

A telescopic column as a pier for your Telescope

Matthias Bopp, October 26th 2005

Hello,

as my NexStar11GPS (named the Borg) was getting heavier and convoluted I was looking for a convenient way of moving it and especially to adjust the height of the setup. Earlier this year I got the opportunity to buy second hand an unused Pier-Tech2® system in perfect conditions. Since then I have not been successful in getting detailed specifications for this model from Pier-Tech® (other than what can be found on their homepage at www.pier-tech.com) and thus I started looking for a more information. Browsing in the internet I found a couple of vendors of such telescopic lifting systems including the “Telescoping-Column Push Actuators” at www.mcmaster.com (page 908) and the Telemag® system of www.magnetic-drives.com. However I found the most “similar” system to the Pier-Tech® offering on the homepages of LINAK at www.linak.com and www.linak.de. Please look for the product-line called DESKLINE® and especially for the model DESKLIFT® “DL2”. Detailed descriptions can be found on their websites in the documents called “dl2.pdf” (German) and/or dl2_eng.pdf” (English).



NexStar11GPS on Pier-Tech2®

On the right you can see 2 pictures, first of the LINAK DESKLIFT® DL2 system and next to is a picture of my Pier-Tech2® column for comparison. I cannot find any difference on the column itself.

Well therefore I started looking closer in the documentation from LINAK to get the requested specification.

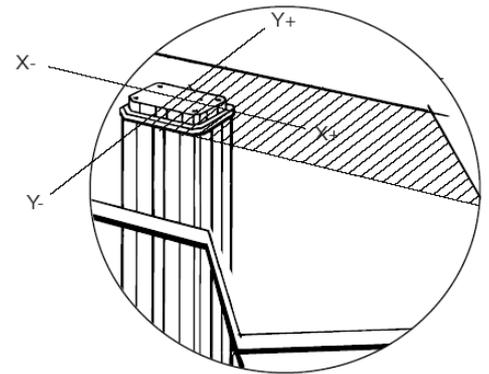


Column

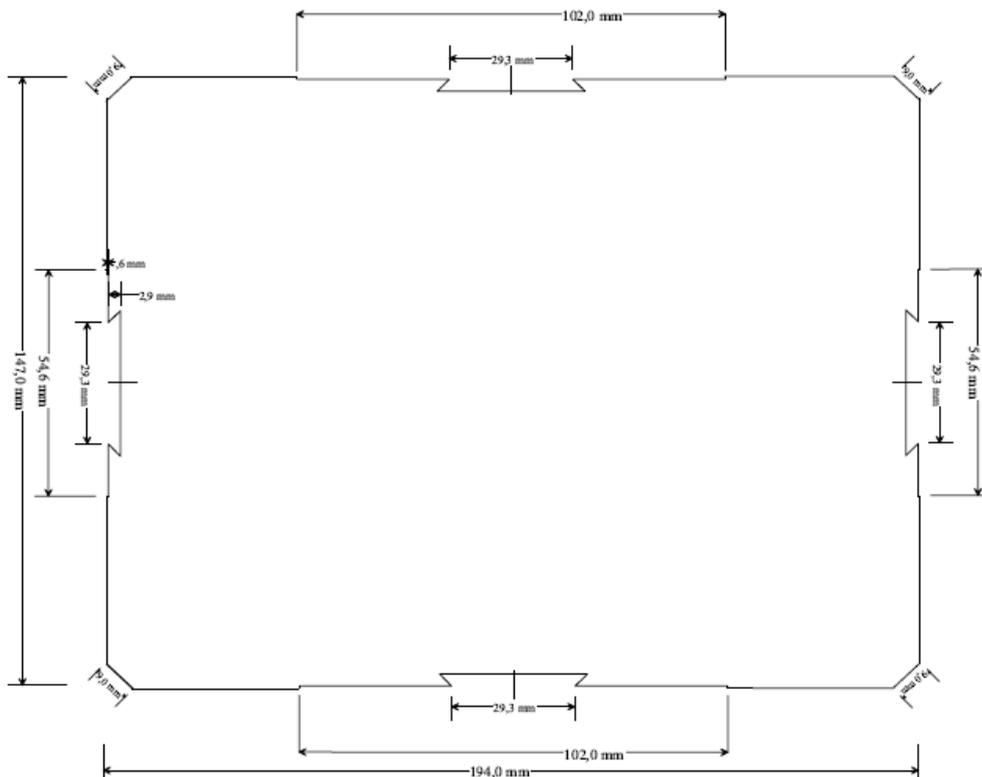
Here is a summary of the specifications of DESKLIFT® model DL2 from the LINAK website

