

DIETZ GSV 544X-xxx/400

**Current Converter For Brush-Type
DC Motors**

**Attachment
Operating Instructions
DIETZ DSV 5444, DSV 5445 Lift**



Edition 04/07
Subject to technical modifications
(Interim)

DIETZ GSV 544X-xxx/400

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:

GSV 544X ; DSV 5445 ; DSV 5452 ; DSV 5453 ; DSV 5445/5453-Plus-series
 KD 915 , KD 920 ; Fine HF-SET 93251340268 (DSV 5452 incl. movable cubicle) ;
 Brake resistors 4...40 Ohm (Type Cressall, Frizlen, Danotherm),

comply with the following directives and standards:

Low voltages directive 73/23/EWG - amendment 93/68/EWG - EMC directive 89/336/EWG, amendments 92/31/EWG and 93/68/EWG, incl. actually EMC directive 2004/108/EG including the appropriate amendment directives up to date of drawing.

The following standards are used:

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

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

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

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

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List of contents

1	Introduction	5
2	Safety Notice	6
3	Technical data	7
3.1	Type code GSV 544x:	7
3.2	Electrical data	7
3.2.1	Power connection and accessories	8
4	Power connection	9
4.1.1	Power connection armature circuit with drive contactors for lift applications	10
5	Parameter overview	11
5.1	Operating instruction GSV 544X-xxx/400	11
5.1.1	WinDietz 1.19 hints	11
5.2	Software package	11
5.2.1	Standard application GSV.KOM	11
5.2.2	Lift DC standard GSV50MHZ.KOM	11
5.2.3	Shelf access equipment conveyor technique GSVNIKE.KOM / GSVRBG.KOM / GSVDIG.KOM	11
5.3	Description of inverter equipment options	11
5.4	Overview parameters and variables standard	12
5.5	Overview parameters and variables lift	15
5.6	Explanations of parameters	18
5.6.1	"F0" armature excitation	18
5.6.2	t rotor time constant	18
5.6.3	First initialisation flag	18
5.6.4	Commutating limit parameters F1, F2 and variables 0E6A, 0E6E	19
6	TIPS, TRICKS	20
7	Hotline note	22
8	Technical data for <input type="checkbox"/> enquiry <input type="checkbox"/> order	23

Explanations 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 %.
Maximum rotational speed n_{max}	Maximum rotational speed at nominal current, as stated on motor rating plate.
Nominal rotational speed n_N	Rotational speed at maximum current, as stated on motor rating plate.
Field excitation	Field current, field voltage; as stated on motor rating plate, can be set with parameters.
Armature nominal voltage	Nominal voltage of armature at nominal excitation and nominal rotational speed. Range for supply voltage 400V 3AC: 400-460 V DC
Armature excitation	Preset value actually "25"
Rotor time constant	Motor parameter that determines the motor torque (between 25...250 ms, ex works preset to 100 ms.
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, actually: "700"
Lifting height	Maximum height of the lift hoist way
Start delay	Specifies the time in seconds between opening the brakes and start of travel.
Braking delay	Specifies the time in seconds before the brake closes.
OFF delay	Time for motor demagnetisation before motor contactors are open.
Stopping distance EH	Distance that the lift car travels after reaching the level signal.
Braking ramp B	Characteristic of braking gradient.
Run-up ramp HL	Characteristic of run-up gradient.
Starting jerk suspension	Caused by static friction or mechanical "adhesion" during starting. Determined by the number of guide pulleys in the lift hoist way.
Translation ratio	Gear reduction number.
Number of gear ratios	Gear reduction number. E.g. Declaration on gear 56 : 2 → reduction 56, → number of gear ratios 2
1 Vpp – encoder type	High quality encoder whose output signal has a sinusoidal profile with a peak-to-peak value of 1 volt. (4 tracks)
TTL encoder type	Encoder of average quality with transistor-transistor logic, i.e. output signal has a rectangular shape and supply voltage is usually 5 V DC. (4 tracks)
HTL encoder type	Encoder of inferior quality with high-transistor logic, i.e. output signal has a rectangular shape, but supply voltage is up to 30 V DC. (2 tracks, cannot be monitored)
Tracks	Number of encoder signals that are displace by 90 ° to each other.

1 Introduction

Inverter for brush-type DC motor with IGBT-inverter technology:

- ◆ Speed-, position-, torque control without dead times of a thyristor controller.
- ◆ Armature- and field current control (2,5 - 12 kHz) PWM avoids alternating torques.
- ◆ Special pulse-width modulation method (2,5 -12 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 UPS 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.
- ◆ One inverter for all brush-type DC motors: gearless, 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!
- ◆ Software package 1 GSV.KOM (menu navigation GSV_D.CNF resp. GSV_E.CNF) for standard applications with analog and/or digital default set point with GSV 5444-xxx/400
- ◆ Software package 2 GSV50MHZ.KOM (menu navigation LIFTGSV.CNF) is a lift program for system GSV 5445 to operate high- and low speed DC winches with or without gear.
- ◆ Software package 3 GSVNIKE.KOM / GSVRBG.KOM / GSVDIG.KOM (menu navigation GSVNIKE.CNF / GSVRBG.CNF / GSVDIG.CNF) system GSV 5444-xxx/400 for shelf access equipment modernisation is projected.

