

MANUAL

Servo Drive
TV3.230-xx-
for DC-Servomotors
with DC-Tachometer

TV3.230

UNITEK | Industrie Elektronik
G m b H

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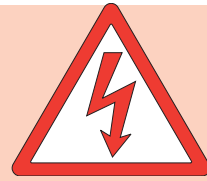
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1 Basic Information

Electronic devices always involve the risk of failure.

Caution High Voltage

AC 255V~, DC 400V=



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s to be read carefully and must be understood by experts before installing or starting the device. If there are any doubts call your trader or the manufacturer.

The TV3-230 series is designed to regulate electrical currents; protection standard IP00.

Standards and Guidelines:

The device and it's associated components can only be installed and switched on where the local laws and technical standards have been strictly adhered to:

- EU-Guidelines 89/392/EWG, 84/528/EWG, 86/663/EWG, 72/23/EWG
EN60204, EN50178, EN60439-1, EN60146, EN61800-3
- IEC/UL IEC364, IEC 664, UL508C, UL840
- VDE-regulations VDE100, VDE110, VDE160
- TÜV-regulations
- Regulations of Professional and Occupational bodies: VGB4

The user has to assure that:

after

- a failure of the device
 - an incorrect handling
 - a failure of the control unit etc.
- the drive has to be brought to a secure operating condition.

Machines and installations are to be provided with supervisory and safety equipment, that is independent of the device.

Adjustment

- only by qualified personnel
- adhere to safety regulations

Installation work

- only when disconnected from all power lines.

QS

The devices are archived by the manufacturer with serial number and their test specifications.

CE

The EU-guide line 89/336/EWG with the Regulations EN61000-2 and EN61000-4 are observed.

General Information

The transistor servo amplifier **SERVO-TV3.2** forms together with the direct current servomotor a propulsion unit distinguished by its high regulating quality

The physical characteristics correspond to those of the direct current motors, that is, the current is proportional to the torque and the voltage is proportional to the speed. Current and speed can be measured precisely,

The tachometer actual value is generated from the sensor unit.

(incremental encoder with rotor position track or resolver.)

The analogue regulation circuits of the servo amplifier are designed simply.

In the speed controller (P-I-controller) of the servo-amplifier the nominal value and the actual value are processed. The result is the current nominal value.

As occurs in all DC-servo-amplifiers which are supplied by the dc-bus , the feed-back of the energy must be observed when braking in the dc-bus (especially where stroke or eccentric cycles are concerned). The ballast circuit is designed for 3% on-period, higher cyclic durations can be reached by adding external resistors. (option)

Information:

Further servo-amplifiers for DC-servo-motors

for low power	SERVO -DC TV3&TV6	24 ... 120V, 6 ... 12A
---------------	-------------------	------------------------

for midrange power	SERVO -DC TVQ6	up to 250V, 10 ... 25A
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for high power	Classic Q2, Q6	up to 250V, 15 ..60A
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Motor governor for DC-shunt motors

from midrange upto higher power	Classic Q1, Q3	up to 550V, 15 ... 2000A
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3-Phase-servo-amplifier analog for AC-synchro-servo motors

for low power	SERVO -AC TVD3-2	24 ... 115V, 5 ...10A
	SERVO-AC TVD3-230	230V, 5...10A

for midrange power	SERVO - AC TVD6-2	200V , 400V, 5 ... 25/40A
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for high power	SERVO-AC AS250/275, AS450/475	
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3-Phase-servo-amplifier digital for AC-synchro-servo motors

for low power upto higher power	Digital-AC-SERVO DS 2xx	230V, 5...10A
	Digital-AC-SERVO DS 4xx	400V, 5...50A

Battery Drive	BAMO C	24V, 10...40A
	BAMO A1,A2,A3	24..200V, 10...500A
	BAMO D3 (digital)	24..200V, 10...500A

1 Basic Information

Application:

for all kinds of machines up to 1.8KW drive power especially as 4Q-servo-drive in travel axes with

- high dynamic acceleration and deceleration cycles
- great regulation range
- high efficiency
- small motor size
- even and smooth travel

for speed or torque regulation or

combined speed-torque regulation with or without superposed position controller.drives with constand speed as in conveyors, lead screw drives, pumps or divider units

For use in

component insertation machines, metall-sheet working machines
machine tools, plastic working machines, assembly machines,
knitting and sewing machines, textile working machines, grinding machines, wood and stone working machines, food processing machines, robots and manipulators, storage across machines, Extruder, Kalander, and many other machines and installations.

DC-drives are particularly known for their good true running and even torque.

Notice

when deceleration is mainly require.

For example

- winding machines, lifts, great centrifugal masses

the braking energy will be annihilated in the ballast circuit
or re-feded to the mains using an external dc-bus converter.



Construction:

cubicle-mount or 3HE-plug-in unit according to the VDE- DIN- and EU- regulations.
Standard analog regulation electronics.
Power electronics for 5A and 10A.
galvanic isolation between power section and device-zero (GND)

There are used:

- fully isolated six-pack IGBT-power semiconductors, generous dimensioning.
- only industrial standard components are used
- SMD - basic insertion
- LED displays
- 4 digit binary switches for system setup
- precision potentiometers for fine adjustment

Characteristics:

- * Power supply max. 230V~
- * differential nominal value inputs
- * Speed and torque regulation
- * Static and dynamic current limit
- * Current nominal value output
- * Test connectors for current and speed
- * Enable logic
- * Quick stop
- * Mains failure braking
- * Temperature control for motor and device

1 Basic Information

Technical data

Power supply 24V~ bis 230V~ +10%

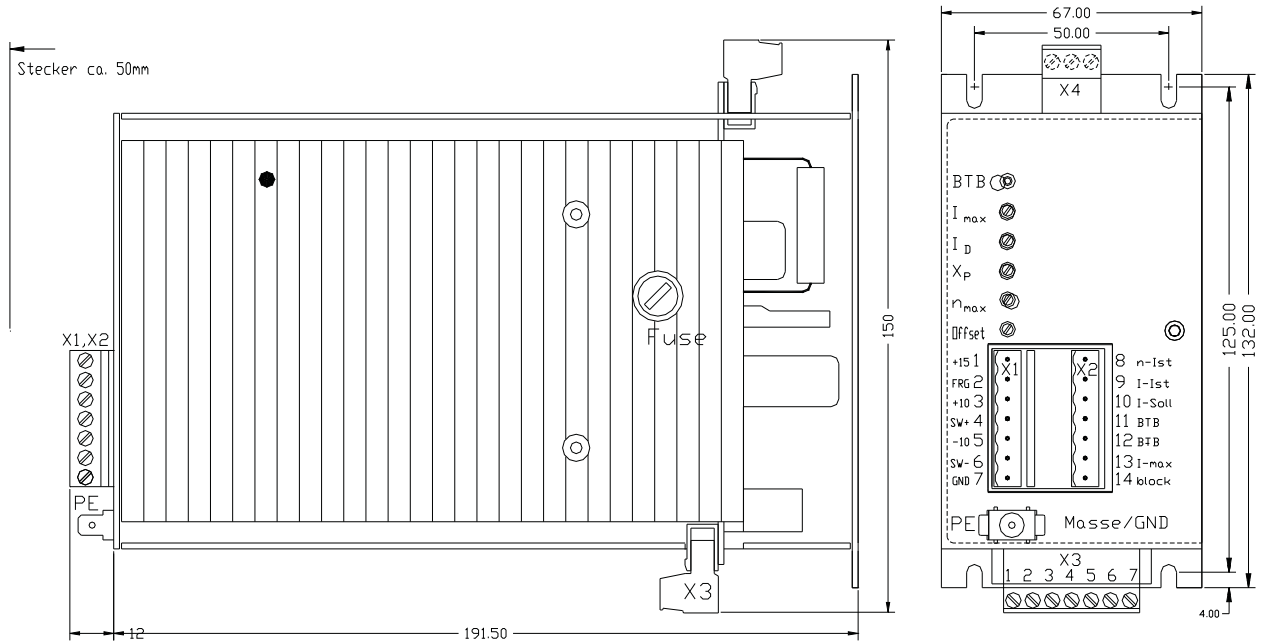
Auxiliary supply 20V~ +10%/-5%
 24V= +10%/-5%
 300mA pro device

Spezifikationen			
Device TV3.230		5	10
Output - standstill current	A=	5	10
	A=	10	20
El. power max.	W	900	1800
ZW-fuses quick	mounted AF	12,5 - 16	12,5 - 16
Cooling	100% ED	convect	fan
Dim. plug in device compact device	BxHB	12TE/3HE	12TE/3HE
	HxWxD mm	132x67x205	132x82x205

Mains module TVD3-230		
Power supply	V~	1x oder 3x 230V~ plus 1x 20V~
Output voltage	V=	max. 320
Output current	A=	max. 30
Ballast circuitry with	V=	400
Ballast power	W	50
	WS	6000

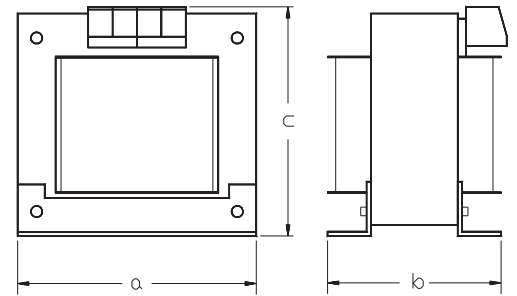
Common spezifikationen	
Enclosure protection	IP 00
Norms	EN 61800-3, EN 60204-1 EN 50178
Humidity stress	Klasse F nach DIN 40040
Site altitude	<1000m über NN
Ambient temperature	0 ... 45°C
Extended operating range	up to 60°C red. 2%/°C
storage temperature	-30°C bis +80°C
Speed controller	
control accuracy (with out actual value error)	±0,5%
Control range (Tacho)	1:1000