- Max. thrust 1000 N
- Max. self lock 1000 N
- Max. duty cycle: 5% ~ (max. 1 min. at continuous use followed by 19 min. pause)
- Max. speed: 50 mm/sec (at zero load)
- Built-in limit switches (not adjustable)
- Stroke length 500mm +/- 4mm
- Current consumption @ 1x DL2 and max load: max. 7.0A (@24V)
- Protection class IP20
- Ambient temperature: +5°C to +40°C
- Compatible with DESKLINE® CBD2 type E, F and G and controls: WDP-L, DP1N, FS (E-version) and CBD2 type N with the control DPXT.
- Dynamic bending moment (@ 100% stroke length):
 $M_{y+}/M_{x+} = 250 \text{ Nm}$
 $M_{y-}/M_{x-} = 200 \text{ Nm}$
- Dynamic bending moment (@ <80% stroke length):
 $M_{y+}/M_{x+} = 500 \text{ Nm}$
 $M_{y-}/M_{x-} = 330 \text{ Nm}$

- The graphic below shows the definition of the directions x+, x-, y+, y- used for the definition of the dynamic bending moment:

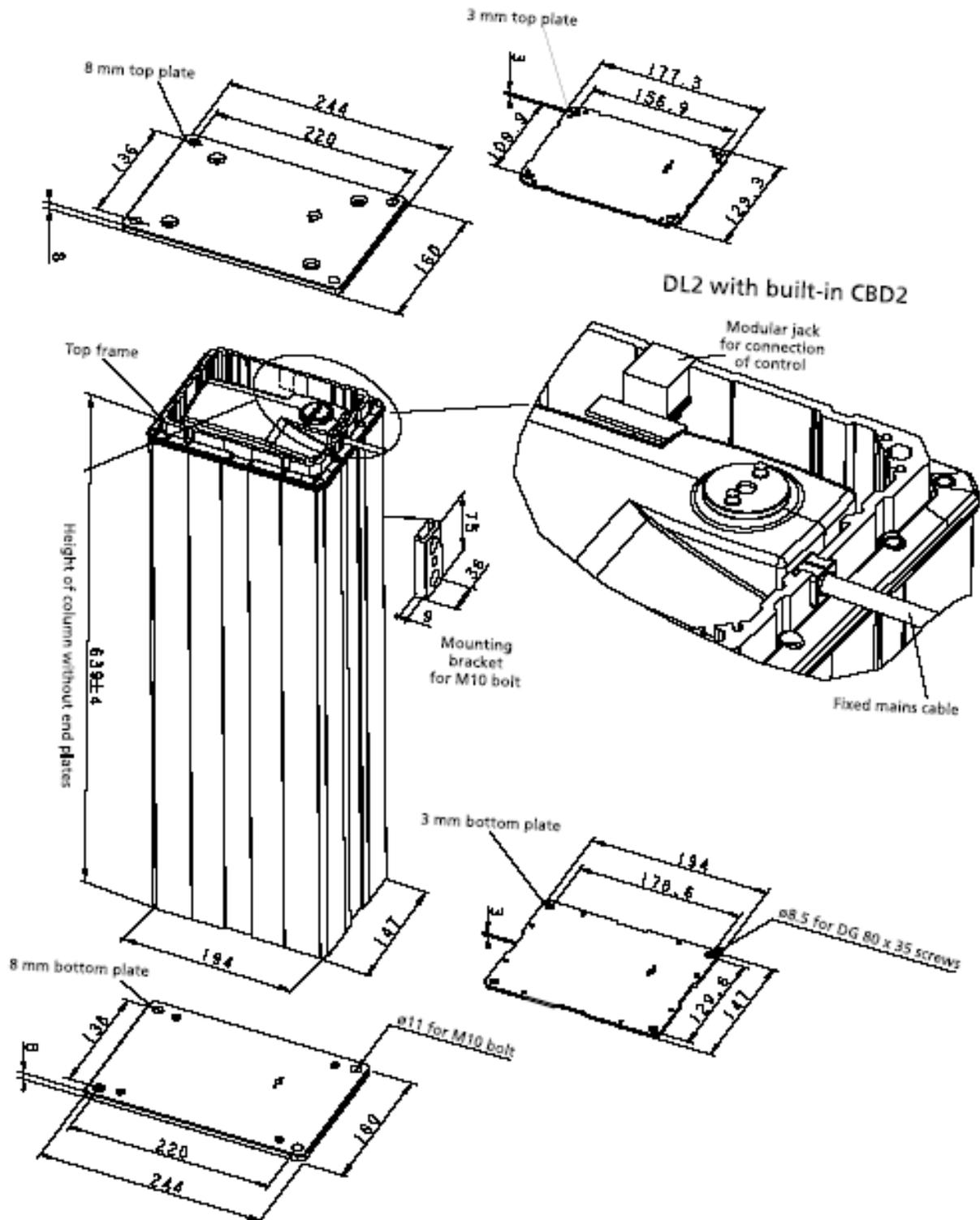


Please note, that I cannot guarantee that these values are also valid for the Pier-Tech® product as I never got such precise data from Pier-Tech®. I propose you use them only as a reference. This is especially true as the column in Pier-Tech2® is mounted upside down versus the column in the DESKLIFT® products. Next please find the profile of the Pier-Tech2® column (the larger outer one which slides over the inner column):



Inside the DESKLIFT® DL2 column

LINAK is kind enough providing an excellent documentation of their products including a detailed explosion schematic of the interior of their column:



Well, if you compare this with some of the pictures I took from my Pier-Tech2® it looks “very similar”. Please compare the dimensions with the profile given the page before and see the pictures on the next page.

