EMOTRON DSV 5445/5444 LIFT

Operating Instructions

Edition 04/09
Subject to technical modifications
(Interim)

Dear customer / user,

System DSV 5445 - Lift offers you a high-quality, modern and very powerful drive concept for old and new lift and lifting gear systems.

The field oriented system DSV 5445 - Lift can power all common winch types (both with and without gearing and independent of synchronous or asynchronous technology).

The customer/user should read these instructions carefully and should have understood them before starting work.

The following products:

DSV 5445 ; DSV 5452 ; DSV 5453 ; DSV 5445/5453-Plus-series

KD 915 , KD 920 ; Fine HF-SET 93251340268 (DSV 5452 incl. movable cubicle) ;

Brake resistors 4...40 Ohm (Type Cressall, Frizlen, Danotherm),

comply with the following directives and standards:

Low voltages directive 73/23/EWG - amendment 93/68/EWG - EMC directive 89/336/EWG, amendments 92/31/EWG and 93/68/EWG, incl. actually EMC directive 2004/108/EG

including the appropriate amendment directives up to date of drawing.

The following standards are used:

EN 60204-1	1998-11	IEC 61000-3-2:	2002-12	EN 55011:	1998
EN 61800-3 pr A.1.1	1999	IEC 61000-3-2/A1:	1997	EN 55011/A1:	1999
EN 61800-3 pr A11 ;	1999	IEC 61000-3-2/A2:	1998	EN 55011/A2:	2000
EN 61800-3	2002-04	EN 61800-2	1999-08	EN 61800-4	2003-08
EN 12015	2004	EN 12016-08	1998	VDE 0660 Part 500 (IEC 439, EN 60439)	
EN 61800-6-3	2002-08	EN 55011B		(basic emission standards) incl. IEC801 Part 1-5	
VDE 0875 Part 11	2003-08	EN 61000-6-3/AA	2004-07	EN 61800-1	1999-08

Optional on request : EN 954-1 part EN 61508 (not for all products available).

The declaration covers the modules and units delivered by us, but the user must ensure that the machine complies with the directives applicable to the end product after mounting or installation.

Following the IEEE915 directive line reactors of 4% uk minimum are needed, further information or special solutions will be projected and quotated on request.

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Explanation of terms:

Nominal device current	The current that is available at the device output, taking the operating time into account.
Dynamic output current	The current that is available at the device output for approx. 60 seconds. Declaration normally in %.
Motor frequency f_M	Motor nominal frequency on motor rating plate.
Number of motor poles p	$p = (f / n_N) * 60 * 2$ (p = value in front of the comma) e.g. motor n_N = 1450 1/min, at 50 Hz → 4-pole machine.
Synchronous rotational speed n	Synchronous speed of the motor operating at no load. $n = (f / p) * 60$ (n is always larger than n_N)
Nominal rotational speed n_N	Rotational speed of the motor operating at nominal load and nominal frequency (as stated on motor rating plate).
P_{Brake}	Continuous power of the braking resistor
Load capacity	Permitted payload of the lift car in kg.
v_{max}	Maximum speed of the lift car in metres per second.
η_{Gear}	Efficiency of the employed gear (value smaller than 1)
Characteristic factor	Specific value for the employed motor
Lifting height	Maximum height of the lift hoist way
Rotor flux	Motor parameter that determines the excitation of the asynchronous motor. (See Chapter 8.2).
Rotor time constant	Motor parameter that determines the motor torque. (See Chapter 8.2).
Start delay	Specifies the time in seconds between opening the brakes and start of travel.
Stopping distance EH	Distance that the lift car travels after reaching the level signal.
Braking ramp B	Characteristic of braking gradient
Braking delay	Specifies the time in seconds before the brake closes.
Run-up ramp HL	Characteristic of run-up gradient.
Starting jerk	Caused by static friction or mechanical "adhesion" during starting.
Suspension	Determined by the number of guide pulleys in the lift hoist way
Translation ratio	Gear reduction number.
Number of gear ratios	Gear reduction number. E.g. Declaration on gear 56 : 2 → reduction 56, → number of gear ratios 2
1 Vpp – encoder type	High quality encoder whose output signal has a sinusoidal profile with a peak-to-peak value of 1 volt. (4 tracks)
TTL encoder type	Encoder of average quality with transistor-transistor logic, i.e. output signal has a rectangular shape and supply voltage is usually 5 V DC. (4 tracks)
HTL encoder type	Encoder of inferior quality with high-transistor logic, i.e. output signal has a rectangular shape, but supply voltage is up to 30 V DC. (2 tracks, cannot be monitored)
Tracks	Number of encoder signals that are displace by 90 ° to each other.

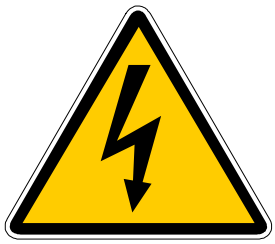
1 Introduction

EMOTRON the leading brand for lift and conveyor technology!

A field-orientated lift inverter with MULTIDRIVE DSV 5445 LIFT direct entry:

- Up to 60% energy saving compared to thyristor actuators.
- Reduced starting current (1.2 I_N max. factory adjustment).
- Use of single-speed proprietary standard motors possible without special forced-ventilation blowers.
- Special pulse-width modulation method (10-15 kHz) for «whisper-silent running», no speed dependent noise.
- Conservation of motor winding without additional choke by dv/dt limitation, therefore also suitable for converting existing systems.
- High efficiency ≥ 97% at 65% duty cycle (< 45° ambient temperature, 10 kHz).
- High control performance and optimum concentricity using field oriented current control with typically 65536 points per motor revolution. All common encoder types and number of pulses per revolution are possible.
- Braking energy dissipated using commercially available resistor cage or using "cos phi = 1" energy recovery unit. No mains reactive power.
- Emergency evacuation possible with USV or battery supply (option).
- Optimum factory presetting, very simple operation using customised menu. Lift data like suspension, translation, number of gears and driving wheel diameter can be input in current physical units. Automatic fine control using fuzzy controllers.
- Homepage http://www.emotron.com or old http://www.dietz-electronic.de. Detailed customer information with application examples.
- One inverter for all drives: Gearless (synchronous/asynchronous), epicyclical gear, hypoid gear, worm gear, V-belt and even hydraulic drives are possible!
- The devices handles lift speeds up to 6.0 m/s and supplies all necessary signals for commercially available lift controllers. Constantly reproducible levelling control is possible to within < 0.5 mm with direct approach.
- No problems with CE and EMC directives when patented AddOn filter technology is used.
- Optimum data administration using project-linked data storage with PC/laptop. Updates guaranteed to be compatible with preceding releases.
- Standardised lift program (also for digital integral shaft copy)
- Unique encoder evaluation process (65536 increments per revolution) guarantees quiet motor operation even at slow speeds!
- Special versions for synchronous and asynchronous gearless winches with 50 MHz controller card and options for different encoder systems (SSI combined encoder, 8-channel 1Vpp, resolver, etc.).
- Special versions with integrated shaft copy (for storage and retrieval unit and lifting axles).
- User interface via a convenient PC program (under W95, W98, ME, W2000, NT, XP).

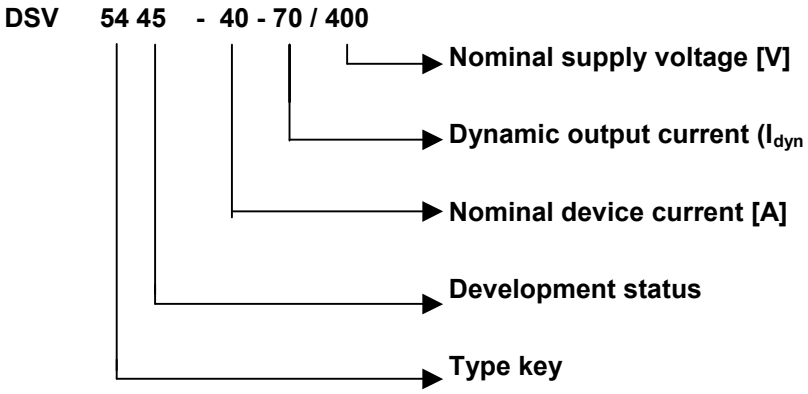
2 Safety Notice



- The installation, commissioning and parameter configuration may be performed only by qualified personnel, who have thoroughly read and understood these commissioning instructions.
- The technical documents and program versions issued by the manufacturer must always be used for commissioning.
- One must be prepared for unexpected responses by the whole drive during commissioning as a result of incorrect settings, incorrect connection and/or defective components.
- Before commencing commissioning, at least the EMERGENCY OFF functions, voltage isolation and fall of the mechanical brake must be installed and tested.
- The unauthorised removal of parts of the enclosure, improper use and incorrect installation or operation can cause fatal or serious injury and material damage.
- Pay attention before every commissioning that all persons and objects are removed from the danger area.
- The frequency converter described in these operation instructions is specially intended for use in the lift industry. The frequency converter is to be used only for the step less speed control of three-phase motors. The operation of other electrical consumers is not permitted and can lead to destruction of the equipment.
- Commissioning, i.e. the commencement of operation for the intended purpose, is permitted only subject to the applicable EMC directives.
- Oil lubrication in a power or force transmission systems with an oil-filled gear casing (geared motor) or reduction gears can deteriorate during operation at low speeds. Information on the permissible continuous speed range must be obtained from the gear manufacturer.
- The motor and the rotary encoder must have the same direction of rotation. The exact phase connection is to be taken into account on the motor terminal panel for synchronous motors in addition to the phase sequence (rotating field).
- If reactive power compensation equipment is installed in the power mains, it is to be checked for correct function.
- If earth-leakage relays are employed, their sensitivity should be 300 mA or more per converter. The earth-leakage relays must be suitable for pulsed DC currents.
- Check the required motor current at all speeds after completing commissioning (current measurement or evaluation of terminal A6).
- Check the function of the brake resistor after completing commissioning; the resistor must not glow! Pay attention to the risks of ignition/inflammation and fire.

3 Technical data

3.1 Type code DSV - LIFT:



3.2 Electrical data

♦ Typical input voltage range:	3 × 400V ±10 % TT, TN system (3 x 500V .+5%/-15%) TT, TN system (option) (1/3 x 230V ±10 %) TT, TN system (option) Other connection voltages and/or IT system on request
♦ Power mains frequency:	50...60 Hz ± 5 %
♦ Control voltage for fans from 80A-DSV:	230V +5, -15 %
♦ Control voltage PLC level:	+24V ±15 %
♦ Typical power factor	>0,97
♦ Output voltage:	3 × 0...(network input voltage – 20V)
♦ Output frequency:	0...400 Hz
♦ Pulse frequency adjustable:	2.5...15 kHz (typ. 10 kHz, BGR 5 > 200A: 5kHz)
♦ Typical du/dt:	< 1 kV/µs (with AddOn filter)
♦ Dynamic output current (I_{dyn}):	150 % (200% BGR 1 10A)
♦ Duty cycle at 10 kHz (12 kHz) PWM:	65 % (50%)
♦ Control range (2…64.pole motors):	1:32000
♦ Encoder interpolation for !Vpp	up to 256-times for 2048 pulses per revolution
♦ Fixed speeds:	6
♦ Speed thresholds:	3
♦ Protection class:	IP 20
♦ Ambient temperature:	0 ... 40 °C
♦ Storage temperature	-20…70 °C

♦ Humidity rating E to DIN 40040
♦ Power reduction from 40 °C by 1.5 % per 1 C° (maximum up to 55 °C)
♦ Installation altitude up to 1000m, thereafter power reduction 6% per 1000m

3.2.1 Power connection and accessories

DSV 5445	I_{dyn} [A]	Output power [kVA]	Power loss [kW] Airflow [m³/h]	Motor type [kW]	Network-fuse type gL	RFI motor filter AddOn	Line reactors (typically)	Conductor cross-section mains/motor lines	Brake resistor Approx. 6 mounting pedestals Cable cross-section
5/10	10/20	6,5	0,19 27	3,0 - 5,5	3 × 10A	Bgr. 1	3×1,5 mH, 16A	4 x 1,5 mm² *	40 Ω / 0.5 kW 2. x.1,5 mm²
15	24	10	0,30 27	4,0-7,5	3 × 16A	Bgr. 1	3×1,5 mH, 16A	4 x 1,5 mm² *	40 Ω / 1 kW 2. x.1,5 mm²
20	30	13,0	0,41 112	5,5 - 9,0	3 × 25A	Bgr. 2	3×0,7 mH, 35A	4 x 2,5 mm² *	40 Ω / 1 kW 2. x.1,5 mm²
30	45	19,5	0,58 112	7,5 - 15,0	3 × 35A	Bgr. 2	3×0,7 mH, 35A	4 x 4,0 mm² *	18-20 Ω / 2 kW 2. x.2,5 mm²
40	60	26,0	0,75 112	11 - 22	3 × 50A	Bgr. 3 40A	3×0,5 mH, 50A	4 x 6,0 mm² *	18-20 Ω / 2 kW 2. x.2,5 mm²
60/ 70	90/ 100	39,0/ 45,5	1,2 112	22 - 30	3 × 63A	Bgr. 3 60A	3×0,3 mH, 80A	4 x 16 mm² *	14-15 Ω / 4 kW 2. x.2,5 mm²
80	120	52,0	1,5 490	30 - 45	3 × 80A	Bgr. 4 Typ 2	3×0,25 mH. 100A 3×0,3 mH, 80A	4 x 25 mm² *	14-15 Ω / 4 kW 2. x.2,5 mm²
120	180	78,0	2,25 490	45 - 55	3 × 125A	Bgr. 4 Typ 3	3×0,18 mH, 130A 3×0,25 mH, 100A	4 x 35 mm² *	13 Ω / 6,5 kW 2. x.4,0 mm²
150	225	104,0	3,0 490	55 -75,0	3 × 160A	Bgr. 4 Typ 3	3×0,12 mH 200A 3×0,18 mH, 130A	4 x 50 mm² *	10 Ω / 8 kW 2. x.4,0 mm²
150 [1)]	225	104,0	3,0 810	55 -75,0	3 × 160A	Bgr. 5	3×0,12 mH 200A 3×0,18 mH, 130A	4 x 50 mm² *	10 Ω / 8 kW 2. x.4,0 mm²
200	300	138,5	4,0 810	90-110	3 × 200A	Bgr. 5	3×0,12 mH 200A	4 x 70 mm² *	6,5 Ω / 11 kW 2. x.6,0 mm²
250	375	173,5	5,0 810	132	3 × 250A	Bgr. 5	3×0,10 mH 250A 3×0,12 mH 200A	4 x 70 mm² *	4,0 Ω / 13 kW 2. x.10,0 mm²
320	480	222,0	6,0 810	160	3 × 320A	Bgr. 5	3×0,10 mH 250A 3×0,093mH 315A	4 x 95 mm² *	2,5 Ω / 19 kW 2. x.25,0 mm²

Motor type [KW] The allocation DSV 5445 to motor power has to be verified by means of the lift data!

Network fuse The type "gL" can be used for the network fuse. In case of using semiconductor fuses the nominal current has to be increased.

Line reactors Depending on the operating time, mechanical and electrical specifications of the system the nominal data of the line reactor can drift.

Conductor cross-section: The given cross-sections are standard values regardless the ambient conditions, used cable types and network fuses. Because of this the cross-sections can vary depending on the applicable regulations.

Installation position As pictures s. chapter 13, perpendicularly connecting terminals left

Installation distances Min. 100mm upward and downward, min. 10mm sideways

Brake resistor The dimensioning of the brake resistor has to be verified by means of the lift data!

DSV 5445 Size 2 flat The values are according to the table above.

[1)] **DSV 5445 150/400 BGR 5** is an old type (don't use it for new applications, if the BGR 4 can be used here).

GSV 5445 – series: See separate manual for DC-brushed motors!

4 Connection of frequency converter

4.1 Installation instructions

"Six golden rules for switchgear cubicle design"

1) Keep the "24V systems" (or any other low voltages) separate from the "230V systems" or "400V systems"!

2) Take care that the three basic voltages mentioned under 1) must be routed star-wise from their sources to the individual loads! Especially the "24 V system" is critical in this respect. Never wind the 24 V or 0 V lines through the bus bars and load points! Always lay new cables from the star point for each bus bar or load group. The star point in the "24 V system" is the power unit or smoothing capacitor in the 24 V source! Provide a distribution connector for this purpose for the corresponding voltage to allow star supply.

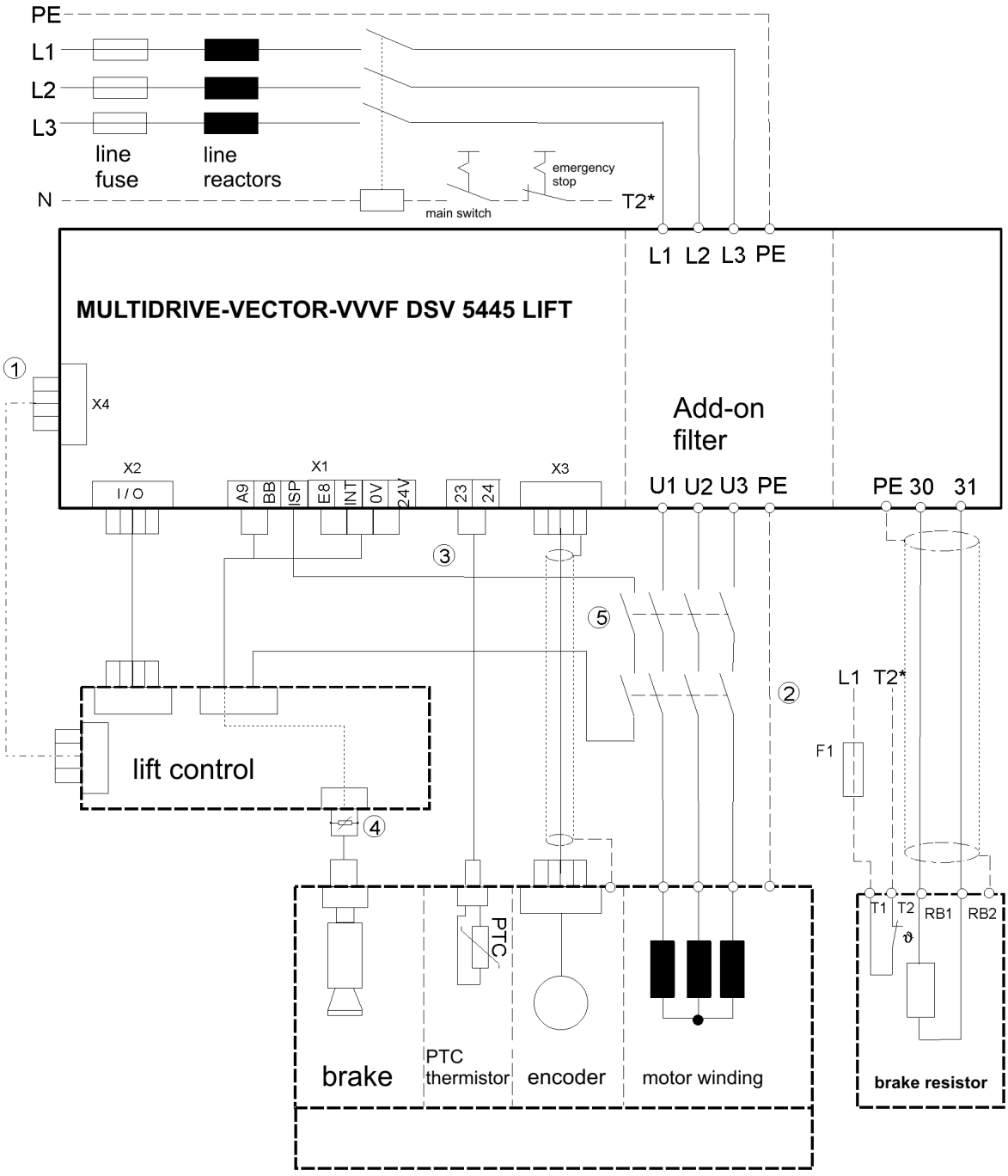
3) The screening of all screened cables (these are normally cables from the converter to the motor - if no add-on filter is employed - and the cables to the brake resistor and to the rotary encoder system) must always be connected at both ends! The rotary encoder must also be connected to the motor earth potential, i.e. be connected internally to the screen. On long lines, it can become necessary to repeat this every 25 m, if a suitable earthing point is available. The only cables to be screened at one end (always at the source end) are analogue set points (0...10V, 0...20mA or 4...20mA).

4) Suppress interference at contactor coils with associated RC elements or varistors. Also pay attention to the electromagnetic valves and brakes! An omitted varistor (which is selected to suit the nominal input voltage at the braking rectifier, i.e. for 230 V AC or 400 V AC) in the brake terminal box (or at the supply terminal in the switchgear cubicle) impedes the function. The RD, RC or varistor elements must be connected directly to the seat of the coils. If this is not possible, the cable must be screened at least as far as the possible seat of the suppression element. Unsuppressed inductances cause radio interference and high transient over voltages during switching. The result can be unexpected function and defects, which can affect your entire system.

5) Provide sufficiently large cross-sections especially for "0 V" and "protective earth"! All supply cables to DSV544 and DSV545 may not be looped to other loads! All supply cables to DSV544 and DSV545 may not be looped to other loads. - see next paragraph). It is not permitted to change from a 4-wire to a 5-wire system and vice versa within an installation branch, which can lead to undesirable EMC problems. If you wire the lift cubicle with 4 conductors, the separation to 5 conductors may be performed only directly in the cubicle.

- Use our add-on filters that are available for the DSV544 and DSV545 systems. The add-on filter is a power mains and motor filter in one unit and can be used at a distance of 10 metres without screened cables. The normal external power supply filter cannot dissipate reflection power. Reflection power is the term used to describe an interference source that is often underestimated, and which arises only after screening. This capacitive energy must drain away, which is often impossible when earthing points are too far away or earthed at too weak earth points.

4.2 Power connection



1 Travel controlled interface, only if required
2 Second contactor, only if required
3 If the PTC thermistor of the motor is placed on the external lift control, the plug-in connections 23 and 24 must be bridged.
4 mount transient voltage surge supressor (e.g. TNR G331K) at the coil of the brake!
5 auxiliary contact must be suitable for lower currents (10mA) (otherwise base load 1k0R parallel!)

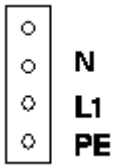
4.3 Connection of equipment fans for devices size 4 and 5

The following applies only to the converters DSV5444/5445 - (60), -80, -120, -150, -200, -250/400
The fans for converters DSV 5444/5445 - 10 - 60/400 are supplied internally, so that the terminals mentioned below are not applicable to sizes 1 – 3 and “Plus” devices.

Devices of sizes 4 and 5 from the DSV 54 series can also be supplied on request for a fan voltage of 400 V AC instead of 230 V AC. A small autotransformer is integrated into the device in this case. Attention is to be paid to the terminal assignment on the 4-pole power supply connector.

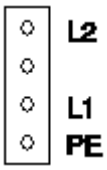
1) Standard (without autotransformer):

The upper pin of the connector may not be used in this case!



1-phase
230 VAC

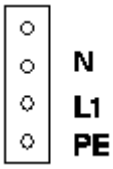
2) Special versions with autotransformers can be supplied on request,



2-phases
400 VAC

or

is selectable possible



1-phase
230 VAC

The choice of pin assignment to 400 V AC or 230 V AC is possible only when the delivered connector has the marker "L2" on the uppermost pin.
Free pins must never be used, i.e. never use L1, L2 and N simultaneously!
Care is to be taken in the case of a 400 V AC connection, that two external fuses in the range 2-4AT are to be provided for phases L1 and L2.

Notes on fan operation:
All sizes are provided with temperature control (fan control). The fan is normally switched on above 40°C.

4.4 Digital inputs/outputs

The DSV 5445 LIFT are provided with programmable and hard-wired inputs and outputs. They are preset for their lift application. A voltage of 30 V DC must on no account be exceeded at the inputs and outputs. **The control voltage must be smoothed using electrolytic capacitors** (a transformer only with rectifier is not sufficient!). Each output can switch a maximum current of 0.1 A at a maximum voltage of 24 V DC. The power supply for the outputs is provided from an external source via pin 11 and pin 12 in connector X1. The power supply is to be provided with a 2AT fuse. The inputs switch at a voltage of 15 - 24 V DC. They each require a current of 10 mA. The voltage refers to the earth connection pin 11 in connector X1.

Digital inputs connector X1	**Pin**		**Function**	**Remarks**
ISP	5	24 V	Pulse lock-out	Positive release of motor contactor (contactor monitor)
Input 8	6	24 V	Rotation direction selection	Using DCP: master-direction
INT	8		Reference signal	Wired to output A5 (if signal comes not separate from plc)
0 V	11	24 V	0 V external	From external power-supply
24V	12		24 V external fuse 2 AT	From external power-supply
Digital outputs connector X1	**Pin**		**Function**	**Remarks**
Output 9	2	24 V	Release brake	Max. load 0.1A (all outputs)
BB	3	24 V	Ready for operation	'BB' set to high, if no fault
Digital inputs connector X2	**Pin**		**Function (0E50=0 standard)**	**Function (0E50=255/-256/15)**
Input 0	16	24 V	Enable controller	Binary: Up
Input 1	15	24 V	Emergency-evacuation V4	Binary: Down
Input 2	14	24 V	Vi Inspection run	Binary: Bin 0
Input 3	13	24 V	V3 Fast gear step	Binary: Bin 1
Input 4	12	24 V	V2 Medium gear step	Binary: Bin 2
Input 5	11	24 V	V1 Small gear step	Binary: Bin 3
Input 6	10	24 V	Ve Approaching gear step	Binary: Bin 4
Input 7	9	24 V	Vn Readjustment	Input not used at the moment
Digital outputs connector X2	**Pin**		**Function**	**Remarks**
Output 0	8	24 V	Controller running	Motor is under current
Output 1	7	24 V	V < threshold in E12	Deceleration check
Output 2	6	24 V	V < threshold in E14	Door zone
Output 3	5	24 V	V < threshold in E16	Over speed
Output 4	4	24 V	Over temperature	Motor or unit to hot
Output 5	3	24 V	Parallel to X1 Pin 8	A5 to INT
Output 6	2	24 V	Maximum torque reached	Signal permitted only for short period
Output 7	1	24 V	Standstill	End of run
PTC thermistor input Connector "23-24"	**Pin**		**Function**	**Remarks**
Motor thermistor	23		Motor temperature monitoring (last run is still to be ended)	Without motor thermistor Please bridge "23-24"
Motor thermistor	24			

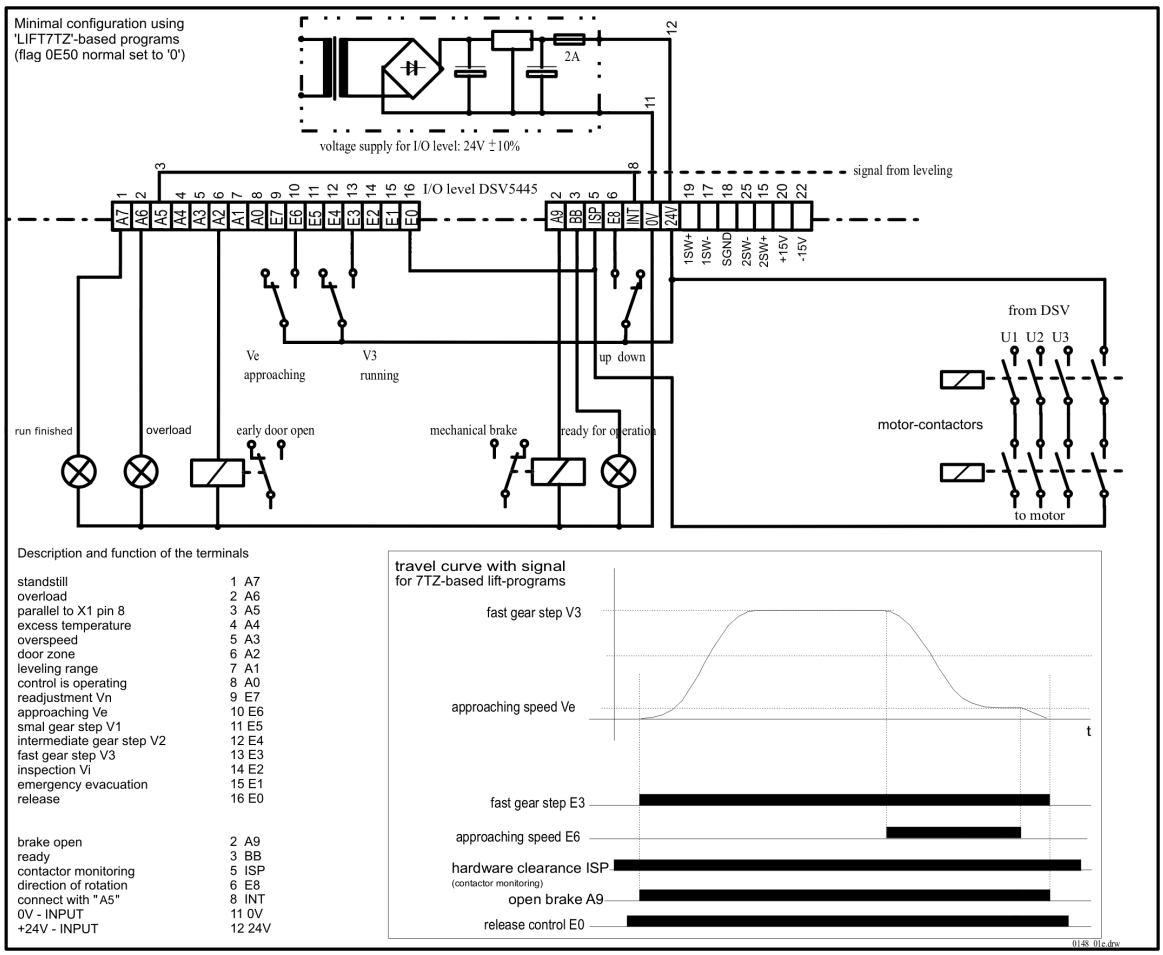
Note: Flag 0E50 = 0 -> normal function of 7TZ-based programs, 0E50 not 0 -> binary coded input-signals !

