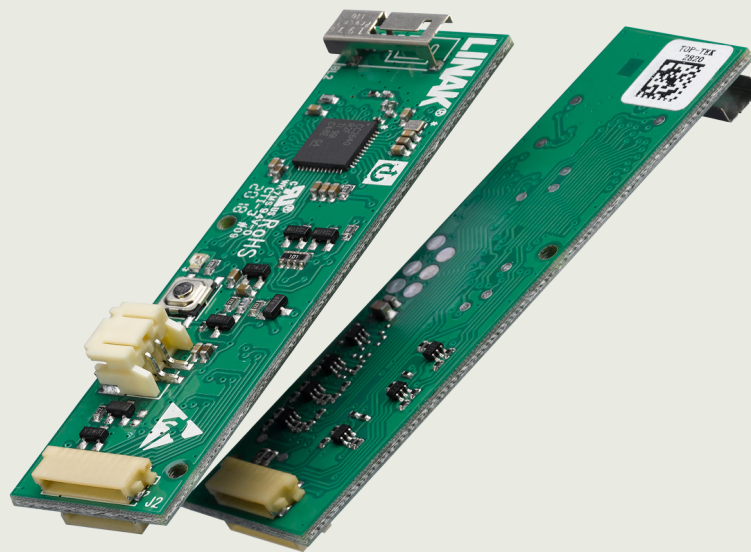


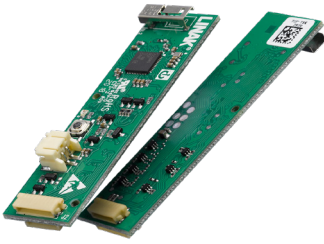
Analogue to Bluetooth® Low Energy - ABL Data Sheet



Contents

Introduction.....	3
Features and options	4
Usage	4
Liability Agreement	4
Ordering Example	5
Cable ordering.....	6
Connectors on PCBA	7
External supply voltage	8
Connectors	9
ABL pairing	10
ABL - commands and pairing.....	10
Dimensions	11
Mounting.....	12
Recommendations	13
Wireless risks and recommendations	14

Introduction



With the small ABL print it is possible to convert analogue input to Bluetooth Low Energy. The ABL print can be used as attendant control or hand control integrated in side rails in for instance healthcare applications and offers easy access to different positioning functions.

The ABL is a 2-sided PCBA for conversion of switches into Bluetooth commands. This can be used in specific OEM controls, such as side rails, hand controls, foot controls, touch panels.

Another benefit is the high and easy adaption to customer applications for easy build-in.

The ABL print can be used for third party products. Specific software makes it possible to control applications where wireless control is preferable.

Features and options

Input number and type:	10 analogue inputs
Output number and type:	4 open collector outputs
Battery:	Prepared for battery operation (3-3.3V)
Battery lifetime:	CR2032: 2 years w. 140 seconds daily usage. 2 x AAA: 4 years w. 140 seconds daily usage.
Current consumption:	3.7 mA during activation
Housing:	Circuit board without housing
IP rating:	No IP rating as standard. The customer must ensure a proper application design and built-in of the PCBA to achieve the correct IP degree (e.g. IPX4)
Cables:	Not included To be ordered separately - see Ordering Example page
Number of connectors:	3
Pairing:	LINAK standard pairing procedure

Usage

Operation temperature:	+5 °C to +40 °C
Storage temperature:	-10 °C to +50 °C
Compatibility:	Compatible with LINAK Bluetooth Low Energy (BLE) control boxes. Please contact LINAK. See sales backup Chapter 3 Compatibility.
Relative humidity:	20% to 80% – non-condensing
Atmospheric pressure:	700 to 1060 hPa
Meters above sea level:	Max. 3000 meters
Approvals:	- IEC60601-1 - ANSI/AAMI ES60601-1 - CAN/CSA-22.2 No 60601-1

Liability Agreement

For ABL the following is applicable:

The OEM customer must sign a Liability agreement - QA-88-09-001. This agreement covers handling of LINAK PCBA in general.

