Typ: LCE 15 - 35 Version 1.7 / 21.03.2014	Clamping Elements	ZIMMER group

Installation and Operating Instructions

1. Security Advice:

Caution:
Please read the complete documentation carefully before starting the set-up operation!

1.1. Depending on the type of application danger will be caused by:

- Contusion during installation caused by unsecured connecting construction
- Loose attachment screws
- removal of the spring cap
- Not turning off the operating instrument during installation or repair works at the clamping element
- Human malpractice
- Non-observance of the information and warning facilities during installation and the set-up operation

Installation instructions have to be followed and the necessary equipment and supplies have to be used during installation, modifications, maintenance and repair. Throughout every working process on the clamping elements the appropriate accident prevention regulations, VDE security and installation instructions have to be followed.

1.2. The application of the clamping elements – in accordance with regulations – implies that this technology will be utilized exclusively in consideration of the realm of possibilities defined by technical specification. All different ways of use exclude further liability of the Zimmer GmbH.

2. Model LCE (Electric clamping element)

The clamping element of the model LCE is preset to the appropriate LM guide gauge ex factory. The contact sections are pressed onto the non-attached areas of the LM guide. Therefore the process of clamping does not influence the precision and the economic life-time of the LM guide.

2.1. Operational Area:

The LCE model is a bistable element and designed for static use. The funktional principle of self-locking makes clamping without electric current possible, i.e. in the released or clamped state only the control voltage is applied.

- max. surrounding temperature +5°C to +65°C
- supply voltage min. 24VDC ± 10%

0

3. Installation Instructions

3.1. General:

For mounting the clamp elements, utilized screws have to comply with the category of solidity of min. 8.8. Attachment screws have to be tightened with the required moment. (Tab.3)
The maximum holding load is reached only by a rigid connection construction which must cover the complete connection surface of the clamping element.

The accessibility of the elements for maintenance has to be warranted.

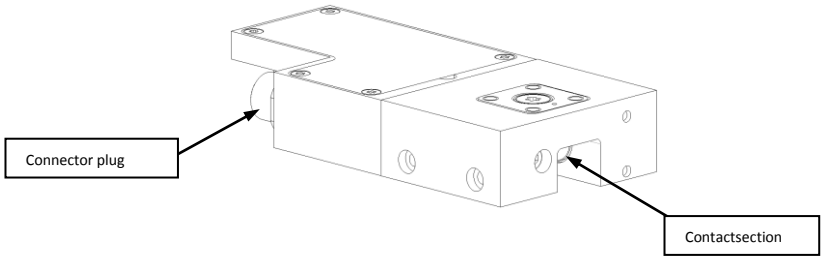


Fig. 1

3.2. Installation / Disassembling of the clamping element:

- set clamping element onto LM guide
- in case of using an adapter plate PMK, place this adapter plate between the clamping element and the connecting construction as a device of leveling
- turn the screws loosely into the screw threads
- clamp and release the clamping element several times (see paragraph 5.)
- clamp the model LCE
- tighten attachment screws with the required torque (Tab.3)
- release the model LCE
- for uninstalling perform in reverse order

3.3. Installation / Disassembling of the external controller:

The installation can be made installed in any operating position by the snap fastening (Fig.2 and Fig.3) on a DIN rail EN 60 715, 35 mm wide. Care must be taken to the reliable and permanent connection of the line. Maximum tightening torque of 1.2Nm.

Caution:
The assembly and disassembly is permitted only by authorized personnel.

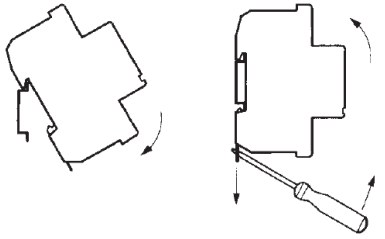


Fig. 2
clip

Fig. 3
releasing

4. connection description

4.1. The connection between the LCE model and the external controller raised by an 8-poles female connector with threaded joint M12x1, witch is as accessories available (see point 7).

