

EDB20022B
00323958

Lenze

Betriebsanleitung
Operating Instructions

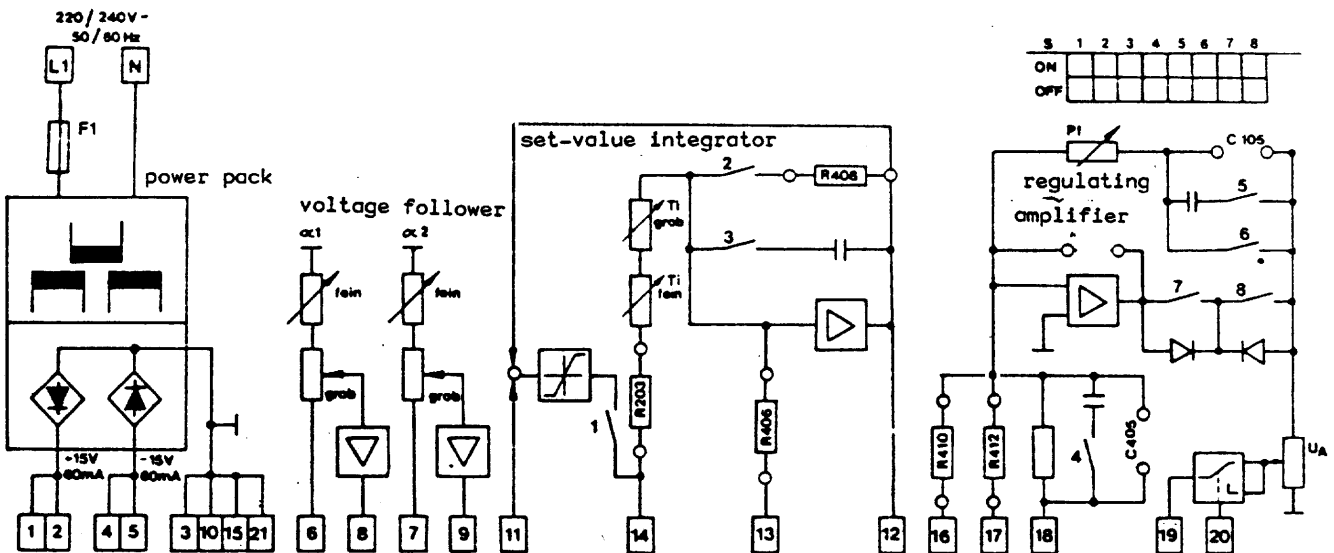
Funktionsbaugruppe 2002
Function board 2002



The module type 2002 comprises all important functions required for applications with LEA standard power converters, such as

- . high-stabilized power pack $\pm 15V / 2 \times 60 \text{ mA}$
- . voltage follower
- . bipolar set-value integrator $0 \pm 10V / 5 \text{ mA}$
- . integrating amplifier
- . comparator
- . time - lag element
- . amplifier with free components for superpositioned closed-loops (speed, voltage, current, output, tension, torque, dancer, etc.)
- . reciprocal value former

Block Circuit Diagram



Ease of operation on commissioning and servicing is ensured through

- . compact design, print onto a plastic fastening plate
- . programme switch and trimmer
- . soldering positions at all important spots to enlarge the range
- . testing bushes on the terminal block
- . snapping socket for quick installation can be delivered.

