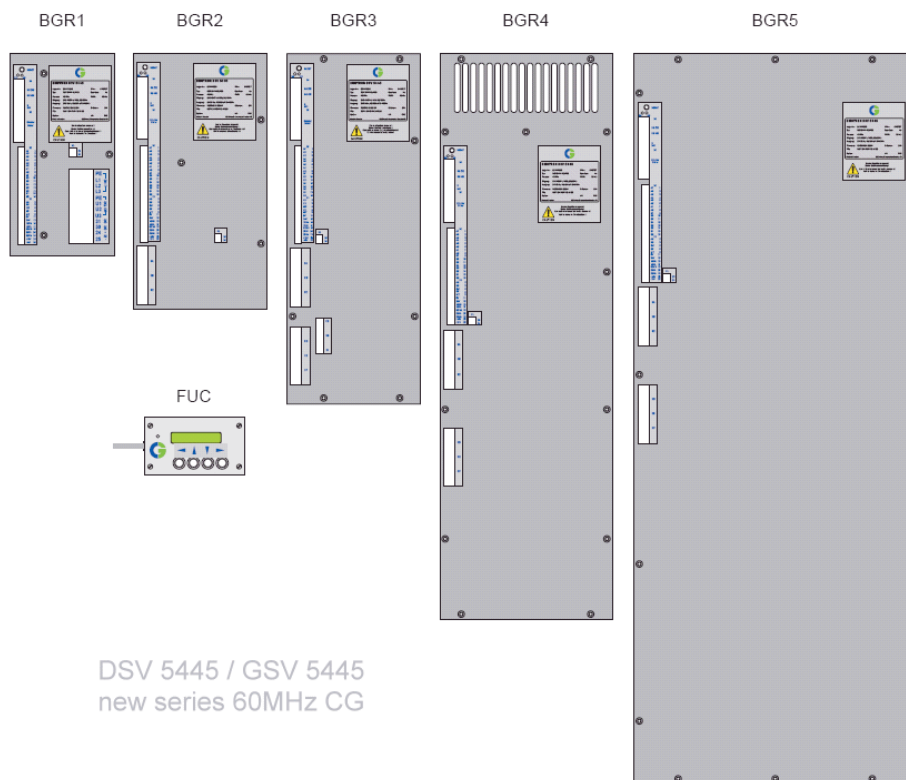


EMOTRON DSV 5445/5444 LIFT

Operating Instructions

units 60MHz, 50MHz, 40MHz
(TUDY, TUDX, TUDZ, TUDW)



Edition 08/13
Subject to technical modifications
(Interim)



EMOTRON DSV 5445/5444

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 5444 ; GSV 544x ; DSV 5445/5444-Plus-series ; KD 915 , KD 920 ;

Brake resistors 2,5...40 Ohm (Type Cressall, Frizlen, Danotherm) and AddOn-filters

comply with the following directives and standards:

Low voltages directive 2006/95/EG and 73/23/EWG - amendment 93/68/EWG - EMC directive 2004/108/EG and 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 61000-6-3	2002-08	EN 55011B	(basic emission standards) incl. IEC801 Part 1-5		
VDE 0875 Teil 11	2003-08	EN 61000-6-3/AA	2004-07	EN 61800-1	1999-08
EN 12015:2005/A1	2008	EN 12016:2008	2009/A1	EN ISO 13849-1	2006/42/EG

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 quoted 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 displaced 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 $\geq 97\%$ at 65% duty cycle ($< 45^\circ$ 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 device 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, W7, W8).

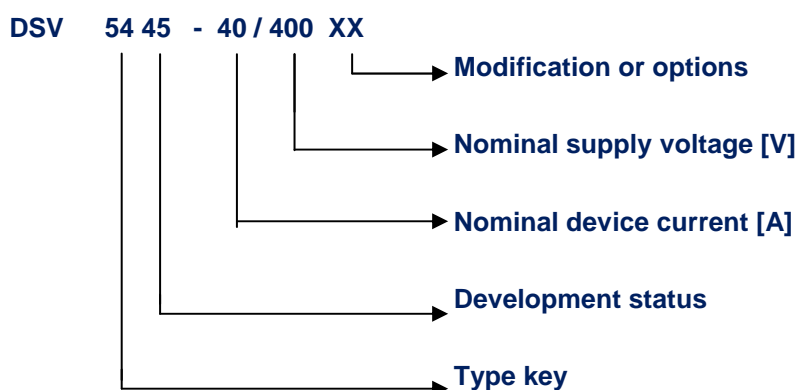
2 Safety Notice



- 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. [If there is no possibility for a safe connection of cabinet/unit to earth/ground, earth-leakage relays has to be a class B-type.](#)
- 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 × 500V +5%/-15%) TT, TN system (option)
(1/3 × 230V ±10 %) TT, TN system (option)
1 × 200VDC up to 700VDC on request (option)
Other net-voltage and/or IT system on request
- ◆ Power mains frequency: 50...60 Hz ± 5 %
- ◆ Control voltage for fans from BG-4/5 >80A: 230V +5, -15 % (optional 400V ±10 % internal)
- ◆ Control voltage PLC level: +24V ±15 %
- ◆ Typical power factor: >0,97
- ◆ Output voltage: 3 × 0...(network input voltage – 10V typically)
- ◆ Output frequency: 0...600 Hz
- ◆ Pulse frequency adjustable: 2.5...15 kHz (typ. 10 kHz, BGR 5 > 250A: 2.5kHz)
- ◆ Typical dV/dt: < 1 kV/μs (with AddOn filter)
- ◆ Dynamic output current (I_{dyn}): 150 % (200% BGR 1 10A)
- ◆ Duty cycle at 2.5, 5, 10.,12, 15 kHz PWM: 110, 100, 65, 50%, 40% (depend from size)
- ◆ Control range (2...128-pole motors): 1:32000
- ◆ Encoder interpolation for 1Vpp up to 512-times for 2048 pulses per revolution
- ◆ Fixed speeds: 6
- ◆ Speed thresholds: 3
- ◆ Position mode: ± 31bit
- ◆ Torque mode: ± 15bit
- ◆ Protection class: IP 20 (optional IP21), boards: dirty-class 3
- ◆ Ambient temperature: -10...55°C, at heavy duty: 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 normal duty)
- ◆ Installation altitude up to 1000m, thereafter power reduction 6% per 1000m
- ◆ MTTFD 11415 years
- ◆ MTTF 53 years
- ◆ MTBF 26 years
- ◆ ISO 13849 ISP/E0 plus motor-connector
- ◆ EN954-1 Cat.3, EN61508 SIL2 BG-3, BG-4, BG-5
- ◆ EN954-1 Cat.2, EN61508 SIL1 BG-1, BG-2



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
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 Typ 1	3×0,5 mH, 50A	4 x 6,0 mm² *	18-20 Ω / 2 kW 2. x.2,5 mm²
60/70/80 ²⁾	90/100/ 120	39,0/ 45,5	1,2 112	22 - 30	3 × 63A	Bgr. 3 Typ 3	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	3×0,3 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	3×0,25 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	3×0,18 mH, 130A	4 x 50 mm² *	10 Ω / 8 kW 2. x.4,0 mm²
150 ¹⁾	225	104,0	3,0 750	55 - 75,0	3 × 160A	Bgr. 5	3×0,18 mH, 130A	4 x 50 mm² *	10 Ω / 8 kW 2. x.4,0 mm²
200	300	138,5	4,0 750	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	5,0 750	132	3 × 250A	Bgr. 5	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 x 320A	Bgr. 5	3×0,10 mH 250A	4 x 95 mm² *	4,0 Ω / 13 kW 2. x.25,0 mm²
400	600	275,0	7,0 980	200	3 x400A	Bgr. 5	3x0,093mH 315A	4 x 95 mm² *	5,0 Ω / 19 kW 2. x.25,0 mm²
470	700	300,0	7,5 980	250	3 x400A	Bgr. 5	3x0,093mH 315A	4 x 95 mm² *	2,5 Ω / 19 kW 2. x.25,0 mm²

The allowed value of brake-resistors is +/- 20%, the values 'Ohm' is according to 3AC400V power (+/-10%) !

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).

²⁾ DSV 5445 80/400 BGR 3 is only for Asian market (only frontal connectors, only without net-/AddOn-filters).

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.

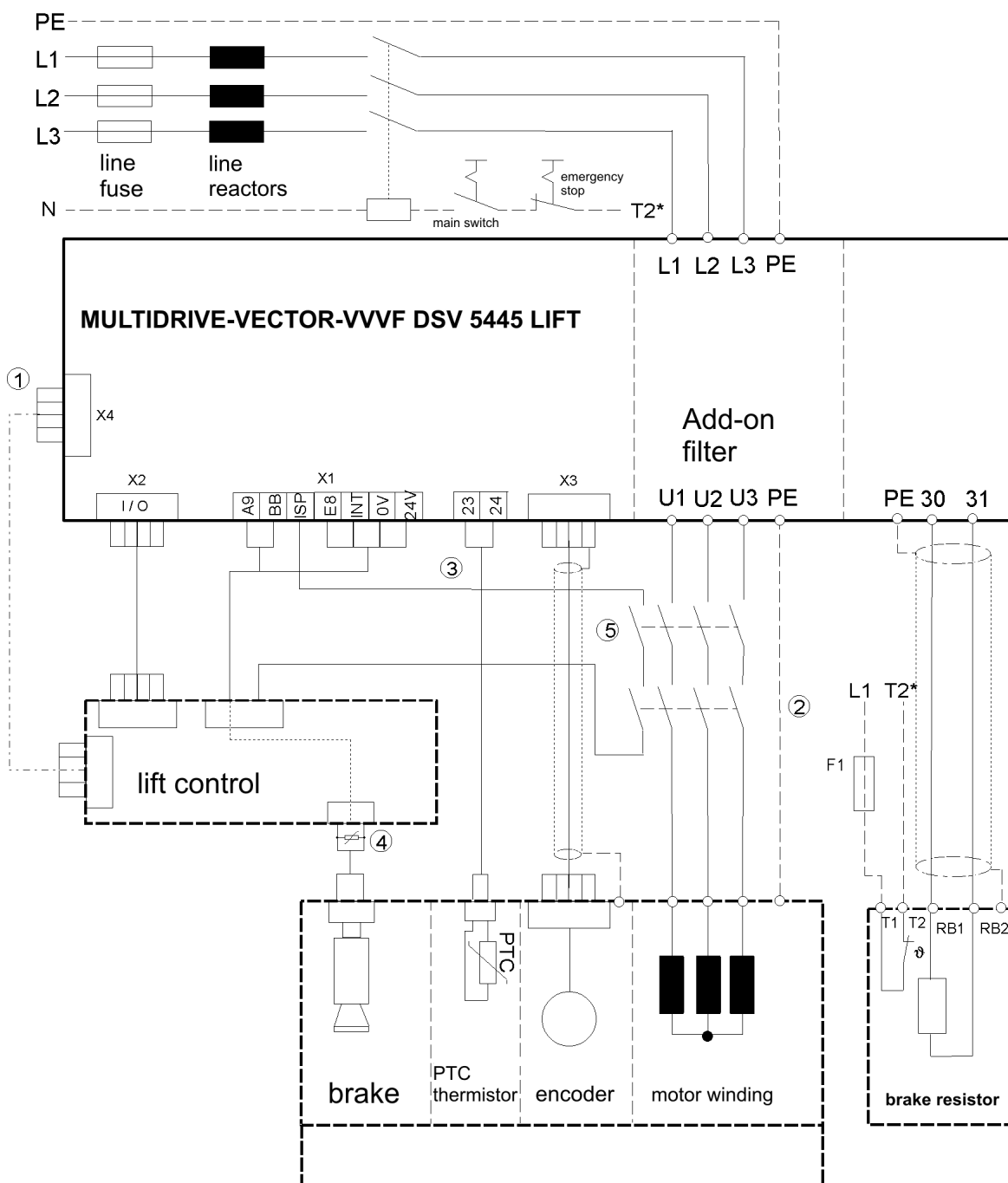
3) The screening of all screened cables (these are normally cables from the converter to the motor - if no add-on filter is employed - and the cables to the brake resistor and to the rotary encoder system) must always be connected at both ends! The rotary encoder must also be connected to the motor earth 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



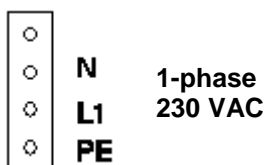
The following applies only to the converters DSV5444/5445 - (60), -80, -120, -150, -200, -250/400

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.

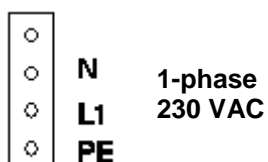
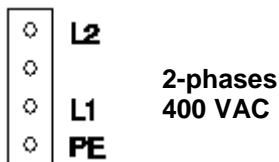
1) Standard (without autotransformer):

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



2) Special versions with autotransformers can be supplied on request only:

or is selectable possible



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
Motor thermistor	24			Please bridge "23-24"

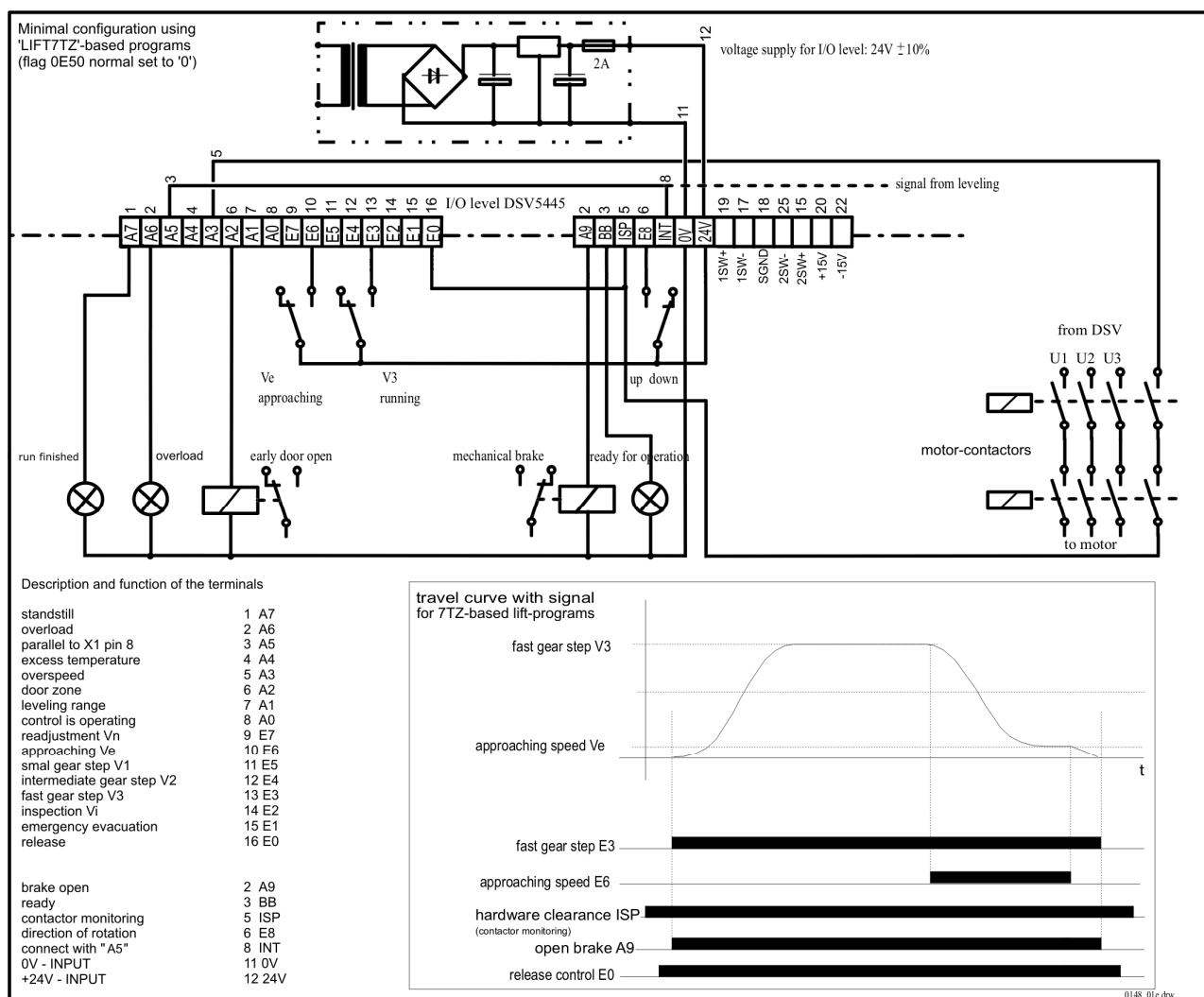
Note: Flag 0E50 = 0 -> normal function of 7TZ-based programs, 0E50 not 0 -> binary coded input-signals !

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 ...7TZ... with normal inputs for speed and direction (0E50 = 0)

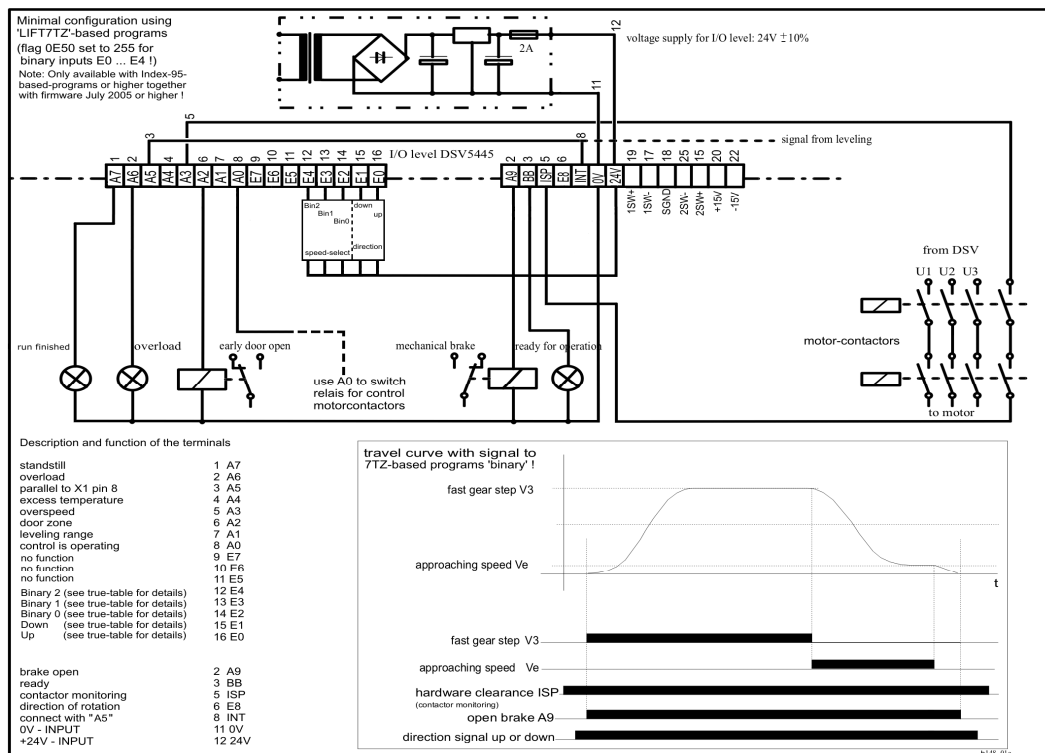


In the minimal configuration for ...7TZ..., the main drive steps V3, V1, V2, Vn or Vi remain applied and "Ve" is added after the copy point. It is also possible to remove the fast drive signal shortly after "Ve" is applied. It is however recommended to wait for at least 5 ms between removing the fast drive signal and applying the approach speed signal; the switchover must however be made "bounce-free"!