Inside the Pier-Tech2® column:



Actuator

Inside the DESKLIFT® DL2 column is a modified LA31 actuator. The specification of the LA31 actuator can be downloaded from the LINAK homepages. The filename is “la31t_eng.pdf”.

A summary of the specification is given below:

- 12V or 24 V DC permanent magnet motor
- Thrust up to 6000 N in push and up to 4000 N in pull
- Duty cycle: Max. 10% or 2 minutes continuous use followed by 18 minutes not in use
- Ambient temperature +5°C to +40°C
- Standard protection class: IP 51
- Built-in limit switches (not adjustable)
- Strong wear and corrosion resistant stainless steel inner tube
- Noise level 45 dB (A); measuring method DS/EN ISO 3746, actuator not loaded.

Please note that this specification might be slightly changed as the DESKLIFT® DL2 product is using a modified version of LA31:

On the right you see a picture of the original LA31 actuator: It looks just like the device on my pictures you have seen on the previous page. So again I think you can use the data above as a reference.



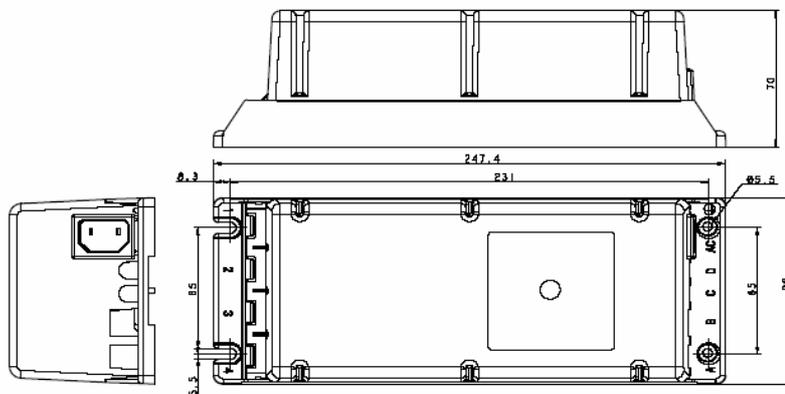
Control-Unit

The DESKLIFT® DL2 system can have the optional CBD2N control unit built in. This is the configuration my Pier-Tech2® lift is using and therefore all further information are based on this configuration (DL2 incl. CDB2N). The optional Hall Sensors seem to be not built into my system and are therefore not discussed any further (this would require a CBD2E unit). The control box is designed with soft start function. The possible different configurations of the control unit can be found in the document cbd2_eng.pdf on the LINAK homepage.