The signed liability agreement must be added to the system specification.



Ordering Example

	ABL			
Functionality	V1	V0 = V0	V1 = V1	V2 = V2
Housing	0	0 = No Housing		
Not Used	0	0 = None		
Not Used	0	0 = None		
Bluetooth Generation	4	0 = Gen. 1	4 = Gen. 2*	
Not Used	0	0 = None		
Not used	0	0 = None		
Not used	0	0 = None		
Not used	0	0 = None		
Not Used	0	0 = None		
Not Used	0	0 = None		
Chosen item number: ABLV10004000000				

* For further BLE information, see sales backup 'Chapter 11.02 Bluetooth Low Energy'.



Cable ordering

10P inputs connector (J2):

On PCB:

- Manufacturer part number: CI1410M1HRI-NH
- Manufacturer: CVILUX

Mates with cables with PH-connector (housing and terminals):

- Housing part number: CI1410SL00C-NH
- Terminals: CI14T011 PEO

LINAK part number for 150mm open-end cable: 0965366

8P inputs/outputs connector (J3):

On PCB:

- Manufacturer part number: CI1408M1HRI-NH
- Manufacturer: CVILUX

Mates with cables with PH-connector (housing and terminals):

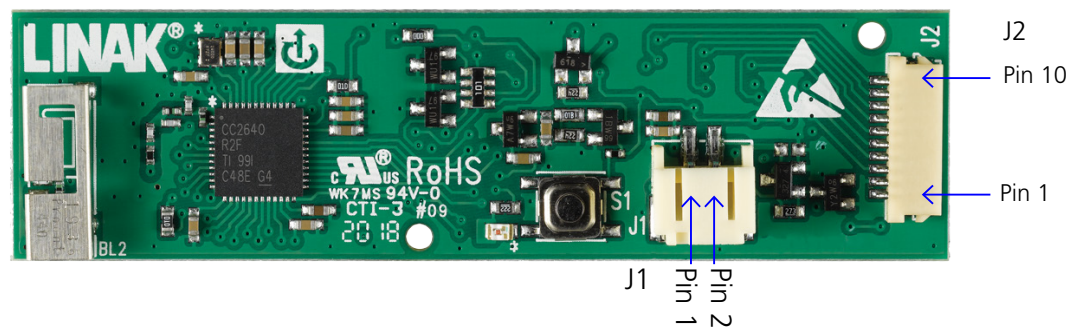
- Housing part number: CI1408SL00C-NH
- Terminals: CI14T011 PEO

LINAK part number for 150mm open-end cable: 0965367



Connectors on PCBA

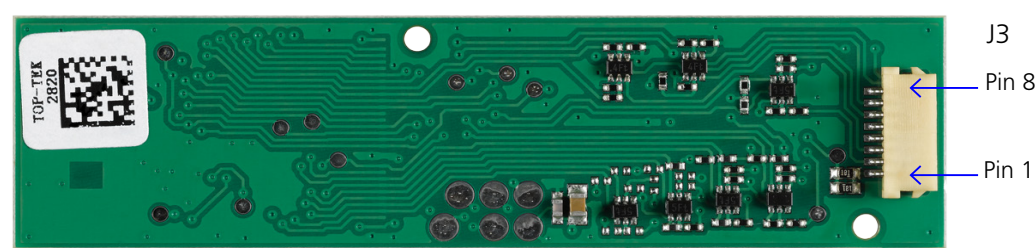
Top side



J2

Pin	Connection	Bluetooth Low Energy command (V0/V1/V2)
3 (input)	Active when connected to pin 2 (GND)	I0/I10/I20
4 (input)		I1/I11/I21
5 (input)		I2/I12/I22
6 (input)		I3/I13/I23
7 (input)		I4/I14/I24
8 (input)		I5/I15/I25
9 (input)		I6/I16/I26
10 (input)		I7/I17/I27