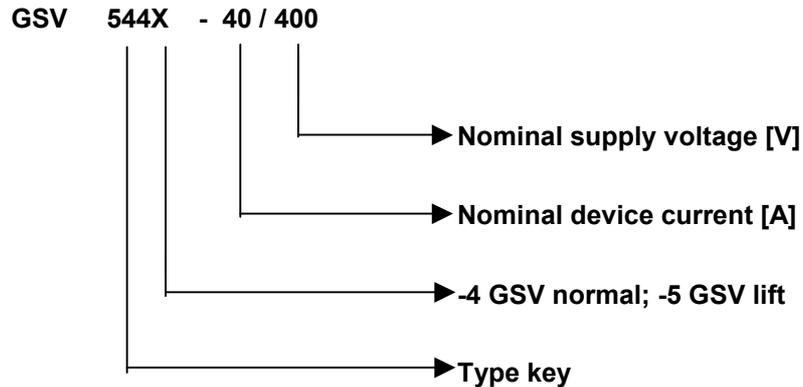
2 Safety Notice



- 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.
- The unauthorised removal of parts of the enclosure, improper use and incorrect installation or operation can cause fatal or serious injury and material damage.
- Set before first initialisation or reconnection the first initialisation -flag (E60)
- The inverter DC-DRIVE GSV 5444-xxx/400 is only for operating DC drives. Other electrical consumers are prohibited! Otherwise there will be danger of live and material damage.
- 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.
- Armature-, field current and encoder have to be the same sense of rotation.
- If reactive power compensation equipment is installed in the power mains, it is to be checked for correct function.
- If earth-leakage relays are employed, their sensitivity should be 300 mA or more per converter. The earth-leakage relays must be suitable for pulsed DC currents.
- Check the required motor current at all speeds after completing commissioning (current measurement or evaluation of terminal A6).
- **This short manual is only in conjunction with the corresponding operating instructions for three phase drives valid. There you can find also how to operate this drive and the pin assignment of the input/output clamps.**

3 Technical data

3.1 Type code GSV 544x:



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)
Other connection voltages and/or IT system on request
- ◆ Power mains frequency: 50...60 Hz ± 5 %
- ◆ Control voltage for fans from 80A-DSV: 230V +5, -15 %
- ◆ Control voltage PLC level: +24V ± 15 %
- ◆ Typical power factor: >0,97
- ◆ Armature voltage: 0...460 V at Un 3AC 400 V
- ◆ Field voltage: 0...460 V at Un 3AC 400V
- ◆ Field current: 0...10 A (option 0-25A) controlled
- ◆ Pulse frequency adjustable: 2,5...12 kHz
- ◆ Typical du/dt: < 1 kV/μs (with AddOn - filter)
- ◆ Dynamic output current (I_{dyn}): 150 % (200% size 1 10A)
- ◆ Duty cycle: 100 % at 2,5 kHz PWM
65 % (50%) at 10 kHz (12 kHz) PWM
- ◆ Control range (encoder 1Vpp): 1:32000
- ◆ Field suppression mode: 100...200%
- ◆ Default set point: digital, analog SPS, bus
- ◆ Fixed speeds Lift 7TZ: 6
- ◆ Speed thresholds: 3
- ◆ Protection class: IP 20
- ◆ Ambient temperature: 0 ... 40 °C
Power decrease from 40 °C at 1,5 % per 1 °C (maximum up to 55 °C)
- ◆ Storage temperature: -20 ...70 °C
- ◆ Humidity rating E to DIN 40040
- ◆ Installation altitude up to 1000m, thereafter power reduction 6% per 1000m

3.2.1 Power connection and accessories

GSV 5444	I_{dyn} [A]	Output power [kW]	Power-loss [kW]	Rec. motor type power [kW]	Network-fuse	RFI motor filter Addon	Line reactors	Conductor cross-section mains/motor lines	Brake resistor cable cross-section
10	20	4,6	0,19	3,0-5,0	3 × 16 AT	Size. 1	3 × 1,5 mH (16A)	1,5 mm ² *	41 Ω / 450 W 2. x. 1,5 mm ²
20	30	9,2	0,41	6,5-11	3 × 25AT	Size. 2	3 × 0,7 mH (35A)	2,5 mm ² *	41 Ω / 1 kW 2. x. 1,5 mm ²
30	45	13,8	0,58	9,0-15,0	3 × 50 AT	Size. 3/0	3 × 0,7 mH (35A)	4,0 mm ² *	18,8 Ω / 2 kW 2. x. 2,5 mm ²
40	60	18,4	0,75	15,5-21,5	3 × 63 AT	Size. 3/1	3 × 0,5 mH (50A)	6,0 mm ² *	18,8 Ω / 2 kW 2. x. 2,5 mm ²
60	90	27,6	1,2	22,0-29,5	3 × 80 AT	Size. 3/3	3 × 0,3 mH (80A)	10 mm ² *	14,4 Ω / 4 kW 2. x. 2,5 mm ²
80	120	36,8	1,5	30,0-44,5	3 × 125 AT	Size. 4/2	3 × 0,25 mH (100A)	25 mm ² *	14,4 Ω / 4 kW 2. x. 2,5 mm ²
120	180	55,2	2,25	45,0-65,0	3 × 160 AT	Size. 4/3	3 × 0,18 mH (130A)	35 mm ² *	13 Ω / 6,5 kW 2. x. 4,0 mm ²
150	225	69,0	3,0	55,0-75,0	3 × 200 AT	Size. 5	3 × 0,12 mH (200A)	50 mm ² *	10 Ω / 6,5 kW 2. x. 4,0 mm ²
200	300	92,0	4,0	65,0-110,0	3 × 250 AT	Size. 5	3 × 0,12 mH (200A)	70 mm ² *	6,5 Ω / 11 kW 2. x. 4,0 mm ²
250	375	115,0	5,0	90,0-132,0	3 × 250 AT	Size. 5	3 × 0,10 mH (250A)	70 mm ² *	6,5 Ω / 11 kW 2. x. 4,0 mm ²

Motor type [KW]

The above mentioned data are suitable for armature nominal voltage of 460V DC.

