Hänel Lean Lift Technical Information for Power Connection

NOTE: THIS INFORMATION IS PROVIDED AS A GENERAL GUIDE FOR THE POWER CONNECTION FOR THE HÄNEL LEAN-LIFT. ADDITIONAL INFORMATION WILL BE FOUND ON THE SPECIFICATION LABEL OF EACH LEAN-LIFT.

Power Supply Connection

Unless otherwise agreed when placing the order, for a three phase drive the electrical components must be equipped with a separate neutral (when required) and ground wire in the entire power system (TN-S power system in accordance with IEC 60364-1). Therefore, the connection to the power supply must have the following conductors:

If using a 208v connection:

- 3 Power Conductors
- 1 Neutral Conductor
- 2 Ground Conductors

If using a 480v connection:

- 3 Power Conductors
- 2 Ground Conductor

For all other voltage connections, please contact service at 1-800-ROTOMAT to get additional connection information.

The permitted supply voltage and the required customer-side fuse protection are specified on the type plate. In addition, specific local circumstances may need to be considered when connecting the Lean-Lift to the power supply. Contact the responsible energy company for more information on these connection conditions.

Circuit Breaker

Each Hänel machine requires it's own individual circuit breaker.

Residual Current Circuit Breakers

If the owner/operator employs residual current circuit breakers, these must conform to EN 50178 or IEC 755.
For Lean-Lifts with a frequency converter a universal, time-delayed, residual current circuit breakers (type B) must be used.

Ground Wire

All conductive parts, which can take voltage directly in the event of a fault, must be connected to the ground wire connection.

Wiring Installation

The wiring installation provided by the owner/operator must conform to the following standards:

- IEC 60364-4-43:1977, IEC 60364-4-473:1977, IEC 60364-5-52:1993

Instructions for Motor Fuses:

- The short circuit and overload protection switch installed in all LEAN-LIFT types is set to the nominal current specified above (tolerance + 0% to + 5%).
- Additional thermal sensors are fitted in the motors of all types, causing a safety stop if the motor coils heat up beyond the permitted limit.
- The current which blocks the motor is around three times the motor's nominal current. The overload safety switch is triggered if it is subjected to three times the nominal current when the motor is cold after around 30 seconds and when it is warm after around 5-10 seconds.

