



# MJB - Gateway User manual

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# Preface

Dear User,

We are delighted that you have chosen a product from LINAK®.

LINAK systems are high-tech products based on many years of experience in the manufacture and development of actuators, electric control boxes, controls and chargers.

This User Manual does not address the end-user. It is intended as a source of information for the manufacturer of the equipment or system only, and it will tell you how to install, use and maintain your LINAK electronics. It is the responsibility of the manufacturer of the end-use product to provide a User Manual where relevant safety information from this manual is passed on to the end-user.

We are sure that your LINAK product/system will give you many years of problem-free operation.

Before our products leave the factory they undergo full function and quality testing. Should you nevertheless experience problems with your LINAK product/system, you are always welcome to contact your local dealer.

LINAK subsidiaries and some distributors situated all over the world have authorised service centres, which are always ready to help you.

LINAK provides a warranty on all its products. This warranty, however, is subject to correct use in accordance with the specifications, maintenance being done correctly and any repairs being carried out at a service centre, which is authorised to repair LINAK products.

Changes in installation and use of LINAK products/systems can affect their operation and durability. The products are not to be opened by unauthorised personnel.

The User Manual has been written based on our present technical knowledge. We are constantly working on updating the information and we therefore reserve the right to carry out technical modifications.

**LINAK A/S**

# Important information

## Description of the various signs used in this manual.



### Warning!

Failure to comply with these instructions may result in accidents involving serious personal injury.



Failing to follow these instructions can result in the product being damaged or destroyed.

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## Safety instructions



Safe use of the system is possible only when the operating instructions are read completely and the instructions contained are strictly observed.

Failure to comply with instructions marked with the "NOTE" symbol may result in serious damage to the system or one of its components.

Persons who do not have the necessary experience or knowledge of the product/ products must not use the product/ products. Besides, persons with reduced physical or mental abilities must not use the product/products, unless they are under surveillance or they have been thoroughly instructed in the use of the apparatus by a person who is responsible for the safety of these persons.

Moreover, children must be under surveillance to ensure that they do not play with the product.



It is important for everyone who is to connect, install, or use the systems to have the necessary information and access to this User Manual.



If there is visible damage to the product it must not be installed.



The appliance is not intended for use by young children or infirm persons without supervision.



Young children should be supervised to ensure that they do not play with the appliance.



### Residual risk

Some of the products contains software based components. LINAK has made various possible efforts to assure that the software is free of errors and that the software has been developed according to the rules of IEC 60601-1-4 (software in Medical products). That involves Risk Analysis which shows a small residual risk for unwanted/unintended movement of actuators under specific conditions.

According to the above rules it must be informed and if necessary considered in the Risk analysis of the final application - More details to residual risk can be provided by LINAK if necessary.

**Warning!**

The plastic parts in the system cannot tolerate cutting oil.

**Warning!**

LINAK's actuators and electronics are not constructed for use within the following fields:

- Planes and other aircrafts
- Explosive environments
- Nuclear power generation

**Warning!**

If faults are observed, the products must be replaced.

**Warning!**

Never spray directly on the products with a high-pressure cleaner.

**Warning!**

Always insure that the patient is accessible in case of emergency.

**Warning!**

Cables must be secured safely so that persons cannot get trapped in it.

**Warning!**

Always use locking mechanism and O-ring

**Warning!**

Sockets not used must be fitted with blind plugs to ensure IP degree



The LINAK products cannot tolerate the influence of strong solvents, basic or alkaline liquids.

**Precautions:**

- Please note, the MJB with SMPS is using 150 mA on V permanent 40V. This means that the remaining current on the V Permanent 40V is 50 mA.
- Some electronically device is only to be used together with 4 Watt version, like for instance Ipod
- Ipod types which can be connected = Nano, Iphone, ??
- There can be a risk of conflict with other accessories, like HB, ACP, SLS etc. it is recommended to make a system overview.

**Cable ordering nos.:**

USB cable to be used, 0834000-1000

Modular plug cable with open end, 00xxxxx-1000

## **Before installation, re-installation, or troubleshooting**

- Stop the application
- Switch off the power supply and pull out the mains plug.
- Relieve the application of any loads, which may be released during the work.

