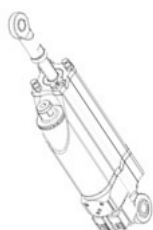


Hydraulic locking unit HLU LE-X (M)

Size	LE-X (M)
Type DL	Blocking against extension incl. comfort lock
Stroke	150 mm



Product characteristics

The hydraulic locking units HLU LE (25/32) as well as HLU LE-X (M/E) are specially developed for amusement rides and flying constructions and can be configured to meet individual customer requirements. They ensure maximum safety in shoulder restraints, lap restraints, and abdominal restraints of passenger restraint systems. A check valve in the hydraulic locking unit blocks the cylinder movement and thus reliably locks the restraint bar.

Features and advantages

- delivery Plug & Play - simple installation and immediately ready for use
- closed and low-maintenance hydraulic system
- electric unlocking and manual emergency operation
- easier acceptance process through TÜV-Süd component certificate according to current standards
- high passenger comfort through stepless and silent bar adjustment
- comfort locking: restraint bars can be used as an aid for getting in and out (depending on model)
- easier bar opening: energy applied during closing is used to open the bar (depending on model)

Intended applications

- amusement rides and flying constructions (e. g. roller coasters, VR rides, robot simulations)

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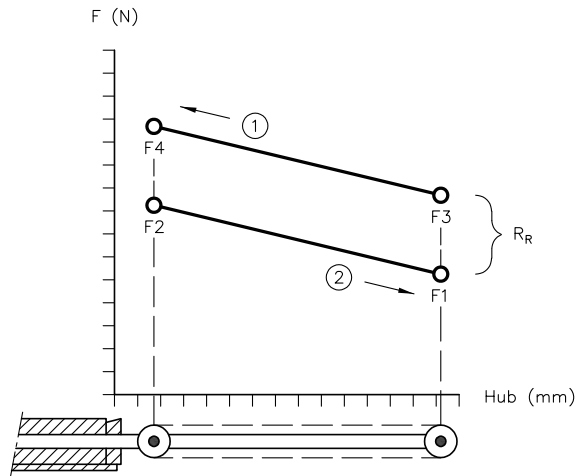
Technical data

General

Blocking direction	Blocking against extension			
Comfort lock	Yes			
Weight (incl. hydraulic fluid), size		Size	Weight	RoHs
	862-7004-0	LE-X (M)	6.4 kg	✓
	862-7005-0	LE-X (M)	6.4 kg	✓
Material	Steel, aluminium, acrylonitrile-butadiene (NBR), polytetrafluorethylene (PTFE), polyurethane			
Operating temperature	-10 to + 60 °C			
Ambient and storage temperature	-10 to + 60 °C			
Outside dimensions cartonage (LxWxH)	630 mm x 250 mm x 200 mm			
Mounting position	Arbitrary			
Behavior in case of power failure	Closed/locked			
Corrosive category	862-7004-0	C2 up to 10 years (M) DIN EN ISO 12944-2		
	862-7005-0	C4 up to 10 years (M) DIN EN ISO 12944-2		
<p>! NOTICE</p> <p>The specified corrosion protection classes were tested by means of a salt spray test according to DIN EN ISO 9227 under laboratory conditions. This neutral salt spray test only serves as quality control for the coatings / materials used and does not reflect the behavior in natural environments. An earlier occurrence of corrosion - than assumed according to the corrosion protection class - can therefore not be ruled out.</p>				
Dimensions		Nominal stroke	Piston diameter	Rod diameter
	862-7004-0	150 mm	30 mm	18 mm
	862-7005-0	150 mm	30 mm	18 mm
		Installation length when piston rod is retracted (LO)	Installation length when piston rod is extended	Nominal bore diameter of rod end bearing
	862-7004-0	503 mm	653 mm	17-0.008 mm
	862-7005-0	503 mm	653 mm	17-0.008 mm
Rod end angle foot side	0°			
Speed at 20 °C		Max. permissible extension speed	Max. permissible retraction speed	
	862-7004-0	--	--	
	862-7005-0	--	--	

Retraction and extension forces at 20 °C

	F1 (±10 % tolerance)	Progression
862-7004-0	300 N	26 %
862-7005-0		26 %



- 1 Retraction
- 2 Extension

- ▶ F2: $F_1 + F_1 \times \text{progression (XX\%)}$
- ▶ F3 and F4: Contact between the seal and the piston rod and piston on the inside of the pressure pipe produces friction. This friction acts counter to the piston rod's direction of movement. Retracting the piston rod requires additional force equal to the friction. F3 and F4 depend on retraction speed: the greater the retraction speed, the greater the forces required for retraction.

Load cases *

* Calculation base DIN EN 13814:2019 / ISO 17842-01:2015 / compatible to ASTM F 2291-15

	Static load	Fatigue load	Panic load
862-7004-0	19,800 N	10,500 N	30,800 N
862-7005-0	19,800 N	10,500 N	30,800 N

Primary function:
lap bar locking

The hydraulic cylinder's piston rod retracts when closing (valve V2 energised) the restraint system. The check valve prevents the cylinder from extending, thus locking the restraint system during operation.

Secondary function:
lap bar drive

The hydraulic locking unit acts as a bar drive. When the valve (V1) reopens, the restraint system's bar can be opened once more aided by the piston's extension force. The energy stored in the hydraulic system opens the restraint system.

Secondary function:
bar lock

When the restraint system is open, blocks on both sides of the valve V2 prevent the hydraulic cylinder from retracting under load. Ride passengers can use the restraint system as a handle when embarking and disembarking. Further, constricting closing of the restraint system during ride operation is prevented. Both functions increase passenger comfort.