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.

Field current

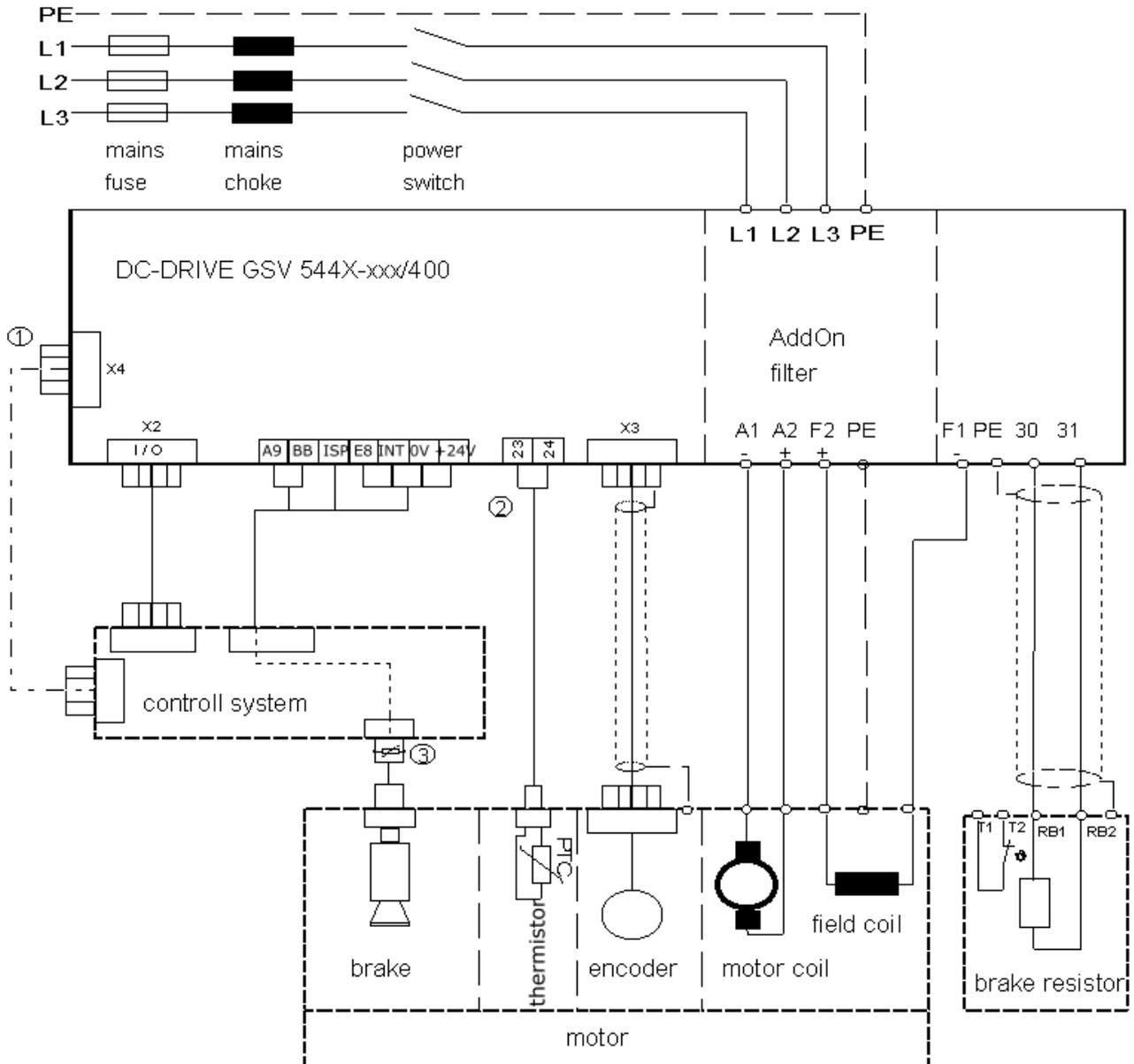
0 - 10 A 1,5 mm² 0-20 A 2,5 mm²

Brake resistor

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

DIETZ GSV 544X-xxx/400

4 Power connection



- Driving via interface only if required.
- Bridge the clamps 23 and 24 if thermistor is connected to external controller.
- Connect varistor to brake magnet.

DIETZ GSV 544X-xxx/400

4.1.1 Power connection armature circuit with drive contactors for lift applications

The modern IGBT-based drive technology combined with old DC machines provides an excellent ride quality at maximum efficiency.

But a few things need to be taken into account if you want the system to operate with the usual reliability for many years to come. Especially the often very low armature voltage and the electric strength of all windings against earth must be taken into consideration. There are only a few products able to stand the intermediate circuit voltage or high du/dt of modern inverters.