## **Before start-up**

- Make sure that the system has been installed as instructed in the User Manual.
- Make sure that the voltage of the control box is correct before the system is connected to the mains.
- System connection. The individual parts must be connected before the control box is connected to the mains.

## **During operation**

- Ensure that the cables are not damaged.
- Unplug the mains cable on mobile equipment before it is moved.

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## **Information on the MJB**

The MJB Modular Junction Box is designed for use together with OpenBus™ control boxes. The MJB makes it possible to connect multiple handsets, attendant controls or it makes it possible to use the MJB as a control unit for 3<sup>rd</sup> party products as Out of Bed detection, USB charger, Under Bed Light etc.



LINAK A/S delivers only the OpenBus system and is not responsible for any products other than LINAK products (i.e. products from 3<sup>rd</sup> party suppliers) or the compliance of such products with the LINAK OpenBus™ system.

## Repairs

In order to avoid the risk of malfunction, all repairs must only be carried out by authorised LINAK workshops or repairers, as special tools must be used and special gaskets must be fitted. Products under warranty must also be returned to authorised LINAK workshops.



### Warning!

If any of the LINAK products are opened, there will be a risk of subsequent malfunction.

## Disposal of LINAK's products

LINAK's products may be disposed of, possibly by dividing them into different waste groups for recycling or combustion.

We recommend that our product is disassembled as much as possible at the disposal and that you try to recycle it. As an example of main groups within sorting of waste we can mention the following:

Metal, plastic, cable scrap, combustible material and collection for recoverable resources.

Some of these main groups can be sub-divided into groups e.g. metal can be divided into iron, stainless steel and aluminium and alloy steel. Plastic can e.g. be divided into ABS, PA, PE and PP.

The MJB can be disassembled and sorted into the following recycling groups:

Component	Recycling group
MJB	Plastic housing – Plastic recycling or combustion
	Cable – Cable scrap or combustion
	PC-board – Electronics scrap

By now all our casted plastic units are provided with an interior code for plastic types and fibre contents, if any.

## **Misc. on the MJB system**

### **Warranty and service life**

The LINAK warranty covers manufacturing defects in the products, starting from the date of manufacture. There is 18 months' warranty for MEDLINE and CARELINE products. The warranty is limited to the value of the LINAK product.

LINAK's guarantee is only valid so far as the products have been used and maintained correctly and has not been tampered with. Furthermore, the products must not be exposed to violent treatment. In the event of this, the warranty will be ineffective / invalid. LINAK's warranty is only valid if the system is unopened and has been used correctly.

All LINAK products are designed to have an optimum service life as a matter of course, but the expected service life in a specific application is very dependent on how the products are used.

### **Maintenance**

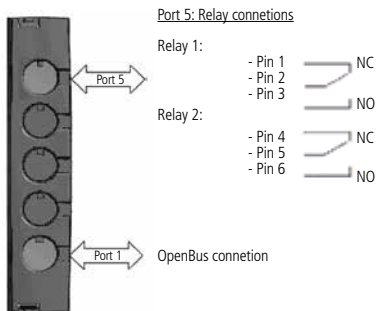
- The LINAK products must be cleaned at regular intervals to remove dust and dirt and inspected for mechanical damage, wear and breaks.
- The LINAK MJB is a closed unit and requires no internal maintenance.
- IPX6 is waterproof.
- Make sure that the plugs in the MJB are correctly fitted with O-rings before washing.
- Electronics must be inspected at attachment points, wires, cabinet, and plugs.
- Inspect the connections, cables, cabinet and plugs, and check for correct functioning.



## MJB - GATEWAY variant, 504-010 & 504-020 :

The MJB is a simple gateway interface, which can connect the bed to the infrastructure of the hospital or nursing homes. The Gateway can be used in combination with an Out of Bed Sensor, which makes it possible to indicate if the patient leaves the bed.

The Gateway can also be used as a service/nurse call system. Please note it is only to be used as a guided system, not for emergency issues.



### Standard functionality:

The MJB - Gateway consist of two relays, which are connected through Port 5 on the MJB. This can be made with the special cable 0964140 (Modular plug - Open end) There are as standard 2 configurations, 504-01 and 504-02, see description on the next pages.