4.5 Connection examples for the control inputs

Preface: For historical reasons, there are different connection methods for the input/output level (input/output signals on connectors X1 and X2).

- Assignment on the basis "7TZ" (most popular file, approach speed is removed in the flush range). The basic program "7TZ" is factory setting (also gearless-files based on input/outputs like "7TZ").
- For assignment “10SZ” (for DCP, ACP and other bus systems) see more details in point 4.5.5.
- Older programs not longer supported in that manual (please ask technical-support for more details).

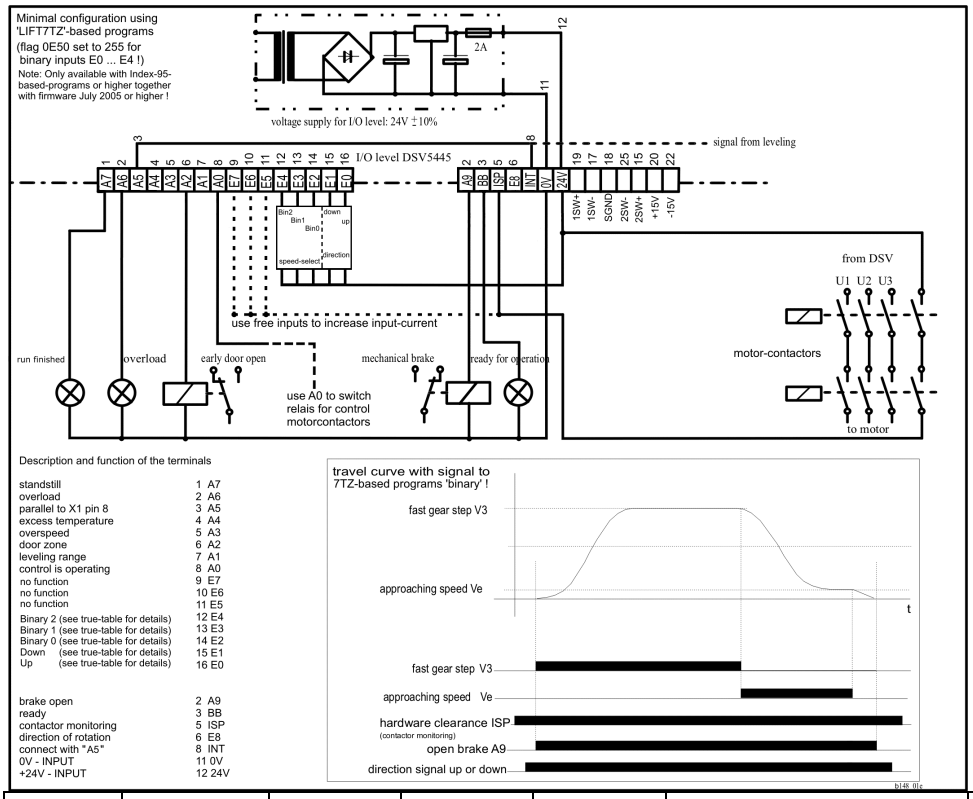
4.5.1 Connection example LIFT7TZ with normal inputs for speed and direction (0E50 = 0)



In the minimal configuration for LIFT7TZ., the main drive steps V3, V1, V2, Vn or Vi remain applied and "Ve" is added after the copy point. It is also possible to remove the fast drive signal shortly after "Ve" is applied. It is however recommended to wait for at least 5 ms between removing the fast drive signal and applying the approach speed signal; the switchover must however be made "bounce-free"!
The controller switches Ve back to low in the flush region. Output X2 A5 pin 3 associated with X1 INT pin 8 switches the DSV 5445 automatically to position control and causes the approach into the stop point.
The exact remaining distance up to stop is specified in parameter "F26" (Stop distance to floor).

The specification of the terminals is described in Chapter "Digital Inputs/Outputs".

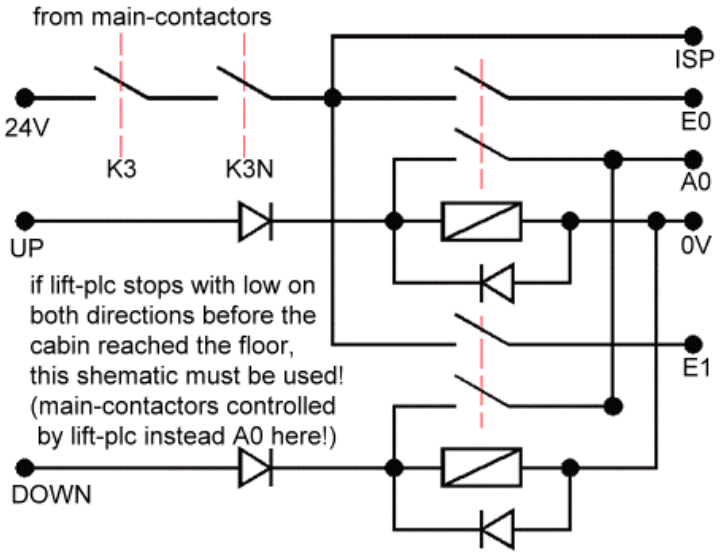
4.5.2 Connection example 7TZ with binary inputs for speed and direction (0E50 = 255/-256)



Up	Down	Bin 0	Bin 1	Bin 2	Action	Findili / binary-flag
E0	E1	E2	E3	E4	DSV to Lift-PLC	0E50
0	0	x	x	x	Emergency stop	255 or -256
1	0	x	x	x	Up-direction	255 or -256
0	1	x	x	x	Down-direction	255 or -256
1	1	x	x	x	No operation	255 or -256
1	0	0	0	0	Stop (normal mode)	255 or -256
1	0	0	1	0	Ve	255 or -256
1	0	0	0	1	Vi	255 or -256
1	0	1	0	1	V1	255 or -256
1	0	1	1	0	V1	-256
1	0	0	1	1	V2	255 or -256
1	0	1	1	0	V3	255
1	0	1	1	1	V3	-256
1	0	1	0	0	Vn	255 or -256
0	1	0	0	0	Stop (normal mode)	255 or -256
0	1	0	1	0	Ve	255 or -256
0	1	0	0	1	Vi	255 or -256
0	0	1	0	1	V1	255 or -256
0	1	1	1	0	V1	-256
0	1	0	1	1	V2	255 or -256
0	0	1	1	0	V3	255
0	1	1	1	1	V3	-256
0	1	1	0	0	Vn	255 or -256
0	0	0	0	0	Wait to a next ride	255 or -256

** This new function of flag 0E50h works only in newer 7TZ-based programs ≥ "index 99' together with inverter-firmware ≥ 'July 2007'

In some cases an older or very simple lift-plc needs an additional schematic to hold both direction-signals to 'high' during the full ride to the floor, because the direction-signal goes to 'low' same time as levelling-speed:



4.5.3 Connection example 7TZ with 'mixed decimal' coded inputs (value of 0E50 = 15)

Preface: Spec.-firmware from October 2008 or later (for example TUDXxxN) makes it possible to use the inverter together with some Chinese lift-plc's (signal ISP must be set to 1, before signals E0 … E6 will work):

up	down	bin 0	bin 1	bin 2	bin 3	bin 4	action ***
E0	E1	E2	E3	E4	E5	E6	DSV to Lift-PLC
0	0	x	x	x	x	x	Emergency stop
1	0	x	x	x	x	x	Up-direction
0	1	x	x	x	x	x	Down-direction
1	1	x	x	x	x	x	No operation
1	0	1	0	0	0	0	Ve
1	0	0	0	0	0	0	Stop (normal mode)
1	0	1	1	0	0	0	V1
1	0	1	0	1	0	0	V2
1	0	1	0	0	1	0	V3
1	0	1	0	0	0	1	Vi
1	0	0	0	0	0	1	Vn
0	1	1	0	0	0	0	Ve
0	1	0	0	0	0	0	Stop (normal mode)
0	1	1	1	0	0	0	V1
0	1	1	0	1	0	0	V2
0	1	1	0	0	1	0	V3
0	1	1	0	0	0	1	Vi
0	1	0	0	0	0	1	Vn

*** Firmware > end of 2008

Be sure to connect the input INT to output A5, to get the stop (normal mode) like the picture in 4.5.2 here!

4.5.4 LIFT7TZ with analogue velocity setpoint setting (0E3C = 0)

From up to LIFT7TZ (index 98), which is datet 01-13-2006, the meaning of flag 0E3C (Schmitt-Flag / digital flag) had been changed!
With this flag now you can differ, whether the program runs via digital regulating steps or if it follows an analogue setpoint given to clamps X1 17/19.
If this flag (0E3C) is set to '0', an analogue setpoint at X1 17 1SW- / 19 1W+ is expected.

Please pay attention to the following table:

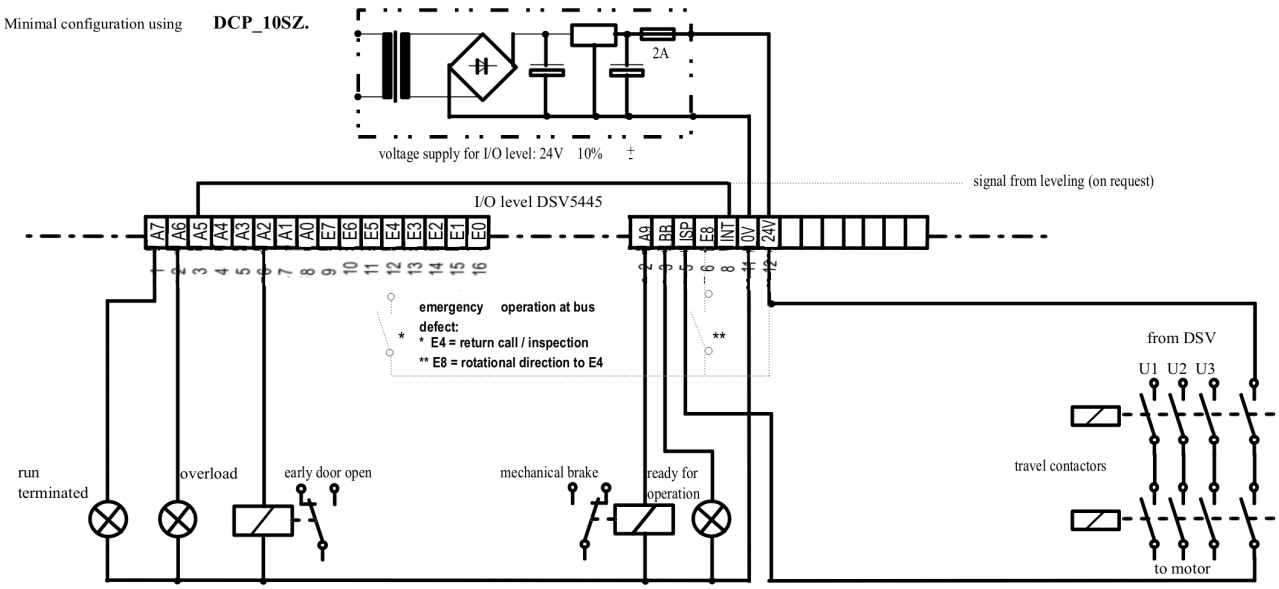
Adr. 0E50	Adr. 0E3C	Function
0	255	regulating steps digital, decimal-coded, direction via E8
255	255	regulating steps digital, binary-coded like 'KEB', direction via E0 / E1
-256	255	regulating steps digital, binary-coded like 'CT', direction via E0 / E1
15	255	regulating steps digital, binary-coded for 'BLT', direction via E0 / E1
0	**0**	**regulating steps analogue, direction via setpoint sign or E8**
255	**0**	**regulating steps analogue, direction via E0 and E1 (or sign)**

In analogue mode the rating of the analogue setpoint will be set with variable 0E02 (V3). 10V setpoint correspond to the here registered drive velocity.
In analogue mode all functions of the program are the same as in digital mode (brake A9, stop signal A7, motor contactor signal A0 and all revolution thresholds).
The end of ride will be recognised automatically (setpoint and actual value = 0).

The following parameters and variables have a new meaning from 'Index 99':

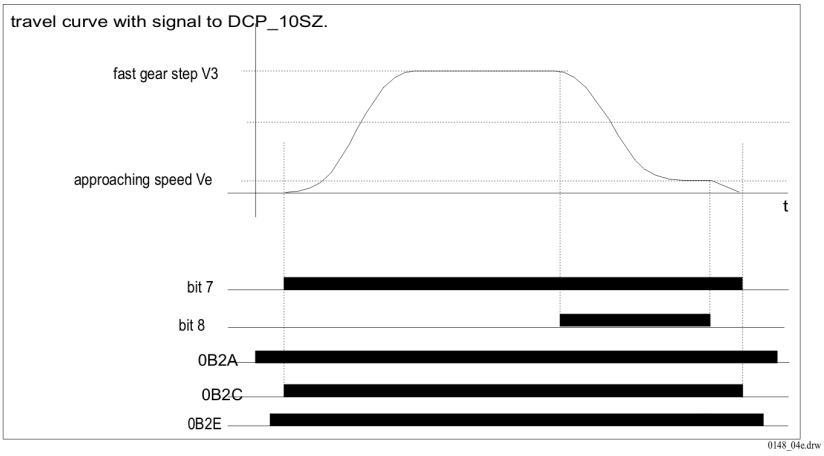
F9	read only	shows the determined value of the analogue rating
0E02	V3	scales the analogue setpoint at X1 17/18/19
0E20	ramp	restricts the maximum ramp at analogue setpoint
0E2C	offset	adjusts analogue setpoint only at +/- 10V-mode
0E2E	hysteresis	mask-out of interferences at 0V (5mV = 1)
0E3C	Schmitt-Flag	determines the mode (analog = 0)
0E4E	start time	tolerance-time for identifing setpoint = 0
0E50	Findili-Flag	determines input code (binary = 255 or -256)
0E38/0E3A	hidden	buffer analogue rating (sign)

4.5.5 Connection example “DCP/ACP-10SZ.KOM for DCP/ACP-BUS” option



Description and function of the terminals:

standstill	1	A7
overload	2	A6
parallel to x1 pin 8	3	A5
excess temperature	4	A4
overspeed	5	A3
door zone	6	A2
leveling range	7	A1
control is oprating	8	A0
	9	E7
	10	E6
	11	E5
emergency operation return call	12	E4
	13	E3
	14	E2
	15	E1
	16	E0
brake open	2	A9
ready	3	BB
contactor monitoring	5	ISP
emergency operation direction	6	E8
leveling	8	INT
0V - INPUT	11	0V
+24V - INPUT	12	24V



Inputs E0, E1, E2, E3, E5, E6, and E7 must not be used. Input E4 is provided for emergency operation, i.e. after failure of the DCP bus. Flag E0C must however previously be set to "0" for this, in order to switch off the DCP bus.

The description of the "CAN/DCP bus interface" option can be found in Chapter "Options".

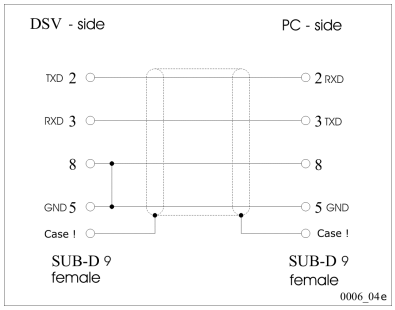
The ACP bus is also supported in addition to the DCP bus; additional information can be found in the DCP-10SZ.TXT file in the EmoSoftLift program.

Hints for old control procedures LIFT3SZ.KOM and LIFT9SZ.KOM can be found in the technical customer information “ki0302d0”.

4.6 Interface X4

RS232 → Connect pin 8 to pin 5 (see sketch 0006_04d.drw)
Addressed RS485 mode → Connect pin 5 to pins 6 and 7. (General sense as RS232)

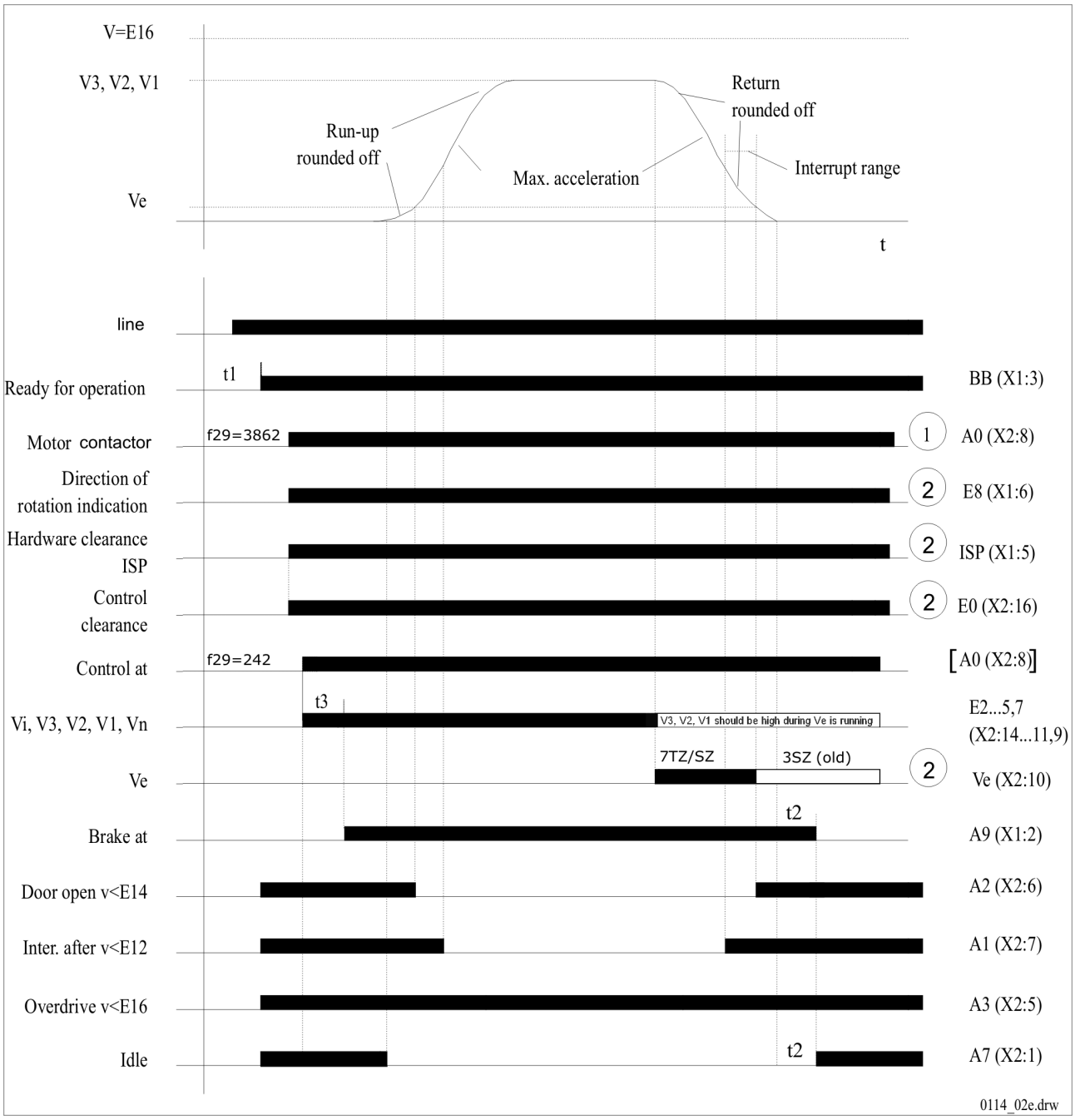
Connector SUB-D 9 pin no.	*Meaning*
1	TXD-RS422
2	TXD RS232 or TXD+ RS422
3	RXD RS232 or RXD+ RS422
4	RXD- RS422
5	GND
6	Switchover RS485/422
7	Switchover to addressed RS485 mode
8	Connect with pin 5
9	VCC



The RS232 interface cable for MAXIDRIVE VVVF DSV 5453 and MULTIDRIVE VECTOR VVVF DSV 5445 LIFT is suitable for both systems. (Our article no: 7906014)

If the PC program (EmoSoftLift or TER) displays the message „Transfer Error“ or "b3 error" during the read out/alteration/programming of the data, then restart the program, change the interface from COM1 to COM2 in the entry template. If this does not help, please check the RS232 cable.

4.7 Timing diagram



t1	Time until ready for operation approximately 3 s
t2	Braking deceleration adjustable at memory location E24H
t3	Starting delay against starting jerk from memory location E28H typically 500 ms
❶	Only operate motor contactor if A0 OFF and A7 ON, only valid for F29=242.
❷	Leave signal applied until A7 is set, only valid for F29=242.

4.8 Braking distances / gear-down points

Braking distances of the three main speeds V1, 2, 3 depending on the running speed and rounding (ramp gradient = 200). The braking distance is set using E18 (braking ramp B).

4.8.1 Typical braking distances for DSV systems with TUDY/TUDX (normal gear systems)

V3, V2, V1 in m/s	Braking ramp B = 45 a = 0.6 m/s²	Braking ramp B = 30 a = 1.0 m/s²	Braking ramp B = 15 a = 1.4 m/s²	V3, V2, V1 in m/s	Braking ramp B = 45 a = 0.6 m/s²	Braking ramp B = 30 a = 1.0 m/s²	Braking ramp B = 15 a = 1.4 m/s²
0.50	0.550 m	0.450 m	0.350 m	1.80		3.000 m	
0.60		0.600 m		1.90		3.250 m	
0.70		0.750 m		2.00	4.375 m	3.525 m	2.500 m
0.75	1,000 m	0.800 m	0.600 m	2.10		3.850 m	
0.80		0.900 m		2.20		4.125 m	
0.90		1.050 m		2.25	5.300 m	4.200 m	2.975 m
1.00	1.550 m	1.250 m	0.925 m	2.30		4.450 m	
1.10		1.450 m		2.40		4.750 m	
1.20		1.600 m		2.50	6.250 m	4.850 m	3.600 m
1.25	2.150 m	1.700 m	1.250 m	2.60		5.400 m	
1.30		1.850 m		2.70		5.650 m	
1.40		2.000 m		2.75	7.200 m	5.700 m	4.125 m
1.50	2.725 m	2.250 m	1.625 m	2.80		6,000 m	
1.60		2.450 m		2.90		6.300 m	
1.70		2.725 m		3.00	8.175 m	6.600 m	4.700 m
1.75	3.500 m	2.825 m	2.050 m	4.00		9,000 m	

4.8.2 Typical braking distances for DSV systems with TUDZ-firmware (gearless winches)

V3, V2, V1 in m/s	Braking ramp B = 225 a = 0.6 m/s²	Braking ramp B = 150 a = 1.0 m/s²	Braking ramp B = 75 a = 1.4 m/s²	V3, V2, V1 in m/s	Braking ramp B = 225 a = 0.6 m/s²	Braking ramp B = 150 a = 1.0 m/s²	Braking ramp B = 75 a = 1.4 m/s²
0.50	0.550 m	0.450 m	0.350 m	1.80		3.000 m	
0.60		0.600 m		1.90		3.250 m	
0.70		0.750 m		2.00	4.375 m	3.525 m	2.500 m
0.75	1.000 m	0.800 m	0.600 m	2.10		3.850 m	
0.80		0.900 m		2.20		4.125 m	
0.90		1.050 m		2.25	5.300 m	4.200 m	2.975 m
1.00	1.550 m	1.250 m	0.925 m	2.30		4.450 m	
1.10		1.450 m		2.40		4.750 m	
1.20		1.600 m		2.50	6.250 m	4.850 m	3.600 m
1.25	2.150 m	1.700 m	1.250 m	2.60		5.400 m	
1.30		1.850 m		2.70		5.650 m	
1.40		2,000 m		2.75	7.200 m	5.700 m	4.125 m
1.50	2.725 m	2.250 m	1.625 m	2.80		6,000 m	
1.60		2.450 m		2.90		6.300 m	
1.70		2.725 m		3.00	8.175 m	6.600 m	4.700 m
1.75	3.500 m	2.825 m	2.050 m	4.00		9.000 m	

5 Encoder

5.1 Pin assignment of rotational encoder and connector X3

X3 pin	Pin assignment at connector X3 of the DSV 5445	Encoder type 1Vpp 4 tracks Ub=5V	Encoder type TTL 4 tracks Ub=5V	Encoder type TTL 4 tracks Ub=10...30V	Encoder type HTL 2 tracks Ub=10...30V	No encoder (Emergency operation)
1	A	A	A	A	A	
2	/A	/A	/A	/A		
3	5 VDC	5 VDC	5 VDC			
4	GND	GND	GND	GND		
5	B	B	B	B	B	
6	/B	/B	/B	/B		
7	N	N **	N **	N **	N **	
8	/N	/N **	/N **	/N **		
9	Inner screen					
10	-15 VDC				-15 VDC	
11	GND SENSE	-sense **	-sense **			
12	Outer screen	Screen	Screen	Screen	Screen	
13	VCC SENSE	+sense **	+sense **			
14	Alarm					
15	+15 VDC			+15 VDC	+15 VDC	
Jumper position on the controller board (JP3)						
JP3-Flag 0E3E		0	255	255	255	(0E60=255)

The table shown above is valid for elevator plants using **asynchronous motors**.

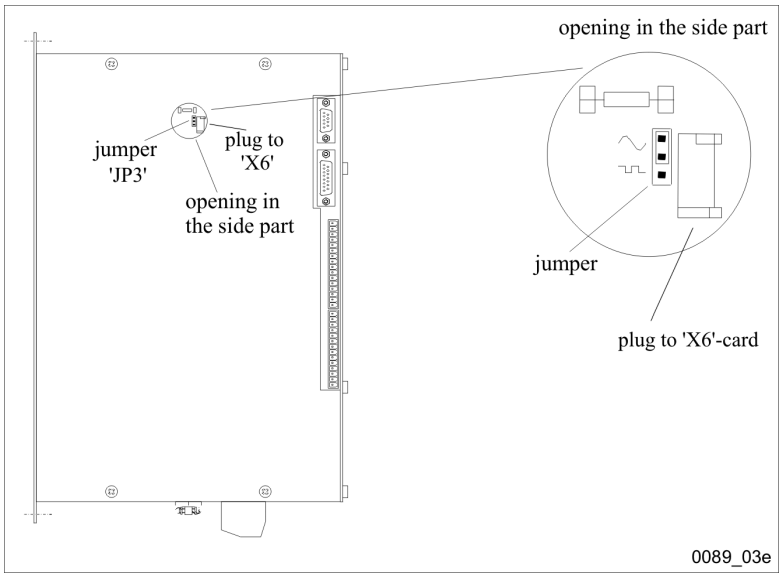
** = N, /N and sense-control should only connected if used encoder has that function and cables!

For **synchronous motors**, option **SSI**, **EnDat ®**, **second encoder ATB-version** or **resolver** please note the specification for termination and setting in the respective chapter.

5.1.1 Jumper JP3

Hardware encoder monitoring: **top → 1Vpp sine;** **bottom → 4 channel TTL**
centre → no monitoring HTL or in case of resolver-card

If the jumper JP3 must be changed, check also the JP3-flag in variables: 1Vpp sine "0E3E = 0", TTL/HTL "0E3E = 255"! (Note: for encoderless driving the service-flag 0E60 must set from 0 to 255)



Pic.: Position jumper JP3 size 2-5; In case of size 1 and size 2 flat the housing has to be opened.

5.2 Setting encoder devices and number of pulses

Encoder type	Memory cell 0E4A	Memory cell 0E3E	Jumper JP3
1024 pulses 1Vpp	1024	000	top
1024 pulses TTL	1024	255	bottom
1024 pulses HTL	1024	255	centre
2000 pulses TTL	2000	255	bottom
2048 pulses 1Vpp	2048	000	top
2048 pulses TTL	2048	255	bottom
2500 pulses TTL	2500	255	bottom
2500 pulses HTL	2500	255	centre
4096 pulses TTL	4096	255	bottom
500 pulses TTL	500	255	bottom

preferred version "normal winch" preferred version "gearless winch"

A calculation overflow can sometimes occur for encoder pulse numbers **above 2500** pulses after performing the function "Save values" using the internal, external FU-Control. The internal FU-Control displays: **"Parameter control off**"; while the external displays: "**Ready for operation?**". In this case, set parameter **F24** to value **"1"** under menu item "Change parameters". The device is ready for operation again after **"Save values"** has been performed.
The same can also apply to the rare suspension "4:1".

The devices are normally already prepared for the corresponding project ex-works. Therefore check the rating plate before you load the new .UPD or .KOM programs to see whether your project has already been taken into account.

You can call our application department if you have questions related to the base setting.

5.3 Encoder technology

5.3.1 1Vpp 4-channel sine/cosine

The 1Vpp sine/cosine encoder (e.g. 1024 cycles) represents the most modern encoder system available today. The additional internal multiplication (64-times analogue sampling) represents, for example, an effective 131,072 increments per motor shaft revolution. This high resolution is necessary especially for a smooth ride, since no discrete control steps (jumps between the flanks and dead times) can occur. This applies especially to the slow running "gearless" drives.

The system furthermore offers perfect monitoring in the event of cable breakage and encoder faults by evaluating the four individual 1Vpp channels in the DSV 544x system.

5.3.1.1 Absolute value encoder with 1Vpp 4-channel sine/cosine and analogue resolver systems

The rotor displacement angle RHO is necessary for the operation of synchronous motors so that the converter always feeds the stator rotating field in an optimal manner for the position of the permanently magnetised rotor in the corresponding motor phases. A single turn position is therefore notified to the device with the help of an additional option board. Such systems are explained in the annex using examples of various winches with synchronous motors.