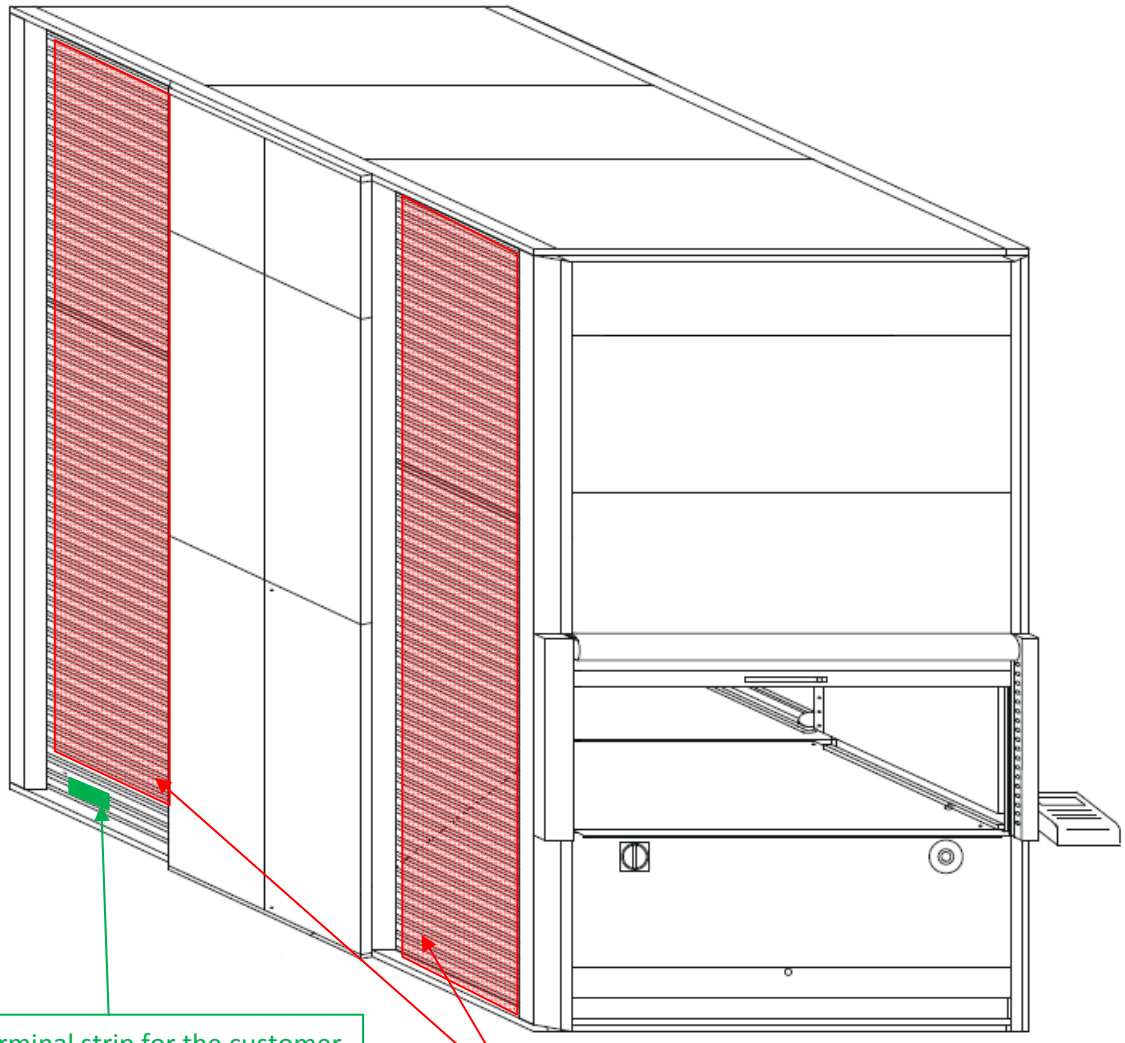
Conductor Cross-Sections

The selection of the conductor cross ‑ section must conform to:

- DIN VDE 0298-4 (VDE 0298 Part 4:1998-11 table A.1) in the A2 method of installation

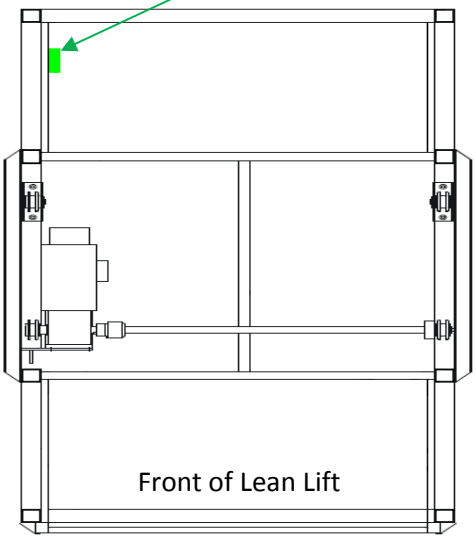
or

- Table 13.5.1 of the NFPA 79 (National Fire Protection Association).



The terminal strip for the customer power connection is located inside of the left rear panel.

Power connection and retaining hardware must not penetrate the red highlighted area of the side panels.



Electrical connection of the lift

For the Lean-Lift, the owner/operator has to provide an electrical connection before beginning the installation in accordance with following remarks. To do so, please observe the Power Supply and Foundation Plan as well.
The owner/operator has to provide at least one suitable power socket for the tools necessary to install the lift, such as electric screwdrivers etc.

DANGER

If work on the electrical equipment is not carried out properly, there is a risk of fatal injury!

- All tasks on the electrical system may be performed by qualified electrically skilled personnel only.
- The power supply cable may be connected to the power terminal strip only by an electrically skilled person provided by the owner/operator and has to remain de-energized until the on-site installation supervisors approve it for being switched on.
- The electrically skilled person is allowed to enter the lift only in the presence of the on-site installation supervisors.

