Dräger

Carina® Pocket Guide
Software version 3.n

The Carina® Pocket Guide is not a replacement or substitute for the Instructions for Use.

Any use of the device requires full understanding and strict observation of the Instructions for Use. The user must be familiar with the device according to the national and local laws and recommendations. There will be no exchange of the Pocket Guide when the product is updated/upgraded.

Dräger. Technology for Life®

1 CONTENT

2 System Overview

The Carina Pocket Guide is not a replacement or substitute for the Instructions for Use.
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2.1 CONTROL PANEL, TOP

1 Carrying handle

2 Screen

3 Buttons for functions and parameters

4 Rotary knob

5 Audio paused 2 min. button

6 LED for indicating power supply:
- – LED lit = External power supply (mains/external battery), internal battery is charged
- – LED flashes = External power supply (mains/external battery), internal battery is being charged
- – LED off = battery operation

7 **»Start/Standby«** button

8 **»Select Menu«** button

MT-8229-2005

2.2 CARINA® UNDERSIDE

1 Switch for hose system with leak valve or hose system with expiratory valve masked by sliding cover (not illustrated)

2 Future functions

3 Holes for positioning on the trolley (4)

D-1493-2009

2.3 FRONT CONNECTION BLOCK

1 Ventilation hose connection

2 Emergency air inlet and oxygen overflow

3 Connection for control hose
(for hose system with expiratory valve)

MT-8232-2005

2 System Overview

2.4 REAR CONNECTION BLOCK

1 Not assigned
2 Connection for nurse call system
3 RS 232 serial port (MEDIBUS)
4 Not assigned
5 Inlet filter (HEPA filter)
6 Connection for HPO oxygen supply
7 Connection for LPO oxygen supply
8 Mains switch
9 Connection for external battery
10 Power cable connection

MT-8233-2005

2.5 TROLLEY

1 Carina bracket
2 Standard rail grip
3 Universal bracket
   with standard rail, optional
4 Trolley column
5 Pedestal
6 Red locking lever of the
   column mount closed
   (under pedestal)
7 Dual rollers with locking
   brakes, 4 each