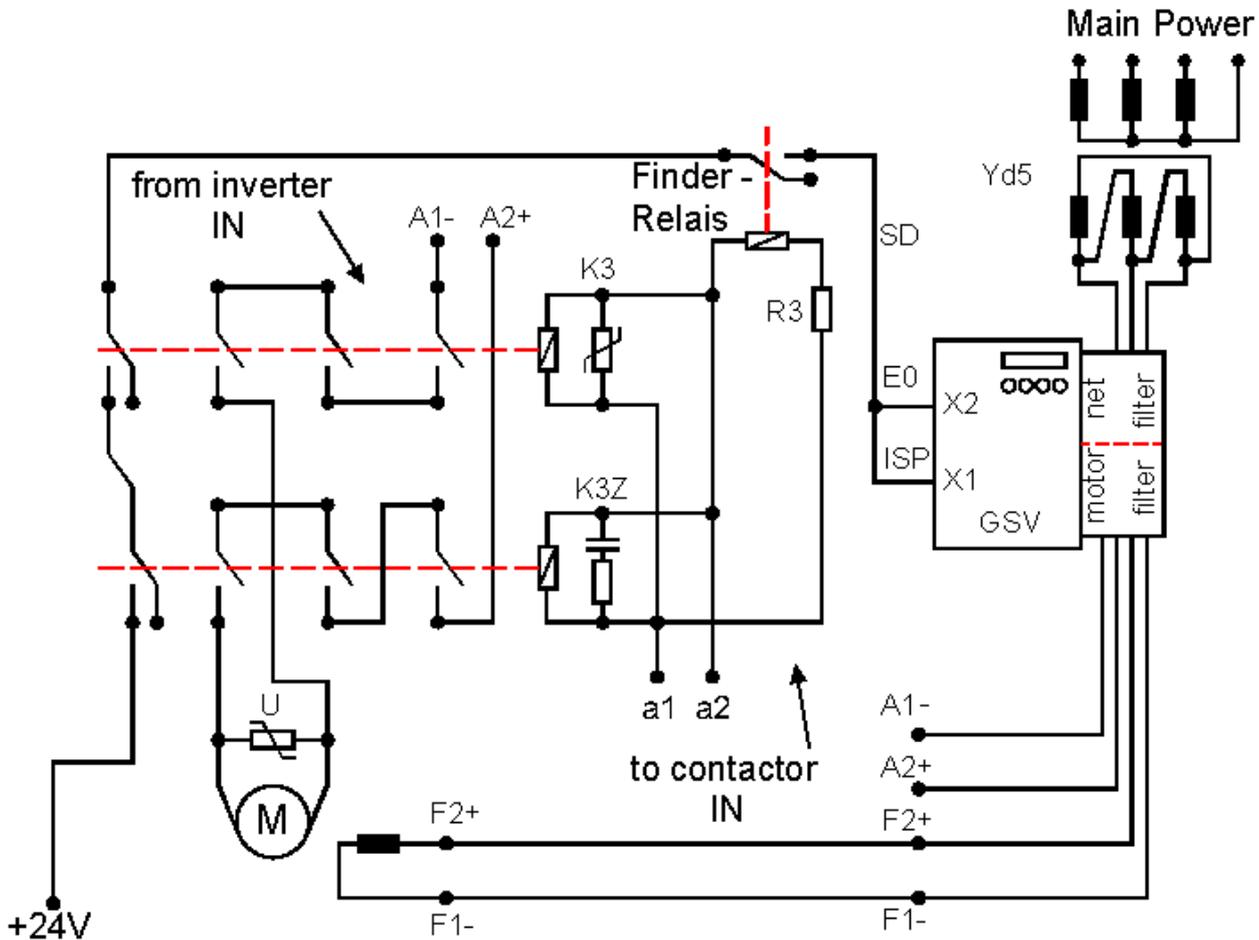
When the armature voltage is distinctly below 300V, an isolating transformer is usually required upstream of the inverter which also assures the electric strength against earth.

High-quality-contactors need to be provided in the armature circuit which in emergencies (i.e. high DC current and high DC voltage) can interrupt the supply of energy to the armature circuit. But the contactors no longer need to be dimensioned to provide a steadily recurring isolation under load. The power varistor of the DC motor armature is a particularly important component as it prevents the collector from being damaged when the safety circuit is opened. Depending on the performance of the motor, the varistor has a tablet size between 40 and 80 and a voltage matching the effective intermediate circuit. An inverter with a 3AC 230V network therefore requires a 300V varistor at the armature winding (e.g. type SIOV B60K300).



There must be no contactor in the field circuit. There are only two contactors in the armature circuit, the three pairs of contacts of which are each connected in series in the below example.

Non-binding switching proposal for the power circuit (R3 = 2kΩ 0,5W carbon film):



5 Parameter overview

5.1 Operating instruction GSV 544X-xxx/400

This manual needs as a completion the basic operating instruction of Vectordrive DSV 5444 resp. Multidrive DSV 5445 Lift. There you can find handling, programming and so on described in detail.

5.1.1 WinDietz 1.19 hints

WinDietz hints in detail you can find in the corresponding manual.

Select the inverter type in the WinDietz start window: DSV 5444/ML for standard- or DSV5445/MLL for lift applications.

