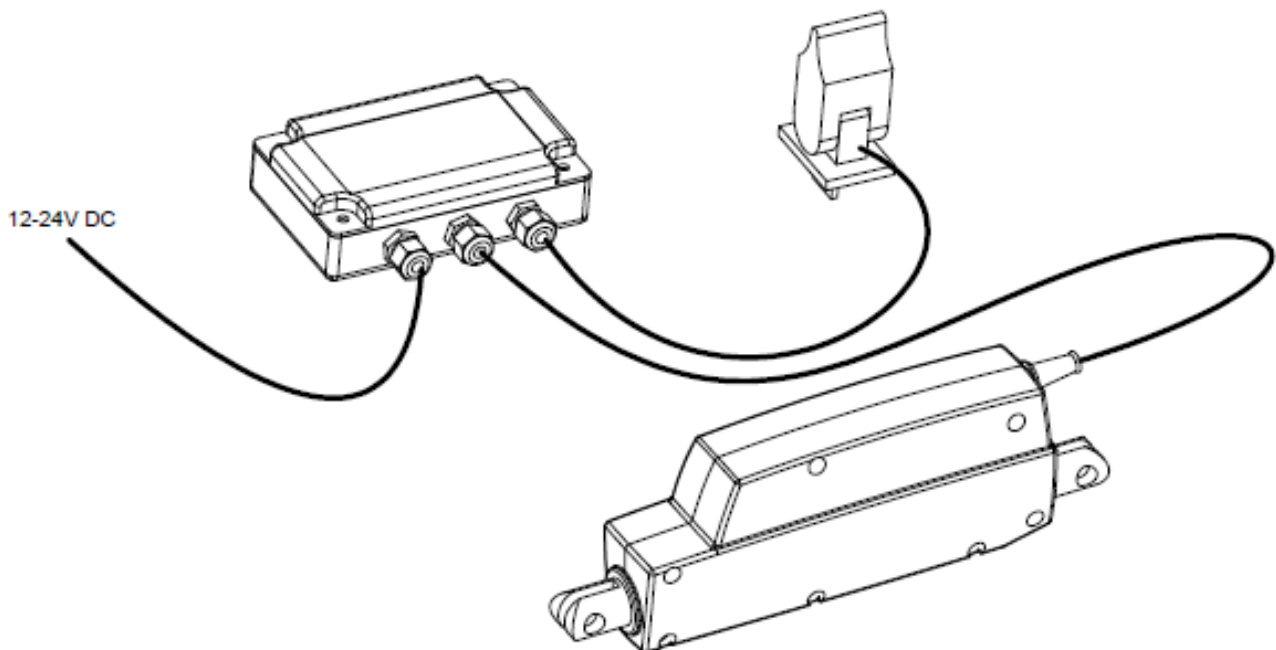


TECH-system Type 165

For single operation with servo function
Instructions for installation and use



Introduction

Dear User,

Thank you for choosing an actuator system from LINAK®. LINAK systems consist of hi-tech products based on many years of experience in the development and manufacture of actuators, electric control boxes, control systems and chargers.

TECH-systems comprise LINAK actuators and a motor control unit developed and produced by third party manufacturers. The function and operational reliability of TECH-systems have been tried and tested in a wide range of situations. In addition we continuously improve our products and systems so as to accommodate customer requirements.

This instruction manual describes how to install and maintain your TECH-system. We are sure that your TECH-system will provide you with many years of problem-free operation.

Before our products leave the factory, they are subjected to comprehensive function and quality tests. In the unlikely event that you experience problems with your systems, please call LINAK Danmark A/S on +45 86803611.

LINAK provides a warranty on all its products and systems. However, this warranty is issued on condition that the product is used in accordance with the specifications, that maintenance is performed correctly, and that any repairs are carried out at a workshop that is authorised to repair LINAK products.

Any alterations to the installation and use of LINAK systems may affect their operability and durability. The products must not be opened by unauthorised persons.

LINAK Danmark A/S
Mønstedvej 9
DK-8600 Silkeborg

Important information

Important information about LINAK I products is presented under the following headers:



Warning! Failure to comply with these instructions may result in accidents leading to serious personal injury.