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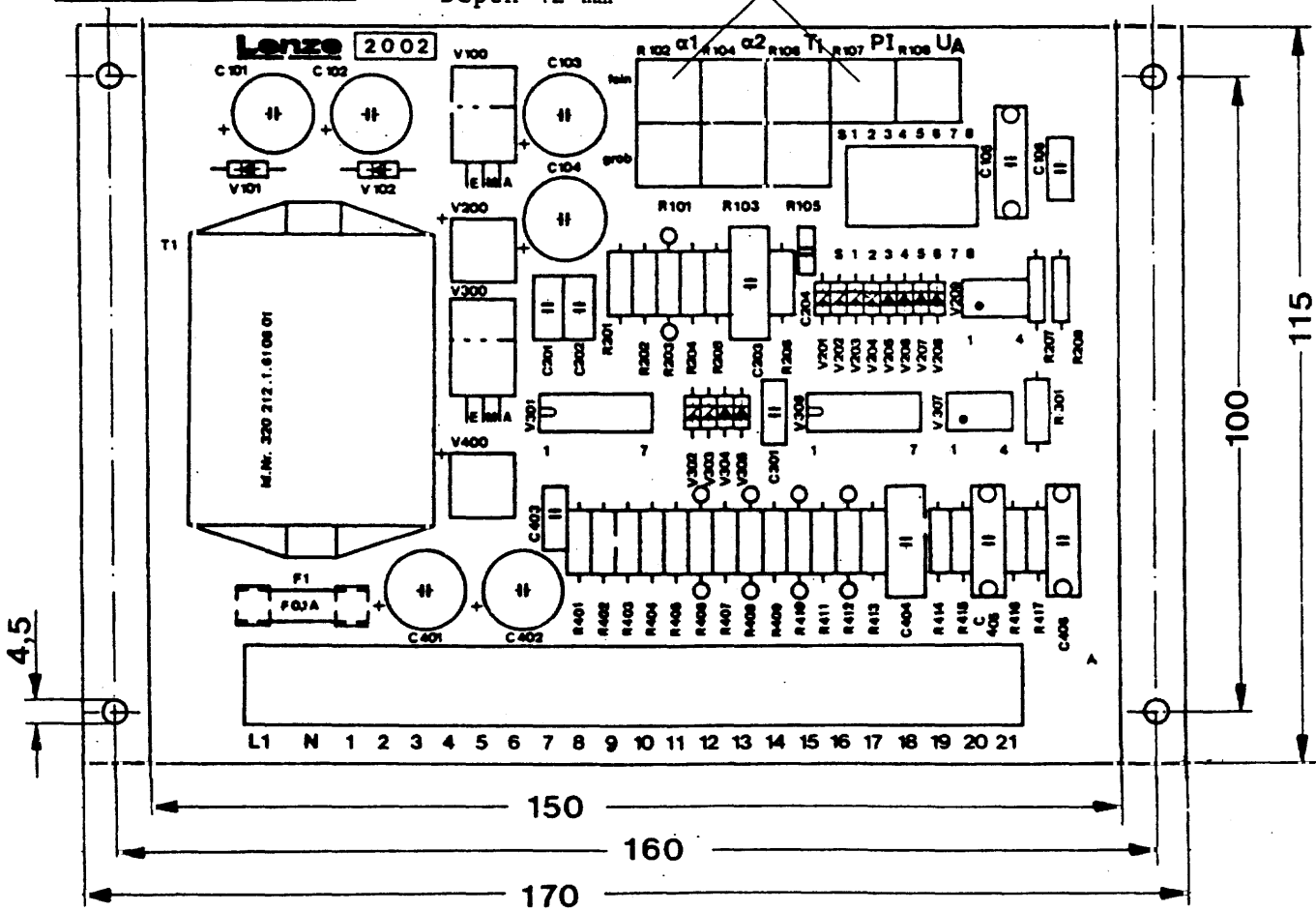
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1. Dimension Sheet

Depth 42 mm Trimmer



Accessories

fuse 5x20.F0,1A,250V

Item No. 305 715

Snapping socket for quick installation

Item No. 320 280

(When using the snapping socket, the width reduces to 150 mm while the depth will then be 70 mm).