SAFETY INSTRUCTIONS

Switch off the main switch and secure it!

As soon as the power supply to the lift has been established, the installation personnel must ensure that the main switch of the lift is switched off prior to carrying out additional tasks inside the lift and that a padlock is attached to prevent it from being switched on again.

Observe:

The cable entry point for the owner/operator's power line with a separate ground wire is located on the rear side of the lift.

Any deviations must be specified when placing the order and described in the order confirmation.

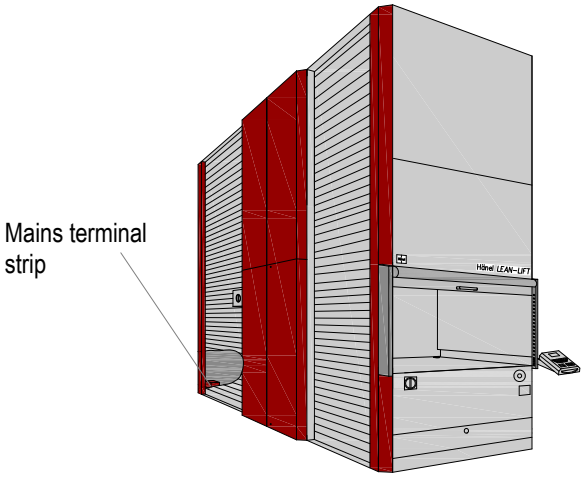


Fig. 22: Electrical connection of the Lean-Lift

Power supply connection and wire cross-sections

The lift's electrical equipment is designed as standard for connection to three-phase AC current TN power system (L1/L2/L3/N/PE) in accordance with IEC 60364-1 (separate neutral and ground wire in the same power system):

3 outer conductors (for the wire cross-section, see the following table),
1 neutral conductor (for the wire cross-section, see the following table),
1 ground wire (for the wire cross-section, see the following table),
1 additional separate ground conductor (wire cross-section, at least 2.5 mm²) in accordance with IEC 60204-1 (due to the leakage current of the frequency converter > 3.5 mA).

A connection to three-phase AC (three-phase current) TN power system (L1/L2/L3/PE) without neutral conductor is also optionally available at a surcharge:

3 outer conductors (for the wire cross-section, see the following table),
1 ground wire (for the wire cross-section, see the following table),
1 additional separate ground conductor (wire cross-section, at least 2.5 mm²) in accordance with IEC 60204-1 (due to the leakage current of the frequency converter > 3.5 mA).

All other power systems are to be co-ordinated with the supplied lift by owner/operator in co-ordination with the responsible energy company.

The owner/operator must observe the following:

The power supply voltage and fuse protection of the power supply line at the owner/operator's location

- must conform to the specifications on the type plate.

If the customer employs a residual current circuit breaker at the installation site,

- a "universal, time-delayed residual current circuit breaker (Type B)" is required in accordance with EN 50178 or IEC 755.

Wiring installation

The wiring installation provided by the owner/operator must conform to the following standards:

- IEC 60364-4-43
- IEC 60364-5-52

Observe:

The owner/operator has to find out the specific on-site connection conditions (power system, voltage and frequency) from the responsible energy company and supply this information when ordering.

Observe:

The following technical connection conditions for the responsible energy company apply.

Power supply connection and wire cross-sections (Cont.)

Wire cross-section

Select the minimum wire cross-section for the power line provided by owner/operator depending on the lift power/type using the following table.

The following standards are used as a base:

- IEC 60364-5-52, Table B.52-1 and B.52-4 using the A2 method of installation, or
- NFPA 79 (National Fire Protection Association), Table 12.5.1.

Selecting the fuse protection

As a safety device for protection from overload and short-circuits in the power line provided by owner/operator, it is recommended that the owner/operator provide the following safety devices according to IEC 60364-4-43:

- Miniature circuit breaker with overcurrent and short-circuit trip, with standard "B" trip characteristic,
- Fuses with fuse links with standard "gG" trip characteristic (standard type: full-range protection, general application).