MT-7683-2006
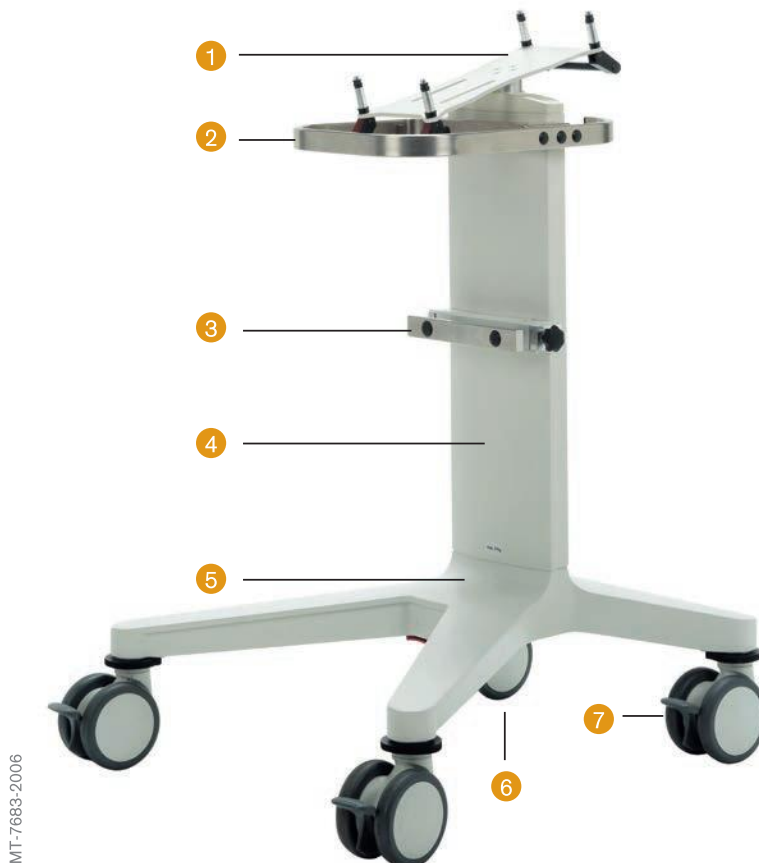
2 System Overview

2.6 SCREEN LAYOUT

1 Alarm line for alarm message
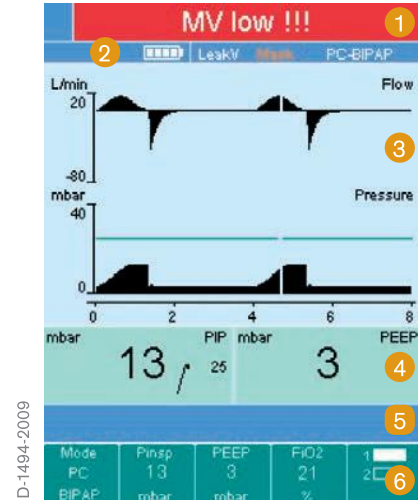**2** Status line for current device settings (refer to 2.7)
3 Display for real-time waveforms of flow and pressure
4 Display for 2 measured values, configurable
5 Information line
6 Display of ventilation parameters

2.7 STATUS LINE FOR DISPLAYING CURRENT
DEVICE SETTINGS

1 LPO oxygen supply
2 Power supply
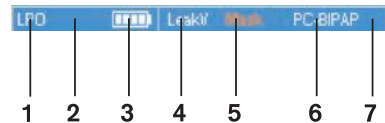
int Internal battery

ext External battery

  Mains

3 Charge of internal battery
4 Hose system – expiratory valve or leak valve
5 Ventilation method – tube or mask
6 Set ventilation mode
7 Patient effort detection

3 Preparation

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3.1 CONNECTING TO THE POWER SUPPLY

– Plug the power cable into the device and secure
  with the wire clip Ⓐ.
– Insert the mains plug into a power socket.
  The LED flashes or lights up according to the
  charge of the internal battery.

MT-0488-2007

3.2 CONNECTING THE OXYGEN SUPPLY

– Screw the O_2 compressed gas hose onto the
  HPO nozzle Ⓑ of Carina. Supply with oxygen from
  the central supply or from the O_2 gas cylinder.

or:

– Connect the O_2 supply hose from the O_2
  source to the LPO nozzle Ⓒ .

MT-0489-2007

3 Preparation

3.3 CONNECTING A HOSE SYSTEM

Select hose system with leak valve or hose system
with expiratory valve.

> To carry out the basic device setting correctly, please refer to the Instructions for Use!

Hose system with leak valve

1   Connect the filter to socket.
2   Connect the ventilation hose: VentStar Carina LV
    (MP00312) to filter.

Check that the hose system is displayed in the
status line of the screen as follows: **»LeakV«**.

or:

Hose system with expiratory valve:

1   Connect the filter to socket.
2   Connect the ventilation hose: VentStar Carina EV
    (MP00313) to filter
3   Connect the pilot line of the expiratory valve to
    pilot hose socket.

Check that the hose system is displayed in the
status line of the screen as follows: **»ExpV«**.

MT-0487-2007

MT-0486-2007

3 Preparation

3.4 SWITCHING ON CARINA®

1 Set the mains switch to »(·)«

Carina conducts a self-test.

During the self-test the screen indicates the progress of the self-test. The self test is followed by the screen showing the ventilation mode and parameters last set. The device is in standby mode.

Starting ventilation

2 Press the **»Start/Standby«** button.

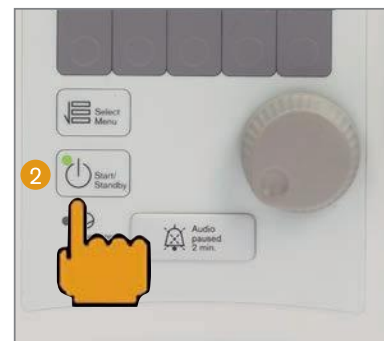Carina ventilates at the ventilation parameters set. The screen shows the current ventilation waveforms and values. For configuration of the screen display, see Instructions for Use.