Relay 1: NC (normally closed) = Pin 2 + Pin 1 / NO (normally open) = Pin 2 + Pin 3

Relay 2: NC (normally closed) = Pin 5 + Pin 4 / NO (normally open) = Pin 5 + Pin 6

**Relay 1** is NO when connected to the mains and NC when no mains, this means the relay is "active", when connected to the mains (closed loop). The Closed Loop principal is to ensure that a notification is sent if power is missing on the bed. When the mains is disconnected (power is missing), the relay will go from NO to NC, which will automatically result in a notification (status indicator) on the OpenBus™.

Relay 1 can be activated via the patient control (Key 1 / Key 4) or the attendant control (Key 2 / Key 3). When a key is activated, the relay will switch state from NO to NC for 2 seconds. After 2 seconds the relay will automatically change state from NC to NO.

The status of the relay is indicated on the OpenBus™ and can be used for switching on an LED.

**Relay 2** is as default NC, with or without mains, (Open Loop)

Relay 2 can be activated via the patient control (Key 1) or the attendant control (Key 2 / Key 3).

When the relay is activated, it will switch from NC to NO for 2 seconds. After 2 seconds the relay will automatically change state from NO to NC.

The status of the relay is indicated on the OpenBus™ and can be used for switching on an LED.

By using the variant 504-020 relay 2 will be controlled by the MJB variant 505/506 with switch input.

Notification 1 = Switch input S2 (OoBD notification) / notification = Switch input S1

When using this combination, is it important to have the MJB 505/506 connected to the system all the time. If it is not connected, the Gateway MJB will see it as a notification and the relay will be activated.

The Gateway MJB is "scanning" the OpenBus™ system every minute for a notification.

<b>Relay 1</b>		
CB power mode	Notification level	Relay state
Mains unplugged, CB is in power down or the OpenBus™ is not running (Clock/ data is missing)	Notification	NC\*
On mains or battery at "wake up"	Bed notification \ **	NC
	No notification	NO

<b>Relay 2</b>		
CB power mode	Notification level	Relay state
Mains unplugged or CB is in power down	No notification	NC
On mains or battery at "wake up"	Bed notification \ **	NO
	No notification	NC

\\* When the mains is unplugged or CB is in power down will the relay shift to NC state and generate notification.

\\*\* Notification generated by nurse call or bed notifications.

## Features:

- Add-on value for hospital & care bed
- Compact and functional design which allows easy mounting
- 2 connections, Port1 OpenBus™ connection / Port 5 Gateway
- Colour: Light grey RAL 7035
- Protection class IPX6
- Connection to OpenBus™ control box via modular plug cable, 6 wires
- Modular plug to Open end, see precautions.

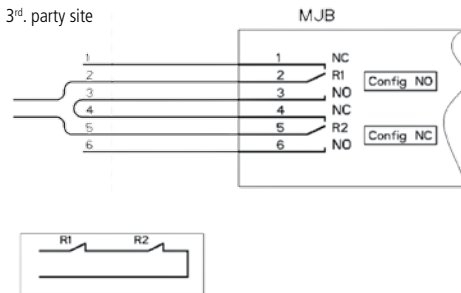
## Options (special article):

- Customised configuration (Configuration number  $\geq 100$ )
- It is possible to define the OpenBus™ signals to be used for activating the relays and / or change the notification indicator, so that it fits to the customer's system.  
Please contact your Sales Engineer at LINAK A/S for further information.

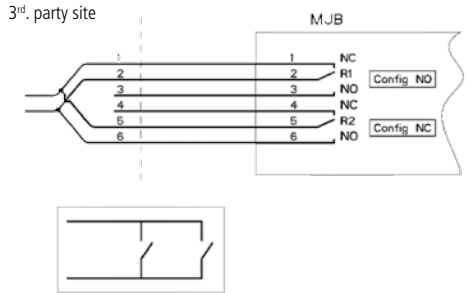
## Usage:

- Compatible with all LINAK OpenBus™ Control Boxes, light & full.
- Contact rating :  
Max continuous current: = 1A  
Max switching voltage: = 48 V (DC)  
Max switching capacity: = 24 VA  
Contact resistance: < 100 m $\Omega$
- Current consumption:  
V bus 8V : < 9 mA  
V permanent 40V : < 14 mA
- Approvals: The MJB has been approved according to IEC60601-1:2005 3<sup>rd</sup> edition, ANSI / AAMI ES60601-1:2005, 3<sup>rd</sup> edition, and CAN / CSA-22.2 No 60601-1:2008

