

OPERATING INSTRUCTIONS - Supplement

STAR LIFTKET VFD | Electric chain hoists



MADE IN GERMANY

Please do not use the electric chain hoist before all operators have carefully read and understood this manual and signed the form on the rear cover.

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Original operating instructions

Contents

1	General information.....	5
2	Technical Overview.....	5
2.1	Operating Voltage / Control Voltage.....	5
2.2	VFD Layout	5
3	Operating of the VFD Electric Chain Hoists.....	5
3.1	Selection of the operating mode.....	6
3.2	Reduce Speed Mode.....	8
3.3	Hold Speed Mode.....	9
3.4	Setting the Frequency Inverter	10
3.4.1	Keys for Setting	10
3.4.2	Adjustable parameters	11
3.4.3	Setting new parameters	11
3.5	Load spectrum counter.....	11
3.6	Possible fault messages.....	12

1 General information

The supplement to the operating instruction for electric chain hoists with frequency inverter (VFD series) is only valid in connection with the main operating instruction for electric chain hoists. It only describes the specific operation and possible fault messages of the electric chain hoists with frequency converter.

The special mentioned points of the supplement to the operating instruction for electric chain hoists with frequency inverter have priority over the main operating instruction for electric chain hoists.

The electric chain hoists of the VFD series are equipped as standard with:

- A frequency inverter control integrated in the electric chain hoist
- Emergency stop button
- Limit switches for lifting and lowering
- Thermal protection
- Load-dependent control of the lifting speed
- Load spectrum counter in the control.

If there are questions concerning the electric chain hoists with frequency inverter (VFD series), please be prepared to provide the following data:

- Serial number of the electric chain hoist (see type plate)
- Software version of the frequency inverter (see label at the frequency inverter, under the control cap).

2 Technical Overview

2.1 Operating Voltage / Control Voltage

The electric chain hoists of the VFD series are suitable for operation on either 1-phase or 3-phase mains. The connection voltage can be found on the type plate or in the inspection book.
The control voltage is 24 VDC.

2.2 VFD Layout



Figure 1: VFD Layout

3 Operating of the VFD Electric Chain Hoists

The electric chain hoist is operated via a two-stage control pendant with emergency stop.

Two different operating modes are possible, the Reduce Speed Mode and the Hold Speed Mode. Alternatively, the selection of a control pendant with analog push-buttons for stepless control of the lifting and lowering movement is possible.

Caution! The minimum speed at minimum frequency shall only be used for final positioning of the load. The minimum speed at minimum frequency must not be used to lift or lower the load over the entire lifting height or long hook paths.



Pressing / pushing the emergency stop button stops any lifting and lowering movement immediately and the brake engages.

The emergency stop button can be unlocked again by turning it to the right. Before unlocking/resetting the cause for actuating the emergency stop button must be checked and eliminated.

3.1 Selection of the operating mode

There are different versions of the PCB on the brake side in the electric chain hoist.