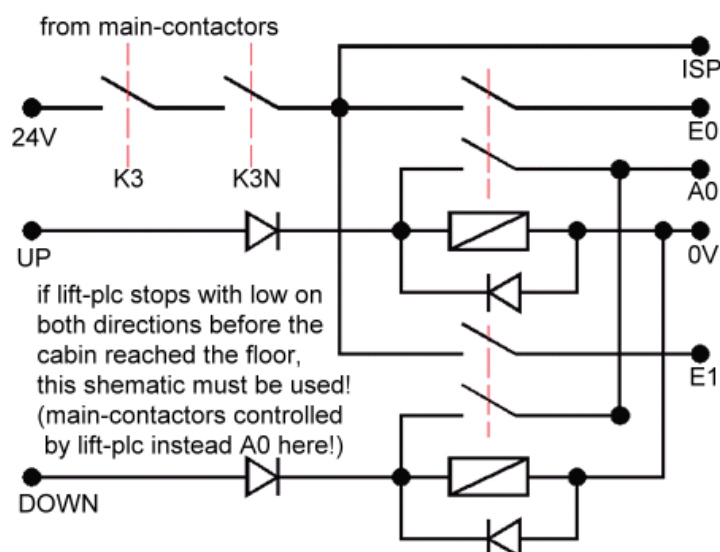
The controller switches Ve back to low in the flush region. Output X2 A5 pin 3 associated with X1 INT pin 8 switches the DSV 5445 automatically to position control and causes the approach into the stop point. The exact remaining distance up to stop is specified in parameter "F26" (Stop distance to floor).

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)



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:



(not needed in case of used code 0E50 = -16)

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

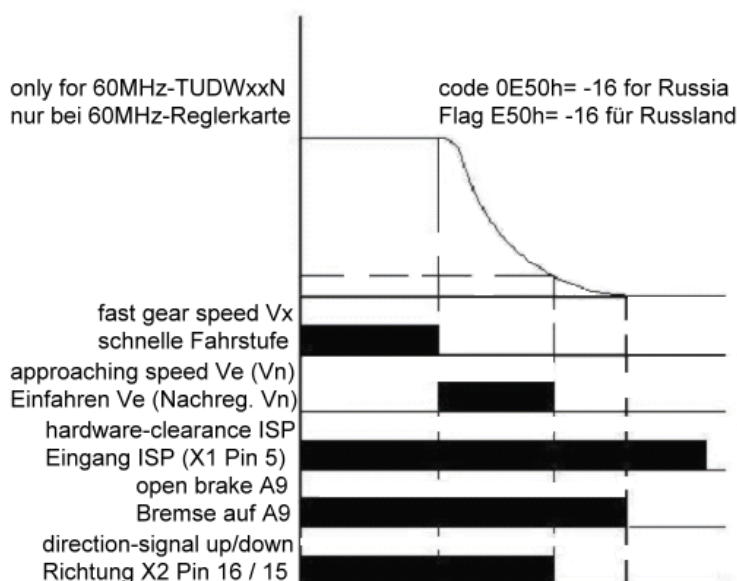
Preface: Spec.-firmware from October 2008 or later (for example TUDXxxN) makes it possible to use the inverter together with some Chinese lift-plc's (signal ISP must be set to 1, before signals E0 ... E6 will work):

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 Connection example 7TZ with 'binary - Russia' coded inputs (value of 0E50 = -16)



Important: 60-MHz needed for this code!

60MHz (ADL)	Up	Down	Bin0	Bin1	Bin 2	Action	binary-flag
ISP	E0	E1	E2	E3	E4	DSV -> Lift-PLC	0E50
0	X	X	X	X	X	Emergency stop	-16
1	0	0	X	X	X	Stop (normal mode after Ve / Vn)	-16
1	0	0	0	0	0	Wait to a next ride	-16
1	1	0	X	X	X	Up-direction	-16
1	0	1	X	X	X	Down-direction	-16
1	1	1	X	X	X	No operation	-16
1	1	0	0	0	0	Stop (normal mode, all speeds)	-16
1	1	0	0	1	0	Ve	-16
1	1	0	0	0	1	Vi	-16
1	1	0	1	0	1	V1	-16
1	1	0	0	1	1	V2	-16
1	1	0	1	1	0	V3	-16
1	1	0	1	0	0	Vn	-16
1	0	1	0	0	0	Stop (normal mode, all speeds)	-16
1	0	1	0	1	0	Ve	-16
1	0	1	0	0	1	Vi	-16
1	0	0	1	0	1	V1	-16
1	0	1	0	1	1	V2	-16
1	0	0	1	1	0	V3	-16
1	0	1	1	0	0	Vn	-16

The code -16 (ADL) has same results as code 255 (KEB), only different: E0 + E1='low' -> drive to floor!

Other documentations about code for Haushahn [MC3000](#) (0E50=16) or as replacement for old series [DSV5452/3](#) (0E50=-15) you will find after internet-update of EmoSoftLift (look to folder EmoSoftLift\infos). Named as MC3000 and 5453.pdf, ASW5453-LESS7TZ.gif, 2500WTTL-LIFT1SX.gif, DSV5453-to-60MHz.gif.



4.5.5 LIFT7TZ-based files with analogue velocity setpoint setting (0E3C = 0)

From up to LIFT7TZ (index 98), which is dated 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
-16	255	regulating steps digital, binary-coded for 'ADL', 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.

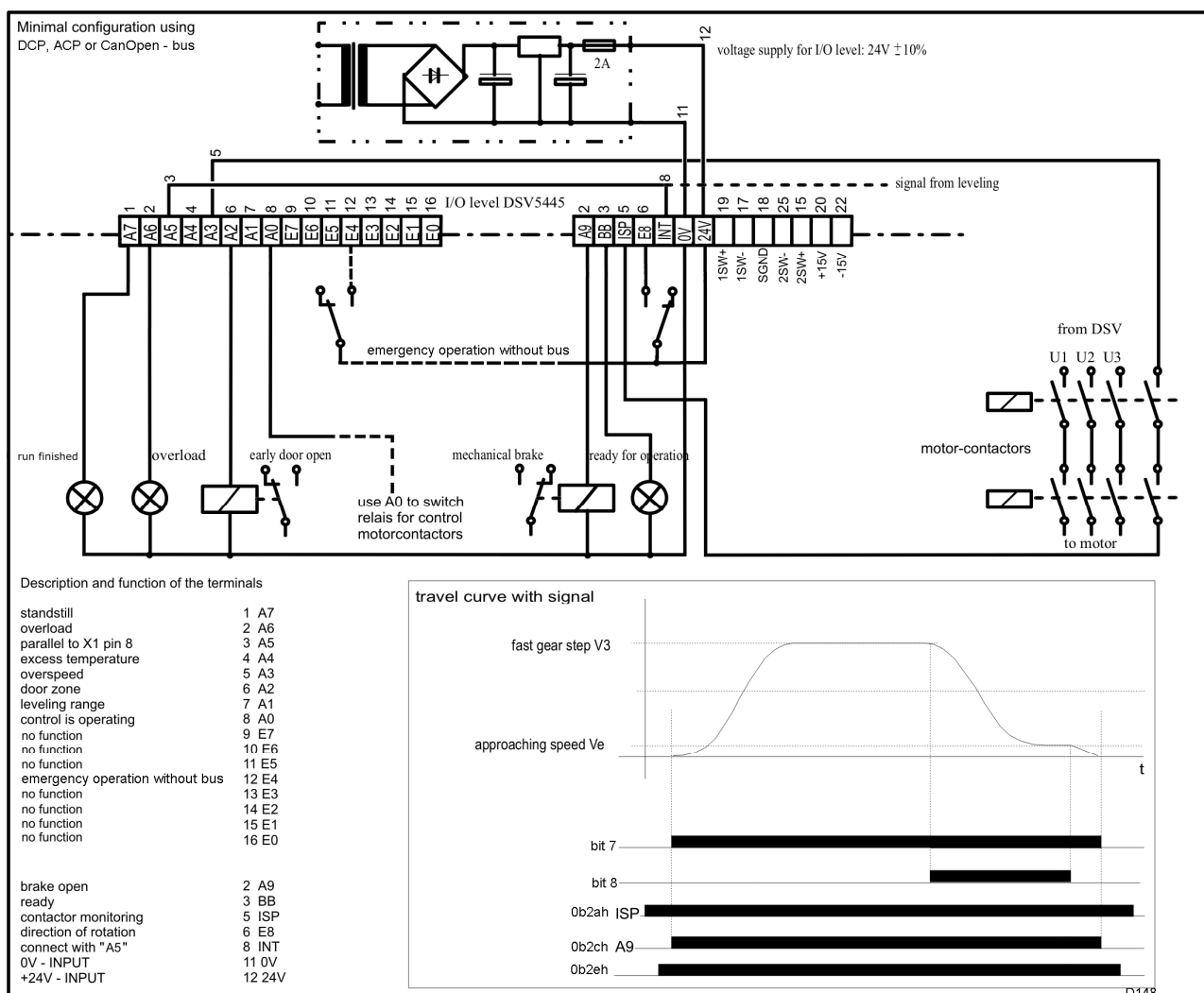
In analogue mode all functions of the program are the same as in digital mode (brake A9, stop signal A7, motor contactor signal A0 and all revolution thresholds).

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	SW1	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	digital-flag	determines the mode (analog = 0)
0E4E	start time	tolerance-time for identifying setpoint = 0
0E50	binary-flag	determines input code (binary = 255 or -256)
0D38/0D3A	hidden	buffer analogue rating (sign)
F24	P of I-regulator	(only 60MHz) gain of current-regulator (see details at table page 47)
F28	motor-V or EMK	(only 60MHz) motor-voltage or EMK related to parameter F1
0B38	s-max	(only 60MHz) max. incremental output-current to calculate F0
0B3A	ke	(only 60MHz) value $ke = V/1000 \cdot 10$ for encoder-less mode only
0B3C	R1	(only 60MHz) measure R1 of motor-phase for encoder-less mode
0B3E	BRUSH	(only 60MHz) set to 255 for synchronous or 0 for asynchronous motor

4.5.6 Connection example "...DCP.../...ACP... for DCP_03/_04/ACP_03-BUS" option



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.

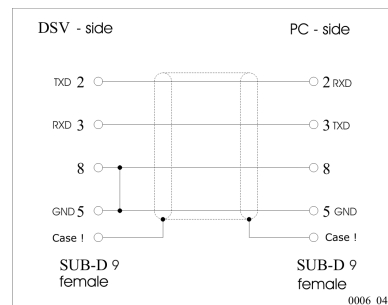


Hints for old control procedures LIFT3SZ.KOM and LIFT9SZ.KOM can be found in the technical customer information "ki0302d0".

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)

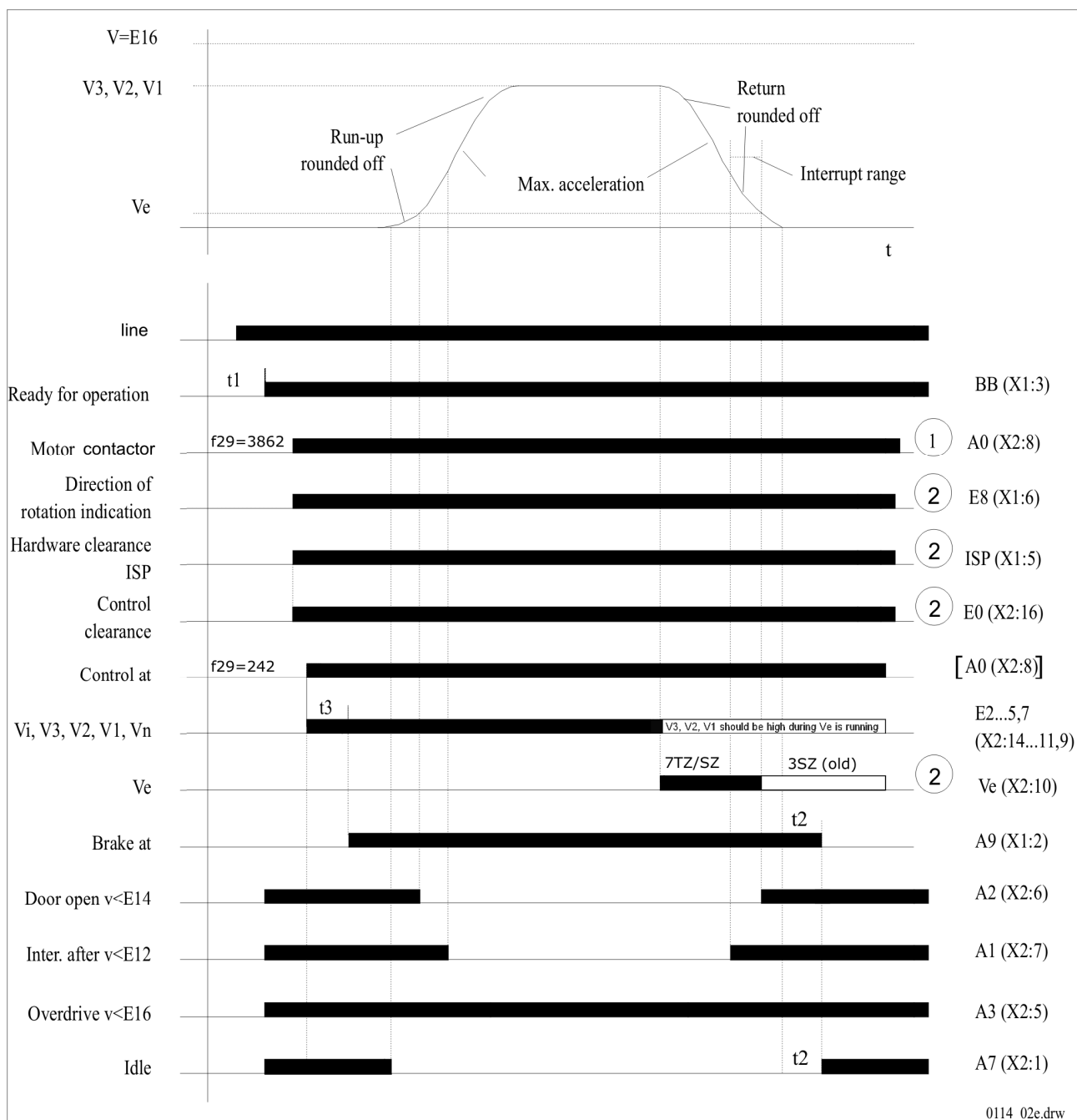
Connector SUB-D 9 pin no.	Meaning
1	TXD-RS422
2	TXD RS232 or TXD+ RS422
3	RXD RS232 or RXD+ RS422
4	RXD- RS422
5	GND
6	Switchover RS485/422
7	Switchover to addressed RS485 mode
8	Connect with pin 5
9	VCC



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
① Only operate motor contactor if A0 OFF and A7 ON, only valid for F29=242.
② 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/s^2	Braking ramp B = 30 $a = 1.0$ m/s^2	Braking ramp B = 15 $a = 1.4$ m/s^2	V3, V2, V1 in m/s	Braking ramp B = 45 $a = 0.6$ m/s^2	Braking ramp B = 30 $a = 1.0$ m/s^2	Braking ramp B = 15 $a = 1.4$ m/s^2
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 TUDW/TUDZ (or for gearless mainly)

V3, V2, V1 in m/s	Braking ramp B = 225 $a = 0.6$ m/s^2	Braking ramp B = 150 $a = 1.0$ m/s^2	Braking ramp B = 75 $a = 1.4$ m/s^2	V3, V2, V1 in m/s	Braking ramp B = 225 $a = 0.6$ m/s^2	Braking ramp B = 150 $a = 1.0$ m/s^2	Braking ramp B = 75 $a = 1.4$ m/s^2
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 control-board (40/50MHz)						
JP3-Flag 0E3E (40/50MHz)		0	255	255	255	(0E60=255)
JP3-Flag 0E3E (at 60 MHz)		0	255	255	-256	(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!

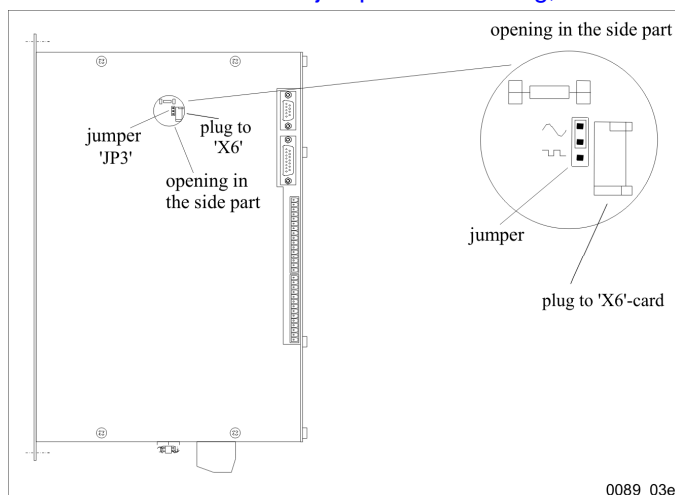
For **synchronous motors**, option **SSI**, **EnDat ®**, **second encoder ATB-version** or **resolver** please note the specification for termination and setting in the respective chapter.

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! Important note: **In case of 60-MHz-units no jumper JP3 existing, because the value of JP3-flag 0E3E also sets the hardware.**



Only 40/50MHz-units: Position jumper JP3 size 2-5; In case of size 1 / size 2 flat housing has to be opened!

5.2 Setting encoder devices and number of pulses

Encoder type	Memory cell 0E4A	Memory cell 0E3E	Jumper JP3 (only 40/50-MHz)
1024 pulses 1Vpp	1024	000	top
1024 pulses TTL	1024	255	bottom
1024 pulses HTL	1024	255 (-256 at 60 MHz)	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 (-256 at 60 MHz)	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

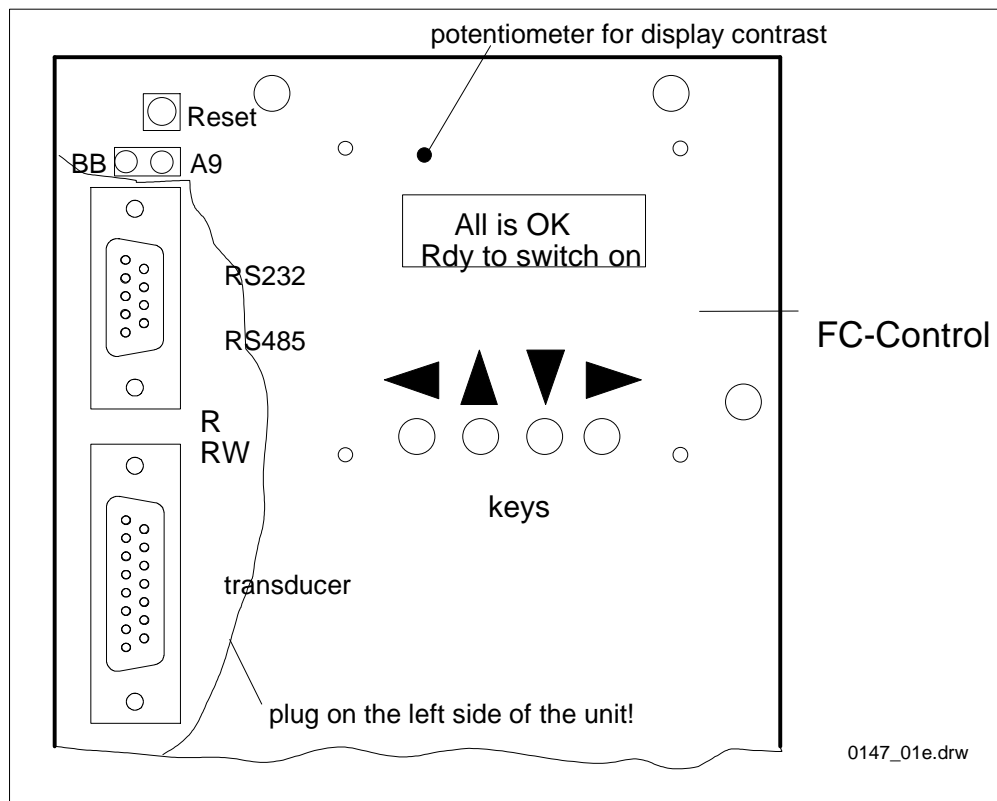
The correct and noise-free measurement of the actual speed value is very important for high-quality control properties of your drive system. The actual speed value is part of the overall control loop. Its quality is determined solely by the worst component, i.e. by a possibly defective actual value.