3 Preparation

3.5 SETTING VENTILATION MODES

 Push „Menu" key

Vent. Settings	Alarms	Values	Config.	Unlocked
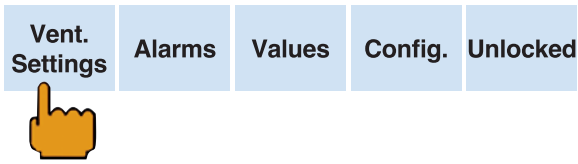
VC-SIMV AF	Volume Control – Synchronized Intermittent Mandatory Ventilation AF - AutoFlow
PC-BIPAP*	Pressure Control – Biphasic Positive Airway Pressure
PC-AC	Pressure-controlled, Assisted Ventilation
SPN-PS	Spontaneous - Pressure Support For patients with sufficient spontaneous breathing.
Volume guarantee	VG can be switched on in ventilation mode SPN-PS. Tidal volume guarantee
SPN-CPAP	Spontaneous - Continuous Positive Airway Pressure
Apnoea ventilation	For automatically switching to volume-controlled, mandatory ventilation (VC-SIMV AF) in the event of apnoea. Only on SPN-PS and SPN-CPAP

* Trademark used under license

3 Preparation

3.6 SETTING ALARM LIMITS

The current measured value is displayed between the upper and lower alarm limits.

Upper Limit

Measured value | Lower Limit | Unit

| Vent. Settings | Alarms | Values | Config. | Unlocked |
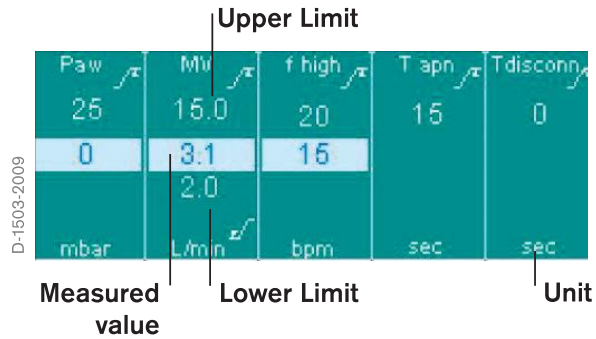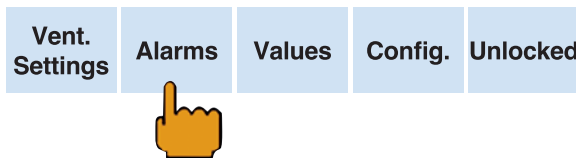
ALARM	SETTING RANGE
Paw high	10 to 55 mbar
MV high	2 to 40 L/min
MV low	0.1 to 39 L/min
f high	10 to 50 bpm
Tapnea	5 to 60 seconds
Tdisconn	Mask: 0, 15, 30, 60, 90, 120 sec. Tube: 0, 15, 30, 60 sec.

3.7 DISPLAYING SET VALUES AND MEASURED VALUES

Measured values, set values and pressure curve are displayed. (Only available during operation).

The screen displays:

– Settings
– Measured values
– Graphic representation of Paw

| Vent. Settings | Alarms | Values | Config. | Unlocked |
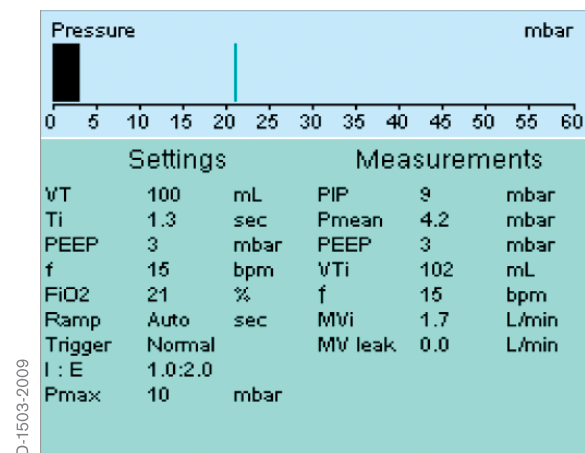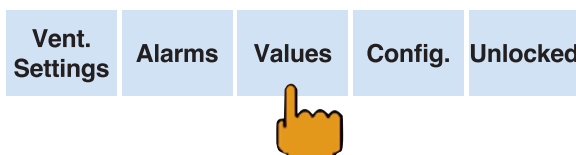
3 Preparation