Below please find the dimensions and the connector definitions of the CBD2 control unit:

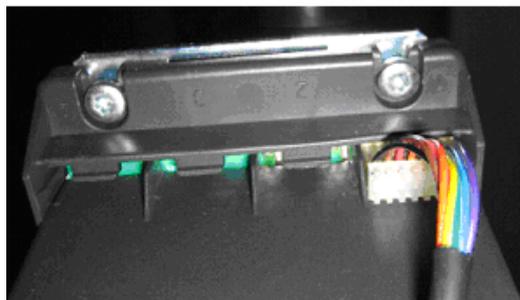
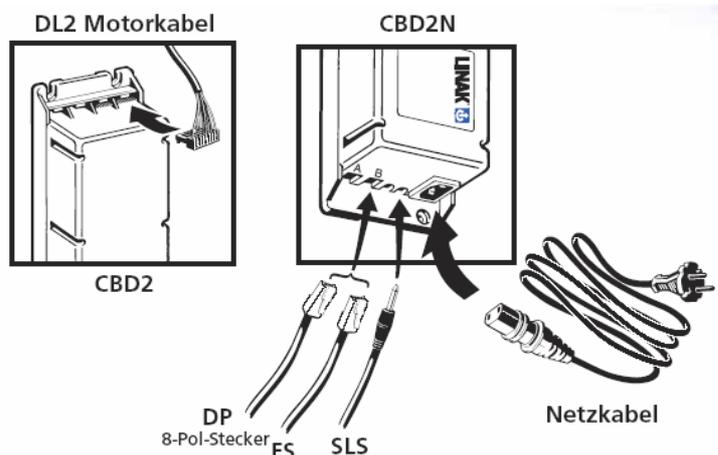
Dimensions (mm):



Mounting abbreviations:

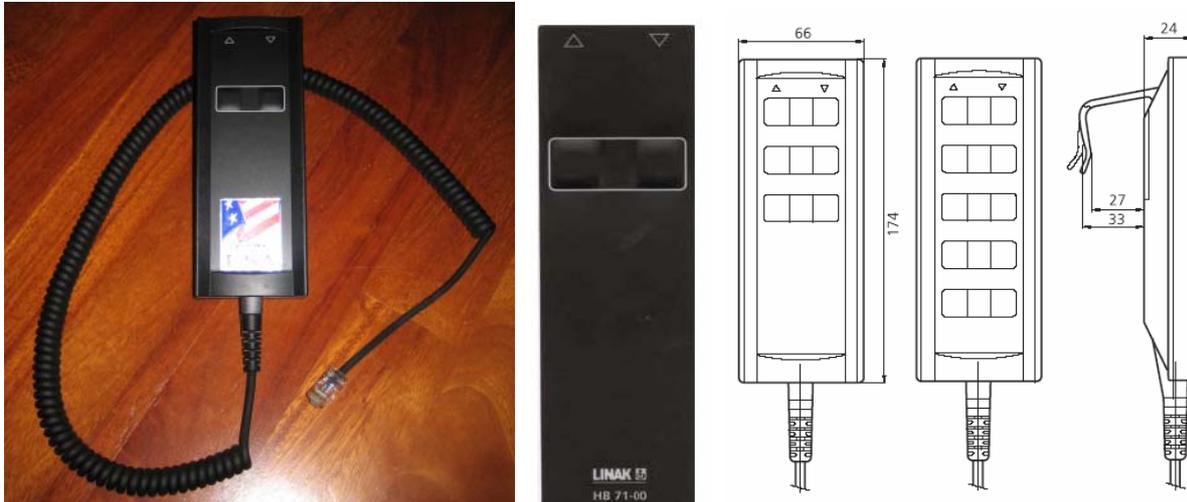
- A = Control WDP
- B = Control (DPA/DP1)
- C = Anti-squeeze safety switch no. 1
- D = Anti-squeeze safety switch no. 2
- AC = Connection to the mains
- 1-3 = 1 - 3 sockets for DL2 lifting units

The unit in my Pier-Tech2® looks exactly like this. Only 3 connectors are used as can be seen in the pictures below: mains connector to supply the 220V (AC), 8 pin Western plug for the hand-controller or desk panel control unit (B), socket for the DL2 lifting unit (1). Thus I assume the ordering number for such a unit should be CBD2NF01100-3J but I am not sure.