Bottom side



J3

Pin	Connection	Bluetooth Low Energy command (V0/V1/V2)
2 (input)	Active when connected to pin 8 (GND)	I8/I18/I28
3 (input)		I9/I19/I29
4 (output)	Voltage between this pin and pin 1 is equal to supply voltage on J1 when LED is active	LED1/LED11/LED21
5 (output)		LED2/LED12/LED22
6 (output)		LED3/LED13/LED23
7 (output)		LED4/LED14/LED24



External supply voltage

- Connect through J1
 - Pin 1: +
 - Pin 2: -
- Includes reverse polarity protection for J1
- Operational voltage:
 - Minimum: 2.2V
 - Absolute maximum voltage: 3.8V
- Current consumption: 3.7 mA during activation

Inputs

- 0 active-low inputs:
 - When input is active, it is connected to GND terminal (pin 2 on J2, pin 8 on J3)
 - Required impedance for activation of an input < 1k Ω

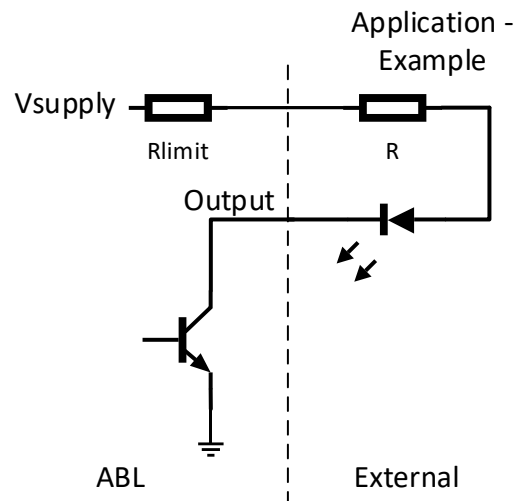
Outputs

- 4 open-collector outputs (active-low). Requires external pull-up to pin 1 on J3.
- Pin 1 on J3: Connection from supply voltage with output impedance: 50 Ω .



Connectors

Circuit output



Connector part names

- 2P Supply voltage connector (J1):

On PCB: 2P PH-connector

- Manufacturer part number: S2B-PH-SM4-TB
- Manufacturer: JST

Mates with cables with PH-connector (housing and terminals):

- Housing part number: PHR-2
- Terminals part number: SPH-002T-P0.5S, SPH-002T-P0.5L or SPH-004T-P0.5S, depending on cable dimensions

- 10P inputs connector (J2):

On PCB:

- Manufacturer part number: CI1410M1HRI-NH
- Manufacturer: CVILUX

Mates with cables with PH-connector (housing and terminals):

- Housing part number: CI1410SL00C-NH
- Terminals: CI14T011 PEO

LINAK part number for 150mm open-end cable: 0965366

- 8P inputs/outputs connector (J3):

On PCB:

- Manufacturer part number: CI1408M1HRI-NH
- Manufacturer: CVILUX

Mates with cables with PH-connector (housing and terminals):

- Housing part number: CI1408SL00C-NH
- Terminals: CI14T011 PEO

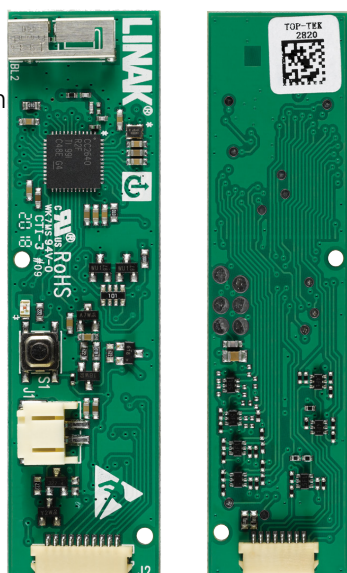
LINAK part number for 150mm open-end cable: 0965367



ABL pairing

Direct Pairing button

- similar to FS3BLE



Direct Pairing can also be initiated by activating pin 3 and 4 on J2 and pin 2 on J3 simultaneously. Confirm on pin 3, J2.