3.8 CONFIGURATION

The following settings for application can be made under **»Config.«**:

Vent. Settings	Alarms	Values	Config.	Unlocked

1st page

Service:	for system and contact information and log book (Password:12345)
Volume:	adjustable from 1 to 5
Tone:	default tone or Dräger tone can be selected
Screen:	adjustable for displaying curves or values

2nd page

Set value:	for selecting measured values to display value 1 and value 2
Method:	for setting mask or tube ventilation, only for LeakV
LPO:	for setting LPO oxygen supply
Ti / I : E:	for selecting the setting used for Ti or I : E ratio

3rd page

Night:	for switching on the screen in night screen mode after 3min. display

3.9 LOCKING BUTTONS

All the buttons (apart from the **»Audio paused 2 min.«** button) can be locked in order to prevent them from being pressed accidentally.

Locking: Press the **»Un-Locked«** button and keep it pressed until the colour of the button switches to red and the button indicates **»Locked«**.

Vent. Settings	Alarms	Values	Config.	Unlocked

Unlocking: Press the **»Locked«** button to unlock again.

Vent. Settings	Alarms	Values	Config.	Locked
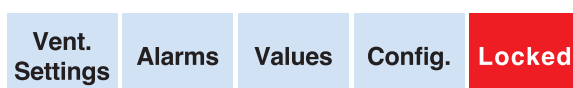
4 Alarm handling

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4.1 IN THE EVENT OF AN ALARM

If the alarm message, e.g. **»MV high !!«**, appears in the alarm line on the screen.

MV high !!

Carina assigns the message an appropriate level of priority.

Red !!!	Alarm Message with the highest priority
Yellow !!	Important Message with medium priority
Yellow !	Note Message with low priority

4.2 SUPPRESSING THE ALARM TONE

For up to 2 minutes:

1 Press **»Audio paused 2 min.«** key.
The alarm tone is suppressed for approx. 2 minutes.

2 The symbol of silent alarm is displayed on the screen.

If an alarm with a higher or equal priority occurs during the period when the alarm tone is suppressed, the alarm tone sounds again.

MT-8229-2005

D-1502-2009

5 Stand-by and Switching off

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5.1

SWITCHING CARINA® TO STANDBY

Press **»Start/Standby«** button and confirm with
rotary knob. Carina is in standby mode.
LED in the button flashes.
The screen displays
»Standby – Patient not ventilated«.

MT-8229-2005

Standby activated

LeakV   SPN-PS

Standby

Patient not ventilated

D-1496-2009

5.2 SWITCHING OFF THE DEVICE

Switch Carina to standby.
Set the mains switch to   »◯«
Carina is switched off.
Carina cannot be switched off during ventilation.
Carina signals **»Set standby to shut-off !!«**
The internal battery is also charged when the device
is switched off.

MT-8233-2005

6 Cleaning and maintenance

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6.1 CLEANING INTERVALS

PART	INTERVALS	ACTIVITY
Carina basic device, Trolley, hinged arm HPO hose	Per patient	Wipe disinfection
Reusable ventilation hoses Reusable water trap	Per patient/ weekly	Dismantle, Sterilise hot steam 134 °C Cleaning and disinfection machine 93 °C / 10 min with detergents only.

Disposable components: Please follow the manufacturers Instructions for Uses.

These active ingredients for wipe disinfection are suitable:
– Aldehydes
– Quaternary ammonium compounds

To avoid the possibility of damage to material – do not use any disinfectants based on:
– Alkylamine-based compounds
– Phenol-based compounds
– Halogen-releasing compounds
– Strong organic acids
– Oxygen-releasing compounds

6.2 MAINTENANCE INTERVALS
Clean and disinfect equipment and/or components before any maintenance procedures and before returning for repair.