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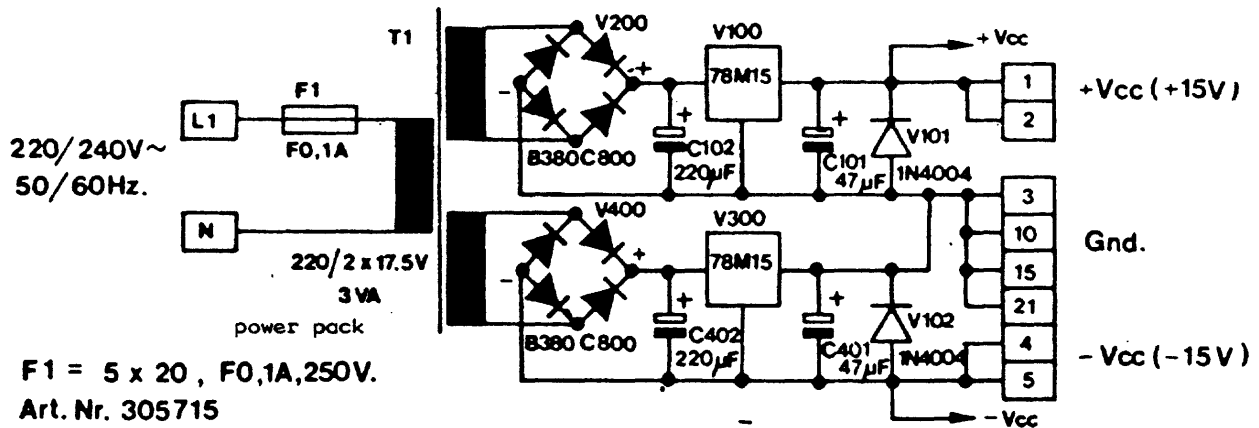
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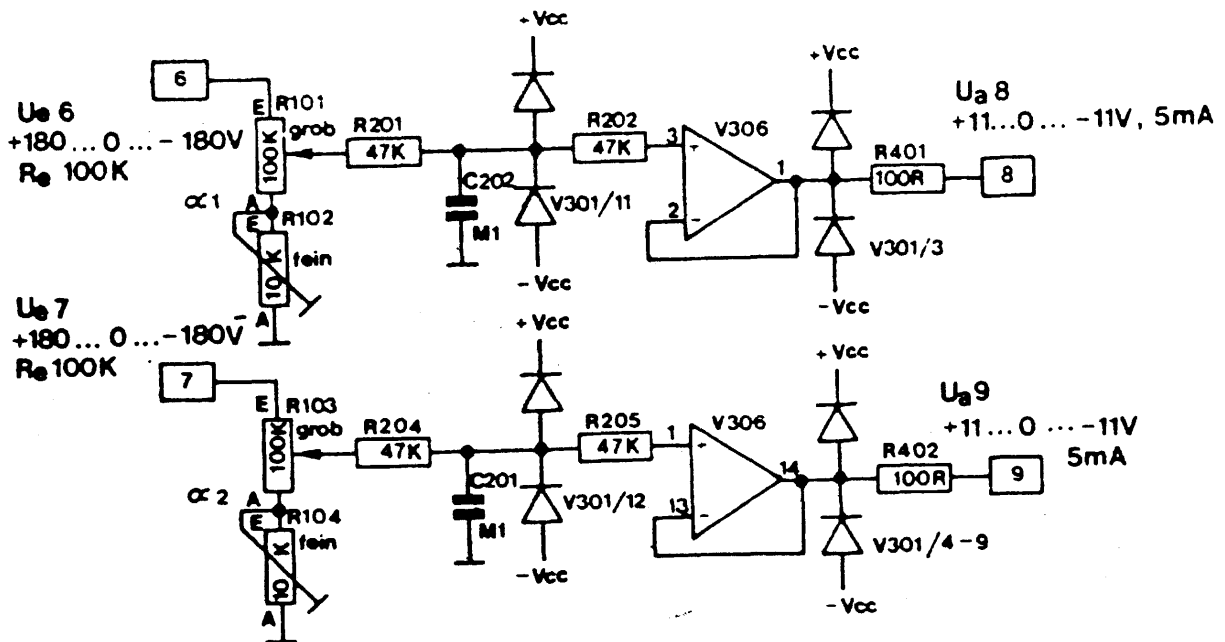
2. Functions

2.1 Power pack

The power pack gives the stabilized ($\pm 0.5\%$ over the whole temperature range of 0-45°C) mains potential free supply voltage for the 2002 module and may externally be loaded with 2x60mA.