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 (in case of 60-MHz-units only external FUC's possible)

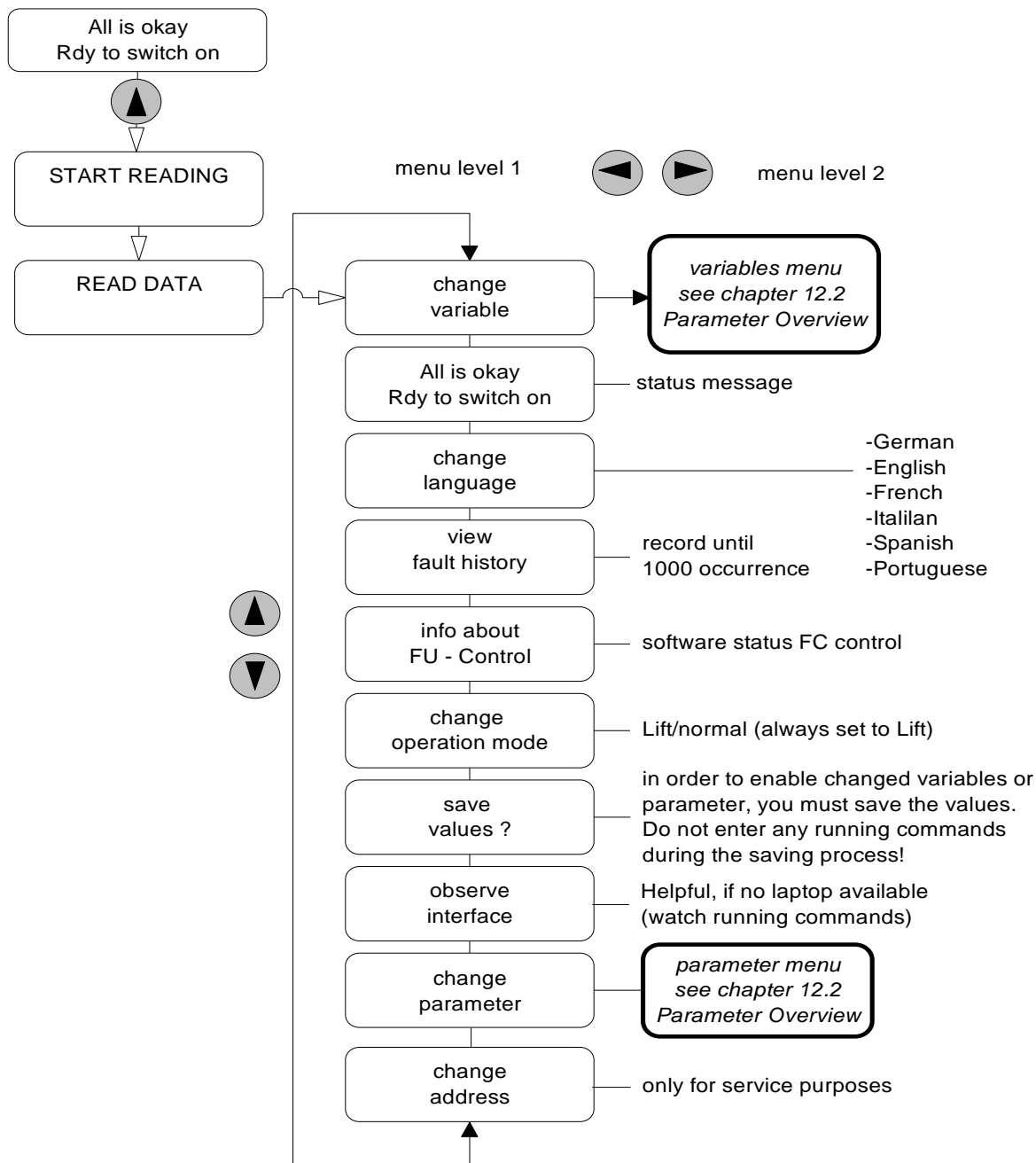


The converter performs self-test of the hardware and associated peripherals (mains phases, motor thermistors and rotary encoders...) during the initialisation phase.




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. <i>Please note that data entries may be made at FU-Control only when no drive command is present. TIP: Switch controller to recovery.</i>
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 (for complete menu-structure read the file ki0503de.pdf)



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".

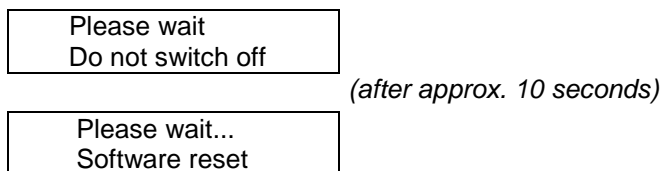
The possible min/max values can be found in Chapter 8.1: Parameter overview.

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:



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 TROUBLESHOOTING*.

6.1.2.2 Fine adjustment of the lift

Please take note of Chapter *TIPS, TRICKS AND TROUBLESHOOTING* and the remarks in Chapter *PARAMETERS AND VARIABLES LIST*.

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 memory). For [external FUC](#) a version with memory independent from power is available!

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 $\pm 2.000.000.000$ 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**.

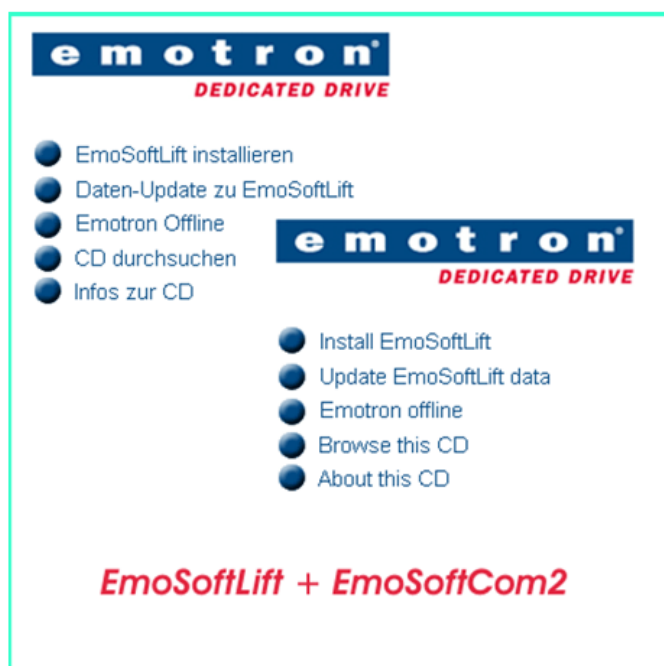
EmoSoftLift needs at least "80486", 16 MB memory and Windows 95/98/ME or NT4/W2000/XP/VISTA and a special RS232 interface cable shown in Chapter *INTERFACE X4*.

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.

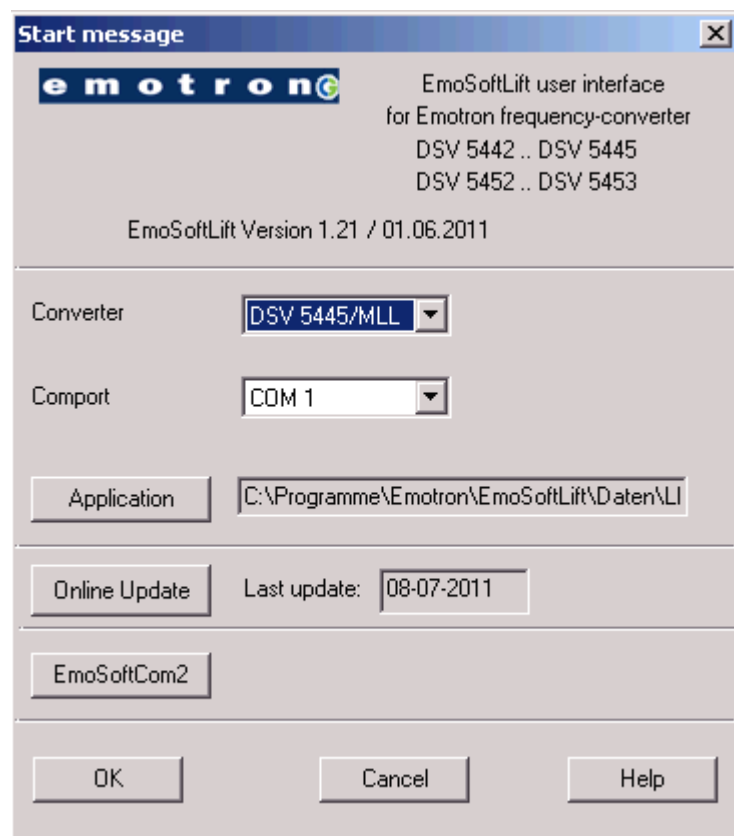


If you are visiting our download website for receiving the actual version of EmoSoftLift you have to register. For this you need a customer number and your email address. Visit our website or try directly click to URL: www.emotron.com go to "downloads" "products" "variable speed drives Emotron DSV/GSV" or the old URL: www.dietz-electronic.de/download.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.

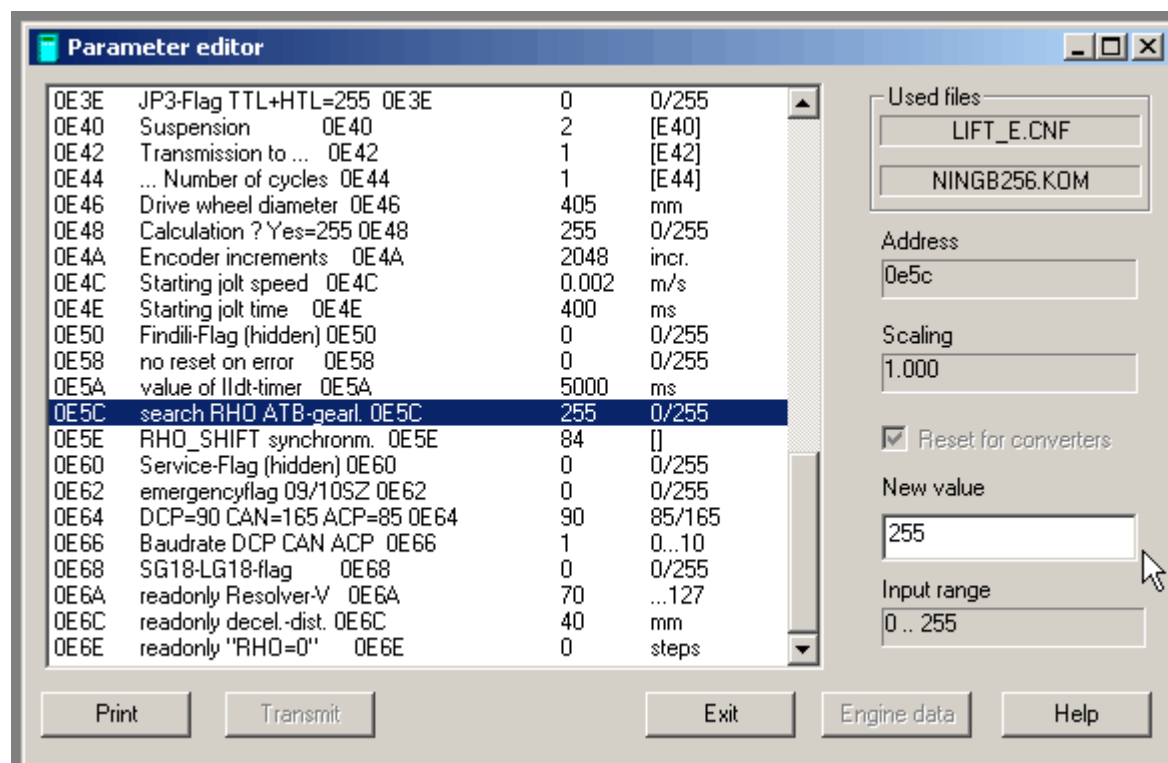


6.2.2.5 Help

Use the help function.

You will get more information in using the additional documentation [EmoSoftLift-DSV.pdf](#) (this file you always will find after You've pushed the internet-update-button at first start-window of your EmoSoftLift installation)!

6.2.3 EmoSoftLift Parameter-Editor and Online Help



Ensure that your system is set to "stop" so that no drive commands are initiated while you change data in the DSV. In case of read or write of data a reset of the unit will cause an emergency stop !

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..., TUDZ... and new TUDW... (for 60 MHz DSV only)

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 TUDYxxN or TUDXxxN, all gearless drives and synchronous motors use the '50 MHz' version TUDZxxN ...

Begin of 2011 the customer is able to select the 60-MHz-version. This TUDWxxN-version is able to drive all winches without changing the Eprom and a lot of new features are available (see details in parameter list) !

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 with a 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 epicyclic 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.
TUDWxxN 60MHz	The units with those Eproms support '60 MHz'-regulation-boards and are made for high performance. That firmware collects all functions from firmware TUDX, Y, Z together.

7.1.2 Firmware AUDY/Z, TUDY, TUDX, TUDZ, TUDW with command program (*.KOM)

The software was formerly based on the connection variants '3SZ', '7SZ', '9SZ', '10SZ', and special customised variants. After June 2002, all 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), refer to gearlist.pdf!

End of 2010 we will add some more soft- and firmware for the 60-MHz-versions of DSV 544x-system. Which file can be used for which unit or firmware you will find in "gearlist.pdf / .htm". These files are available after registering to our download-area. Our units always comes with the latest *.kom-programs, so it should be not changed without any reason. Warning: *.kom-programs for 40- or 50-MHz not running on 60-MHz-systems! Example: Use 7TZASY60.KOM for normal winches (instead LIFT7TZ), for gearless ask or read gearlist.pdf!

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. [Files like LIFT7TZ.KOM, CHINA7TZ.KOM, ARGANO7TZ.KOM now running with TUDY, TUDX and TUDW \(index should be 129 and TUDW must compiled after 25. of Nov. 2010\)!](#)
- **Files, *.KOM or *.UPD with content of variable 0B34h (software-index) has minimum 132, are optimat running at latest firmware TUDWxxN (60MHz) and they are back-ward compatible to last current versions of older firmware TUDYxxN (40MHz), TUDXxxN and TUDZxxN (50MHz)!**
- 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 '7TZ' assignments, whereby the high interpolation (typically $256 \times 4 \times 2048 = 2097152$), 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. NINGBDGP.... or GAF58DGP....), 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). [Files WYTW800F.KOM \(ERN-encoder\) or WYTV800F.KOM \(ECN-encoder\) now working with all gearless \(F31 free to set\). Both files working with TUDZ and TUDW!](#)
- [Files like *SSI60.KOM, *END60.KOM, *8SP60.KOM](#) and all gearless-data with an index 0B34h=125 running both with the new 60-MHz-firmware TUDWxxN and with the current version of older 50-MHz-firmware TUDZxxN, but pre-settings are made for 60-MHz-regulation-boards. Using it with any 50-MHz-units, not all functions or features will be available (see more details in chapter 8 'parameters').
- **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

Series = 30 ≡ **TUDYX3N/XX3N** for DSV 544x-Typen with 16A, 20A, 40A, 120A, 150A, 200A

Series = 40 ≡ **TUDY04N/X04N** for DSV 544x-Typen with 5A, 9.2A, 10A, 60A, 80A, 250A

Series = 43 ≡ **TUDYX4N/XX4N** for DSV 544x-Typen with 30A, 60A, 150A (old)

Series = 48 ≡ **TUDY05N/X05N** for DSV 544x-Typen with 15A, 70A

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

Series = 30 ≡ **TUDZX3N** for DSV 544x-Typen with 20A (old), 150A, 200A

Series = 40 ≡ **TUDZ04N** for DSV 544x-Typen with 5A, 10A, 60A (old), 80A (old), 250A

Series = 43 ≡ **TUDZX4N** for DSV 544x-Typen with 30A, 150A (old)

Series = 48 ≡ **TUDZ05N** for DSV 544x-Typen with 15A, 20A

Series = 60 ≡ **TUDZ06N** for DSV 544x-Typen with 40A, 60A, 120A

Series = 70 ≡ **TUDZ07N** for DSV 544x-Typen with 70A, 80A

Note: 60 MHz-TUDWxxN has similar selections like used in table 7.2.2, but only two of series here

Series = 48 ≡ **TUDW05N** für DSV 544x-Typ 15A, 20A, 30A

Series = 60 ≡ **TUDW06N** für DSV 544x-Typ 40A, 50A, 60A, 80A, 120A, 150A, 200A, 250A, 320A, 400A



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.



EMOTRON DSV 5445/5444

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, Osmo, 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
*.UPD / *.KOM	since Oct. 2011	running with all TUD... (see file gearlist.pdf)	new index min. 132
LESS*.-files	since Jan. 2012	need 60MHz-2012-firmware for full function	new index min. 135

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 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.

Note: 60 MHz-TUDWxxN can't be used with older units or regulation-boards. That new board must be changed complete, if it's needed, but those new reguatioboards run with older power-boards (ask for details). How to adjust a regulation-board together with a new / old power-board, please read customer-info ki0703e0!



