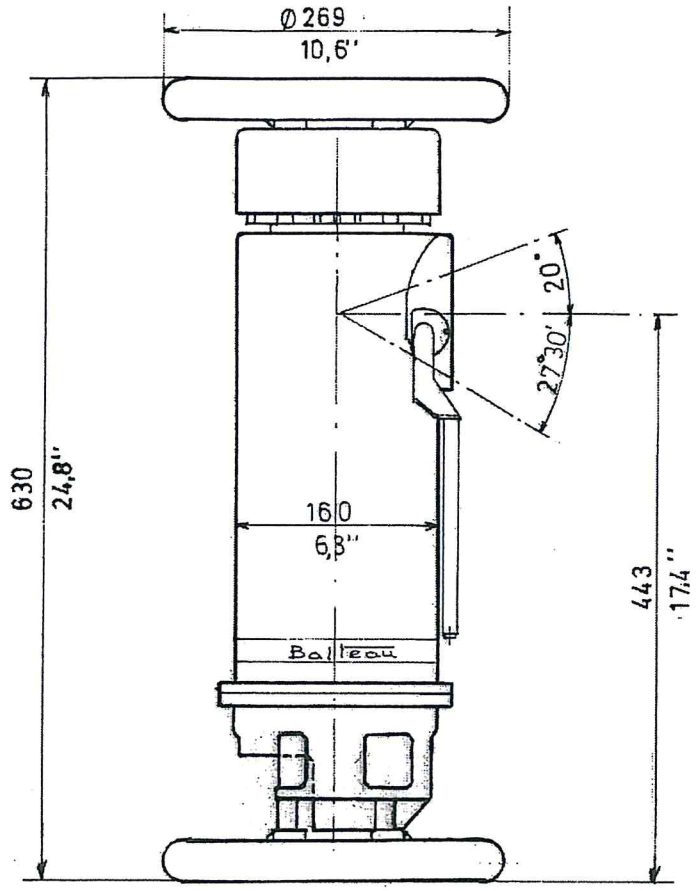
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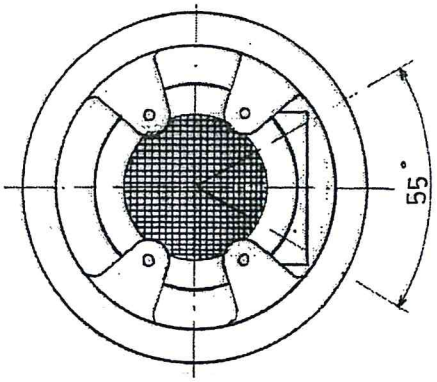
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WEIGHT WITHOUT END RINGS 29,3 Lbs
ANNEAUX - END RINGS 4 Kg 8,7 Lbs