For details on LINAK® Bluetooth® Low Energy , please see Sales Backup Chapter 11.02.

ABL - commands and pairing

Function	Details	Default		
Direct Pairing Activation	To enter Direct Pairing mode.	S1 (Tactile switch next to battery connector)	OR	Pin 3 (J2) + Pin 4 (J2) + Pin 2 (J3) Connected simultaneously to GND
Direct Pairing Confirmation	To confirm Direct Pairing	S1 (Tactile switch next to battery connector)	OR	Pin 3 (J2)
OEM ID and type	Used to filter in CB whitelist	OEM ID: 000000001		
		OEM type: 2000 (ABL V0) 2001 (ABL V1) 2002 (ABL V2)		

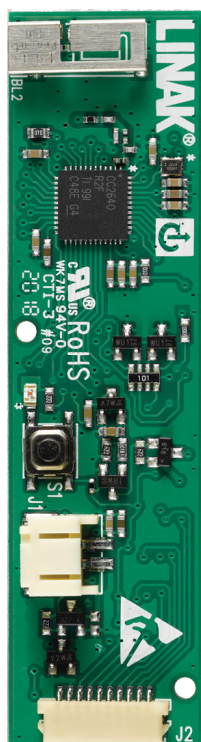


Dimensions

All dimensions are in mm.

W = 20 mm

H = 10 mm



L = 75 mm



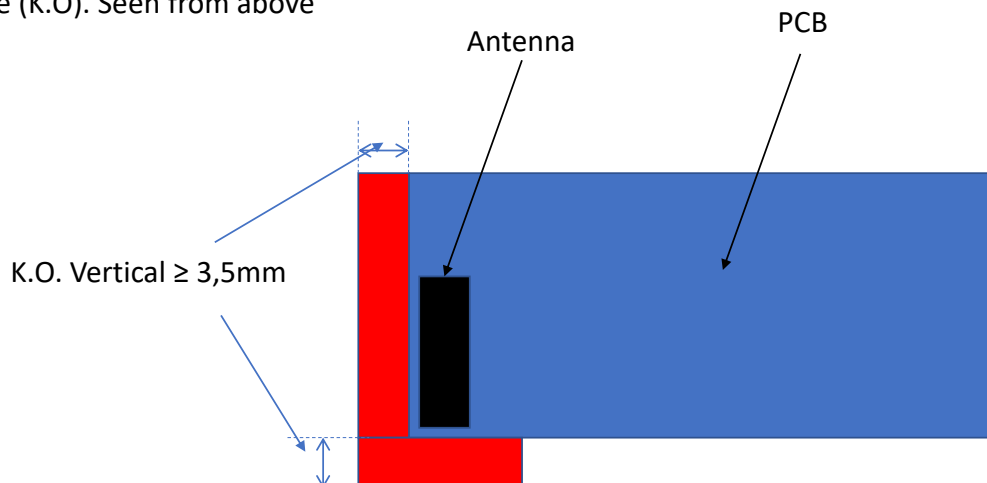
Mounting

When mounting the PCBA print in a housing be aware of the minimum recommended distance between antenna and housing – see drawings below.

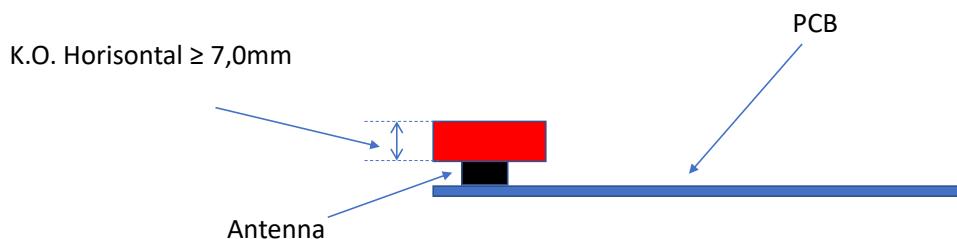
The housing material should be non-conducting due to the BLE signal.