NB Failure to comply with these instructions may result in damage to or destruction of the product.

Warranty

The LINAK warranty covers manufacturing faults in the products, calculated from the date of production. For additional information about the warranty period, contact LINAK Danmark A/S. The warranty is limited to the value of the LINAK product.

The LINAK warranty is only valid if the system is unopened and has been used correctly. The control box and control unit must not be subjected to violent handling as this will void the warranty.

Safety instructions

Please read the following safety information carefully. Everyone who is to connect, install or use the system must have been given the necessary information and must have access to this user manual.

LINAK recommends that the actuators be used for pressure applications rather than tension applications.

It is essential that everyone who is to connect, assemble or operate the systems receives the necessary information and has access to this instruction manual.

Before fitting, removal or troubleshooting:

- Stop the actuator.
- Disconnect the power supply and remove the mains plug from the socket.
- Relieve the actuator of any load that may be released during the work.

Before start-up:

- Make sure that the system has been installed as described in this user manual.
- Make sure that the voltage to the control box is correct before connecting the system to the power supply.
- System connection. The individual parts must be connected before the motor control unit is connected to mains power.

During operation:

- If the motor control unit emits unusual sounds or smells, disconnect the mains current and any external batteries.
- Make sure that the cables are not damaged.
- Disconnect the mains cable to mobile equipment before moving same.
- The products is intended to be used indoors (see the encapsulation class of the individual actuator).

Classification:

The equipment is not suitable for use in the immediate vicinity of a flammable, anaesthetic mixture containing air, oxygen or laughing gas (nitrous oxide).

Environmental conditions

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



Warning!

The following applies if the actuator is used to apply tension in an application that carries a risk of personal injury:
The manufacturer of the application is responsible for implementing suitable safety measures to prevent the risk of personal injury in the event of actuator failure.



Warning!

Please note that in all applications in which an actuator is to be involved, steps must be taken to prevent personal injury – such as the risk of crushing fingers.



Warning!

The plastic components in the system cannot withstand the effects of cutting oil.

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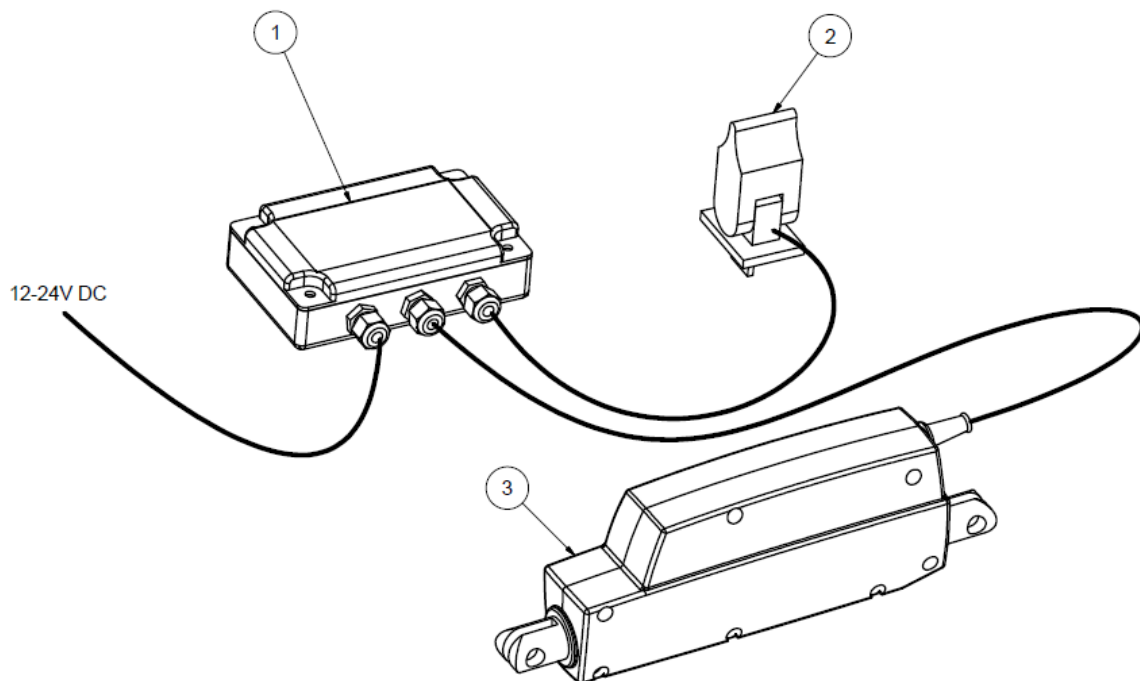
Technical data

The TECH-system type 165 consists of: a servo controller and an actuator. You can choose between 3 different types of actuator.