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Symbole ISO

BALTOSPOT GFD 165

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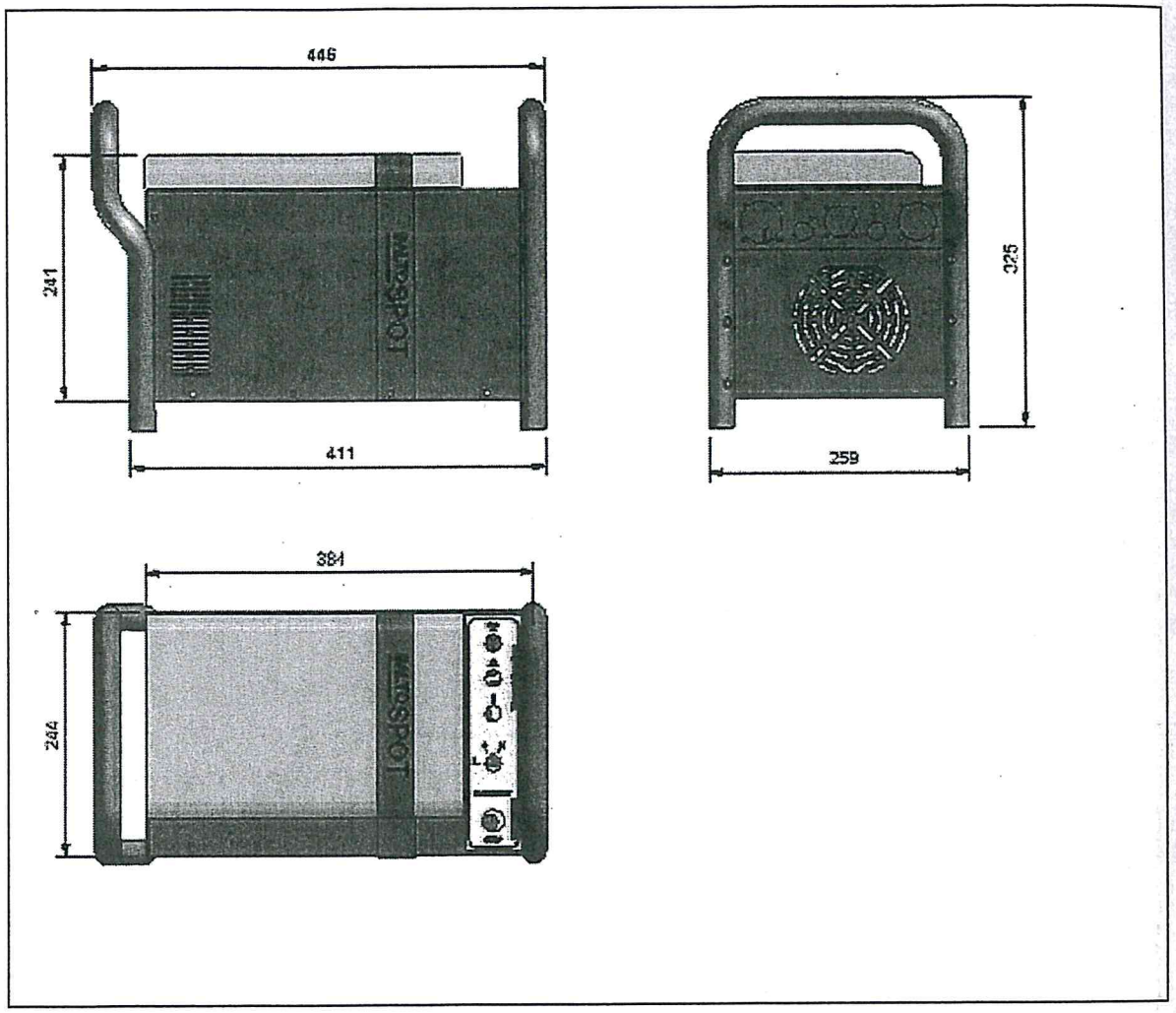
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CF2000