PART	INTERVALS	ACTIVITY
Inlet filter (HEPA filter)	Every 6 months	Replace
Internal Battery	Every month (+35 to +55 °C) Every 3 months (-20 to +35 °C) After 3 years	Recharge Recharge To be replaced by technicians.
Carina basic device	Annually	Inspection by technicians
Nurse call (if applied)	Monthly	Check

7 Alarm message Cause & Remedy

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The following error messages are an extract from all possible alarms only.
For more information, please refer to the Instructions for Use.

7.1 IMPORTANT CLINICAL RELATED ALARMS

ERROR MESSAGE	CAUSE	REMEDY
Airway pressure high !!!	The excess pressure alarm can be caused by continuous coughing.	Check condition of patient, check ventilation pattern, correct alarm limit if necessary.
Airway pressure low !!!	A connection has become detached in the hose system. Ventilation not possible!	Make sure the hoses, filters and other components are secure again. Check the setting of Tdisconn.
High frequency !!!	Patient is breathing at a high spontaneous frequency, therefore the monitored overall frequency is too high. The alarm is not active in ventilation mode PC-BIPAP and VC-SIMV.	Check condition of patient, check ventilation pattern, correct alarm limit if necessary.
MV high !!	The minute volume has exceeded the upper alarm limit. Leak in breathing system.	Check condition of patient and ventilation pattern, correct alarm limit if necessary. Ensure that breathing system is leak-proof.
MV low !!!	The minute volume has exceeded the lower alarm limit. Leak in breathing system.	Check condition of patient and ventilation pattern, correct alarm limit if necessary. Ensure that breathing system is leak-proof.
Apnoea ventilation !!!	The device has detected respiratory arrest in SPN-PS or SPN-CPAP mode and will ventilate under control in VC-SIMV mode until Spontaneous breathing resumes.	Apply controlled ventilation or extend apnoea alarm time Tapnea.
Pmax limit reached !	The VT measured is lower than the VT set. The maximum permissible pressure range has been reached.	Check the range of Pmax. Check the setting for VT.

7 Alarm message Cause & Remedy

7.2   IMPORTANT FUNCTIONAL RELATED ALARMS

ERROR MESSAGE	CAUSE	REMEDY
Disconnection/ high leakage !	Disconnection of the hose or large leakage is detected. After the leakage alarm, Carina delivers a low constant flow at PEEP level. When the leak has been eliminated, Carina automatically resumes operation at the previous ventilation settings.	Check hoses, filters and other components to make sure the connections are not leaking and are secure.
Large leakage !!!	The hose system is leaking. Note: This is only displayed after the 3rd ventilation stroke. Alarm is not active in ventilation mode SPN-CPAP.	Check hoses, filters and other components to make sure the connections are not leaking and are secure.
Insufficient O_2/LPO set? !	HPO O_2 supply is too low or LPO source is used and does not correspond to the device setting.	Check the HPO and LPO settings in the Configuration menu In HPO mode: check central gas supply.