5.3.2 TTL 4-channel

The TTL 4-channel encoder can be employed as an alternative to the 1Vpp encoder; however its properties are poorer by a factor of 16, since the high analogue sampling is not activated. (JP3 flag at 255). The relatively low number of increments per revolution still allow good travel properties with worm gears, whereby drive noise is noticeably increased. The encoder system is only conditionally suitable or sometimes even unsuitable for epicyclical gears or gearless drives.
The system offers perfect monitoring during cable breaks and encoder faults by evaluating the 4 tracks in the DSV 544x system, whereby the motor needs only to move minimally to recognize this fault.

5.3.3 HTL 2-channel

The HTL encoder with two channels should be used only in emergency situations, e.g. during the conversion of old systems where the encoder is already installed.
The system does **not** offer monitoring facilities by the DSV 544x during cable breaks and encoder faults, due to the presence of only two channels.

5.3.4 Mounting of encoder and coupling

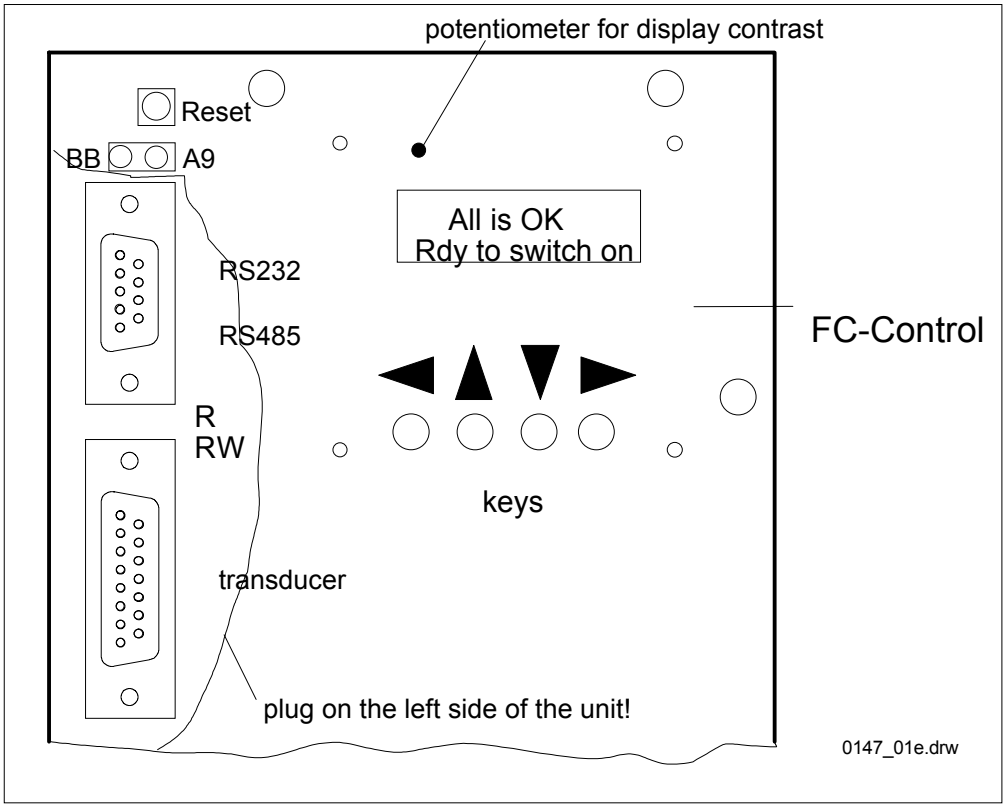
In addition to the choice of encoder, the positioning and type of coupling are, of course, highly significant for the quality of the control characteristics of your drive. A "poor" actual speed value destroys the best controller!
The encoder should be connected to the motor or worm gear shaft, with as little play as possible, at the location with the highest moment of inertia. The coupling may not permit resonance, especially at the control time constants. In this respect, couplings manufactured from sawn aluminium (Helical) and wound steel springs (SEW) have shown themselves to be only of low suitability or even unsuitable. You can achieve good results with periflex and bellow-type couplings; couplings with a hard rubber star must not be pressed together under any circumstances during installation. Align the two shafts exactly and pay attention to the instructions of the encoder manufacturer with regard to fastening the encoder to the drive unit. Secure the connections against loosening (grub screws, locking rings, tensioning collet). Ensure that the encoder casing is connected in an electrically conducting manner with the motor or worm gear casing.

5.3.5 Encoder cable screening

The correct and noise-free measurement of the actual speed value is very important for high-quality control properties of your drive system. The actual speed value is part of the overall control loop. Its quality is determined solely by the worst component, i.e. by a possibly defective actual value.
Therefore employ the cable specified by the encoder manufacturer with satisfactory cross-section, good screening and "twisted pair" cable design.
The screen must be earthed at both ends (motor and frequency converter). Rotary encoder types without earthed outer casings are therefore unsuitable for our application.

6 Commissioning

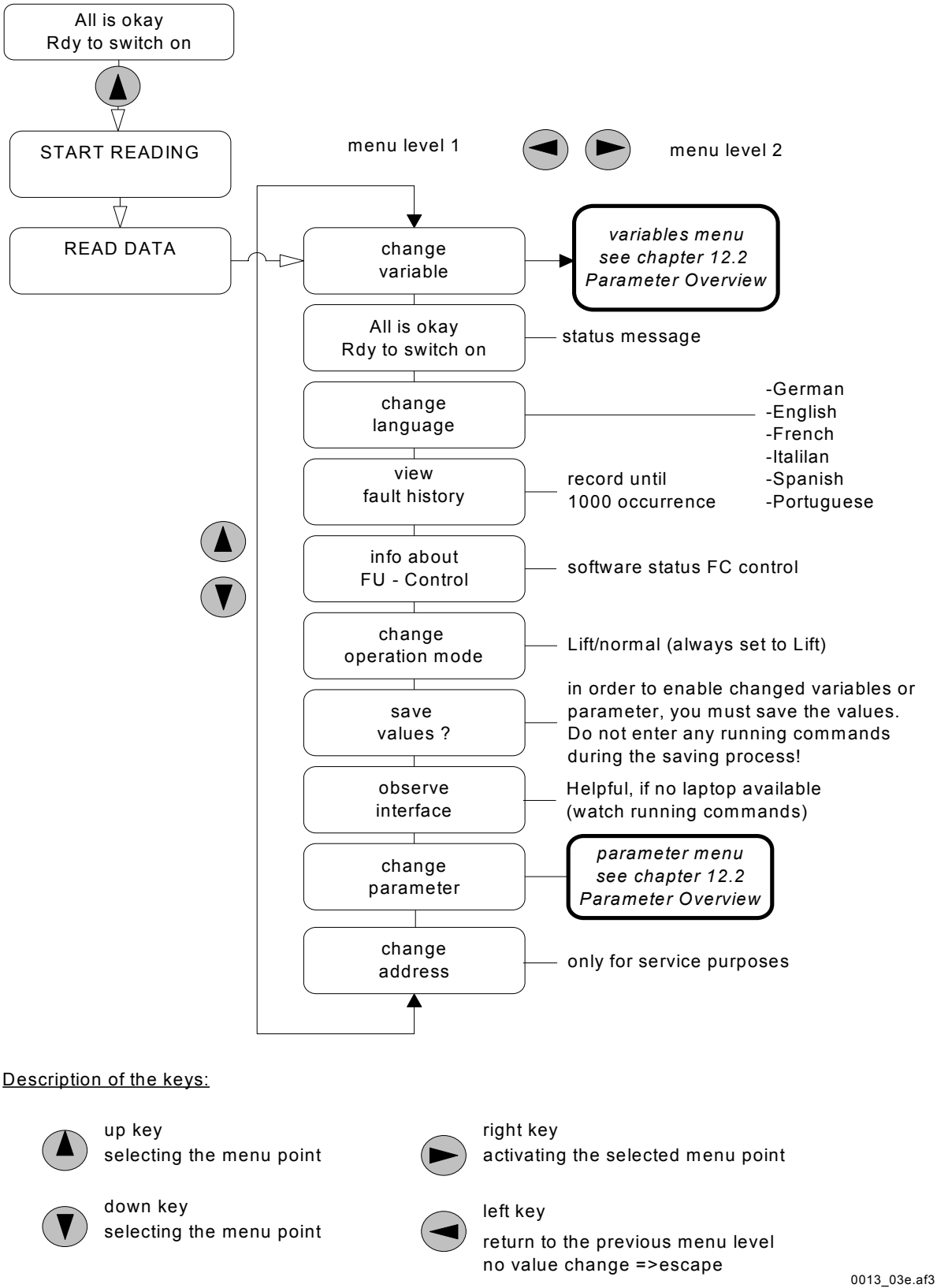
6.1 Operation of FU-Control



The converter performs self-test of the hardware and associated peripherals (mains phases, motor thermistors and rotary encoders…) during the initialisation phase.
The following messages appear on the FU-Control display for a short time and signify the following:

	Display message	Meaning of the display message
Switch power ON:	EMOTRON LIFT CENTER FUC 2.1 11.07.07	Initialisation phase: Converter performs a self-test.
	WAITING FOR STATUS WAITING FOR ERRORS	Initialisation phase: Converter performs self-test of peripherals.
	All OK Pulse lock-out	If this message appears in the display, the converter cannot detect any faults. *Please note that data entries may be made at FU-Control only when no drive command is present. TIP: Switch controller to recovery.*
The parameters and variables must be loaded before they can be altered. Press UP button: ▲		
	Starting to read Pulse lock-out	
	Reading data Pulse lock-out	FU-Control now reads all necessary parameters from the converter
	Alter variables Change	Reading completed.

6.1.1 Menu prompts for FU-Control



Description of the keys:

up key
selecting the menu point

right key
activating the selected menu point

down key
selecting the menu point

left key
return to the previous menu level
no value change =>escape

0013_03e.af3

6.1.2 Parameter configuration in frequency converter (using FU-Control)

Parameter configuration can commence after the converter has completed reading the parameters.

The appropriate menu items are selected using the raise/lower buttons and activated for editing using the right button. The editing sequence can be selected freely.

Editing: Position the cursor at the appropriate position using the *move right* or *move left* button

A numerical or algebraic sign change can be made using the *up* or *down* buttons.

Accept altered values: Operate the right button until FU-Control reports "VALUE ACCEPTED".

The possible min/max values can be found in Chapter 8.1: Parameter overview.

Distinctive number: Factory setting "0": no password request.
A lost password can be altered only using EmoSoftLift or by our service staff.

Select menu item "Save values"

After this menu item has been selected and activated using the right button, the following appears in the display:

Please wait Do not switch off

(after approx. 10 seconds)

Please wait... Software reset

The value is "valid" for the frequency converter only after saving.
Do not read, alter or save data while the lift is moving

6.1.2.1 Run lift

Please take note of Chapter *TIPS, TRICKS AND TOUBLESHOOTING*.

6.1.2.2 Fine adjustment of the lift

Please take note of Chapter *TIPS, TRICKS AND TOUBLESHOOTING* and the remarks in Chapter *PARAMETERS AND VARIABLESLIST*.

6.1.2.3 Fault and event memory

This memory records the last 100 trips or approx. 1000 messages. If the events (status) are not to be displayed, then the address 0F06h can be selected beforehand in the menu "Change address": if its content is set to 00255, then only faults will be displayed. All events will be displayed if the setting is 0000. The memory can also be read there from EmoSoftLift and higher.

A RAM memory is used, so please do not disconnect the device from the mains supply (this deletes the memory).

6.1.2.4 Password

All FU-Controls (that means internal and external FU-Controls for system DSV 5445) provide since March 2001 password protection with factory setting “0” (0 = no password required). If the password protection is activated with a numeric input between ±2.000.000.000 the control panel requires this input to modify parameters or variables. Attention: A lost password can only be deleted with the program EmoSoftLift. In this case you can call our hotline for deleting the code addresses.

6.2 Commissioning with EmoSoftLift W95 / W98 / ME / W2000 / NT4 / XP VISTA

The **EmoSoftLift** program is very powerful. You can configure and even program the system both **online** and **offline**.

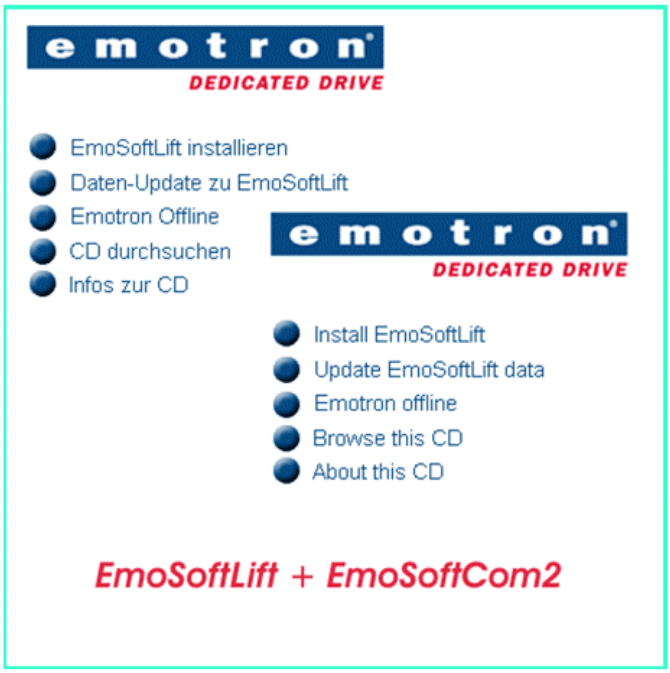
EmoSoftLift needs at least “80486”, 16 MB memory and Windows 95/98/ME or NT4/W2000/XP/VISTA and a special RS232 interface cable shown in Chapter *INTERFACE X4*.

The CNF files or CFG files form the user menu control and are also adaptable if required.

EmoSoftLift also installs several important basic data sets and command programs, which simplify commissioning for you – in the case that they were not loaded already in the factory.

6.2.1 Installation of EmoSoftLift

If you are using an actual EmoSoftLift-CD AUTORUN starts the setup-window. First do the installation and after this the update-function from CD. If the CD is older than 3 months then better do the update using the integrated online-function within EmoSoftLift. If you can not start AUTORUN from here, try to start EmoSoftLift manually from path z:\terminal\EmoSoftLift. 'z' means here the CD-ROM and 'x' the version you want to have. This is also valid for the update from CD with 'DATEN.ZIP' which you have to unzip manually if AUTORUN does not work.

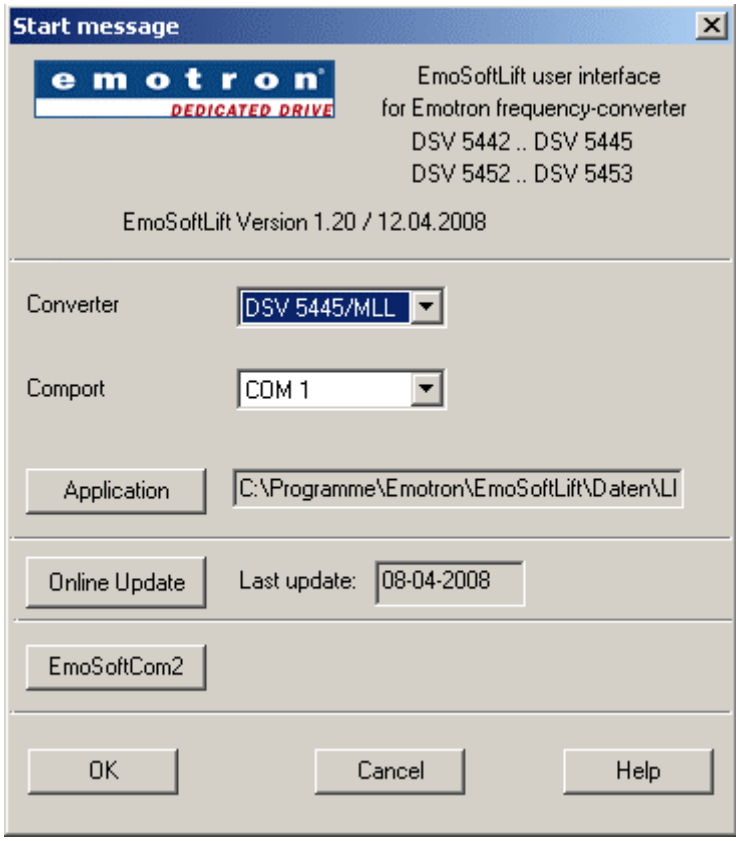


If you are visiting our download website for receiving the actual version of EmoSoftLift you have to register. For this you need a customer number and your email address. Visit our website or try directly click to URL: www.emtron.com go to ‘’downloads’’ ‘’products’’ ‘’variable speed drives Emotron DSV/GSV’’ or the old URL: www.dietz-electronic.de/dowload.htm you will be redirected automatically (only fill out the ‘’registry-form’’) …

You can get the zipped full version of EmoSoftLift (appr. 8MB) from the download site. Try and click 'link' … download zipped file 'EmoSoftLift. After the setup please use the online-update-function of EmoSoftLift for getting additional actual files. If your PC/laptop has no connection to the Internet please try to get at least the file DATEN.ZIP and unzip it to the EmoSoftLift-folder DATEN. You only need the full version if you have installed a EmoSoftLift version lower than 1.16 resp. Your PC/laptop has no connection to the Internet. Otherwise the new online-update-function completes EmoSoftLift.

6.2.2 EmoSoftLift start message

The following start message appears after starting the program:



6.2.2.1 Select converter

Select the converter type in the converter window. "DSV 5445/MLL" for your lift device.

6.2.2.2 ComPort interface

Select the correct COM X for your PC/laptop! COM1 is standard.

6.2.2.3 Application

The selection of the application inserts or ignores parameters and variables in the parameter record appropriate to the application and defines setting limits. Only the applications German **lift_d / lift1sx**, English **lift_e / lift3sx**, French **"Lift_f"**, Portuguese **"Lift_p"** are suitable for many standard cable lifts.

Select **"Beringer"** for the analogue set point specification for Bucher AG (Beringer) hydraulic lift systems.

Other application files are purely customer-specific and are required only after consultation.

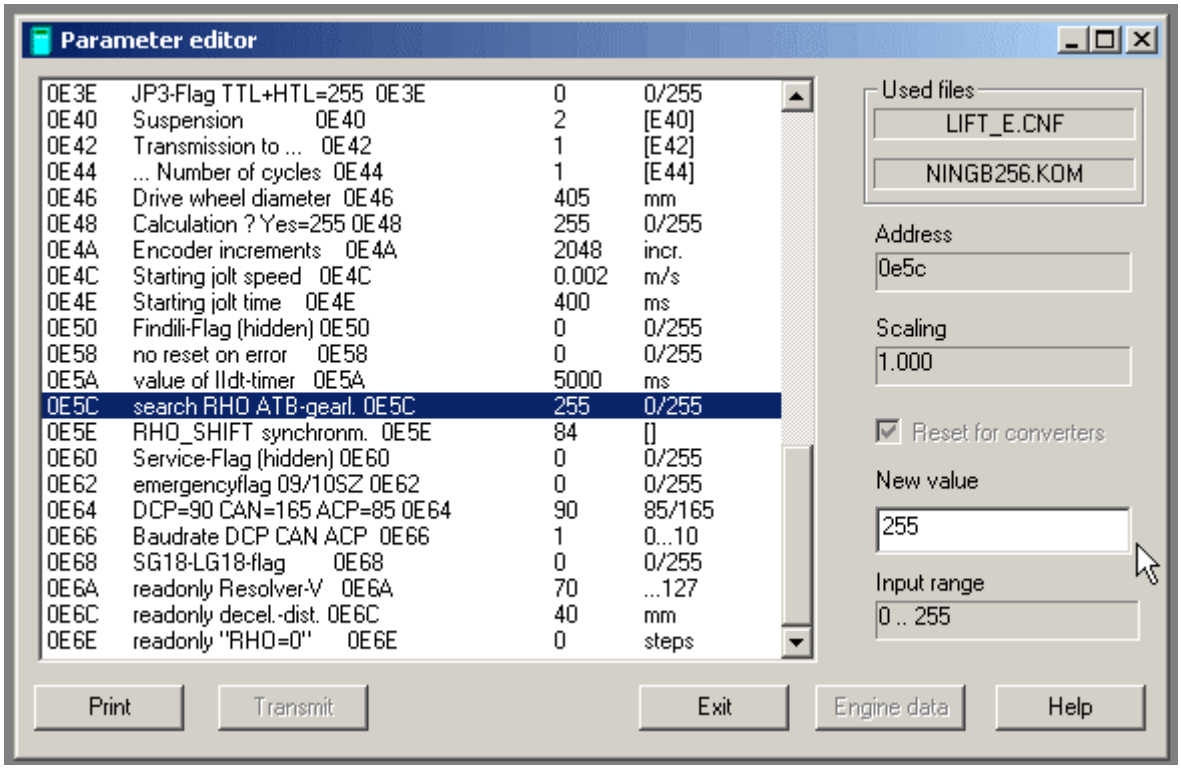
6.2.2.4 Online update

If using EmoSoftLift on a PC/laptop connected to the Internet press the button “Online Update”. After a short initialisation press “Start” to run the update. The subdirectories e.g. DATEN, HTML, AUDZ, … can be copied to other PCs/laptops for updating them.

6.2.2.5 Help

Use the help function.

6.2.3 EmoSoftLift Parameter-Editor and Online Help



Ensure that your system is set to "return" so that no drive commands are initiated while you change data in the DSV.

6.2.3.1 Changing data in the DSV

The most important function is "Edit parameter of converter" in the menu “Parameter”. After the read-out of the data in the DSV you can change any given parameters or variables. Pressing the button “Send” starts the transmission of all parameters and variables back to the DSV. A RESET is necessary for storing the data in its EEPROM and validate them. The parameters F0 rotor flux and t rotor time constant can be evaluated automatically by using the function “Motor data”. This function is only appropriate for 2 – 6 pole asynchronous motors with 25 – 100Hz. Please check the evaluated values F0 and t by means of the table in Chapter *EXPLANATIONS TO THE PARAMETERS*.

6.2.3.2 Backup of parameters and variables

To perform a "data backup" of the DSV use the function “File – complete read-out from DSV to PC” (Tip: Enter the project or controller number as the file name like 12345, then you later have a clear relation between the data status and the hardware on site). The backup file you can find in the subdirectory “Daten” (factory setting) or in the assigned path e.g. 12345.KOM. The file ending “.KOM” is attached automatically.

6.2.3.3 Transmission of parameters and variables to DSV

For transmission of the selected file from PC/laptop to the DSV use the function “File – Complete transfer from PC to DSV”. In the select window you can find all files ending *.KOM resp. *.UPD. Files ending .KOM are prepared with complete settings incl. parameters/variables.

Files ending .UPD include no or not all parameters/variables; that is why *.UPD files are capable for update only.

6.2.3.4 Actual value curve

A very useful function is the "actual value curve" setting. In the default, the drive curve is displayed in the upper diagram and the torque in the lower diagram. The drive runs correctly when the lower curve does not approach a positive or negative limit. It should form a "peak" in the acceleration phase, which continues at a constant level (in the course of the constant travel). A "valley" should then follow during the braking phase, which then finishes at the zero line at the end of the run. Extreme peaks or collapses should not be visible. The run curve must proceed "smoothly" in the upper diagram.

6.2.3.5 Terminal

Online checks of the run progress can be performed with the "Terminal" function. The sequence of the typical "(…)" messages provide information, for example, on whether the controller is sending the correct signal sequence to the converter.

6.2.3.6 Fault memory

A further diagnosis facility is provided by the "Read error memory" function. Using the factory settings the error messages are displayed here combined with all events and status messages.

6.2.4 Hints for using the program EmoSoftLift

6.2.4.1 “Save as”

The menu item “Save as” is only suitable for administrating one file. After you have edit your file, you can rename it using the menu item “Save as”. In addition you have to close the open window to store the file proper.

6.2.4.2 Program functions

EmoSoftLift contains further tools for programming and changing the whole software of the DSV. This functions should only be used by experienced users. Before proceeding one of this functions store the command program by using the function “Complete read-out from DSV to PC”.

After each alteration of the software you have to do a proper commissioning of the DSV with the suitable tests. Erroneous programming can cause unpredictable behaviour of the system and as a result of this there may be the risk of serious injury and material damage.

7 Lift programs, firmware

7.1 Firmware TUDY..., TUDX… (asyn. gearbox-lift) and TUDZ... (syn. gearless-lift)

The lift software (i.e. the 'command programs *.KOM') in the DSV 5444/5445-Lift equipment depends upon the firmware and the version of control-board that is being employed (*'40 MHz'-TUDY or '50 MHz'-TUDX or '50 MHz'-TUDZ*). All standard winches with asynchronous motors and gearboxes normally use the version TUD**Y**xxN or TUD**X**xxN, all gearless drives and synchronous motors use the *'50 MHz'* version TUD**Z**xxN …

7.1.1 Application and function of the firmware

Firmware	Application Function
AUDYxxN (40MHz)	EPROM's have been used up to 2002-05-31 for the *'40 MHz'*-device and support all normal gear winches with asynchronous motors.
TUDYxxN 40MHz	EPROM's are in use since 2002-06-01 for the *'40 MHz'*-device and support all normal gear winches with asynchronous motors. The difference to 'AUDYxxN' is the evaluation of the output 'A0'. With command programs from (EmoSoftLift the new parameter 'F29' determines, if the output 'A0' will have either the known function 'control on' (F29=242) or the output 'A0' controls the motor contactors (F29=3862). With this new function the regard of the contactors over travel time of the control is unnecessary, because 'A0' is switching the drive contactors always current less on or off.
TUDXxxN 50MHz	EPROM's from 2009 witha 50-MHz-board – but for applications with gearbox-winsches – have the same settings like units with 40-MHz-boards. The reason for changing is the higher needed calculation-power using for example the 'DCP_04-lift-bus-sytsem' here.
AUDZxxN 50MHz	EPROM's have been used up to 2002-05-31 for the *'50 MHz'*-device and support all gearless winches with synchronous and asynchronous motors and synchronous motors with epicyclic gear as well.
TUDZxxN 50MHz	EPROM's are in use since 2002-06-01 for the *'50 MHz'*-device and support all gearless winches with synchronous and asynchronous motors and synchronous motors with epicyclical gear as well. The difference to 'AUDZxxN' is the evaluation of the output 'A0'. With command programs from EmoSoftLift the new parameter 'F29' determines, if the output 'A0' will have either the known function 'control on' (F29=242) or the output 'A0' controls the motor contactors (F29=3862). With this new function the regard of the contactors over travel time of the control is unnecessary, because 'A0' is switching the drive contactors always current less on or off.

7.1.2 Firmware TUDY..., TUDX..., TUDZ..., AU..., with command program (*.KOM)

The software was formerly based on the connection variants '3SZ', '7SZ', '9SZ', '10SZ', and special customised variants. After June 2002, new features are provided only in the '7TZ' based programs (e.g. the switchover facility for output 'A0', or also in the '10SZ'-based bus-versions.

7.1.3 Important master programs (factory setting)

The following master programs are provided:

- **LIFT7SZ.KOM/LIFT7SZ.UPD** receive date 2003-05-24, supports all '40 MHz' devices after the MNo. 193000 (AUDYxxN and TUDYxxN) in the DSV 544x-Lift series. It always suffices for all 'normal' geared winches (e.g. worm). The assignments list corresponds to Figure '7SZ' in the instructions. LIFT7SZ.KOM (or the update file LIFT7SZ.UPD) after 2002-05-23, 'default' is present on the old function with respect to output 'A0'. After MNo. 217000 (TUDYxxN), a switchover can now also be made to the new function. If parameter 'F29' is switched over on older firmware, output 'A0' does not function (it always remains 'low' in association with 'AUDYxxN'. 'Quick menu' (internal FU-Control after March 2002) or LIFT_E.CNF ('Default' application of EmoSoftLift) suffices for the setting of systems under LIFT7SZ.KOM. Emergency evacuation (input 'E1') is supported.

- **xxxxx7TZ.KOM/xxxxx7TZ.UPD** receives date 2007-10-29, supports all '40 MHz' devices after the MNo.: 193000 (AUDYxxN and TUDYxxN) and also new ’50 MHz’-boards (working with TUDXxxN) in the DSV 544x-Lift series. It is recommended for all higher quality geared winches. Such winches include all epicyclical gears or hypoid gears with asynchronous motors and belt gears and worms with higher gear ratios (all gears with high efficiencies). Separate I-gains (as with gearless drives) are possible here in contrast to LIFT7SZ.KOM/LIFT7SZ.UPD, which considerably improves running comfort during 'start' and 'stopping'. The assignments and functions otherwise correspond to older LIFT7SZ. The new function of the 'A0'signal is set in the factory for TUDYxxN in this case (if used under AUDYxxN, then you must reset the 'F29' parameter back to '242' so that 'A0' functions 'normally' again.

- Master programs for **asynchronous gearless or synchronous motors** ('50 MHz' devices) are all customised. Such lift programs include, for example, GAF58NEU.KOM/GAF58NEU.UPD (a factory setting for asynchronous gearless Type 'Klose'), GAxx2567.KOM/GAxx2567.UPD (factory settings for all Blocher gearless), SMxxx7TZ.KOM (factory settings for Ziehl-Abegg gearless), WSGxxxxx.KOM (factory setting for Wittur-SAD gearless winches), EPM7-xxx.KOM (factory setting for Alpha synchronous motors), and still for NINGB256.KOM/NINGB256.UPD (factory setting for Ningbo Motors China). All of these files have '7**T**Z' assignments, whereby the high interpolation (typically 256 x 4 x 2048 = 2097152), needed for gearless technology, is provided by the '50 MHz' firmware.
  If the attachment DCP, ACP or 10SZ is used in the program name, (e.g. NINGBDCP…. or GAF58DCP….), then the '10SZ' assignments are valid (a gearless drive with a bus system, e.g. DCP_01, etc. is being used.). Gearless drives are normally pre-set; you should contact us before changing certain parameters. Only speed, ramps and, in some cases, gains 'k' and 'F7' (see parameter list) are normally to be changed. Please pay attention with respect to synchronous motors that 'primary initialisations' may need to be performed to determine the rotor position 'E6E'. The 'first steps' for synchronous motors will be explained later (see PowerPoint-animation or mpeg-video of your EmoSoftLift-CD).