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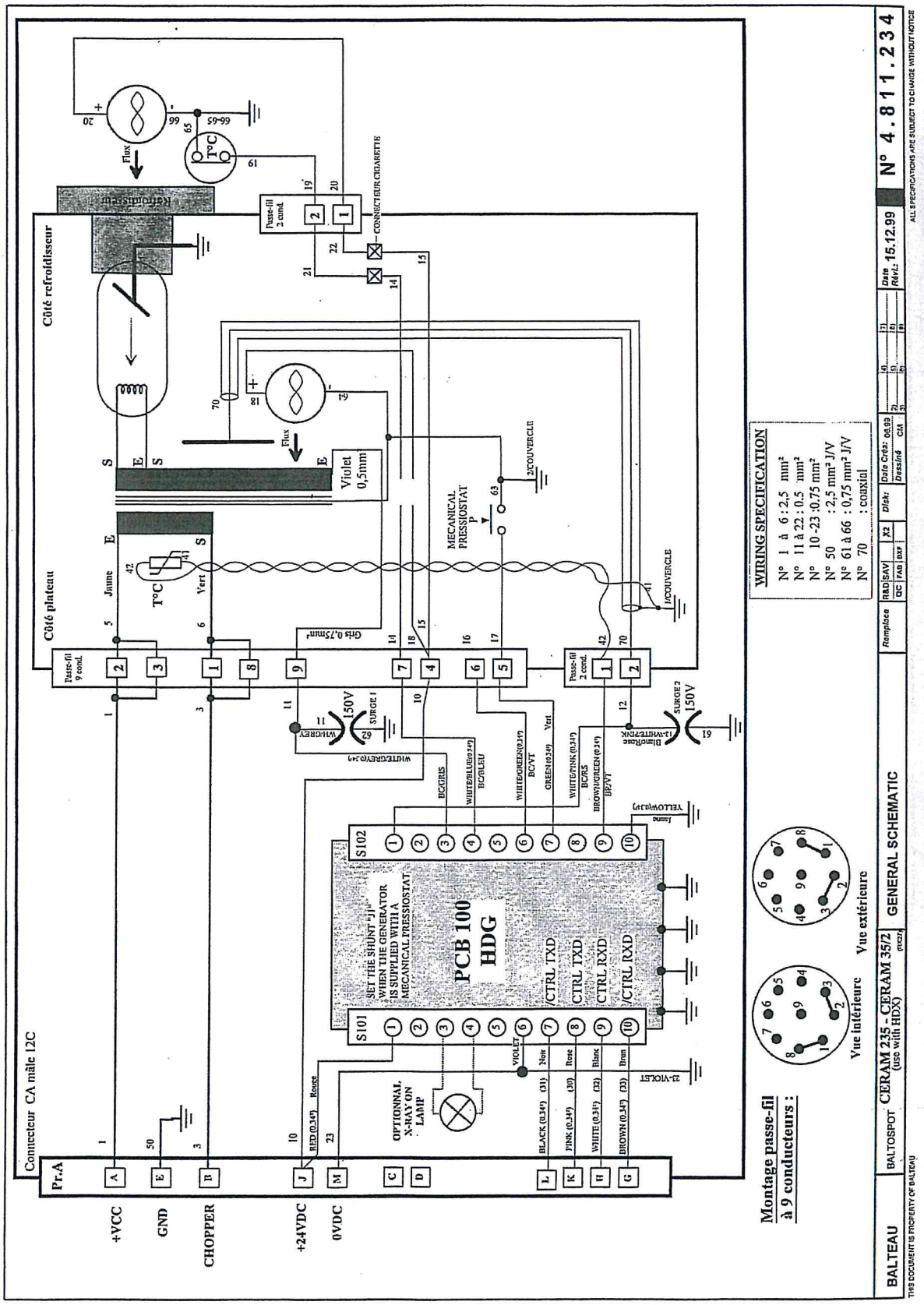
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CHAPTER XII - ELECTRICAL DRAWINGS

1. GENERAL SCHEMATIC CERAM 35/235 4.811.234
2. SCHEMATIC BLOC CPU 4.811.276
3. SCHEMATIC POWER UNIT : 4.811.277
4. Flashing light and safety interconnections 5.811.246