However, the customer-side or owner/operator specifications are authoritative in this context.

Note:

The impedance of the energy supply, including the power supply line to the power supply terminal box of the lift provided by the owner/operator, may not exceed 500 milliohms.

Observe:

For the minimum wire cross-section, the thermally relevant line current (root mean square of the line current) has been determined for a vertical lift at the max. possible lift height taking into account the different movement directions for the longest possible continuous operation. The root mean square of the line current is approx. 70% of the nominal line current. Furthermore, a potential voltage drop has been taken into account; the individual wire cross-sections are higher than the standard specification for this reason.

Observe:

Due to the soft starter with frequency converter, no current surges need to be taken into account for designing the fuse protection.
The main switch for the lift is equipped with an integrated protective motor switch for protection from overload and short-circuits. The setting value for the protective motor switch is set to the thermally relevant line current (root mean square).

Minimum wire cross-section and maximum fuse protection for the power line for which owner/operator is responsible

The following provides an overview of the minimum wire cross-section the owner/operator is responsible for according to IEC 60364-5-52 and NFPA 79 as well as the maximum fuse protection for which the owner/operator is responsible due to the lift's internal wiring.

Observe:

The fuse protection on the power supply side for which owner/operator is responsible is selected according to IEC 60364-4-43.
The maximum fuse protection on the power supply side listed in the following table refers to the lift's internal wiring and may not be exceeded.

The **lift power** is specified in the order confirmation (e.g.: Lift: 400 V AC, 50 Hz, **4.0 kW**, 100% duty cycle).
The **lift type** is specified in the order confirmation as part of the complete lift name (e.g. Lean-Lift 1300-825/281/164/75/**300**/20).

				Minimum wire cross-section according to IEC 60364-5-52 Table B.52.4				Maximum safety device on the power supply side	
Lift power	**Carousel type**	**AntTyp**		**230 - 240V**	**380V**	**400V**	**415V**	**230 - 240V**	**380 - 415V**
3,0KW	////150	ES11	ES12	5 x 2,5 mm²	5 x 1,5 mm²	5 x 1,5 mm²	5 x 1,5 mm²	20A	20A
4,0KW	////130-300	ES21	ES22	5 x 2,5 mm²	5 x 2,5 mm²	5 x 2,5 mm²	5 x 1,5 mm²	20A	20A
5,0KW	////130-300HS	HS21, HS22	HS25, HS26	5 x 4,0 mm²	5 x 2,5 mm²	5 x 2,5 mm²	5 x 2,5 mm²	25A	20A
6,0KW	////200-500	ES31	ES32	5 x 4,0 mm²	5 x 2,5 mm²	5 x 2,5 mm²	5 x 2,5 mm²	25A	20A
7,5KW	////200-500HS	HS31, HS32	HS35, HS36	---	5 x 4,0 mm²	5 x 4,0 mm²	5 x 4,0 mm²	---	20A
6,5KW	////400-700	ES41	ES42	---	5 x 2,5 mm²	5 x 2,5 mm²	5 x 2,5 mm²	---	20A
7,0KW	////600-1000	ES51	ES52	---	5 x 2,5 mm²	5 x 2,5 mm²	5 x 2,5 mm²	---	20A
7,0KW	////600-1000HS	HS51	HS52	---	5 x 2,5 mm²	5 x 2,5 mm²	5 x 2,5 mm²	---	20A
7.3 .. 7.5 kW	>=3660-635 .. 825////500HS	HS33	HS34	---	5 x 2,5 mm²	5 x 2,5 mm²	5 x 2,5 mm²	---	20A
7.4 .. 9.5 kW	>=3660-635 .. 825////700HS	HS43	HS44	---	5 x 4,0 mm²	5 x 4,0 mm²	5 x 4,0 mm²	---	25A

Table 1: Minimum wire cross-section and maximum fuse protection in accordance with IEC 60364-5-52