Description of the system

TECH-system type 165 is an actuator system, comprising 1 LINAK actuator, which, by means of a specially designed motor controller, provides a reliable and cost-effective system for resolving tasks where accurate positioning of the actuator spindle movement is desired. The motor controller has been developed to receive signal feedback from actuators with an integral potentiometer. Actuator positioning can be achieved either by entering new values via a potentiometer control unit or by sending a 0-5V/0-10V signal, for example, from a PLC.

TECH-system type 165 is specially developed for industrial uses and compatible with several different LINAK actuators.



Servo controller (pos.1)

Type designation:	TR-EM-165-0-5 and TR-EM-165-0-10
Actuator connection:	1 actuator
Actuator power limit:	5A continuous 8A for max. 15 sec. 12A for max. 5 sec.
Actuator voltage:	12/24 V DC
Supply voltage to PCB:	12–32 V DC smoothed voltage
Power limit, setting:	2A, 4A, 7A and 12A (DIP switch)
Error output:	NPN open-coll. 30 V 50 mA
Regulation accuracy:	+/- 1%
Operating temperature (Ta):	-20 - 60 °C
Controller inputs:	
<i>TR-EM-165-0-5:</i>	0-5 V DC
<i>TR-EM-165-1-10:</i>	0-10 V DC

The Servo controller TR-EM-165 is available in 2 variants as a standalone PCB:

1) 0-5V signal input (<i>LA12; LA30; LA32</i>):	Order. no. TR-EM-165-0-5
2) 0-10V signal input (<i>LA23; LA35</i>):	Order. no. TR-EM-165-0-10

Actuator (pos.3)

The system is compatible with the following LINAK actuators (all with potentiometer feedback):

- Actuator LA12 - potentiometer
- Actuator LA23 - Hall potentiometer
- Actuator LA30 - potentiometer
- Actuator LA32 - potentiometer
- Actuator LA35 - Hall potentiometer

(see the appropriate product data sheets for additional information)

Controller: (pos.2)

The system is compatible with the following LINAK control units

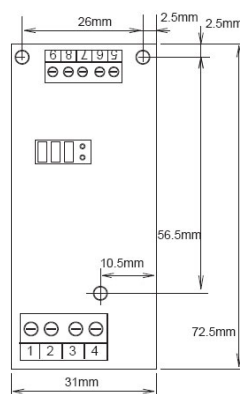
- Swivel potentiometer
- External PLC

Other types of control units can also be used.

Dimensions

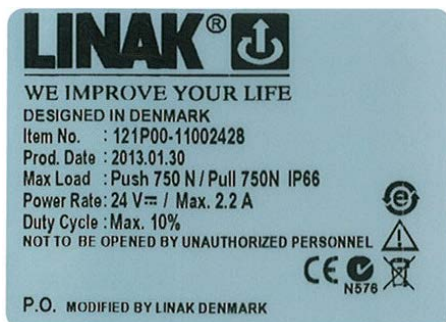
For actuator dimensions, see the appropriate product data sheet.

Dimensions of servo controller PCB:

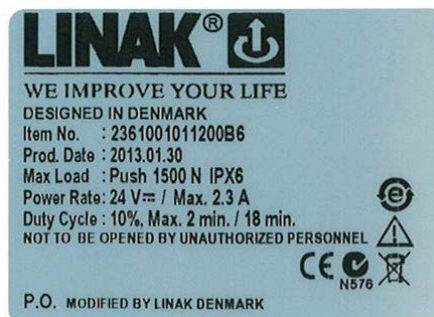


Data plate and labelling

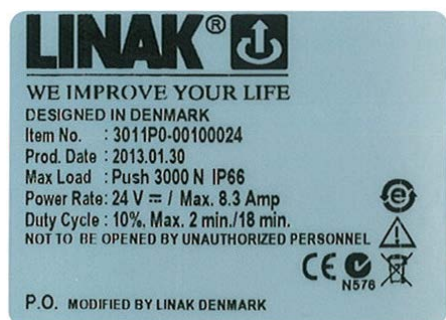
Data plate on actuator LA12



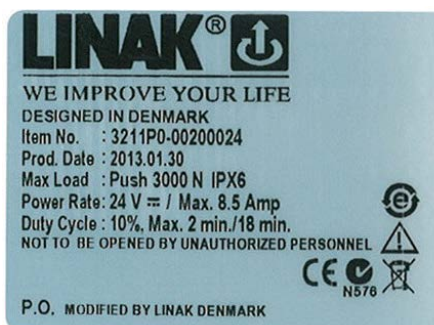
Data plate on actuator LA23



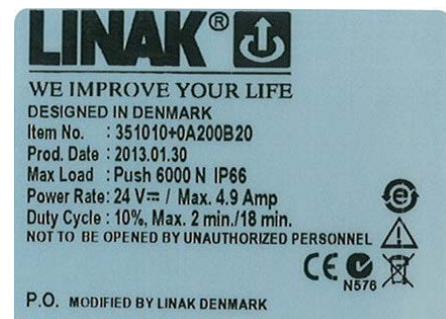
Data plate on actuator LA30



Data plate on actuator LA32



Data plate on actuator LA35



Declaration of incorporation of partly completed Machinery

Directive 2006/42/EC Annex II B

The signatory Manufacturer and authorised to compile the relevant technical documentation for partly completed Machinery and in response to a reasoned request by the national authorities transmit the relevant information:

**LINAK Danmark A/S
Mønstedsvvej 9
DK-8600 Silkeborg**

Declares that the partly completed machinery:

Description: Linear Actuator system for single Actuator operating
Name: TECH-system
Type: **165**

Consisting of:
LINAK Actuator type: **LA12 or LA23 or LA30 or LA32
or LA35**

Motor controller unit: **TR-EM-165-0-5 or TR-EM-165-0-10**

comply with the following parts of the essential health and safety requirements of the Directive 2006/42/EC Annex I:

1.2.1-safety and reliability of the control system; 1.2.2-control device; 1.2.3-starting; 1.2.4.1-stopping; 1.2.6-faliure of the power system; 1.3.2-risk of brake-up during operation; 1.3.7-risks related moving parts; 1.3.8-choice of protection against risks arising moving parts.

comply with the requirements of the following EC Directives:

- Electromagnetic compability 2004/108/EC

The partly completed Machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive 2006/42/EC and other relevant Directives, where appropriate.

Date

Silkeborg

Name and signature

18/
2-13

Technical chief

Lars Omme



Connection and installation

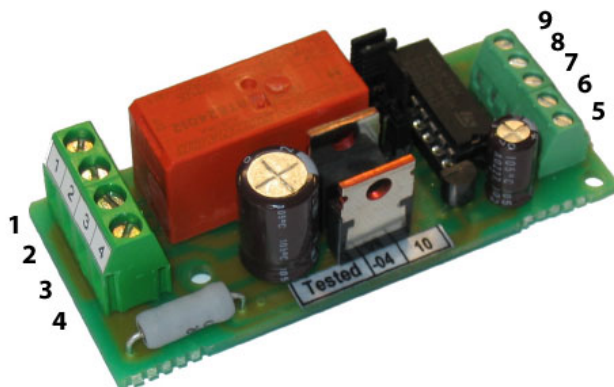
Screw terminals are used to connect the TR-EM-165 motor control unit. A general description of the individual terminals is presented below. See the diagrams later in this manual for information about the correct connection of the different actuators.

Fitting the motor control unit

The PCB is fitted using three 3 mm diameter screws and connected to an external power supply. The height of the PCB is approx. 25 mm.

Connection of the motor control unit

The power stage is equipped with self recovery overload and over current protection, but the use of an external fuse on the supply voltage is recommended.