Hand-Controller

My Pier-Tech2® was supplied with a simple 2 button hand-controller to control the lift. On the backside it is marked with the product ID HB7160000-30600. Below please find pictures of the Pier-Tech2® hand-controller and layout and dimensions as defined by LINAK for their “HB71xxx” hand-controller.



Thus the Pier-Tech2® hand-controller looks identical to the DESKLIFT® hand-controller of the series HB70. The Pier-Tech® product ID HB7160000-30600 and the nomenclature of LINAK for their HB70 hand-controller as defined below seem to match too.

HB7 = Type 7
 1 = 1 Channel
 6 = IP66 protected
 00 = functionality is
 00 = cover design is
 - = body colour is black
 3 = Coiled 8 core. Modular jack (CB7/CBD/CBR)
 0600 = cable length

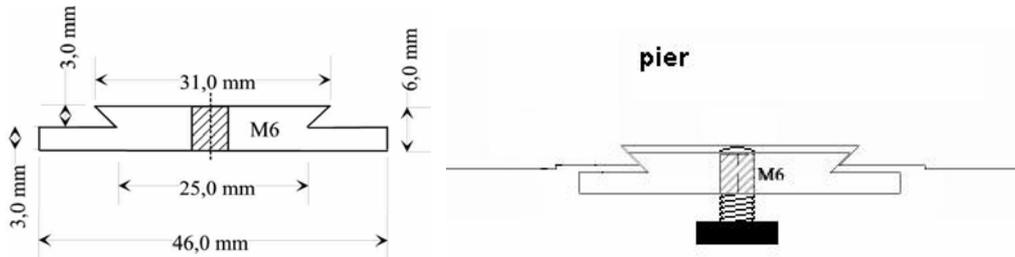


The hand-controller can be easily substituted by a home-built unit.

You only need to have a cable with a 8 pin connector as shown left. To move the pier down just connect pin 2 and pin 8, to move the pier up connect pin 5 and pin 8. You can use a push button or a relay to control the pier remotely. The voltage between the pins 2 and 8 respectively 5 and 8 (while open) is approximately 29 V DC. Once you connect the pins the voltage goes to 0 and a current of approximately 40 mA is flowing. Thus make sure you use a cable with a low resistance (less than 3 Ohms per wire should be ok). At my hand-controller pin 2 is connected with an orange wire, pin 5 is connected with a green wire and pin 8 is connected with a red wire.

Accessories:

As the Pier-Tech® as well as the LINAK® column both feature a nicely profiles outer surface, I am intending to build accessory holders for my telescope. Below on the left please find the drawing of the bracket a friend of mine proposed to me and which I am intending to build. On the right drawing you can see how it will be attached to the column.



As you can see on the main picture on page 3 of this document there is also a “mounting bracket for M10 bolt” available from LINAK®. The part number is 0578006. In case you do not want to build your own bracket this may be your choice. Pier-Tech® is offering ready made accessory trays and Laptop holders. If you are willing to spend the money they ask for this may be your quickest way. Here are pictures of the LINAK® mounting bracket:



Summary and Disclaimer:

Finally I want to point out, that my description is not intending to imply that the DESKLIFT® DL2 product and the Pier-Tech2® product are identical. All information given is based on documents found on the LINAK® homepage, the pictures I took from my Pier-Tech2® product and the limited information on the Pier-Tech® homepage. Thus I assume this is not revealing anything secret or infringing any IP rights but is rather intended to be a compilation of information to enable the user of those products to understand their products better and make better use of them. Please note that both, the LINAK® as well as the Pier-Tech® products claim to be patent protected. In case you are using information from this document for modifications of your product please be aware, that you may loose your warranty when opening and/or changing your column.

Finally please note that there may be errors in my description and thus please use this information on your own risk. Questions and comments are always very welcome. Please send them to the Email address given below.

Best regards

Matthias

Email: DDIUS@AMSAT.ORG
Homepage: www.dd1us.de