TECHLINE®
IMPROVING FLEXIBILITY

LA35 ACTUATOR

To learn more about LINAK, please visit:
WWW.LINAK.COM

LINAK®
WE IMPROVE YOUR LIFE

Contents

Preface

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, electronic control boxes, controls, and chargers. We are also constantly improving our products to meet customer requirements.

This user manual will tell you how to install, use, and maintain your LINAK LA35 actuator.

We are sure that the LA35 actuator will give you a problemfree operation. Before our products leave the factory they undergo full function and quality testing. Should you nevertheless experience problems with your LINAK products, you are always welcome to contact our service departments or service centres.

Most LINAK subsidiaries 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.

LINAK A/S

Safety instructions 

Please read the following safety information carefully.

Ensure that all staff who are to connect, mount, or use the actuator are in possession of the necessary information and that they have access to this user manual.

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.

Before you start mounting/dismounting, ensure that the following points are observed:
- The actuator is not in operation.
- The mains current supply is switched off and the plug has been pulled out.
- The actuator is free from loads that could be released during this work.

Before you put the actuator into operation, check the following:
- The actuator is correctly mounted as indicated in the relevant user instructions.
- The equipment can be freely moved over the actuator's whole working area.
- The actuator is connected to a mains electricity supply/transformer with the correct voltage and which is dimensioned and adapted to the actuator in question.
- Ensure that the voltage applied matches to the voltage specified on the actuator label.
- Ensure that the connection bolts can withstand the wear.
- Ensure that the connection bolts are secured safely.

During operation
- Listen for unusual sounds and watch out for uneven running. Stop the actuator immediately if anything unusual is observed.
- Do not sideload the actuator.
- Use only the actuator within the specified working limits.
- Do not step or kick on the actuator.

When the equipment is not in use
- Switch off the mains supply or pull out the plug in order to prevent unintentional operation.
- Check regularly the actuator and joints for extraordinary wear.
- Reinstall always the cabellock and a tight screw with 1,5 Nm +/- 20%

Classification
The equipment is not suitable for use in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide.

Important information

Information about the actuators is described under the following two headings:

Warning!
Failing to follow these instructions can cause accidents resulting in serious personal injury.

Failing to follow these instructions can result in the actuator suffering damage or being ruined.

DECLARATION OF CONFORMITY

LINAK A/S

Smedevænget 8

DK - 6430 Nordborg

hereby declares that **LINAK Actuator 35xxxxxxxxxx2x**

complies with the EMC Directive: 2004/108/EC according to following harmonized standards:
EN 61000-4-2:1995+A1+A2, EN 61000-4-3:2006, EN 61000-4-4:2004,
EN 61000-4-5:1995+A1, EN 61000-4-6:1996+A1, EN 50121-3-2, EN 60204-31:1999

Additional information:
The actuator does also comply with EMC parts of:
The Machinery Directive 2006/42/EC
The Recreational Craft Directive 94/25/EC
The Vehicle EMC Directive 2004/104/EC

and complies with the following standards:
DS/EN 13309:2001 (Construction machinery - Electromagnetic compatibility of machines with internal electrical power supply), DS/EN ISO 14982:1998 (Agricultural and forestry machines - Electromagnetic compatibility - Test methods and acceptance criteria) and EN/ISO 13766:2006 (Earth-moving machinery - Electromagnetic compatibility)

Date: 2009-04-16

Signature:

(John Kling)

Misc. on the TECHLINE® actuator system

Warranty
There is a 18 months' warranty on the TECHLINE products against manufacturing faults calculated from the production date of the individual products (see label). LINAK's warranty is only valid in so far as the equipment has been used and maintained correctly and has not been tampered with. Furthermore, the actuator must not be exposed to violent treatment. In the event of this, the warranty will be ineffective/ invalid. For further details, please see LINAK A/S ordinary conditions of sale.

Maintenance
- The actuator must be cleaned at regular intervals to remove dust and dirt and inspected for mechanical damages or wear.
- Inspect attachment points, wires, piston rod, cabinet, and plug, as well as check that the actuator functions correctly.
- The actuator is a closed unit and requires no internal maintenance.
- To ensure that the pregreased inner tube remains lubricated, the actuator must only be washed down when the piston rod is fully retracted.