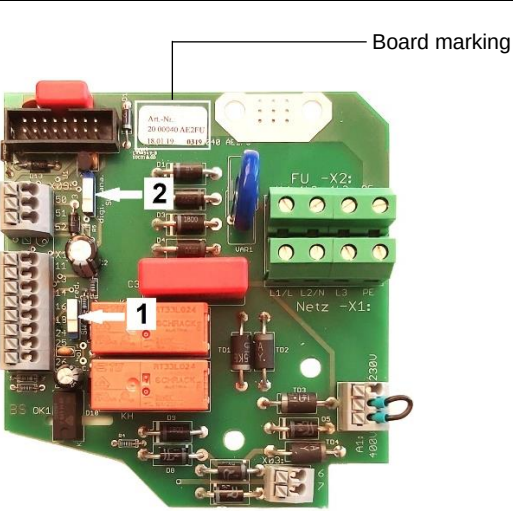
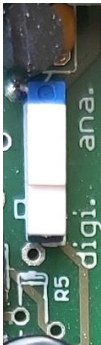
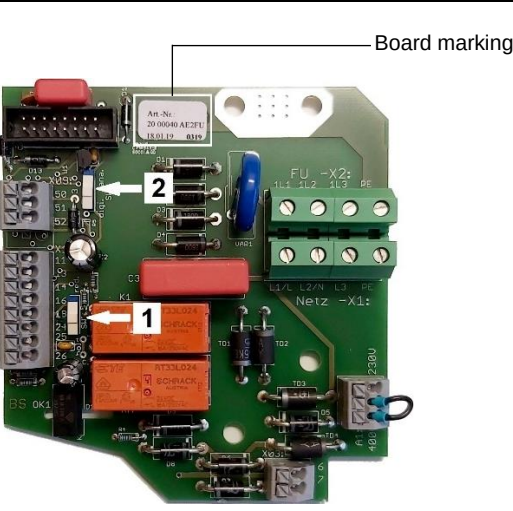
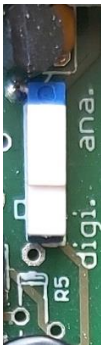
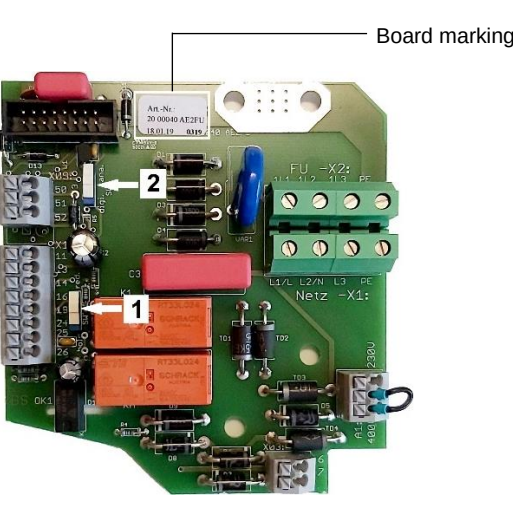
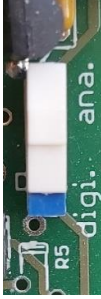
Board 29 HIDA0 AE2FU	Switch position		Operating mode
	Dip switch 1	Dip switch 2	
 Board marking			Reduce speed Mode Dip switch 1 must be set to 'red.'. Dip switch 2 must be set to 'digi.'.
 Board marking			Hold speed Mode Dip switch 1 must be on 'hold'. Dip switch 2 must be set to 'digi.'.
 Board marking			Analog button Mode Dip switch 2 must be set to 'ana.'. Dip switch 1 is in any position.

Table 1: Operating modes for version with board 29 HIDA0 AE2FU

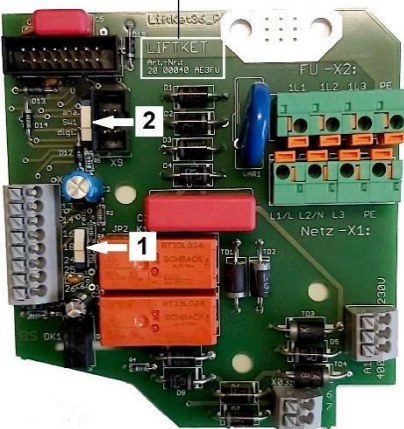
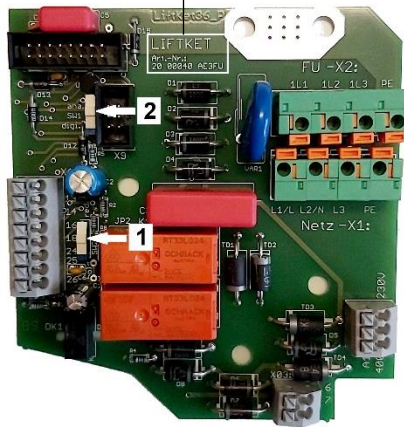
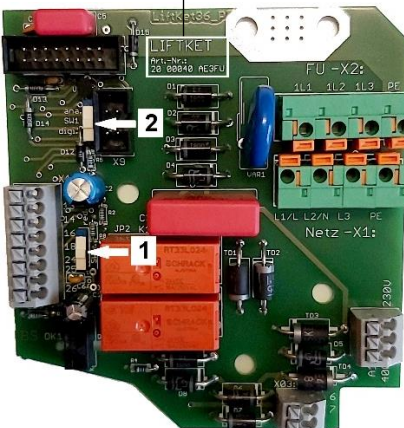
Board 29 HIDA0 AE3FU	Switch position		Operating mode
	Dip switch 1	Dip switch 2	
 Board marking			Reduce speed Mode with Soft Stop Dip switch 1 must be set to ,red.'. Dip switch 2 must be set to ,digi.'.
 Board marking			Reduce speed Mode with Quick Stop Dip switch 1 must be set on ,red.'. Dip switch 2 must be set to ,ana.'.
 Board marking			Hold speed Mode with Soft Stop Dip switch 1 must be set to ,hold'. Dip switch 2 can be set to ,digi.' or ,ana.'.