Dimensions Compact Device

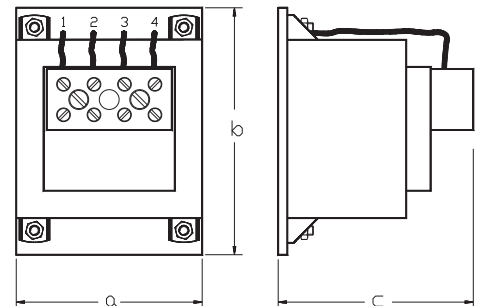


Dimensions transformer, choke

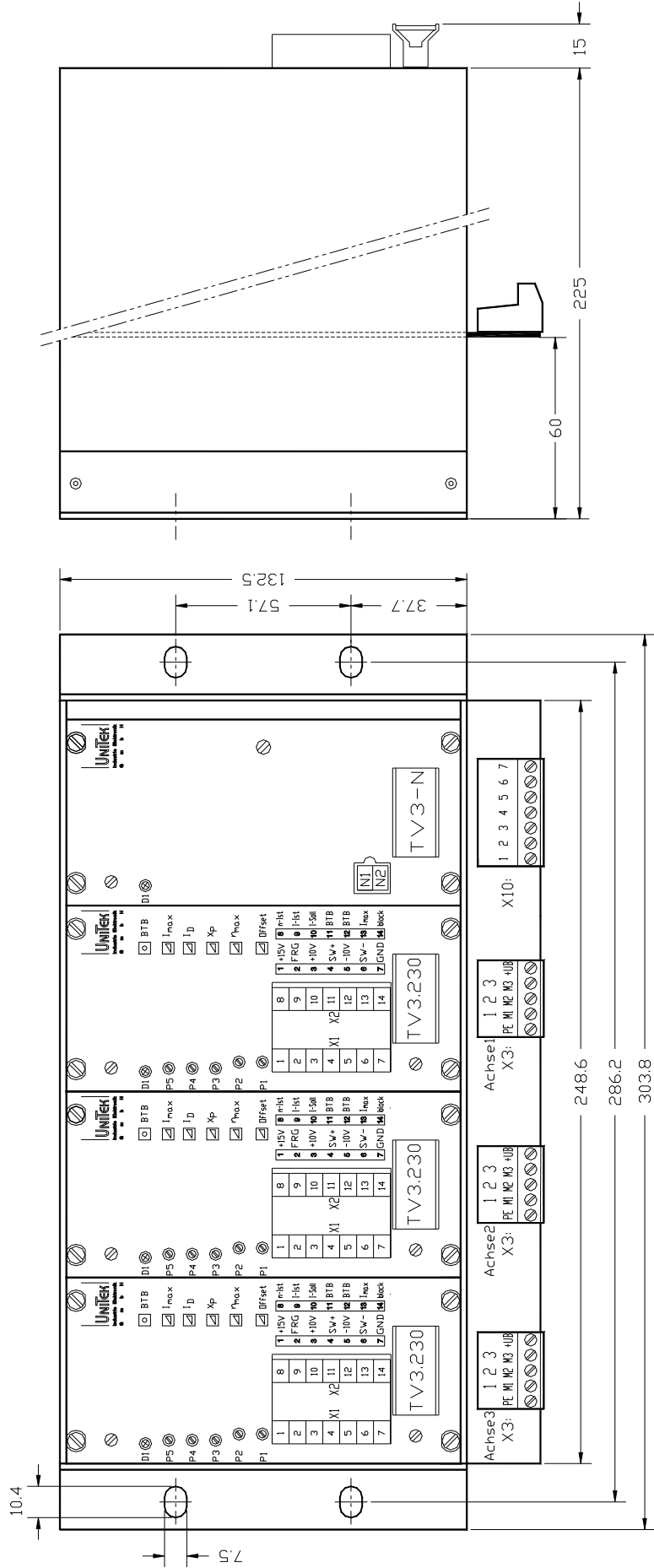
Trafo-Typ	Trafo power VA	Dimensions a / b / c mm	Weight kg
TE 8/2	100	85x 89x 82	2.0
TE 12/1	250	120x101x115	4.3
TE12/3	400	120x133x115	6.8
TE 15/1	500	108x132x122	8.2
TE 15/3	800	150x150x132	13.5
TE 74/2	1300	175x140x160	15.4
TE 74/3	1600	175x150x160	18.5

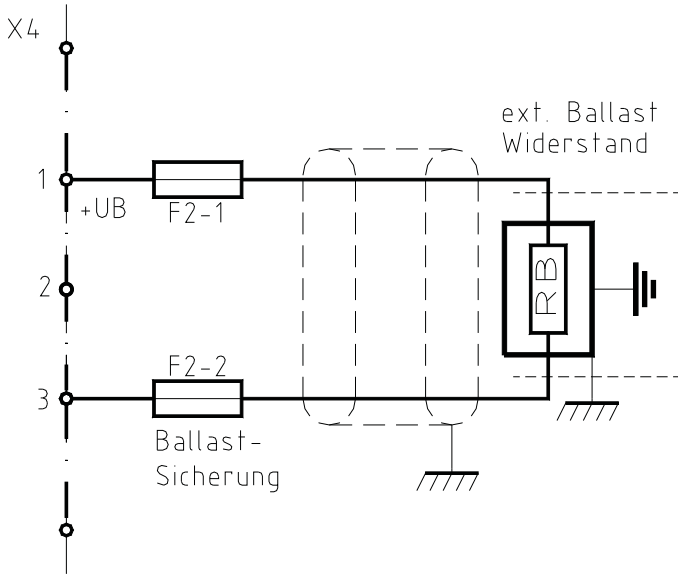


Choke Typ	rated current A	Ind. mH	Dimensions a / b / c mm	Weight kg
2M5-4	4	2.5	60x 85x 65	0.7
2M6-8	8	2.5	70x 90x 75	1.2
2M7-12	12	1.5	80x 105x 86	1.4



2 Mechanical Installation





The energy generated during braking is fed to the DC-BUS. The Elkos DC-Buses are able to store only a small amount of energy. The excess energy has to be converted into heat in the regenerative resistor. The internal resistor is designed for drives without flyweights. Always use external regenerative resistors for flyweights or design uncertainties.

External regen resistor

Dimensionierung

Maximalwert der Bremsleistung

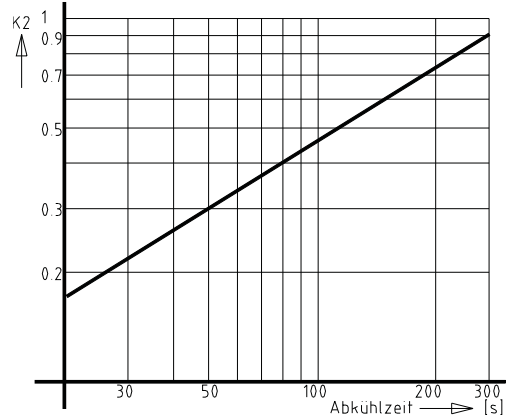
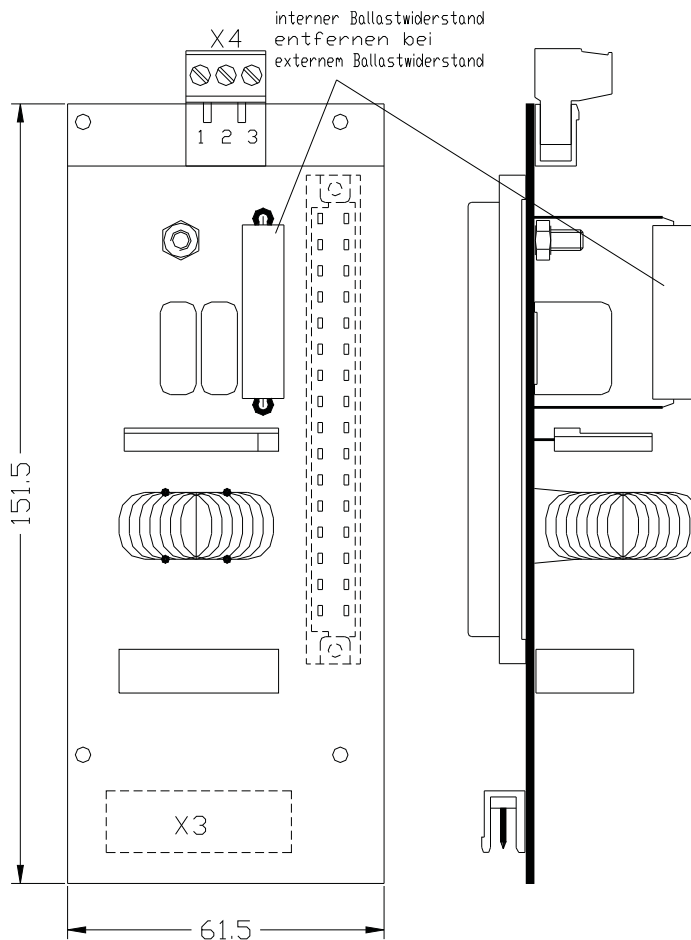
$$P_{max} [W] = \frac{J_g \times \Delta n \times n}{91 \times t_B}$$

- J_g = Motor- und reduziertes Lastmoment [kgm²]
- n = maximum Speed [min⁻¹]
- Δn = Speed differenz [min⁻¹]
- t_B = Brake time [s]