- **List of all factory-settings:** For most winches we provide ’ready-tuned’ programs. Over internet or in the root of our customer-CD you will find the file **’gearlist.htm’** and/or **’gearlist.pdf’**, which is very helpful to decide for correct files for your application. For more details please contact us direct.

7.2 Current firmware

The employed firmware can be determined from the following list.

7.2.1 40 MHz – TUDYxxN or 50 MHz - TUDXxxN for all standard lift-winches

Serie = 30 ≡ TUDYX3N/XX3N for DSV 544x-Typen with 16A, 20A, 40A, 120A, 150A, 200A
Serie = 40 ≡ TUDY04N/X04N for DSV 544x-Typen with 5A, 9.2A, 10A, 60A, 80A, 250A
Serie = 43 ≡ TUDYX4N/XX4N for DSV 544x-Typen with 30A, 60A, 150A (old)
Serie = 48 ≡ TUDY05N/X05N for DSV 544x-Typen with 15A, 70A

7.2.2 50 MHz – TUDZxxN - Reglerkarte for all gearless- or 'Alpha'-winches

Serie = 30 ≡ TUDZX3N for DSV 544x-Typen with 20A (old), 150A, 200A
Serie = 40 ≡ TUDZ04N for DSV 544x-Typen with 5A, 10A, 60A (old), 80A (old), 250A
Serie = 43 ≡ TUDZX4N for DSV 544x-Typen with 30A, 150A (old)
Serie = 48 ≡ TUDZ05N for DSV 544x-Typen with 15A, 20A
Serie = 60 ≡ TUDZ06N for DSV 544x-Typen with 40A, 60A, 120A
Serie = 70 ≡ TUDZ07N for DSV 544x-Typen with 70A, 80A

An exchange of firmware EPROM's may be made only after consultation with our factory, since "incorrect" versions can lead to functional faults.
The firmware, delivery state, is recorded on the rating plate.

7.2.3 Old device series (20 MHz – DSV 5444 or 20 MHz – DSV 5442)

Please contact our headquarters for the upgrade of older frequency converters for lift systems. "UPD" files may be available for old devices on the basis of "3SZ" and "7SZ".

7.3 Selection of special lift program versions

7.3.1 Command programs

All programs that are loaded into the converter are known as command programs. They have the ending .KOM. These programs reset any parameters and variables already modified to the factory settings. (You must check all parameters and variables after loading a .KOM program and adapt them to your lift system as applicable).

7.3.2 Update programs

Update programs are all programs with the ending .UPD. The customer parameters are not changed when these programs are loaded into the converter. (Previous variables and parameters must not be re-entered, however check the new variables added by the update). The function "Transmit program only" can be employed under EmoSoftLift instead of using UPD files. New variables/parameters, you can find in the parameters and variables list, then need values that are still plausible.

Which .UPD files must one load under which conditions (only for **TUDYxxN/TUDXxxN** standard lift)?

Program name	**e.g. suitable for controllers manufactured by:**
*3**.KOM/UPD	Böhnke+Partner, Osma, High-Content, certain old relay controllers. not for new development; updates and div. functions are not available.
***7**.KOM/UPD**	Kollmorgen, Liftronic, Schneider, NewLift, Wittur, Schmitt&Sohn and other types (typical standard setting, also runs with High-Content and Böhnke+Partner).
*9**.KOM/UPD	International version (separate UP/DOWN signal), otherwise upwards compatible to "7SZ", updates and div. functions are not available.
*10**.KOM/UPD ****D.KOM/UPD ****A.KOM/UPD	DCP/ACP-bus version, e.g. for Böhnke+Partner, AS, NewLift, Kollmorgen.

Following updates are currently available (only 20...40 MHz – standard lift).

UPD file:	**Recommended state**	**Suitable for:**	**Remarks**
7SZ 5442.UPD	From 29.03.2000	System 5442-Lift	old
3SZ 5442.UPD	From 29.03.2000	" " "	old
7SZ 5444.UPD	From 29.03.2000	System 5444-Lift up to MNo. 192999	old
3SZ 5444.UPD	From 29.03.2000	" " "	old
LIFT7SZ.UPD	From 24.05.2003	System 5444+5445 Lift from MNo. 193000	Standard-Liftprogr.
LIFT7TZ.UPD	From 29.10.2007	System 5444+5445 Lift from MNo. 217215	Profi-Liftprogramm
CHINA7TZ.UPD	From 15.10.2008	System 5444+5445 Lift from MNo. 217215	Premium-Liftprogr.
LIFT3SZ.UPD	From 06.12.2003	" " "	old
LIFT9SZ.UPD	From 31.01.2002	" " "	old
ACP-DCP.UPD	From 30.01.2008	" " " from MNo. 205000	Standard-DCP/ACP

The advantage of the updates lies, for example, in the fact that older systems such as DSV 5442/5444 can be operated with DSV 5445 interactive control or prompts.
The updates for DSV 5442 and the older DSV 5444 devices assume that these systems have already been configured with the aid of the original program, i.e. are already running.

What is to be considered with older 40 – 50 MHz board:

UPD-files for 50MHz devices (gearless winches and EPM from Alpha only) are partly available now.
If you wish to update your system without a present UPD-file use the function “Complete transfer...” and the respective KOM-file. After this you have to accommodate the settings according to the settings of the old values of your lift system. Use for new parameters/variables the factory settings.

8 Overview parameters and variables

8.1 Parameters and variables list

Adr.	Parameter FU-Control		Remarks	TUDY/X	TUDZ
F0	**F0 rotor flux (<31=synch)**	P	See lift instructions ① (explanation of parameters). Values 25-30 are reserved for synchronous motors, therefore never set in association with asynchronous motors! "f0" determines the motor current during "encoder less" operation (only intended for emergency operation). The value is then typically 1200 and service flag E60 is 255. The value range for 'rotor flux' is: 25 - 2500	**225...500** for 'new' motors or **500...750** for 'old' motors	**650** for asynchr. or **25...30** for synchron gearless
F1	**Rated speed typ. 380V**	P	Speed motor rating plate (relative to 400 V), e.g. 1450 (4-pole motor), 960 (6-pole), 700 (8-pole) also pay attention to the Hz-value! This value is calculated automatically here for synchronous motors. Value range typically 25 -4495/min	**1450**	**95**
F2	**Synchronous speed 380V**	P	Motor synchronous speed 1500 (4-pole motor), 1000 (6-pole), 750 (8-pole) pay attention here to the Hz-value! The value is calculated automatically here for synchronous motors.	**1500**	**100**
F3	**P-part stop and hold**	P	P holding gain (position control) is the holding force at standstill that prevents reverse rotation up to closing the brake. The value lies between 12 and up to 400.	**12**	**20**
F6	**I-part start to end**	P	I-gain in the position controller; the larger the value, the softer the start transition (travel with "f26"). It is recommended for '50 MHz' programs that this value is set to the same value as '**I-gain stopped' (i.e. variable E1C).**	**8**	**10**
F7	**P-part start to end**	P	P-gain in the position controller; as high as possible. Drive may however not "hum" during starting. The P-value should always be set before I-values. The value can lie below 100 for gearless, but for 'normal' motors, it should be at least 200. Typical values lie between 300 and 1200.	**600**	**200**
F9	load-sensing-factor	P	Monitoring parameter (read only) Only for LIFT7TZ with analogue setpoint setting.	514	514
F10	Standardization of speed	P	These parameters need not be observed if the variable 0E48 is set at 255. The data is revealed to check for number overflows. If, for example, F10 suddenly jumps from 5-digit to 4-digit, the drive wheel has been specified too large. In this case, change ratio or suspension until a drive wheel diameter matches without number overflow. This could also be happened in using a suspension 4:1.	2001	20010
F21	Standardization of distance	P		800	400
F22	Speed adjustage (read only)	P		6994	13988

Adr.	Parameter FU-Control		Remarks	TUDY/X	TUDZ
F23	encoder factor setup	P	These cells are only for diagnostic purposes. 'F23' is for '40 MHz' normally encoder pulses / 4, or for the '50 MHz' version encoder pulses 4. In the case of older lift programs below '50 MHz', 'F23' = encoder pulses per revolution. A new calculation can be performed with parameter 'F24' = 1 in the event of 'parameter error' after setting with help of 'FU-Control' (the 'error' is then possibly corrected).	256	8192
F24	switch to F23-default	P		2	2
F25	**show firmeware**	P	0 = shows firmware-typ after 'reset' and 'b3<cr>;<cr>'	**1**	**1**
F26	**stop distance to floor**	P	Stopping distance after level magnet/zone. This value must be adjusted to the level values in the lift controller. Value range: 0 - 250 mm	**65** 40 for LISA	**20**
F29	**A0-old=242 A0-new=3862**	P	Selection possible only in association with TUDYxxN, TUDXxxN, TUDZxxN (with AUDYxxN or AUDZxxN firmware, only 'F29' = '242' may be selected, otherwise output 'A0' will not function). With devices with MNo. 217000 and higher with command programs after 22.05.2002, one can decide whether 'A0' only displays 'Controller running' as in the past, or can be employed as a signal to switch the motor contactors correctly ('F29' must be equal to '3862' in this case). This ensures compatibility with several competitors).	**3862** 242 Schmitt + Sohn, Findili	**3862**
F30	PWM Adjustment fine	P	**This value may not be changed without consultation with the factory.** The PWM is already matched to the motors. SM225 winches run, for example with 15 kHz (F30 = 85).- Very large asynchronous gearless sometimes only with 2.5 kHz, since an internal jumper furthermore controls the range 10 kHz - 20 kHz, a readjustment of the 'F30' parameter can possibly lead to unexpected results and damage to the drive or converter caused by overheating.	**124**	**124**
F31	**Number of poles**	P	Rating plate or manufacturer's specification. ($F31=120 \times f_n/n_n$, round the calculated number to the next even whole number)Value range: 2 – 128.	**4...8**	**8...128**
I	**I-part run (normal)**	P	I-gain in speed controller during normal running; the higher the value, the smoother the running. Start value = '40'. Please take note that this parameter is used only with the basic programs for 'normal' geared systems (e.g. with LIFT7SZ.KOM), while all other programs, especially those for '50 MHz', use the value for constant run from the variable '0E1E'! The programs for high quality drives exchange the parameter 'I' during starting with '0E1C' and during the run with '0E1E' and switch back to '0E1C' only with the threshold '0E12'. This 'adaptive switchover of the I-gains' is needed only to perform the 'virtual load measurement'.	**8**	**40**
K	**P-part speed run**	P	P-gain in the speed controller during normal running. Start value: see F7, value range: 50 – 4000 possible	**600**	**200**
t	**Rotor time constant**	P	See lift instructions (explanation of parameters). Old motors between 40 and 250, in new systems 125 … 600, value range: 25 – 1000, start value is '250' for 'TUDY/X' or '600' for 'TUDZ' with new motors. The start value is '50' for old motors (only '40 MHz').	**275** (50 is recommended for old motors)	**600** (the value moves from 300-900)

Adr.	Variable in FU-Control		Remarks	TUDY/X	TUDZ
B30	password low	V	Attention: Changing the value blocks the program / FUC!	0	0
B32	password high	V	Attention: Changing the value blocks the program / FUC!	0	0
B34	**version of program**	V	TUDY / Z...capable software has an index of min. 60!	**min. 60**	**min. 65**
B36	**actually overload**	V	Diagnostic cell to determine the cabin loading in %.	**0...100**	**0...100**
D2A	set point torque load	V	Diagnostic 's-value: See LAST7TZ.TXT / HTM for explanation	0...2500	0...2500
D2C	actual torque load	V	Diagnostic 's-value: See LAST7TZ.TXT / HTM for explanation	0...2500	0...2500
D2E	maximum torque load	V	Diagnostic 's-value: See LAST7TZ.TXT / HTM for explanation	max. 3473	max. 4048
E00	**Vi Inspection run**	V	Enter speed in m/s, see E2 (FU-Control in mm/s) Value range: 0.0010 - 1.0000	**0.30**	**0.30**
E02	**V3 Fast stage**	V	Enter speed in m/s, see E3 (FU-Control in mm/s) Only for LIFT7TZ with analogue setpoint setting. Scales analogue setpoint 10V = V3 Value range: 0.3000 - 6.0000	**0.990**	**1.60**
E04	**V2 Intermediate. stage**	V	Enter speed in m/s, see E4 (FU-Control in mm/s) Value range: 0.1000 - 5.0000	**0.750**	**0.80**
E06	**V1 Low stage**	V	Enter speed in m/s, see E5 (FU-Control in mm/s) Value range: 0.0100 - 4.0000	**0.50**	**0.60**
E08	**Ve drive-in stage**	V	Enter speed in m/s, see E6 (FU-Control in mm/s) Value range: 0.0050 - 0.5000	**0.05**	**0.025**
E0A	**Vn adjust stage**	V	Enter speed in m/s, see E7 (FU-Control in mm/s) Value range: 0.0010 - 0.2000	**0.010**	**0.002**
E0C	**Direction of rotation**	V	For E0C = 0 ➔ 24 V-level = UP and 0 V-level = DOWN. For E0C = 255 ➔ 24 V-level = UP and 24 V-level = DOWN. **For DCP-10SZ, ACP variants and LIFT9SZ always leave at 255** (a fixed choice of direction is permanently possible there using 'low'=0V or 'high'=24V at input 'E8').	**255**	**255**
E0E	max. acc. of vi		Linear section of the ramp during inspection-mode (fixed in the factory).	30	30
E10	Linear ramp normalst.		Linear section of the ramp during emergency (fixed in the factory).	20	200
E12	**Start clearance run**	V	If speed is less than the set value (m/s), then output A1 is set. At speeds less than the set value, the lift will stop at the next levelling pulse (only LIFT7SZ/TZ). (FU-Control in mm/s), value range: 0.003 - 7.000. Remark: Cell 0E12 controls the switchover point from 'I-gain stop' (0E1C) and the 'I-gain run new' (0E1E) for virtual load measurement for gearless/EPM. It is only permitted with gearless to set 0E12 smaller than 'Ve' (prevents I-switchback to value 0E1C).	**0.70** Value serves here to mask the level signal only with older prog. LIFT7SZ, 3SZ, 9SZ and 10SZ	**0.20** Value serves the switch-back to the I-gain at stop. For older DCP-progr.: 0.50

Adr.	Variable in FU-Control		Remarks	TUDY/X	TUDZ
E14	**Open door at V lower**	V	If the speed is less than the set value (m/s), then output A2 is set. At speeds less than the set value, following lift function is enabled: "Early opening doors". Remark: 0E14 takes over the switchover of the I-gain described under 0E12 for technical reasons with DCP under 50 MHz (Reason: 0E12 may not be below 0.5 m/s under DCP). Value range: 0.003 - 3.000	**0.30**	**0.30** (Function E12 and E14 is exchanged with older DCP: 0,020)
E16	**Excess speed**	V	If the speed is less than the set value (m/s), then output A3 is set. V3 must be smaller than E16; the standard setting 1.05 x V3 = value for 0E16 is recommended in association with flag set for pointed arch (0E1A) (fine adjustment of long run to one-floor run is made here using the value of 0E16). Value range: 0.300 - 8.000 m/s (FUC=300...8000 mm/s) Reaching the over speed does not lead to an automatic fault shut-down (A3 changes to low); if this is required, A3 must be used as the supply voltage for the generation of the ISP and/or E0 signals. A3 then switches the DSV off (brake engagement).	**1.050** approx. 1.05 x 'V3' using new TUD-Firmware, ca. 1.15 x 'V3' using old AUD-Firmware	**1.68** approx. 1.05 x 'V3' using new TUD-Firmware, ca. 1.15 x 'V3' using old AUD-Firmware
E18	**Return Ramp B**	V	The greater the value, the softer and longer the braking distance. Special case "0" ➔ B = HL see point ② in normal lift instructions, value range: 0 – 1000. Remark: At 50 MHz, approx. the factor 10 is included in the value of the ramp (Reason: The resolution is better).	**45**	**200**
E1A	**Pointed arch ok=255**	V	The pointed arch function is activated by the value 0E1A='255'. Only V3 is used for driving (V1, V2 no longer make a pointed arch as from 22.05.2002 and can therefore be used separately, since only V3 performs a pointed arch drive). In connection with 0E02 (V3) and 0E16 (over speed)! Note: Using ACP/DCP_03 this value should be '0', for DCP_04 value of 0E1A must be set to 255 all time.	**0**	**0**
E1C	**I-part stop and hold**	V	The I-part stop and hold prevents reverse rotation during brake is opening. Effective within the speed threshold 0E12 and at standstill, start value: 8 Value range: 2 - 400	**8**	**8**
E1E	**I-part run**	V	I-part run replaces function of parameter I (I-gain normal running)! Start value: 40, value range: 2 – 400, variable	**40**	**80**
E20	**Ramp gradient**	V	Discrease if having elevators with velocities more than 2m/s in use. default value = 200; see also ② in standard lift manual Value range:: 10 – 1000 Only for LIFT7TZ with analogue setpoint setting. Restricts the maximum ramp at analogue setpoint.	**200**	**200**
E22	**Run-up ramp HL**	V	The larger the value, the softer and longer the acceleration; see also point ② in instructions. Value range: 10 – 1000 (as for brake ramp 'B') Remark: At 50 MHz, approx. the factor 10 is included in the value of the ramp (reason: resolution is better here).	**45**	**300**

Adr.	Variable in FU-Control		Remarks	TUDY/X	TUDZ
E24	**Braking delay**	V	Time after stopping V = 0 m/s, the motor continues to be magnetised until the brake has closed mechanically, value range: 1 - 4000 ms	**500**	**250**
E26	**OFF delay**	V	Delay time for signals A0 and A7 for motor demagnetisation before motor contactors are open. Value range: 1 - 4000 ms	**125**	**125**
E28	**Start delay**	V	Time between the mechanical opening of the brake and start up. Value range: 1 - 4000 ms, use the smallest possible value for this with gearless, but do not drive against the brake.	**250**	**125**
E2A	**preselection overload**	V	This function depends on the actually program-version. Please ask us for details. For example in 40-MHz this adjust UPS/battery –current (using input E1)	**100**	**60**
E2C	load-sensing-offset	V	Adjusts analogue setpoint only in +/-10V mode	0	0
E2E	load-sensing hyst.	V	Mask-out of interferences regarding 0V-zone (5mV=1)	3	0
E3C	**Schmitt flag /digital flag**	V	Determines the mode (digital=255 or analogue=0)	**255**	**255**
E3E	**JP3 flag TTL+HTL=255**	V	Set encoder type (sinusoidal = 0, **TTL or HTL = 255**)	**0**	**0**
E40	**Suspension**	V	Number of pulleys, 1 for 1:1, 2 for 2:1 Value range: 1 - 4	**1**	**2**
E42	**Transmission to ...**	V	Gear translation ration according to gear rating plate information. Enter "1" for gearless, in the typical factory setting, means, e.g. 54 : 4 = 18.88 : 1 (translation ratios can only be represented by a fraction in the DSV system). Value range: 1 - 500 (or 1 - 10).	**37**	**1**
E44	**... Number of cycles**	V		**1**	**1**
E46	**Drive wheel diameter**	V	Effective drive wheel diameter in 'mm'. Value range: 25 -1.000 mm (for gearless max. 625)	**600**	**400**
E48	**Calculation? Yes=255**	**V**	Yes = 255, no = 0. If 255 is entered here, then parameters F10, F21 and F22 are calculated automatically and thus also the travelling speed and approach from your system data. E48 = '255' is urgently recommended. (Attention: The specification of '0' possibly leads to unexpected speeds and runs!)	**255**	**255**
E4A	**Encoder increments**	V	Set encoder pulses per revolution (see also variable 0E3E), following are permitted: 500, 1024, 2048, 2500, 4096 pulses for '40 MHz' and 1024 and 2048 for '50 MHz' encoder PPRs. FU-Control: Entry of 2500, 4096 can cause a "Parameter error" fault. In this case, please set parameter F24 from 2 to 1 and save.	**1024**	**2048**
E4C	**Starting jerk speed**	V	Starting jerk speed to overcome the static friction during start. The speed is dependent upon the selected starting jerk time. A long time requires also a higher value of 0E4C. TTL encodes sometimes possess insufficient resolution; set a higher speed, e.g. min. 0.005 m/s, value range : 0.001 - 0.020m/s (gearless under 0.001).	**0.003**	**0.001**

Adr.	Variable in FU-Control		Remarks	TUDY/X	TUDZ
E4E	**Starting jerk time**	V	Time needed to overcome static friction. If rollers are employed, the value can be set below 100 ms. In the case of slide ways, the value can be 1000 ms (with simultaneous back-pack suspension, the time can lie over 1.5 s, whereby the starting jerk speed is then 0.003 to 0.005). Value range typically: 1 - 2500 ms Only for 7TZ-progr. with analogue setpoint setting: Value for tolerance-time for identifying setpoint = 0.	**250**	**125**
E50	**Findili flag / Binary flag**	V	7TZ-based programs with 'index-95' (or higher) could be switched with flag '0E50' from 'normal' input-mode to 'binary' input-mode. Customisation of those lift-programs to STEP controller and similar controls with binary coded specification of speeds and bidirectional signals is only available with firmware ≥ date July '05! Other program- and index-versions have only the older function 'V3=V1+V2', if flag 0E50 is set to '255' ! Newest version of programs selected between 'KEB' or 'CT'-coded binary inputs (0E50h = 255 or set -256)! Firmware > end of 2008 also have the possibility to set the value 0E50 to 15 for half-decimal coded plc's.	**0**	**0**
E52	**speed-filter all**	V	The actual value of the encoder is filtered: E52 = 0 without, 255 medium, -256 high filtering. Control is stiffer at 0, however slight noises occur, depending upon the quality of the encoder signal.	**255**	**255**
E54	**current-filter all**	V	The torque output is filtered: E52 = 0 without, 255 medium, -256 high filtering. Control is stiffer at 0, however loud noises occur, depending upon the quality of the encoder signal.	**255**	**255**
E56	**64_256_switch 50 MHz**	V	Only readable flag: It shows whether multiplication = '256' (255) or '512' (-256) or '64/16' (0)	0	255
E58	**no reset on error**	V	For '0', the inverter is automatically reset after a fault. For '255', it waits with all current faults for a reset. Using firmware TUDYXXX and TUDZXXX from February 05 (M-No. 231500) a choice concerning the fault handling can be made. '20' means: all faults will be reset, except encoder and processor faults (see Chapter 9.2.1)	**20** (new) 255 (old)	**23** (new) 255 (old)
E5A	**value of iidt-timer**	V	Unacceptable high current, incorrect rotating fields and phase angle, and loose encoder lead to a shut-down of the inverter after the time in E5A (I^2dt error has occurred).	**5000**	**2500**
E5C	**search RHO ATB-gearl.**	V	This variable starts the **'first initialisation'** of a new synchronous motor (for example after changing an encoder). Note: Before set this value from '0' to '**255**' be sure to have a 'high'-signal on input 'ISP' (X1 pin 5) and opened the breaks and closed all contactors. For more details see PowerPoint-file on the EmoSoftLift-CD.	**0**	**0**
E5E	**Rho_Shift Synchronm.**	V	**Only important for synchronous motors ('50 MHz')** The angular displacement RHO changes with increasing speed, preset in the factory according to motor type.	**7...21**	**7...84**

Adr.	Variable in FU-Control		Remarks	TUDY/X	TUDZ
E60	**Service flag**	V	Emergency operation without encoder (set F0 at least to 1200). If 0E60 = '255' and jumper 'JP3' is in the middle position (i.e. encoder not present), then the system runs also without encoder. **Attention: The motor current can become very large at low speeds, so that the machine catches fire! A motor temperature monitor must always be active; this function is not possible or permitted with synchronous motors (accident risk).**	**0**	**0**
E62	**Emergencyflag**	V	Can be set with 7TZ, 7SZ, 10SZ, 3SZ , 9SZ versions. ”0” means here that emergency evacuation is active. 7TZ, 7SZ versions also automatically enable the emergency evacuation by means of a 'high' signal at 'E1' (only in decimal-coded-inputmode, not so binary). The status of flag 0E62 is thus irrelevant. The value “0” disables the phase monitoring. The hardware must be prepared for emergency evacuation (terminals 24/25 must be present).	**255**	**255**
E64	**DCP=92/172 ACP=87 CAN=165**	V	Code for selection of ACP/DCP depend from lift-plc: Böhnke: DCP_01 = 90, DCP_03 = 92, DCP_04 = 93 Kollmorg: DCP_03 = 172, DCP_04 = 173 Newlift: ACP_01 = 85, ACP_03 = 87	**92**	**92**
E66	**Baudrate DCP=2 ACP=6**	V	Baudrate for DCP, ACP or other bus-system: DCP_01 = 1, DCP_03 = 2, DCP_04 = 2 ACP_01 = 6, ACP_03 = 6	**2**	**2**
E68	**SG18-LG18-flag**	V	7tz-based programs using TUDY/TUDX-firmware: When 0, all status infos are stored in the fault memory, when 255, only the error messages. Newer gearless-files for TUDZ don’t use this value in 0E68. **Note: Using DCP_04 this value in variable 0E68 will be used for dead-time of absolute-encoder-signal! The value-range is 50 to 250 (typ. is ’60’) !**	**255**	**255**
E6A	**read only Resolver_V**	V	Resolver voltage value 85 = 6.3 V (min. 70 to max. 90 are in this case correct for the EPM series from Alpha-Wittenstein)	**85**	**85**
E6C	**read only decel.-dist.**	V	Braking distance for direct approach after gear-down point in mm; this parameter can only be read (value serves to entry of the gear-down distance in the controller and is determined only when variable 0E1A is set to 255). When 0E1A is set to 0, the value from parameter F26 appears here (levelling distance)!	**2500** (read-only)	**2500** (read-only)
E6E	**read only RHO-0**	V	Angular displacement of the synchronous motor (normally set to 0). This value may not be readjusted arbitrarily. Please pay attention to Chapters 10.2, 10.3 et seqq.	**0**	**0**

Important: The parameter 't' for asynchronous gearless-motors under 'TUDZxxN' is twice as high as shown in the commissioning table. For synchronous gearless-motors ‘t' is constant and F0 specifies the type of motor; because of this you must not change F0 randomly. Don’t change t / F0.

8.2 Explanations of parameters

8.2.1 F0 Rotor flux

Rotor flux "F0" is responsible for the no-load current (field) of an asynchronous motor. We recommend the use of the values in the tables and/or the project related settings. If the flux is too large, the motor heats up unnecessarily, while if the flux is too small, the starting torque is reduced. The flux serves the coding of the motor in the case of synchronous motors (do not change the setting under any circumstances). One sets the maximum necessary current is set with "F0" in "encoder-free" mode (the values are then normally 4-digit in this case).

8.2.2 t rotor time constant

The rotor time constant "t" is responsible for the motor torque (rotor). It is dependent upon the motor cos φ. If cos φ is poor, then "t" is also small. If the value of "t" is too large, torque losses occur. Values that are too small lead to oscillations in the acceleration range. Use the values in the table and/or any preset project values. The exact value for the motor-specific parameter "t" can also be obtained from the motor manufacturer. Attention: The double table value must be entered for asynchronous-gearless ("New motor" line), e.g. "Klose" 18.5 kW has t=600 at F0-500 !

8.2.3 Adjustment of parameters "F0" and "t" dependent upon the installed motor

DSV 5445 - x / 400	**010**			**16**			**20**			**30**		
Motor power [kW]	3.0	4.0	5.0	4.0	5.5	6.5	5.5	7.5	8.5	9.0	11.0	15.0
Rotor flux "F0"	400	600	750	400	500	600	350	450	700	450	550	650
Rotor time constant "t"												
New motor	200	225	230	225	230	245	240	250	260	270	275	280
Old motor	50	75	80	75	85	95	90	100	110	120	125	130

DSV 5445 - x / 400	**40**			**40-70**			**60**			**80**		
Motor power [kW]	15.5	18.5	21.2	18.5	22.0	25.0	22.0	27.0	29.5	30.0	37.0	45.0
Rotor flux "F0"	400	500	600	400	500	600	400	500	600	425	475	550
Rotor time constant "t"												
New motor	290	300	310	300	310	320	310	325	330	340	350	360
Old motor	140	150	160	150	170	175	170	175	180	190	200	220

DSV 5445 - x / 400	**120**			**150**			**200**			**250**		
Motor power [kW]	45.0	55.0	65.0	75.0			90.0	110		132		
Rotor flux "F0"	400	450	500	400			450	500		400		
Rotor time constant "t"												
New motor	375	400	425	450			450	500		550		
Old motor	230	250	275	275			275	300		325		

The above-named values in the tables for "F0" and "t" apply only to asynchronous motors with gearbox (TUDYxxN or TUDXxxN-firmware). Value "t" is doubled for TUDZxxN-firmware using for example 'asynchronous-gearless'. Note: TUD-version is written on DSV-typeplate. All gearless-asynchronous are preset; the values can deviate from the above mentioned table. Only the values set in the factory are valid for synchronous motors; they may not be altered since this removes the winch type code in the converter. See details also chapter *OPERATION OF SYNCHRONOUS-GEARLESS MOTORS…*

8.2.4 Formula to estimate the start values for "F0" and "t"

Formulas for parameters "F0" and "t" for motor powers that are not listed above are:

$$F0 \approx 800x \frac{I_{N\ motor}}{I_{N\ DSV}} \qquad t_{new\ motor} = \frac{kW_{\ motor} \times 17}{\tan\varphi_{\ motor}} + 20 \qquad t_{old\ motor} = \frac{kW_{\ motor} \times 12}{\tan\varphi_{\ motor}} + 20$$

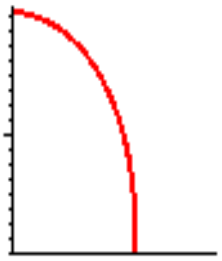
The above formulas for the rotor time constant are rules of thumb, which are applicable up to approx. 22 kW. Exact values can be obtained from your motor manufacturer. Value "t" is doubled for 50 MHz systems (asynchronous-gearless). Using inverters with high-current-resolution (TUDx05N, x06N, x07N), F0 is higher.

