# Laboratory / Medicine / Pharmaceutical Refrigerators (with solid door)

# **Biomedical Refrigeration I LR / ML**















# The model range LR complies with the Dometic Safety Standard



MODEL	LR 250 G	LR 410 G	LR 490 G	LR 750 G
DIN 58345 (Refrigerators for drugs) GMP Clean Room Class A / ISO 5 (ISO EN 14644-1)				
Dometic Electronic				
Key-operated power switch (power ON/OFF)				
Safety door lock				
Digital temperature indicator (display : 0.1 digits)				
Controlled fan cooling system for constant temperature and even temperature distribution	•	•	•	•
across the entire refrigerating chamber. Automatic fan switch-off when front door opens				
Self-contained alarm system with integrated battery takes over the alarm function	•	•		•
and temperature value measurements in case of power failure for at least 48 hours				
Acoustic/visual alarm signal in case of temperature alarm and power failure				
All relevant data of temperature alarm and power failure alarm are stored in the alarm history.		•		•
Such as date and time of start and end, min. max and average temperature				
Alarm function test: simulation of a temperature rise or drop in order to test the alarm functionality				
Control via self-diagnostic system				
Safety thermostat prevents dropping of the cold storage products' temperature below +2°C				
Interior lighting				
Door opening alarm				
Remote transmission alarm signal (via potential-free contact) in case of temperature	•	•	•	•
alarm (change-over contact)				
Remote transmission alarm signal (via potential-free contact) in case of power failure	•	•	•	•
(change-over contact)				
Automatic closing of the front door below a door opening angle of 90°				
Interior made from stainless steel		•	•	•
Climate class (ambient temperature range) T (+16°C to +43°C)	•	•	•	•
Smooth castors with stabilizers for optimum flexibility of movement			•	•
RS485 interface for the display of all operating and control functions (hardware and software settings)				
via DMN monitoring software on a peripheral device (computer)	•	•	•	•
DMN Software package				
DCU - Dometic Communication Unit	O			O

■ standard / ○ optional























## LR 250 G

Gross volume : 246 L Net volume : 167 L



## LR 410 G

Gross volume : 408 L Net volume : 319 L



### LR 490 G

Gross volume : 489 L Net volume : 395 L

Available as Internal (Ex) II 3 G EEx nA II T6

### LR 750 G

Gross volume : 746 L Net volume : 620 L



# **Technical Data**



	0401
Gross volume	2461
Net volume	167
External dimensions (H x W x D)	1305 x 850 x 785 mm
Inner dimensions (H x W x D)	655 x 680 x 552 mm
Net weight (with standard equipment)	138 kg
Set temperature (preset)	+4°C
Set temperature (setting range) can be adjusted in steps of 0.5 °C	+4°C to +15°C
Cold alarm limit (preset)	+2°C
Warm alarm limit (preset)	+6°C
Control sensor	PT1000 2-WIRE 1/3DIN CL.B
Precision (from -80°C to +180°C)	± 0,2°C
Display sensor, optional	PT1000 2-WIRE 1/3DIN CL.B
Precision (from -80°C to +180°C)	± 0,2°C
Voltage	220-240 V - 50/60Hz (10A)
Power	200 W
Energy consumption	0.90 kWh /24h
Heat emission	172 Kcal/h
Compressor running time	15%
Noise level (at 1m height & 1m distance)	57 dB(A)
Accu data / function time of the control panel when power failure	12V -7 AH / 48 hours
Climate class (ambiant temperature range)	T (+16°C to +43°C)
Relative humidity range at ambient temperature	≤ 70% at 32°C
Defrosting technique	automatic (natural)
Refrigerant type	R134a
Door insulation (polyurethane)	100 mm
Casing insulation (polyurethane)	85 - 95 mm
Hold over time	120 min (from +4°C to +10°C)
Safety class	I
EMC directive	2004 / 108 / EEC
Low voltage directive	2006 / 95 / EEC
GMP - clean room classification	A / ISO 5
Material inner body	Stainless steel (V2A - 1.4301)
Material outer casing & door	Galvanized sheet steel (ST02Z-AZ150)
Material Drawers	Stainless steel (V2A - 1.4301)
Material Wire Shelves	Wire DIN 172-2, PA11 coated
Material N-Rack	Polycarbonate, transparent
Color outer casing	White (similar RAL 9010)
Color contrasts	Blue (similar RAL 5002)
ATEX category III, zone 2, interior	-