Fig. 4:
Pin assignment of the control line

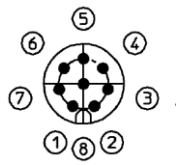


Fig. 5: Assignment of the external controller

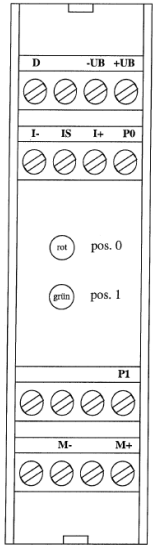


Fig. 6: Terminal- and LED assignment

terminal	operation	plug version PIN	wire version conductor colour
+UB	supply voltage +24VDC		
-UB	supply voltage GND		
D	control input 24VDC open / closed		
P0	output clamping element opened		
P1	output clamping element closed		
I+	+ supply voltage Encoder	8	red
I-	- supply voltage Encoder	7	blue
IS	input Encoder	3	Green
M+	+ motor	2	brown
M -	- motor	1	white

LED colour	description	signal
red	Pos 0	clamping element opened
green	Pos 1	clamping element closed

4.2. Initialisation:

4.2.1 The clamping element is opened (delivery condition)
- If the control voltage "Open" (high = on) is applied, when switching on (supply voltage), the clamping element is opened and the red LED is shining at the external controller.
- If the control voltage "Close" (Low = closed) is applied, when switching on (supply voltage), the clamping element is opened and at the external controller the red LED is shining (defined state). If you first put the control voltage "Open" (high = on) on, the red LED is shining and after the next signal change "Close" (Low = closed), the clamping element closes and the green LED is shining.

4.2.2 The clamping element is closed (e.g. after a power failure)
- If the control voltage "Close" (Low = closed) is applied, when switching on (supply voltage), the clamping element is closed and the green LED is shining at the external controller.
- If the control voltage "Open" (high = on) is applied, when switching on (supply voltage), the clamping element is closed and at the external controller green LED is shining (defined state). If you first put the control voltage "Close" (Low = closed) on, the green LED is shining and after the next signal change "Open" (high = on), the clamping element open and the red LED is shining.

4.3. Operation:
The clamping element moves in the particular end-position, depending on the state of the input signal D (High = open / Low = closed). At the same time it checks the force. If the move is out of a well-defined range, the red and the green LED are shining and both output signals are “Low“. This condition must be assessed as an error and can be reseted by switch-off and switch-on of the supply voltage.

Caution:

- **It is permitted to close the clamping element, only if an associated LM guide exists!**
- **When connecting or disconnecting the cords and connections, no control voltage may be present!**
- **Reversing the connected controllers, or clamping elements to each other (open and closed inverted), can lead to errors especially when different status!**
- **A signal change of the control input below the times specified in item 8 in Table 2 should be avoided, otherwise errors may occur.**
- **After opening the housing of the clamping element it will void the warranty!**

5. Operational Test

5.1. After the appropriate installation of the clamping element the operating readiness has to be tested

The mobility has to be tested by manually moving the slide.
The process of clamping has to be tested by manually moving the connecting construction.
The appropriate mounting of the fixed and flexible plug wire has to be tested by visual control.
All attachment screws have to be checked for their required moment (Tab.3).

Non-observance of the installation and operating instruction causes the guarantee to expire.

6. Function: Unlocking of the LCE Series clamp

Loosening of the clamp element from a jammed or locked up closed position.

If an LCE element cannot be opened up anymore from the closed position the following causes should first be considered:

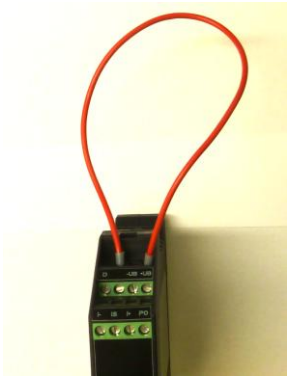
- Ensure a voltage of 24VDC ± 10% is present
- Verify all cables and connections
- Verify if an open (high) signal is present at the „D“ terminal of the controller
- If external mechnical forces are present at the clamp contacts after the clamp had been closed, please ensure these forces are eliminated

If the above stated conditions are verified and rectified and still do not allow the clamp to open, please follow the steps below to open up the clamp element:

Pre-requisite:
- - The element is closed
- - Both LED's are on

6.1. Turn on the 24VDC ± 10% power-supply, which in turn powers up the LCE controller. Based on the fault condition both LED's should be lit. When connecting a new controller to a closed clamping element, when switching on (operating voltage) is no LED light up. Only when there is a signal change at the control input "D", the green or red LED will light up on the controller, according to the present control signal "Open "(high = on) or "Close" (low = closed).

