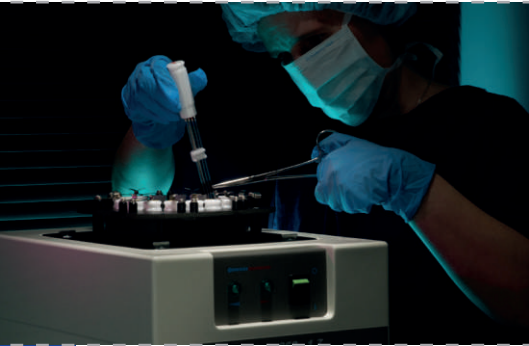


Controlled Rate Freezers

...programmable Freezers
for Cryopreservation



Controlled freezing ...



... for biological matter.



Kryo 360 - 3.3, Kryo 560 - 16 and Kryo 750 - 30

The freezers Kryo 360-3.3, Kryo 560 and Kryo 750-30 incorporate all the important features expected of a first-class freezer for biological mater. The final temperature of -180°C ensures integrity during transfer to the storage location. Due to its flexibility the system is ideal for the complex and demanding protocols used in the latest techniques of cryoconservation.

The sample capacity of the systems also fulfils the requirements of laboratories with an extremely high workload and the compact highly up-to-date form produces increases in efficiency in even the most modern facilities.

Advantages that convince:

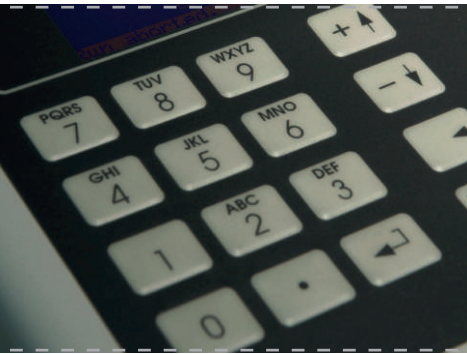
- high reliability
- horizontal or vertical freezing (Kryo 360-3.3)
- validation – consistent results
- increased holding time – safe
- manifold protocols – flexible
- compact – requires little space in laboratory
- menu controlled – user-friendly
- freezing of ampoules and straws (Kryo 360-3.3)
- freezing of ampoules-straws and freezer bags (Kryo 560-16)
- directed laminar flow for efficient and even cooling (Kryo 560-16)

The freezers conform to the “Guideline 93/42/EWG on medicinal products”.

With PC- software DeltaT[®]

Article No.	Freezer
78213715	Kryo 360-3.3 MD
78213716	Kryo 560-16 MD
78213717	Kryo 750-30 MD

Easy Operation ...



... for a secure system.

MRV-programmer for Kryo 360 - 3.3 and Kryo 560 -16

The MRV-programmer allows manifold protocols yet remains easy to programme and to operate. During the process and thereafter a comprehensive stack of information is displayed which is available as alphanumeric and graphic data on the display or it can be printed on the integrated full screen printer.

Validation was afforded a high priority. The MRV-programmer enables password controlled access to several oper-

ating levels, date and time stamp, programme preview and checking before processing and data storage of the previous 5 processes with subsequent printout. User calibration and the creation of the appropriate paper printouts belong to the range of functions of the device. A PC-connection compatible to the comprehensive DeltaT® software belongs to the standard equipment.

The system has been fitted with a number of security elements which protect against loss of power or the PC during operation of the device by the

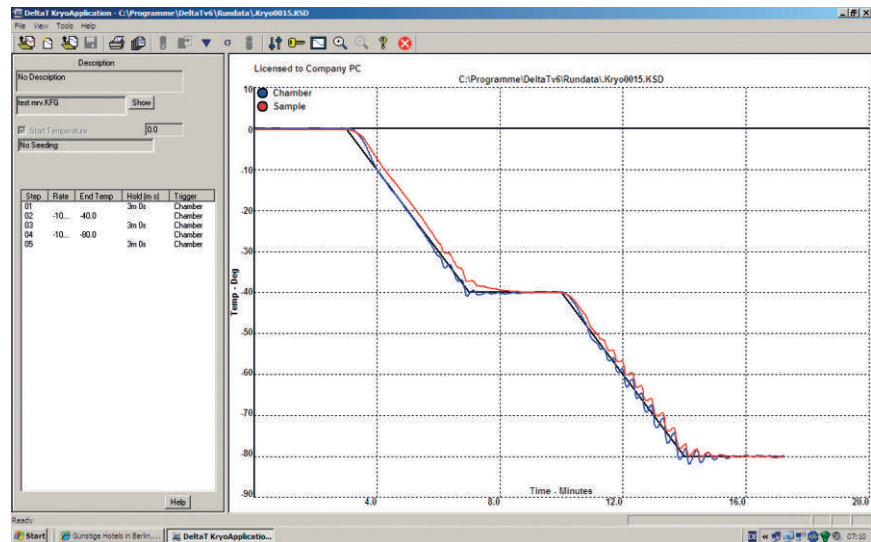
software. Processor or system problems are monitored and the system independently reboots automatically in order to protect the samples.