8.2.5 Motor characteristics

Motor and equipment design in dependence on the characteristic curve and efficiency

Motor characteristic curves:

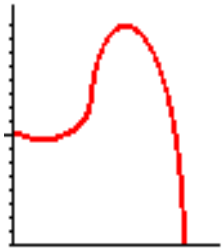
Old motor



Typical curve for an older Silumin motor.

Characteristic factor = 600

New motor



Typical curve of a newer asynchronous motor.

Characteristic factor = 700

$$\text{required maximum current in A} = \frac{\text{load capacity [in kg]} \times v_{max}\ \text{[in m/s]} \times 16\text{As}}{\text{gear efficiency} \times \text{characteristic factor} \times 1\text{kgm} \times \text{pulley efficiency}}$$

$$\text{pulley efficiency} \approx 1\text{-(number of pulleys} \times 0{,}045)$$

Detailed information related to the electrical design can be found in our "Technical Customer Information"

8.2.6 Optimisation of parameters "F0" and "t"

F0 Rotor flux and **t Rotor time constant** can be optimised locally by means of trial runs.
To do this, you need a current tong-test instrument, with which you can determine the minimum motor current. The measurement accuracy is therefore insignificant. The probe should be an "analogue" device.

Presettings, conditions:

- Speed V3 = 50-80 % of the rated speed
- Set the P-gains **F7 and k** to 400-800 (if possible, to 800)
- Set **F0 and t** to the start values; see Chapter: "Adjustment of parameters "F0" and "t" dependent upon the installed motor"
- A run at constant speed over several floors must be possible so that accelerations do not disturb the current measurement
- Constant load during motorised operation

Optimum for t Rotor time constant

- Alter t starting with the start value with +/- 10 % in increments
- The motor current should reduce. If t is too small or too large, it increases again. t is optimal at minimum current.

Optimum for F0 Rotor flux

- Set 't' Rotor time constant to the optimum value that you have determined above.
- Attempt to reduce the motor current further by altering F0 = start value with +/- 10 %.

The optimum is minimum current.

The absolute optimum of both parameters does not necessarily mean the best possible run behaviour. Try small deviations in parameter 't' by approx. (+)/(-) 10 % so that the running behaviour becomes better also during acceleration.

8.2.7 Parameters and variables of the speed and position controller

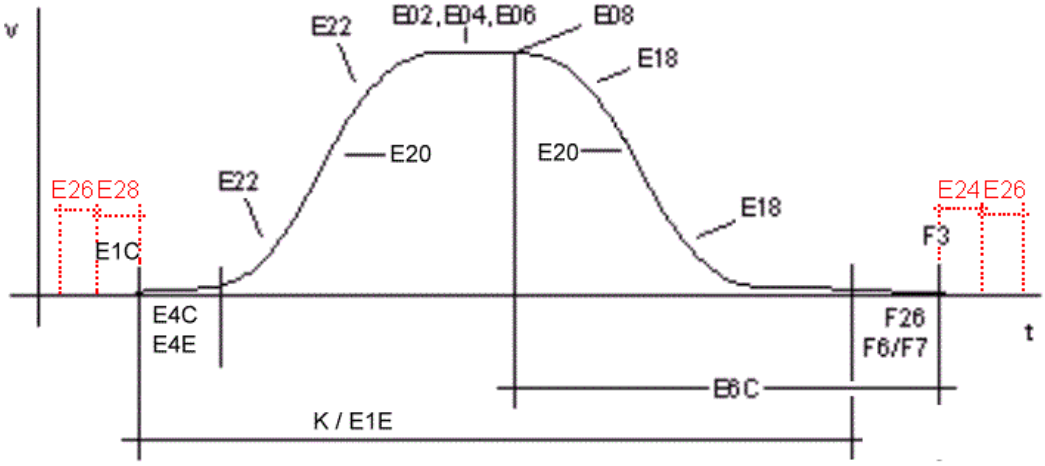
The meaning of the P-part and I-part (the so called divided 'I-part' for increasing of the running comfort at the time of the load change from brake to motor torque and contrary) is shown in the following.

F3	P-part stop and hold	takes effect on standstill at the end of run only (before the drop-out of the brake)
F6	I-part start to end	takes effect only during the distance „F26" (that is in the flush range)
F7	P-part start to end	takes effect only during the distance „F26" (that is in the flush range)
I	I-part run (normal)	takes effect only on LIFT7SZ and "old" command programs during the run
K	P-part speed run	takes effect on all ranges, excepting the flush range (that is „F26")
0E1C	I-part stop and hold	takes effect on standstill resp. after the under-run of the step 0E12
0E1E	I-part run (new)	takes effect during the run above the threshold 0E12

8.2.7.1 Remarks on parameter overview (normal winch, "40MHz" devices)

①
Parameters i, k, F6, F7 are to be set at the maximum value so that: $\frac{k - Anteil}{i - Anteil} < 150$.
Set "E1E" to min. 40 and "k" to min. 600 and run a short distance with "Vn" or "Vi". If the motor does not start to buzz, increase "k" up to 20% below the value that causes the motor to buzz. Adjust "E1C" to a smaller value such that k/E1C<150 is just attained. Transfer "E1E and K" into parameters "F6" and "F7". If the lift does not run smoothly double "E1E". High numerical values for "k" and "F7" cause high P-gains in the DSV. .Low numerical values for "E1C" and "F6" therefore cause harsh integration in the controller.

③ *Recommendation:*
E18 = select a small value at first (e.g. 20), then increase in small steps (see Chapter *Braking distances*).
E20 = Standard value 200
E22 = should be twice as large as E18.
③ Gear translation ratio = 69:2 ➔ to increase the accuracy, 345:10 is also permitted (with epicyclical gears).



8.3 Pointed arch drive

1) The "Pointed arch 0E1A" flag is found in the FU-Control menu and/or in the EmoSoftLift or TER menu mode. If this flag is set, pointed arch is activated. The lift program will behave in the usual manner at "0" (this is the factory setting. But as soon as "255" is entered, a change from, for example, "V3" to "Ve", leads to a "pointed arch drive". The braking distance covered during this is always the same from the gear-down point onwards. This value is stored in cell 0E6C after the first run with "V3" and can then be referred to there. This is very practical for systems with digital integral shaft copy, since one can now read exactly this value for copying (the lift then makes a "direct approach").

2) You set the pointed arch drive with constant braking distance from the gear-down point on your DSV 544-Lift in the following manner (applies also to the so-called direct approach from the gear-down point with subsequent levelling correction INT2):

a) Adjust your lift data, if not already preset, in the usual manner. Enter a value in the variable for the over speed threshold that is 1.15 to 1.20 times the value of drive step "V3" (i.e. a value of 1.85 m/s for threshold 0E16 for a max. drive step of 1.6 m/s).

b) Adjust variable 0E1A (enable pointed arch) to 255 or "true". Drive the lift past several stops with the highest drive step "V3" and adjust a suitable braking behaviour using braking ramp "B" (0E18) (a value of approx. 40 is recommended, giving an approximate braking distance of 2400 mm at 1.6 m/s or 1600 mm at 1 m/s for standard worm gears). You can inspect the braking distance in "mm" in variable 0E6C after a run with "V3". The gear-down point that the lift controller specifies, may not be smaller than the distance in 0E6C, otherwise the lift will overrun or will be halted too sharply during a direct approach (enter a value in the controller that is approx. 5 % larger).

c) Now start a one-floor or short-stop run with "V3" If the pointed arch proceeds correctly, the lift will approach just as cleanly as in the case of a run over several floors. If the lift takes a different non-permitted path between full-speed and one-floor run, then the gear-down point is not coming with sufficient accuracy (system dead-time). The "dead-time" can be adjusted in this case by altering the variable 0E16:
If "Ve" is reached too early during a one-floor run, the over speed value must be increased slightly; if the approach is too short, reduce the value slightly. The DSV system always reaches the stop exactly, thanks to the second correction in the levelling zone, even if the controller cannot give the upper gear-down point exactly (dead-time is always allowed, but it should behave as constantly as possible).

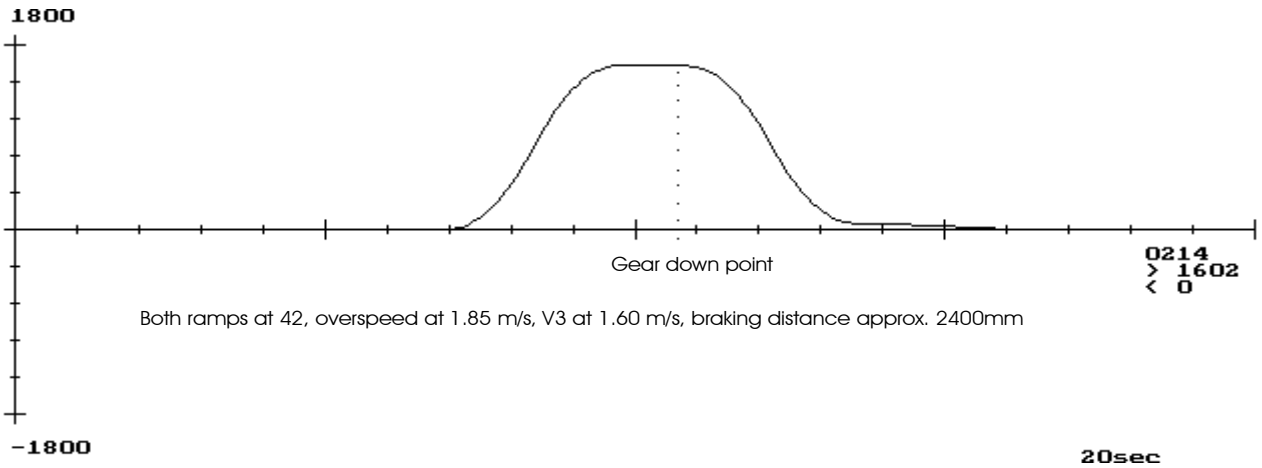
d) The switchover to "Ve" ensures a direct approach from the gear-down point. The path that is stored in cell 0E6C of the DSV is always followed. If the "dead-time" is entered correctly using variable "0E16", the braking distances of the digital shaft copy agree exactly with the value in 0E6C (in this case, the approach is performed directly without a crawl stretch).

e) Please always leave the value for the "Ramp rate of rise" (0E20) at factory setting; It is also recommended that the run up ramp "HL" and braking ramp "B" be set at the same value (e.g. both at 42) as this gives the best results.

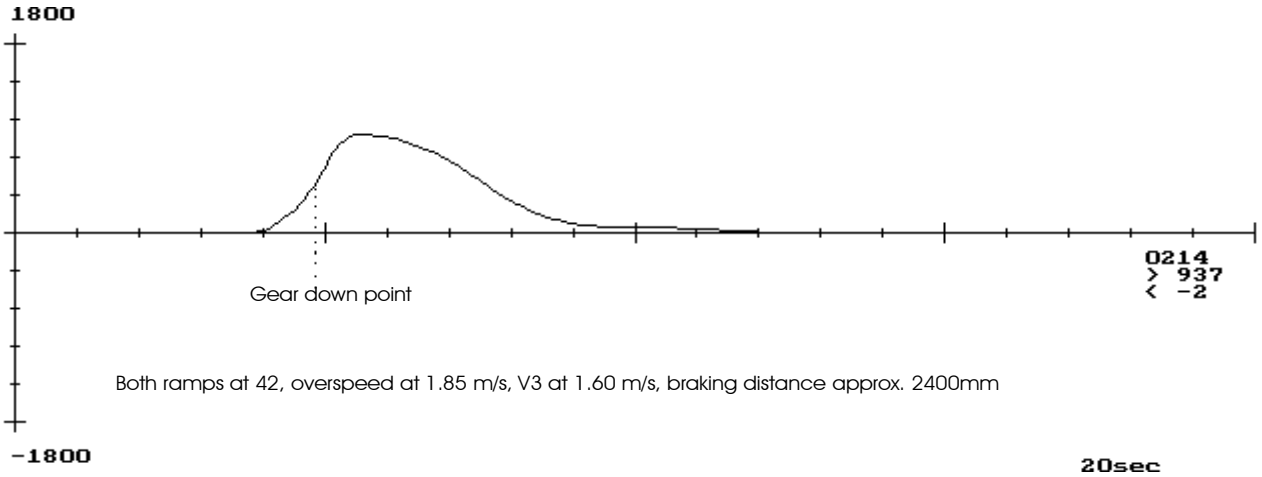
f) If the controller supports several drive steps, then the "pointed arch" will only take effect on “V3”.

g) Using DCP_03 or DCP_04 the default-settings of ’0E1A’ should be not changed in the file or inverter!

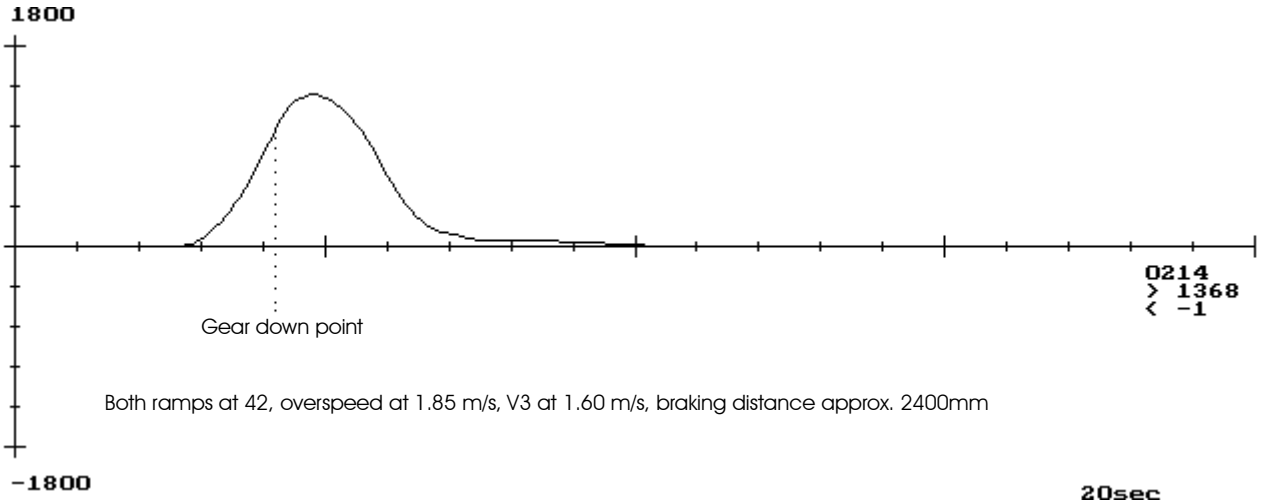
Examples for drive curves each with the same data but different floor distances.



Both ramps at 42, overspeed at 1.85 m/s, V3 at 1.60 m/s, braking distance approx. 2400mm



Both ramps at 42, overspeed at 1.85 m/s, V3 at 1.60 m/s, braking distance approx. 2400mm



Both ramps at 42, overspeed at 1.85 m/s, V3 at 1.60 m/s, braking distance approx. 2400mm

9 TIPS, TRICKS AND TROUBLESHOOTING

1) Motor reacts independently from the drive step with slow speed and draws a high current:

When high current is drawn at a low speed, the A6 signal is present for several seconds or the torque curve reaches the limit. This state causes considerable overload of the motor and converter! Stop the run **immediately** and seek the fault.

- The rotating field at motor is incorrect or the rotary encoder is not running with the motor.
- PPR number is not suitable (1024 1Vpp is standard -> check memory cell 0E4A)
- Number of poles "31" is incorrect or exchange two motor phases

2) Encoder error alarm or severely uneven running:

- Cable wired incorrectly or encoder defective
- TTL encoder instead of 1Vpp fitted (check memory cell 0E3E)
- Coupling is defective or encoder screen is not connected at both ends
- Pin 12 in connector X3 must have contact to protective earth at DSV

3) No confirmation signal from signal "A0" (controller ON):

- Contacts bouncing severely: For versions prior to 19.03.99, load update and set Schmitt flag (0E3Ch), switch "ISP" and "E0" simultaneously (automatic bounce suppression).
- One of the enable signals "ISP" or "E0" not present, check wiring
- "E0" was not removed after end of run, measure signal

4) Direct approach does not function, since signal "Ve" removed in levelling zone:

- "A5" and "INT2" must be connected for programs on the basis of 7SZ, 9SZ, 10SZ.
- The threshold 0E12 may not fall below the value of Ve with standard winches (40 MHz).

5) Motor cannot bear the load (pull it out of the catch) or stalls:

- Check the motor terminal plate (star or delta connection)
- Incorrect dimensioning of a drive device (efficiency of the system "Pay attention to machine top/bottom" or poor efficiency of "back-pack suspension with slideways")
- Rotor time constant not suitable for motor. "t" is usually smaller for conversion of old systems from Silumin motors. The rotor flux can also be too low in individual cases (check table value)

6) Motor buzzes at standstill or hums loudly at low speeds:

- Gain values to high
- Reduce P-gain stop, start and run
- Encoder not located at the position with the largest mass inertia

7) Driving wheel jerks backwards noticeably during start:

- 40MHz: I-gain run and start not low enough, P-gain stop too low
- 50MHz: I-gain stop counter value too high, start delay value too large

8) Drive jerks during start (starting jerk)

- Soft start time too short, run-up rounding to steep
- Soft speed not matched to static frictional (too high)
- With epicyclical gears: Increase I-gain run and P-gain stop
- With old worm gears: Select high I-gain run and small P-gain stop

9) Noticeable transition from "Ve" interrupt during stopping:

- "Ve" not matched to the "approach distance", solution by reduction of "Ve" or increase of distance in parameter "F26".
- The gear-down point to the approach speed "Ve" is located too close to the level position. This causes an excessively steep approach from the interrupt point. Remedy: Move the gear-down point further back until a crawl speed is reached up to the interrupt point. Now increase the return rounding so that the transition is made without a noticeable crawl distance.
- 50MHz: Difference between 0E1C and 0E1E too large (try 0E12 below the value of "Ve" so that the switchback to "I-gain stop" cannot be made).

10) External 24 V supply voltage is short-circuited as soon as an input is activated or connected at DSV

- The 24 V level was exceeded by more than 25 %.
- The DSV protection elements have responded.
- Please send the device to our factory for examination.

11) Lift travels at half or double speed

- Check values for number of gears and suspension.
- There can be a problem with counter overflows when the drive wheel or the suspension have unusual values (f10 and f22 are then changed to revs/min.).

12) Output A9 not removed in levelling zone.

- If parameter F7 (P-gain start) is too large, A9 will sometimes not be removed; if k (P-gain run) is too large, run will be terminated prematurely. Too large results in the motor humming, see also Point ***6) Motor …***

13) Phase fault message during emergency evacuation

- E1 for ...7SZ. or flag 0E62h for ...3SZ., 9SZ. or 10SZ. basis not activated.

14) Run is not terminated correctly (system is not uniformly flush)

- Control signal coming incorrectly. This can be checked either with the FU-Control under point "Inspect interface", or also using the "Terminal" function in EmoSoftLift (or mode "F3" in the DOS ter.exe). The typical "bracket messages" for the drive steps must normally be displayed here. the run was terminated correctly, the last command chain is normally … (Ve)(go)(LPOS)(AUS) If (LPOS) is missing, for example, then the system has probably stopped with the mechanical brake. This may have several causes:
- The time "Contactor delayed off" or "T2 motor time" or "Restart delay" are smaller than the time that the DSV needs to travel the remaining distance "F26" after removal of "Ve" or output of "INT2". Because of this the time "Contactor delayed off" should be set always higher than E24 “Braking delay” + t “Rotor time constant”.
- The remaining distance "F26" does not correspond to that in the controller or to the half of the length of the flush magnets (pure magnet copying), i.e. the distance to achieve flush alignment.
- The necessary "DSV5444/5445" mode was not selected at the lift controller.

9.1 Error check list

Error	Operation	Comment
BB off (instantly after switching power on)	1) Check encoder and connection 'X3' (if necessary 'XA' / 'XC'), jumper 'JP3' is not positioned correctly (1Vss or TTL/HTL)	Read the operating instructions!
	2) PTC thermistor plug not connected, one of the phases at L1...L3 is missing	Series fuses ok?
	3) Short-circuit at either 'X1' or the plugs of encoder or interface: measure pin 20 and 22 at 'X1' against pin 18 (at each case approx. 15V?), measure pin 3 against pin 4 at 'X3' (5V not there? -> as a result of short-circuit at 'X3', 'XC' or 'X4' caused the defect of the internal fuse 2,5A, if you can measure none of the voltages the power-unit is defect -> send for repair!)	Disconnect all plugs!
	4) emergency evacuation activated, but flag 0E62 not set to '0'	'E1' resp. '0E62' ok?
BB instantly off (after ISP and E0)	1) Short-circuit at the motor terminal plate (humidity?), defect motor supply cable, contactors defect, motor winding defect, foreign particles	Insulation test?
	2) Encoder-cable-screen not or only one-sided contacted to the housing	Measure against PE
	3) Power stage or AddOn of the inverter defect (send for repair)	
	4) IIdt-timer value (0E5A) is below 250ms (set it to 5000ms)	
BB off after a few seconds	1) IIdt error, because of wrong rotating field allocation or phase-sequence of the motor, or motor is not connected at all	U1, U2, U3 -> U, V, W (motor)
	2) Motor temperature too high or thermistor is not working correctly or defect	
	3) Mechanical stiffness (the brakes unlock not totally)	
Motor is rotating very slow or is jerking	1) Phase-sequence, phase angle, encoder pulse numbers or number of motor poles wrong, resp. slow speed instead of high speed connected (modification – plant with old motor)	Rating plate?
Motor causes heavy noise ('growling')	1) Amplification values (parameters 'k' and 'f7') adjusted too high, or possibly encoder-cable-screen is not or only one-sided contacted to the housing	
	2) JP3-flag 0E3E is set to '0' although no 1Vss-Encoder is in use	
extraneous voltage 24V short-circuited	1) Input/Output at 'X1' or 'X2' short-term over voltage more than 30Vdc (Transildiodes break through -> possibly you have to remove them)	Avoid suspending mass as far as possible
Parameter can not be modified	1) Data safety switch between 'X3' and 'X4' set to 'R' (at the top) -> set it to 'RW' (lower position)	
	2) wrong password or special software inside	
After changing data the drive does not work	1) Variable/parameter, by mistake, transferred via FU-Control during the run, modified and stored later	Transfer the software again from PC to inverter
After changing the software the drive does not work	1) 40-MHz-software transferred into 50-MHz-inverter (or contrary). Wrong update transferred, chosen option board not compatible with software (resp. important in regard of 12-bit and 16-bit resolver)	Read the operating instructions!
Motor is accelerating very slow	1) Parameter 't' wrong: 'old' silumin motors often have only double-digit values, new ones always have triple-digit values from 150 to 450 (asynchronous gearless even from 550 to 750)	Read the operating instructions!
	2) Parameter 'f0' wrong: at 10...15A-inverters 'f0'-value can be till 850, for others normally have typical values from 300 to 600	
Motor oscillates during constant motion	1) I-part 'run' too small: at all 50-MHz-inverters and 40-MHz-inverters with special software (LIFT7TZ, LAST7TZ) the I-parts 0E1C and 0E1E can be modified separately (set 0E1E to approx. 2...5 times higher than 0E1C)	Read the operating instructions!

Motor jerks heavy during the start-up process	1) Values 'start delay', 'starting jerk speed' and 'starting jerk time' chosen unfavourable or 'P-parts' too weak and 'I-part stop and hold' not small enough (possibly mechanical system defect?)	Read the operating instructions!
Motor jerks heavy during the approach	1) 'Ve' too high ('stop distance to floor' and 'return ramp' are not compatible), approach too much direct in the case of heavy cabin, ramp 'B' too steep	Read the operating instructions!
	2)In case of 50-MHz-software: possibly value 0E12 is to set lower than 'Ve'	
Synchronous gearless does not run correctly	1) Primary initialisation faulty, phase angle ignored, encoder during the run dis- and reconnected	Read the operating instructions!
	2) Encoder cable faulty (in case of using cable screened in- and outside either both to Pin 12 or use metallised housing encoder (resp. manufacturer Thora SON 2100 Nr. 47150M25T001)	
In spite of 'BB' on there is no connection to the PC	1.Interface cable wrong wired (attention: special type of interface cable), wrong 'COM' or wrong inverter resp. wrong application chosen: Chose '5445' at 'Converter', the used 'Comport' (mostly interface 'COM1') and at 'Application' chose 'LIFT_D.CNF' (or for experts LIFT1SX.CNF), [please update at least every 3 months the folder DATEN via internet)	SUB-D-9-female to SUB-D-9-female, pin 2 to 2, pin 3 to 3, pin 5 to 5, pin 8 and pin 5 bridged and cable-screen to housing

9.2 Error messages

Error message	**Meaning/correctives**	**Comment**
"Rot. encoder err"	Encoder not connected or defect. Encoder type (sin/cos, TTL, HTL) chosen wrong. Encoder cable wrong wired or defect.	check Jumper JP3, encoder connection
"IIDT"	IIDT value too high (over current for a too long time) caused by: overload, control deviation, wrong motor, wrong encoder connection, brake locked or grinding during the run, mechanical stiffness, wrong FU settings.	
"Phase failure"	Line voltage not beneath the specification; one phase is missing, or voltage is too low.	resp.Un +/- %
"DC link over V"	The DC link voltage is too high. Brake resistant not connected electrically, or wrong value chosen, internal brake chopper defect, GND fault motor or brake resistant.	Uk max = 700V at Un =400V 3AC
"DC link under V"	The DC link voltage is too low. Line voltage too low, line voltage breakdown. Charging circuit defect. Short voltage breakdown: means error stored.	Uk min = 300V **RESET**
"Temp rectifier"	The temperature of the cooling element is too high. overload, output current too high for a long time, ambient temperature too high, fan defect, inverter dirty	80°C - 90°C
"PTC therm. error"	Thermistor input: motor temperature too high, not bridged, thermistor input or thermistor defect	motor temperature 120°C - 185°C
"Short circuit"	Short-circuit and/or GND fault at the motor clamps, wrong parameter settings F0, t, p-gains, switching at the inverters motor output during current flow, short-circuit while disconnected motor means DSV is defect	approx. 2 times In momentary
"Parameter error"	Different checksum RAM and EEPROM. Overflow after calculation of customer units in command program, command program defect. Check settings and command program!	"save values ?" effects new, updated checksum
"RS485"	The communication from controller board to FU-Contol is faulty.	

9.2.1 Fault handling for automatic reset

Bit	Fault	Value
Bit 0	IIDT	1
Bit 1	Short circuit, module error	2
Bit 2	Encoder error (1 and 2)	4
Bit 3	Temp. rectifier, over temperature (PTC thermistor error)	8
Bit 4	Program halt, Watch-Dog, checksum EEPROM, parameter error, mains overvolt	16
Bit 5	DC link over V, DC link under V	32
Bit 6	Phase failure	64
Bit 7	vacant	128

The recommended default settings of 0E58 “no reset on error” is ‘20’, that means all faults will be reset automatically except bit 2 encoder error and bit 4 program halt…..so the value for 0E58 is generated by adding the value of bit 2 and bit 4 (4 + 16 = 20).

9.3 Operating messages

Operating message	Meaning	Comment
"All is okay"	No error.	
"Pulse inhibit"	The input ISP is low; the inverter is off.	Put values in for all settings and store here exclusively.
"Rdy to switch on"	The inverter is waiting for start command.	
"Speed control"	Start command is present, operation mode is "Speed control".	
"Posit. control"	Start command is present, operation mode is "Posit. control".	
"Analogue mode“	Start command is present, the set point is given analogue.	resp. Beringer Hydraulic Lift

9.4 “inspect interface”-messages

Message	Meaning	Comment
leer	No command is given; menu activated just now	
(frei)	ISP and E0 active, the motor is energised, holding torque, the brake unlocks (output A9)	
(V3)(an)	Drive command V3 is active.	
(Vi), (V1), (V2), (Ve), (Vn)	Active drive command Vi, V1, V2, Ve resp. Vn	
(Ve)(go)	Electrical braking operation at approach speed Ve.	
(pos), (lpos)	Position control and electrical stop in level position.	
(npos)	Position control stopped outside of the exact level position, run abortion caused by ISP and/or E0.	
(V0)	Drive signals V3 - Vn withdrawn, contact bounce, error during the run.	
(aus)	End of run caused by ISP and/or E0 withdrawn.	

10 Hydraulic lifts, EPM / ECD Alpha, synchronous gearless

10.1 Hydraulic lifts with DSV 544-Lift, analogue "Beringer" process

Connectors "X1" and "X2" are however assigned as follows. The DSV 5445 - Lift, "analogue" "Beringer" process works exclusively as speed controller for the hydraulic pump in accordance with the analogue set point. Other functions are performed by super ordinate controllers.

The rotary encoder has 512 pulses per revolution q.v. BERINGER.KOM resp. 2048 pulses per revolution for BERIPACK.KOM (JP3 is set at position TTL).