## Interior Equipment & Options (Concerning further information on accessories please see our leaflet "Racking & Storage Systems")

Standard interior equipment	2 Wire Shelves •
Wire Shelves, recommended / max.	2/40
ST-Drawers with Front Cover, max.	20
ST-Drawers without Front Cover recommended / max.	2/40
N-Racks	max. 5 per Drawer ○
N-Racks with Front Cover	max. 5 per Wire Shelf 🔾
ST-Wire Shelves, stainless steel (V2A - 1.4301)	0
RS485 interface	•
DMN Software package	•
DCU - Dometic Communication Unit	0
Ambient temperature sensor	0
Potential-free contact in case of power failure	•
Integrated inlet for external sensor (installed by customer)	•
Additional refernce bottle with reference fluid and fitting	0
Smooth castors with stabilizers for optimum flexibility of movement	•
Interior lighting	•
Integrated temperature recorder in form of a circular chart recorder / recording range : -10°C to +20°C	for 24h or 7 days 🔾
External water cooling	
Door hinge right	•
Door hinge left	0
Wooden packaging for ocean transport / export	0

### LR 410 G LR 490 G LR 750 G







746 I	489	408 I
620 I	395 I	319
1990 x 910 x 985 mm	1950 x 850 x 785 mm	1735 x 850 x 785 mm
1352 x 730 x 760 mm	1300 x 680 x 552 mm	1085 x 680 x 552 mm
202 kg	192 kg	171 kg
+4°C	+4°C	+4°C
+4°C to +15°C	+4°C to +15°C	+4°C to +15°C
+2°C	+2°C	+2°C
+6°C	+6°C	+6°C
PT1000 2-WIRE 1/3DIN CL.B	PT1000 2-WIRE 1/3DIN CL.B	PT1000 2-WIRE 1/3DIN CL.B
± 0,2°C	± 0,2°C	± 0,2°C
PT1000 2-WIRE 1/3DIN CL.B	PT1000 2-WIRE 1/3DIN CL.B	PT1000 2-WIRE 1/3DIN CL.B
± 0,2°C	± 0,2°C	± 0,2°C
220-240 V - 50/60Hz (10A)	220-240 V - 50/60Hz (10A)	220-240 V - 50/60Hz (10A)
300 W	240 W	240 W
1.60 kWh /24h	1.00 kWh /24h	0.90 kWh /24h
275 Kcal/h	207 Kcal/h	207 Kcal/h
18.5%	17%	15%
59 dB(A)	59 dB(A)	59 dB(A)
12V -7 AH / 48 hours	12V -7 AH / 48 hours	12V -7 AH / 48 hours
T (+16°C to +43°C)	T (+16°C to +43°C)	T (+16°C to +43°C)
≤ 70% at 32°C	≤ 70% at 32°C	≤ 70% at 32°C
automatic (natural)	automatic (natural)	automatic (natural)
R134a	R134a	R134a
85 mm	100 mm	100 mm
90 mm	85 - 95 mm	85 - 95 mm
120 min (from +4°C to +10°C)	120 min (from +4°C to +10°C)	120 min (from +4°C to +10°C)
1	Ī	<u> </u>
2004 / 108 / EEC	2004 / 108 / EEC	2004 / 108 / EEC
2006 / 95 / EEC	2006 / 95 / EEC	2006 / 95 / EEC
A / ISO 5	A / ISO 5	A / ISO 5
Stainless steel (V2A - 1.4301)	Stainless steel (V2A - 1.4301)	Stainless steel (V2A - 1.4301)
Galvanized sheet steel (ST02Z-AZ150)	Galvanized sheet steel (ST02Z-AZ150)	Galvanized sheet steel (ST02Z-AZ150)
Stainless steel (V2A - 1.4301)	Stainless steel (V2A - 1.4301)	Stainless steel (V2A - 1.4301)
Wire DIN 172-2, PA11 coated	Wire DIN 172-2, PA11 coated	Wire DIN 172-2, PA11 coated
Polycarbonate, transparent	Polycarbonate, transparent	Polycarbonate, transparent
White (similar RAL 9010)	White (similar RAL 9010)	White (similar RAL 9010)
Blue (similar RAL 5002)	Blue (similar RAL 5002)	Blue (similar RAL 5002)
-	option, without light, only with inox wire shelves	· · ·