### Example of closed loop:



### Example of Open Loop:





## Recommendations:

- Always use locking mechanism and O-ring
- Sockets not used must be fitted with blind plugs to ensure IP Degree
- When using the modular plug with open end, it is up to the customer to maintain the IP degree.
- If the MJB – Gateway is used as open loop, there is a risk of not sending a notification, when no mains are connected. The MJB – Gateway will only send a notification if mains is missing, when using a Closed Loop (see functionality description.)
- When the Gateway is used on a system with battery, the gateway functionality will follow the power down mode of the control box, see table

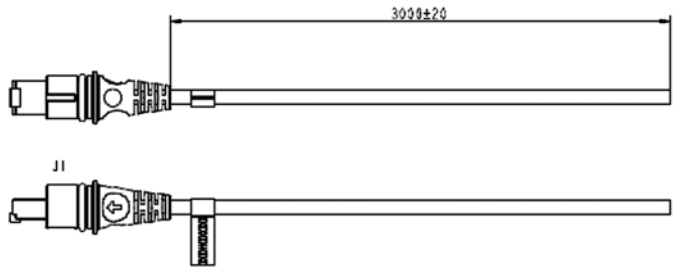
CB Power mode	Gateway
On mains	Function ok
On battery Power down "Wake Up"	No function
	Function ok

- The MJB – Gateway is not to be used as safety, it is only to be used as a guided system.
- It is important to test the specified notification is working in the correct way, before sending the system to the end user.
- Do not use 2 MJB variants with same device ID on the OpenBus™. This will cause conflicts and the SDT is not able to identify the different products attached.
- Before the final functional test in the production, it is important that the system is re-powered. This is to ensure that all items have been detected on the OpenBus™.
- We recommend the end user to make a regular test procedure in order to prevent failures and hazardous situations on the system, e.g. defective OOB sensor, squeezed cables. The MJB is not able to detect defective 3<sup>rd</sup>. party products.
- LINAK only takes responsibility for LINAK products, not 3<sup>rd</sup>. party products.  
Please pay attention to the "Patient Environment" Clause 3.79 - EN60601-1 3<sup>rd</sup> edition: Any volume in which contact can occur between a patient and parts of the medical equipment or between a patient and other persons touching parts of the equipment. Justified practice here is 1.5 m. This volume must be subject to the Risk Analysis.  
It is important to inform the customer about this.
- There can be a risk of conflict with other OpenBus™ accessories, such as HB, ACP, etc.  
It is therefore recommended to make a system/bit overview.

**Cable ordering nos.:**

0964140-3000: Gateway cable, 3000 mm, modular plug–open end

0964140-1375: Gateway cable, 1375 mm, modular plug–open end



Please note, the slit is placed on the opposite side of the modular plug.

This is to ensure that the cable is only being used for the Gateway MJB.



## IP Protection degree:

All LINAK products can be cleaned as follow according to their IP protection, which is stated on the product label.

The IP code specifies the degrees of protection provided by the enclosures. Only the protection against ingress of water (second characteristic numeral) is specified, ingress of solid foreign objects (first characteristic numeral) is not specified and therefore replaced by the letter X in the code.

IP Protection	Cleaning instructions
IPX0	Clean with a damp cloth
IPX1	Clean with a damp cloth
IPX2	Clean with a damp cloth
IPX3	Clean with a damp cloth
IPX4	Clean with a damp cloth
IPX5	Wash with a brush and water, but not water under pressure
IPX6	X Wash with a brush and water. The water can be under pressure, but the system must not be hosed down directly with a high-pressure cleaner. Max. 20°C
IPX6 Washable	Clean by the use of water tunnels

The materials are resistant to the majority of cleaners and disinfectants used in the hospital and nursing home sector.

Cleaning with a steam cleaner, for example, is not permitted, as it will not be possible to maintain a minimum distance of 300 mm from the electrical parts.

### **The following directions regarding cleaners and disinfectants must be complied with:**

- They must not be highly alkaline or acidic (pH value 6-8).
- They must not contain caustic agents.
- Their contents must not be able to change the structure of the surface or adhesion of the plastic.
- They must not break down grease.