2.2 Voltage follower



The input voltage can be adapted via trimmers α coarse and α fine.

Use: Adaptation and decoupling of master voltage for multi-motor drives.

Current amplification of signals with great inner resistance.
(e.g. tacho-amplifier)

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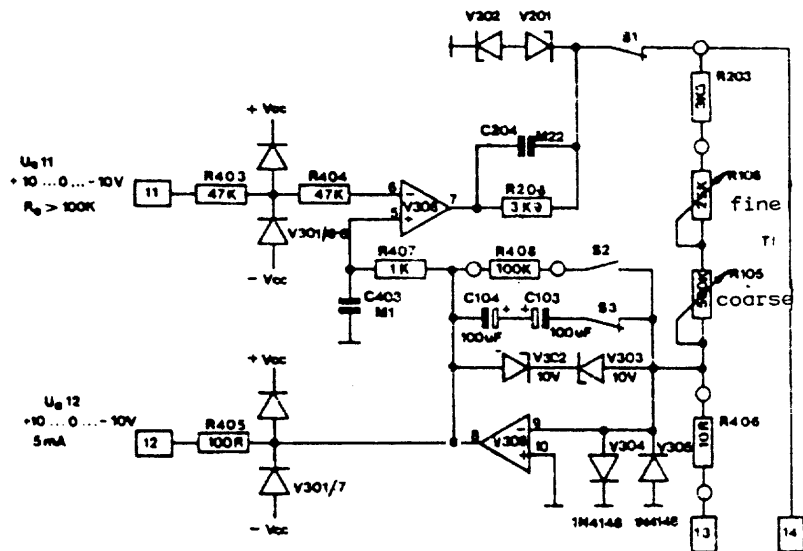
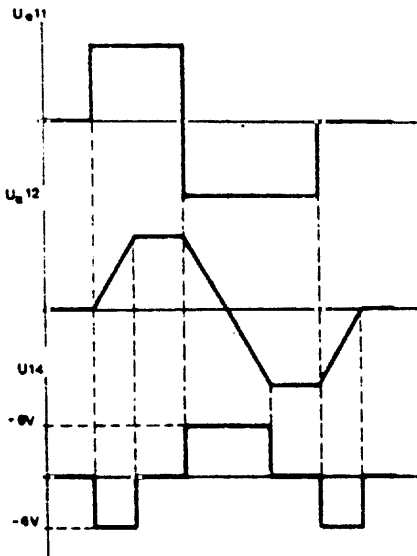
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2.3. Set-value integrator

If the input signal U₁₁ jumps, the output signal U₁₂ follows with the ascent ($25 \frac{V}{s}$ $0.25 \frac{V}{s}$) set at trimmers "Ti coarse" and "Ti fine" until both values are equal.

U₁₄ indicates the tendency of the output signal and can be used to evaluate the acceleration processes.



- Use:**
- . Slope limiter for common master value of multi-motor drives,
 - . Dancer positioning set-value for winder and unwinder
 - . Set-value switch-over via 2-point controller.
 - . Voltage follower.

2.4. Inverting amplifier (S2=on, S1,S3 = off)

Through a different programming the set-value integrator can be modified to an inverting adding amplifier with max. two inputs.