8 Overview parameters and variables (example for TUDWxxN and index 135)

* Rotor flow (<31=synchron.)	F0	4100.0000	f0	+	10.0000..	16000.0000
* Rated speed typ. 380VAC F1	F1	1450.0000	1/min	+	25.0000..	9000.0000
* Synchronized speed 380V F2	F2	1500.0000	1/min	+	25.0000..	9000.0000
* P-part stop F3	F3	30.0000	f3	+	8.0000..	4000.0000
* Ue-curve form F5	F5	16.0000	1/min	+	1.0000..	1024.0000
* I-Part start to end F6	F6	4.0000	f6	+	1.0000..	400.0000
* P-part start to end F7	F7	1200.0000	f7	+	10.0000..	8000.0000
* norm. SW1 / load-sense F9	F9	81.0000	f9	-	4095.0000..	4095.0000
* Standardization of speed	F10	4002.0000	f10	+	1.0000..	32767.0000
* Standardization of distance	F21	1092.0000	F21	+	1.0000..	32767.0000
* speed adjuststage (readonly)	F22	6994.0000	f22	+	1.0000..	32767.0000
* encoder factor setup F23	F23	256.0000	f23	+	1.0000..	32767.0000
* gain current regulator F24	F24	1.0000	1...3	+	1.0000..	3.0000
* head of firmware if=0 F25	F25	0.0000	0...63	+	0.0000..	64.0000
* Stop distance to floor F26	F26	40.0000	mm	+	0.0000..	10000.0000
* motor voltage or EMK F28	F28	380.0000	U / f1	+	1.0000..	2047.0000
* A0-old=242 A0-new=3862 F29	F29	3862.0000	f29	+	242.0000..	3862.0000
* PWM-Adjustment fine F30	F30	124.0000	f30	+	0.0000..	500.0000
* Number of poles F31	F31	4.0000	f31	+	2.0000..	128.0000
* I-part run (normal) i	i	8.0000	i	+	1.0000..	400.0000
* P-part speed run k	k	1200.0000	k	+	10.0000..	8000.0000
* Rotor time constant t	t	600.0000	ms	+	25.0000..	2000.0000
* password low 0B30	0B30	0.0000	(read)	-	32767.0000..	32767.0000
* password high 0B32	0B32	0.0000	(read)	-	32767.0000..	32767.0000
* version of program 0B34	0B34	135.0000	(read)	+	0.0000..	32767.0000
* RHO-speed 0B36	0B36	15000.0000	incr.	+	0.0000..	32767.0000
* s-max control 0B38	0B38	10330.0000	read	-	32767.0000..	32767.0000
* ke=U/(1000rpm)*10 78E 0B3A	0B3A	2620.0000	read	+	0.0000..	32767.0000
* R1=0hm Milli-0hm 71C 0B3C	0B3C	1000.0000	m.-0hm	+	1.0000..	10000.0000
* BRUSH syn=255 asyn=0 0B3E	0B3E	0.0000	0...255	+	0.0000..	255.0000
* data-set of gearless 0C10	0C10	0.0000	read	-	32767.0000..	32767.0000
* F9 control (+) 0D38	0D38	0.0000	read	-	32767.0000..	32767.0000
* F9 control (-) 0D3A	0D3A	0.0000	read	-	32767.0000..	32767.0000
* Ui Inspection run 0E00	0E00	0.3000	m/s	+	0.0010..	3.0000
* U3 Fast stage 0E02	0E02	1.4000	m/s	+	0.1000..	9.0000
* U2 Intermediate stage 0E04	0E04	1.0000	m/s	+	0.0500..	7.0000
* U1 Low stage 0E06	0E06	0.7500	m/s	+	0.0100..	5.0000
* Ue drive-in stage 0E08	0E08	0.1000	m/s	+	0.0000..	0.5000
* Un adjust stage 0E0A	0E0A	0.0100	m/s	+	0.0000..	0.2000
* Direction of rotation 0E0C	0E0C	255.0000	0/255	+	0.0000..	255.0000
* linear emergency ramp 0E0E	0E0E	50.0000	in/taa	+	1.0000..	400.0000
* stop with s-curve 0E10	0E10	4.0000	in/taa	+	1.0000..	400.0000
* Start clearance run 0E12	0E12	0.8000	m/s	+	0.0030..	8.0000
* Door open if U lower 0E14	0E14	0.3000	m/s	+	0.0030..	6.0000
* Excess speed 0E16	0E16	1.6000	m/s	+	0.3000..	10.0000
* Return Ramp B 0E18	0E18	450.0000	di/taa	+	0.0000..	10000.0000
* pointed arch ok = 255 0E1A	0E1A	0.0000	0/255	+	0.0000..	255.0000
* I-part stop and hold 0E1C	0E1C	4.0000	i-stop	+	1.0000..	400.0000
* I-part run (new) 0E1E	0E1E	8.0000	i-new	+	1.0000..	400.0000
* Ramp gradient 0E20	0E20	10.0000	in/taa	+	1.0000..	10000.0000
* Run-up ramp HL 0E22	0E22	450.0000	di/taa	+	10.0000..	10000.0000
* Deceleration delay 0E24	0E24	750.0000	ms	+	1.0000..	4000.0000
* Out-decelerat. delay 0E26	0E26	125.0000	ms	+	1.0000..	4000.0000
* Starting delay 0E28	0E28	250.0000	ms	+	1.0000..	4000.0000
* preselection overload 0E2A	0E2A	75.0000	1-150%	+	1.0000..	150.0000
* load-sensing-offset 0E2C	0E2C	0.0000	digits	-	32767.0000..	32767.0000
* load-sensing-hyst. 0E2E	0E2E	3.0000	digits	-	32767.0000..	32767.0000
* current shunt 0hm*10 0E30	0E30	953.0000	0hm*10	+	0.0000..	4000.0000
* curr.-sensor fact. Kn 0E32	0E32	1000.0000	Wdg+Kn	+	0.0000..	8000.0000
* motor-lost-err. 60MHz 0E34	0E34	1000.0000	incr.	+	0.0000..	32767.0000
* motor-lost-flag 60MHz 0E36	0E36	0.0000	- 0 +	-	256.0000..	255.0000
* motor-lost-time 60MHz 0E38	0E38	250.0000	ms	+	0.0000..	32767.0000
* motor-lost-hyst 60MHz 0E3A	0E3A	400.0000	incr.	-	32767.0000..	32767.0000
* analog/digital flag 0E3C	0E3C	255.0000	- 0 +	-	256.0000..	255.0000
* JP3-Flag ITL+HIL=255 0E3E	0E3E	0.0000	- 0 +	-	256.0000..	255.0000
* Suspension 0E40	0E40	1.0000	1...4	+	1.0000..	4.0000
* Transmission to ... 0E42	0E42	49.0000	count.	+	1.0000..	500.0000
* ... Number of cycles 0E44	0E44	2.0000	divis.	+	1.0000..	10.0000
* Drive wheel diameter 0E46	0E46	468.0000	mm	+	25.0000..	1000.0000
* A3-old=449 A3-new=475 0E48	0E48	449.0000	v-flag	+	0.0000..	500.0000
* Encoder increments 0E4A	0E4A	1024.0000	incr.	+	0.0000..	4096.0000
* Starting jolt speed 0E4C	0E4C	0.0030	m/s	+	0.0010..	0.0200
* Starting jolt time 0E4E	0E4E	500.0000	ms	+	1.0000..	2500.0000
* decimal/binary flag 0E50	0E50	0.0000	- 0 +	-	256.0000..	255.0000
* speed-filter all 0E52	0E52	255.0000	- 0 +	-	256.0000..	255.0000
* current-filter all 0E54	0E54	255.0000	- 0 +	-	256.0000..	255.0000
* Hyst. Ux / x-factor 0E56	0E56	250.0000	mm/s	-	500.0000..	500.0000
* no reset on error 0E58	0E58	22.0000	0/255	+	0.0000..	256.0000
* value of IIdt-timer 0E5A	0E5A	5000.0000	ms	+	0.0000..	32767.0000
* search RHO ATB-gear1. 0E5C	0E5C	0.0000	- 0 +	-	256.0000..	255.0000
* RHO_SHIFT synchronm. 0E5E	0E5E	10.0000	incr.	+	2.0000..	200.0000
* Service-Flag (hidden) 0E60	0E60	256.0000	- 0 +	-	256.0000..	255.0000
* emergencyflag 09/10SZ 0E62	0E62	255.0000	0/255	+	0.0000..	255.0000
* DCP=92/172 ACP=87 CAN=165		90.0000	85/175	+	85.0000..	256.0000
* Baudrate DCP CAN ACP 0E66	0E66	1.0000	0...10	+	0.0000..	10.0000
* time abs.-encoder 0E68	0E68	255.0000	ms	+	0.0000..	500.0000
* Resolver-U / S-limit 0E6A	0E6A	100.0000	...127	+	0.0000..	127.0000
* readonly decel.-dist. 0E6C	0E6C	40.0000	mm	+	0.0000..	32767.0000
* readonly "RHO=0" 0E6E	0E6E	0.0000	steps	-	32767.0000..	32767.0000



8.1 Parameters and variables list

Adr.	Parameter FU-Control		Remarks	TUDX/Y/Z	TUDW
F0	f0 Rotor flow (rotor flux)	P	F0 < 31 means at TUDZ or TUDW that a synchronous motor is connected. In case it's driven TUDW with an asynchronous motor, the rotor flux is now 4 times as high a value, as in TUDY/TUDX! To calculate that F0 exactly, please use the form and table at page 47 .	26...2000	26...8000
F1	Rated speed at typ. 380V	P	Speed motor rating plate (relative to 380-400V), 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 normal.	10...2999	10...4499
F2	Synchronous speed at typ. 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 normal synchronous motors and gearless-winchers.	11...3000	11...4500
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...120	12...240
F5	f5 Ve curve form	P	F5 corrects the form of positioning (depends on values from 'Ve' and 'F26'). Long distance from 'F26' and low 'Ve' the default settings always ok. For the normal gearbox-winchers set value of F5 => 0E08+1	1...101	1...101
F6	I-part start to end	P	Using TUDW the value of I-part should be the half of the value as given for TUDZ / TUDY / TUDX, to get the same effect and result of regulation (way 'F26')!	2...400	1...200
F7	P-part start to end	P	The P-part 'F7' and 'k' normal have the same value. Using TUDW the P-part is the same as in TUDY/TUDX, but 2 times as high a value, as used in TUDZ!	50...2000	100...4000
F9	Load-sensing-factor	P	Control parameter for analogue set-point. The value for TUDW is a quarter of the value as shown in TUDZ	4...4000	1...1000
F10	Standardization of speed	P	These parameters are depending of the internal encoder-multiplication (16, 64, 256, 512), the increments of used encoder and the data of gearbox (E48 also must have value 255 to allow the calculation). TUDW has the same values as shown in TUDZ, but from TUDY or TUDX the values for normal gearbox-winchers are different: Parameter F10 is 2 times more and F9 is 8 times less for gearbox-winch!	1...20010	1...20010
F21	Standardization of distance	P		10...4096	20...8192
F22	Speed adjustage (read)	P		1...13988	2...27976
F23	Encoder factor setup	P	This parameter is used for diagnostic purposes only, the value using TUDX/Y = increments of encoder / 4	128... 16384	125... 20000
F24	Gain current regulator (old meaning in 40/50MHz-units: switch to f23 default)	P	Only needed in case of using latest 60-MHz unit and encoder less vector control mode. Select value from table at page 47 . Other old units 40/50MHz set to 2.	1...2	1...3
F25	show firmware	P	0 = shows firmware-typ after 'reset' and 'b3<cr>;<cr>'	0...63	0...63
F26	stop distance to floor	P	Stopping distance after level magnet/zone. This value must be adjusted to the same level values in that lift controller. Example: 65mm for MPK, 40mm for LiSa. Note: In case of F26=255 the s-ramp 0E10h is used!	0...255	0...255
F28	motor voltage or EMK (old meaning: set f28 = 1)	P	only available with option 'encoder-less vector-control with MAX 1324 and Innovasic-shipset' See more info using files LESS*. (latest EmoSoftLift V1.21 needed)	1...2047 default = 1	48...690 typ. = 380



Adr.	Parameter FU-Control		Remarks	TUDX/Y/Z	TUDW
F29	A0-old=242 A0-new=3862	P	Selection possible only in association with TUDYxxN, TUDXxxN, TUDZxxN, TUDWxxN (with AUDYxxN or AUDZxxN firmware, only value '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 (Schmitt+Soehn , Liftronic , Findili = 242)	242 / 3862	242 / 3862
F30	PWM Adjustment fine	P	This value may not be changed without consultation with the factory! If you're not sure, please look on type-plate and select PWM from it! 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.	85...500 85=15kHz 104=12kHz 125=10kHz 250=5kHz 500= 2,5 kHz	104...500 104=12kHz 125=10kHz 250=5kHz 500= 2,5 kHz
F31	Number of poles	P	See rating plate or manufacturer's specification. (F31=120 x f _n /n _n , round the calculated number to the next even whole number), Value range: 2 – 128.	2...128	2...128
I	I-part run (normal)	P	I-part for speed-control during main ride. A higher value makes the ride smoother (example '40'). This parameter is read-only, because it will be switched between the values given from 0E1C und 0E1E. Using TUDY, TUDX, TUDZ: i = k/159 is the smallest value. For TUDW: i = k/639 is the smallest value.	2...400	1...200
K	P-part speed run	P	P-part for speed-control (see value of 'F7' as default) has the following maximum value if a TUDW is used: k = i * 639 (for TUDX / TUDY maximum: k = i * 159)!	25...2500	50...5000
t	T Rotor time constant	P	For TUDX, TUDY and TUDW same values, but using TUDZ the values is double! Note: Using older asynchronous engines the value could be below 50, for synchronous motors the value is fixed in the program (fixed like the value of parameter 'F0').	25...2000	25...2000
B30	password low	V	Attention: Changing the value blocks the program or access to FU-Control!	0...255	0...255
B32	password high	V	Attention: Changing the value blocks the program or access to FU-Control!	0...255	0...255
B34	version of program	V	TUDX/Y/Z... capable software should have an index of 117 or higher, the TUDWxxN needs 125 or higher!	min. 117 (132...135)	min. 125 (132...135)
B36	RHO-speed	V	Virtual searching speed to find RHO-offset under load and closed brake. The default value is 15000. Please change only if 'RHO' is not found correct. This value and function is only available with TUDWxxN-60MHz!	0...15000	2500... 30000
B38	s-max Kontrolle (read)	V	needed to calculate F0 in case of 60MHz (page 47)	0...4096	0...16000
B3A	ke=V/(1000rpm)*1 (read)	V	value = 10* ke (generated from F1 and F28), it's only needed for encoder-less vector-control mode 60MHz	0	1...32776
B3C	R1=mOhm Milli-Ohm	V	Innenwiderstand R1 der einzelnen Motorwicklung (Stern = 0,5*R=R1, Dreieck=R1), nur bei 60MHz !	0	1...10000
B3E	BRUSH syn=255 asyn=0	V	Entscheidet Synchron oder Asynchron-Motor (nur bei geberlosem Betrieb mit 60MHz und File = Index-135)	0	0...255



Adr.	Variable in FU-Control		Remarks	TUDX/Y/Z	TUDW
E00	Vi Inspection run	V	Enter speed in m/s, see E2 (FU-Control in mm/s), typical 0.3 m/s	0.001... 1.000	0.001... 1.000
E02	V3 Fast stage	V	Enter speed in m/s, see E3 (FU-Control in mm/s) Only if value of 0E3C=0 (analogue setpoint setting): scales analogue setpoint 10V = V3	0.1...6.0	0.1...9.0
E04	V2 Intermediate. stage	V	Enter speed in m/s, see E4 (FU-Control in mm/s)	0.05...5.0	0.05...7.0
E06	V1 Low stage	V	Enter speed in m/s, see E5 (FU-Control in mm/s)	0.01...4.0	0.01...5.0
E08	Ve drive-in stage	V	Enter speed in m/s, see E6 (FU-Control in mm/s), typical 0.05 m/s	0...0.5	0...0.5
E0A	Vn adjust stage	V	Enter speed in m/s, see E7 (FU-Control in mm/s), typical 0.01 m/s	0...0.2	0...0.2
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').	0...255	0...255
E0E	linear emergency ramp		Linear section of the ramp during inspection-mode, typical 80 (for soft stop it's set to 8 also)	8...80	2...300
E10	stop with s-curve		Instead of using INT (F26=255) this value controls s-ramp and distance to floor (default=8)	2...20	1...150
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). The typical value should be set between 0.5 and 0.7!	0.2...0.8 Value serves here to mask the level signal only with older prog. LIFT7SZ, 3SZ, 9SZ and 10SZ	0.1...8.0 Value serves the switch-back to the I-gain at stop. For older DCP-progr.: 0.50
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), typical 0.3 m/s	0.03...3.0	0.003...6.0
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 $1.05 \times V3$ = 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 - 10.000 m/s (FUC=300... 10000 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).	0.3...8.0	0.3...10.0



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Adr.	Variable in FU-Control		Remarks	TUDX/Y/Z	TUDW
E18	Return Ramp B	V	A higher value will be made a softer and longer way of braking distance. Using a gearbox, the value is typical 45. Using a gearless, it's 180 for example	10...1000	10...5000
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...255	0...255
E1C	I-part stop and hold	V	This I-part 0E1C is used against starting jerk or ride-back during opening the brake. TUDW: $i = k / 639$ is smallest value, for TUDY/X/Z it's limited to $i = k / 159$.	2...80	1...40
E1E	I-part run (new)	V	I-part 0E1E is used during the normal riding to get a smooth reaction of cabin. For TUDW: $i = k / 639$ is smallest value, for TUDY/X/Z it's limited to $i = k / 159$.	4...400	2...200
E20	Ramp gradient	V	Discrease if having elevators with velocities more than 2m/s in use, typical value is 200 Only 7TZ-programs with analogue set point setting: Restricts the maximum ramp at analogue set point.	1...200	1...200
E22	Run-up ramp HL	V	A higher value will be made a softer and longer way of acceleration. Using a gearbox, the value is typical 60. Using a gearless-winch, it's 240 for example here	10...1000	10...5000
E24	Braking delay	V	Time after stopping $V = 0$ m/s, the motor continues to be magnetised until the brake has closed mechanically, typical value is 500 ms	1...4000	1...4000
E26	OFF delay	V	Delay time for signals A0 and A7 for motor demagnetisation before motor contactors are open, typical value is 125 ms	1...4000	1...4000
E28	Start delay	V	Time between the mechanical opening of the brake and start up. Use the smallest possible value for it, but do not drive against the brake, typical 250 ms	1...4000	1...4000
E2A	preselection overload	V	This function depends on the actually program-version. Please ask us for details. For example in TUDX or TUDY with 7tz-based program this adjust UPS/battery –current (using input E1), but in gearless mode with TUDZ or TUDW this adjust the current for searching the RHO-offset. So it's set for asynchr. typical to 75%, but for a synchr. motor to typical 40%	1...150	1...150
E2C	offset analogue SW1	V	Adjusts analogue setpoint in a +/-10V mode (typ. =0)	-10...10	-10...10
E2E	hysteresis analogue SW1	V	Mask-out of interferences regarding 0V-zone (typ.=3)	-10...10	-10...10
E30	current-shunt Ohm * 10	V	see table at the end of page 45 for more details here	10...1000	124...2000
E32	current-sensor Kn	V	see table at the end of page 45 for more details here	20...8000	1000...8000
E34	Motor-lost-err. 60MHz	V	Only 60MHz: Allowed range of current-asymmetry recommended value = 500	0...32767	250...800
E36	Motor-lost-flag 60MHz	V	0 = default, 255 activates motor-lost (only Russia)	0...32767	0...255
E38	Motor-lost-time 60MHz	V	Only 60MHz: Allowed range to accept lost signals ecommended value = 125	0...32767	50...500
E3A	Motor-lost-hyst 60MHz	V	Only 60MHz: Allowed range of voltage-asymmetry recommended value = 200	0...32767	100...800
E3C	digital flag / Schmitt flag	V	Determines mode digital=255, analogue=0, typ. =255	0...255	0...255
E3E	JP3-Flag TTL+HTL=255	V	Encoder-type (1Vpp=0, TTL=255, set Jumper JP3), Note: 60MHz has no jumper JP3 (for HTL use -256)	0...255	-256...255



Adr.	Variable in FU-Control		Remarks	TUDX/Y/Z	TUDW
E40	Suspension	V	Number of pulleys, 1 for 1:1, 2 for 2:1, 4 for 4:1	1...4	1...4
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).	1...500	1...500
E44	... Number of cycles	V	(translation ratios can only be represented by a fraction in the DSV system). Value range: 1 - 500 (or 1 - 10).	1...10	1...10
E46	Drive wheel diameter	V	Effective drive wheel diameter in 'mm'. Note: if this value must be more than 1000, please take the half value of that diameter only and set double of value from "number of cycles 0E44h" instead!	25...1000	25...1000
E48	A3-old=449 A3-new=475 (ab TUDW, Index ab 129) Calculation? Yes=255 (old files up to Index 128)	V	using TUDW-firmware and files index 129 or higher: E48=449 -> A3 output -> no overspeed is happened E48=475 -> A3 output -> tolerance-band 0E56h is ok using TUDY, TUDX, TUDZ up to the file-index 128: E48=0 -> no calculation, E48=255 -> calculation ok but index 129 or higher: please set it always to 449!	0...449	449...475
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 1Vpp. In case of '60 MHz' and asyn. mode also 512 pulses is added in program now. FU-Control: Entry of 2500, 4096 can cause a "Parameter error" fault. In this case, please set parameter F24 from 2 to 1 for save to reset the error. We recommended to use 1024 or 2048 pulses (1Vpp)	500...4096	500...4096 asynchr. typical 1024 synchr. typical 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).	0.001...0.02	0.001...0.02
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). Try 250 for normal, 125 for gearless! Only for 7TZ-progr. with analogue setpoint setting: Value for tolerance-time for identifying setpoint = 0.	0...2500	0...2500
E50	Binary flag / Findili 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. TUDXxxN, TUDZxxN, TUDWxxN supports also the Chinese code '15', TUDWxxN also Russia code '-16'.	-256...255	-256...255