5.2 Software package

5.2.1 Standard application GSV.KOM

The software package 1 GSV.KOM with the menu prompt GSV_D.CNF (German) resp. GSV_E.CNF (English) are suitable for standard application with analog and/or digital default set point.

5.2.2 Lift DC standard GSV50MHZ.KOM

The software package 2 GSV50MHZ.KOM with the menu prompt LIFTGSVE.CNF is a lift program for operating high- and low speed DC winches with or without gear.

5.2.3 Shelf access equipment conveyor technique GSVNIKE.KOM / GSVRBG.KOM / GSVDIG.KOM

The software package 3 GSVNIKE.KOM / GSVRBG.KOM / GSVDIG.KOM with the menu prompt GSVNIKE.CNF / GSVRBG.CNF / GSVDIG.CNF) for the system GSV 5444-xxx/400 is for modernisation projected. A short-term description is available on request.

5.3 Description of inverter equipment options

The GSV series is a precision drive for armature- and field voltages up to max. 460 Volt DC nominal voltage. The system is high dynamic and stiff in control. Integrated SPS- function, current-, speed- and position control are as standard.

The GSV 5444 has its connectors at the front "X1" to "X4".

The GSV 5445 has its connectors sideways "X1" to "X4".

As standard both inverters were with brake chopper and field current control equipped. Furthermore is for protection of the motor winding and for radio interference suppression the AddOn-Filter attached. Additional smoothing chokes in the armature circuit are not necessary and should be removed in case of modernisation. Both in the armature- and in the field current circuit a high dynamic current control avoids alternating torques.

Up to the double nominal speed is the field suppression mode possible, unless this high speed is released from the motor manufacturer. The standstill torque can be utilised, accordingly to the motor specification, up to the maximum output current of the inverter.

The actual speed value will be retrieved, contrary to former times, through modern incremental encoders, whereas we recommend sin/cos 1Vpp encoders with 1024 resp. 2048 increments per motor revolution. Thereby a speed set point range 1:32000 can be reached. Encoder- and armature voltage refeeding are not provided. Sources for rotary encoders you can find in the basic manual DSV 5445.



The internal FU-Control is not able to encode all possible applications itself. Please check the menu item "operation mode", if the suitable application has been selected.

Is the system e.g. operating with "GSV_NIKE" (shelf access equipment) and you are working with standard application "GSV.KOM", the operation mode has to be changed to "normal" before editing parameters or variables!

5.4 Overview parameters and variables standard

Factory settings for GSV.KOM (general engineering).

Parameters and variables	Adr.	Remarks	factory-settings
armature excitation	F0	Factory setting! Leave this value always on "25" for all DC motors.	25
nominal speed	F1	Default value is the speed n_{nom} , that can be driven with I_{max} as stated on motor rating plate.	1650
maximum speed	F2	Default value is the maximum speed $n_{max,1}$, that can be driven with I_{nom} as stated on motor rating plate.	1800
PCG, holding force position control loop	F3	P-gain, holding force for position control.	40
target ramp (F4<Y1)	F4	Target ramp (number always less than Y1)	400
speed (3 rd ->2 nd root section) position control loop	F5	Maximum speed for 2 nd root braking curve range.	1250
l-part position control loop	F6	l-part of control position, the higher the value, the smoother the start up.	24
P-part position control loop	F7	P-part of control position as high as possible until the motor is near humming; set P-values always before setting I values (standard 800)	800
offset 1 for zero position	F8	Offset for zero position for F11 (in the same direction of rotation)	0
factor of analog set point value	F9	Standardisation for analog set point value (operating mode B1)	730
speed divisor	F10	Speed divisor	4002
reduced speed.1 for positioning	F11	Reduced positioning speed; positioning in the same direction as the machine is running.	1500
reference cycle speed	F12	Speed of reference cycle.	-150
speed tolerance SET/ACTUAL on	F13	Maximum speed deviation (tolerance window) for setting the "REQUIRED = ACTUAL" message.	100
speed tolerance SET/ACTUAL scan on	F14	F14*0,8 ms (scan time) gives the period, in which the speed must fall within the tolerance window to set the message "SET = ACTUAL".	10
speed tolerance SET/ACTUAL off	F15	Minimum speed deviation (tolerance window) for deleting the "REQUIRED = ACTUAL" message.	200
speed SET/ACTUAL scan off	F16	F16*0,8 ms gives the period, in which the speed must fall outside the tolerance window to reset the message "SET = ACTUAL".	5
position tolerance SET/ACTUAL on	F17	Maximum position deviation (tolerance window) to set the message "REQUIRED = ACTUAL".	500
position SET/ACTUAL scan on	F18	F14*0,8 ms gives the period, in which the position must fall within the tolerance window to set the message "SET = ACTUAL".	10