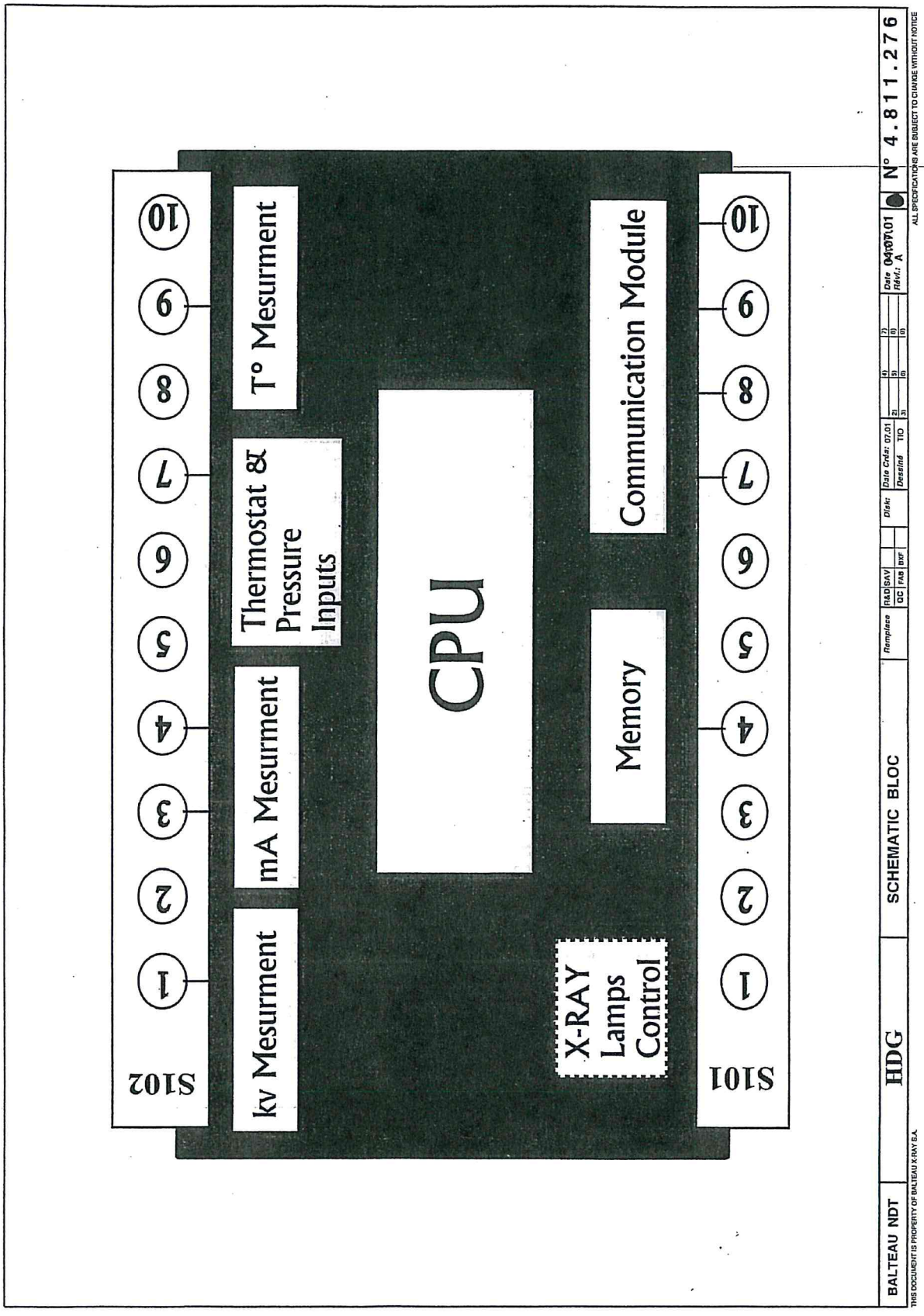
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