4 Wire Shelves ●	5 Wire Shelves ●	5 Wire Shelves
4/8○	5 / 10 🔾	5 / 10 〇
40	5 🔾	5 🔾
4/8○	5 / 10 🔾	5/10 〇
max. 5 per Drawer ○	max. 5 per Drawer ○	max. 5 per Drawer 🔾
max. 5 per Wire Shelf 🔾	max. 5 per Wire Shelf (	max. 5 per Wire Shelf 🔾
0	0	0
•	•	•
•	•	•
0	0	0
0	0	0
•	•	•
•	•	•
0	0	0
•	•	•
•	•	•
for 24h or 7 days ○	for 24h or 7 days ○	for 24h or 7 days ○
0	0	0
•	•	•
0	0	0
0	0	0





### ML 155 SG

Gross volume : 155 L Net volume : 141 L

Availlable as Internal ( I 3 G EEx nA II T6



### ML 320 S

Gross volume : 322 L Net volume : 274 L

Availlable as Internal ( I 3 G EEx nA II T6



### ML 360 CS

Gross volume : 357 L Net volume : 324 L



### ML 580 S

Gross volume : 578 L Net volume : 518 L



The illustrations show the models of the ML range with standard interior equipment.

**Control of the storage temperature** and documentation of the temperature changes can – depending on the application – be carried out via an optional temperature recorder (in form of a circular chart recorder) or via the optional DCU, this through the Monitoring & Visualization Software DMN.

Gross volume : 353 L Net volume : 340 L



Subject to change without prior notice. Some of the accessories shown in the pictures are optional.



# **Technical Data**





Gross volume Net volume	155 I 141 I	322 I
Net volume	1/11	
	1411	274
External dimensions (H x W x D)	900 x 595 x 630 mm	1830 x 595 x 605 mm
External dimensions (with mounted temperature recorder)	1075 x 595 x 630 mm	1990 x 595 x 605 mm
Inner dimensions (H x W x D)	745 x 495 x 455 mm	1496 x 500 x 455 mm
Net weight (with standard equipment)	47 kg	60 kg
Set temperature (preset)	+5°C	+5°C
Set temperature (setting range) can be adjusted in steps of 0.5 °C	+4°C to +15°C	+4°C to +15°C
Temperature cold alarm limit (preset)	+2°C	+2°C
Temperature warm alarm limit (preset)	+8°C	+8°C
Control sensor	PT1000 2-WIRE 1/3DIN CL.B	PT1000 2-WIRE 1/3DIN CL.B
Precision (from -80°C to +180°C)	± 0,2°C	± 0,2°C
Display sensor, optional	PT1000 2-WIRE 1/3DIN CL.B	PT1000 2-WIRE 1/3DIN CL.B
Precision (from -80°C to +180°C)	± 0,2°C	± 0,2°C
Voltage	220-240 V - 50Hz (10A)	220-240 V - 50/60Hz (10A)
Power	70 W	140 W
Energy consumption	0.54 kWh /24h	1.10 kWh /24h
Heat emission	12 Kcal/h	120 Kcal/h
Compressor running time	20%	29%
Noise level (at 1m height & 1m distance)	40 dB(A)	37 dB(A)
Accu data / function time of the control panel when power failure	6V - 4,2Ah / 48 hours	6V - 4,2Ah / 48 hours
Climate class (ambiant temperature range)	SN / ST (+10°C to +38°C)	N (+16°C to +32°C)
Relative humidity	75%	70%
Defrosting technique	natural	automatic (natural)
Refrigerant type	R600a	R134a
Door insulation (polyurethane)	90 mm	70 mm
Casing insulation (polyurethane)	38 - 50 mm	50 - 55 mm
Hold over time	70 min (from +5°C to +10°C)	60 min (from +5°C to +10°C)
Safety class	Ī	i
EMC directive	2004 / 108 / EEC	2004 / 108 / EEC
Low voltage directive	2006 / 95 / EEC	2006 / 95 / EEC
GMP - clean room classification	B / ISO 6	B / ISO 6
Material inner body	Polystyrene (PS)	Styrene (SAN)
Material outer casing and door	Galvanized sheet steel (ST02Z - AZ150)	Galvanized sheet steel (ST02Z - AZ150)
Material Drawers	Polycarbonat, transparent	Polycarbonat, transparent
Material Wire Shelves	Wire DIN 172-2, PA11 coated	Wire DIN 172-2, PA11 coated
Color outer casing	White (similar RAL 9010)	White (similar RAL 9010)
Color contrasts	Blue (similar RAL 5002)	Blue (similar RAL 5002)
	option, without light,	option, without light,