DIETZ GSV 544X-xxx/400

Parameters and variables	Adr.	Remarks	factory-settings
position tolerance SET/ACTUAL off	F19	Minimum position deviation (tolerance window) for deleting the "REQUIRED=ACTUAL" message.	2000
position SET/ACTUAL scan off	F20	Value of F20*0,8 ms gives the period, in which the position must fall outside the tolerance window to reset the message "SET=ACTUAL".	5
insert factor	F21	Standardisation factor for position control commands ("C" "D" "H") and parameters F8 and F26.	64
speed factor	F22	Standardisation for specified standard set point (operating mode B0) / Standardisation for speed control commands ("O" ,"G") and parameters F11, F12 and F27.	13988
increment number factor	F23	Increment number factor	256
change-over of transducer transmission.	F24	Change-over of transducer transmission.	2
RS485 address	F25	Sets the unit address if there are several units connected to one bus. F25=0 communication via bus operation is cut off .	5
offset2 for zero position	F26	Offset for zero position for F27 (in the positioning direction)	0
reduced speed 2 for position	F27	Reduced positioning speed; direction of rotation reversed for reference travel.	0
jerk	F28	Limitation of the maximum acceleration. The higher F28, the faster the set point value is sought.	1600
Inc. follower	F29	Increment number ratio of follower drive	125
Inc master drive	F30	Increment number ratio of master drive (increment number of master drive in relation of follower drive speed). Only the speed value is evaluated.	125
number of poles	F31	Factory setting! Leave this value always on "2".	2
Intergr.zeitk. TIN-N	l	I-part for speed control.	12
amplification VPN_N	K	P-part for speed control.	800
rotor time constant	t	Factory setting! Leave this value always on "100" for all DC motors.	100
run-up ramp	Y0	The higher this value, the smoother and longer the acceleration.	400
return ramp	Y1	The higher this value, the smoother and longer the deceleration.	480
automatic brake torque	E4E	Customised settings.	0
Standardised analog speed	E50	Customised settings.	0
hyst. analog speed	E52	Customised settings.	0
offset analog speed	E54	Customised settings.	0
max. digital speed	E56	Customised settings.	0
Standardised analog torque	E58	Customised settings.	0
hyst. analog torque	E5A	Customised settings.	0
offset analog torque	E5C	Customised settings.	0
max. digital torque	E5E	Customised settings.	0

DIETZ GSV 544X-xxx/400

Parameters and variables	Adr.	Remarks	factory-settings
first initialisation flag	E60	This flag is for monitoring the allocation field current, armature current and encoder sense of rotation. For protecting the motor please always set this flag! Only very dynamical drives cause a switch-off in case of error.	255
mode digital/analog	E62	Switching digital (0) / analog (255) default set point	0
internal/external zero	E64	Internal referencing (0) analysis of the zero track external (255) input INT2	0
interface mode	E66	Mode interface.	5
SG18-LG18-flag	E68	Select memory mode: event memory (0). error memory (255)	0
set point field current	E6A	Set point field current; input as stated on motor rating plate, nominal field current in mA.	1000
encoder type 1Vpp/TTL	E6C	Select encoder type (1Vpp = 0; TTL=255)	0
commutation limit	E6C	Between the revolutions n_{nom} and n_{max} the armature current will be decreased to the reduced value. (% of I_{nom})	80



Encoder increments actually only 1024 increments per motor revolution preset
Please change the bold values of the factory settings only after well examination resp. after calling back our company.

DIETZ GSV 544X-xxx/400

5.5 Overview parameters and variables lift

Factory settings for GSV50MHZ.KOM (lift applications with or without gear, based on *7TZ.KOM/UPD).

Adr	Parameters and variables	Remarks	factory-settings
F0	armature excitation	Factory setting! Please don't change value "25"!	25
F1	Nnom (Imax)	Default value is the speed n_{nom} , that can be driven with I_{max} as stated on motor rating plate.	170
F2	Nmax (Inom)	Default value is the maximum speed n_{max} , that can be driven with I_{nom} as stated on motor rating plate.	200
F3	P-part stop and hold	P holding gain (position control) is the holding force at standstill that prevents reverse rotation up to closing the brake.	12
F6	I-part start to end	I-gain in the position controller; the larger the value, the softer the start transition.	16
F7	P-part start to end	P-gain in the position controller; as high as possible. Drive may however not "hum" during starting. The P-value should always be set before I-values. (standard 1200)	800
F10	Standardisation of speed	These parameters need not to be observed, if for the calculation of F10, F21, F23 the variable 0E48 is set to 255 (read only).	15715
F21	Standardisation of distance		320
F22	Speed adjustage		27976
F23	encoder factor setup		2048
F24	switch to F23-default	Read only.	2
F25	show firmware F25=0		0
F26	stop distance to floor	Stopping distance after level magnet/zone.	40
F29	A0-old=242 A0-new=3862	Function of output A0; "242" motor energised, "3862" activation of the motor contactors.	3862
F30	PWM-adjustment fine	This value may not be changed without consultation with the factory.	500
F31	number of poles	Factory setting! Leave this value always on "4".	4
I	I-part run	I-part ; setting irrelevant see E1A and E1C	8
K	P-part speed run	P-part of the speed control.	800
t	rotor-time constant	The rotor time constant value range 25.....250 ms.	100
B34	version of program	Version of the command program (read only)	99
E00	Vi inspection run	Enter speed in m/s.	0,600
E02	V3 fast stage	Enter speed in m/s.	2,500
E04	V2 intermediate stage	Enter speed in m/s.	1,500
E06	V1 low stage	Enter speed in m/s.	1,000
E08	Ve drive-in stage	Enter speed in m/s.	0,050
E0A	Vn adjust stage	Enter speed in m/s.	0,004
E0C	Direction of rotation	For E0C = 0 → 24 V level = UP and 0 V level = DOWN. For E0C = 255 → 0 V level = UP and 24 V level = DOWN.	0
E12	Start clearance run	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.	0,700
E14	Open door at V lower	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".	0,300
E16	excess speed	Output A3 will be low at $V_x > E16$ (start value = $1,15 * V3$)	2,850