Comfort function

- Valve can be loaded with up to 12 kN. At maximum load, a drift of 4.5 mm/s (tolerance: ± 2.5 mm/s) is possible.
- The restraining bar will resist brief load spikes (e.g. brief gripping). Longer gripping may cause the bar to drift (yield).
- The valve's high load capacity makes it suitable for use in rides in which, for example, passengers share a single restraining bar.

Hydraulic parameters

Filling gas	Nitrogen			
Hydraulic medium	Hydraulic fluid DIN 51524 - RSL 22			
Fill volume (hydraulic medium)	862-7004-0	~0.21 l		
	862-7005-0	~0.21 l		
Pressure at 20 °C * * The pressures stated are calculated values, i. e. they may deviate in reality.		P0 Pneumatic preload pressure	P1 Filling pressure (hydraulic fluid) with piston rod extended (piston side)	P2 Filling pressure (hydraulic fluid) with piston rod retracted (piston side)
	862-7004-0	13,2 bar	15,2 bar	19.3 bar
	862-7005-0	13.2 bar	15,2 bar	19,3 bar

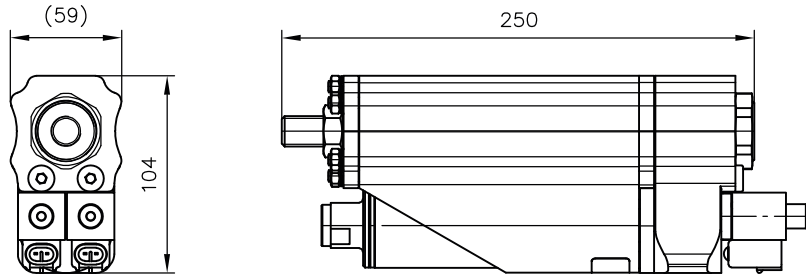
Electrical parameters

Rated voltage seated valve	24 VDC +/- 10 %
Coil V1 power consumption	22 W
Coil V2 power consumption	22 W
Power supply	Socket AMP-Superseal 1.5 2 poles
Protection class (with appropriate connector)	IP 65 *
Duty cycle	Depending on the environment up to 100 % of duty cycle

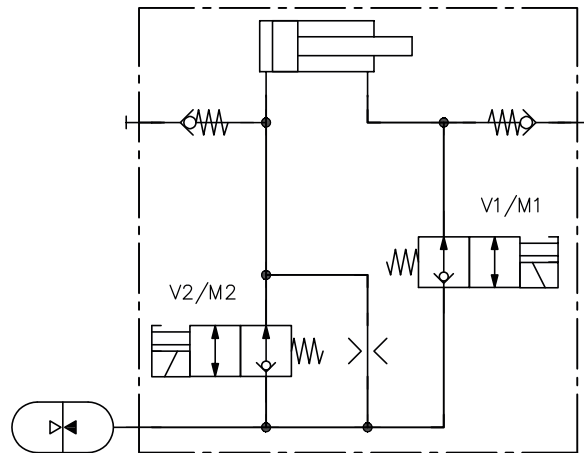
* Up to IP 67 with optional accessories

Dimensions and connections

Dimensions are given in mm.



Circuit diagram



Order information

Order number	Lot size "spare parts Fastlane" (delivery time 5 days)	Batch size "standard" (delivery times 6 weeks, delivery time 12 weeks **)					
		1-36	37-72	73-108	109-144	145-180	>180
862-7004-0	1-5 *						
862-7005-0 **							

* Max. 5 spare parts per month possible per order number

Accessories, spare & tear parts

Designation	Details	Order number
Packaging set HLU	Standard	063-6003-0 *
Remote unlocking set	Remote unlocking set 1 m	390-6001-0 *
	1 m tension/pressure cable	390-2045-0 *
	Clamping	390-2048-0 *
	Cylinder screw (2x) DIN912-M 2x 10-8.8-A2A	KNS.0230 *
	Remote unlocking set 2 m	390-6002-0 *
	2 m tension/pressure cable	390-2046-0 *
	Clamping	390-2048-0 *
	Cylinder screw (2x) DIN912-M 2x 10-8.8-A2A	KNS.0230 *
	Remote unlocking set 3 m	390-6003-0 *
	3 m tension/pressure cable	390-2047-0 *
	Clamping	390-2048-0 *
	Cylinder screw (2x) DIN912-M 2x 10-8.8-A2A	KNS.0230 *
Plug AMP Superseals & wire 1.5 m without jacket, up to IP 65, UL/CSA-certified	2-way cable <ul style="list-style-type: none"> Resistant to hydraulic fluid 	325.6001 *
Plug AMP Superseals & wire 2 m with jacket, with protective sleeve, up to IP 67, UL/CSA-certified	Control wire <ul style="list-style-type: none"> Cross section 2x0.75 mm² Wire end 2 mm stripped Black/red 	014-3017-1 *
Plug AMP Superseals & wire 5 m with jacket, with protective sleeve, up to IP 67, UL/CSA-certified	Max. bending radius <ul style="list-style-type: none"> Once 5x outside diameter Several times 15 x outside diameter 	014-3011-2 *
Coil of 2/2-way valve	24 VDC 22 W	390-2007-0 * (2x)
Coil casing		330-2012-0 * (2x)
Protective cap		390-1000-0 * (2x)
Rod end bore diameter 17-0,008 mm	Rod side	085-1023-0 *
	Foot side	085-1024-0 *
Lock nut M16	On both sides	850-2113-0 *
Memory	Filling adapter (M16x1.5/M28x1.5)	860-1000-0 *

Designation	Details	Order number
	Filling device HAWE DFM 400	860-6000-0 *
	Gas filling screw	007-1021-0 *
	USIT ring	007-1022-0 *

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