Terminal 1:	Supply voltage (+ 10-35 V DC) smoothed voltage
Terminal 2:	Voltage to motor on actuator (+12/24 V DC)
Terminal 3:	Voltage to motor on actuator (-0 V DC)
Terminal 4:	Supply voltage (- GND)
Terminal 5:	5 V signal OUT max. 15 mA
Terminal 6:	Fault signal UD, NPN max. 50 mA
Terminal 7:	Controller potentiometer signal IN
Terminal 8:	Actuator potentiometer signal IN
Terminal 9:	0 V - signal (GND)

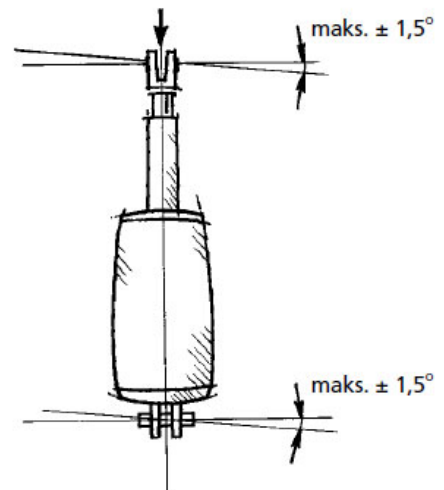
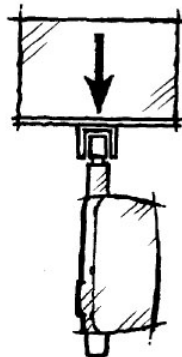
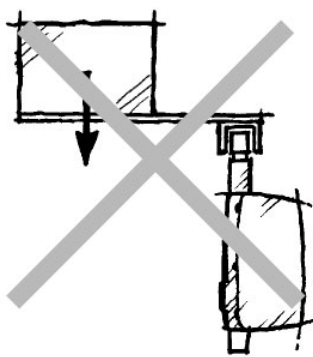
Installing the actuators

When installing actuators, it is important to make sure that the actuators can move freely along their full stroke length, without being limited by the mechanical construction. It is also important to ensure that the application is not subjected to uneven twisting and traction, nor to unevenly distributed load.



NB The actuator must only be secured using the piston rod eye and back fixture – never the outer tube of the spindle or the motor housing.

For additional information, please refer to the data sheet for the actuator in question.



Connection of LINAK actuators

The majority of LINAK actuators are supplied as standard with a pre-fitted cable, and the actuators are also fitted with different types of plugs depending on which control box has been selected for control operations. For operation with TR-EM-165, actuators are typically supplied without plugs.

The new generation of actuators is fitted with minifit plugs in the motor housing, and thus supplied without fitted cables. In contrast to the cable types mentioned above, the supply and signal conductors have now been separated and are thus in individual cables.