Thus, for example, all control and data systems are separate from each other and the controller can be removed from the freezer chamber in operation without loss of any programme integrity. Data storage and the execution of the programme are carried out in isolated electronic systems that are independent of each other.

DeltaT® PC-Software for Freezers

DeltaT® supports the PC-interface of the freezers. This enables you to quickly develop and maintain profiles (freezer curves) on your PC and observe the freezing process on your PC in real time.

DeltaT® can not only be utilized to store data on your PC (the possible volume simply depends on the size of your hard drive) but also to print the manual documentation on a standard printer.



	DeltaT®
Create profiles	yes
Run profiles	yes
View Kryo-data	yes
Print Kryo-data	yes
Export Kryo-data	yes

Features:

- unlimited freezing profiles
- graphic data in real time
- graphic data after programme execution
- traceability of records
- password protection
- commentary before and after programme execution

Kryo 360-3.3 and Kryo 560-16 ...

... for a programmed, controlled Cryoconservation.



Features of the Kryo 360-3.3

- The controller displays the desired temperature, the sample and chamber temperature, the programme level and the current temperature graph.
- menu controlled controller which is easy to programme and to operate
- horizontal and vertical operation
- compact form
- standard functions:
 - start above the temperature of the environment
 - controlled warming
 - data print (integrated printer)
 - serial interface (RS 232) to connect PC
 - fast cooling rates
 - many security features



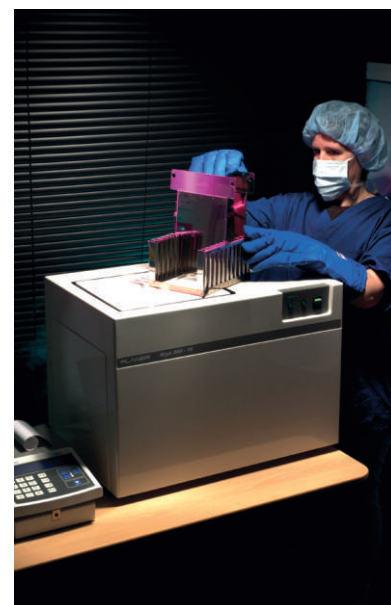
	Kryo 360-3.3
Chamber volume	3.3 litres
Straw capacity	60 x 0.25ml or 45 x 0.5ml on 15 radial radially aligned positions
Ampoule capacity	60 x 2 ml on 15 radial radially aligned positions
Bag capacity	-
Temperature lower limit	-180°C
Cooling rates	-0.01 to -50° C/min
Controlled heating rates	0.01 to 10°C/ min
System controller	MRV



Features of the Kryo 560-16

In connection with the unique directed laminar flow of the cooling agent and the cryogenic isolation for an even temperature control in all phases of the protocol the top loading chamber ensures that the lid does not freeze at cryogenic temperatures.

	Kryo 560-16
Chamber volume	16 litres
Straw capacity	2904 x 0.25 ml (in beakers), 968 x 0.5ml (in beakers) or 456 x 0.25-0.5 ml (on freezer stands)
Ampoule capacity	784 x 1.0-2.0 ml or 588 x 1.0-5.0 ml in baskets
Bag capacity	11 x 250/500 ml bags or 48 x PALL-bags
Temperature lower limit	-180°C
Cooling rates	-0.01 to -50°C/Min
Controlled heating rates	0.01 to 10°C/Min
System controller	MRV



Technical Data

System Specifications	Kryo 360-3.3	Kryo 560-16
Temperature range	+40°C to -180°C	+30°C to -180°C
Heating rate	0.01°C/min to 10°C/min	0.01°C/min to 10°C/min
Cooling rate	-0.01°C/min to -50°C/min	-0.01°C/min to -50°C/min
Precision of Controller	±0.3°C at storage of 0°C	±(0.3 + 0.005 x TM)°C (where TM is the temperature)
Storage temperature	-10°C to +50°C	-10°C to +50°C
Storage humidity	5% to 95% relative humidity not condensing	5% to 95% relative humidity not condensing
Operating temperature	5°C to 40°C	5°C to 40°C
Operating humidity	5% to 90% relative humidity not condensing	5% to 90% relative humidity not condensing