10.1.1 Digital input/output assignment list "analogue" "Beringer" process

A7	Standstill
A6	Overload (or rotating field incorrect)
A5	Over temperature (device of motor, if thermistor connected)
A4	Speed set point = actual speed
A3	Actual direction
A2	Free speed threshold 0E40
A1	Handshake UP is selected
A0	Handshake DOWN is selected
E7	Reserved
E6	Travel UP (digital) ***
E5	Travel DOWN (digital) ***
E4	UP with 50 Hz/s and fixed speed from cell 0E40
E3	DOWN with 50 Hz/s and fixed speed from cell 0E40
E2	RS232/RS485 selection if E2 fixed at 24 volt (after 18.09.00) **
E1	Travel UP (analogue)
E0	Travel DOWN (analogue)
E8	Reset pulse
BB	DSV ready for operation
A9	Controller ON (motor has torque)
ISP	Motor protection monitoring
0V	0V of external voltage "11"
24V	24V of external voltage "12"
+SW1	"+" delta controller (when machine/encoder has clockwise rotating field) "19" *
-SW1	"-" delta controller (when machine/encoder has clockwise rotating field) "17" *

* Some systems have "anticlockwise rotating fields", then exchange "+" with "-".
** Connect E2 permanently to 24 V to suppress unintentional output (e.g. Beringer OK), which disturb RS485 operation.
*** Mode RS 232/485 on request.

10.1.2 Table of parameters and variables analogue “Beringer” process

Adr	Parameter, variable	Meaning	Factory settings	Range of values
F0	Rotor flow	Motor rotor flux	500 (750)	50...2000
F1	Rated speed	Nominal speed according to rating plate	2905 (1475)	100...4000 1/min
F2	Synchr. speed	Synchronous speed	3000 (1500)	100...4500 1/min
F31	Number of poles	number of motor poles	2 (4)	2...64
i	I-part run	I-part speed controller	300	4...400
k	P-part run	P-part speed controller	300	100...5000
t	Rotor time const.	Motor rotor time constant	100	25...1000
0B34	Version of progr. (>75)	Program revision index (read only)	>75	read only
0E00	Stand. of speed "1"	Evaluation of the analogue set point (660 = 10 = 3000 1/min)	660 (1452)	-1500...1500
0E26	Off-decel. delay	Delay controller switch-off	1	1...1000
0E40	Excess speed "A2"	Speed threshold 1/min for output A2 (0E40 is also employed for the fixed speed using input E3 resp. E4; the ramps are stored in 0E64, analogue in 0E62)	1500	0...4000
0E4A	Encoder pulses (new)	Encoder pulse number	512 (2048)	512, 1024, 2048
0E5A	value of iidt-timer	Unacceptable high current, incorrect rotating fields and phase angle, and loose encoder lead to a shut-down of the inverter after the time in E5A (I^2dt error has occurred).	5000	1 - 32767
0E60	Service-flag (emergency operation)	Emergency operation without encoder (set rotor flux F0 to maximum)	0	0/255
0E62	Ramp gradient 01	Set ramp flat Y0/Y1	335 (1000)	1...5000
0E64	Ramp gradient 34	Set ramp steep Y0/Y1	67 (67)	1...5000
0E68	Emergency-flag OFF = 0	Flag for switching-off the phase monitoring ("phase failure")	255	0/255

10.1.2.1 Data setting via internal or external FU-Control

The parameters and variables have to be set in the “Beringer” mode. Experienced user only should use other modes for this, because there were shown either none, wrong or incomprehensible displayed readouts, according to the chosen mode. The “Beringer” mode always will be set automatically while parameter F29 (hidden) is set to “255”.

10.1.2.2 Setting the data via EmoSoftLift:

In the case of **EmoSoftLift,** BERINGER.CNF and BERINGER.KOM must be in the corresponding directories and must be selected to modify the following parameters and variables. Parameter and variables DSV 5445 - Lift, analogue "Beringer" process.

10.1.2.3

This is the description of the data from BERINGER.KOM or BERIPACK.KOM in the factory setting:
For commissioning you must only check or set the parameters rotor flux **F0** and rotor time constant **t** according to the "Operating Instructions Messrs Bucher AG" (fit motor type, DSV5445 type).
The system BERIPAC with BERIPACK.KOM is pre-set completely. The factory settings for BERIPAC are in brackets, e.g. F0 (750).

10.2 EPM / ECD 100, 300, 500 lift gears from Alpha Getriebebau GmbH

The EPM / ECD 100, 300, 500 requires the "Resolver interface" option, which is installed in the DSV544*. The 15-pole connector on the option card is now used instead of the encoder connector "X3" (it remains unused and the jumper JP3 is inserted on "middle"). Each EPM and ECD type possesses its own file (EPM7-100.KOM for EPM100, EPM7-300.KOM for EPM300, EPM7-500.KOM for EPM500 and ECD7-100.KOM for ECD100). The program basis is “7TZ”.
A 14/16 bit resolver interface is employed, which is already set for the EPM / ECD. The 9-pole connector optionally corresponds to option X6.
The significance and factory setting of the jumpers on the option card "Resolver interface":

JP2	Resolver feeder frequency 6, 9, 13, 16 kHz (EPM300 = 13kHz)
JP1	Encoder error evaluation (plug must be connected in the direction of the SUB-D-9)
JP4	In this case only for 16-bit emulation: definition of the tracking rate (lower position)

Jumper JP3 on the controller card must always be plugged into the central position when the "resolver interface" option is employed.
The motor encoder, resolver, must be fitted on the “resolver interface” option board.

10.2.1.1 SUB-D connector assignment for "resolver interface" (15-pole SUB-D connector).

This connector provides the connector resolver with the reference voltage and receives the two signals from the resolver.
Lower connector 15-pole female, resolver X01 "XA":

X01 Pin 12	Screen		X01 Pin 13	GND
X01 Pin 8	COS\(-)		X01 Pin 2	OSC\(-)
X01 Pin 7	COS (+)		X01 Pin 1	OSC (+)
X01 Pin 6	SIN\(-)		X01 Pin 10	n.c.
X01 Pin 5	SIN (+)		X01 Pin 15	n.c.
X01 Pin 4,9,11	GND		X01 Pin 14	GND
Housing	PE			

10.2.1.2 SUB-D connector assignment on the option card "Resolver interface" (9-pole SUB-D connector).

All signals at this connector are the same as for option "X6". An emulated "zero signal" is also present at pins 7 and 8.
Upper connector 9-polig male, encoder output X02 "XC";

X02 Pin 6	UA2-OUT\		X02 Pin 4	n.c.
X02 Pin 7	UA0-OUT		X02 Pin 3	n.c.
X02 Pin 8	UA0-OUT\		X02 Pin 2	UA1-OUT\
X02 Pin 9	GND-OUT		X02 Pin 1	UA1-OUT
X02 Pin 5	UA2-OUT			
Housing	PE			

10.2.1.3 Hardware connection to EPM ECD synchronous lift motor (resolver):

Attention: The power connection "U, V, W" must be connected exactly in this sequence to the terminals "U1, U2, U3". Both the phase sequence and also the rotating field are important in this case.

The 12-pole round connector to the resolver has the following pins assignment, whereby differentiation is made between "standard and AES versions".

Name	12pole-IP65-Pin	15pole-SUB-D-Pin (option card)
S1/cos	1	7 COS (+)
S3/cos-low	2	8 COS\(-)
S2/sin	3	5 SIN (+)
S4/sin-low	4	6 SIN\(-)
R1/Ref	7	1 OSC (+)
R2/Ref-low	8	2 OSC\(-)
Screen	9	12 Screen

The following pins are assigned as follows for the standard version:

Thermistor	5	23 thermistor connector on DSV
Thermistor	6	24 thermistor connector on DSV

The following pins are assigned as follows for the AES version:

HS U	5	to AES auxiliary controller
HS V	6	to AES auxiliary controller
HS W	10	to AES auxiliary controller
GND	11	to AES auxiliary controller
+UB	12	to AES auxiliary controller

A pre-formed resolver cable of 6 m length can be obtained under order no. 9544R812.

10.2.2 First initialisation of EPM / ECD with resolver interface

The resolver for the EPM / ECD winches are matched mechanically to the angular displacement angle RHO = 0 in the factory. A first initialisation must be performed after dismantling (e.g. resolver exchange), misalignment (e.g. loose screw connection) or lack of factory adjustment.

You require a PC/laptop with EmoSoftLift and the interface cable to perform the first initialisation.

Please execute the following steps carefully. The first initialisation should be performed only by experienced users, who have read and understood this chapter.
You require a clamp-on ammeter and/or PC/laptop with EmoSoftLift and interface cable to check that you have found the “correct" RHO at the correct motor phase. To do this, it must be possible to run the synchronous motor in both directions at no load and at medium speed.
A defective first initialisation means that you must remove the cables again and repeat all steps once more.

10.2.2.1 Execution of first initialisation

- Connect the motor - without load or transmission rope - directly to the DSV and plug the resolver cable into the bottom of the option card.
- Connect interface "X4" of the DSV with a laptop and start EmoSoftLift.EXE.
  To enable the motor, you require 24 V at terminals X1 pin 12 and X1 pin 5, and earth at terminal X1 pin 11.
- Connect output A9 (X1 pin 2) with a relay, which should open the brake on the "EPM gears".
- Release the resolver plate screws.
- Load a suitable EPM file (for 50 MHz) into the converter (if this has not already been done). Check the values f0, f1, f2, f31.
- Change to online mode (terminal mode) and enter the command sequence:
  "**b3<cr>;<cr> w63<cr>**".
  The brake opens and the motor makes a small "jerking movement". The brake closes and the numeric values for the current angle "RHO" appear on the monitor screen.
- Now move the resolver mounting plate until the value of "RHO" is "0". Tighten two of the resolver screws to fix the resolver. Tighten the remaining screws later.
- Press the reset button at the DSV and repeat the command sequence:
  "b3<cr>;<cr> w63<cr>". If "RHO" is now on "0" (plus/minus "1" is OK), press "Reset" on DSV once again.
- Then recall the “Terminal” function and switch ON the DSV using the corresponding button. The required speed is then determined by the slide controller. Click on “neg. rotation direction” to reverse the direction of rotation.
  The first initialisation has been completed successfully when you measure the same small current for both rotation directions.
- Tighten all resolver plate screws.

10.2.2.2 Execution of first initialisation without manual resolver adjusting

- The drive needs to have a firmware TUDZxxx from March 05 (MNo. 231650 or higher)
- An applicable command program EPM/ECD…C…KOM has to be in use.
- Please pay attention to Chapter 10.3.

First initialisation with internal or external FU Control

- Change variable E5C “Auto RHO search ATB” from “0” to “255”.
- Start function “save values ?”. The synchronous motor moves to the defined rotor position.
- Repeat the above steps two times.
- Press the red reset button on the DSV.

First initialisation with PC/laptop, variable E5C “Auto RHO search ATB”

- Change variable E5C “Auto RHO search ATB” from “0” to “255” under “Parameter” “Process parameter from converter” and press “transmit”. The synchronous motor moves to the defined rotor position. Close the parameter window and reopen it.
- Repeat the above steps two times.
- Press the red reset button on the DSV.

10.3 Operation of synchronous-gearless motors with DSV 544*-Lift

10.3.1 Synchronous winches with absolute encoder SSI option or second encoder ATB

- It is imperative that the motor phases DSV5445 output terminals U1 - U2 - U3 be connected one-to-one to the motor terminals, e.g. 1 – 2 – 3.
- A check of the rotating field is not sufficient for synchronous motors.
  The interpretation of the direction terminal for UP and DOWN can be set only by means of the variable E0C “Rotation direction”.
- The rotary encoder cable may **not** be removed with the converter switched ON. If this is nevertheless done, a reset must be activated at the DSV so that the initialisation of the rotor position is restarted.
- The "SSI, EnDat ®” option card or “2nd ATB encoder” and the "internal UD cable" are required.
- Jumper "JP3" is always on "1Vpp" and the pulses per revolution in cell 0E4A to "2048".
- The DSV 5445 Lift for synchronous gearless (with SSI option or 2nd ATB encoder) is always preset to suit the winch type; i.e. before commissioning, you check or change only the speed, the lift suspension and the driving wheel diameter of the lift, after a test run the “direction of rotation” 0E0C (up and down signal) and in case for having an ACP/DCP option card in use set input E8 to 24V.
  Changing the suspension 0E40 from 2:1 to 1:1; i.e. 2 times the value of 0E18 and 0E22.
  Changing the suspension 0E40 from 1:1 to 2:1; i.e. 0.5 times the value of 0E18 and 0E22 (0E18 “Return Ramp B”, 0E22 “Run-up ramp HL”)
- The parameters / variables **F0, F1, F2, F30, F31, t, E4A, E52, E54 E58, E5A, E5E, E60, E6E** must **not** be arbitrarily. Unexpected behaviour of the drive can otherwise occur.

10.3.2 Lift programs for synchronous gearless winches

Due to the growing number of gearless drives, separate files are available for the individual types which are configured to suit the motor data, encoder and activation type (*7TZ, resp. ACP/DCP option card).

Visit our old website www.dietz-electronic.de/gearlist.htm to get the list of all actual command programs and updates *.KOM, *.UPD including synchronous gearless drives (or on the ’CD’)!

10.3.3 First initialisation, allocation of absolute value encoder and rotor

Synchronous motors require correct allocation of the absolute value encoder and rotor (RHO).

The DSV 5445 supplies DC current during the first initialisation. The magnetic field generated by it draws the rotor into an exactly defined position that the absolute value encoder detects and which is stored as an offset in the variable 0E6E “RHO”.

- Synchronous gearless Winches with SSI or EnDat ® encoder (option SSI) can be adjusted by the winch manufacturer in that way, that the winch is working immediately by using our factory setting RHO=0 in variable 0E6E. Additional the winch manufacturer can specify a value for variable 0E6E "RHO-0", that has to be set before primary initialisation.
- Synchronous gearless winches with 8-channel encoder (option second encoder ATB-type), or other encoder systems, always require the primary initialisation (except value is written on motor type plate).
- After removing or readjusting the encoder system, you always have to do the primary initialisation. In that case ropes and load should be not on the winch, brakes must be opened and contactors must be closed.

You require an FU Control (internal or external) or a PC/laptop with EmoSoftLift and an interface cable to perform the first initialisation.

Please execute the following steps carefully. The first initialisation should be performed only by experienced users, who have read and understood this chapter.
You require a clamp-on ammeter and/or PC/laptop with EmoSoftLift and an interface cable to check that you have found the “correct” RHO and the correct motor phase arrangement. To do this, it must be possible to run the synchronous motor in both directions at no load and at medium speed.
A defective first initialisation means that you must remove the cables again and repeat all steps once more.

10.3.3.1 Preparation of the first initialisation

- Without load and cables so that the rotor can move to the defined position unhindered
- With continuously open brake (Check that drive wheel rotates freely).
- Connect synchronous motor directly with the correct motor phase arrangement or close or shunt the drive contactors permanently.
- Connect the motor rotary encoder correctly, together with the UD cable, if an external one is provided.
- Remove connector X2 (E0 - E7, A0 - A7). Inputs must not be set or changed during the first initialisation.
- Set pulse inhibit ISP connector X1 pin 5 to high.
  If the external 24 V supply is present and connected to X1 pin 11 (0V) and X1 pin 12 (+24V), then bridge X1 pin 12 (+24V) with X1 pin 5 (ISP).
  If the external 24 V supply is not present, then bridge X1 pin 20 (+15V) with X1 pin 5 (ISP) and 2ndconnection X1 pin 18 (SGND) with X1 pin 11 (0V).
- Connect your external FU Control or your PC/laptop.
- Check whether the correct command program corresponding to the winch type (see also above table) is present in the DSV.
- Have you done everything correctly so far?
  Then switch ON the power to the DSV 5445. It signals its readiness for operation, the LED “BB” is on, display indicates "All OK", "Ready".

10.3.3.2 Starting the first initialisation

A simplified procedure has been implemented for the first in initialisation of synchronous gearless after software version 01.01.2002, namely the variable E5C “Auto RHO search ATB”.

This procedure can be used both with FU Control and also with EmoSoftLift under the parameter function “Process parameter from converter”.
If you wish to perform a first initialisation on a DSV 5445 with an older software revision state without the update, solely the terminal function “Terminal” functions under EmoSoftLift.

10.3.3.3 First initialisation with internal or external FU Control

- Change variable E5C “Auto RHO search ATB” from “0” to “255”.
- Start the function “Save value”. The synchronous motor moves to the defined rotor position.
- Repeat the above steps another two times.
- Press the red reset button on the DSV.

10.3.3.4 First initialisation with PC/laptop, variable E5C “Auto RHO search ATB”

- Change variable E5C “Auto RHO search ATB” from “0” to “255” under “Parameter” “Process parameter from converter” and press “transmit”. The synchronous motor moves to the defined rotor position. Close the parameter window and reopen it.
- Repeat the above steps two times.
- Press the red reset button on the DSV.

10.3.3.5 First initialisation with PC/laptop, terminal (only for old programs or under firmware AUDZ)

- Open "Terminal" under "Terminal"
- The call: "b3<cr>;<cr>w36<cr>" or "b3<cr>;<cr>w53<cr>" (depending on the winch type, see table) starts the initialisation. The synchronous motor moves to the defined rotor position. When to call ‘w36’ or ‘w53’ you can find in column c10 on our website www.dietz-electronic.de/EmoSoftLift/gearlist.htm.
- Repeat the above steps another two times.
- Press the red reset button on the DSV.

10.3.3.6 Check first initialisation

- The value of variable E6E “RHO-0” has changed automatically. The factory setting was “0”.
- Start the winch without load and cables with a medium rotational speed, speed in operation. It is possible that the P-components F7 and K too high for a winch without load, causing the synchronous motor to hum.
- If the synchronous motor does not start, try changing the motor phases. To do this, exchange the output phases U2 with U3 at the DSV and repeat the first initialisation.
- Measure the motor current for both clockwise and anti-clockwise rotation. The current must be the same for both directions and has a value of only 0.2 - 2 A. The drive signals can be given using "Terminal" under EmoSoftLift or using the corresponding inputs at connector X1 X2.
- The first initialisation has been completed and you can continue commissioning.

10.3.3.7 Tips for first initialisation (only SSI or SinCos)

Please note the value of E6E “RHO-0” after completing the first initialisation and mark clearly the phase connections between the synchronous motor and DSV. This value for E6E “RHO-0” can also be entered immediately for another DSV 5445 for the marked motor, without the need to perform a new first initialisation. Using EnDat-System the value of E6E is always ’0’ (the value is written to the memory in the encoder direct)!

10.3.4 Important addresses for SSI, EnDat ® and 2nd encoder ATB option

0E5Eh is the speed-dependent offset for RHO, known as the RHO-SHIFT. It is matched to the corresponding motor type in the factory and should therefore never be changed.

0E6Eh is the memory address for the current offset angle "RHO-0“.

EnDat ®: After completing the first initialisation the absolute value encoder will be zero adjusted automatically and the value of 0E6E will be set to ‘0’.

Only for experienced users:
Users of SSI based programs, which want to zero adjust their absolute value encoder manually have to type in the following start commands using the terminal box:

B3<cr> ;<cr> **L**<cr> **736**<cr> **m255**<cr> **w57**<>cr !

To abort type in “;;;” or press “break program”.
Only for testing the first initialisation should be done again as explained above.
The value RHO-0 has to be after this ‘0’ or nearly ‘0’.

10.3.5 Option SSI, EnDat ® *

The rotary encoder connection for ECN 1313 / ERN 113 SSI or EnDat ® and electrically compatible systems, e.g. Hengstler 2048 is 13-bit Gray-code with 17-pole angled connector on the motor side and a 'normal' 15-pole SUB-D male (2-row) on the converter side (screen attached at both ends):

Plug type **G**	1a	2a	3a	4a	5a	6a	2b	3b	1b	4b	5b	6b	Outer screen	Inner screen
Plug type **B**	B	K	J	F	G	C	H	M	D	E	L	A	Housing	---
Plug type **C**	17	15	4	12	9	1	8	13	7	10	16	14	Housing	11
Plug type **D**	8	1	11	5	9	13	14	6	3	4	2	7	Housing	12
Colour of wire	pink	green - black	white	blue-black	yell-ow	blue	purple	red-black	brown-green	white-green	yellow - black	grey	silver	black
Descr.	data\	A+ K1	0V sens.	B+ K2	clock \	5V sens.	clock	B- K2\	5V Up	0v Un	A- K1\	data	Outer screen	Inner screen
Comm.	-SSI out	+sin 2048		+cos 2048	-clock input		+clock input	-cos 2048	power supply		-sin 2048	+SSI out	ground PE	gnd

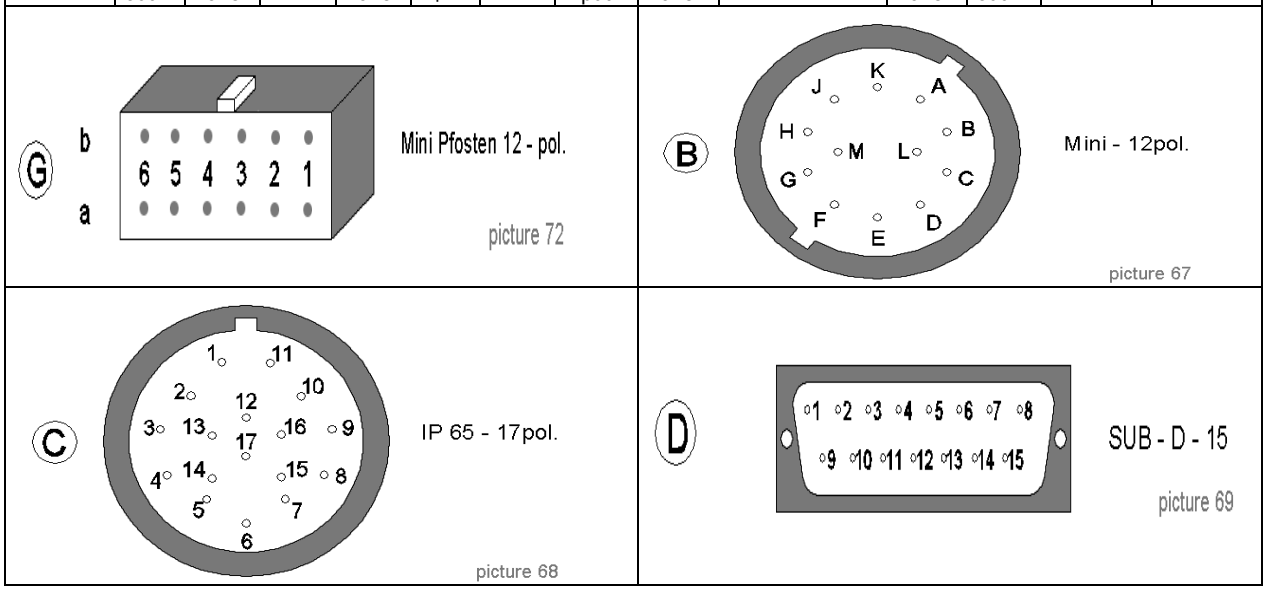


Figure 72 shows the 'Mini-post connector 12-pole (designated with 'Type **G**' in the table 'ECN 1313'), as it is mounted on the connection side of the rotary encoder internally in the encoder:

Figure 67 shows the 'miniature screwed connector 12-pole (designated with 'Type **B**' in the table 'ERN 1313'), as it is used between the rotary encoder and the rotary encoder cable:

Figure 68 shows the 'IP65 screwed connector 17-pole (designated with 'Type **C**' in the table 'ERN 1313'), as it is used between the rotary encoder and the rotary encoder cable:

Figure 69 shows the 'normal' SUB-D 15-pole female (designated with 'Type **G**' in the table 'ECN 1313'), as it is mounted on the connection side, e.g. of a frequency converter:

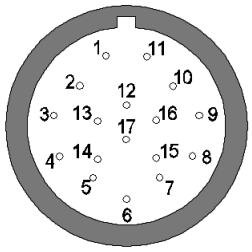
*) EnDat ® is a registered trade mark of the company Dr. Johannes Heidenhain GmbH

10.3.6 Option 2nd encoder ATB

The rotary encoder connection for Heidenhain ERN 1387, ERN 1385 and electrically compatible systems with 17-pole angled connectors and 15-pole high-density SUB-D male (3-row) on the converter side (screen attached at both ends):

Plug type **C**	15	16	12	13	3	2	14	17	9	8	Housing	7	10	1	4	11
Plug type **F**	8	3	9	4	15	14	6	1	7	2	Housing	12	13	---	---	5
Colour of wire	green - black	yellow - black	blue-black	red-black	red	black	grey	pink	yell-ow	pur -ple	silver	brown-green	white - green	blue	white	black
Descr.	K1 A+	K1\ A-	K2 B+	K2\ B-	K0 N+	K0\ N-	K3 C+	K3\ C-	K4 D+	K4\ D-	Outer screen	5V Up	0V Un	5V sens.	0V sens.	I-s.
Comm.	+sin 2048	-sin 2048	+cos 2048	-cos 2048	+ zero	- zero	sin +1	sin -1	cos +1	cos -1	ground PE	power supply		sensor only if needed		gnd

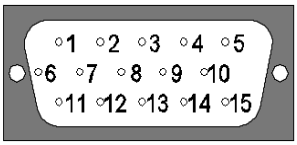
C



IP 65 - 17pol.

picture 68

F

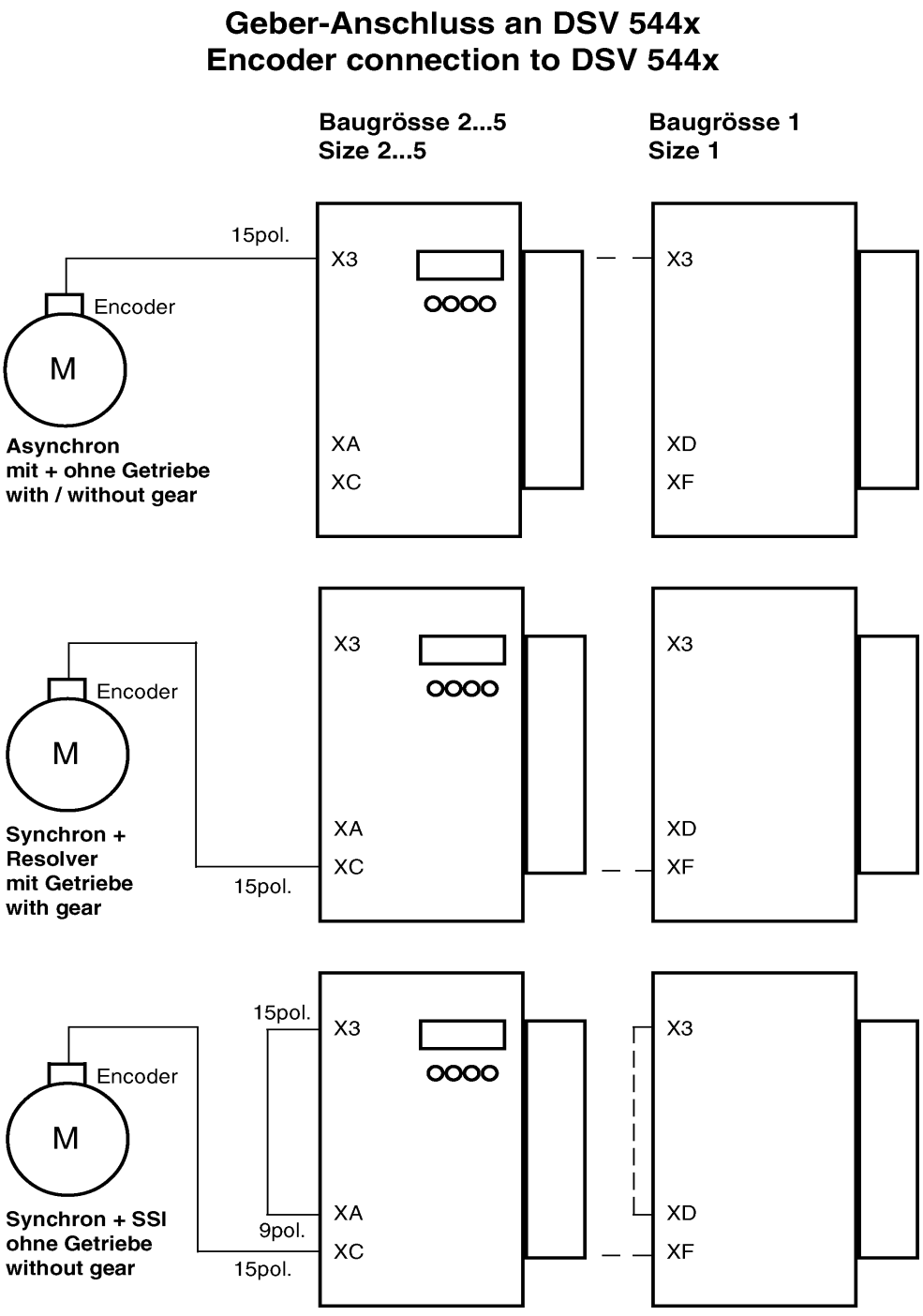


High Density 15 - pol.

picture 71

Synchronous gearless winches with 8-track encoder, i.e. for DSV 5445 with option 2nd encoder ATB, currently always require the first initialisation described above.

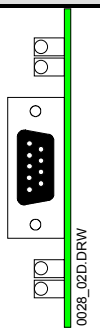
10.4 Overview of rotary encoder connection



The UD cable, connection of plug XA to X3, is not required any more since 2003-01-01. The connection is internal present, whereas X3 and/or XA are also not present in some units now.