### **The following disinfectants/detergents are recommended:**

- Neodischer Dekonta, dosage 1-3%, made by CHEMISCHE FABRIK Dr. WEIGERT,
- CCOTRADE RW, dosage 0.5%, made by CCOTRADE GmbH.

**Warning!**

The systems must not be sprayed directly with a high-pressure cleaner.

**Warning!**

Interconnecting cables must remain plugged in during cleaning to prevent the ingress of water.

**Precaution!**

When cleaned, water must never be sprayed upwards from underneath the bed, because it may enter the cable outlet.

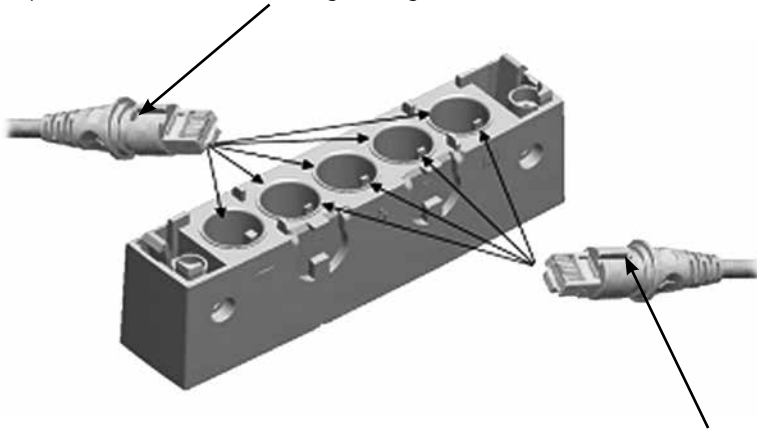
**Environmental conditions:**

Environmental conditions	
Operating:	
Temperature Relative humidity Atmospheric pressure	5°C to 40°C 20% to 90% @ 30°C – not condensing 700 to 1060 hPa
Storage:	
Temperature Relative humidity Atmospheric pressure	-10°C to +50°C 20% to 90% @ 30°C – not condensing 700 to 1060 hPa

Valid where nothing otherwise is stated under the specific products in a later section.

## Modular plug with wide alignment groove

To be used with **LINAK products**.  
Can be connected to all ports in the MJB, both ports with narrow and wide alignment grooves.
















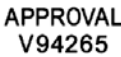






















## Modular plug with narrow alignment groove

To be used with **3<sup>rd</sup> party products**.  
Can only be connected to ports in the MJB with narrow slit. This is to prevent 3<sup>rd</sup> party products to interfere with the OpenBus™ connections.



## Key to symbols

The following symbols are used on the label on the LINAK products.

	IEC 60417-5172: Class II equipment		UL Listing Mark		ZERO standby power
	Product with a thermofuse		UL Listing Mark for Canada		Regulatory Compliance Mark: The Australian Safety/EMC Regulations
	IEC 60417-5957: For indoor use only		UL Listing Mark for Canada and the United States		Protection against contact/foreign matter (first character) and water (second character) as per EN60529
	IEC 60417-5222: Safety isolating transformer, general		UL Listing Mark		Alternating Current
	IEC 60417-5840: Patient part of type B		AS 3108 Australian approval mark		Direct current
	Patient part of type BF		Various		Lock function
	Earth		TÜV Rheinland - LGA tested		Release function
	IEC 60417-5019: Protective earth; protective ground		Recognised Component Mark		Charge indicator
	IEC 60417-5002: Positioning of cell		Canadian Recognised - Component Mark		Safety switch/enable button
	ISO 7000-0434A: Caution, consult accompanying document		Recognised Component Mark for Canada and the United States	 XXXXXX	Reduced ETL Recognized Component mark for Canada and United States.  X: The mark is always accompanied by a Control Number of 6 or 7 figures.  For complete description, see ETL-marking on next page.
	ISO 7000-1641 Operating instructions		PSE-Mark		
	Electronics scrap		Compliance to all relevant EC directives		
	Recycle		China Pollution control mark (also indicates recyclability)		

## ETL-marking

Due to space limitations, the complete ETL-marking demands are not represented on the marking plates.

The full ETL Recognized Component markings are shown here.