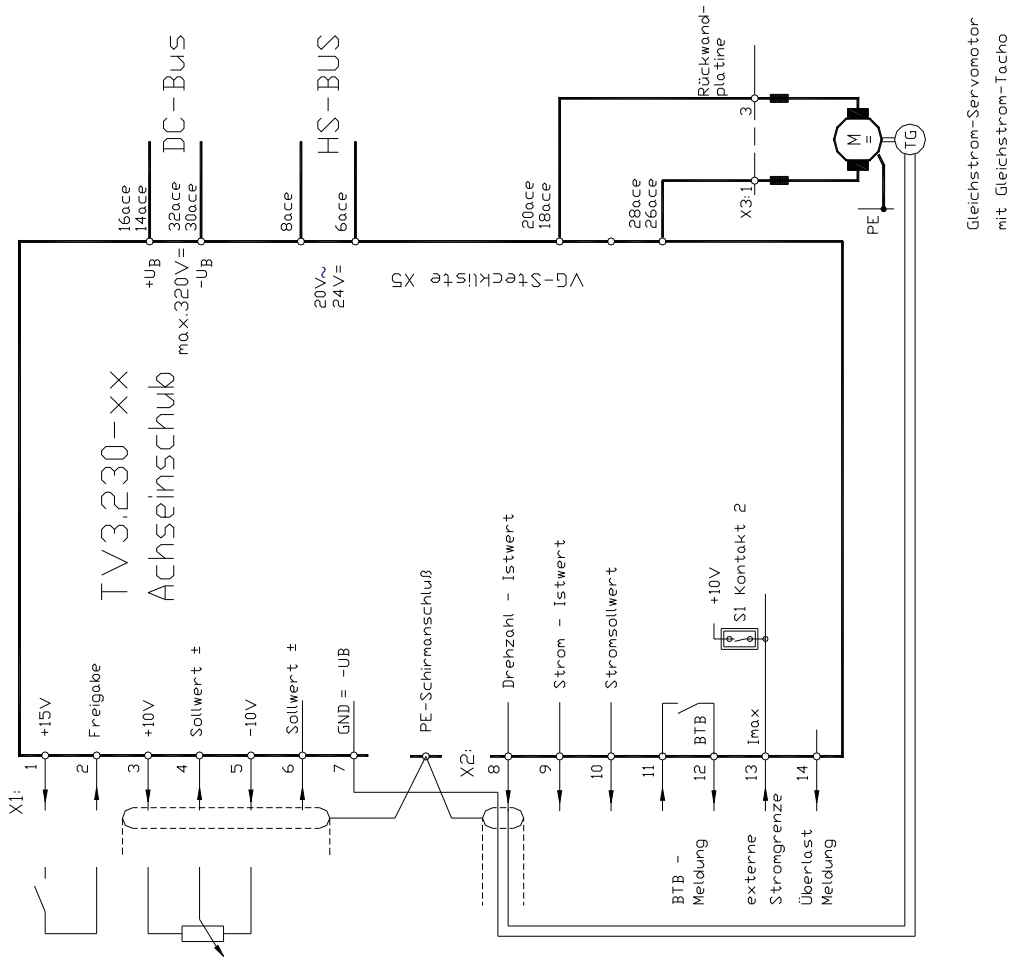
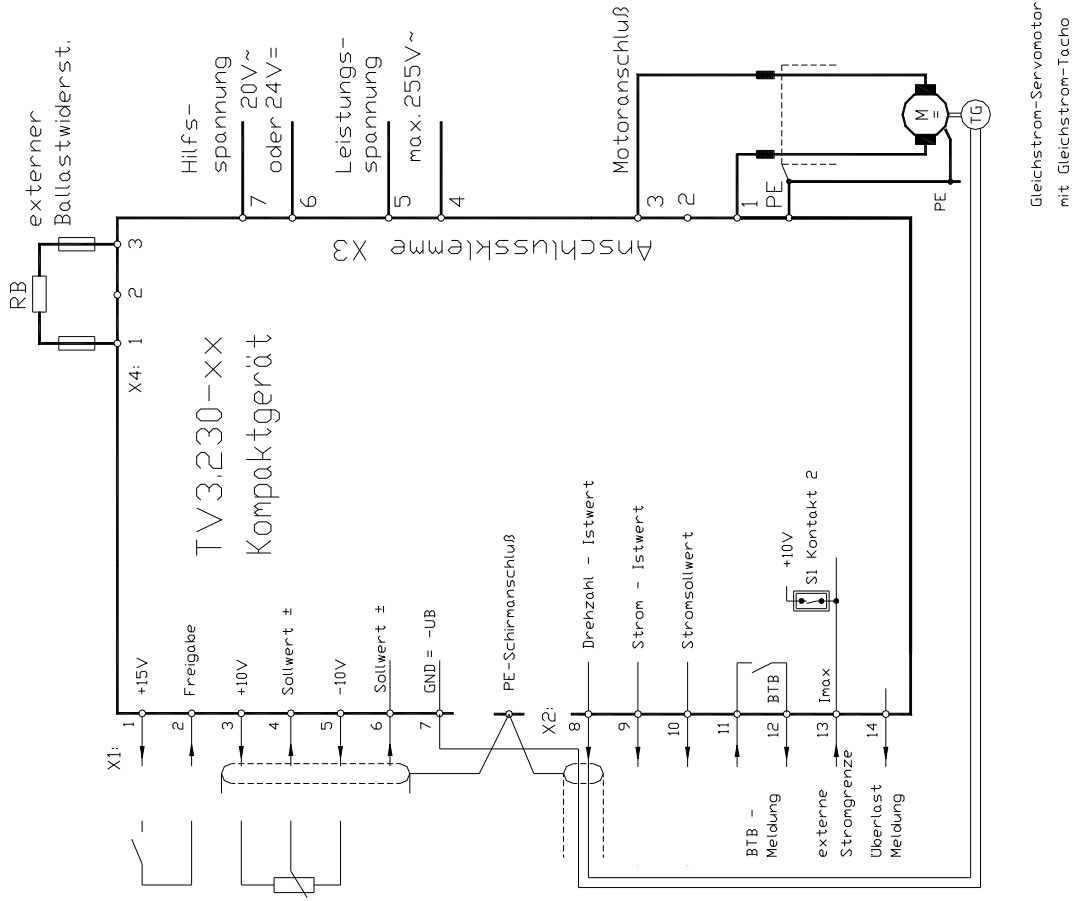
Power regen resistor

$$P_{regen} [W] = \frac{P_{max}}{K1 \times K2}$$

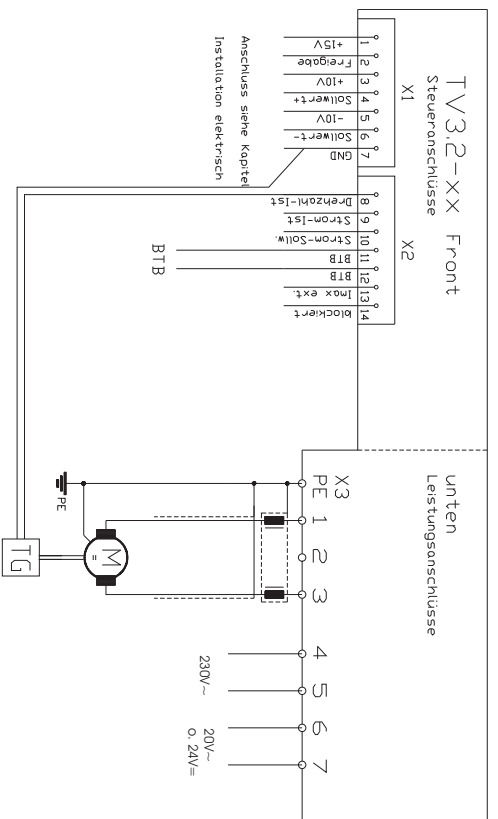
Type TVD3-230-K	5A	10A
Internal resistor	100 Ohm	100 Ohm
Continuous power	50W	
Pulsepower	6kW	
Ext. resistor min. Ohm	80	42
Fuses F2	6,3 AF	