6.2. Place a bridge (jumper-wire, preferably with an inline SPST switch) as shown in the below picture from Position 1 to Position 2. (Please note the correct order of connection: Position 1 first and Position 2 second, with the switch already in the closed position). The controller is now in the „freerunning mode“ and for indication purposes both the red and green LED should be flashing.



6.3. When the „D“ signal changes state from closed to open, the motor will be driven by the controller for a defined period of time in the open direction. This change in state has to be repeated several times (possibly 10 times or more) until only the green LED is lit.

Note: As soon as only the green LED is lit any further signal changes will not effect the motor or open position any further.

6.4. Removal of the bridge (jumper-wire) at this stage will place the controller back into its normal operation where both LED's are off. Once again please note the importance of the proper order in whcih to remove the bridge. (Position 2 first, Position 1 second).

6.5. Changing the state of the „D“ signal at this point will have the clamp operating normally based on the input signal supplied to the clamp controller. And the corresponding LED will be lit according to their designated operation.

7. Troubleshooting

Check the following points before calling a service center.

	Symptoms	Remedies/Causes
General	* The clamping element cannot be set on the rail.	* The element can only set on the LM guide parallel or perpendicular. * The element can be fitted in only pushed from the front of the LM guide. * The LM guide is not suitable, so the components do not match.
	* The opened element cannot move smoothly on the LM guide.	* Check proper installation according to the installation and operating instructions * Check whether the effects of other components in your design stems, e.g. the runner block
	* The clamping element is closed, but cannot open.	* Check the cords and connections. * Check, if the control voltage "Open" (high = on) is applied. * When forces are applied to the element, which were applied after closing, these forces must be eliminated. * Check the operating voltage (24VDC ± 10%) * Perform point Function “Unlocking of the LCE Series clamp”
	* The clamping element is open, but cannot close.	* Check the cords and connections. * Check, If the control voltage "Close" (Low = closed) is applied. * Check the movement of the clamping element by manual displacement of the carriage. * Check the operating voltage (24VDC ± 10%)
Controller	* The unit does not work at all.	* Check the cords and connections. * Check, If the control voltage is applied.
	* No LED lights up on the controller.	* Check the cords and connections. * Check, If the control voltage is applied. * Turn of the power then on again.
	* Both LEDs light up on the controller.	* This condition must be regarded as an error message, be cleared by switching on and off the operating voltage. * Causes could be: - Incorrect installation of the element, please check the "C-level" or whether an adapter plate is required. - Exceeded current limit - operating voltage (24VDC ± 10%) pass over or fall below - Close without LM guide
Holding Force	* The holding force is not achieved.	* If oil is used, which set down the coefficient of friction between the contact profile and LM guide, the holding force can be reduced up to 40%.

8. Technical Data

Tabelle 1

size	supply voltage [VDC]	max. starting currant [A]	Output P0/P1 [VDC / mA]
15	24	1,0	24 / 500
20	24	1,0	24 / 500
25	24	1,5	24 / 500
30	24	3,5	24 / 500
35	24	3,5	24 / 500

advice:
After switching on a system start-up time of 280ms is required.

Table 2

size	time to open [s]	time to close [s]
15	<2,7	<3,5
20	<2,7	<3,1
25	<1,5	<2,0

Table 3

attachment screws Category of Solidity 8.8	moment [Nm]
M 5	5,5
M 6	9,5
M 8	23,0
M10	46,0

9. accessories

item number	design	length [m]
CSTE00-10	straight	10
CSTE90-10	90° angle	10

For further information please contact our technical service: 0049/7844/9138-0

Design and specifications are subject to change without notice.

10. Declaration of Incorparation

as defined by the EC Directive 2006/42/EC for Machinery (Annex II 1 B)

Herewith we certify that the type of construction

Product's Name: **Clamping Elements**

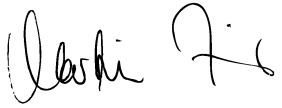
Part Number: **LCE**

is – in its delivered version - intended to be installed into a machine or for the assembly with other machines in order to create a new machine, and that its start-up is prohibited until it is proved that the machine, in which the above-named machine shall be integrated, corresponds to the EC – Machinery Directive 93 / 44 / EEC.

Angewandte harmonisierte Normen, insbesondere:

DIN EN ISO 12100-1 (Sicherheit von Maschinen – Teil 1)

DIN EN ISO 12100-2 (Sicherheit von Maschinen – Teil 2)



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Legally binding signature (business management)