7.3   IMPORTANT BATTERY RELATED ALARMS

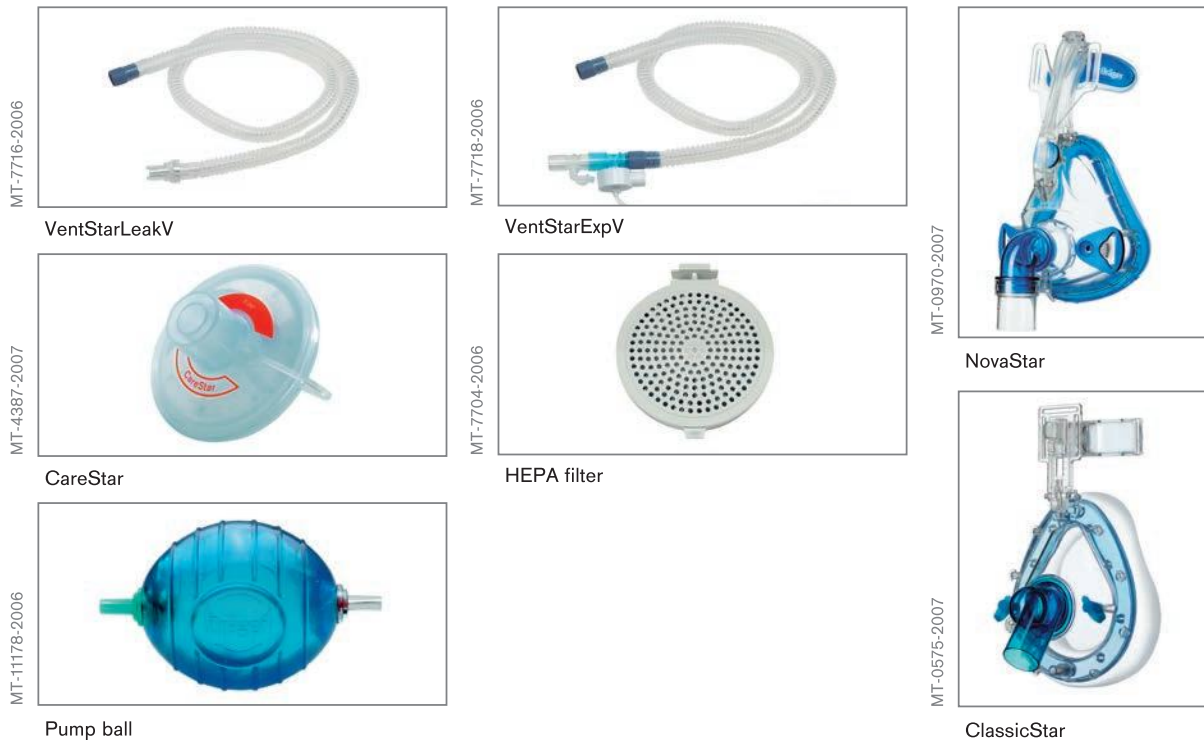| ERROR MESSAGE	CAUSE	REMEDY
External power failure !!	The device has no external power supply. The mains or DC plug is loose. The mains or DC cable has a break. Mains power failure. The external battery is completely discharged.	Check the mains supply or DC power supply. Insert the mains plug or DC plug properly at both ends. Change the cable. Connect a replacement battery. Connect to the mains. Charge external battery.
Int. battery activated !	Lack of an external power supply.	Reconnect external power supply.
Int. battery low !	Battery charge has dropped to below 50 %.	Charge the battery: Connect external power supply.
Int. battery low !!!	Battery charge has dropped to below 25 %.	Charge the battery: Connect external power supply.
Int. battery empty !!!	The operating time with supply from the internal battery has expired.	Connect ventilator immediately to mains power supply or to a fully charged external battery.

7 Alarm message Cause & Remedy

7.4 IMPORTANT TECHNICAL FAILURE ALARMS

ERROR MESSAGE	CAUSE	REMEDY
Auto Reset !!!	Internal system fault.	The device performs a restart. Ventilation continues. After 3 attempts the device stops ventilation. Disconnect the patient from Carina and continue ventilation immediately using a different, separate ventilator. Call DrägerService.
Technical alarm !!	The device has a technical problem. This Technical Failure does not affect to the breathing function. e.g. Hard key defect	Use a replacement device. Call DrägerService.
Technical alarm !!!	The device has a technical problem. This Technical Failure might affect to the breathing function. e.g. Temperature sensor defect	Use a replacement device. Call DrägerService.
Device failure !!!	The device has a fatal technical problem. Ventilation has failed.	Immediately disconnect the patient from Carina and continue ventilation using a different ventilator. If the device cannot be turned off, remove the O_2 hose from the central supply and then turn off the device. Call DrägerService.