LA35



Motor cable
Order no.: 0367002-1500

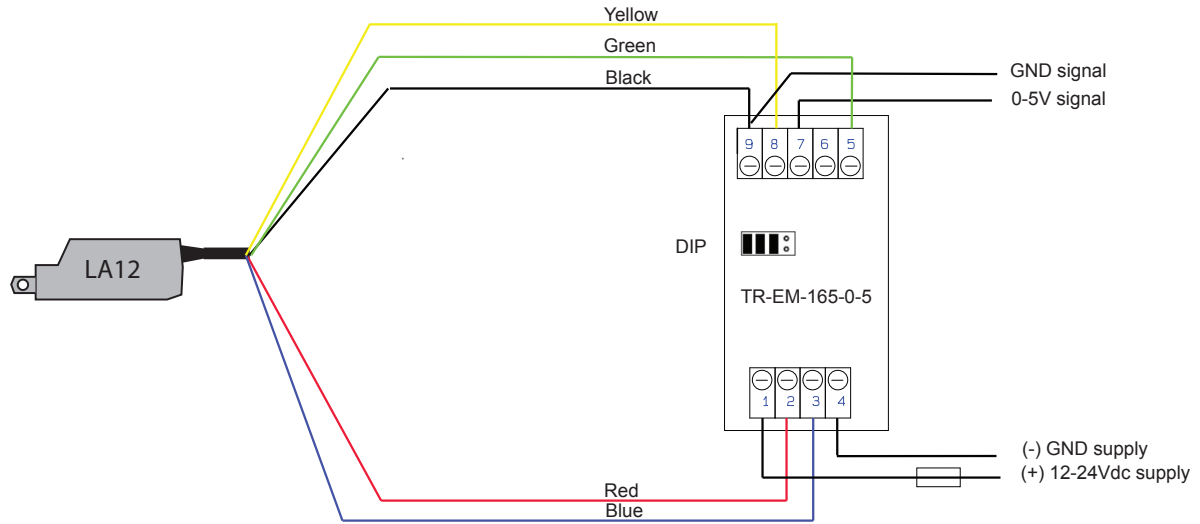
Signal cable Order no.:
0367003-1500

LA23

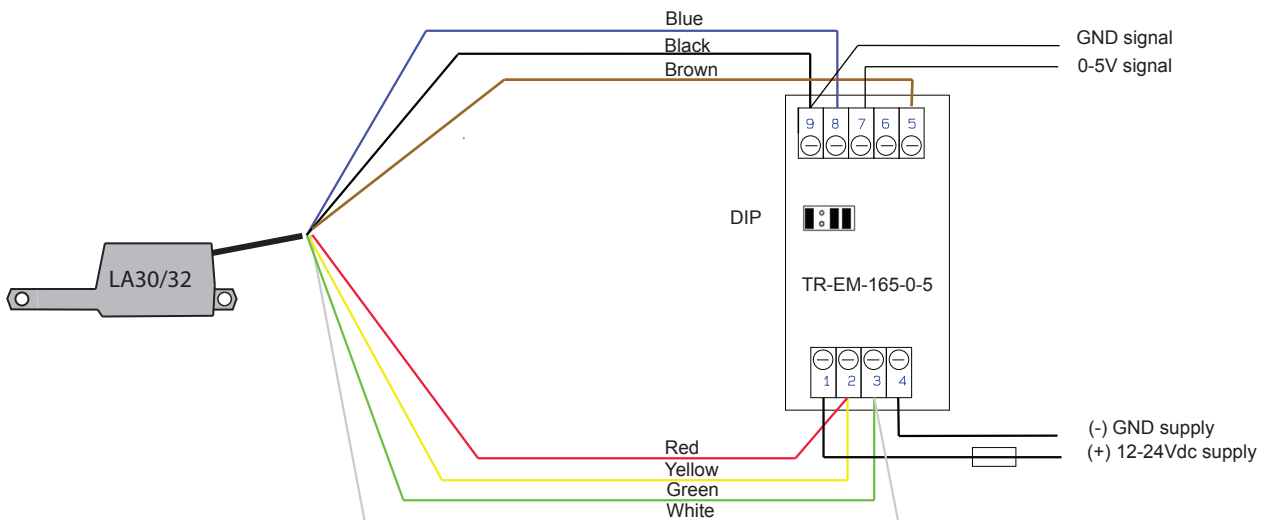


Motor cable
Order no.: 0237008-0750-A

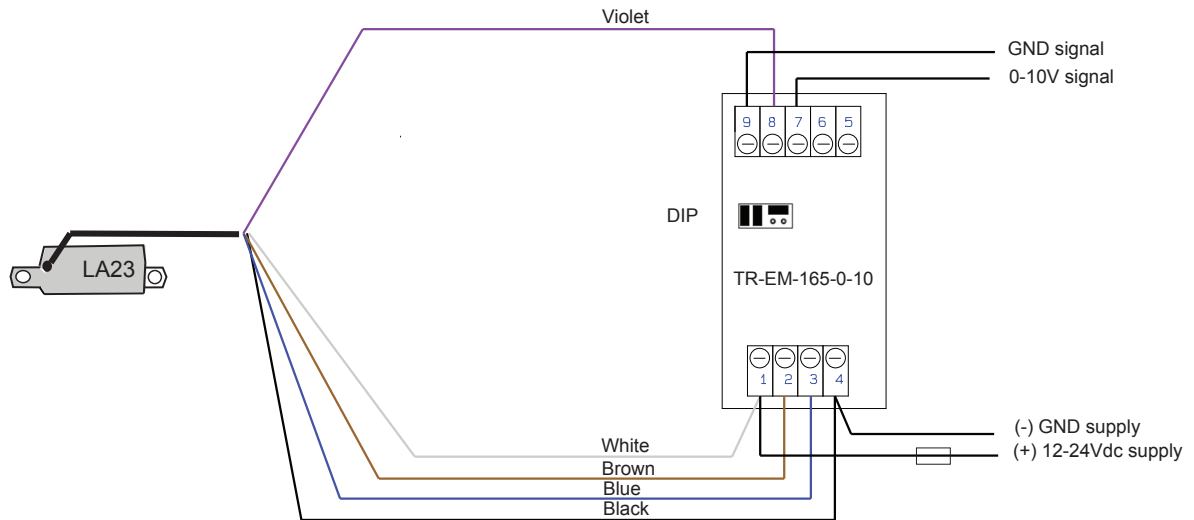
LA12 - Potentiometer



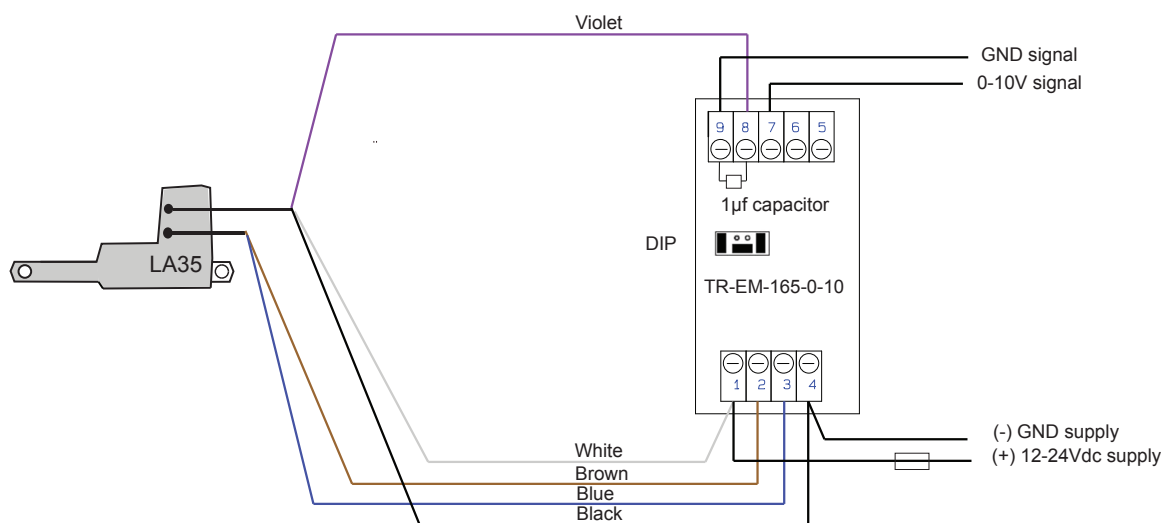
LA30/32 - Potentiometer



LA23 - Hall-potentiometer

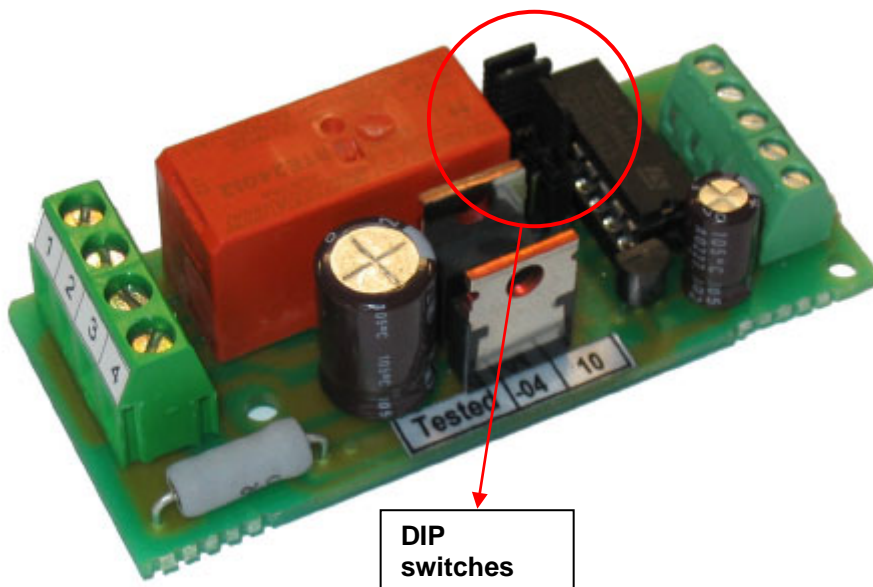


LA35 - Hall-potentiometer



Function settings

DIP switches are fitted to the PCB of TR-EM-165 motor control unit. These make it possible to set cut-off limits appropriate for the individual type of actuator.



Cut-off limit

You can set the desired cut-off limit using 3 x DIP switches:



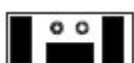
Disconnects at 2A (Recommended in LA12 applications)



Disconnects at 4A (Recommended in applications with LA23, LA30, LA32)



Disconnects at 7A (Recommended in applications with LA30, LA32, LA35)



Disconnects at 12A (Recommended in applications with LA30, LA32, LA35)



Warning!

It is important that the disconnection limit is appropriate for both the application and the actuator. If the cut-off limit selected is too high, this may seriously damage the unit.

Operation

Before starting to use the system, it is important to ensure that the motor control unit has been set correctly according to the above.

If no adjustments are made, the system will use the factory settings.

Stop