Adr.	Variable in FU-Control		Remarks	TUDX/Y/Z	TUDW
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. The typical factory setting is 255 (for most cases ok).	-256...255	-256...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. The typical factory setting is 255 (for most cases ok).	-256...255	-256...255
E56	Hysteresis Vx / Verf. (TUDW and Index > 129) 64_256_FLAG 50 MHz (older files < index 128)	V	New function: Speed-control with a tolerance-band, values in m/s, typ. 100mm/s, 0E48h must be set 475 Old function: Shows the internal fine-pitch-factor: 0=16f./64f., 15=64f. (TUDW), 255=256f., -256=512f.	-256...255	0...500
E58	no reset on error	V	For '0', the inverter is automatically reset after a fault. For '127', 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)	0...255	0...128
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 ² dt error has occurred), typical 5000 (for gearless set to 2500)	1...30000	0...30000 0=no I ² dt
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. Note: In case of 60-MHz-units and lift-files with index-125 or higher it's also allowed to set value of 0E5C to -256 (searching RHO under a closed brake), but searching RHO with 255 will produce better RHO!	0...255	-256...255
E5E	Rho_Shift Synchronm.	V	Only important for synchr. motors (TUDZ, TUDW) The angular displacement RHO changes with increasing speed, preset in the factory according to motor type. This depends from inside motor structure.	7...84	6...72
E60	Service flag	V	Emergency operation without encoder (set F0 at least to 1200 or more in case of TUDX, TUDY and TUDZ). If 0E60h = '255' and the jumper 'JP3' is in the middle position (i.e. encoder not present), then the system runs also without encoder, but it's no vector control. Attention: The motor current will perhaps increase to high values, so be careful not to overheat the engine or inverter. A motor temperature monitor must always be active. The function is not possible or permitted with synchronous motors in case of older 40/50MHz-units. Use 60-MHz-units with new function: '-256' ! Using 60-MHz-board with TUDW-firmware, it's possible to use 0E60 = '-256'. In that case the parameters 'F28, F24, 0B3A, 0B3C, 0B3E' will be switched on. This mode allows to rides asyn. and syn. motors for longer time without any encoder (it's helpful to run escalators with a DSV also) This new mode is a real open loop vector control, but you' need lift-file 'index 135' and firmware > January 2012!	0...255 normal = 0 before use the mode 255, please ask in factory how to proceed	-256...255 normal = 0 the new mode -256 is only available with the 60-MHz-units (see more details at chapter 9, page 52 up to page 56)

Adr.	Variable in FU-Control		Remarks	TUDX/Y/Z	TUDW
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 also for emergency evacuation (terminals 24/25 must be present), typical set to 255	0...255	0...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	85...173	85...256 167 = BP308
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	1...10	1...10
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') !	0...255	0...500
E6A	Resolver-V / S-limit	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). In case of files with index higher than 128 that value (%) sets the nominal current limit!	0...127	0...110
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)!	0...2500 (read-only)	0...30000 (read-only)
E6E	read only RHO-0	V	Angular displacement of the synchronous motor (normally set to 0, or read it from type-plate of winch). This value may not be readjusted arbitrarily. Please pay attention to Chapters 10.2, 10.3, ...	0...16000	-32767... 32767



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).

Using TUDWxxN ('60MHz') together with asynchronous motors, the value of 'F0' is 4 times more than use TUDX/Y/Z !



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 $\cos \varphi$. If $\cos \varphi$ 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 ! **Using TUDW the value of rotor time constant 't' is the same as found with TUDY or TUDX (but it's the half of value found with a TUDZ).**

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

DSV 5445 - x / 400	10			15			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
"F0" TUDX , TUDY	400	600	750	400	500	600	350	450	650	450	550	650
"F0" TUDW (asyn.)	1600	2400	3000	1600	2000	2400	2100	2700	3900	1800	2200	2600
"t" neuer Motor für FU	125	150	175	150	175	200	175	225	250	250	275	300
"t" alter Motor (Silumin)	35	45	50	45	50	60	50	75	80	90	100	110

DSV 5445 - x / 400	40			60			80			120		
Motor power [kW]	15,5	18,5	21,2	22,0	27,0	29,5	30,0	37,0	45,0	45,0	55,0	65,0
"F0" TUDX , TUDY	400	500	600	400	500	600	425	475	550	400	450	500
"F0" TUDW (asyn.)	3000	3750	4500	2000	2500	3000	2550	2850	3300	3200	3600	4000
"t" neuer Motor für FU	300	325	350	350	375	400	400	425	450	450	475	500
"t" alter Motor (Silumin)	110	125	130	140	150	160	170	180	190	190	225	250

DSV 5445 - x / 400	150			200			250			320		
Motor power [kW]	75,0			90,0	110		132			160		
"F0" TUDX , TUDY	400			600	750		750			600		
"F0" TUDW (asyn.)	2400			2400	3000		2400			2400		
"t" neuer Motor für FU	600			875	900		950			1000		
"t" alter Motor (Silumin)	275			400	4450		500			750		



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'. **Value "F0" is ≈ 4 -times for TUDWxxN-firmware.** 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 in chapter 10.3)



EMOTRON DSV 5445/5444

Adjustment in case of 60-MHz-unit to view and norm the display for motor-current, -voltage and more values:

var.	unit	10A	15A	20A	30A	40A	40A	50A	60A	80A	80A	120A	150A	200A	250A	320A	400A	470A
0e30h		1000	1000	1500	953	2000	1000	1500	665	487	487	300	267	200	150	124	100	86
0e32h		500	500	1000	1000	2000	1000	2000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
BGR		1	1	2	2	3	3	3	3	3	4	4	4	5	5	5	5	5
Firmware		04N	05N	05N	05N	06N	06N	06N	06N	06N	06N	06N	06N	06N	06N	06N	06N	06N
Serie Amp		48	48	48	48	60	60	60	60	60	60	60	60	60	60	60	60	60
Ur84 Volt		9	9	9	7,6	10	9	10	5	5	10	10	5,4	5,6	4,25	4,7	3,1	3,2
R-shunt Ohm		100	100	150	95,3	200	100	150	66,5	48,7	48,7	30	26,7	20	15	12,4	6,65	5,76
R-gate Ohm		56,2	56,2	39,2	27,4	22,1	22,1	15	15	10	15	5,62	4,7	3,32	3,32	2,74	2,74	1
Wdg current		2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
R-reg K-Ohm		33,2	33,2	33,2	33,2	33,2	33,2	33,2	66,5	66,5	33,2	33,2	66,5	66,5	66,5	66,5	100	100
Lem/VAC		1000	1000	1000	1000	2000	1000	2000	2000	2000	1000	1000	2000	2000	2000	2000	2000	2000
max. kHz		15	12	12	12	12	12	12	12	10	10	5,0	5,0	5,0	2,5	2,5	2,5	2,5
R96 K-Ohm															4,75	4,75	4,75	4,75
f24 60MHz		1	1	1	1	1	1	1	2	2	1	1	2	2	2	2	3	3
f30 min.		85	104	104	104	104	104	104	104	124	124	250	250	250	500	500	500	500
CNYD-Type:		10A	12A	15A	25A	30A		40A	45A	60A								
nominal A		10	12	15	25	30		40	45	60								
dynamic A		20	24	30	50	60		80	90	120								
case-form		1	1	2	2	3		3	3	3								
max. kHz		15	12	12	12	12		12	12	10								

(same table is used for FU-Control with version 3.4 or new 3.5, also for ACP/DCP since October 2011)

Value 0e30h/0e32h: 16A-unit has same settings like 20A-unit, 10A-unit has same settings like 15A-unit

Firmware	MHz	(Serie)	0B38h = S-MAX	2/3 * (S-MAX)	Firmware	Service-Flag	Brush-Flag	Synchron	F0 = ?
TUDZX3N	50	30	1736	1157	TUDW	0		no	F0 = F0
TUDYX3N	40	30	1736	1736	TUDZ	0		no	F0 = F0
TUDXX3N	50	30	1736	1736	TUDY / X	0		no	F0 = F0
TUDZD4N	50	40	2304	1536	TUDW	0		yes	F0 = 28
TUDYD4N	40	40	2304	2304	TUDZ	0		yes	F0 < 31
TUDXD4N	50	40	2304	2304	TUDY / X	0			
TUDZX4N	50	43	2482	1655	TUDW	255		no	F0 = 1,5 * F0
TUDYX4N	40	43	2482	2482	TUDZ	255		no	F0 = 1,5 * F0
TUDXX4N	50	43	2482	2482	TUDY / X	255		no	F0 = 1,5 * F0
TUDW05N	60	48	11076	7384	TUDW	255		yes	F0 = 1,5 * F0
TUDZ05N	50	48	2769	1846	TUDZ	255		yes	F0 = 1,5 * F0
TUDY05N	40	48	2769	2769	TUDY / X	255			
TUDX05N	50	48	2769	2769					
TUDW06N	60	60	13892	9260	TUDW	-256	0	no	F0 = F0
TUDZ06N	50	60	3473	2315	TUDZ	-256			
TUDY06N	40	60	3473	3473	TUDY / X	-256			
TUDX06N	50	60	3473	3473	TUDW	-256	255	yes	F0 = F0 / 2,5
TUDZ07N	50	70	4048	2699	TUDZ	-256			
					TUDY / X	-256			

This table allow to calculate the exactly F0
Note: S-MAX (60MHz) shown at value of 0B38

This table shows needed corrections for F0
Note: Service-flag = 0E60 and BRUSH = 0B3E

$$F0 = \frac{S-MAX * I-nominal motor}{3,0 * I-nominal DSV} \quad \text{Example: } F0 = \frac{11076 * 33,3A}{3,0 * 30A} = 4100 \quad (\text{example 60MHz})$$

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:

$$F0 \approx 800 \times \frac{I_{N \text{ motor}}}{I_{N \text{ DSV}}} \quad t_{\text{new motor}} = \frac{kW_{\text{motor}} \times 17}{\tan \phi_{\text{motor}}} + 20 \quad t_{\text{old motor}} = \frac{kW_{\text{motor}} \times 12}{\tan \phi_{\text{motor}}} + 20$$

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.

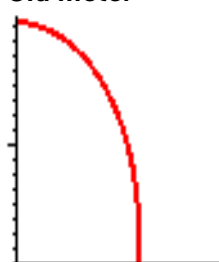
Note: Using '60MHz'-units (TUDWxxN), formula for 'F0' is changed to: $F0 \approx 3200 \times (I_{N \text{ motor}} / I_{N \text{ DSV}})$, or use information from type-plate of DSV and motor together with tables and forms at chapter 8.2.3 !

8.2.5 Motor characteristics

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

Motor characteristic curves:

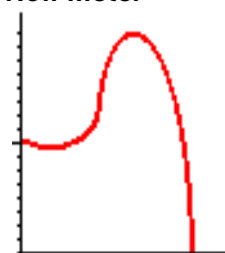
Old motor



Characteristic factor =
600

Typical curve for an older
Silumin motor.

New motor



Characteristic factor =
700

Typical curve of a
newer asynchronous motor.

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

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

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. [If you're using new FU-Control \(firmware > 3.3\) together with 60-MHz-unit \(TUDWxxN\), so you also are able to adjust the parameter with the actual view of voltage and current looking into the FU-control values instead.](#)

Presettings, conditions:

- Speed V3 = 50-80 % of the rated speed
- Set the P-gains **F7** and **k** to 400-800 ([using TUDWxxN/60-MHz, the values are allowed to set higher too](#))
- 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 (before the drop-out of the brake)
F5	Ve curve form	takes effect depend from 0E08 and „F26“ (try F5=0E08+1, or values=1...4)
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: $\frac{k - \text{Anteil}}{i - \text{Anteil}} < 150$.

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.

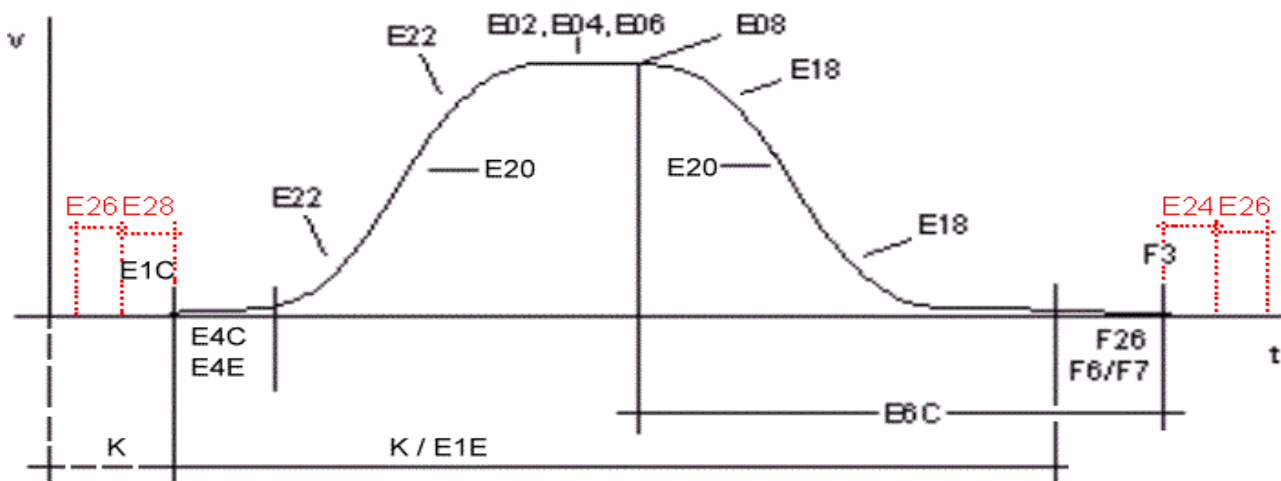
③ Recommendation:

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 epicyclic gears).

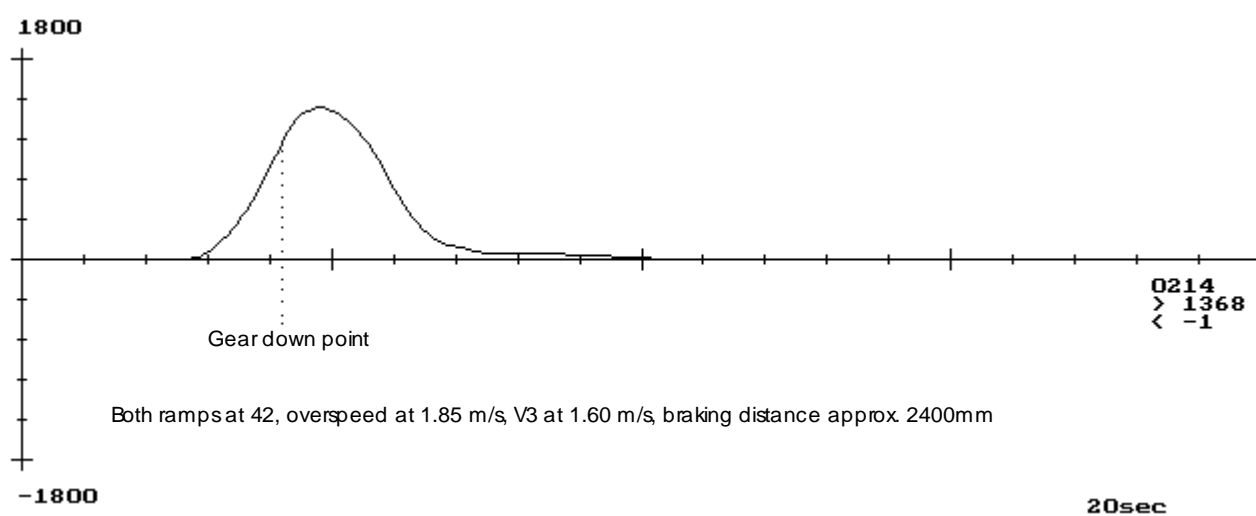
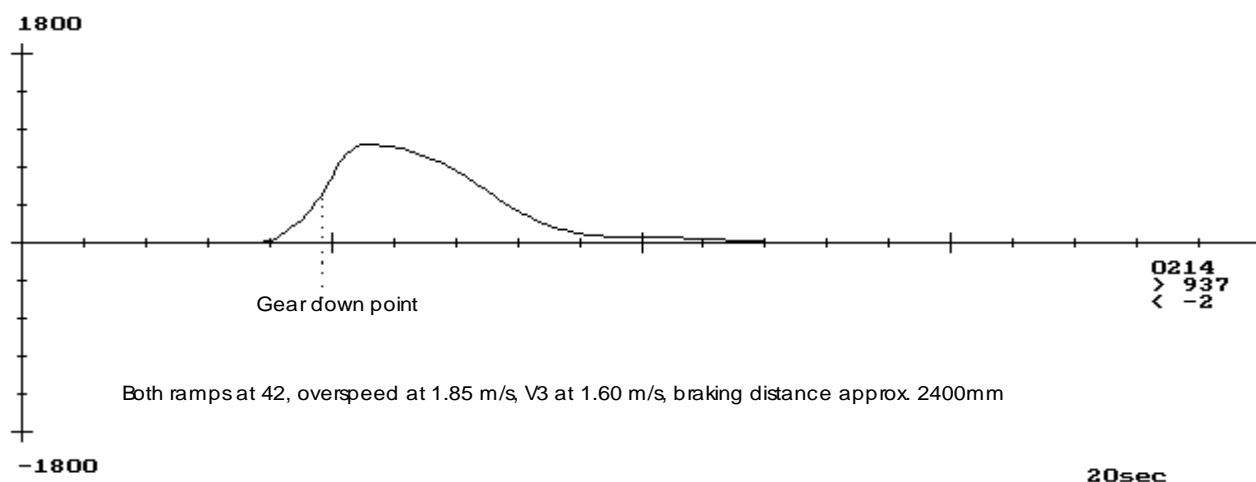
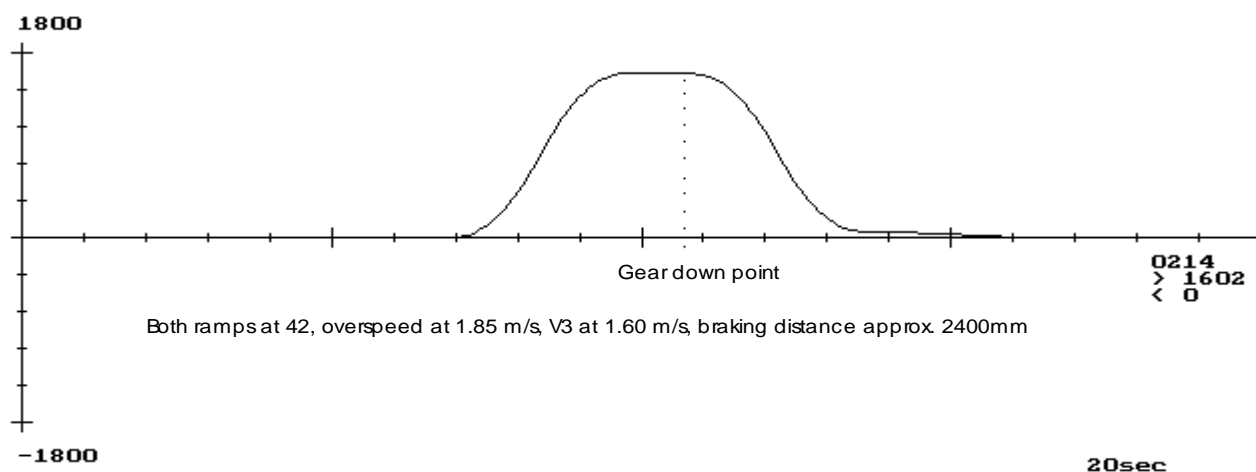




8.3 Pointed arch drive

- 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.