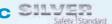
# Interior Equipment & Options (Concerning further information on accessories please see our leaflet "Racking & Storage Systems")

Standard interior equipment	3 Wire Shelves ●	6 Wire Shelves ●
Wire Shelves, recommended / max.	3/4○	6/90
Drawers, recommended / max.	3/3○	6/90
PC-Kit (polycarbonate) & AL-Kit (aluminium)	0	0
RS 485 interface	•	•
DMN Software package	•	•
DCU - Dometic Communication Unit	0	0
Ambient temperature sensor	0	0
Potential-free contact in case of power failure	•	•
Integrated inlet for external sensor (installed by customer)	•	•
Additional reference bottle with reference fluid and fitting	0	0
Smooth castors with stabilizers	-	-
Temperature recorder in form of a circular chart recorder / recording range : -10°C to +20 °C	Mounted, for 24h or 7 days ○	Mounted, for 24h or 7 days 🔾
Door hinge right	•	•
Door hinge left	0	0
Wooden packaging for ocean transport / export	0	0

#### ML 360 CS ML 355 S ML 360 CS ML 580 S ML 1300 S Refrigerator Deep Freezer 353 I 239 I 118 I 578 I 1301 I 340 I 218 I 106 I 518 I 1183 I 1690 x 700 x 616 mm 2030 x 595 x 605 mm 2030 x 595 x 605 mm 1980 x 750 x 800 mm 1980 x 1500 x 800 mm 1850 x 700 x 616 mm 2190 x 595 x 605 mm 2190 x 595 x 605 mm 1460 x 605 x 473 mm 934 x 525 x 482 mm 1435 x 600 x 645 mm 1435 x 1350 x 645 mm 735 x 475 x 462 mm 89 kg 112 kg 112 kg 164 kg 258 kg +5°C +5°C -35°C +5°C +5°C +5°C to +15°C +5°C to +15°C +4°C to +15°C -20°C to -35°C +5°C to +15°C +2°C +2°C -40°C +2°C +2°C +8°C +8°C +8°C -30°C +8°C PT1000 2-WIRE 1/3DIN CL.B ± 0,2°C ± 0,2°C ± 0.2°C ± 0.2°C ± 0.2°C PT1000 2-WIRE 1/3DIN CL.B ± 0,2°C ± 0,2°C ± 0,2°C ± 0,2°C ± 0,2°C 220-240 V - 50Hz (10A) 240 W 130 W 220 W 400 W 600 W 1.41 kWh /24h 1.10 kWh /24h 2.60 kWh /24h 3.00 kWh /24h 4.20 kWh /24h 155 Kcal/h 95 Kcal/h 215 Kcal/h 300 Kcal/h 430 Kcal/h 25% 30% 45% 37% 35% 44 dB(A) 40 dB(A) 43 dB(A) 47 dB(A) 50 dB(A) 6V - 4,2Ah / 48 hours 6V - 4.2Ah / 48 hours N (+16°C to +32°C) 70% 70% 70% 70% 70% automatic (natural) automatic (natural) automatic (natural) automatic (natural) manual R134a R134a R404a R134a R134a 45 mm 50 mm 50 mm 60 mm 60 mm 40 - 50 mm 30 - 68 mm 50 - 85 mm 75 mm 75 mm 120 min (from +5°C to +10°C) 30 min (from +5°C to +10°C) 90 min (from +5°C to +10°C) 60 min (from -35°C to -18°C) 150 min (from +5°C to +10°C) П П 2004 / 108 / EEC 2006 / 95 / EEC B / ISO 6 Polystyrene (PS) Styrene (SAN) Styrene (SAN) Stainless steel (V2A - 1.4301) Stainless steel (V2A - 1.4301) Galvanized sheet steel Galvanized sheet steel **Galvanized sheet steel** Stainless steel (V2A - 1.4301) Stainless steel (V2A - 1.4301) (ST02Z - AZ150) (ST02Z - AZ150) (ST02Z - AZ150) Stainless steel (V2A - 1.4301) Stainless steel (V2A - 1.4301) Polycarbonat, transparent Polycarbonat, transparent Styrene (SAN) Wire DIN 172-2, PA11 coated White (similar RAL 9010) White (similar RAL 9010) White (similar RAL 9010) Stainless steel (V2A - 1.4301) Stainless steel (V2A - 1.4301) Blue (similar RAL 5002) 5 Wire Shelves 4 Wire Shelves 4 Drawers 6 Wire Shelves 12 Wire Shelves 4/60 5/80 6/12 ( 12 / 24 $\bigcirc$ 5/80 4/60 4/4 6/90 12 / 18 🔾 0 $\circ$ 0 • • • • 0 0 • • • • 0 0 0 0 0 $\circ$ Mounted, for 24h or 7 days $\bigcirc$ Mounted, for 24h or 7 days $\bigcirc$ Mounted, for 24h or 7 days $\bigcirc$ Integrated, for 24h or 7 days $\bigcirc$ Integrated, for 24h or 7 days 🔾

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# The model range ML complies with the Dometic SILVER