Maintenance of spherical eyes
In order to maintain a prober performance of the spherical eyes and to increase the resistances against hard environmental wear, we strongly recommend that the spherical (ball bearings) eyes mounted on actuators from LINAK are greased with anticorrosive grease or similar.

Warning!
If irregularities are observed, the actuator must be replaced.

Specifications

Motor:	Permanent magnet motor 12, or 24 *
Cable:	Motor: 2 x 14 AWG PVC cable Control: 6 x 20 AWG PVC cable **
Housing:	The housing is made of casted aluminium, coated for outdoor out and in harsh conditions
Spindle part:	Outer tube: Powder coated steel Inner tube: Stainless steel AISi304/SS2333 Acme spindle: Trapezoidal spindle with high efficiency
Temperature range:	- 10° C to +50° C Full performance +5° C to +40° C
End play:	2 mm maximum
Weather protection:	Rated IP66 for outdoor use. Furthermore, the actuator can be washed down with a high-pressure washer.

* BUS actuators only 24V - please see the installation guide.
** Special control cabels for BUS actuator - please see the installation guide.

Mounting guidelines

LINAK® linear actuators are quickly and easily mounted by slipping pins through the holes on each end of the units and into brackets on the machine frame and the load.
The mounting pins must be parallel to each other as shown in *Figure 1*. Pins, which are not parallel to each other, may cause the actuator to bend and be damaged.

The load should act along the stroke axis of the actuator since off centre loads may cause bending and lead to premature failure. *See Figure 2*.

Make sure the mounting pins are supported in both ends. Failure to do so could shorten the life of the actuator. Cantilever mounts are unacceptable.

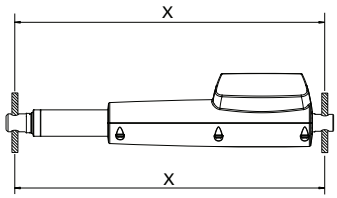


Figure 1

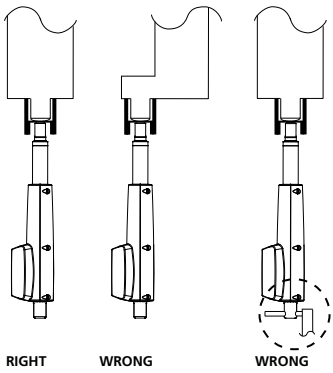


Figure 2

Warning!
If the actuator is used for pull in an application where personal injury can occur, the following is valid:

It is the application manufacturer's responsibility to incorporate a suitable safety arrangement, which will prevent personal injury from occurring, if the actuator should fail.

Warning!
LINAK's actuators are not constructed for use within the following fields:

- Offshore installations
- Aeroplanes and other aircraft
- Explosive environments
- Nuclear power generation

Application hints

The actuator is weatherproof for use in outdoor applications. The actuator can be washed down with a high pressure washer, but it should not be used under water.

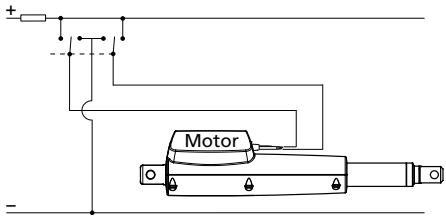
The duty cycle at max. load is 10% on time. This means if the actuator runs continuously for 2 minutes it must remain off for 18 minutes before operating again.

Electrical installation

Be aware of BUS actuator - please see the installation guide.

Motor connection

Wiring: The actuator direction (forward, reverse) is controlled with a doublethrow switch with the centre postion "off".



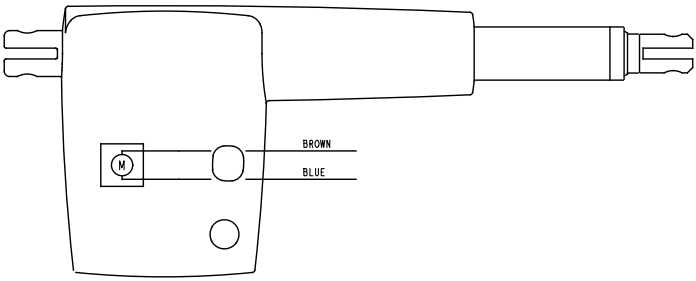
Actuation

To extend the actuator, connect brown to positive and blue to negative.
To retract the actuator, connect blue to positive and brown to negative.