9 Using motors without encoder (encoder-less vector-control)

Note: We recommend to use the latest file-set for the DSV5445-60MHz-units LESSNEW.* combined with a TUDWxxN-firmware 27. of January 2012 or later. The firmware is running with an Innovasic-shipset IR1 or IR2 and with a little bit limited performance also with older Intel.

LESSNEW.* is based on a LIFT7TZ.KOM, but this file-set is prepared for an encoder-less use! Note: This file-set can be also used with encoder, but in that case only for asynchronous motors. The file-set is mainly made for the industrial applications. The use in escalators and elevators or hoisting applications should be only done in case no encoder could be mount, for low-cost lift, or the existing encoder is broken.

This file-set (index 135) supports:
Asynchronous motors without encoder
Asynchronous motors with encoder
Synchronous motors without encoder

(Note: connecting or description of any not listed functions or tables, you will find in manual 5445!)

Choose the application to LESSNEW.CNF, so also the application help will show this file LESSNEW.HTM !

How to set the encoder-less vector-control, step by step (don't change not listed parameters/variables):

9.1 Asynchronous motors

Asynchronous motor without encoder (example 15kW):

$$F0 = \frac{[0B38] * \text{In motor}}{3.0 * \text{In unit}} = \frac{10330 * 35.7A}{3.0 * 30A} = 4100$$

(Note: F0 is set to 50% of the nominal motor-current, that's the reason for factor \3.0 instead \7.5 here)

F1 = rpm at In, Un, fn = 1450

F2 = rpm at f empty = 1500

F24 = see from table (R-reg K-Ohm) for 30A-DSV = 1

F28 = Un at In, fn (V) = 380

F31 = motor poles = 4

t ms= rotor-time-constant of motor (see table) = 600

0B3C = R1 in 1/1000 Ohm = 1000

(Note: measure between U and V of motor and set R1 to the half in case motor has a star-winding, but set it to $\frac{2}{3} * R1$ as measured in case of triangle winding!)

0B3E = for asynchronous = 0

(Note: only in case of synchronous motor, value is 255)

0E00 = maximal customer working speed V3 in rpm = 1400

(Note: in case of analogue set +/-10V means +/- of V3)

0E30 = current shunt (see from table) for 30A-DSV = 953

0E32 = curr.-sensor (see from table) for 30A-DSV = 1000

(Note: should be normal set correct from factory here)

0E3C = analogue/digital flag (for digital inputs) = 255

(Note: for analogue input X1 pin 17 and 19 set to = 0)

0E4A = encoder-increments (it's simulation only) = 1024

(The settings will depend on the motor poles,

2.....8 poles set 0E4A to 1024

10...16 poles set 0E4A to 2048

18...32 poles set 0E4A to 4096)

0E50 = decimal/binary flag (for decimal example) = 0

(Note: set it to 255 or other for two direction-inputs)



9.2 Synchronous motors

Synchronous motor without encoder (example 5.5kW):

$$F0 = \frac{[0B38] * \text{In motor} \quad 11100 * 11.6A}{7.5 * \text{In unit} \quad 7.5 * 30A} = \frac{\quad}{\quad} = 572$$

(Note: F0 is set to 20% of the nominal motor-current, that's the reason for factor \7.5 instead \3.0 here)

F1 = rpm at In, Un, fn = 155

F2 = rpm at f empty = 156

(Note: F2 is always set to F1 + 1, so always F2 > F1)

F24 = see from table (R-reg K-Ohm) for 30A-DSV = 1

F28 = Un at In, fn (V) = 265

(Note: this is the EMK-voltage of motor running at F1 without load! In case the factory has given the value of $k_e = V/(1000\text{rpm})$ instead, change F28 as long as the value of variable 0B3A has the value of k_e , but *10 !)

F31 = motor poles = 24

(Note: ask factory or calculate from rpm and frequency)

t ms= rotor-time-constant of motor (default) = 175

(Note: for all synchronous motors set this value 175)

0B3A = $k_e = V/(1000\text{rpm}) * 10 = 17096$

(Note: This will be calculated from unit using value in F28 and F1. If you get the k_e from factory, adjust F28)

0B3C = R1 in 1/1000 Ohm = 1500

(Note: measure between U and V of motor and set R1 to the half in case motor has a star-winding, but set it to $\frac{2}{3} * R1$ as measured in case of triangle winding!)

0B3E = for asynchronous = 255

(Note: only in case of asynchronous motor, value is 0!)

0E00 = maximal customer working speed V3 in rpm = 1400

(Note: in case of analogue set +/-10V means +/- of V3)

0E30 = current shunt (see from table) for 30A-DSV = 953

0E32 = curr.-sensor (see from table) for 30A-DSV = 1000

(Note: should be normal set correct from factory here)



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0E3C = analogue/digital flag (for digital inputs) = 255
(Note: for analogue input X1 pin 17 and 19 set to = 0)

0E4A = encoder-increments (it's simulation only) = 4096
(The settings will depend on the motor poles,
2.....8 poles set 0E4A to 1024
10...16 poles set 0E4A to 2048
18...32 poles set 0E4A to 4096)

0E50 = decimal/binary flag (for decimal example) = 0
(Note: set it to 255 or other for two direction-inputs)



9.3 Asynchronous and synchronouse motors (other needed adjustments):

Asynchronous:

With FU-Control or A-meter check motor current of motor without load. Please increase f0 in case the asynchronous motor is below the half of its nominal current (empty running at half of the nominal speed)

Synchronous:

With FU-Control or A-meter check motor current of motor without load. Please decrease f0 in case the asynchronous motor is more than 20% of its nominal current (empty running at half of the nominal speed)

Other settings:

k and F7 are depending on the value of 0E4A (simulated encoder-pulses) and how big the different is between motor-power and unit-power! Set k and F7 to 1200 for asynchronous and value of 0E4A = 1024, but for motors with high motor-poles 0E4A (like some synchronous) of 4096 the value 1200 has to set lower (200 ... 300), to prevent big noise in the engine. Parameters i, f6, 0E1C and 0E1E could be set to lower values in case the k and f7 is also set to lower values (2 to 4 instead 4 to 8). Filters 0E52 and 0E54 are in case of asynchronous motor always best set to 255, but in synchronous 0 could be a better choice to make the regulation at low speed strong.

Table for f24:

f24 = 1 at 3A, 6A, 9A, 10A, 12A, 15A, 16A, 20A, 25A,
30A, 32A, 40A old, 45A, 50A 80A old, 120A
f24 = 2 at 40A new, 60A, 80A new, 150A, 200A, 250A, 320A
f24 = 3 at 400A (Note: normal factory has set it correct)

Table of t ms:

synchronous = 175, asynchronous depending cosinus-phi:
t= 50 for cos-phi 0.50
t= 100 for cos-phi 0.70
t= 200 for cos-phi 0.80
t= 300 for cos-phi 0.82
t= 400 for cos-phi 0.83
t= 600 for cos-phi 0.85
t= 800 for cos-phi 0.88
t= 1200 for cos-phi 0.92

Check curve:

To see the simulated vectors and speed, choose the default setting of LESSNEW.IWK, to control load and direction here.

10 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 "A9" (controller ON):*

- ◆ Contacts bouncing severely: For versions prior to 19.03.99, load update and set 0E3Ch=255, 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 please

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, 7TZ, 10SZ, 10TZ.
- ◆ 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 too 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 too 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.

10.1 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 (Transilidiodes 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!



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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

10.2 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. Note: In case of 'motor-lost'-function is activated, also the 'IIDT'-messages will be given from inverter if one or more motor-phases or one of motor-windings are damaged	To find the reason of that warning, please switch off 'motor-lost-function' first in case of using 60MHz engine and firmware
"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.	U _k max = 700V at U _n = 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.	U _k 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.	

10.2.1 Fault handling for automatic reset

Bit	Fault	Value
Bit 0	IIDT, inverter is overloaded, or motor phases lost, or motor windings damaged	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 ($4 + 16 = 20$).

10.3 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

10.4 "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.	



11 Hydraulic lifts (40MHz), EPM / ECD (50MHz), Synchron Gearless

11.1 Hydraulic lifts with DSV 544-Lift, analogue "Beringer" process (40MHz only)

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).

11.1.1 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.



11.1.2 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 ² dt 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

11.1.2.1 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".

11.1.2.2 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.

11.1.2.3 Additional information to Beringer

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).

Note: In case of 60-MHz-units please use file **BUCH60M.KOM** and document **BUCH60M.pdf** (both you will find in folder EmoSoftLift\Daten and \infos after the first internet-update was done!

11.2 EPM / ECD 100, 300, 500 lift gears from Alpha Getriebebau GmbH (only 50MHz)

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.

11.2.1.1 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		

11.2.1.2 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-pole 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		

11.2.1.3 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.

11.2.2 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.

11.2.2.1 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.

11.2.2.2 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.

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

11.3.1 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 value of 0E3Eh is always set to 0!
- 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.

11.3.2 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')!

11.3.3 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 should 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.

Note: Using 60-MHz-units and lift-files with index 125 (or higher): If the value of 0E5Ch is set to -256 (instead to 255), you are able to find the RHO-offset without keeping the ropes away from your winch (the brake must be let closed!). This is an easy way to find the RHO-value in case of changing an encoder in an existing lift, but the result is not as good as made with 0E5Ch = 255!
Important: Normal the first-initialisation without load for EnDat set RHO = 0, but not so in case of first-initialisation under load: $RHO \neq 0$ will be happened, so please write it to type-plate of winch!

11.3.3.1 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".

11.3.3.2 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.

11.3.3.3 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.

11.3.3.4 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.

11.3.3.5 First initialisation under load (only available with 60MHz-units and firmware TUDWxxN):

- Be sure DSV shows "BB-lamp ok". Brake must be closed, but motor contactors must be active (closed). Signal "ISP" must be high, but no signal for direction and/or other inputs from connector "X2" are "high".
- Now set value of 0E5C to -256. You should hear some different noises from the motor (but no moving). The process works round 60s. Please not the found RHO-offset from value 0E6E and start this process again in setting 0E5C to -256. Wait for finishing the initialisation (round 60s again). 0E6E should be ok.
- Try properly working of winch with normal inspection mode in both directions. It should be the same slow speed, otherwise the initialisation was wrong and must be done again with an other value for 0B36. The default is 15000, try first 10000 and let search RHO new, values of 0B36 are between 5000 and 20000.

11.3.3.6 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.

11.3.3.7 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)!

11.3.4 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".

0736h set to 255, to read out data from SSI or EnDat (or write to EnDat).
0F12h set to 255, to read out data from ERN-encoder (sinwave-signals).
0716h is the low-word of the absolute angel from SSI- or EnDat-encoder.
0F6Eh is the searching-current (value like parameter F0, only in 60MHz).
0F70h is the searching-offset-current (value like F0, only used in 60MHz).
0B36h is the searching speed (015000 = 285Hz, it's only used in 60MHz).
0F68h is the electrical angel (only 60MHz).
0F6Ah is the calculated angel (only 60MHz).
07C8h is the mechanical angel (only 60MHz).

11.3.5 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	yellow	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

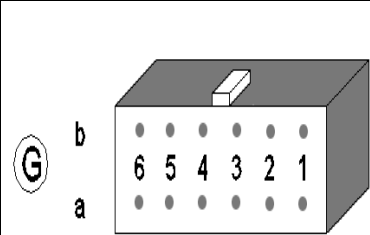
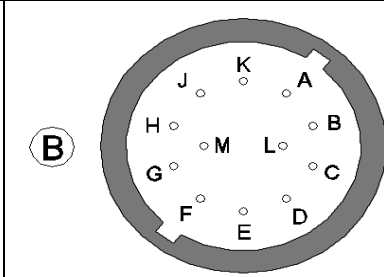
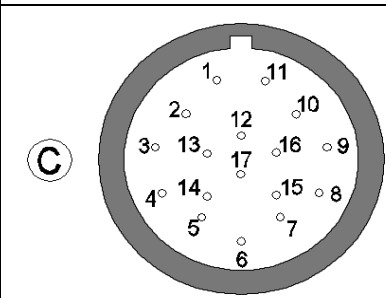
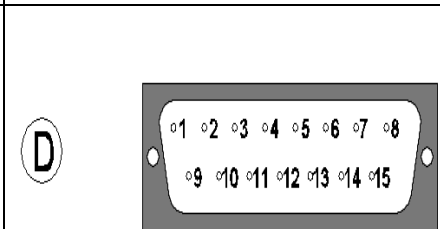
 <p>Mini Pfosten 12 - pol.</p> <p>picture 72</p>	 <p>Mini - 12pol.</p> <p>picture 67</p>
 <p>IP 65 - 17pol.</p> <p>picture 68</p>	 <p>SUB - D - 15</p> <p>picture 69</p>

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:

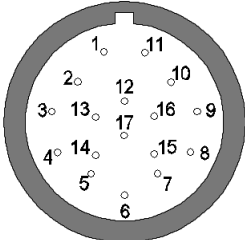
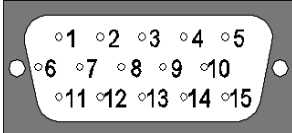
Figure 68 shows the 'IP65 screwed connector 17-pole (designated with 'Type **C**' in the table 'ERN 1313'), as it is used between the rotary encoder and the rotary encoder cable:

Figure 69 shows the 'normal' SUB-D 15-pole female (designated with 'Type **D**' 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

11.3.6 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):

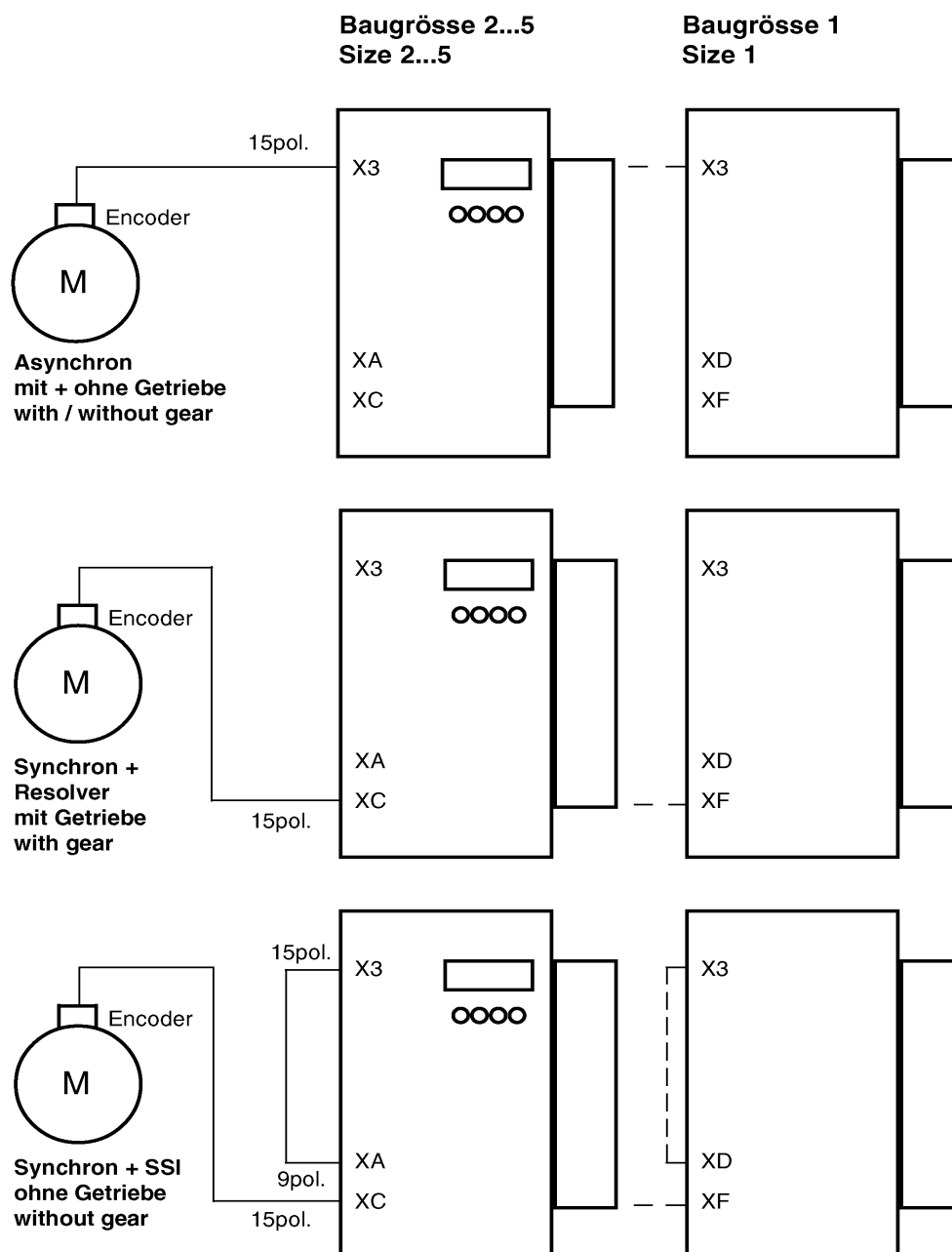
Plug type C	15	16	12	13	3	2	14	17	9	8	Housing	7	10	1	4	11
Plug type F	8	3	9	4	15	14	6	1	7	2	Housing	12	13	---	---	5
Colour of wire	green - black	yellow - black	blue-black	red-black	red	black	grey	pink	yellow	purple	silver	brown-green	white - green	blue	white	black
Descr.	K1 A+	K1\ A-	K2 B+	K2\ B-	K0 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
<div><div><div>C</div></div><div>IP 65 - 17pol.</div><div>picture 68</div></div>						<div><div><div>F</div></div><div>High Density 15 - pol.</div><div>picture 71</div></div>										



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.

11.4 Overview of rotary encoder connection

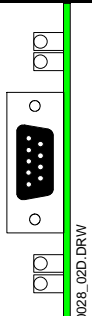
Geber-Anschluss an DSV 544x Encoder connection to DSV 544x



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.