3 Electrical Installation

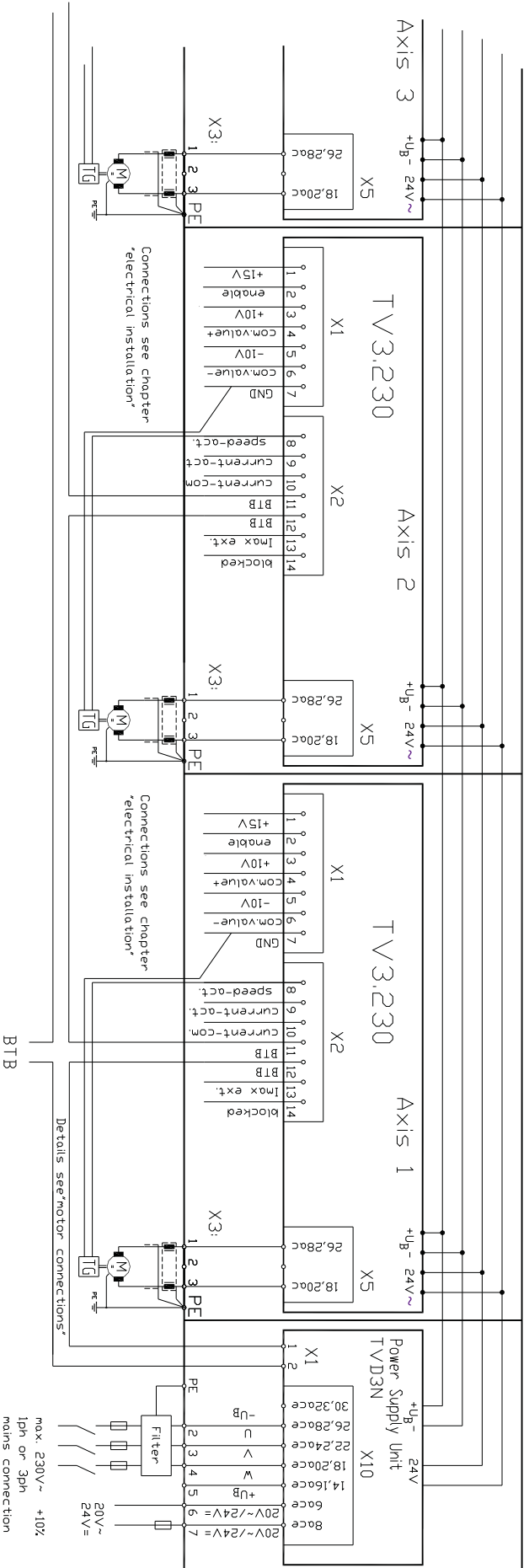


Compact Device

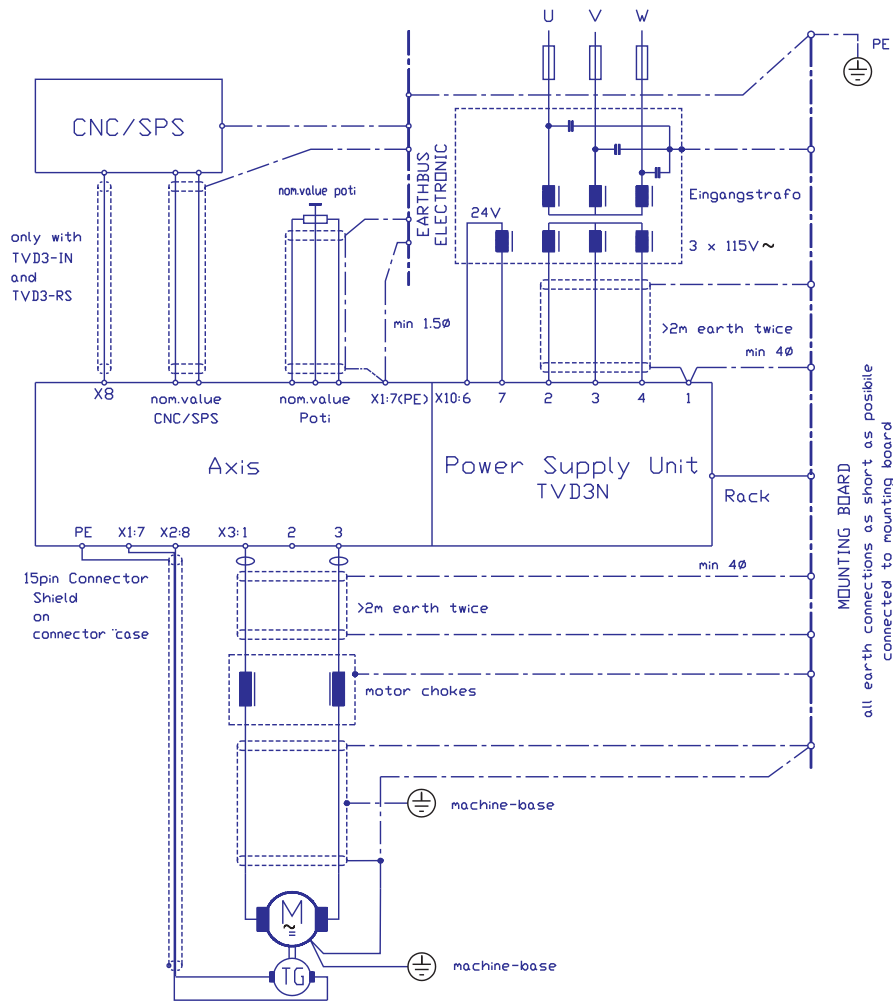


Multi-axes Combination

Rack for several axes



Connection Plan



EMC-Advice

The standards EN 50081-2 and prEN 50082-2 will be observed under the following conditions:

device, mains choke and filter capacitor conductive fixed on a 500x500x2 mm mounting board.

mounting board connected to gnd with a 10mm² wire.

device ground X1:7 connected to mounting board with a 2.5mm² wire.

X10:1(-UB)connected to mounting board with a 50mm long 4mm² wire.

Rack-gnd-screw connected to mounting board with a 50mm long 4mm² wire.

Connection one-phase:

Trafo with filter type : TE8/2 F to TE17/3 F

linelength between device and mains filter <100mm

Connection three-phase:

Trafo with filter type : DT3/50 F to DT4/75 F

connection motor :

motor-line chokes type: 5A= MD66-5 10A= MD78-10

motor-line 1.5m long, 4wires shielded. Shield fixed to mounting plate on device side and to gnd on motor side.

connection control lines:

all control lines shielded 1.5m. Shield fixed to gnd.

Caution:

The connection advice concerning the individual attachments of the connections to the plug numbers or terminals are binding. All further advices to this are not binding. The input and output lines can be altered or completed in consideration of the electrical regulations.

Notice:

- connection advice and operation advice
- local technical regulations
- EU-machine regulation 89/392/EWG



Connection with isolation transformer

Notice:

- rate contactor contacts according to transformer inrush current.
- delay-action fuses before transformer
- fuse value according to transformer current
- quick fuses after transformer
- fuse value for each power supply unitl max. 30AF

Isolation transformer

$$\text{Transformer-nominal power [VA]} = 1.42 \times 115 \times I_M \times GLF \times nF$$

I_M = Sum of motor currents (effective)

GLF = coincidence factor

nF = speed ratio factor

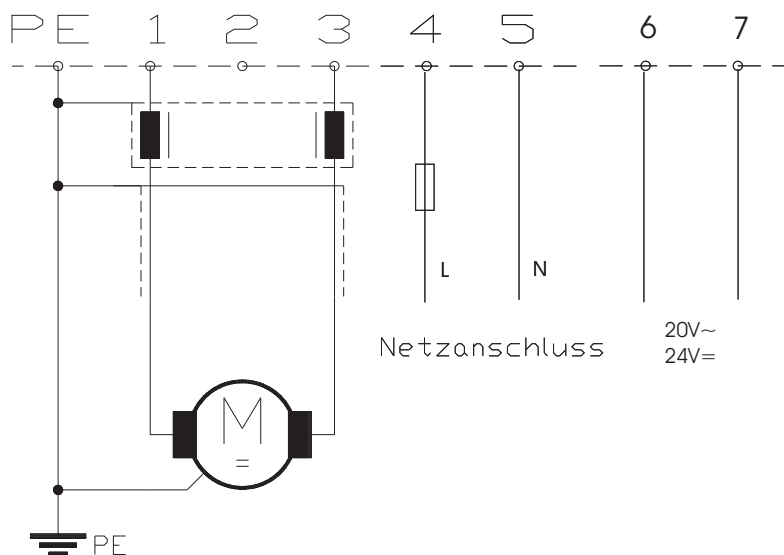
GLF =

- 1 with 1 motor
- 0.5 - 0.7 with 2 motors
- 0.4 - 0.6 with > 2 motors

nF =

- effective speed
- maximum speed

Connection compact device X3

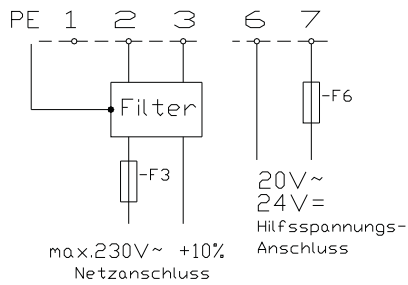


auxiliary voltage
clamp X3:6, X3:7
of isolation
transformer
or external 24V
supply

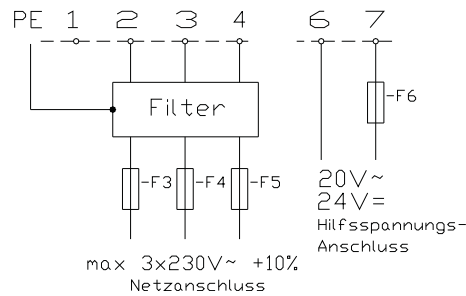
3 Electrical Installation

Connection at Power Supply X10

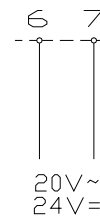
alternating voltage
1x 230 + aux.voltage



3-phase voltage
3x 230V +aux.voltage



auxiliary voltage



3
0

Connection

Dimensions	5A-k	10A-k	Power supply 10A	Power supply 30A	Auxiliary voltage
line cross section mm ²	0.5	0.75	0.75	2.5	0.5
fuse protection					
blow-out-fuse AF	6	10	10	25	0.5
automattion - B	A	10	10	25	

Motor-Power Connection

cable No.	PE	M1	M2	M3
connection	PE-bolt	X3:1	X3:3	M3:3
motor cable with cross section	5A 0.75	10A 1.5	thermo 0.5	break 0.5

kable kind 2x motor line + PE **shielded**
+ (if required: 2x thermo + 2x break)

shielding

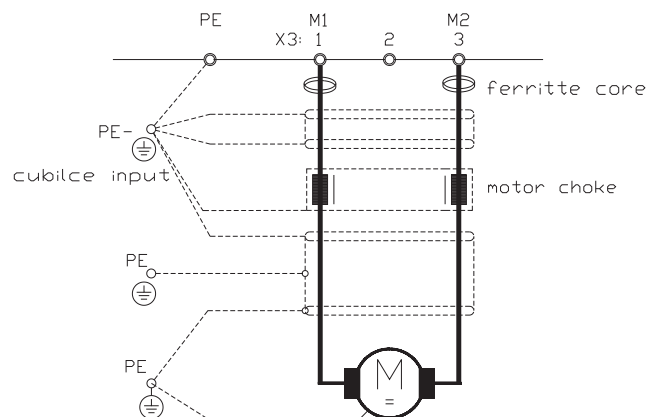
- with earth clamp
- directly at switch cabinet entry
- and connect with motor.
- earth manifold with long lines.

ferrite cores

- against HF-failures

motor chokes

- against NF-failures
- against high discharge current
- for motor efficiency
- for motor operating life



The connecting advices are for general information and without obligation

Notice:

- Connecting- and operating instructions
- Local regulations
- EU-machine regulation



connection-No. clamps-plugs

X1: 1 up to X1:7 and X2 : 8 up to X2 : 14

Signal lines

Shielded and seperated from power lines.
nominal values paired twisted and shielded.

Logical connections

relay with gold contacts or reed relays. Contact current 6mA.