8 Accessoires

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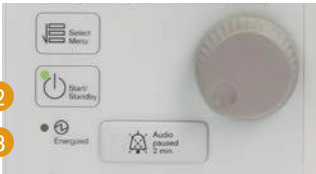
8.1 ACCESSORIES FOR CARINA®

MT-7716-2006

VentStarLeakV

MT-7718-2006

VentStarExpV

MT-0970-2007

NovaStar

MT-4387-2007

CareStar

MT-7704-2006

HEPA filter

MT-11178-2006

Pump ball

MT-0575-2007

ClassicStar

NR.	PRODUCT	NUMBER	DESCRIPTION
1	Ventstar Carina LeakV	MP00312	Dispo. hose with leakage valve Length: 150 cm, 5 pieces
2	Ventstar Carina ExpV	MP00313	Dispo. hose with expiratory valve Length: 150 cm, 5 pieces
3	Filter CareStar 30	MP01770	For device protection
4	HEPA filter	5703105	Consumable parts for Carina Exchange: Every 6 month
5	NovaStar size L	MP01581	Gel mask: Reusable
6	NovaStar size M	MP01580	Gel mask: Reusable
7	NovaStar size S	MP01579	Gel mask: Reusable
8	ClassicStar size L	MP01575	Air cushion Mask
9	ClassicStar size M	MP01574	Air cushion Mask
10	ClassicStar size S	MP01573	Air cushion Mask
11	Two-side pump ball	MP01590	To inflate ClassicStar Air cushion
12	Leak valve „silent flow"	MP00224	Dispo. leakage valve, 5 pieces
13	Expiratory valve	MP00220	Dispo. expiratory valve, 1 piece
14	Spiral hose E 150 cm	2165643	Reusable silicone hose: 150 cm

9 Checklist

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This test must be conducted every time before the device is put into operation.
Please use the blue Dräger testlung (partnumber: 84 03 201)

	ACTION	OBSERVE	CHECK
1	Connect all necessary equipment: hoses, cable, filter, etc.	Equipment is connected correctly, refer to chapter „preparation".	☐
2	Turn the main switch on.	Carina performs a self-test, LEDs light up and alarm tone is given.	☐

Main switch

LED ② LED ③

3	Check if the used hose system (leak valve or expiratory valve) conforms with the text in the status line.	»LeakV« for leak valve or »ExpV« for expiratory valve is displayed in the status line. Example:	☐

4	Check if the used patient connection (tube or mask) conforms with the text in the status line.	»Mask« for mask or »Tube« for tube application method is displayed in the status line. Example:	☐

5	Connect the test lung to the hose system.		☐

6 Make the following settings:

Each time the lung is compressed, expiration should be initiated instantly.   ☐

Mode	**PC-BIPAP**	
Settings	– Pinsp	15 mbar
	– PEEP	5 mbar
	– FiO$_2$	21%
	– f	10 bpm
	– Ti / I:E	2 s / 1:2
	– Ramp	0.2 s
Alarms	– Paw high	20 mbar
	– Tdisconn	0 s

After the second compression on Pinsp level alarm tone starts and „**Airway pressure high!!!**" is displayed.   ☐

Press »**Start/ Standby**« button to start the ventilation and squeeze the test lung several times strongly during inspiration.

9 Checklist

	ACTION	OBSERVE	CHECK
7	Confirm alarm, then disconnect the test lung from the hose system.	Alarm tone starts and „**Airway pressure low!!!**" is displayed.	☐
8	Reconnect test lung and hose system.		☐
9	Change the following settings: Mode **SPN-CPAP** Settings – AppVent on Alarm – Tapn 5 s Steadily inflate and deflate the test lung to simulate spontaneous breathing, then stop simulation.	Without spontaneous breathing and after apnoea alarm time has elapsed, alarm „**Apnoea ventilation!!!**" is displayed. Apnoea ventilation starts.	☐
10	Set ventilation mode to **PC-BIPAP**.		☐
11	Disconnect device from all external power supplies.	Alarm tone starts and display indicates „**External power failure!!**".	☐
12	Reconnect the power supplies. Disconnect the test lung from the hose system.		☐

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