12 Options

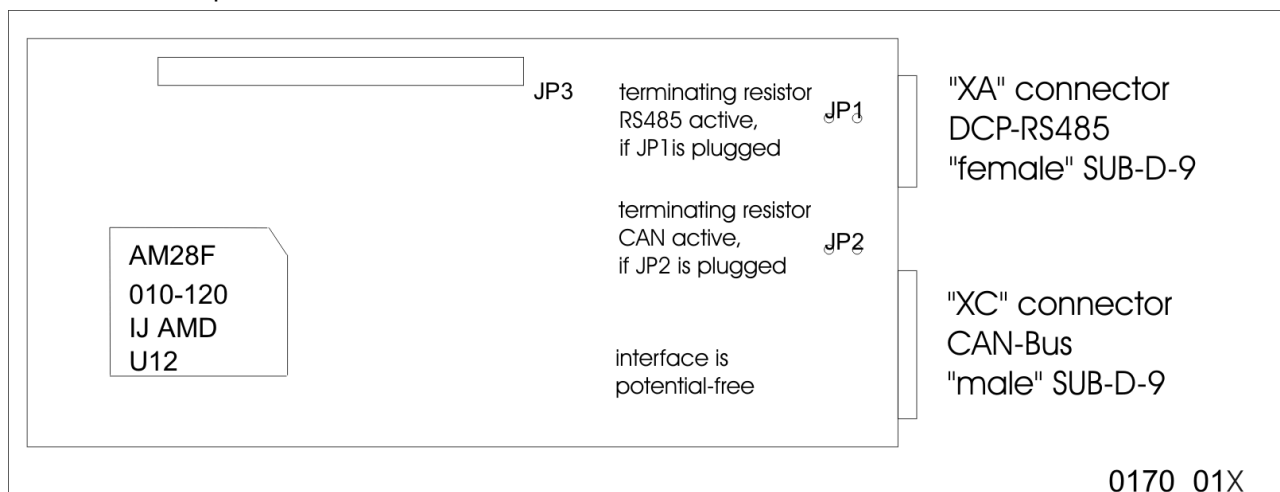
12.1 Further processing of encoder signals with option "X6" (X7 optional available)

Connector option "X7"	Connector option "X6"	Pin assignment for option X6/X7	
Jumper divided by 1 ON 1/1 2 ON 1/2 3 ON 1/4 4 ON 1/8 5 ON 1/16 (Note: This card needs 5V-power! To use it with older regulation-board, order separate manual / instructions!) X8 is also available for HTL and +24V-signals.	 Note: for 60-MHz only 2010-versions of that option-cards possible!	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 connectors of X6 and X7 are the same! 60MHz-unit build after August 2013 needs X7.	

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

12.2 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!

12.2.1 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

12.2.1.1 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".
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12.2.1.2 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.
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12.2.1.3 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.
------------------	---------------------------------------------------------------------------	-------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

12.2.1.4 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.
----------------------	----------------------------------------------------------------------------	-------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

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

12.2.1.6 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

New added feature for 60-MHz-unit only: Supports now [BP308](#), please reed BP308-V302-candcp.pdf (find file content at folder [..\EmoSoftLift\infos](#) after the first internet-update made after EmoSoftLift was installed).

12.2.2 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.

12.3 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.

12.4 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).

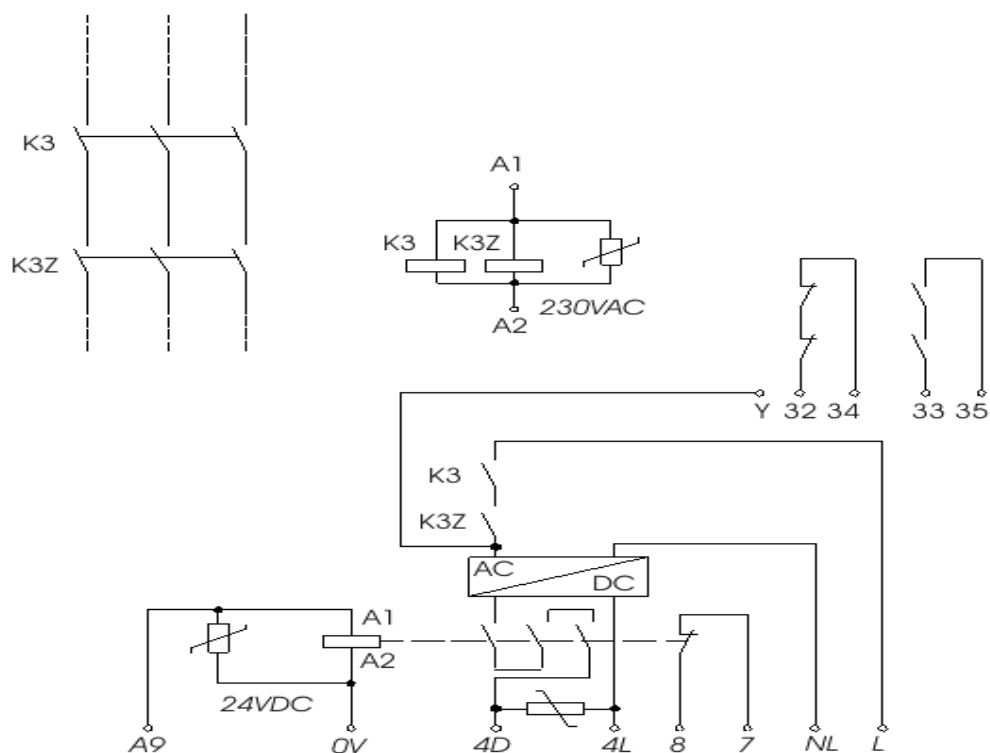
40 and 4L are for the terminal of the brake magnets (this is already a DC voltage) and NL and L are the AC supply (max. nominal voltage 240 V AC).

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.

DSV 5445 - Plus





13 Option link circuit terminals for emergency evacuation and power recovery

13.1 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.

13.2 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.

13.2.1 Accessories

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

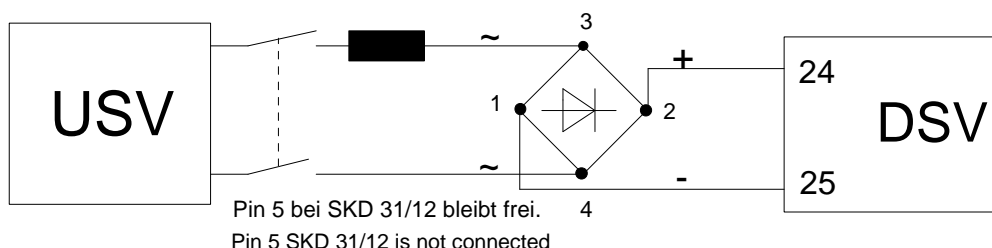
Size	USP type	Reactor	Art. No.	Rectifier	Art. No.
1 (10°)	1.0 kVA	10° 4%uk	7902509	VBO 13 – 16 AO2	8025020
2 (20°)	2.2 kVA	10° 4%uk	7902509	VBO 13 – 16 AO2	8025020
3 (30A)	3.0 kVA	35A 4%uk	7902540	SKD 31/16	8025026
3 (40A)	5.0 kVA	35A 4%uk	7902540	SKD 31/16	8025026



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").

13.2.2 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).

13.3 Power recovery unit REVCON Series SVC

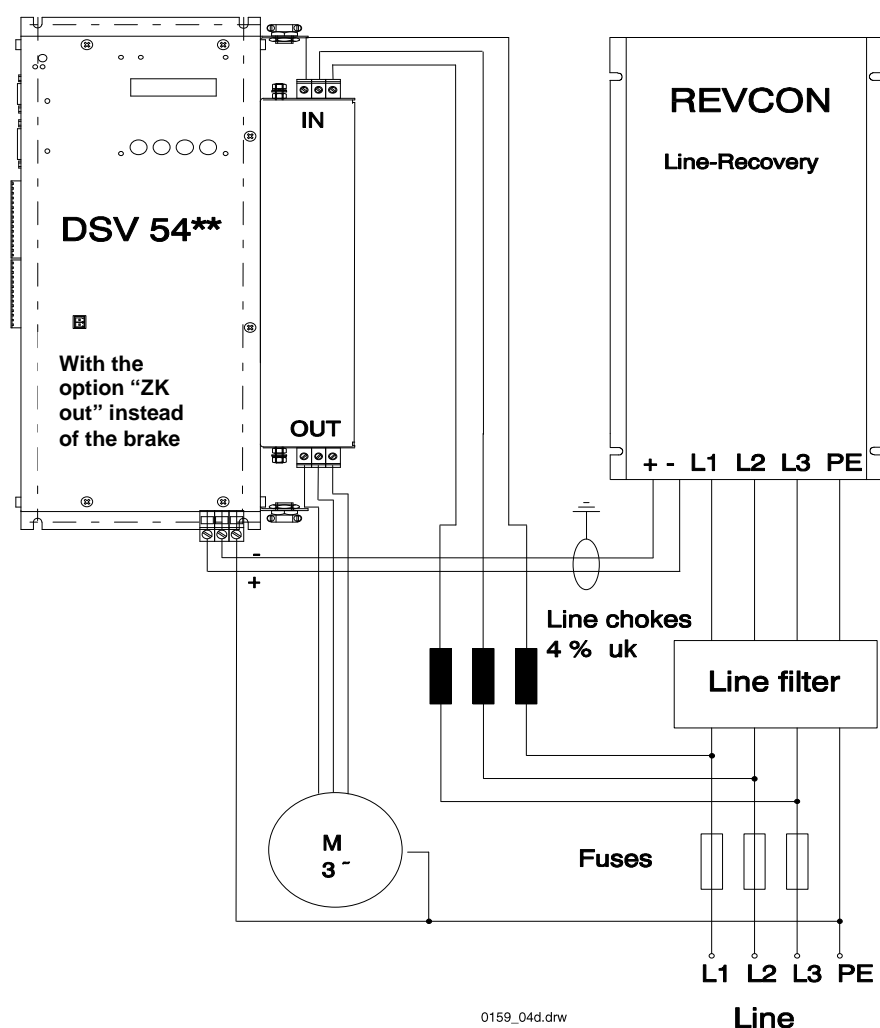
A Revcon power recovery unit is used for power recovery. The terminal 30/31 for the braking resistor is then not provided in the DSV system (i.e. no chopper installed). Option "ZK out" is needed instead (i.e. DC link connection "24" (+) and "25" (-)). The Revcon device is supplied from this terminal.

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**.

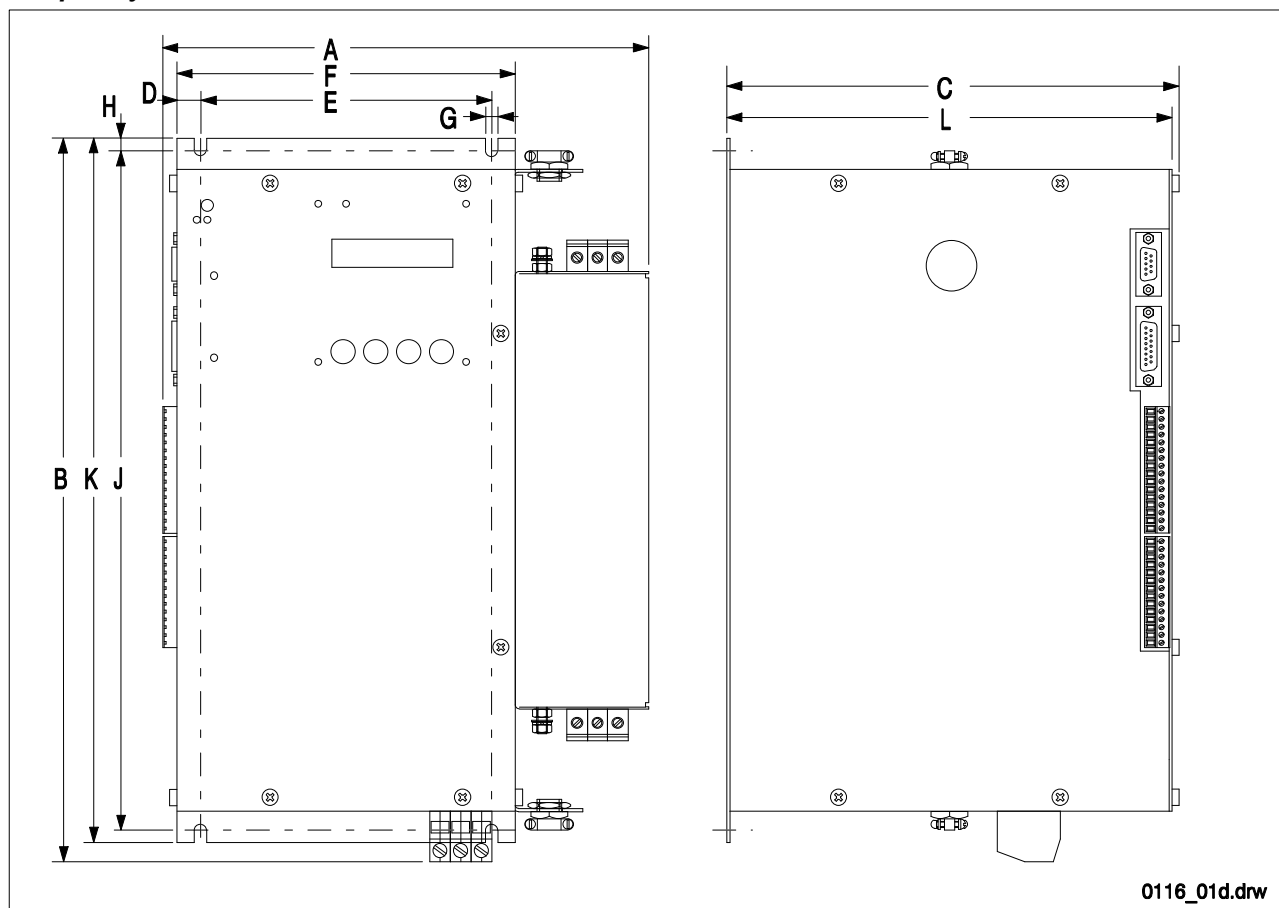
Terminal assignment



14 Appendix

14.1 Dimensions and weight

Frequency converter with built-on filter



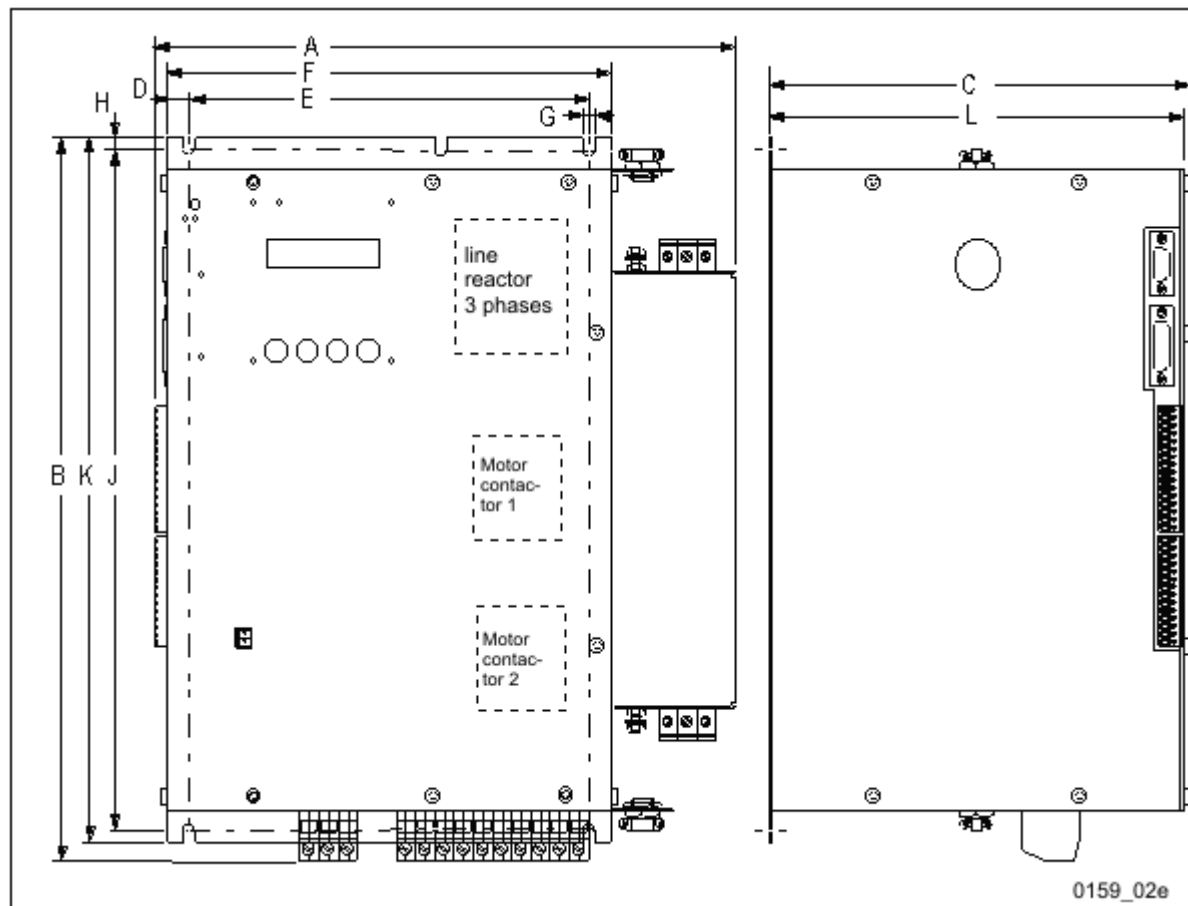
DSV 5445	Size	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	J [mm]	K [mm]	L [mm]	Weight [kg]
10 - 15A	1	167		174	11.5	107	130	6	6	264	276	171	10.5
20 - 30A	2	237	353	220	11.5	142	165	6	6	331	343	217	16.5
40 - 70A (80A*)	3	237	473	220	11.5	142	165	6	6	451	463	217	24.0
80 - 120 - 150A	4	293	759	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.
- The unit 80A in size 3 are only available without filters and with frontal connections.