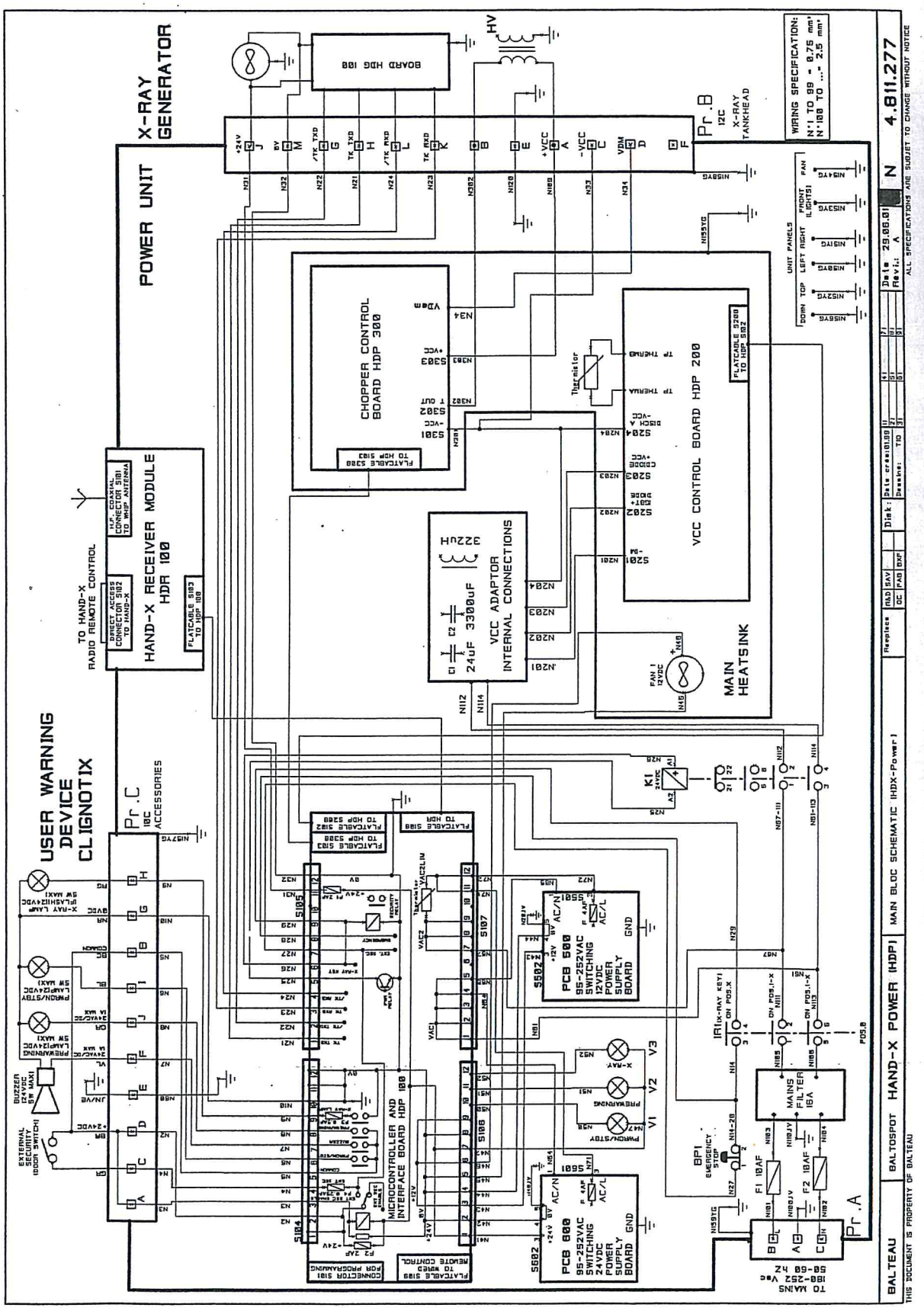
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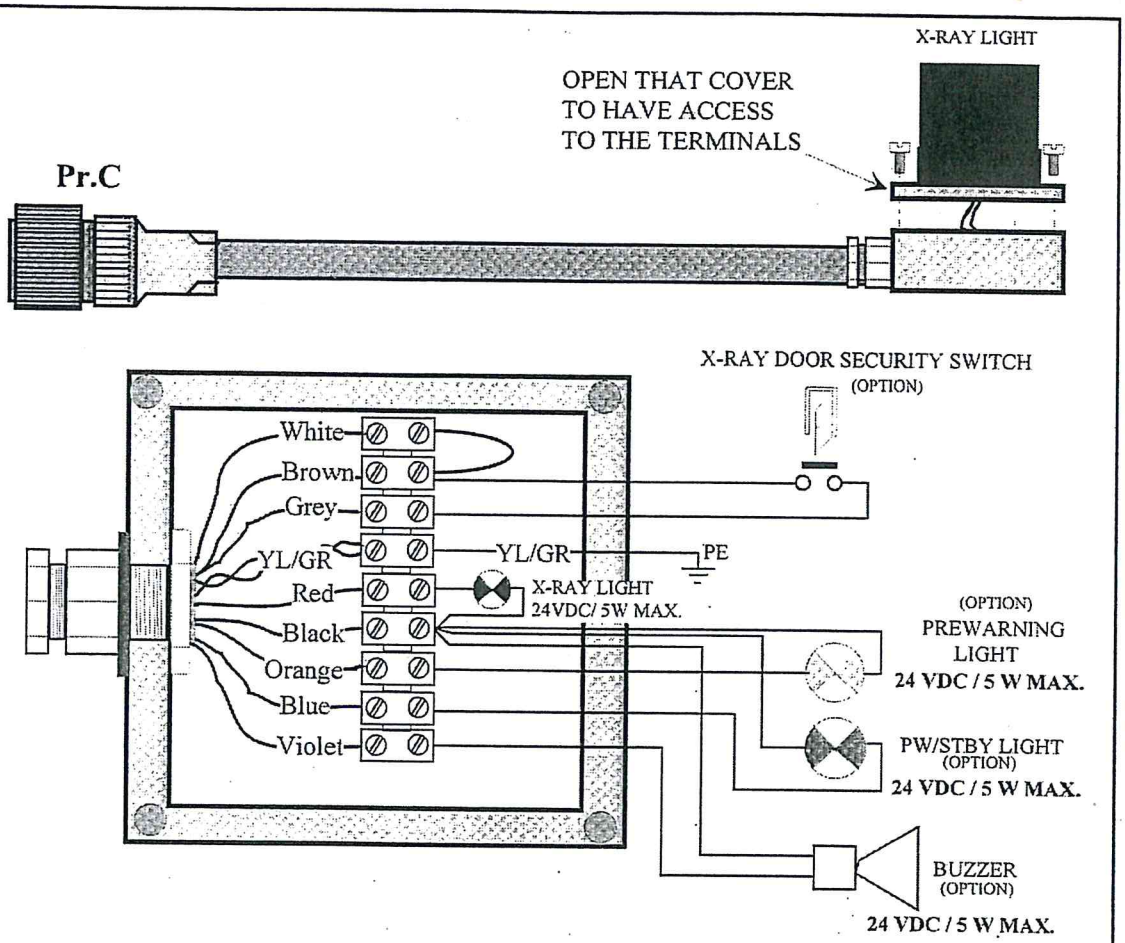