**C/N 120690**  
Conforms to ANSI/AAMI Std. E560601-1  
Cert. to CSA Std. C22.2 No. 60601-1



**C/N 9901916**  
Conforms to ANSI/AAMI Std. E560601-1  
Cert. to CSA Std. C22.2 No. 60601-1



**C/N 4008003**  
Conforms to ANSI/AAMI Std. E560601-1  
Cert. to CSA Std. C22.2 No. 60601-1



**C/N 4008004**  
Conforms to ANSI/AAMI Std. E560601-1  
Cert. to CSA Std. C22.2 No. 60601-1



**C/N 4008005**  
Conforms to ANSI/AAMI Std. E560601-1  
Cert. to CSA Std. C22.2 No. 60601-1



**C/N 4008623**  
Conforms to ANSI/AAMI Std. E560601-1  
Cert. to CSA Std. C22.2 No. 60601-1



**C/N 4008838**  
Conforms to ANSI/AAMI Std. E560601-1  
Cert. to CSA Std. C22.2 No. 60601-1



**C/N 4008671**  
Conforms to ANSI/AAMI Std. E560601-1  
Cert. to CSA Std. C22.2 No. 60601-1

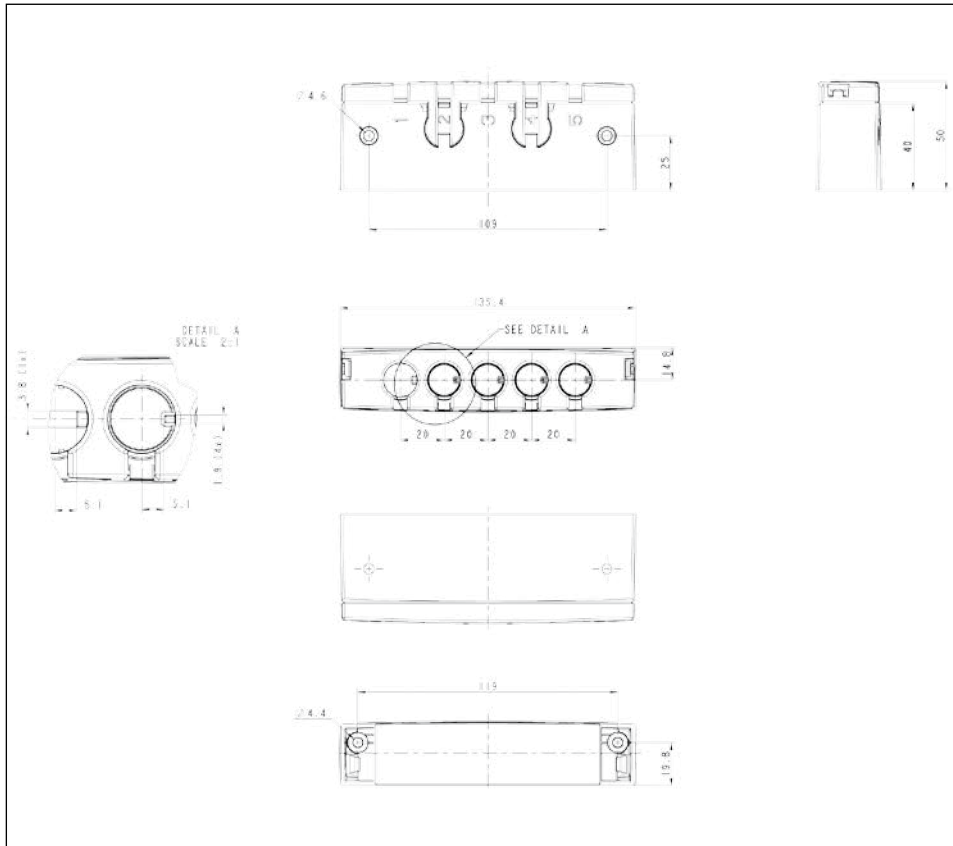


**C/N 4009507**  
Conforms to ANSI/AAMI Std. E560601-1  
Cert. to CSA Std. C22.2 No. 60601-1

# DRAWING APPENDIX

## MJB - Modular Junction Box

MJB



## **LINAK APPLICATION POLICY**

The purpose of the application policy is to define areas of responsibilities in relation to applying a LINAK product defined as hardware, software, technical advice, etc. related to an existing or new customer application.