The customer is responsible for testing and ensuring the BLE performance/range of the final system.

Keep out zone (K.O). Seen from above



Keep out zone (K.O). Side view





Recommendations

- The customer responsibility includes making a proper design of the cable strain relief inside the side rail panel.
- The customer should consider the existence of vibrations when defining and specifying the housing, i.e. we recommend the customer to carry out a vibration test on the final product.
- The customer must ensure a proper IP rating/test.
- The customer must ensure proper drop testing according to IEC60601-2-52.
- §201.15.3.4.1. In this clause there is an additional reference to IEC60601-2-31.
- The customer is responsible for correct mounting of the PCBA. Among other things, it means
 - ensuring proper and safe mounting of the PCBA into for instance the side rail.
 - ensuring proper and correct mounting between key pad connection tails and the ABL PCBA.
 - ensuring proper and correct mounting of the key pad.
 - the customer should consider proper precautions against ESD (Electrostatic discharge).
- When handling ESDS (Electrostatic Discharge Sensitive) devices – e.g. during transport, storage, handling, production or mounting in an application - exposure to harmful ESD must be avoided.
- Consider proper creepage and clearance measures to fulfil IEC 60601. With One MOPP (One Means Of Patient Protection / Secondary side of the actuator system)
- It is not recommended to dismount the membrane front cover after mounting as this may cause damage.



Wireless risks and recommendations

Due to some customer concerns regarding the range of BLE, LINAK decided to set the RF sensitivity and the transmit power settings to a maximum. In addition to that, LINAK Standard BLE allows pairing all the time.

Risk 1

If a BLE hand control is to be paired with an application, this can be done without coming closer to the application, as the above-mentioned settings are at a maximum. In such a scenario, there is a risk of pairing with another application from a longer distance as opposed to the distance of the application you want to pair with. The rule is that a BLE hand control is paired with the closest BLE device that it detects, however, the BLE device is not always physically closest.

Recommendation for Risk 1

The pairing process must always be made in near proximity to the application. It must also be ensured that the pairing is done with the correct application by simply operating the application after the pairing process.

Risk 2

In case that there are more LINAK BLE applications in a building and the BLE hand controls are accidentally swapped, there is a risk of operating another BLE application if within range. This can cause unintended movement and can have severe consequences for the patients' health.

Recommendation for Risk 2

When intending to operate an application with LINAK BLE, it must be ensured that the correct BLE hand control is used. Otherwise, there is a risk of unintended movement of the application that has been paired with the BLE control.



Contacts

FACTORIES

Denmark - Headquarters
LINAK A/S
Phone: +45 73 15 15 15
Fax: +45 74 45 80 48
Fax (Sales): +45 73 15 16 13
Web: www.linak.com

China
LINAK (Shenzhen) Actuator Systems, Ltd.
Phone: +86 755 8610 6656
Phone: +86 755 8610 6990
Web: www.linak.cn

Slovakia
LINAK Slovakia s.r.o.
Phone: +421 51 7563 444
Web: www.linak.sk

Thailand
LINAK APAC Ltd.
Phone: +66 33 265 400
Web: www.linak.com

USA
LINAK U.S. Inc.
Americas Headquarters
Phone: +1 502 253 5595
Fax: +1 502 253 5596
Web: www.linak-us.com
www.linak-latinamerica.com

SUBSIDIARIES

Australia
LINAK Australia Pty. Ltd
Phone: +61 3 8796 9777
Fax: +61 3 8796 9778
E-mail: sales@linak.com.au
Web: www.linak.com.au