Enable -internal logical voltage

- internal logical voltage X1:1 +15V/10mA
- contact chain between X1:1 and X1:2

Enable -external logical voltage

- enable voltage +10 ... +30V X1:2
- GND X1:7

Switch on enable

- nominal value and speed controller are enabled immediately.

Switch off enable

- quick stop
- nominal value >>> is switched internally immediately to 0
- after 2 seconds >>> speed controller is locked.

Mains failure- breaking

breaking function

- switch nomianl value in case of mains failure to 0V
- breaking time max. 150ms

generatoric rear feed into intermediate circuit

3 Electrical Installation

Nominal Value-Speed

voltage source for nominal values $\pm 10V, 10mA$

+10V	X1:3
-10V	X1:5
GND	X1:7

Nominal value input

- nominal value input maximum $\pm 10V=$
- differential input
- input resistance $50\text{ k}\Omega$
- relay contacts: gold- or reed contacts



Caution

Nominal value lines paired twisted and shielded. Screen connection one-sided.

Connection :

Nominal value voltage with internal supply

nominal value	X1:4 (signal)
	X1:7 (GND)
bridge	X1:6 — X1:7

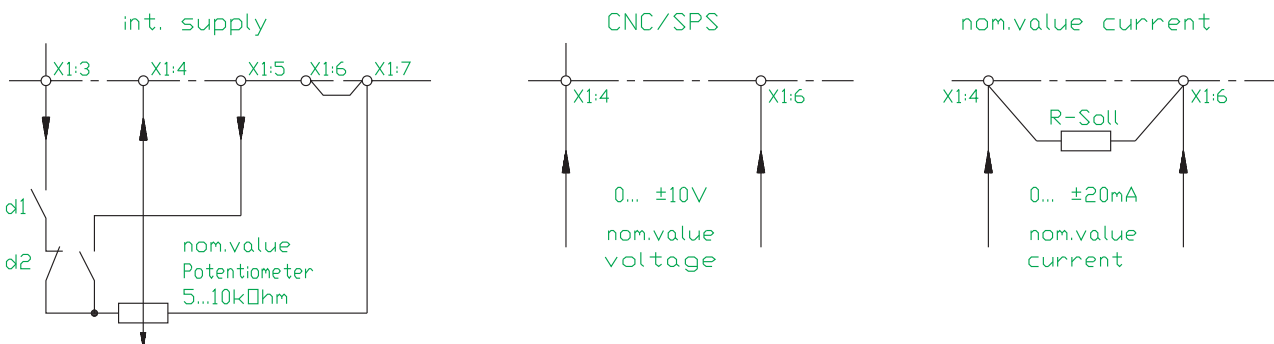
External nominal value voltage SPS/CNC

nominal value	X1:4 (signal)
	X1:6 (GND)

External nominal value current SPS/CNC

resistance for nominal value current $0 \dots \pm 20mA \gg R\text{-nominal} = 500\Omega$

nominal value current	X1:4 (signal)
	X1:6 (GND)



Caution:

to not use nominal value current between 4 and 20mA



External current limitation

voltage source for external current limit

+10V/10mA	X1:13
GND	X1:7

Range

0...+ 5V	>>>	0 up to 100% device rated current
0...+10V	>>>	0 up to 200% device rated current
internal overcurrent control	>>>	max. 5sec.

Current limit- input

maximum input voltage +10V

input resistance 10 kΩ

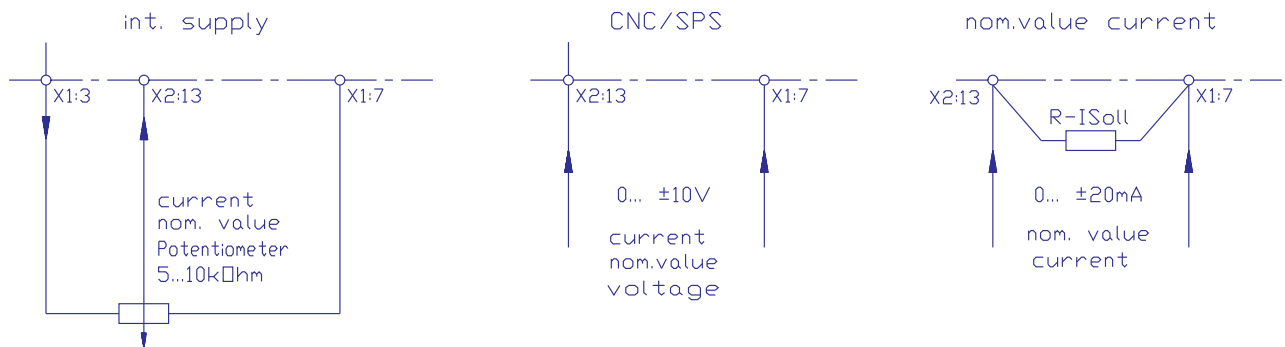
Internal attenuation with potentiometer I_{max1}

relay contacts: gold- or reed contacts

switch S1, contact 2 = OFF

Connection

current limit	X2:13	(signal)
	X1:7	(GND)



Caution:

in case of internal current limit adjustment

switch S1	>>>	Contact 2 = ON
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3 Electrical Installation

Ready for operation signal BTB

Relay RL1

signal contact X2:12 - X2:13
 contact values max. 48V, 0.5A

The ready for operation signal (BTB) shows the CNC/SPS that the drive is ready for operation.
 switch BTB- signals of several axes in one row.

delay after switching on mains >>> max. 1sec.

Indication

ready for operation	LED green bright	contact closed
error	LED red bright	contact open

BTB turns off with

overtemperature	controller, motor	stored
overvoltage		stored
short-circuit, line-to-earth-fault		stored
voltage error		not stored
intermediate circuit error		not stored

To reset store switch off/on enable

Caution:

Use BTB-contact always with CNC/SPS - control or with emergency-stop circuit !
 Self-starting possible!
 fault memory
 - is not effective with all faults!



Signal blocked

current demand	normal	overload
output X2:14	>+12V	<+2V

Analogue measuring outputs

function	motor current indication	speed- indication
connection	X2:9 - X1:7	X2:8 - X1:7
measuring value	2.5V = type current 5.0V = peak current unipolar positive	tacho voltage before divider bipolar
output resistance	1 kΩ	4.7 kΩ

Control connections

Function

+ 15 Volt (for enable)	clamp No.
enable - input(+10 ... +30 Volt)	X1: 1
+ 10 Volt (for nominal value)	X1: 2
nominal value + input	X1: 3
- 10 Volt (for nominal value)	X1: 4
nominal value- input	X1: 5
GND	X1: 6
speed- actual value- output	X1: 7
current- actual value- output	X2: 8
current nominal value- output	X2: 9
BTB contact	X2: 10
BTB contact	X2: 11
external current limit input	X2: 12
blocked-output	X2: 13
	X1: 14

Power connections

compact device

function

motor 1	clamp No.
free	X3: 1
motor 3	X3: 2
power	X3: 3
voltage	X3: 4
auxiliary-	X3: 5
voltage	X3: 6
	X3: 7

Power connections

plug-in unit

Function

intermediate circuit - (UB-)	plug-in connector	clamp-No.
motor 1	X5: 30, 32 ace	X3: PE
free	X5: 26, 28 acc	X3: 1
motor 3	X5: 18, 20 ace	X3: 2
intermediate circuit (UB+)	X5: 14, 16 ace	X3: 3
24V~	X5: 8 ace	
24V~	X5: 6 ace	

Power supply unit

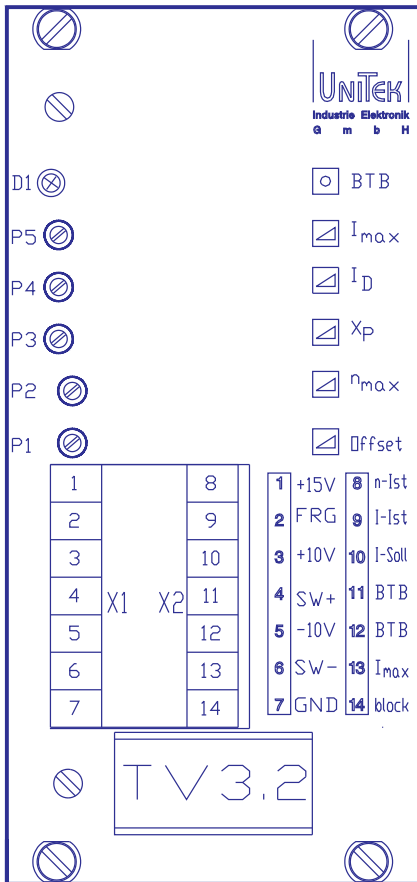
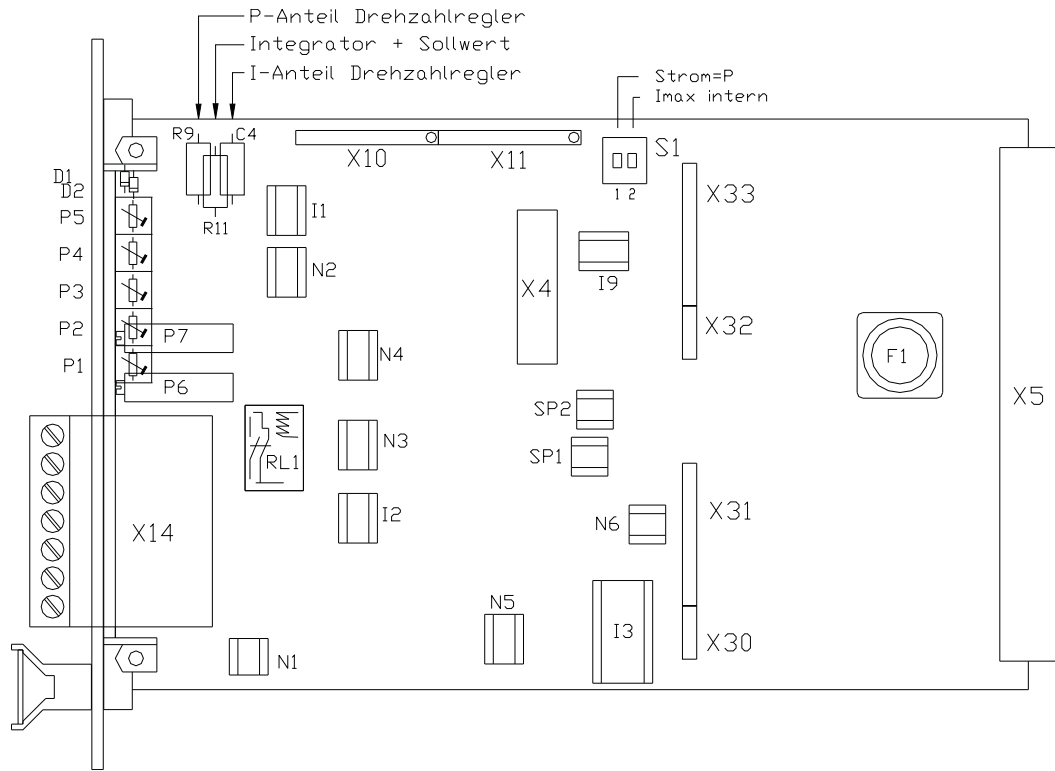
plug-in unit