11 Options

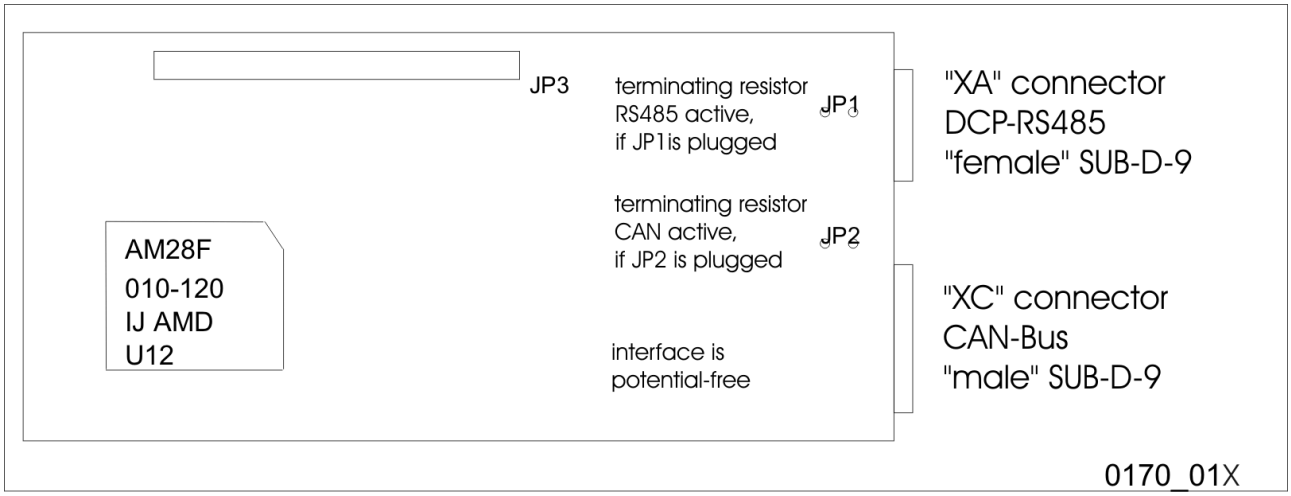
11.1 Further processing of encoder signals with option "X6" (X7 optional available)

Connector option "X7"	*Connector option "X6"*	*Pin assignment for option X6/X7*	
Turn-switch Divider 0 ON 1/1 1 ON 1/2 2 ON 1/4 3 ON 1/8 4 ON 1/16 (Note: Sinus and Cosinus have it's own switch, please set both in the same directions)		**Terminal** 1 2 3 4 5 6 7 8 9	**Meaning** UA1-OUT UA1-OUT\ no connection no connection UA2-OUT UA2-OUT\ no connection no connection GND
Square wave pulse with adjustable ratio	Square wave pulse with ratio 1:1		

The motor encoder signal can be made available, for example to the controller, using the X6/X7 option card.

11.2 Option "CAN / DCP-ACP bus interface"

Accessories for option 95444241 for connection from DCP-RS485 bus or CAN bus:



Both interface connectors are potential-free!

11.2.1 Pin assignment on option card "DCP/ACP bus interface"

Connector position "XA" (DCP or fast 2nd RS485 interface):
Upper connector / 9-pole ***female***

Pin 1 = + RS485	Pin 4 = - RS485	Pin 7 = + RS485
Pin 2 = n.c.	Pin 5 = GND	Pin 8 = n.c.
Pin 3 = n.c.	Pin 6 = - RS485	Pin 9 = +5V 10mA

11.2.1.1 Connection "SP5" of the Böhnke + Partner - control "bp306" to DSV5445/5444 (3-wire)

bp 302 "SP5"	5-------green--------5 (gnd) 6------ brown-------4 (B) 7-------white--------1 (A)	DSV "XA"	Upper connector on option card "DCP/ACP" of DSV5445 Put the screen, if present, for pull relief on the housing of connector "XA".

11.2.1.2 Connection "FST" NewLift - control to DSV5445/5444 (3-wire)

NewLift "FST"	5----------5 (gnd) 8//9----------4 (B) 4//7----------1 (A)	DSV "XA"	Lower connector on option card "DCP/ACP" of DSV5445 Put the screen, if present, for pull relief on the housing of connector "XA". The cable is attached to the NewLift – control.

11.2.1.3 Connection "FST" NewLift - control to DSV5445/5444 (5-wire)

Newlift "FST"	5----------5 (gnd) 8----------4 (B) 9----------6 (B) 4----------1 (A) 7----------7 (A)	DSV "XA"	Lower connector on option card "DCP/ACP" of DSV5445 Put the screen, if present, for pull relief on the housing of connector "XA". The cable is attached to the NewLift – control.

11.2.1.4 Connection "MPK..." Kollmorgen to DSV5445/5444 (3-wire)

Kollmorgen MPK...	DS------grün--------5 (gnd) 88-----braun--------4 (B) 87------weiß--------1 (A)	DSV "XA"	Lower connector on option card "DCP/ACP" of DSV5445 Put the screen, if present, for pull relief on the housing of connector "XA". The cable is attached to the NewLift – control.

11.2.1.5 Remarks on DCP/ACP bus

X2 inputs may not be used with DCP, ACP. Output functions are however still available.
Blocks 0 to 8 are used!
Connect X2-A5 to X1-INT!
Emergency operation via E4 (direction E8) possible if flag 0E0Ch is "0"!

W0 = Bit0 = Ve	W4 = Bit4 = Vi (E4)	To activate Lift-DCP,
W1 = Bit1 = Vn (E1)	W5 = Bit5 = V1	flag 0E0C must be set to 255.
W2 = Bit2 = emergency-stop	W6 = Bit6 = V2	This is the case in the programs
W3 = Bit3 = normal-stop DCP4	W7 = Bit7 = V3	based on ACP_03/DCP_03/DCP_04
	E8 = Basic direction !	(0E0Ch controls 0750h here).

11.2.1.6 Bus system settings

see also parameter and variables list

Controldelieverer	Newlift	bp	bp	Kollmorgen	Kollmorgen
Fieldbus	ACP_03	DCP_03	DCP_04	DCP_03	DCP_04
0E64 (DCP, ACP, CAN)	87	92	93	172	173
0E66 (baudrate)	6	2	2	2	2
0E0C (direction of rotation/bus=255)	255	255	255	255	255

11.2.2 Connector position "XC" (CAN interface):

Lower connector / 9-pole ***male***

Pin 1 = n.c.	Pin 4 = n.c.	Pin 7 = CAN-HIGH
Pin 2 = CAN-LOW	Pin 5 = Earth	Pin 8 = n.c.
Pin 3 = GND	Pin 6 = n.c.	Pin 9 = n.c.

☞ Transferring a standard program for conventional activation based on *7TZ.KOM via EmoSoftLift the field bus functions will be deactivated even if the option card is mounted.

11.3 Option IT-net

The DSV 5445 series size 1-4 can be provided with option IT-net. This option contains a special RFI suppression filter, so that operation in case of also earth fault, i.e. one of the phases is short-circuited with the insulated protective earth, is possible unlimited.

☞ The specification resp. measuring of the radio interference level refers to a none insulated protective earth system.

The earth fault monitoring has to tolerate the earth leakage current caused by the systems principle, these are the RFI suppression capacitors and the capacity of the motor.
Use an applicable line filter.

DSV 5445 with option IT-net are also suitable for operation in TN-, TT-net. A special radio interference level can not be specified here.

The control voltages of the lift system have to be prepared potential-free. Pay attention to the instructions of the operator.

11.4 Special version of lift devices (integrated contactors, integrated reactance coil)

1) Both DSV 5445-Lift and DSV 5453-Lift can be delivered as the following variants:

Standard	Device with side AddOn motor/line filter.
PLUS	Device with side AddOn motor/line filter motor contactors, brake contactor, brake rectifier, line reactor.
PLUS **synchron**	Device with side AddOn motor/line filter motor contactors, brake contactor, brake rectifier, line reactor. In case of synchronous motors the short-circuit, caused by contactor K3Z effects that the drive trundles slowly away, even if the brake is opened.

2) Additional terminals are provided on the full version of the DSV 5445-Lift (or DSV 5453-Lift) device, which are assigned as follows:

The upper row for the motor contactor controller is assigned as follows:

A1	A2	Y	32	33	34	35

A1 and A2 are the solenoid terminals for the motor contactors. The solenoid voltage is 230 V AC. The power contacts are already wired internally; one pair of contacts is interlinked with the AC circuit of the brake rectifier.

Terminal Y together with terminal L (in the lower terminal strip) forms the contactor interlock with the brake rectifier. Y is brought out only for inspection purposes; this contact is needed only when the internal brake contactor should not be used for certain reasons.

The auxiliary normally-open contact is connected to 35 and 33 (to connect the enable signals "ISP" and/or "E0" on DSV 5445-Lift). The auxiliary normally-closed contacts on the motor contactors lie alternatively between 34 and 32.

The lower row for the brake controller has the following terminals:

A9	0V	4D	4L	NL	L	8	7

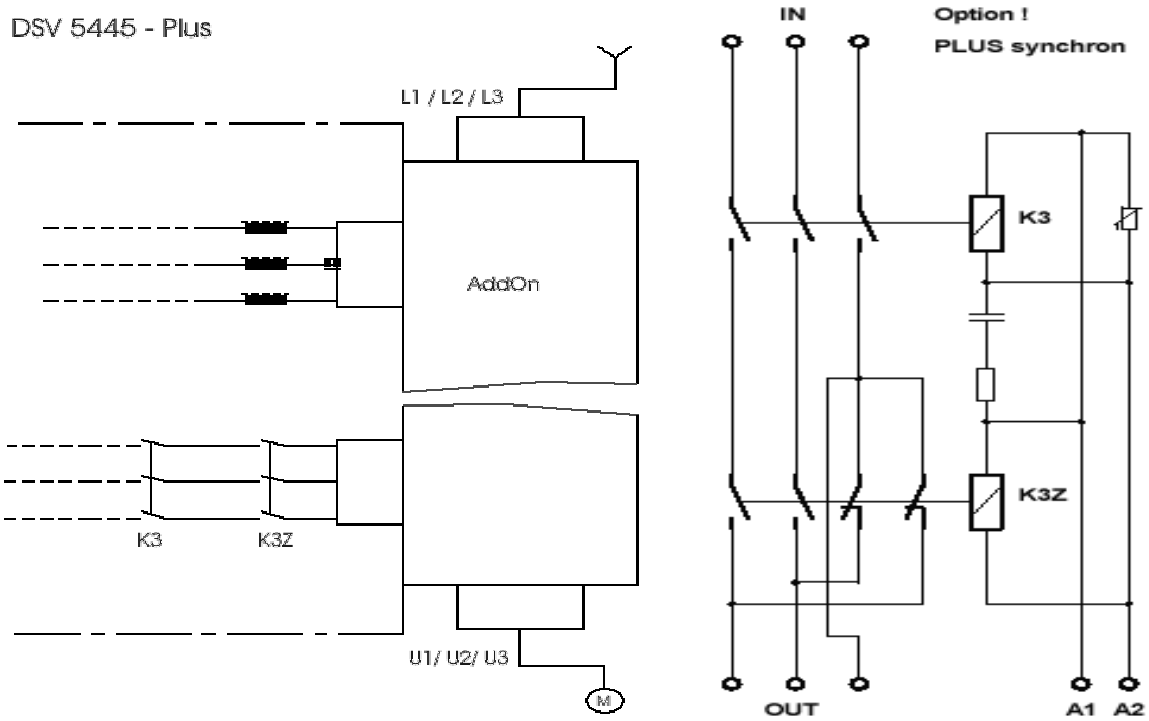
A9 and 0V are the solenoid terminals of the brake contactor. The solenoid voltage is 24 V DC. The solenoid can be supplied, for example, from the converter output (i.e. by the associated 80 mA output "A9" at the DSV 5445-Lift).

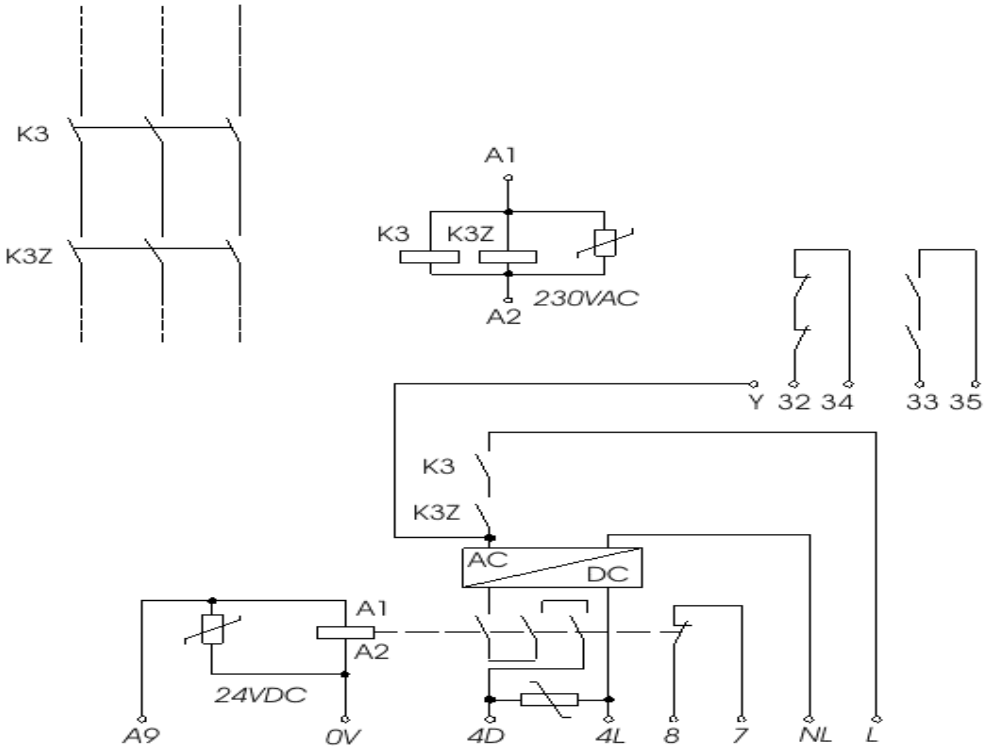
40 and 4L are for the terminal of the brake magnets (this is already a DC voltage) and NL and L are the AC supply (max. nominal voltage 240 V AC).

This circuit is, of course, already interlocked with the two motor contactors. Contacts 8 and 7 provide an additional free normally-closed (!) contact (the three normally-open contacts are located on the DC side, in this case).

The brake contactor (terminals A9 - 0V) possesses a **24 volt** coil and can be fed directly from A) connector X1.

11.4.1 DSV5445 PLUS circuit





12 Option link circuit terminals for emergency evacuation and power recovery

12.1 Emergency evacuation using battery

A nominal battery voltage of approx. 240 V DC is recommended. A battery capacity according to the following rule of thumb is recommended: Device nominal current / 10 = capacity of the battery in Ah. I.e.: A DSV 5445 - 20/400 requires a 240 V DC, 2 Ah battery. The device is equipped with a flat-battery monitor so that the battery is not overloaded. It is important that the battery is isolated from the ZK terminal (terminal 24 or 25) by means of a diode in the plus line, since the battery would otherwise be overloaded in generation mode. It must be ensured by means of an interlocking contactor that the 400 V mains and the battery can never be connected to terminal 24 (plus) and 25 (minus) simultaneously. The programs based on 7SZ possess an input E1, which must be present together with the application of the battery voltage, so that the otherwise effective phase-fault detection is suppressed. With some controllers, a small diode must also be connected externally from E1 (anode) to the drive step Ve or Vn or Vi (cathode), so that the run can start immediately after the activation of ISP and inputs E0 and E1. The run can even be started quite normally with many controllers when only the smallest run step V1 is selected. The battery can normally evacuate up to 10 stops. Important: The order must contain details whether the device should support emergency evacuation (the hardware is then equipped with this option). Battery cubicles are available, for example, from Weber-Steuerung.

12.2 Emergency evacuation using UPS device instead of 240 V battery

UPS systems (e.g. from APC) are an alternative method to the above concept with a battery cubicle. The advantage is that, the USP simultaneously provides the 230 V sinusoidal system for the remaining controls and therefore the lift controls, 12 V and 24 V power units as well as the contactor solenoids and brake magnets continue to be supplied with normal voltages, thus reducing the cost of emergency evacuation to a very low value. Furthermore, the charging state of the USP need not be checked (this is done automatically). Only a reactor is necessary (starting current limitation) and a high-blocking capability bridge rectifier (ZK rectification incl. Isolation) to simultaneously provide the DC voltage (approx. 320 V) for the converter. Both parts can be obtained from EMOTRON LIFT CENTER GmbH (also applies to a suitable high-quality USP). The design of the USP can be made according to the following rule of thumb:

Nominal device current in ampere / 10 = USP power in kVA. This power is sufficient to reach the next stop (independent of direction). The device allows only speed Ve or Vn in association with gearless drives. The same measures as for the battery version apply with regard to protective interlocking. The 7SZ version is set to emergency evacuation using input E1 (see also process above). With 3SZ, 9SZ and 10SZ, the "emergency evacuation" flag must be "0" so that a phase fault is not detected.

Please note: Emergency evacuation using the USP system functions only with "new" motors. Old systems that still employ 2-speed original machines cannot be operated by this method, since the losses of such Silumin machines are far too high.

12.2.1 Accessories

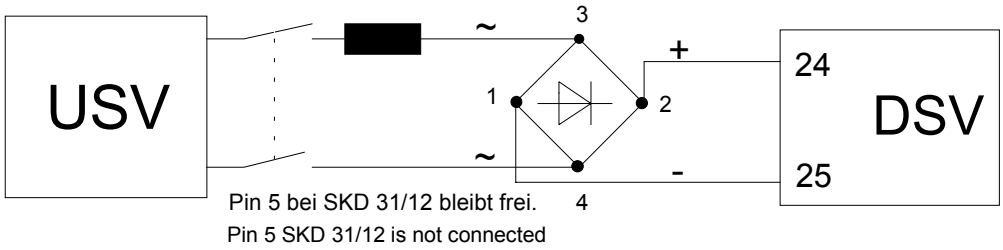
The following accessories are recommended for USP supported emergency evacuation over one stop.

Size	USP type	Reactor	Art. No.	Rectifier	Art. No.
1 (10°)	1.0 kVA	10° 4%uk	7902509	VBO 13 – 16 AO2	8025020
2 (20°)	2.2 kVA	10° 4%uk	7902509	VBO 13 – 16 AO2	8025020
3 (30A)	3.0 kVA	35A 4%uk	7902540	SKD 31/16	8025026
3 (40A)	5.0 kVA	35A 4%uk	7902540	SKD 31/16	8025026

The values given above are values based on experience, which may need exact examination.

A battery cubicle should be used from size 4 upwards(see "Emergency evacuation via battery").

12.2.2 Circuit: UPS, DSV 5445 emergency evacuation



The connection of the UPS system to the converter is performed in accordance with the above circuit example. If emergency evacuation using UPS is used, take note that: The UPS may be connected to the DSV only when the mains is disconnected from terminals L1/L2/L3 (i.e. not online). Evacuation using UPS functions only with new motors (designed for frequency converters) and with gearless or synchronous drives. The UPS may be used to run at maximal "Ve" or "Vi" in both directions (a load measurement is not necessary). The UPS should supply 50 % of the nominal device current for short periods, and continuously 25 % of nominal device current.

Between mains off and switching on the emergency evacuation power supply there has to be a delay time from 5-30sec to ensure the POWER ON RESET.

Standard lift programs use automatically **ve** as emergency evacuation speed as soon as the input E1 is high. The message in brackets looks like this: (V4).

12.3 Power recovery unit REVCON Series SVC

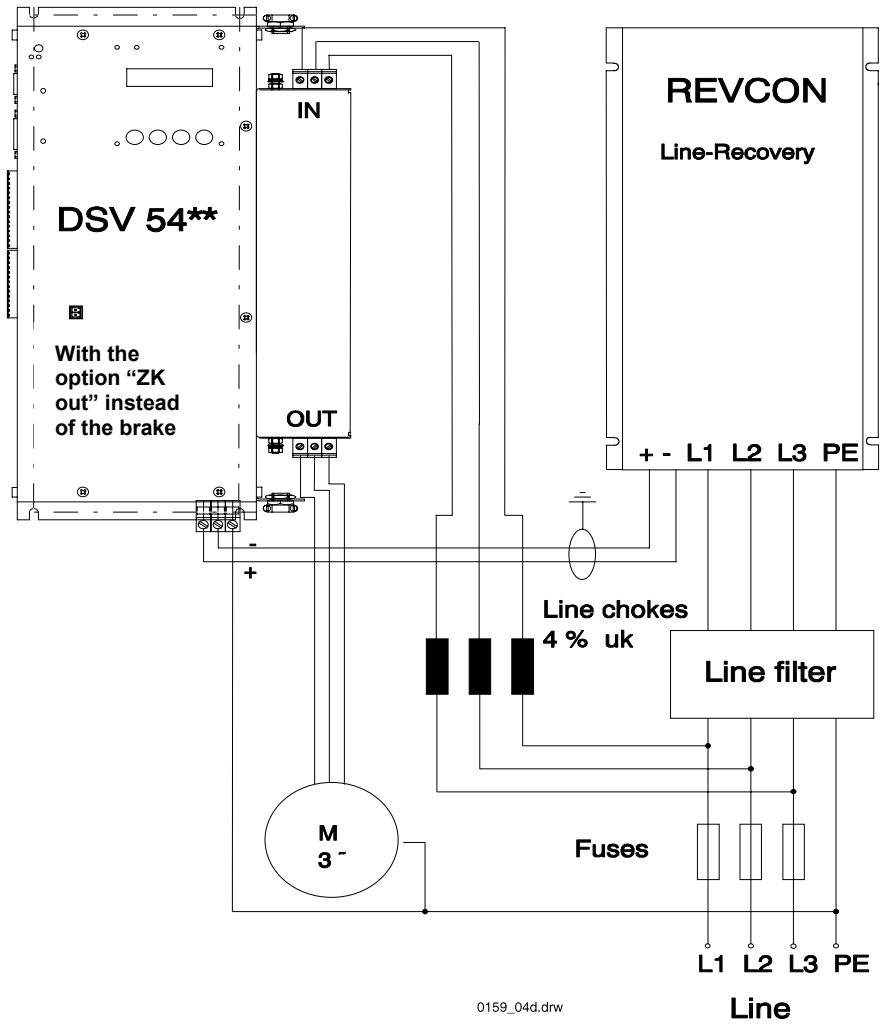
A Revcon power recovery unit is used for power recovery. The terminal 30/31 for the braking resistor is then not provided in the DSV system (i.e. no chopper installed). Option "ZK out" is needed instead (i.e. DC link connection "24" (+) and "25" (-). The Revcon device is supplied from this terminal.

You require Revcon SVC 22-400-1-230VAC for an 60A-Lift-DSV 54**.

You require Revcon SVC 33-400-1-230VAC for an 80A-Lift-DSV 54**.

You require Revcon SVC 45-400-1-230VAC for a 120A-Lift-DSV 54**.

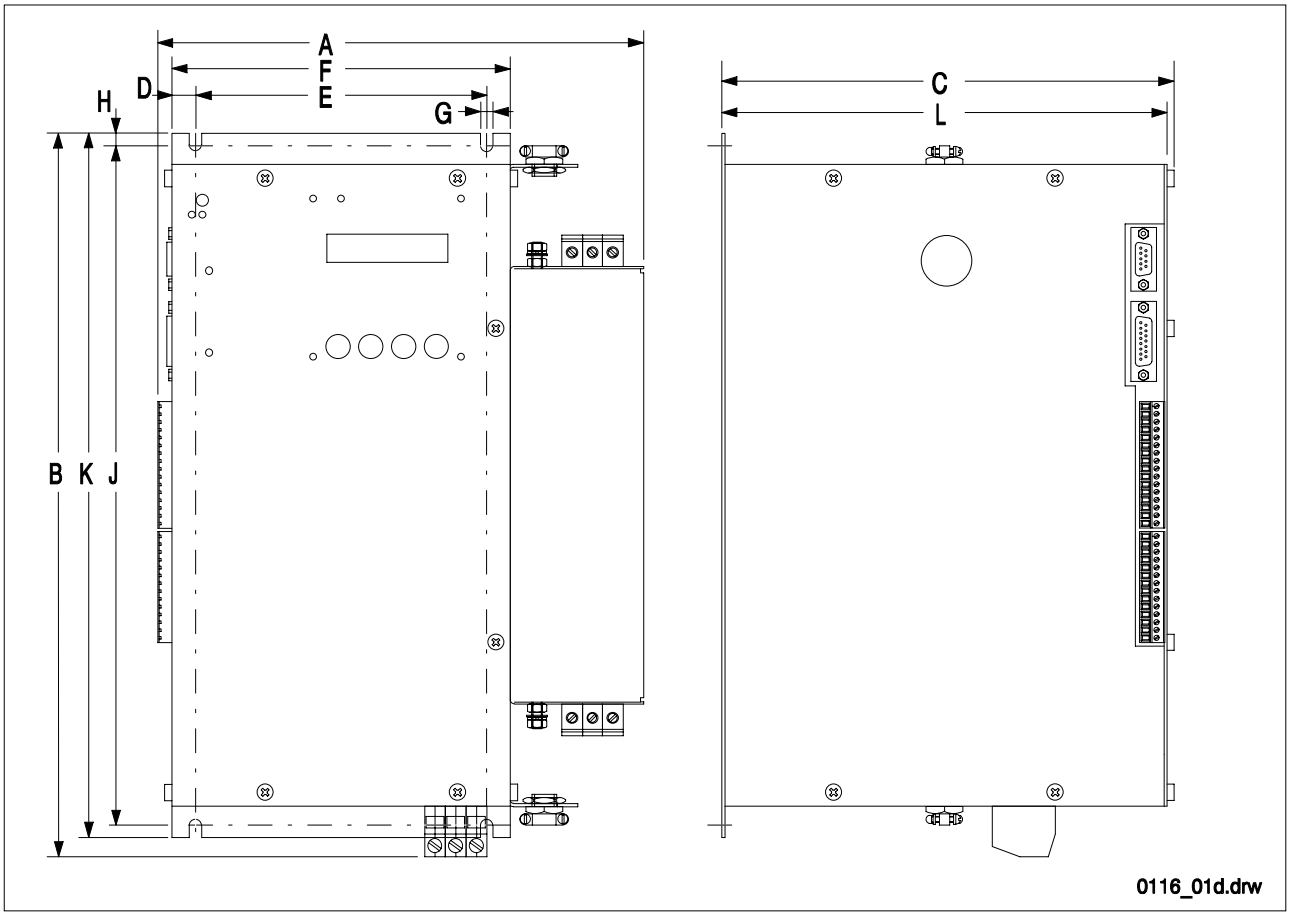
Terminal assignment



13 Appendix

13.1 Dimensions and weight

Frequency converter with built-on filter

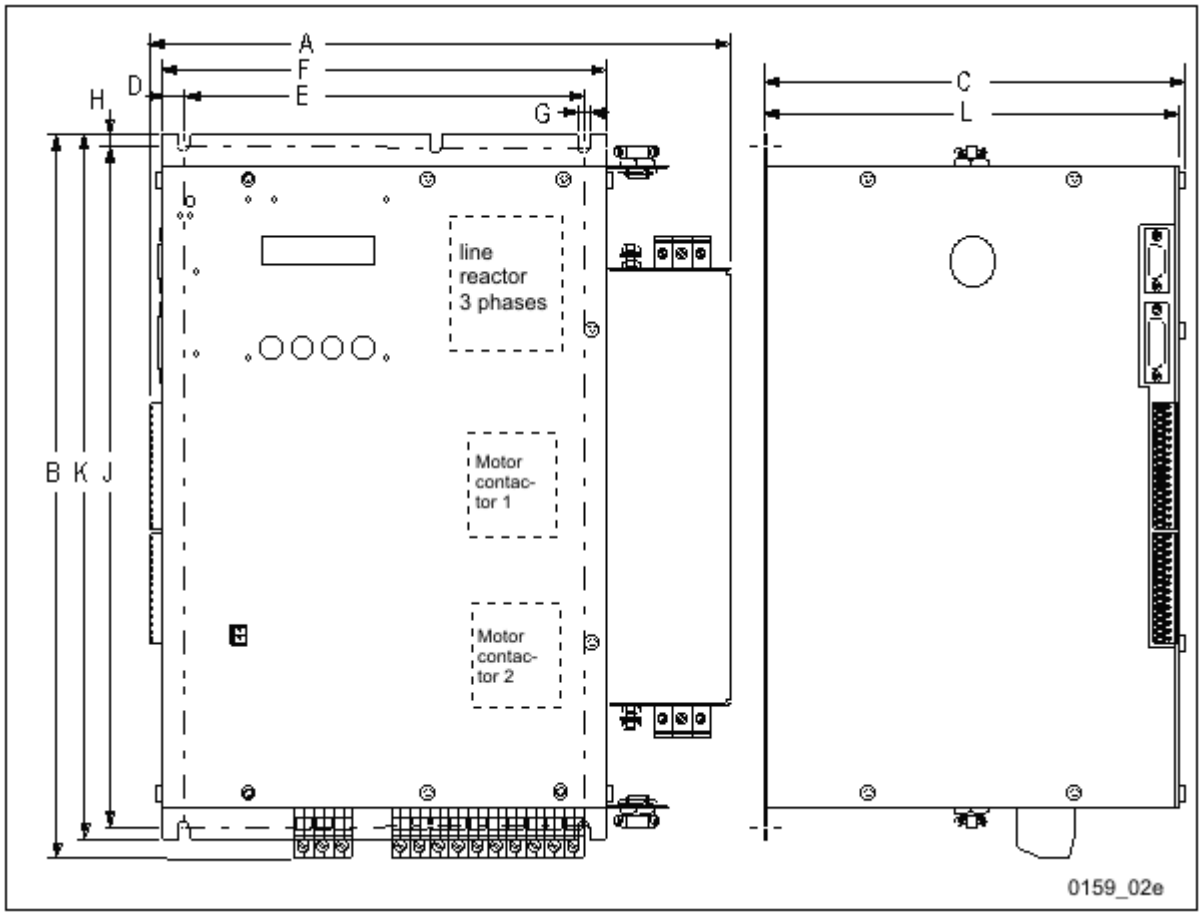


DSV 5445	*Size*	*A [mm]*	*B [mm]*	*C [mm]*	*D [mm]*	*E [mm]*	*F [mm]*	*G [mm]*	*H [mm]*	*J [mm]*	*K [mm]*	*L [mm]*	*Weight [kg]*
10 - 15A	1	167		174	11.5	107	130	6	6	264	276	171	10.5
20 - 30A	2	237	353	220	11.5	142	165	6	6	331	343	217	16.5
40 - 70A	3	237	473	220	11.5	142	165	6	6	451	463	217	24.0
80 – 120 - 150A	4	293	759	310	25	161	210	6.5	6	745	757	304	60.0

- The size 1 connectors are located at the front that means dimension B is inapplicable.
- Size 1 dimensions for 1 option and higher A = 224mm, D = 41.5mm, F = 160mm
- Size 1 and 2 are supplied without internal FU-Control
- Size 2 dimensions for 2 options and higher A = 267mm, D = 41.5mm, F = 195mm; the connectors are located at the front
- DSV 5445 30 size 3 and DSV 5445 60 size 4 should not be used anymore for new installation.