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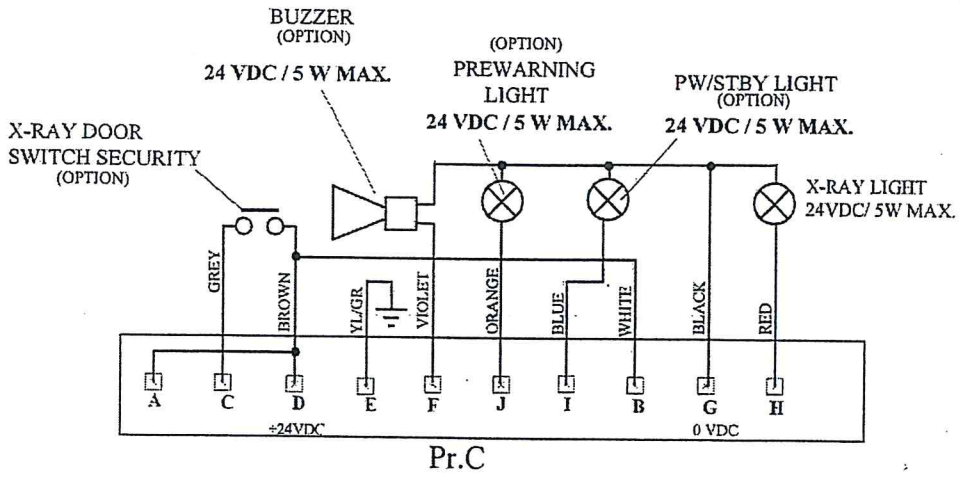