Austria
LINAK Zweigniederlassung - Österreich (Wien)
Phone: +43 (1) 890 7446
Fax: +43 (1) 890 744615
E-mail: info@linak.de
Web: www.linak.at - www.linak.hu

Belgium
LINAK Actuator-Systems NV/SA
(Belgium & Luxembourg)
Phone: +32 (0)9 230 01 09
E-mail: beinfo@linak.be
Web: www.linak.be - www.fr.linak.be

Brazil
LINAK Do Brasil Comércio De Atuadores Ltda.
Phone: +55 (11) 2832 7070
Fax: +55 (11) 2832 7060
E-mail: info@linak.com.br
Web: www.linak.com.br

Canada
LINAK Canada Inc.
Phone: +1 502 253 5595
Fax: +1 416 255 7720
E-mail: info@linak.ca
Web: www.linak-us.com

Czech Republic
LINAK C&S s.r.o.
Phone: +42 058 174 1814
Fax: +42 058 170 2452
E-mail: info@linak.cz
Web: www.linak.cz - www.linak.sk

Denmark - International
LINAK International
Phone: +45 73 15 15 15
E-mail: info@linak.com
Web: www.linak.com

Denmark - Sales
LINAK Danmark A/S
Phone: +45 86 80 36 11
Fax: +45 86 82 90 51
E-mail: linak@linak-silkeborg.dk
Web: www.linak.dk

Finland
LINAK OY
Phone: +358 10 841 8700
E-mail: linak@linak.fi
Web: www.linak.fi

France
LINAK France E.U.R.L
Phone: +33 (0) 2 41 36 34 34
Fax: +33 (0) 2 41 36 35 00
E-mail: linak@linak.fr
Web: www.linak.fr

Germany
LINAK GmbH
Phone: +49 6043 9655 0
Fax: +49 6043 9655 60
E-mail: info@linak.de
Web: www.linak.de

India
LINAK A/S India Liaison Office
Phone: +91 120 4531797
Fax: +91 120 4786428
E-mail: info@linak.in
Web: www.linak.in

Ireland
LINAK UK Limited (Ireland)
Phone: +44 (0)121 544 2211
Fax: +44 (0)121 544 2552
+44 (0)796 855 1606 (UK Mobile)
+35 387 634 6554 (Rep.of Ireland Mobile)
E-mail: sales@linak.co.uk
Web: www.linak.co.uk

Italy
LINAK ITALIA S.r.l.
Phone: +39 02 48 46 33 66
Fax: +39 02 48 46 82 52
E-mail: info@linak.it
Web: www.linak.it

Japan
LINAK K.K.
Phone: 81-45-533-0802
Fax: 81-45-533-0803
E-mail: linak@linak.jp
Web: www.linak.jp

Malaysia
LINAK Actuators Sdn. Bhd.
Phone: +60 4 210 6500
Fax: +60 4 226 8901
E-mail: info@linak-asia.com
Web: www.linak.my

Netherlands
LINAK Actuator-Systems B.V.
Phone: +31 76 5 42 44 40 /
+31 76 200 11 10
E-mail: info@linak.nl
Web: www.linak.nl

New Zealand
LINAK New Zealand Ltd
Phone: +64 9580 2071
Fax: +64 9580 2072
E-mail: nzsales@linak.com.au
Web: www.linak.com.au

Norway
LINAK Norge AS
Phone: +47 32 82 90 90
E-mail: info@linak.no
Web: www.linak.no

Poland
LINAK Polska
LINAK Danmark A/S (Spółka Akcyjna)
Phone: +48 22 295 09 70 /
+48 22 295 09 71
E-mail: info@linak.pl
Web: www.linak.pl

Republic of Korea
LINAK Korea Ltd.
Phone: +82 2 6231 1515
Fax: +82 2 6231 1516
E-mail: info@linak.kr
Web: www.linak.kr