LINAK products as defined above are applicable for a wide range of applications within the Care and Health, Comfort furniture, Desk and Industry areas. Yet, LINAK cannot know all the conditions under which LINAK products will be installed, used, and operated, as each individual application is unique.

The suitability and functionality of the LINAK product and its performance under varying conditions (application, vibration, load, humidity, temperature, frequency, etc.) can only be verified by testing, and shall ultimately be the responsibility of the LINAK customer using any LINAK product.

It is also the responsibility of the LINAK customer to make and supply a comprehensive user manual of the application.

LINAK shall be responsible solely that the LINAK products comply with the specifications set out by LINAK and it shall be the responsibility of the LINAK customer to ensure that the specific LINAK product can be used for the application in question.







## FACTORIES

- **China**  
LINAK (Shenzhen) Actuator Systems, Ltd.  
Tel: +86 755 8610 6656  
Tel: +86 755 8610 6990  
E-mail: sales@linak.cn  
www.linak.cn
- **Denmark - Headquarters**  
**LINAK A/S**  
Group Headquarters  
Tel: +45 73 15 15 15  
Fax: +45 74 45 80 48  
Fax (Sales): +45 73 15 16 13  
E-mail: info@linak.com  
www.linak.com
- **USA**  
**LINAK U.S. Inc.**  
North and South American Headquarters  
User support: +1 800 905 4625  
Tel: +1 502 253 5595  
Fax: +1 502 253 5596  
E-mail: info@linak-us.com  
www.linak-us.com

## SUBSIDIARIES

- **Australia**  
LINAK Australia Pty. Ltd  
Tel: +61 3 8796 9777  
Fax: +61 3 8796 9778  
E-mail: sales@linak.com.au  
www.linak.com.au
- **Austria**  
LINAK Repräsentanz  
Österreich (Wien)  
Tel: +43 (1) 890 7446  
Fax: +43 (1) 890 744615  
E-mail: info@linak.de  
www.linak.at
- **Belgium**  
LINAK Actuator-Systems NV/SA  
(Belgium & Luxembourg)  
Tel: +32 (0)9 230 01 09  
Fax: +32 (0)9 230 88 80  
E-mail: beinfo@linak.be  
www.linak.be
- **Brazil**  
LINAK DO BRASIL COMÉRCIO DE  
ATUADORES LTDA.  
Tel: +55 (11) 2832 – 7070  
Fax: +55 (11) 2832 – 7060  
E-mail: info@linak.com.br  
www.linak.com.br
- **Canada**  
LINAK Canada Inc.  
Tel: +1 502 253 5595  
Fax: +1 416-255-7720  
E-mail: info@linak.ca  
www.linak-us.com
- **Czech Republic**  
LINAK C&S S.R.O.  
Tel: +420581741814  
Fax: +420581702452  
E-mail: info@linak.cz  
www.linak.cz
- **LinAK International**  
Group Headquarters  
Tel: +45 73 15 15 15  
Fax: +45 74 45 90 10  
Fax (Sales): +45 73 15 16 13  
E-mail: info@linak.com  
www.linak.com
- **Denmark - Sales**  
LINAK DANMARK A/S  
Tel: +45 86 80 36 11  
Fax: +45 86 82 90 51  
E-mail: linak@linak-silkeborg.dk  
www.linak.dk
- **Finland**  
LINAK OY  
Tel: +358 10 841 8700  
E-mail: linak@linak.fi  
www.linak.fi
- **France**  
LINAK FRANCE E.U.R.L  
Tel: +33 (0) 2 41 36 34 34  
Fax: +33 (0) 2 41 36 35 00  
E-mail: linak@linak.fr  
www.linak.fr
- **Germany**  
LINAK GmbH  
Tel: +49 6043 9655 0  
Fax: +49 6043 9655 60  
E-mail: info@linak.de  
www.linak.de
- **India**  
LINAK A/S India Liaison Office  
Tel: +91 120 4734613  
Fax: +91 120 4273708  
E-mail: info@linak.in  
www.linak.in
- **Ireland**  
LINAK UK Limited (Ireland)  
Tel: +44 (0)121 544 2211  
Fax: +44 (0)121 544 2552  
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