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SCHEMATIC



Date Créa: 03/99	Remplace	Dessiné CM	Destinataires R&D SAV QC FAB BXF ME	1) 5) 9) 2) 6) 10) 3) 7) 11) 4) 8) 12)
BALTEAU	BALTOSPOT	HAND-X POWER (HDP) (RX28)		
LIGHTING AND SECURITY CABLE		Disk:	Date Révi.: 16.12.99	5.811.246

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CHAPTER XIII - MAINTENANCE AND SPARE PARTS

DISPLAYED MESSAGES – DESCRIPTION AND CORRECTION

CLIGNOTIX GEN.FAIL
Used if X-Ray generator is equipped with flashing light
➔ deflective bulb to be replaced

TEMP.GEN.HIGH
TEMP.TUBE HIGH
Internal temperature or X-Ray tube too high
➔ wait the temperature drop with fans running

PRESSURE GEN.LOW
Pressure less than 3,9 kg/cm²
➔ keep the generator at 20° ambient temperature and wait the pressure is OK
➔ gas leak to be repaired – contact service centre

MANUAL STOP
The X-ray emission has been stopped by stop button

CHOPPER FAIL
Internal chopper CF2000 fault
➔ contact service center

DEMAG.FAILURE
Internal demagnetisation CF2000 fault
➔ contact service center

X KEY OFF
The 3 position key is not in X position
➔ turn the key in X position

EXTERNAL SECURITY
Door switch activated or not connected

EMERGENCY STOP
Emergency button activated
➔ release the emergency button

12 V LOW
24 V LOW
12 or 24 Volts CF2000 voltage low
➔ test fuses
➔ contact service center

MAINS LOW
The main voltage lower than 170 V
➔ check voltage supplies

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INTERLOCK FAILURE

CF2000 internal bad contact
➔ check internal interconnection

INT.CLIGNOTIX FAIL

CF2000 flashing lamp defective
➔ replace the bulb

EXT.CLIGNOTIX FAIL

External flashing light defective
➔ replace the flashing light block

CHOPPER TEMP HIGH

CF2000 chopper temperature too high
➔ wait until the temperature is again OK
➔ check if Fan is still working or air flow not obstructed

TEMP VALISE HIGH

CF2000 temperature too high
➔ wait until the temperature is again OK

mA HIGH

Tube current too high
➔ contact service center

mA LOW

Tube current too low or such
➔ check cable and plug contact
➔ contact service center

kV HIGH

kV to high regarding to normal value
➔ contact service center

kV LOW

kV to low regarding to normal value
➔ check cable and plug contact
➔ check mains power supply
➔ contact service center

GENERATOR LINK LOST

No connection between the power unit and the generator
➔ check cable and plug contact
➔ contact service center

VCC SECURITY

Measured kV different from the requested kV
➔ Contact service center

LINK LOST

➔ no connection between PCB HDX/CF2000 and PCB 120 into CF2000
➔ defective PCB
➔ contact service center

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PREVENTIVE MAINTENANCE

Fan

Power unit and X-ray generator are equipped with 24 VDC big fans. The heat exchanger and Fans have to be regularly cleaned.

SF6 Gas pressure

The X-Ray generator is SF6 gas insulated the pressure should be 4,5 to 5 kg/cm² at 20°C.
If lost of pressure, leakage has to be found and gas pressure corrected.

Plugs-cables

The plugs contacts should remain clean dry and without arcing trace.
The cable should be free for many mechanical damage. Any damage has to be repaired or cable replaced.