Positioning is done by giving a new set value using the set value potentiometer or voltage signal 0-5V / 0-10V. The driver compares the feedback value to the set value and starts to drive the motor towards the set value. When these values begin to approach each other, the driver will slow down, and when the values are identical the motor stops.













































Troubleshooting

Current trip feature will shut down the driver in a fault situation, if either current is on the limit for over 2s, or if it takes more than 30s to reach the set value. In a fault situation the error output will be activated. Reactivation from the trip situation is done by applying a reverse control command.

Key to symbols



NB None of the products carries all of the symbols described here.

	Type B equipment, as per EN 60601-1		Lock function
IPXX	Protection against contact/foreign matter (first character) and water (second character) as per EN60529		Release function
	Class 2 equipment		Charge indicator
	For indoor use		Safety switch/enable button
	Safety isolating		
	Protective earth		
	Alternating Current		
	Direct current		
	Attention, consult accompanying documents		
	Demko approval	File E97199	UL file number
	Fimko approval	File E175209	UL file number
		File E151104	UL file number
			CSA
APPROVAL V94265	Australian approval mark		PSE-Mark
APPROVAL NO.:97122	Australian approval mark		Product with a thermofuse
	Recognised - Component Mark		For indoor use (House).
	Canadian Recognised - Component Mark		Safety isolating transformer.