MODEL	ML 155 SG	ML 320 S	ML 355 S	ML 360 CS	ML 580 S	ML 1300 S
DIN 58345 (Refrigerators for drugs)	•	•	•	•	•	•
GMP Clean Room Class B / ISO 6 (ISO EN 14644-1)	•					•
Dometic Electronic	•	•	•	•	•	•
Key-operated power switch (power ON/OFF)	•					
Safety door lock	•					
Digital temperature indicator (display : 0.1 digits)	_					
Controlled fan cooling system <sup>1</sup> for constant temperature and						
even temperature distribution across the entire refrigerating chamber.	•					
Automatic switch-off when front door opens						
Self-contained alarm system with integrated battery takes over						
the alarm function and temperature value measurements in case	•					
of power failure for at least 48 hours	_					
Acoustic/visual alarm signal in case of temperature alarm and power failure	_					
The alarm history on the operation and control panel stores all the relevant						
values during a temperature alarm, such as : min., max. and average temperature	•					
and also the duration of the alarm				<u> </u>		
Alarm function test : simulation of a temperature rise or drop in order	•					
to test the alarm system						
Control via self-diagnostic system						
Safety thermostat <sup>1</sup> prevents dropping of the cold storage products' temperature below +2°C						
Door opening alarm						
Remote transmission alarm signal (via potential-free contact) in case	•					
of temperature alarm (change-over contact)						
Remote transmission alarm signal (via potential-free contact) in case of power failure	•					
(change-over contact)						
RS 485 interface for the display of all operating and control functions						
(hardware and software settings) via DMN monitoring software	•	•	•	•	•	•
on a peripheral device (computer)						
DMN software package						
DCU - Dometic Communicaton Unit	0	0	0	0	0	0

<sup>●</sup> standard / ○ optional / - not available

## **Equipment / Options**



Temperature recorder (in form of a circular chart recorder) optional, within the mounted casing for ML model range (optional, integrated for LR model range)



Remote temperature and power failure alarm N-Racks with/without Front Cover can be subdivided into compartments (ot ---- --- --- ---



**ST Cover - Wire Shelf** (optional, for LR model range)

<sup>&</sup>lt;sup>1</sup> not for deep freezer of the refrigerator/deep freezer combination ML 360 CS

### **Dometic Electronic**

The new and innovative Dometic Electronic (operation and control panel) assures thanks to its **password protected settings menu** optimum protection for your stored preparations.