Connection diagrams:

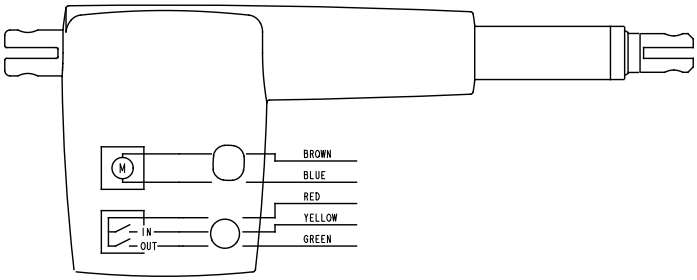
Basic actuator -

Fig.1 : 35xxxxx00xxxxx

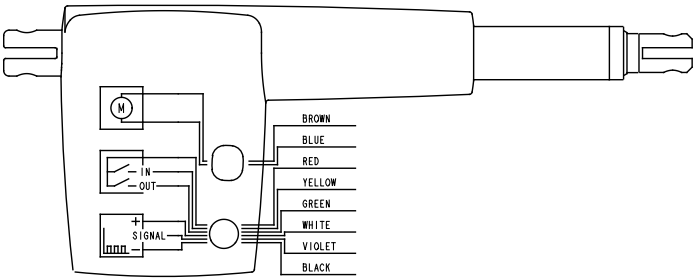


Actuator with potential free switches -

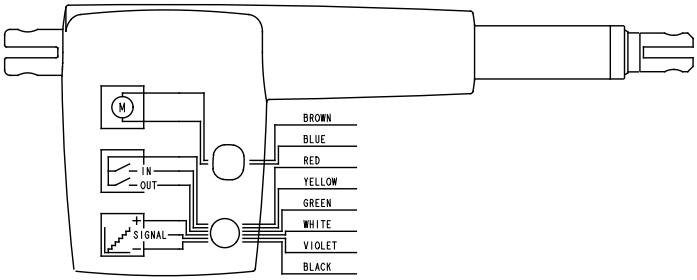
Fig.2 : 35xxxxx10xxxxx



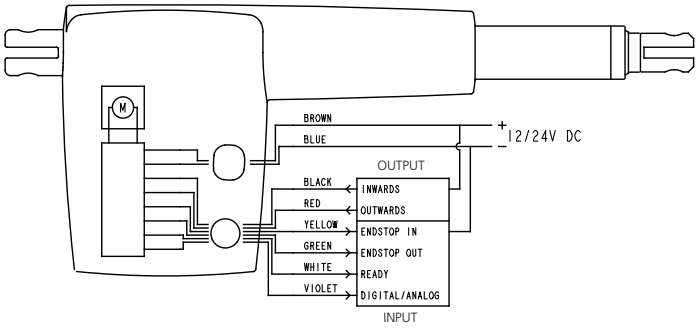
Actuator with potential free switches and relative positioning -
Fig.3 : 35xxxxx0Hxxxxx & 35xxxxx1Hxxxxx



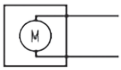
Actuator with potential free switches and absolute positioning -
Fig.4 : 35xxxxx0Axxxxx & 35xxxxx1Axxxxx



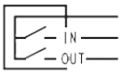
Actuator with IC-option -
Fig.5 : 35xxxxx20xxxxx & 35xxxxx2Hxxxxx & 35xxxxx2Axxxxx



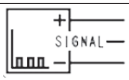
I/O Specifications: Motor

Item	Specification	Comment
Description	Permanent magnet DC motor, available in 12V or 24V	
Input Voltage	12VDC, +/- 20% 24VDC, +/- 10%	Cable dimension 2 x 2,5 mm^2 (2 x AWG14)
Current consumption	12V, 2-10A depending on load 24V, 1-5A depending on load	See curves for typical values
Speed regulations	The motor can run with PWM regulation. This could be used for soft start/stop etc.	The version with "*IC option*" cannot be operated with PWN
Connection	To extend actuator: Connect Brown to positive Connect Blue to negative To retract actuator: Connect Brown to negative Connect Blue to positive	See figure 1 + 2 + 3 + 4 Use cable 0367002-XXXX Actuator direction can be operated with double-throw switch with middle position "*off*" LINAK Code: TR-1939.3314-00