Slovakia
LINAK Slovakia S.R.O.
Phone: +421 51 7563 444
Web: www.linak.sk

Spain
LINAK Actuadores, S.L.u
Phone: +34 93 588 27 77
Fax: +34 93 588 27 85
E-mail: esma@linak.es
Web: www.linak.es

Sweden
LINAK Scandinavia AB
Phone: +46 8 732 20 00
Fax: +46 8 732 20 50
E-mail: info@linak.se
Web: www.linak.se

Switzerland
LINAK AG
Phone: +41 43 388 31 88
Fax: +41 43 388 31 87
E-mail: info@linak.ch
Web: www.linak.ch - www.fr.linak.ch
www.it.linak.ch

Taiwan
LINAK (Shenzhen) Actuator systems Ltd.
Taiwan Representative office
Phone: +886 2 272 90068
Fax: +886 2 272 90096
E-mail: sales@linak.com.tw
Web: www.linak.com.tw

Turkey
LINAK İth. İhr. San. ve Tic. A.Ş.
Phone: +90 312 4726338
Fax: +90 312 4726635
E-mail: info@linak.com.tr
Web: www.linak.com.tr

United Kingdom
LINAK UK Limited
Phone: +44 (0)121 544 2211
Fax: +44 (0)121 544 2552
E-mail: sales@linak.co.uk
Web: www.linak.co.uk

DISTRIBUTORS

Argentina
Novotec Argentina SRL
Phone: 011-4303-8989 / 8900
Fax: 011-4032-0184
E-mail: info@novotecargentina.com
Web: www.novotecargentina.com

Colombia
MEM Ltda
Phone: +[57] (1) 334-7666
Fax: +[57] (1) 282-1684
E-mail: servicioalcliente@memltda.com.co
Web: www.mem.net.co

India
Mechatronics Control Equipments India Pvt Ltd
Phone: +91-44-28558484, 85
E-mail: bala@mechatronicscontrol.com
Web: www.mechatronicscontrol.com

Indonesia
PT. Himalaya Everest Jaya
Phone: +6 221 544 8956 /+6 221 544 8965
Fax: +6 221 619 1925
Fax (Sales): +6 221 619 4658
E-mail: hejplastic-div@centrin.net.id
Web: www.hej.co.id

Israel
NetivTech LTD
Phone: +972 55-2266-535
Fax: +972 2-9900-560
Email: info@NetivTech.com
Web: www.netivtech.com

Singapore
Servo Dynamics Pte Ltd
Phone: +65 6844 0288
Fax: +65 6844 0070
E-mail: servodynamics@servo.com.sg

South Africa
Industrial Specialised Applications CC
Phone: +27 011 466 0346
E-mail: gartht@isagroup.co.za
Web: www.isaza.co.za

United Arab Emirates
Mechatronics
Phone: +971 4 267 4311
Fax: +971 4 267 4312
E-mail: mecatron@emirates.net.ae

Terms of use

LINAK® takes great care in providing accurate and up-to-date information on its products. However, the user is responsible for determining the suitability of LINAK products for a specific application. Due to continual development, LINAK products are subject to frequent modifications and changes. LINAK reserves the rights to conduct modifications, updates, and changes without any prior notice. For the same reason, LINAK cannot guarantee the correctness and actual status of imprinted information on its products.

LINAK uses its best efforts to fulfil orders. However, for the reasons mentioned above, LINAK cannot guarantee availability of any particular product at any given time. LINAK reserves the right to discontinue the sale of any product displayed on its website or listed in its catalogues or in other written material created and produced by LINAK, LINAK subsidiaries, or LINAK affiliates. All sales are subject to the 'Standard Terms of Sale and Delivery for LINAK A/S' available on LINAK websites. LINAK and the LINAK logotype are registered trademarks of LINAK A/S. All rights reserved.