The menu structure of the **modern and user-friendly graphic display** offers a simple and intuitive utilization.

Settings menu

Evtra menu

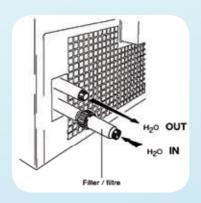
HISTORY
BUZZER
BISPLAY
VOLTAGE IND.
AMBIENT PROBE
ADD. PROBE
RESOLUTION
TEMP. UNIT
LANGUAGE
DIAGNOSTICS
PARAMETERS

### **Beside this the new Dometic Electronic offers:**

- Wide range of adjustment and diagnostic facilities as well as additional protection / warning operations (via external alarm operations, histories and individual display signals).
- An optional PT 100 sensor inlet to show the sensor's temperature data on the display as well as forwarding and further processing via a 4 ... 20 miliA outlet.
- An optional 20 miliA outlet to transmit temperature data of a sensor connected to the electronic.
- Connection facilities for additional (optional) temperature sensors.
- DMN (Dometic Monitoring Network) and the (optional)
   DCU (Dometic Communication Unit) allows to illustrate texts on the product's display.



**ST-Drawers** with/without Front Cover, on telescopic runners with safety stop (optional, for LR model range)



**Water cooling**, external (ex factory) (optional, for LR model range)





**PC-Kit (polycarbonate)** 

AL-Kit (aluminium)

### **DMN - Dometic Monitoring Network**

Universal software for collection, long-term recording and visualization of temperature data.

- Complete activity list (password protected).
- Integrated event and activity history of all appliance components.
- Graphical visualisation of all temperature curves.
- Connection to existing or third-party appliances via network technology (LAN, WLAN, WAN).
- Simultaneous data monitoring and recording.
- Possibility for specific and individually configurable alarm forwardings, e. g. via email, SMS (with optional GSM module) or via DECT.
- Simple and intuitive utilization.
- Essential price advantage compared to a traditional circular chart recorder and its spare parts.

• Economy of time as regular changes of recorder paper, ink and battery is not necessary.

#### Your essential advantages:

- ▶ One central database for all connected appliances.
- ▶ Remote inquiry of all data possible, even from different sites simultaneously.



### **DCU - Dometic Communication Unit**

Hardware module that notes all operating conditions and passes them through to a central data base – via local network, on which devices are connected.

- Interface connection of Dometic appliances to existent network.
- The DCU offers direct connection to the Ethernet, even wireless, to the serial BUS RS 485, as well as to the central building control system (4 ... 20 miliA).
- Possibility of connection of actors (4 ... 20 milliA out).
- Digital IN/OUT (customer-specific use of these connections is programmable).
- The integrated USB port allows to write stored data to an external memory stick.
- Recording and storage of relevant data of the appliance.
- The DCU replaces the paper temperature recorder.
- The DCU also works with Dometic electronics which were applied until October 08 (upgrade possible).

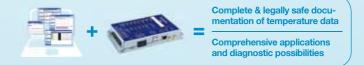
- All data are recorded and saved in the data base of the DMN and are available for analysing purposes at any time.
- Possibility of connection of several additional self-sufficient temperature sensors (up to 4 PT1000 & 2 PT100).

#### Your essential advantages:

- ▶ One integrative system for collecting all temperature relevant appliances and ambients.
- ▶ Many different connection facilities allow flexible upgrades for individual projects.



**DMN & DCU** in combination offer a highly flexible system that is adaptable to specific customer requirements.



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