I/O Specifications: Potential free signal switches

Item	Specification	Comment
Description	The actuator can be equipped with two separate micro switches that that are activated when the actuator is fully retracted (IN) or fully extended (OUT). The micro switches are Normally Open	
Input Voltage	10-28VDC	Cable dimension 6 x 0,5mm^2 (6 x AWG20)
Output voltage	Same as input voltage	
Switching capacity	Minimum 10 mA Maximum 1 A	
Connection	Supply: Red (Pin 2) Actuator retracted: Yellow (Pin 5) Actuator extended: Green (Pin 6)	See figure 2 + 3 + 4 Use cable 0367003-XXXX
Combinations	The potential free switches can be combined with relative or absolute feedback. But cannot be combined with "*IC option*"	35xxxxx1xxxxxx

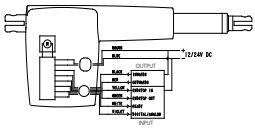
I/O Specifications: Relative positioning

Item	Specification	Comment
Description	The actuator can be equipped with a hall sensor and a spindle magnet. In this way you can have pulses from the actuator when it moves. The output signal is a PNP signal.	
Input Voltage	10-28 V DC	Feedback circuit to be powered 1second before motor runs, and until 1 second after the motor has stopped. Cable dimension 6 x 0.5 mm^2 (6 x AWG20)
Output voltage	Same as input voltage	Typical Output voltage: HIGH: Output = Input -1V (+/- 0.5V) LOW: Output = 0-0.5V
Current consumption	Current consumption is max. 40 mA	Also when actuator is not running
Switching capacity	100 mA, max.	
Resolution	The feedback system gives 8 pulses per spindle turn: 3 mm pitch = 0.38 mm per pulse 5 mm pitch = 0.63 mm per pulse 9 mm pitch = 1.13 mm per pulse 12 mm pitch = 1.5 mm per pulse	Pulse/pause minimum 10 Milliseconds. On 100 mm stroke you will have the following number of pulses: 3 mm pitch = 266 pulses 5 mm pitch = 160 pulses 9 mm pitch = 88 pulses 12 mm pitch = 66 pulses
Connection	Supply: White (Pin 3) Ground: Black (Pin 1) Signal: Violet (Pin 4)	See figure 3 Use cable 0367003-XXXX
Combinations	The Relative positioning can be combined with potential free Switches. But cannot be combined with absolute positioning	35xxxxxxHxxxxx

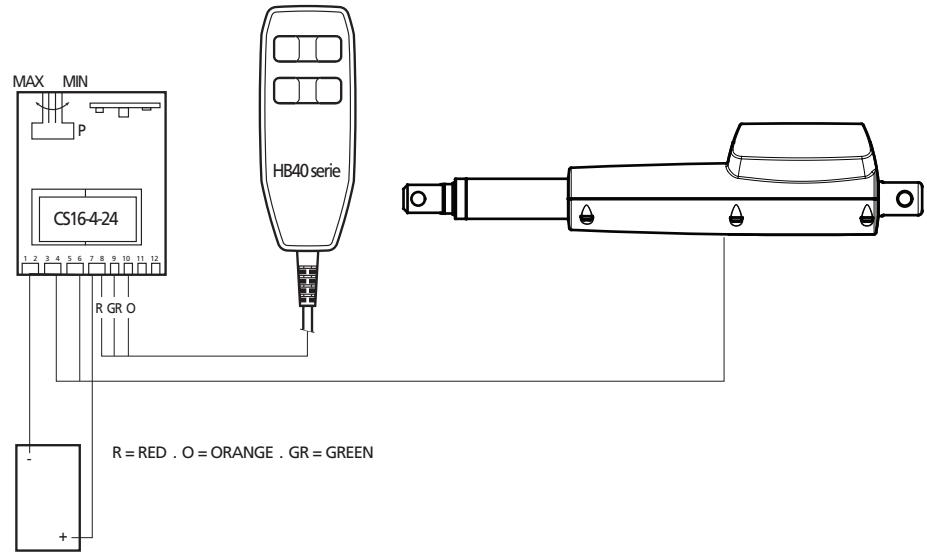
I/O Specifications: Absolute positioning