Function

intermediate circuit- PE(UB-)	plug-in connector	clamp-No.
power U	X5: 30,32 ace	X10: 1
power V	X5: 26,28 acc	X10: 2
power W	X5: 22,24 ace	X10: 3
intermediate circuit+ (UB+)	X5: 18,20 ace	X10: 4
auxiliary-	X5: 14,16 ace	X10: 5
voltage	X5: 8 ace	X10: 6
	X5: 6 ace	X10: 7

4 Device Overview

Component Overview



Indication D1 green BTB
D2 red fault

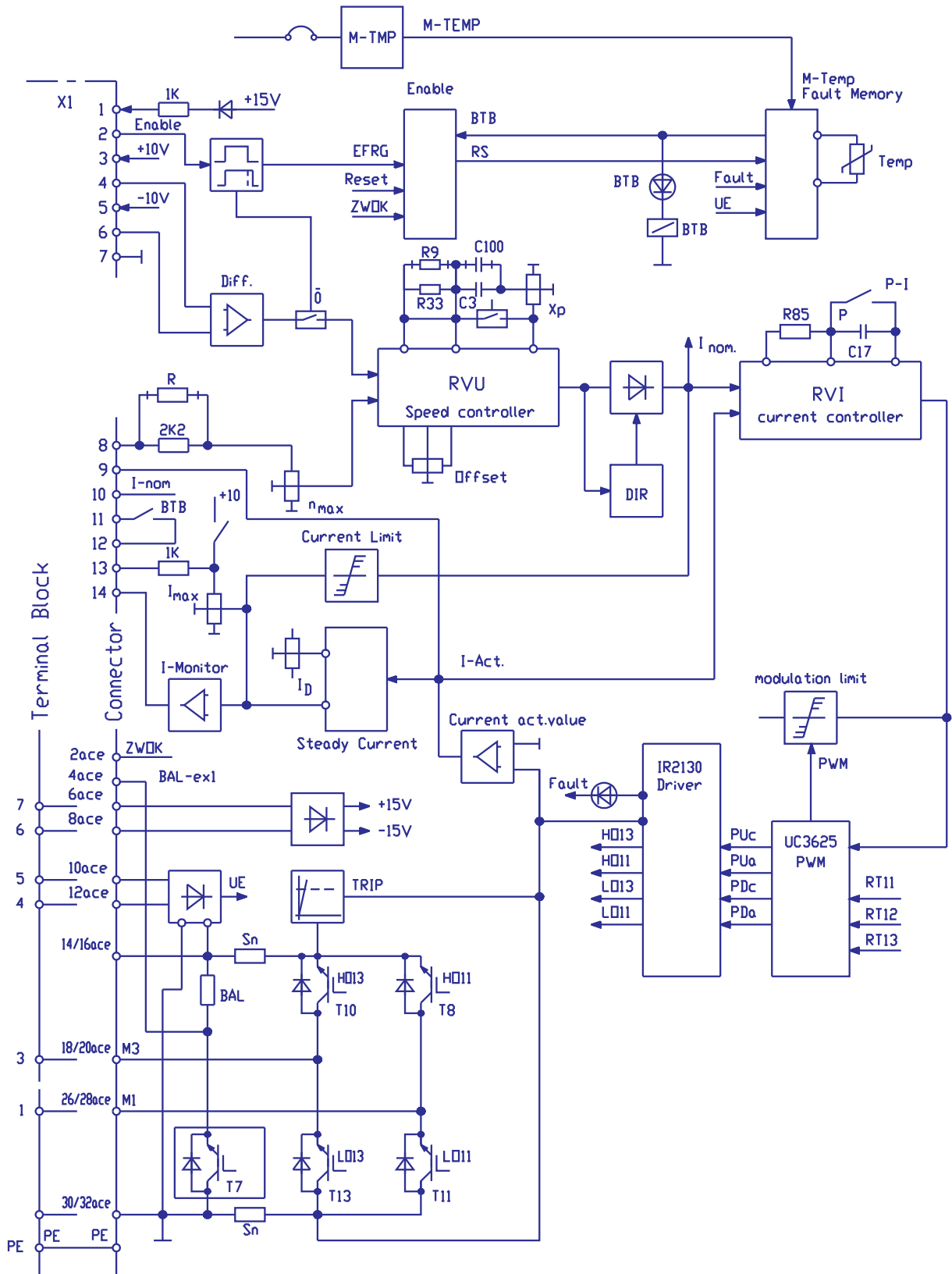
Poti P5 I_{max}
P4 I_D
P3 X_P
P2 n_{max}
P1 Offset

plug

X1:1	+15V
X1:2	enable
X1:3	+10V
X1:4	nom. value + (-)
X1:5	-10V
X1:6	nom. value - (+)
X1:7	GND
X2:8	n-actual value
X2:9	I-actual value
X2:10	I-nom. value
X2:11-12	BTB-contact
X2:13	ext. current limit
X2:14	blocked

Transistor-Servo-Drive TV3.230

Block Diagram



4 Device Overview

Adjustment functions

function	component
actual value adjustment option DC-tacho	resistance R + poti P2 (nmax)
internal current limit	switch S1 >> contact 2=ON poti P5 (Imax)
external current limit	switch S1 >> contact 2=OFF poti P5 (Imax)
continuous current	poti P4 (ID)
amplification P-component	resistance R9 poti P3 (XP)
amplification I-component	condensator C4
zero balance	poti P1 (offset)

switch S1

function	contact	ON	OFF
current limit	2	internal	external
current amplification	1	P	PI

LED-indication

BTB	green	LED 1
fault	red	LED 2

signal outputs

function	name	clamp No.
speed	n-actual value	X2:8
current	I-actual value	X2:9
current nominal value	I-nominal value	X2:10
blocked	+12V/10mA	X2:14
BTB -contact	BTB/fault	X2:11, X2:12

Adjustment advice

adjustments

- only by qualified personnel
- adhered to safety regulations
- notice adjusting sequence

Presettings

actual value	>>>	Tacho coarse balance R23
current limit internal/external	>>>	switch S1, contact 2
current regulator P- PI	>>>	switch S1, contact 1

Optimization

act. value adjustment	nmax adjustment
current regulator	switch S1, contact 1 (basical setup >> ON)
current limits	I _{max} , I _D -adjustment
speed regulator	XP-adjustment, variable components
zero point	offset-adjustment
path-/position controller	in CNC\SPS

Caution:

control systems have to be optimized from inside to outside.

sequence: current controller>>>> speed controller>>>>position controller

Measuring values

measuring value	max.	measuring
nominal value	±10V	X1:4
speed actual value after divider	± 5V	X2:8
current act.value unipolar	+ 5V	X2:9
current nom.value (regulation func.speed controller)	±10V	X2:10

Nominal value

function	max.	connection
input signal	±10V=	X1:4
input GND		X1:6

signal- and GND-connection exchangeabler

Nominal value as current signal

nom.value from external currnet source	0 bis ±20mA
external burden resistor for nom.value	0 bis max. ±10V

nominal value resistor R-Soll

resistance [Ω] =nom. value voltage / nom.value current (max. 500Ω)

Caution:

do not use nom.value current between 4 and 20mA



5 Adjustment

Speed actual value

DC-tachometer generator

Connection

input X1:7 = tacho (GND)
input X2: 8 = tacho (Signal)
PE-bolt = screen

nominal value input X1: 4 positive >>> tacho input X2: 8 positive

Tacho voltage with maximum speed

limit values >>> minimum 7V=, maximum 20V=

Pre-adjustment

with external resistor $R_{\text{ext}} = \text{tacho voltage} \times 1.2 - 8$.