				Minimum wire cross-section according to NFPA79 Table 12.5.1				Maximum safety device on the power supply side	
Lift power	**Lift type**	**AntTyp**		**208V**	**230 - 240V**	**440 - 480V**	**575V**	**208 - 240V**	**440 - 575V**
3,0KW	////150	ES11	ES12	5 x AWG 14	5 x AWG 14	5 x AWG 14	5 x AWG 14	20A	20A
4,0KW	////130-300	ES21	ES22	5 x AWG 14	5 x AWG 14	5 x AWG 14	5 x AWG 14	20A	20A
5,0KW	////130-300HS	HS21, HS22	HS25, HS26	5 x AWG 12	5 x AWG 12	5 x AWG 14	5 x AWG 14	25A	20A
6,0KW	////200-500	ES31	ES32	5 x AWG 12	5 x AWG 12	5 x AWG 14	5 x AWG 14	25A	20A
7,5KW	////200-500HS	HS31, HS32	HS35, HS36	---	---	5 x AWG 12	5 x AWG 12	---	20A
6,5KW	////400-700	ES41	ES42	---	---	5 x AWG 14	5 x AWG 14	---	20A
7,0KW	////600-1000	ES51	ES52	---	---	5 x AWG 14	5 x AWG 14	---	20A
7,0KW	////600-1000HS	HS51	HS52	---	---	5 x AWG 14	5 x AWG 14	---	20A
7.3 .. 7.5 kW	>=3660-635 .. 825////500HS	HS33	HS34	---	---	5 x AWG 14	5 x AWG 14	---	20A
7.4 .. 9.5 kW	>=3660-635 .. 825////700HS	HS43	HS44	---	---	5 x AWG 12	5 x AWG 12	---	25A

Table 2: Minimum wire cross-section and maximum fuse protection in accordance with NFPA 79 (only for use in the USA).

Gauge No.	**Cross-section mm²**	**Gauge No.**	**Cross-section mm²**
5 x AWG 16	5 x 1.31 mm²	5 x AWG 10	5 x 5.26 mm²
5 x AWG 14	5 x 2.08 mm²	5 x AWG 8	5 x 8.37 mm²
5 x AWG 12	5 x 3.31 mm²	5 x AWG 6	5 x 13.3 mm²

Table 3: AWG (American Wire Gauge) to wire cross-section (mm²) conversion table

Power system nominal current values (A) for energy information

Observe:

The lift power is specified in the order confirmation
(e.g.: Lift: 400 V AC, 50 Hz, **4.0 kW**, 100% duty cycle).
The lift type is specified in the order confirmation as part of the complete lift name (e.g. Lean-Lift 1300-825/281/164/75/**300**/20)

				Lean-Lift nominal power supply current [A]						
Lift power	Carousel type	AntTyp		208V	230 - 240V	380V	400V	415V	440 - 480V	575V
3,0KW	////150	ES11	ES12	11.8 - 14.7 A	10.7 - 13.3 A	6.5 - 8.0 A	6.1 - 7.6 A	5.9 - 7.4 A	5.6 - 6.9 A	4.3 - 5.3 A
4,0KW	////130-300	ES21	ES22	14.8 - 20.1 A	13.4 - 18.1 A	8.1 - 11.0 A	7.7 - 10.4 A	7.4 - 10.1 A	7.0 - 9.5 A	5.4 - 7.3 A
5,0KW	////130-300HS	HS21, HS22	HS25, HS26	20.5 - 27.2 A	18.5 - 24.6 A	11.2 - 14.9 A	10.7 - 14.2 A	10.3 - 13.6 A	9.7 - 12.9 A	7.4 - 9.8 A
6,0KW	////200-500	ES31	ES32	19.1 - 28.3 A	17.3 - 25.6 A	10.5 - 15.5 A	9.9 - 14.7 A	9.6 - 14.2 A	9.0 - 13.4 A	6.9 - 10.2 A
7,5KW	////200-500HS	HS31, HS32	HS35, HS36	---	---	14.1 - 22.8 A	13.4 - 21.6 A	12.9 - 20.8 A	12.1 - 19.7 A	9.3 - 15.0 A
6,5KW	////400-700	ES41	ES42	---	---	11.0 - 17.5 A	10.5 - 16.7 A	10.1 - 16.1 A	9.5 - 15.1 A	7.3 - 11.6 A
7,0KW	////600-1000	ES51	ES52	---	---	13.1 - 21.3 A	12.4 - 20.2 A	12.0 - 19.5 A	11.3 - 18.4 A	8.6 - 14.0 A
7,0KW	////600-1000HS	HS51	HS52	---	---	14.3 - 19.8 A	13.5 - 18.8 A	13.1 - 18.1 A	12.3 - 17.1 A	9.4 - 13.1 A
7.3 .. 7.5 kW	>=3660-635 .. 825////500HS	HS33	HS34	---	---	17.0 - 18.7 A	16.2 - 17.7 A	15.6 - 17.1 A	14.7 - 16.1 A	11.2 - 12.3 A
7.4 .. 9.5 kW	>=3660-635 .. 825////700HS	HS43	HS44	---	---	20.7 - 22.7 A	19.6 - 21.5 A	18.9 - 20.7 A	17.9 - 19.6 A	13.7 - 15.0 A