Item	Specification	Comment
Description	The actuator can be equipped with electronic circuit that gives an analog feedback signal when the actuator moves.	
Input Voltage	11-28 V DC	Feedback circuit to be powered 1 second before motor runs, and until 1 second after the motor has stopped. Cable dimension 6 x 0,5 mm^2 (6 x AWG20)
Output voltage	0 -10V 0V = Fully retracted 10V = Fully extended	+/- 0.5V
Max current output	1mA	
Current consumption	Current consumption is max. 40 mA	Also when actuator is not running
Connection	Supply: White (Pin 3) Ground: Black (Pin 1) Signal: Violet (Pin 4)	See figure 4 Use cable 0367003-XXXX
Combinations	The Absolute positioning can be combined with potential free Switches. But cannot be combined with relative positioning	35xxxxxxAxxxxx

I/O Specifications: IC-option

Item	Specification	Comment
Description	Easy to use interface, with integrated power electronics (Hbridge) for direct PLC connection. Soft start of the actuator.	See figure 5 
Power supply		
Input Voltage	12 V DC, +/- 20 % 24 V DC, +/- 10 %	Cable dimension 2 x 2,5 mm^2 (2 x AWG14)
Current consumption	12 V, 2-10 A depending on load 24 V, 1-5 A depending on load	Recommended fuse: 12V version = 20A fuse 24V version = 10A fuse
Inputs: Signals to the Actuator		
Outwards direction	Extends the Actuator FW – Red (Pin 2)	PNP Output (Red + Power supply)
Inwards direction	Retracts the Actuator BW – Black (Pin 1)	PNP Output (Black + Power supply)
On/Off voltages	On voltage (High): > 67 % of the power supply Off voltage (Low): < 33 % of the power supply	Examples on 24 V version: On if the voltage is higher than 16 V Off if the voltage is lower than 8 V
Input Impedance	10 K ohm	
Input current	< 10 mA	
Outputs: Signals from Actuator		
Actuator fully retracted (IN)	Signal when end stop switch in retracted position is activated IN = Yellow (Pin 5 - High)	Max. 50 mA switching capacity
Actuator fully extended (OUT)	Signal when end stop switch in extended position is activated OUT = Green (Pin 6 - High)	Max. 50 mA switching capacity
Actuator ready	When the Actuator is ready the signal is High Ready = White (Pin 3)	Max. 10 mA switching capacity
Current cut-off	Current cut-off 12 V version: 17 - 21 A Current cut-off 24 V version: 8.5 - 10.5 A	
Output voltage	Typical: Input voltage -1 V	Example on 24 V version: Output voltage on IN = 23 V (+/-0.5V) Output voltage on OUT = 23 V (+/-0.5V) Output voltage on READY = 23 V (+/-0.5V)
Relative positioning	For functional description see I/O Specifications for Relative positioning.	Max. 12mA switching capacity  35xxxxx2Hxxxxx
Absolute positioning	For functional description see I/O Specifications for Absolute positioning.	 35xxxxx2Axxxxx
Connection		See figure 5 Use cables 0367002-XXXX and 0367003-XXXX