Fine adjustment

with potentiometer n_{max} (P2)

nominal value of potentiometer:
adjust with 1V nominal value to 10% maximum speed
adjust finely with 10V nominal value to 100%.

nominal value of CNC\SPS:
adjust with 0.8V nominal value to 10% maximum speed

Armature voltage control

only with isolation amplifier (UNITEK QTV)

Change direction of rotation

change nominal value connection X1:4, X1:6

or

change motor and nominal value connection

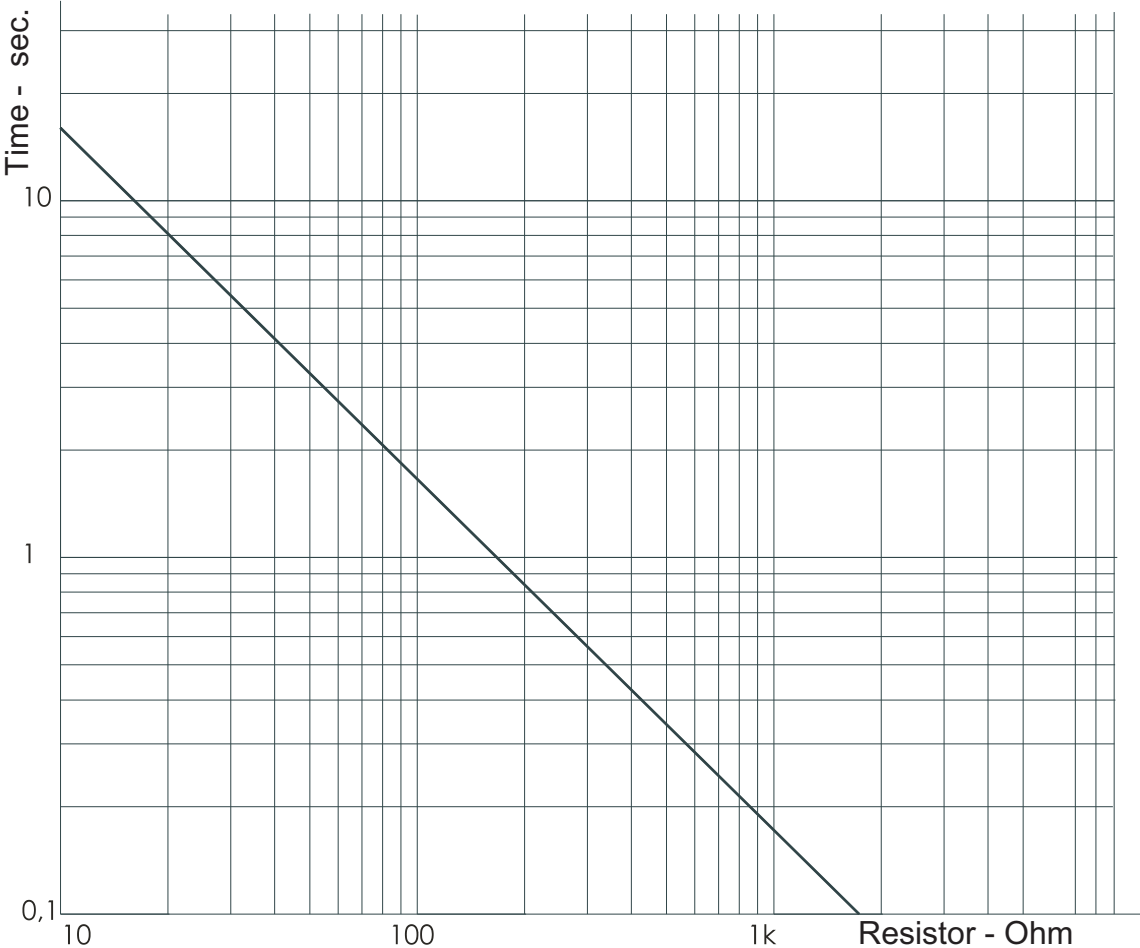
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5 Adjustment

Nominal value - Integrator

Linear - Integrator

Time adjustment with resistor R11 (INT)



Current limitation

peak current	range 0 up to 200% nominal current reset time max. 5sec.	poti I _{max} (P5)
continuous current	range 5 up to 100% nominal current	poti I _D (P4)

internally resetting current limits

current limit	function	limit
overload signal to X2:14	time blocked	continuous current

the smallest current limit is effective!

peak current

internal current limit (basic setup)

adjustment	switch	poti
I _{max}	S1, contact 2=ON	I _{max1} (P5)

external current limit

adjustment	input	switch	poti
I _{max}	X1:9 0 ... +10V	S1, contact 2=OFF	I _{max1} (P5)

the external current limit can internally be reduced with I-potentiometer.

continuous current

adjust motor protection adjustment for both momentum directions on motor nominal current with potentiometer I_D (P4).

measure adjustment values:

- do not connect motor
 - predetermine nominal value and enable >>>
- measuring value current nominal value X2:10 switch off/on (5V=nominal current)

nominal value	measuring value I _{max} (ca. 2sec.)	measuring value I _D
+5V	0 up to max.10V	0.25 up to max. 5V
- 5V	0 up to max.10V	0.25 up to max. 5V

actual values current

measuring value current actual value	X2:9	I _{max}	= 0 to +5V
		I _D	= 0.12 to +2.5V

Caution

for exact torque control:

- PI-current control switching necessary
- manufacturers adjustment is P-control
- change from P- to PI-control in current controller
- Schalter S1, Kontakt 1 = OFF



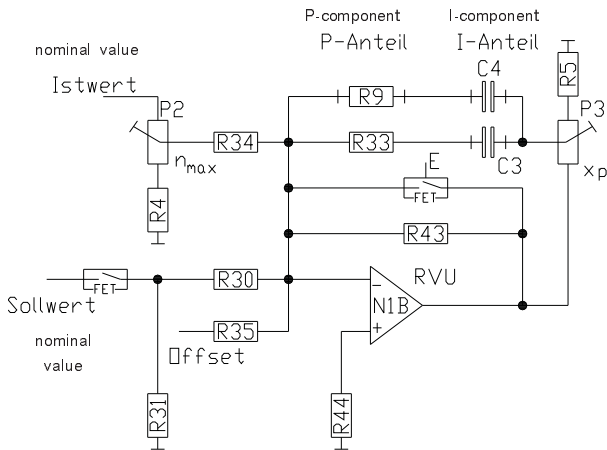
5 Adjustment

Speed controller switching

- variable components R9, C4
- amplification potentiometer P3 (Xp)
- in case of changing devices >>> take over adjustment values.

Basic set up

- firm R, C - values 220kΩ, 22nF
- amplification potentiometer Xp to 50%
- optimal for most drives.



Adjustment without measuring instruments

connect motor,

- nominal value = 0
- Xp = 50%
- R, C = basical values

enable controller,

- turn potentiometer Xp clockwise until drive swings
- turn potentiometer Xp anticlockwise until the swinging is dying-out,
- turn Xp-potentiometer further 2 positions anticlockwise.

Drive behaviour:

amplification too low

- long oscillations 1 - 0.1Hz
- long overshoots
- overruns target position

amplification too high

- short oscillations 30 - 200Hz
- vibrates >during acceleration
- vibrates >during braking and in position

Caution:

in case of operating with CNC\SPS

- in case of maximum speed
- adjust nominal value speed with Poti n. from 8 up to 9V



Basic Setup

Check connections before getting started

power supply nominal 230V~/320V= , maximum 255V~

Compact device

- power supply	compact	clamps X3:4, X3:5,
- auxiliary voltage	compact	clamps X3:6, X3:7
- motor connection	compact	clamps X3:1, X3:3

Mult-axes combination

- power supply	power supply unit	clamps X10:2, X10:3, X10:4
- motor connection	axis	clamps X3:1, X3:3
- protection earth		earth screw at case
- motor-earth connection		earth screw at case

Mind connection advices.

basical connections power connections

- protection earth	PE-bolt
- mains	1x or 3x 230V~
- motor	2x motor lines + protective conductor + screen
- transmitter connection	mind motor specific connection sheets

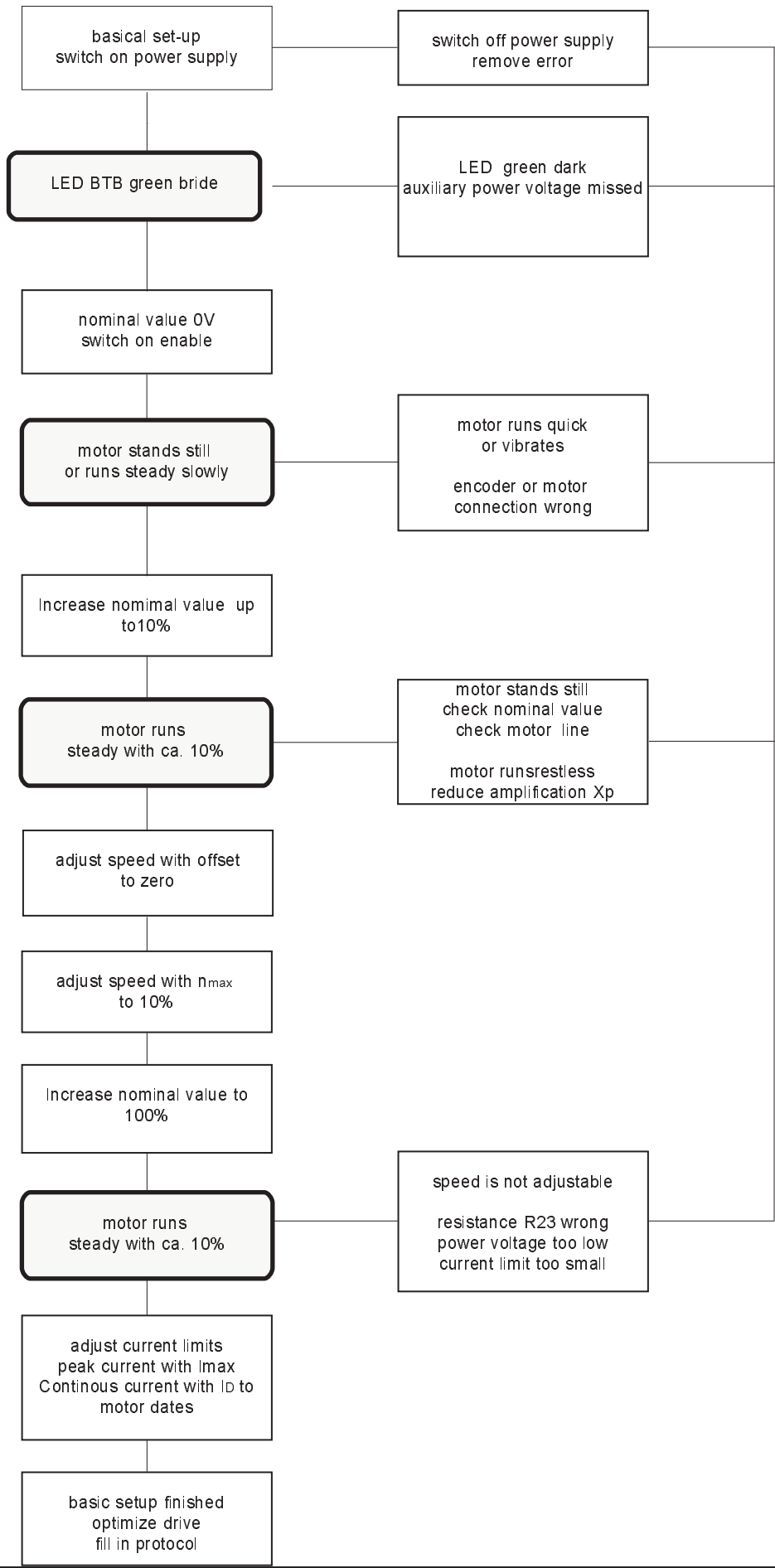
Basical connection control connections

enable	contact between X1:1 and X1:2
nominal value	signal X1:4, GND X1:6 in case of internal poti-supply bridge X1:6 - X1:7
actual value- tachometer	signal X2:8 GND X1:7