Table 2: Operating modes for version with board 29 HIDA0 AE3FU

3.2 Reduce Speed Mode

In Reduce Speed Mode, the maximum achieved lifting speed can be reduced to 5 Hz. As a result, a cautious settling of the load or a gentle approach to the top hook position is possible.

Lifting in Reduce Speed Mode

Operation of button Lifting	Function
Press on 1 st stage	Lifting with minimum frequency according to A062
Pressing down to 2 nd stage	Increasing the frequency or lifting speed as long as 2 nd stage is pressed
Change back from 2 nd stage to 1 st stage	Reduce the frequency setpoint and thus the lifting speed
Releasing the button	Immediate stopping of the lifting movement without a ramp due to the brake being engaged

Table 3: Operation of button Lifting in Reduce Speed Mode

Load measuring in Reduce Speed Mode

When passing through the 50 Hz setpoint, a load measurement takes place. The 50 Hz is "frozen" for about 300 ms. The result of this load measurement determines the maximum frequency or maximum possible lifting speed:

Load	Maximum frequency [Hz]
Full load	50
Without load	100
Partial load	50-100

Table 4: Maximum frequency and alteration rate when lifting in Reduce Speed Mode

Note: The load measurement at 50 Hz during the lifting process takes place only once if it has not been stopped in the meantime.



Lowering in Reduce Speed Mode

Operation of button Lowering	Function
Press on 1 st stage	Lowering with minimum frequency according to A062
Pressing down to 2 nd stage	Increasing the frequency or lowering speed as long as 2 nd stage is pressed
Change back from 2 nd stage to 1 st stage	Reduce the frequency setpoint and thus the lowering speed
Releasing the button	Immediate stopping of the lowering movement without a ramp due to the brake being engaged

Table 5: Operation of button Lowering in Reduce Speed Mode

The maximum lowering speed is regulated via the intermediate circuit voltage. When the limit value of the intermediate circuit voltage is reached, the frequency is not further increased during lowering. The larger the load, the sooner this point will be reached.

Load	Maximum frequency [Hz]
Full load	50
Without load	90
Partial load	50 - 90

Table 6: Maximum frequency when lowering in Reduce Speed Mode

Note: Depending on the gearbox, the maximum possible lifting and lowering speeds are electronically limited at 24 m/min.

Electric chain hoists with a nominal speed of more than 18 m/min at 50 Hz are decelerated before reaching the 90 Hz or 100 Hz mark.



3.3 Hold Speed Mode

In Hold Speed Mode, any other constant frequencies or speeds can be used in addition to the constant 50 Hz and 100 Hz frequencies.

Lifting in Hold Speed Mode

Operation of button Lifting	Function
Press on 1 st stage	Lifting with minimum frequency according to A062
Pressing down to 2 nd stage	Increasing the frequency or lifting speed as long as 2 nd stage is pressed
Change back from 2 nd stage to 1 st stage	The current speed is held
Releasing the button	Immediate stopping of the lifting movement without a ramp due to the brake being engaged

Table 7: Operation of button Lifting in Hold Speed Mode

Load measuring in Hold Speed Mode

When passing through the 50 Hz point, a load measurement takes place. The 50 Hz are "frozen" for about 300 ms. The result of this load measurement determines the maximum frequency or maximum possible lifting speed:

Load	Maximum frequency [Hz]
Full load	50
Without load	100
Partial load	50-100

Table 8: Maximum frequency and alteration rate when lifting in Hold Speed Mode

Note: The load measurement at 50 Hz during the lifting process takes place only once if it has not been stopped in the meantime.