	Recognised Component Mark for Canada and the United States		Electronics scrap
	T-Mark		Equipment KI.2 (Double square)
	RW-Tüv approval		Patient part of type B (Mand)
	TÜVRheinland		Patient part of type BF
			Earth protective
	TÜV Product Service	KL.1	Equipment class1.
	ETL		Earth
	C-ETL		CE Mark
CS95145V			C-TICK
LGA 	LGA		
	UL Listing Mark		
	C-UL Listing Mark		
	C-UL US Listing Mark		
	UL Listing Mark		

Disposal of LINAK products

To dispose of LINAK products, start by sorting them into different categories for recycling or incineration. We recommend that you dismantle your product as fully as possible for disposal, and that you reuse the parts. Sorting categories may include: metal, plastic, cables, combustible material and material for recycling. It is possible to subdivide within some of these categories. For example, "metal" can be subdivided into steel and aluminium, while "plastic" can be divided into ABS and PP. As an example of sorting, the table below illustrates the various categories under which the LINAK components are to be sorted.

Product	Component	Recycling group
Actuator:	Spindle and motor Plastic housing Cable	Metal scrap Plastic recycling or combustion Cable scrap or combustion
Control box:	PC-board Plastic housing Cable Transformer Batteries	Electronics scrap Plastic recycling or combustion Cable scrap or combustion Metal scrap Recoverable resources
Control:	Plastic housing Cable PC-board	Plastic recycling or combustion Cable scrap or combustion Electronics scrap