Controller Specifications	Kryo 360-3.3	Kryo 560-16
Dimensions	80 mm x 220 mm x 350 mm (HxWxD)	80 mm x 220 mm x 350 mm (HxWxD)
Weight (approx.)	2.6 kg	2.6 kg
Display	240 x 64 LCD with CCFL backlight	240 x 64 LCD with CCFL backlight
Printer	320/640 Dot Thermoprinter	320/640 Dot Thermoprinter
Keyboard	membrane Keyboard 20 keys	membrane Keyboard 20 keys
Programmable Cooling rate range	-0.01°C/min to -99.9°C/min	-0.01°C/min to -99.9°C/min
Number of profiles	10	10
Level per profile	32	32
Number of runs stored	5	5

Chamber Specifications	Kryo 360-3.3	Kryo 560-16
Weight (kg)	14.7 (3.3 l chamber)	23 kg
Capacity	3.3 l	16 litres
Chamber dimensions	Inside: 400 mm x 150 mm Ø Outside: 450 mm x 300 mm x 420 mm (HxWxD)	Inside: 350 mm x 230 mm x 230 mm (HxWxD) Outside: 460 mm x 640 mm x 405 mm (HxWxD)
0.25 ml-straws	60	2,904 in beakers or 456 in racks
0.5 ml straws	45	968 in beakers or 456 in racks
2 ml ampoules	60	yes
cryotubes (vials)	-	784 x 1.0-2.0 ml or 588 x 1.0-5.0 ml
50 ml blood bags	-	22
250 ml–750 ml blood bags	-	11
Power requirement (incl. MRV controller)	115 V~50/60 Hz 600 VA/230 V~50/60 Hz 600 VA	115 V~50/60 Hz 1500 VA/230 V~50/60 Hz 1500 VA
Nitrogen supply deeply cold liquid	0.5 - 1.5 bar	0.5 - 1.5 bar

PC-Software: The freezers are delivered together with the PC-Software DeltaT®

Kryo 750-30 ...



... for freezing large quantities.

Features of the Kryo 750-30

The freezer Kryo 750-30 is a unique integrated freezer for cryoconservation of large samples or of samples in large number.

The easily accessible front loading door is locked by means of a three-point locking system which ensures an airtight seal. This prevents the door freezing at low temperatures. Heated door seals add further protection.

The built-in control system is operated by means of a unique two-button process. In this manner one can assure an inadvertent execution of the wrong protocol, that usage is quickly learned and execution is precisely supervised. As an option the device can be operated by using of the PC-application DeltaT®. This enables manifold protocols and online data access as well as creation and storage of the data for validation.

The software employs multi-level password protection so that only authorized users can work with it. User calibration allows the use of external standards. The large, easily accessible chamber is flexible in its use and offers high capacity so that particularly sophisticated laboratory demands can be fulfilled.

Protocols can be started on the basis of the "Event Sample Temperature" which ensures high cooling performance at the melting temperature in connection with the fast cooling rates and the directed laminar flow of the system. This enables efficient removal of latent warmth and ensures an optimum survival rate of the samples after thawing.

Specifications Overview:

- chamber volume: 29 litres
- capacity: 20 x 250 - 1000ml blood bags, or 40 x PALL. Blood bags, horizontal/vertical in the chamber
- capacity for cryotubes: 1452 x 2 ml
- capacity for straws: 5808 x 0.25 ml (on beakers), 1936 x 0.5ml (in beakers) or 836 x 0.25-0.5 ml (on freezer racks)
- temperature lower limit -160°C
- cooling rates: -0.1 to -50°C/min
- controlled heating rates: 0.1 to 10°C/min
- system controller: integrated
- PC-Software DeltaT® included

Performance Features:

- top or front loader for easy loading
- detachable inside chamber for sterilisation
- freezing of samples in bags, ampoules and straws
- directed laminar flow for efficient and even cooling
- protocol start by sample, time or temperature
- designed for freezing of samples in bags, ampoules and straws
- unique two-button operation
- standard PC-Software enables password protected manifold protocols
- protocol level can be started by samples, chamber temperature or time
- unique directed laminarflow of the cooling system ensures absolutely efficient, even cooling
- opening on top or at the front for easy loading
- heated door seals prevent freezing at cryogenic temperatures
- inside chamber removable for sterilisation
- Standard functions:
 - controlled warm up
 - serial interface (RS 232) for PC connection
 - rapid cooling rates

Specifications		Outside	Inside
Frontloader	Height	55 cm	26 cm
	Width	79 cm	46.5 cm
	Depth	48 cm	25 cm
Toploader	Height	48 cm	25 cm
	Width	79 cm	44.5 cm
	Depth	55 cm	26 cm