14.2 Dimensions and weight DSV 5445-PLUS

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



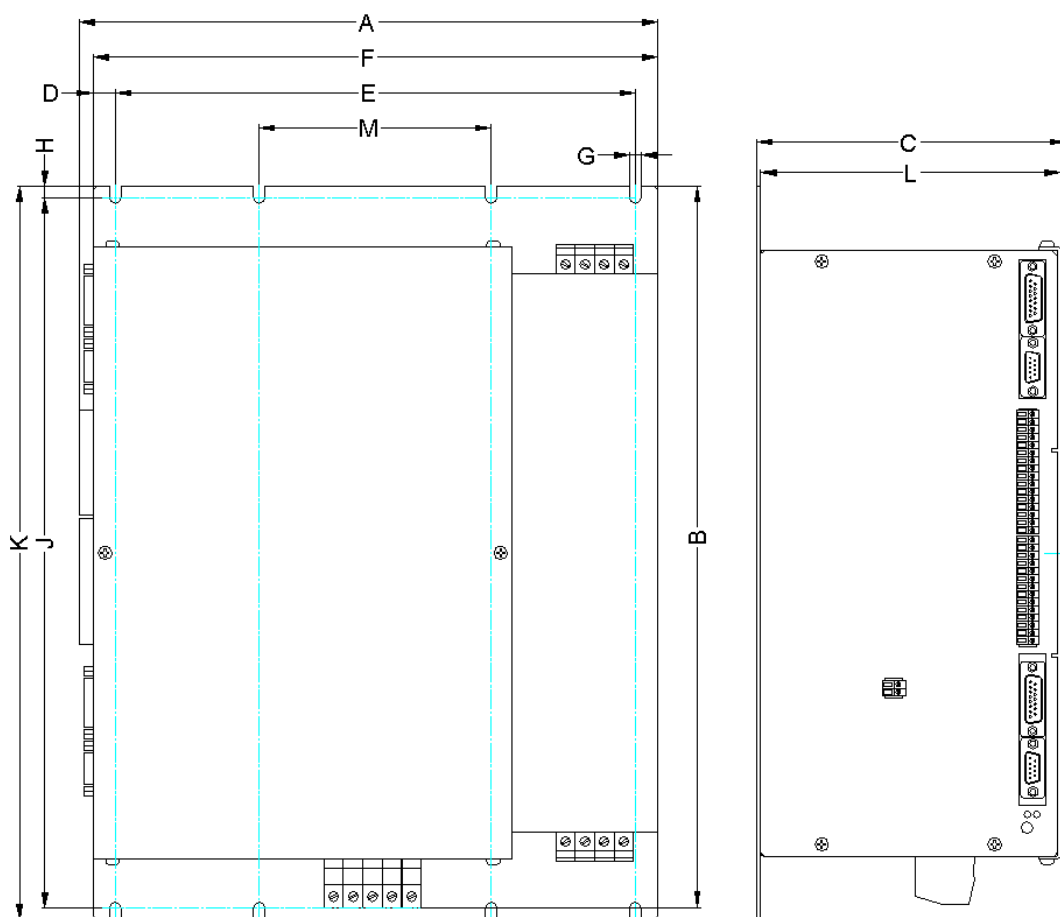
DSV 5445-PLUS including 2 motor contactors and mains reactor 4%uk

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

14.3 Dimensions and weight size 2 flat



DSV5445BGR2FL.GIF

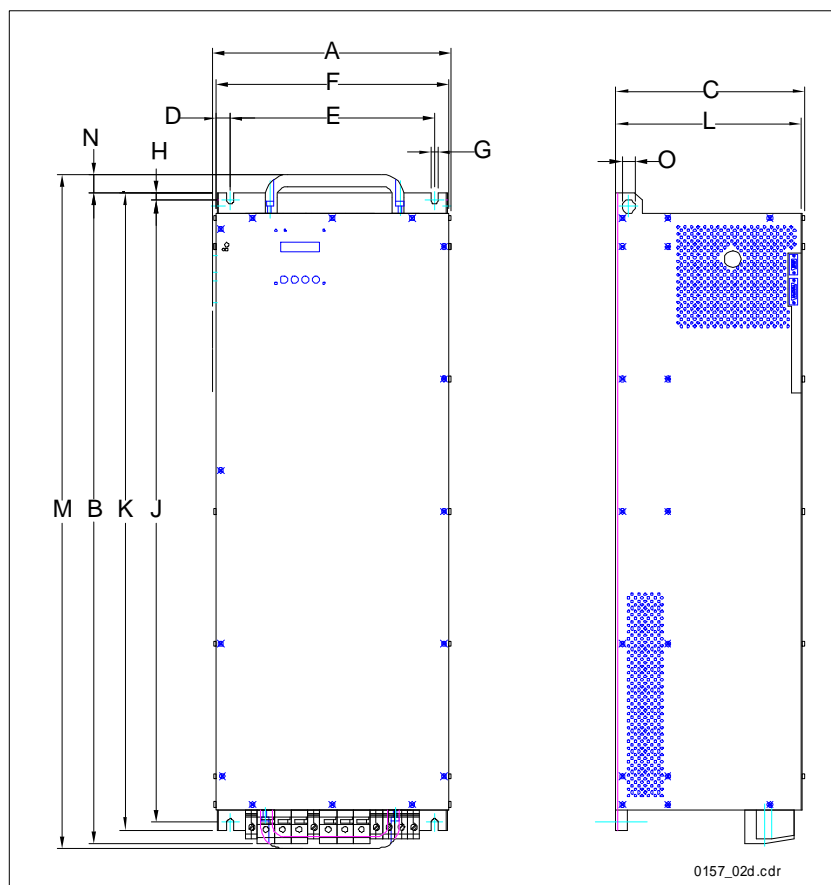
DSV 5445	Size	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	H [mm]	J [mm]	K [mm]	L [mm]	Weight [kg]
20 - 30 A	2 flat	298,5	372,5	160	11,5	268,5	291,5	6	6	367	379	155	20



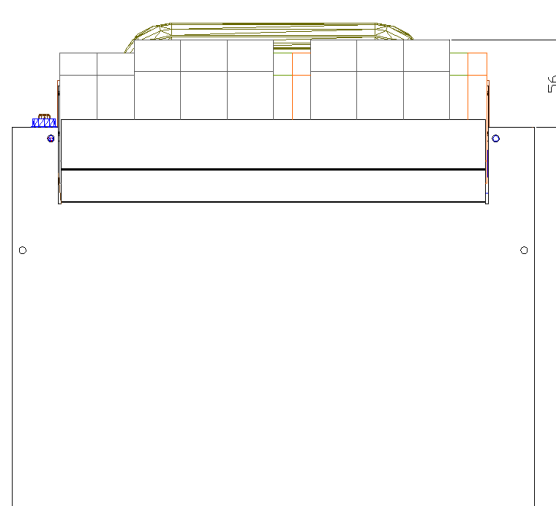
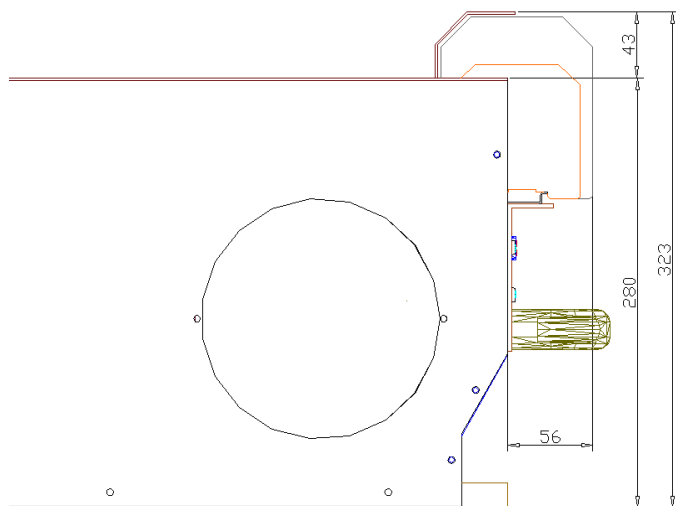
DSV5445 size 2 flat is supplied without internal FU-Control.

14.4 Dimensions and weight of size 5

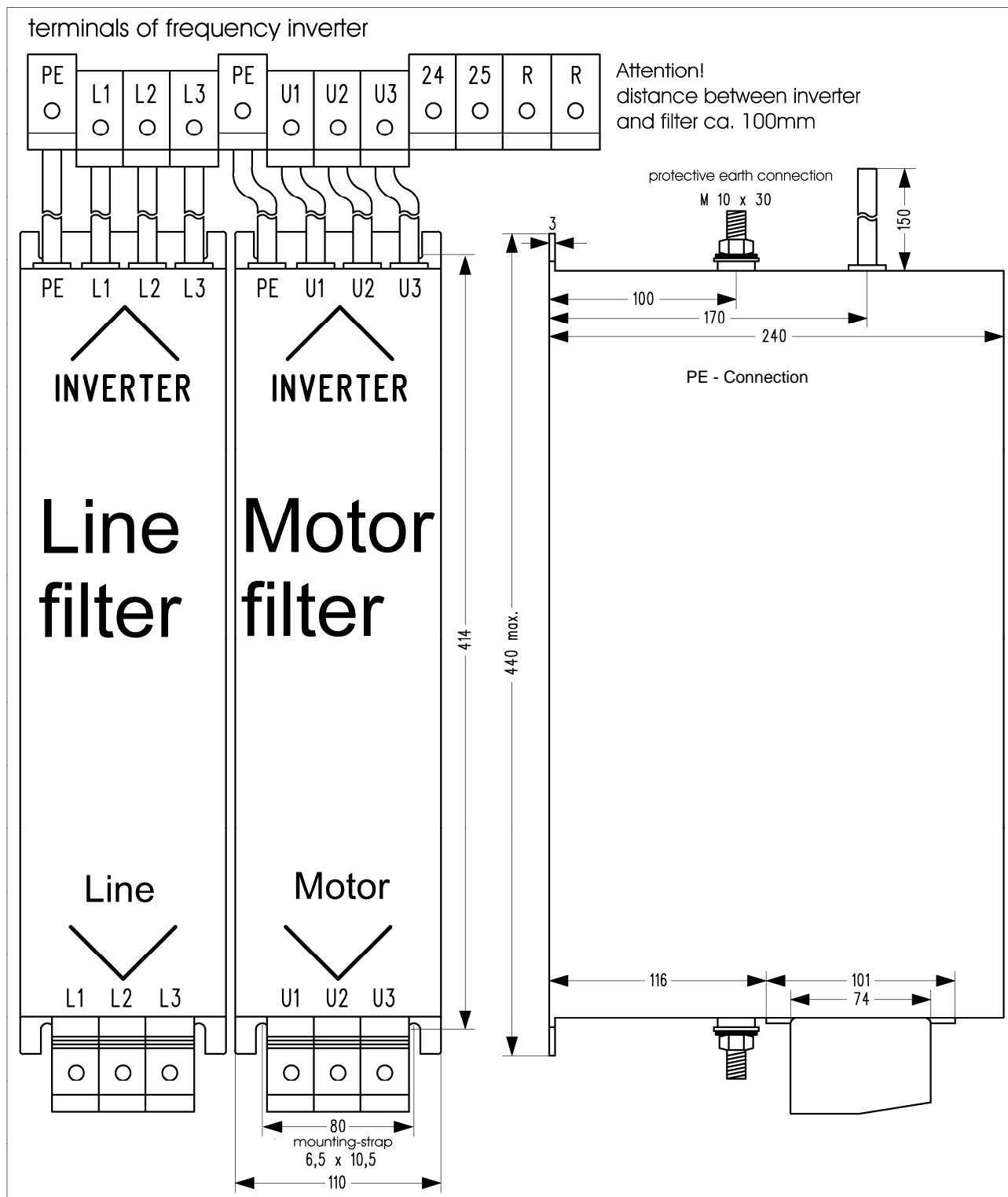
Frequency converter



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]
(old 150 A)	5	357	983	286	21.5	307	346	11	10	913	933	282	1020	28.5	20	60.0
200/250 A	5	357	983	286	21.5	307	346	11	10	913	933	282	1020	28.5	20	75.0
320/470 A	5	357	983	323	21,5	307	346	11	10	913	933	282	1020	28,5	20	85,0

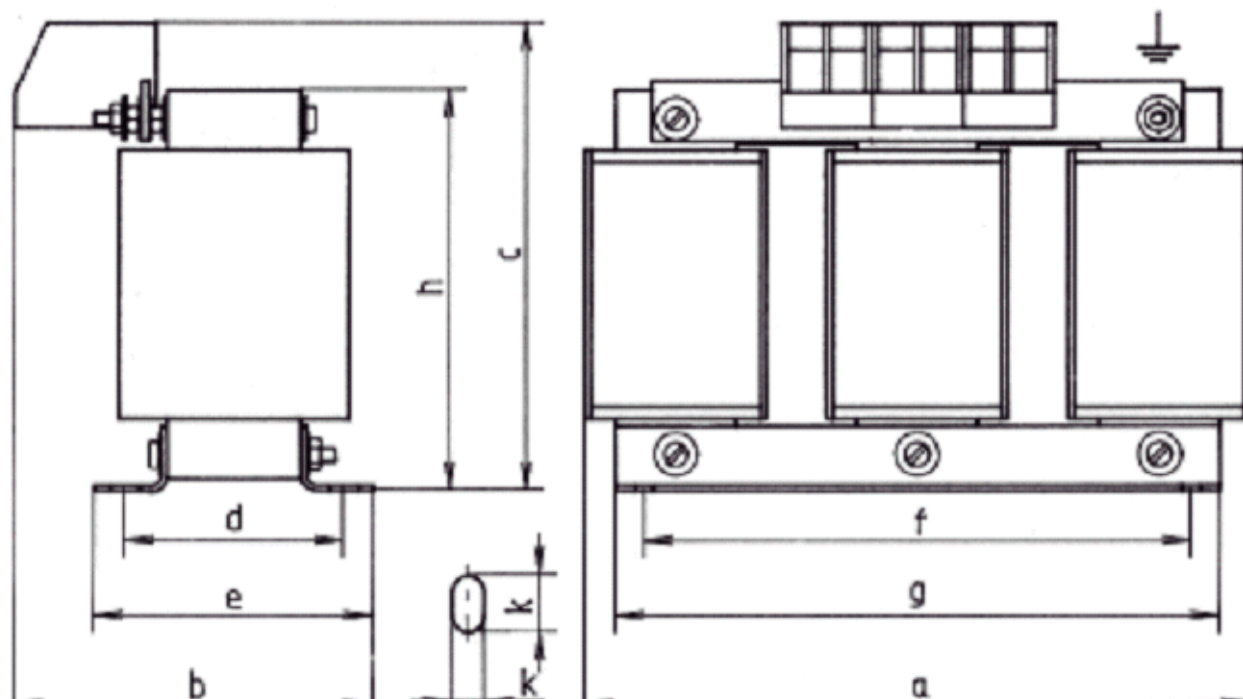


AddOn filter size 5



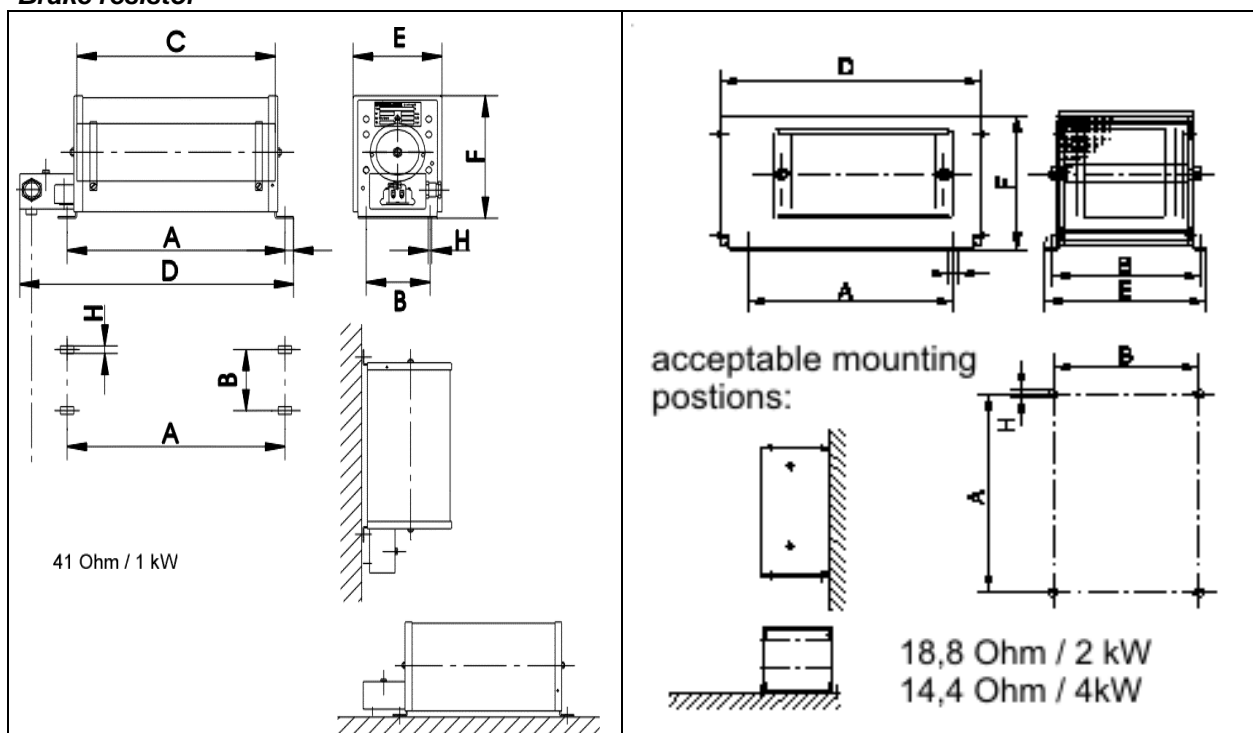
0158_01D.tif

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
320-470 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.



14.5 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 Frauenfeld (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, AML, Rauscher and Hohner (Ideacod) ; please enquire at these companies if applicable.	



15 Hotline note



Tel. 0049 (0) 3943/92050

Fax. 0049 (0) 3943/92055

e-Mail: info@cgglobal.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		Contact person:	
Order:		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? <input type="checkbox"/> yes <input type="checkbox"/> no	
Manufacturer: Gear number:		Epicyclical gear? <input type="checkbox"/> yes <input type="checkbox"/> no	
Translation ratio:		Belt drive? <input type="checkbox"/> yes <input type="checkbox"/> no	
Suspension:		Efficiency: % Number of pulleys:	
Drive wheel diameter:		Gear position: <input type="checkbox"/> bottom <input type="checkbox"/> top	
Fault/problem occurs:			
<input type="checkbox"/> at switch-on	<input type="checkbox"/> during constant travel	<input type="checkbox"/> in both directions	<input type="checkbox"/> in flush area
<input type="checkbox"/> during start	<input type="checkbox"/> during deceleration	<input type="checkbox"/> only during travel UP	<input type="checkbox"/> Fault is reproducible
<input type="checkbox"/> during acceleration	<input type="checkbox"/> when stopping	<input type="checkbox"/> only during travel DOWN	<input type="checkbox"/> Fault occurs sporadically
Short description of fault:			


16 Technical data for
☐ enquiry

☐ order

If ordering equipment please always complete this form and mail or fax it to the th German address:
CG Drives & Automation Application centre & Lift centre Wernigerode, Fax-Nr.:+49 (0) 3943 92055

Customer and order information		Date:	
Customer address		Contact person:	
		Department:	
		Tel:	
		Fax:	
Order:		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 <input type="checkbox"/> synchronous <input type="checkbox"/> real DC <input type="checkbox"/>	
Manufacturer:		Refurbishment? ("old motor") <input type="checkbox"/> yes <input type="checkbox"/> no	
Motor number:		New motor? (for frequency converter) <input type="checkbox"/> yes <input type="checkbox"/> no	
Power:		2-speed? (state only data for higher winding):	
I_n	A	U_n	V, <input type="checkbox"/> star <input type="checkbox"/> delta, F_{nom} Hz, No. poles: -pole $\cos\varphi$: n_n 1/min
Encoder type: <input type="checkbox"/> 1Vpp <input type="checkbox"/> TTL <input type="checkbox"/> HTL <input type="checkbox"/> none; increments:			
Your encoder specification:			
Forced ventil. <input type="checkbox"/> yes: V, -phase; <input type="checkbox"/> no, internal fan			
Gear data		Worm gear? <input type="checkbox"/> yes <input type="checkbox"/> no	
Manufacturer:		Epicyclical gear? <input type="checkbox"/> yes <input type="checkbox"/> no	
Gear number:		Belt drive? <input type="checkbox"/> yes <input type="checkbox"/> no	
Suspension:		Gearless? <input type="checkbox"/> yes <input type="checkbox"/> no	
Translation ratio: to number of gears:		Effective drive wheel diameter: mm	
Gear position(location relative to lift shaft): <input type="checkbox"/> bottom <input type="checkbox"/> top		Efficiency [%]: Number of pulleys:	
Frequency converter <input type="checkbox"/> PLUS-series (with contactors)		Bus systems: <input type="checkbox"/> DCP_0... <input type="checkbox"/> ACP_0... <input type="checkbox"/> BP308 DCP_03+	
<input type="checkbox"/> field oriented system MULTIDRIVE VECTOR VVVF DSV 5445 LIFTA /V			
<input type="checkbox"/> Energy recovery <input type="checkbox"/> Emergency evacuation with battery 240 V DC			
Brake resistor <input type="checkbox"/> not present, please deliver		type: Ω ,W 100% duty cycle;	
AddOn-filter <input type="checkbox"/> not present, please deliver		type:	
Line reactor <input type="checkbox"/> not present, please deliver		type:A	
Additional accessories <input type="checkbox"/> not present, please deliver		
Desired delivery date:		Comment:	