Lowering in Hold Speed Mode

Operation of button Lowering	Function
Press on 1 st stage	Lowering with minimum frequency according to A062
Pressing down to 2 nd stage	Increasing the frequency or lowering speed as long as 2 nd stage is pressed
Change back from 2 nd stage to 1 st stage	The current speed is held
Releasing the button	Immediate stopping of the lowering movement without a ramp due to the brake being engaged

Table 9: Operation of button Lowering in Hold Speed Mode

The maximum lowering speed is regulated via the intermediate circuit voltage. When the limit value of the intermediate circuit voltage is reached, the frequency is not further increased during lowering. The larger the load, the sooner this point will be reached.

Load	Maximum frequency [Hz]
Full load	50
Without load	90
Partial load	50 - 90

Table 10: Maximum frequency when lowering in Hold Speed Mode

Note: Depending on the gearbox, the maximum possible lifting and lowering speeds are electronically limited at 24 m/min.

Electric chain hoists with a nominal speed of more than 18 m/min at 50 Hz are decelerated before reaching the 90 Hz or 100 Hz mark.



3.4 Setting the Frequency Inverter

3.4.1 Keys for Setting

The ramps for acceleration and braking during lifting and lowering can be set using various parameters on the control board.

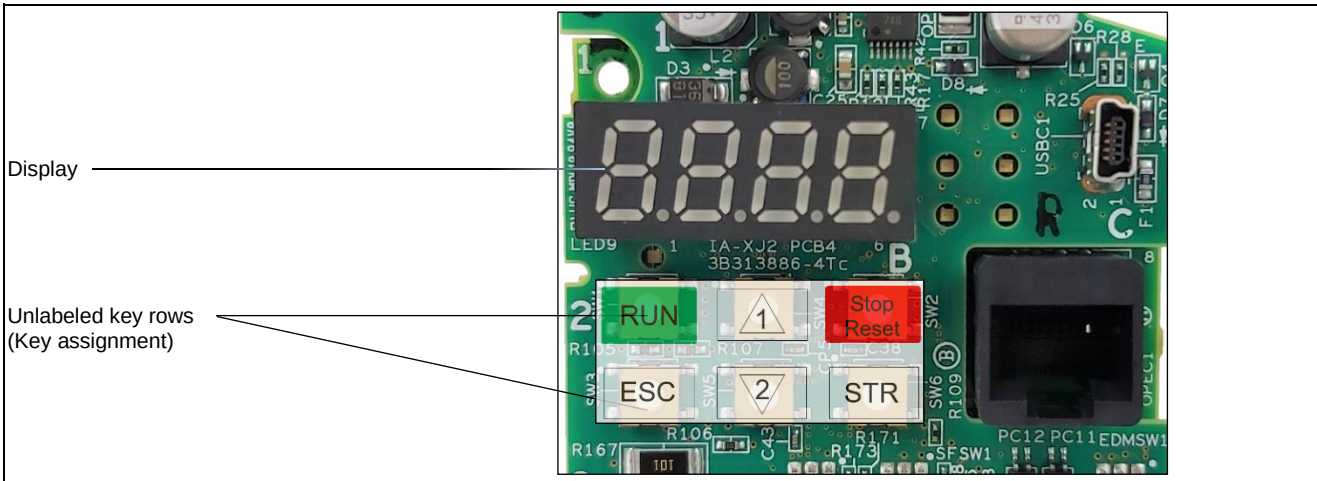


Figure 2: Arrangement of the keys on the board

Keys	Function	Remarks
RUN	Run	not used
ESC	Selection of parameter row / left arrow key	
	Parameter selection key	Parameter higher
	Parameter selection key	Parameter lower
Stop Reset	Stop / Reset	
STR	Confirm or save selection / Right arrow key	
ESC + STR	Open input level	

Table 11: Functions of the keys on the board

3.4.2 Adjustable parameters

The following parameters can be set:

Parameter group	Parameter number	Function	Factory setting	Parameter values	Remarks
F	002	Acceleration ramp Lifting	5	1 ... 10	Values < 3 can lead to error messages
F	003	Deceleration ramp Lifting	1	1 ... 10	
F	202	Acceleration ramp Lowering	3	1 ... 10	Values < 3 can lead to error messages
F	203	Deceleration ramp Lowering	1	1 ... 10	
A	062	Minimum frequency [Hertz]	10	50 ... 200	corresponds to 5 Hz ... 20 Hz
A	092	Maximum frequency [Hertz]	9999	5000 ... 9999	corresponds to 50 Hz ... 100 Hz