Adr	Parameters and variables	Remarks	factory-settings
E18	return ramp B	The higher this value, the smoother and longer the stopping distance.	25
E1A	pointed arch	Pointed arch will be activated E1A = "255".	0
E1C	l-part stop and hold	l-part stop and hold avoids reverse motion when the brake is opening. Activated during standstill.	8
E1E	l-part run	l-part run. replaces function of parameter I (l-part run normal)!	32
E20	ramp gradient	Standard value = 200	200
E22	run-up ramp HL	The higher this value, the smoother and longer the acceleration.	50
E24	braking delay	The time after stopping V = 0 m/s, the motor continues to be magnetised until the brake has closed mechanically.	750
E26	OFF delay	Delay time for signals A0 and A7 for motor demagnetisation before contacts are open.	125
E28	start delay	Time between the mechanical opening of the brake and start up.	250
E3C	Schmitt flag	Brake opens when signal E0 is present, digital mode. In preparation: switching from digital to analog mode (0E3C = 0)	255
E3E	JP3 flag TTL	Set encoder type (sinusoidal= 0, TTL= 255)	0
E40	suspension	Number of pulleys 1:1 o. 1:2.....	2
E42	transmission	Gear (10 ... 100) 1=gearless	1
E44	number of cycles	Gear steps 1=gearless	1
E46	driving wheel diameter.	Effective drive wheel diameter in 'mm'.	570
E48	calculation?	yes = 255, no = 0. calculation F10, F21	255
E4A	encoder increments	Set encoder increments.	2048
E4C	starting jerk speed.	Starting jerk speed to overcome the static friction during start	0,002
E4E	starting jerk time	Time needed to overcome static friction.	250
E50	Findili flag	Simultaneous signal at V1 and V2 results V3.	0
E52	N_IST_FILTER_ALLE	The actual value of the encoder is filtered if: E52 = 0 without; 255 medium; 256 high. If 0 is selected, the regulation is stiffer, but slight noise may occur, depending on the quality of the encoder signal.	255
E54	ISQ_IST_FILTER_ALLE	The torque output is filtered if: E52 = 0 without; 255 medium; 256 high. If 0 is selected, the regulation is stiffer, but heavy noise may occur, depending on the quality of the encoder signal.	255
E56	64_256_FLAG 50 MHz	Read only: shows the multiplication type.	255
E58	no reset on error	For '0', the inverter is automatically reset after a fault. For '255', it waits with all current faults for a reset.	23
E5A	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
E60	first initialisation flag	This flag is for monitoring the allocation field current, armature current and encoder sense of rotation. For protecting the motor please always set this flag! Only very dynamical drives cause a switch-off in case of error.	255
E62	emergency evacuation	Corresponding to LIFT7TZ.	255
E64	DCP=90,CAN=165,ACP=85	Selection of bus mode.	90
E66	baud rate	Selection of baud rate DCP, CAN, ACP	1
E68	SG18-LG18-flag	Event memory 0. fault memory 255	255

DIETZ GSV 544X-xxx/400

Adr	Parameters and variables	Remarks	factory-settings
E6A	set point field current	Input as stated on motor rating plate in mA, i.e. 1A = 1000mA	13500
E6C	stopping distance	Stopping distance for direct approach after gear-down point in mm (read only)	4000
E6E	commutation	Between the revolutions n_{nom} and n_{max} the armature current will be decreased to the reduced value. (% of I_{nom})	90



Please change the bold values of the factory settings only after well examination resp. after calling back our company.

Detailed information about the parameters and variables you can find in the lift manual I445_21e.

5.6 Explanations of parameters

5.6.1 "F0" armature excitation

The armature excitation "F0" is actually preset to **"25"** (valid for all DC motors).

5.6.2 t rotor time constant

The rotor time constant "t" is responsible for the torque (armature) of the motor. Too high values of "t" will effect losses regarding torque. Too small values will effect oscillation in the acceleration range. The rotor time constant for optimal control mode is between 25...250 ms. t increases normally proportional with the motor power, but will be preset to 100ms for all DC motors because the effect is not measurable.

5.6.3 First initialisation flag

The first initialisation flag switches on an effective monitoring to protect the DC motor from the "runaway". If unexpected errors occur when using very high dynamic drives, this monitoring can be switched off.

DIETZ GSV 544X-xxx/400

5.6.4 Commutating limit parameters F1, F2 and variables 0E6A, 0E6E

Parameters "F1" and "F2" as well as variables "0E6A" and "0E6E" are new:

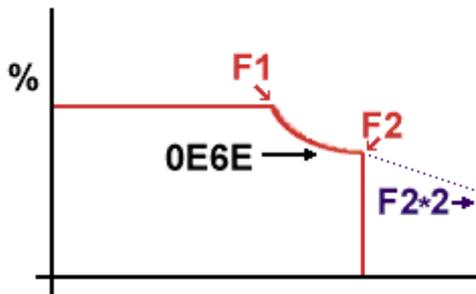
"F1" (N_{nom} - I_{max}) is the speed up to which the operation is effected with full armature current. From "F1" onwards the armature current is limited by the commutating limit "0E6E" up to the "F2" speed.

"F2" (N_{max} - I_{nom}) is the speed up to which the commutating limit "0E6E" is supposed to run. After "F2" the field suppressing is starting (the field being reduced to half as a maximum).