13.2 Dimensions and weight DSV 5445-PLUS

Frequency converter with built-on filter, mains reactor and motor contactors

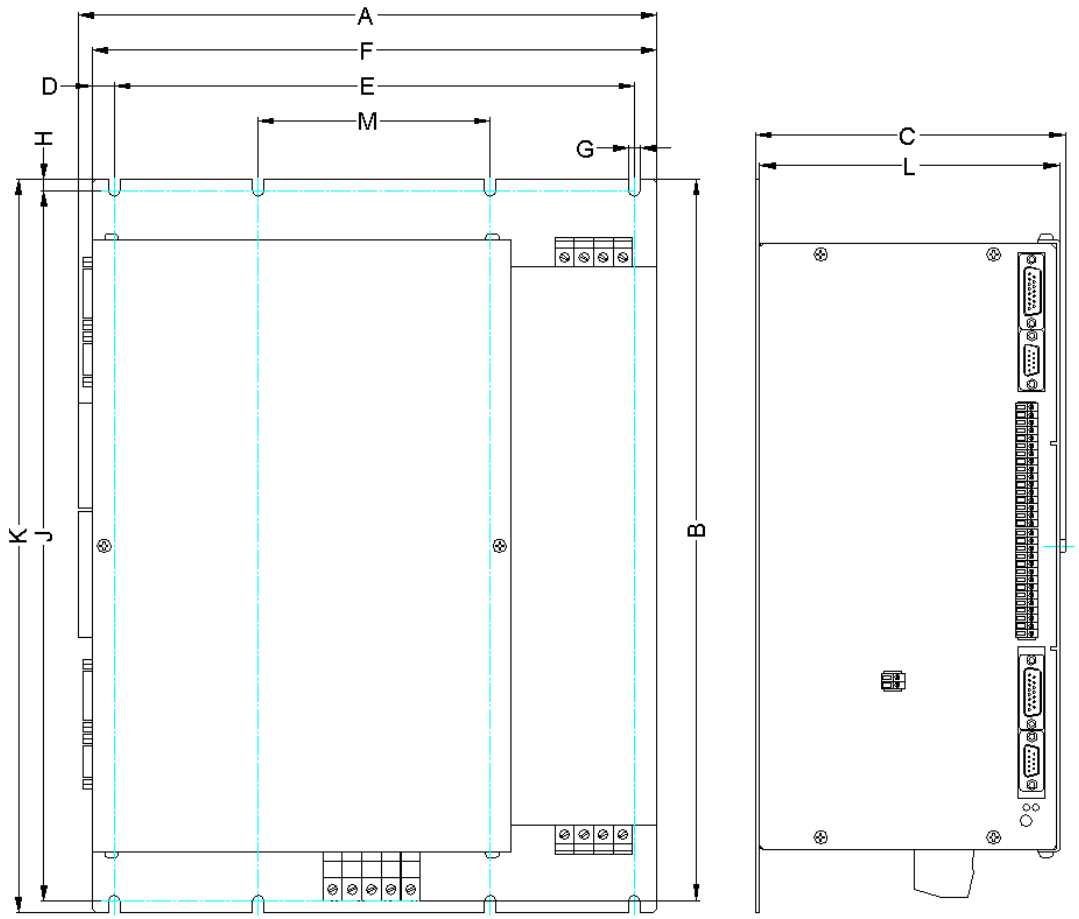


DSV 5445-PLUS including 2 motor contactors and mains reactor 4%uk

DSV 5445-PLUS	*Size*	*A [mm]*	*B [mm]*	*C [mm]*	*D [mm]*	*E [mm]*	*F [mm]*	*G [mm]*	*H [mm]*	*J [mm]*	*K [mm]*	*L [mm]*	*Weight [kg]*
10 - 15A	1	324		174	11.5	234	257	6	6	264	276	171	20.0
16 - 20 - 30A	2	398	353	220	11.5	304	327	6	6	331	343	217	25.0
40 - 60A	3	398	473	220	11.5	304	327	6	6	451	463	217	35.0

- The size 1 connectors are located at the front that means dimension B is inapplicable.
- Size 1 dimensions for 1 option and higher A = 354mm, D = 41.5mm, F = 290mm
- Size 1 and 2 are supplied without internal FU-Control
- Size 2 dimensions for 2 options and higher A = 429mm, D = 41.5mm, F = 357mm; the connectors are located at the front

13.3 Dimensions and weight size 2 flat



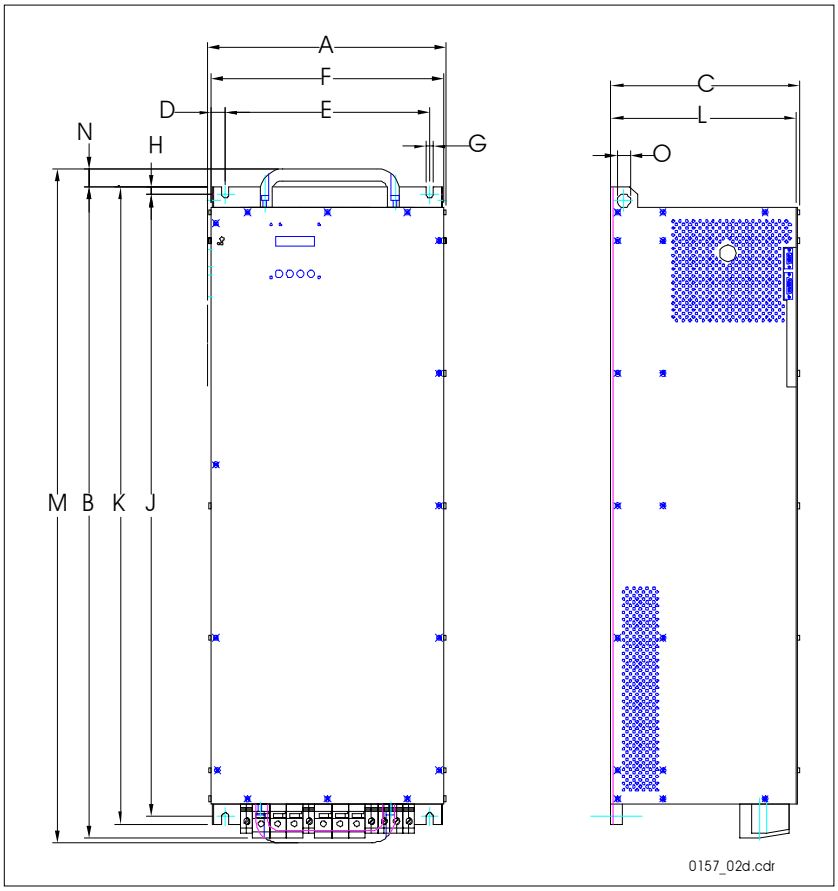
DSV5445BGR2FL.GIF

DSV 5445	Size	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	J [mm]	K [mm]	L [mm]	Weight [kg]
20 - 30 A	2 flat	298,5	372,5	160	11,5	268,5	291,5	6	6	367	379	155	20

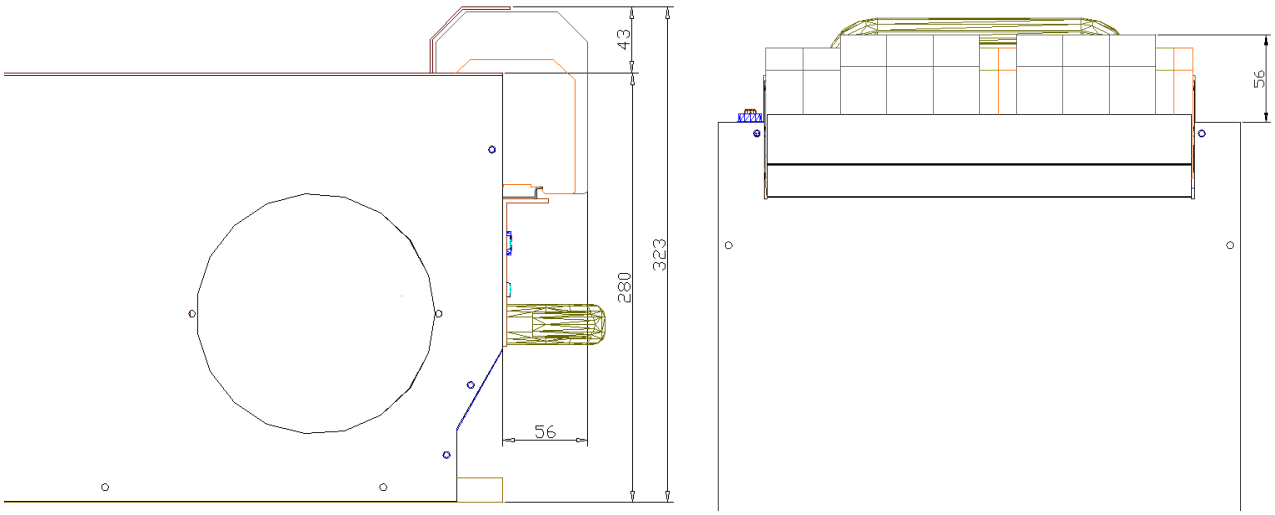
DSV5445 size 2 flat is supplied without internal FU-Control.

13.4 Dimensions and weight of size 5

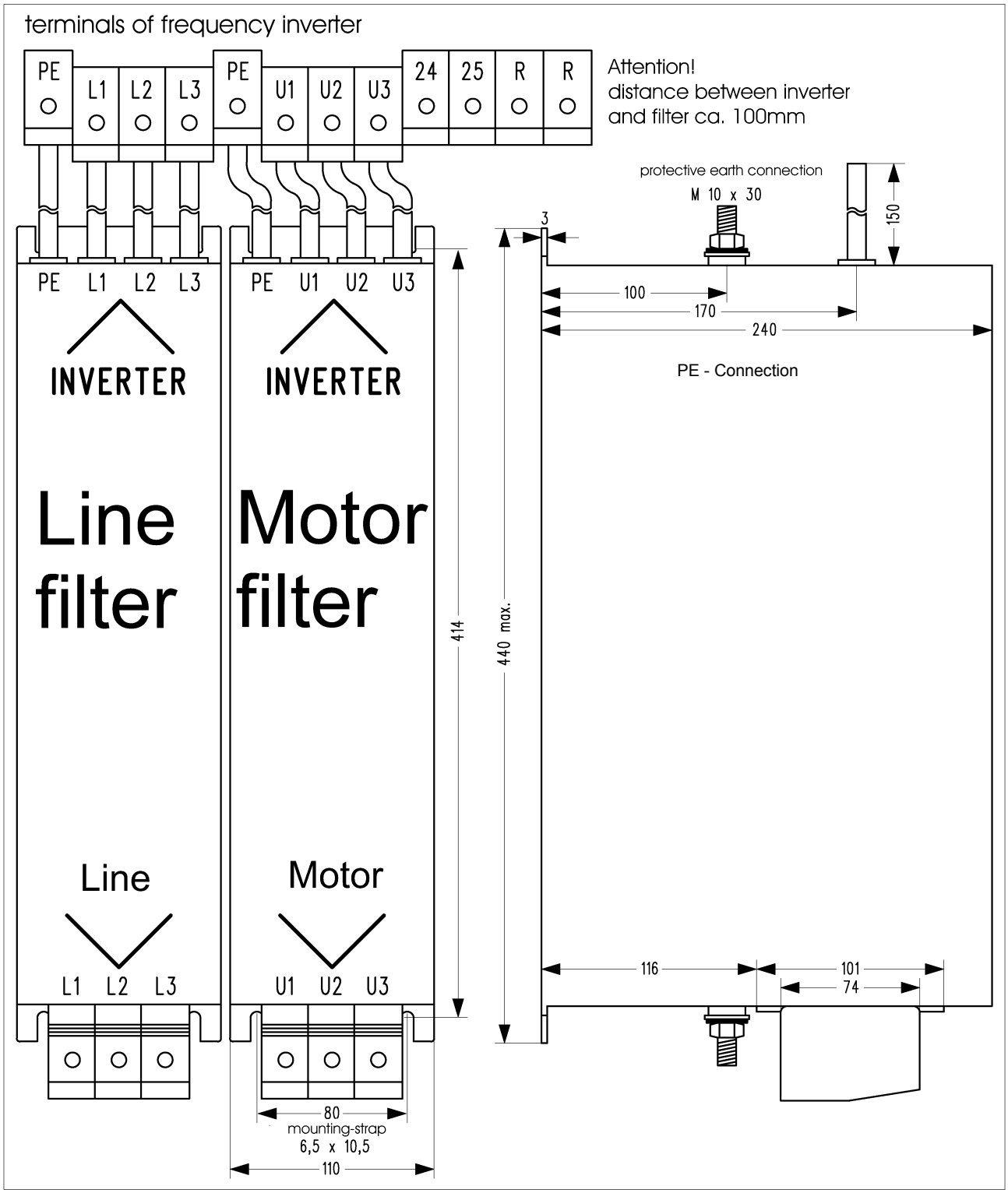
Frequency converter



DSV 5445	*Size*	*A [mm]*	*B [mm]*	*C [mm]*	*D [mm]*	*E [mm]*	*F [mm]*	*G [mm]*	*H [mm]*	*J [mm]*	*K [mm]*	*L [mm]*	*M [mm]*	*N [mm]*	*O [mm]*	*Weight [kg]*
(150 A)	5	357	983	286	21.5	307	346	11	10	913	933	282	1020	28.5	20	60.0
200 A 250 A	5	357	983	286	21.5	307	346	11	10	913	933	282	1020	28.5	20	75.0
320 A	5	357	983	323	21,5	307	346	11	10	913	933	282	1020	28,5	20	80,0



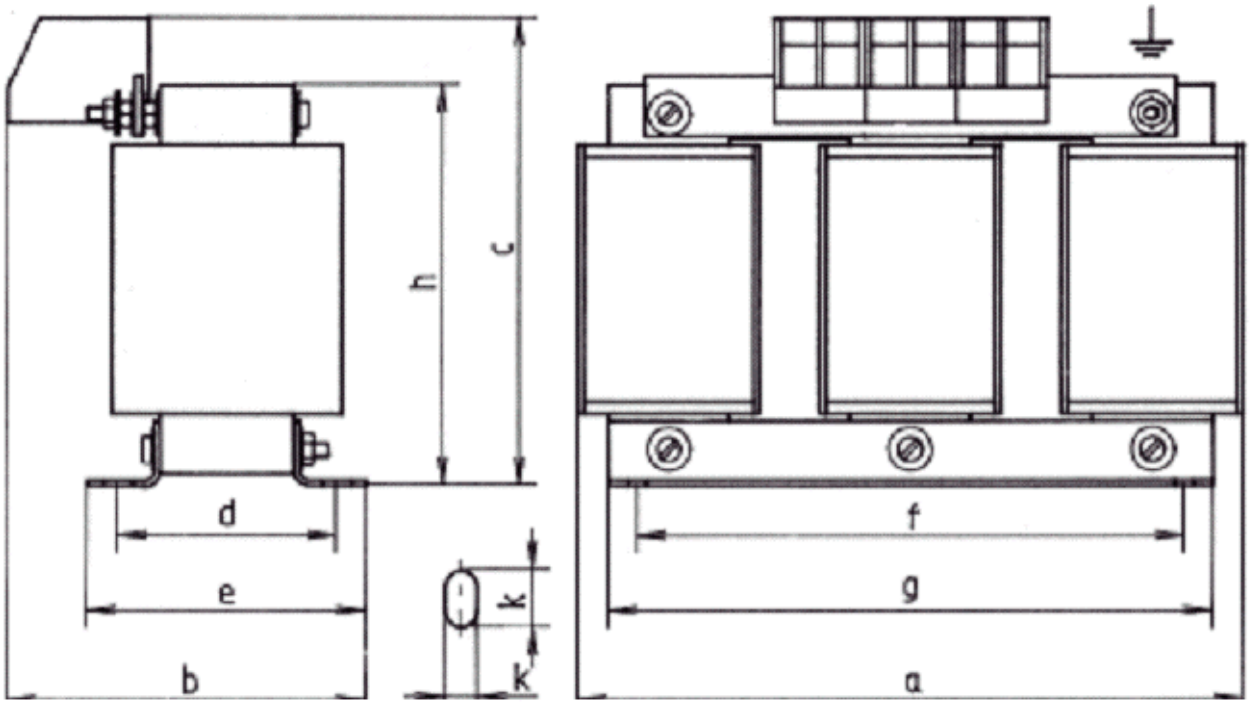
AddOn filter size 5



0158_01D.tif

Note: For DSV 5445 – 320/400 at the moment no AddOn available, only a normal net-filter (article 74848300) with the following data: High x wide x deep = 490 mm x 230 mm x 185 mm, weight = 18,3 kg (no wires here)!

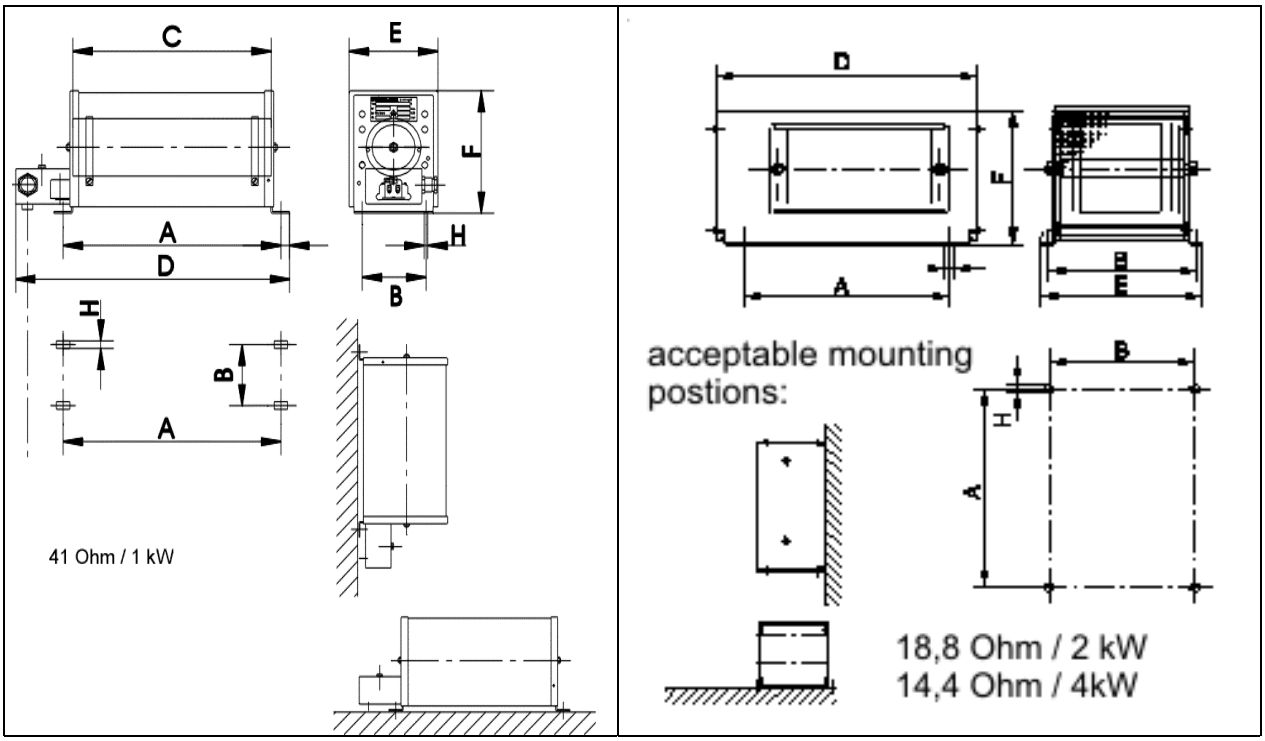
Line reactor



0095_01.GIF

Art. No.	*Current*	*mH*	*a*	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*k x k*	*kg*
7902600	16A	1.50	120	80	120	57	70	84	96	105	10x05	2.5
7902605	35A	0.70	155	120	160	70	90	130	155	130	11x08	5.0
7902610	50A	0.50	190	100	195	58	80	170	190	160	11x08	5.8
7902615	80A	0.30	190	100	230	80	100	170	190	170	11x08	9.0
7902620	100A	0.25	240	120	280	98	120	190	240	220	17x10	13.4
7902625	130A	0.18	240	120	280	98	120	190	240	220	17x10	15.2
7902630	200A	0.12	240	150	320	130	155	190	240	220	17x10	25.0
7902632	315A	0.093			260		240		300			37,0

Brake resistor



DSV 5445	*Brake resistor*	*A [mm]*	*B [mm]*	*C [mm]*	*D [mm]*	*E [mm]*	*F [mm]*	*H [mm]*	*Weight [kg]*
5 - 10 A	40 Ω / 0.5 kW Cressall	236	92	-	288	121	141	10.5	1.4
15 - 20 A	40 Ω / 1 kW Cressall	415	92	-	445	121	141	10.5	4
30 - 40 A	18-20 Ω / 2 kW Cressall	415	185	-	445	213	141	10.5	6
60 - 80 A	14-15 Ω / 4 kW Cressall	415	278	-	445	207	141	10.5	9
120 A	13.0 Ω / 6.5 kW Frizlen	380	370	-	490	395	260	10.5	12
150 A	10.0 Ω / 8 kW Cressall	700	290	-	766	330	141	10.5	15
200-250 A	4.0 - 6.5 Ω / min. 11 kW	380	570	-	490	595	260	10.5	21
320 A	2.5 - 5.0 Ω / min. 19 kW	Size depends on the needed application-datas							41 - 83

Pay attention to connection assignment:

Terminals: RB1 / RB2→ Braking resistor terminals.
Terminals: T1 / T2 → Thermo-contact terminals.

High operating temperature:

The temperature of the resistor elements reaches up to 350 °C. No heat-sensitive objects, e.g. cables, may therefore be located in the vicinity. The electrical connections must be made from below. The braking resistor may not be operated in explosive environments or in the vicinity of inflammable materials. Free circulation of cooling air must not be obstructed.

Protection class:

Due to the low protection class based on the physical principles of braking resistors, it must be ensured by means of a suitable installation position, that foreign objects can never fall, drip, flow or blow into the resistor.

Note: Measurement of housing and connection could be different from this table above.

13.5 Sources for rotary encodes

If you prefer 1Vpp encodes, then TTL and HTL tend towards noise generation in the motor at low speeds. 1Vpp technology offers the highest degree of smooth running without noise.

The following are suitable sources for incremental rotary encodes on the basis of 1Vpp technology:

Manufacturer	*Example*
Kübler Zähl- und Sensortechnik PO Box 3440 D-78023 Villingen-Schwenningen Tel. +49-7720-390344 Fax: +49-7720-21564 Contact: Mr Kahrs (Mr Kulajew) www.kuebler-gmbh.de sales@kuebler-gmbh.de	8.5824.3PA2.1024, 15 mm hollow shaft with shaft seal, 12-pole round connector 8.5824.36AC.1024, 10mm hollow shaft with 7m pre-fabricated cable 8.5804.21AF.1024, 6mm servo-flange with 7m pre-fabricated cable
Wachendorff Elektronik GmbH & Co KG Industriestrasse 7 D-65366 Geisenheim Tel. +49-6722-9965-0 Fax +49-6722-9965-43 Contact: Andreas Kühn www.wachendorff.de sales@wachendorff.de	Hollow shaft encoder 1Vpp 1024 incr. with 25 mm hollow shaft: WDG 80H-25-1024-ABN-SIN-L3 and connection cable or 42 mm hollow shaft encoder for lifts: WDG 100 H-42-1024 (or -2048)-ABN-SIN-L3 Note: Be sure that encoder-cable-screen is contacted to the housing/case of the encoder! Also be sure to order only encoder with a glass-code-disc (no metal)
Baumer GmbH CH-8501 Fraunenfeld (or D-61142 Friedberg) Tel. +41-52728-1122 Fax: +41-52728-1144 www.baumerelectric.com	4mm/6mm-shaft standard encoder
Dr. Johannes **Heidenhain** GmbH Dr.-Johannes-Heidenhain-Str. 5 D-83301 Traunreut Tel. +49-8669-311795 Fax +49-8669-38609 Contact: Mr Rieß	Servo-flange with 6 mm shaft: ROD486-0013-1024 38 mm hollow shaft encoder for lift motors: ERN680-K003-1024
Litton Precision Products International Inc. Oberföhringer-Str. 8 D-81679 München Tel. +49-89-92204-0 Fax +49-89-985184 Contact: Peter Gwinn (Technical Office Litton, Jahnstr. 3, D-88048 Friedrichshafen)	Servo-flange types: Series G58..SI Hollow shaft types: Series G130...
Thalheim-Tachometerbau GmbH+Co. KG Hessenring 17 D-37269 Eschwege Tel. +49-5651-9239-0 Fax +49-5651-8577	Hollow shaft encoder for OMS-Hypoid combination: ITD42A4Y...1Vpp 1024 increments
HENGSTLER GmbH Uhlandstr. 49 78550 Aldingen Tel. +49-7424-89514 Fax: +49-7424-89295 Contact: Mr Franz Göller	Hollow shaft standard encoder
Remark: Rotary encoders with the 1Vpp technology are now also partly available from the suppliers like Stegmann/Sick, AMI, Rauscher and Hohner (Ideacod) ; please enquire at these companies if applicable.	

14 Hotline note

Tel. +49-7025-101-29 / -42
Fax: +49-7025-5824
www. emotron.com

Please check the following points before calling our hotline:

We require several pieces of information to be able to help you with problem cases. Please complete the form and give us the data. (By telephone or by fax.)

Customer and order information	Date:
Customer address Order:	Contact person: Tel.(on-site): Fax:
Frequency converter data	
DSV544... A /	V
M-number:	Installed program:
Lift data	Controller manufacturer:
Load capacity: kg	Total height m
Cabin empty weight: kg	Largest floor height: m
Max. travelling speed V3 m/s	Smallest floor height: m
Motor data	Encoder type: No. of increments:
Manufacturer:	Power: cosφ:
Motor number:	$U_{nom:}$ I_{nom}
Gear data	Worm gear? ☐ yes ☐ no
Manufacturer: Gear number:	Epicyclical gear? ☐ yes ☐ no
Translation ratio:	Belt drive? ☐ yes ☐ no
Suspension:	Efficiency: % Number of pulleys:
Drive wheel diameter:	Gear position: ☐ bottom ☐ top

Fault/problem occurs:

☐ at switch-on	☐ during constant travel	☐ in both directions	☐ in flush area
☐ during start	☐ during deceleration	☐ only during travel UP	☐ Fault is reproducible
☐ during acceleration	☐ when stopping	☐ only during travel DOWN	☐ Fault occurs sporadically

Short description of fault:

15 Technical data for ☐ enquiry ☐ order

If ordering equipment please always complete this form and mail or fax it to:
Emotron Lift Center GmbH, Max-Planck-Straße 15, D-72639 Neuffen
Fax: +49-7025-5824, Tel. +49-7025-101-0

Customer and order information	Date:
Customer address Order:	Contact person: Department: Tel: Fax: Customer number
Lift data	Intermediate speed (V2): m/s
Load capacity: kg	Single-floor run (V1): m/s
Cabin empty weight: kg	Smallest floor height: m
Max. traveling speed (V3) m/s	Largest floor height: m
Motor data	Motor type: asynchronous ☐ synchronous ☐ real DC ☐
Manufacturer:	Refurbishment? ("old motor") ☐ yes ☐ no
Motor number:	New motor? (for frequency converter) ☐ yes ☐ no
Power:	2-speed? (state only data for higher winding):
I_n A U_n V, ☐ star ☐ delta, F_{nom} Hz, No. poles: -pole cosφ: n_n 1/min	
Encoder type: ☐ 1Vpp ☐ TTL ☐ HTL ☐ none; increments:	
Your encoder specification:	
Forced ventil. ☐ yes: V, -phase;	☐ no, internal fan
Gear data	Worm gear? ☐ yes ☐ no
Manufacturer:	Epicyclical gear? ☐ yes ☐ no
Gear number:	Belt drive? ☐ yes ☐ no
Suspension:	Gearless? ☐ yes ☐ no
Translation ratio: to number of gears:	Effective drive wheel diameter: . . . . . mm
Gear position(location relative to lift shaft): ☐ bottom ☐ top	Efficiency [%]: . . . . Number of pulleys: . . . .
Frequency converter ☐ PLUS-series (with contactors)	Bus systems: ☐ **DCP_0…** ☐ **ACP_0…** ☐ L2DP, IBS, CAN
☐ field oriented system **MULTIDRIVE VECTOR VVVF DSV 5445 LIFT .....A / .....V**	
☐ Energy recovery	☐ Emergency evacuation with battery 240 V DC
Brake resistor ☐ not present, please deliver	type: .....Ω, ...W 100% duty cycle;
AddOn-filter ☐ not present, please deliver	type: .....
Line reactor ☐ not present, please deliver	type: .....A
Additional accessories ☐ not present, please deliver	.....
Desired delivery date:	Comment: .....