Table 4: Electrical connection values of nominal line current for Lean-Lift [A] (50 / 60 Hz)

				Quadratic nominal line current (Q2 setting value) Lean-Lift [A]						
Lift power	Carousel type	AntTyp		208V	230 - 240V	380V	400V	415V	440 - 480V	575V
3,0KW	////150	ES11	ES12	9.0 - 11.1 A	8.1 - 10.1 A	4.9 - 6.1 A	5.1 - 6.4 A	4.9 - 6.1 A	4.7 - 5.8 A	3.6 - 4.4 A
4,0KW	////130-300	ES21	ES22	11.2 - 15.2 A	10.2 - 13.8 A	6.1 - 8.3 A	6.4 - 8.7 A	6.2 - 8.4 A	5.8 - 7.9 A	4.5 - 6.1 A
5,0KW	////130-300HS	HS21, HS22	HS25, HS26	15.5 - 20.6 A	14.1 - 18.7 A	8.5 - 11.3 A	8.9 - 11.8 A	8.6 - 11.4 A	8.1 - 10.7 A	6.2 - 8.2 A
6,0KW	////200-500	ES31	ES32	14.5 - 21.4 A	13.1 - 19.4 A	7.9 - 11.7 A	8.3 - 12.3 A	8.0 - 11.8 A	7.5 - 11.1 A	5.8 - 8.5 A
7,5KW	////200-500HS	HS31, HS32	HS35, HS36	---	---	10.7 - 17.3 A	11.1 - 18.0 A	10.7 - 17.4 A	10.1 - 16.4 A	7.7 - 12.5 A
6,5KW	////400-700	ES41	ES42	---	---	8.4 - 13.3 A	8.8 - 13.9 A	8.4 - 13.4 A	8.0 - 12.6 A	6.1 - 9.7 A
7,0KW	////600-1000	ES51	ES52	---	---	9.9 - 16.1 A	10.4 - 16.8 A	10.0 - 16.2 A	9.4 - 15.3 A	7.2 - 11.7 A
7,0KW	////600-1000HS	HS51	HS52	---	---	10.8 - 15.0 A	11.3 - 15.7 A	10.9 - 15.1 A	10.3 - 14.3 A	7.9 - 10.9 A
7.3 .. 7.5 kW	>=3660-635 .. 825////500HS	HS33	HS34	---	---	12.9 - 14.2 A	13.5 - 14.8 A	13.0 - 14.3 A	12.3 - 13.4 A	9.4 - 10.3 A
7.4 .. 9.5 kW	>=3660-635 .. 825////700HS	HS43	HS44	---	---	15.7 - 17.2 A	16.4 - 18.0 A	15.8 - 17.3 A	14.9 - 16.3 A	11.4 - 12.5 A

Table 5: Electrical connection values [A] (50 / 60 Hz) of quadratic nominal current taking into account the max. lift height