Connection of the LA35 with the CS16

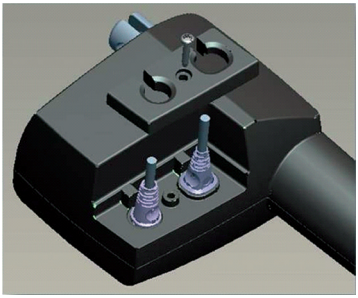


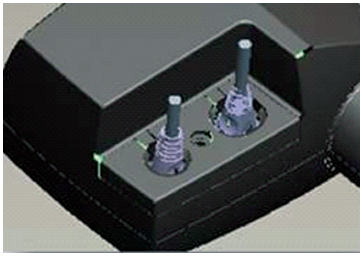
Troubleshooting

Symptom	Possible cause	Action
No motor sound or movement of piston rod	• The actuator is not connected to the power supply • Cable damaged	• Connect the actuator to the power supply • Change cable • Send actuator for repair
Excessive electricity consumption	• Misalignment or overload in application	• Align or reduce load • Send actuator for repair
Motor runs but spindle does not move	• Gearwheel or spindle damaged	• Send actuator for repair
Actuator cannot lift full load	• Clutch is worn • Motor is damaged	• Send actuator for repair
No signal from potentiometer or hall effect sensor	• Cable damaged • Potentiometer damaged	• Change cable • Send actuator for repair
Motor runs too slowly or does not give full force	• Insufficient power supply • Voltage drop in cable	• Increase power supply • Thicker cable
Actuator cannot hold the chosen load	• Load is higher than specified	• Reduce load

Be aware of BUS actuator - please see the installation guide.

Mounting of cables





- Unscrew the cover and remove the two blind plugs
- Plug in the power cable and/or the signal cable
- Slide the cover onto the actuator
  The torque of the cover screw is app. 4 Nm

Note: When changing the cables on a LINAK actuator, it is important that this is done carefully, in order to protect the plugs and pins. Please be sure that the plug is in the right location and fully pressed in before the cable lid is mounted.

Accessories

Cables:

Power cables (Ordered separately)	Order no.
1.5 m cable	0367002-1500
5 m	0367002-5000
0.2 m cable (AMP connectors)	0367006

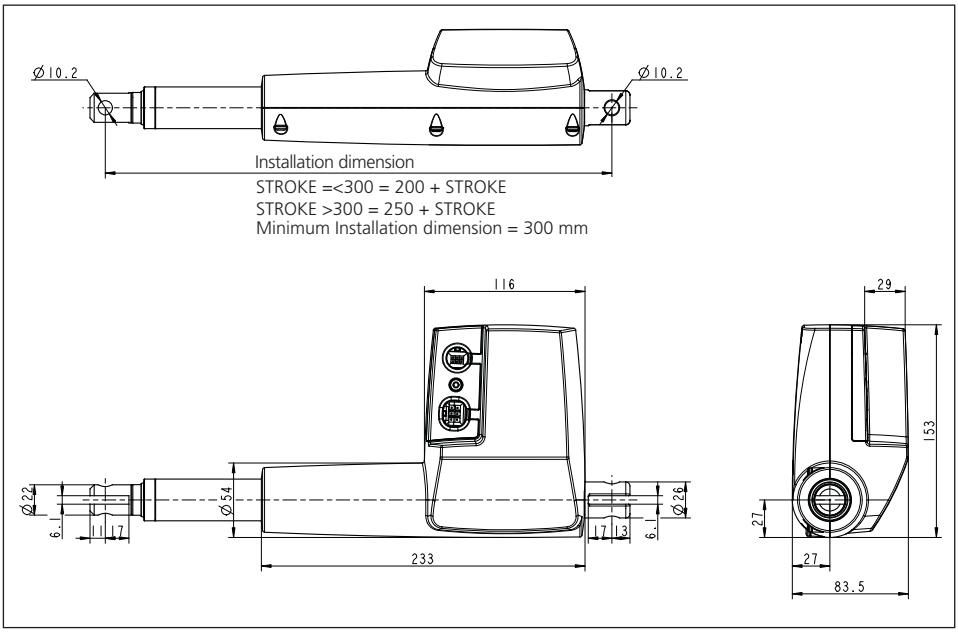
Signal cable (Ordered separately)	Order no.
1.5 m cable	0367003-1500
5 m	0367003-5000

Be aware for BUS actuator - please see the installation guide.

DRAWING APPENDIX

TECHLINE® LA35:

LA35



Main groups of disposal

Product	Metal scrap	Cable scrap	Electronic scrap	Plastic recycling or combustion
LA35	X	X	X	X

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 examples of main groups within sorting of waste we can mention the following:

Metal scrap
Plastic scrap
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 steel and aluminium or plastic can be divided into ABS and PP.

Label for LA35

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 Medical, 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.

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.

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