"0E6A" (field current) indicates the field winding value in "mA". The field as well as the armature currents are controlled so that the magnetic field does not depend on the temperature.

"0E6E" (commutating limit) is indicated as a nominal current percentage. In between the "F1" and "F2" speeds the current is e.g. limited to 90% of the nominal current.

Connection between the parameters F1, F2 and variable 0E6E



Up to the "F1" speed the full DC inverter dynamics are put at disposal. From the "F1" speed up to the "F2" speed it is possible to limit the armature current in order to protect the commutator. Cell "0E6E" indicates the percentage (referred to the motor's I_{max} rating plate) by which the current has to be reduced.

From "F2" onwards, up to 2 x "F2" are linearly run into the field suppression. In this particular case it must however be taken into account that both functions are not always parallelly available. One can either select a field suppression or adjust the black band.

Example 1 (black band as from 135 rpm up to the end-speed of 159 rpm):

F1 = 135

F2 = 159

0E6E = 70%

In example 1 the "F2" speed corresponds to the maximum operating speed of the machine (e.g. for 2,5m/s).

Example 2 (field suppression as from 110 rpm up to e.g. 220 rpm with a 1 to 2 ratio):

F1 = 109

F2 = 110

0E6E = 90%

In example 2 the motor also has to run up to 159 rpm but with a field that is suppressed by a factor 1.34 (the field current must e.g. drop from 8A to 6A). With this setting the field current is reduced to 50% from "F1" = 110 rpm up to 2 x "F2" = 220 rpm. For 159 rpm this results in 75%. On the other hand the value in "0E6E" has practically no effect since "F1" and "F2" inevitably are close.

6 TIPS, TRICKS

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. This state causes considerable overload of the motor and converter! Stop the run immediately and seek the fault.

- ◆ Encoder damaged or is not running with the motor.
- ◆ PPR number is not suitable (1024 1Vpp is standard -> check memory cell 0E4A)
- ◆ Wrong allocation of the direction armature current-, field current, and/or encoder direction.

2) *Encoder error alarm or severely uneven running:*

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

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

- ◆ One of the enable signals "ISP" or "E0" not present, check wiring
- ◆ "E0" was not removed after end of run, measure signal

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

- ◆ INT is self-generated via output „A5“, i.e. you have to check the cable connection between input INT and output A5.

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

- ◆ Check the motor terminal plate (check armature- and field current)
- ◆ Incorrect dimensioning of a drive device (efficiency of the system "Pay attention to machine top/bottom")
- ◆ Measure if field and/or armature current is correct.

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
- ◆ Encoder coupling or encoder mounting is not applicable.

7) *Driving wheel jerks backwards noticeably during start:*

- ◆ I-part run and start not low enough
- ◆ P-part stop too low

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 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.

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.

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 ...9SZ.* not activated.

14) At start up switched off with fault message "armature or field voltage?"

- ◆ Field not connected or polarity wrong.

15) Only at high speed the inverter switches off with fault message "armature or field voltage?"

- ◆ Field voltage higher than 2:1
- ◆ Mains voltage too low.



If the difference between the set point and actual values of the speeds is not too high at high speeds, the first initialisation flag 0E60 can also be set to "0". In this case the above mentioned monitoring is disabled.

DIETZ GSV 544X-xxx/400

7 Hotline note



Please check the following points before calling our hotline:

Tel. +49-7025-101-29 / -42

Fax: +49-7025-5824

www.emotron.com

(old) e-mail: info@dietz-electronic.de

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			
GSV544...		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		Armature nominal voltage: V	
Manufacturer:		Nominal current: A	Maximum current: A
Motor number:		Field nominal voltage:	V
Power:		Field nominal current:	A
		n_{nom} : 1/min	n_{max} : 1/min
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:			

DIETZ GSV 544X-xxx/400

8 Technical data for enquiry order

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

Customer and order information		Date:	
Customer address		Contact person:	
Order:		Department:	
		Tel.:	
		Fax:	
		Customer number	
Lift data		Intermediate speed (V2): m/s	
Load capacity:	kg	Single-floor run (V1):	m/s
Cabin empty weight:	kg	Smallest floor height:	m
Maximum travelling speed (V3)	m/s	Largest floor height:	m
Motor data		Armature nominal voltage: V	
Manufacturer:		Nominal current: A	Maximum Current: A
Motor number:		Field nominal voltage:	V
Power:		Field nominal current:	A
		n_{nom} :	1/min n_{max} : 1/min
Encoder type: <input type="checkbox"/> 1Vpp <input type="checkbox"/> TTL <input type="checkbox"/> HTL <input type="checkbox"/> smaller; increments:			
(Recommended encoder type: 1Vpp sine/cosine-tracks with 1024 increments and supply voltage of 5 V DC).			
Forced ventil. <input type="checkbox"/> ja: 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:	
DC-Drive GSV 5444			
<input type="checkbox"/> GSV 5444 LIFT for external brake resistor			
<input type="checkbox"/> Energy recovery		<input type="checkbox"/> Emergency evacuation with battery 240 V DC	
Brake resistor			
<input type="checkbox"/> present: Ω , W 100% ED; <input type="checkbox"/> not present, please deliver			
AddOn-filter and line reactor		<input type="checkbox"/> AddOn-filter desired	
<input type="checkbox"/> present		<input type="checkbox"/> not present, please deliver	