Bulb from Power unit

Replace the defective bulb if not working.
Type E 10 24 V

Flashing lamp

If detective, replace the complete module 24 V 5 W.

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FAULT TROUBLE SHOOTING LEVEL 1

Turning the key switch (5) on X position :
- no green lamp ON
- fans are not running

→ check power supply
→ check fuses
→ check power supply inside CF2000
→ check entry filter from CF2000
→ contact service centre

Pressing one button from the CF2000 and no display

→ contact service centre

You press START and no X-Ray
→ the Power unit does not deliver any voltage
→ check all fuses
→ power module faulty – contact service center
→ PCB board from X-Ray generator is defective – contact service center

Message GENERATOR LINK LOST always on the display
→ cable to the X-Ray generator defective

Message LINK LOST
→ cable from PCB100 and PCB120 disconnected
→ defective PCB100 – contact service centre
→ defective PCB120 – contact service centre

Message EXTERNAL SECURITY always on display

→ Shut down the Hand-X Power and disconnect the Clignotix
Restart the Hand-X Power and check the message doesn't display anymore.
Check the door contact, it must be linked between the grey wire and the bruin wire in the Clignotix box or security must be wired properly (See view 5.811.246)
Check the fuses F1 et F2 (2A) on the PCB 101.
Through the menu maintenance it's also possible to work without flashing device and door interlock.

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No display at all. (Version < 1.03) or poor contrast

Could be a contrast problem on the LCD.

⇒ Start up the Hand-X. - Bip-
⇒ Press the MENU (6) key
⇒ Press the 3 key
⇒ Press the 8 key
⇒ Lower the contrast value by keeping the scrolling key (13) pressed until something come on display (110 is an average value)
⇒ Select OK (11)
or pressing more than 3 seconds the backlight button will scroll the contrast possibility.
When releasing the backlight button, actual position memorized.

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SPARE PARTS

CF2000 power unit 0 820909 0

Mains plug	1 810171 B
Generator plug	1 810171 L
Security plug	1 810171 K
Rectifier bridge 35 A	0 473003 0
24 V power supply	0 491033 0
12 V power supply	0 491032 0
Fuse 4AF Dim: 5x20	0 427061 0
Yellow light	0 460014 0
Red light	0 460015 0
Green light	0 460016 0
Bulb for light	0 460077 0
Emergency switch	0 420145 0
Key switch	0 420008 0
24 V relay	0 422004 0
Fuse holder	0 427003 0
Fuse support	0 427004 0
Fuse 16AT Dim: 6,3x32	0 427002 0
12 V fan	0 462012 0
PCB HDP 120	0 820912 0
Fuse 0,5AF Dim : 5x20	0 427064 0
Fuse 2AF Dim : 5x20	0 427061 0
Power Module	0 820200 0

X-RAY GENERATOR CERAM235

Hand ring	0 190473 0
Anode cooling fan	0 462013 0
Four protective grid	0 462027 0
Anode thermostat	0 431035 0
plug	1 810171 D

X-RAY GENERATOR CERAM35

Hand ring	0 190571 0
Anode cooling fan	0 462013 0
Four protective grid	0 462027 0
Anode thermostat	0 431035 0
plug	1 810171 D

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X-RAY GENERATOR GFD165

Hand ring	0 190675 0
Anode cooling fan	0 462007 0
Anode thermostat	0 431022 0

X-RAY GENERATOR GFC165

Hand ring	0 190675 0
Anode cooling fan	0 462007 0
Anode thermostat	0 431022 0

X-RAY GENERATOR GFC205

Hand ring	0 190473 0
Anode cooling fan	0 462013 0
Anode thermostat	0 431022 0

X-RAY GENERATOR GFC305

Hand ring	0 190571 0
Anode cooling fan	0 462001 0
Anode thermostat	0 431022 0

CABLES

Power cable (10m)	0 820177 0
20m connection Cable HX/baltospot	0 820179 0
Clignotix cable	0 820178 0