Basic setup for first putting into operation

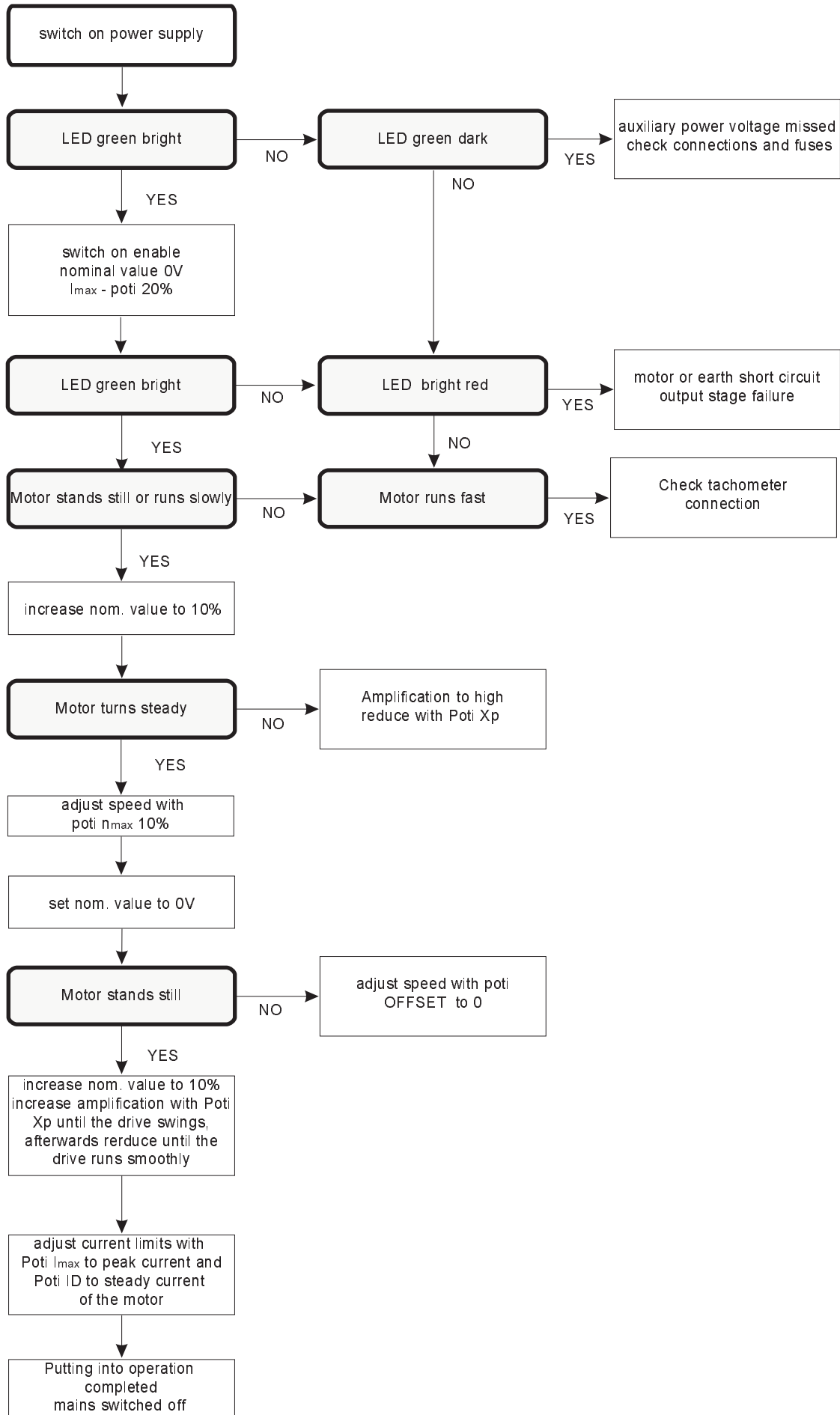
potentiometer	I _{max1}	peak current	20%
potentiometer	I _D	continous current	100%
potentiometer	X _p	amplification	50%
potentiometer	n _{max}	speed	anticlockwise
switch	S1	contact 1 = ON contact 2 = ON	

6 Getting Started

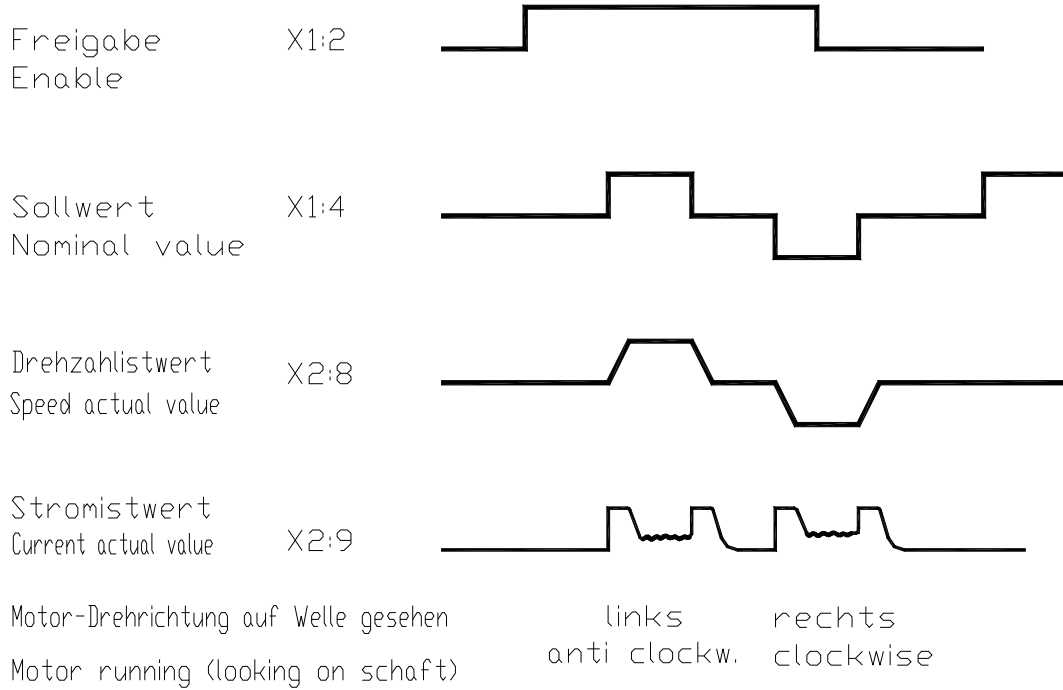


Faults	
Faults	Causes
LED green dark	auxiliary power voltage too low
LED red bright	short circuit at motor cable output stage fault overvoltage
motor stand still no torque	enable missed current limit I_{max} anti-clockwise motor connection interrupted
motor speeds up	tachometer polarity wrong tachometer connection interrupted
motor runs restless	amplification X_p too high nominal value failure
amplifier switches to failure LED red bright	overtemperature, phase- or line-to-earth fault. BTB-fault output stage mistake
speed is not adjustable with Poti n_{max}	nominal value wrong
power supply unit goes to failure while breaking	braking energy too high
power supply unit goes to failure while switching	undervoltage overvoltage

7 Fault Finding



TV3.230 - Signalplan
TV3.230 - Signal scheme



8 Protocol

Customer: Machine-No.
 Device Series-No.

Mainsvoltage [V=,V~]

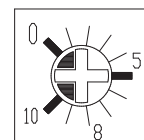
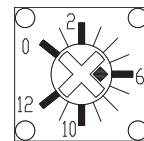
Inputs

Enable	Contact ?	Voltage [V=]
Nominal value	Type	Voltage [V=]
Ext.current nom. value I _{max}	.....	Voltage [V=]
Setup actual value evaluation		
DC-Tacho	external resistor	Value[kΩ]

Setup Speed Controller

Variable Components

P-component	R9	Value	.....
I-component	C4	Value	.....
Poti-positions			
Peek current	I _{max}	P5	Position
Steady current	I _D	P4	Position
Amplification	X _p	P3	Position
Speed	n _{max}	P2	Position
Offset	Offset	P1	Position



Setup Current Controller P/PI Switch S1, Contact 1 ON/OFF

Measuring Values

Motor voltage	max.	.....
Motor current	peek	.....	steady

Motor Data

Producer	.....	Type	.....
Series No.		
Encodertype	IMP.....	Voltage
Motor Voltage		Motor Current.....
Brake		Fan

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For products returned to UNITEK for warranty service, the Buyer shall prepay shipping charges to UNITEK and UNITEK shall pay shipping charges to return the product to the Buyer.

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- * non-observance of the electrical standards and regulations
- * improper maintenance
- * acts of nature

All further claims on transformation, diminution and replacement of any kind of damage, especially damage, which does not affect the UNITEK device, cannot be considered.

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