PC-Software: The freezers are delivered together with the PC-Software DeltaT®

Technical Data

Weight	approx 45 kg (Supply weight incl. packaging)
2 ml cryotubes	1,452
Straws	5,808 x 0.25 ml (in beakers), 1,936 x 0.5 ml (in beakers) or 836 x 0.25-0.5 ml (on freezer racks)
PALL blood bags	40
250-1000 ml blood bags	20
Air flow	horizontal laminar flow
Temperature range	+100.0°C to -160°C
Cooling agent	Liquid nitrogen 22±2 psi
Heating	1000 W
Sensors: Control and Sample Sensors	4 wire platinum resistance thermometer. The sensors are linearized in the software according to international standards which use a 4096-dot-lookup-table based on BS1904:1984, Table 1. Calibration option included.
Precision	±0.5°C at a holding temperature of 0°C (the dynamic precision is programme dependent, for example on the change rate of the temperatures)
Heating rates	0.01°C/min to 10°C/min
Cooling rates	-0.01°C/min to -10°C/min
Programmable cooling rate range	-0.01°C/min to -99.9°C/min
Operating positions	vertical or horizontal
Temperature Security	switches off at 120°C
Power Requirement	103-126 VAC 50/60 Hz 1200VA (max.)(470VA only freezing, on operation of seal and storage heating/seal heating and holding current).The device can be damaged by excess voltage which exceed the level stated by more than 15%.
Sensitivity	16.7mV/°C. nominal impedance > 10 K
Recorder Scale	0V = -200°C, +5V = +100°C
Standards	The device fulfils the safety regulations BSEN 61010, CSA-2No.125-M1984, CSA22.2No.151-M1986, EN50082-2, EN50081-2
Storage Temperature	-10°C to +70°C
Storage Humidity	up to 95% not condensing
Operating Temperature	5°C to 40°C
Operating Humidity	under 95% not condensing
Nitrogen Supply deeply cold liquid	0.5-1.5 bar

Cryo-Supply Systems

The vacuum super-insulated containers by Cryotherm serve to store and transport the deeply cold fluid gases. We deliver for you the ideal supply containers for all uses in research, development, medicine and industry – completely equipped and immediately operational.

JUNO® LIN-Supply container (25 - 100 l) · APOLLO® LIN-Supply Container (50 - 350 l)
SATURN® LIN-Transport Container (100 - 300 l) · MERKUR® Transport Tank (500 - 2,000 l)
SIRIUS® LIN-Supply Container (1,000 - 2,000 l) · HELIOS® LHe-Storage Container (100 - 10,000 l)
STRATOS® LHe-Transport Container (100 - 1,000 l)

Cryo-Piping Systems

In order to transport deeply cold fluid gases from A to B almost without any loss we have developed special vacuum super-insulated transfer piping. These transfer piping systems are distinguished by high thermal quality. For LIN/LOx/LAr/LHe/LH₂ rigid transfer piping (DN 14 - 100) · flexible transfer piping (DN 20 - 32) plug-in coupling – weld coupling · gas phase separator (10 l) · phase separator (50 - 200 l)

Cryo-Customizing/Cryo-Engineering

If you have completely individual research tasks to perform. Do you have the right partner for the job? Whether you work in micro-electronics or one of the many other areas of research we have the specialist staff who know your field and speak your language.

Cryo-Storage Systems

Today storage periods of many years are in demand. Make use of our Cryo -Storage Systems for long - term storage of biological, medicinal and chemical materials in laboratories and Cryobanks. BIOSAFE® MD-sample storage system (medical product) (120 - 1,400 l)
BIOSAFE® SC-sample storage system (120 - 1,400 l) · CHRONOS®-sample container (120 - 1,400 l)
STELLA®-work container (0.5 - 63 l) · Freezing apparatus (3.3 - 16 l) · dryo shipper

Cooling of Transport Systems

Deep frozen foods cover an ever larger part of our daily requirements. For an optimal cooling quality we equip your cold storage vehicles, trailers, semi-trailers, swap bodies and containers with transportable Cryo-Systems.
CRYOGEN®-Trans-System

After-Sales-Service

Installation/Assembly, Start Up, Spare Parts Service, Repair/Maintenance, Instruction/Training, Technical Hotline +49 (0)2741 958575



Contact

Cryotherm GmbH & Co. KG
Euteneuen 4
D-57548 Kirchen
Fon: +49 (0) 2741 9585-0
Fax: +49 (0) 2741 6900
info@cryotherm.de
www.cryotherm.de



01.15