Table 12: List of adjustable parameters

3.4.3 Setting new parameters

1. Press the emergency stop button. → The control is de-energized.
Attention: Input terminals of the frequency inverter are not de-energized
2. Remove the control cap (see Figure 1).
3. Briefly press the **ESC** and **STR** keys simultaneously → The input level opens.
4. Select the required parameter group (letter) by pressing the **ESC** key.
5. Use the **▲** and **▼** keys to select the parameter number.
6. Use the **STR** key to confirm the selection of the parameter. The current parameter value is shown on the display.
7. To change the parameter value, use the **ESC** (left) and **STR** (right) keys to preselect the respective digit of the 4-digit parameter value.
8. Use the **▲** and **▼** keys to set the required number of the parameter value Use the **STR** key to save the selection of the parameter value.
9. Select parameter d026 (see points 4, 5 and 6) to return to the standard display.

3.5 Load spectrum counter

For convenient documentation of the use of the chain hoist, the control saves operating hours and full load hours, counts braking cycles and calculates the remaining life time of the chain hoist.

As long as there is no error, the values are continuously shown on the display in recurring order:

No.	Display values
1	Remaining life time [hours]
2	Operating hours [hours]
3	Full load hours [hours]
4	Braking cycles [x100]
5	Inverter temperature [°C]

Table 13: Display values of the load spectrum counter

Note: The load spectrum counter does not release the operator from keeping records the inspection book!



3.6 Possible fault messages

All messages are shown on the display of the electric chain hoist on the front of the control cap.

A fault can be reset by switching off the mains or by emergency stop. The display of the control unit must have gone out before the power is switched on again.

Fault message	Description	Cause	Remedy
E01	over-current event while in constant speed	motor short circuit	check motor and motor wires
		faulty motor wiring	connect motor wires acc. to the wiring diagram
		immediate load increase	avoid overload
E02	over-current event during deceleration	deceleration ramp too short?	increase parameter values F003 and F203
		motor short circuit	check motor and motor wires
E03	over-current during acceleration	acceleration ramp too short?	increase parameter values F002 and F202
		motor short circuit	check motor and motor wires
		overload	reduce load
E04	over-current during other conditions	ground fault	check output wires and motor for ground fault
E05	overload protection	motor is overloaded	reduce load / duty cycle
E06	braking resistor overload protection	duty cycle of braking resistor exceeded	increase parameter values F003 and F203
E07	over-voltage protection	brake chopper/brake resistor faulty/overloaded	check brake resistor
		brake chopper/brake resistor faulty/overloaded	increase parameter values F003 and F203
E08	EEPROM error	excessive ambient temperature	check ambient temperature
		noise	eliminate emitter
E09	under-voltage error	low power supply voltage	check power supply
E10	current detection error	inverter to react on EM field	check the surroundings
		faulty transformer	replace the VFD control
E11	CPU error	inverter to react on EM field	check the surroundings
		faulty inverter	replace the VFD control
E14	ground fault	ground fault between U, V, W and earth	eliminate ground fault (check motor, cables, wiring)
E15	input over-voltage	intermediate circuit voltage too high	check power supply voltage
E21	inverter thermal trip	inverter overloaded	check motor current
		high temperature	check ambient temperature
		excessive operation	change operating conditions, increase pause times
E22	CPU communication error	inverter to react on EM field	check the surroundings
		faulty inverter	replace the VFD control
E25	main circuit error	noise, EMC error	eliminate EMC emitter
		faulty IGBT	replace the VFD control
E30	drive error	over-current at IGBT	check motor and wires for short circuit
		chain hoist overloaded	reduce load
E38	Low-speed overload protection	overload at <0,2Hz	reduce load
		motor blocked or overloaded	check motor

Fault message	Description	Cause	Remedy
E50	brake error	brake does not operate	check brake and braking voltage
			check 16-pole flat cable
			check brake relay on the PCB
E51	inverter over-temperature	inverter temperature >68°C	reduce duty cycle / switches per hour / load
		high ambient temperature	check ambient temperature
E52	intermediate circuit voltage <342VDC	power off	wait until display turns off. Power on.
ohne	Display does not light up	24V short circuit	check 16-pole flat cable
		faulty power supply	check power supply
		faulty braking resistor	change braking resistor

Table 14: Fault messages of the VFD control