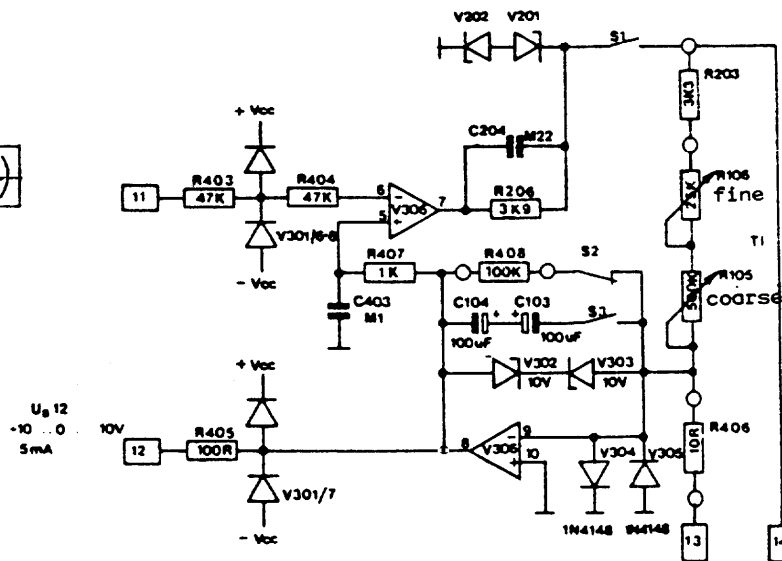
Via input 14 of the standard component it is possible to adjust amplifications of 0.2 30. Range enlargements are possible by adapting the resistors R 408, R 203 and R 406 placed on soldering positions.

- Use:**
- . Addition or subtraction of 2 signals
 - . Inverter

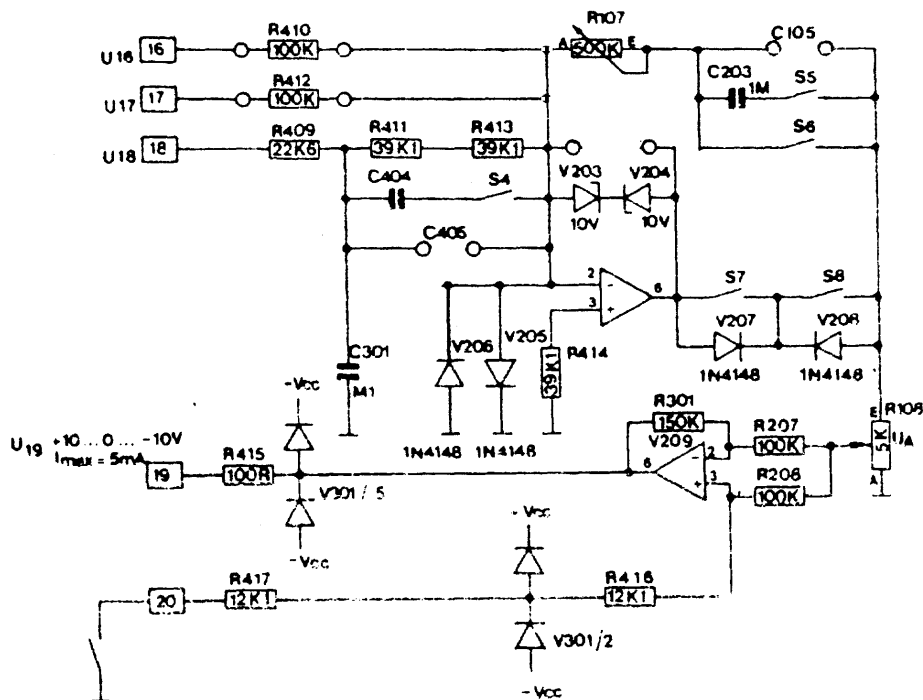
$$U_{12} = - \left(U_{13} \frac{R_{408}}{R_{406}} + U_{14} \frac{R_{408}}{R_{203} + R_{105} + R_{106}} \right)$$

$$V_{13} = \frac{R_{408}}{R_{406}}$$

$$V_{14} = \frac{R_{408}}{R_{203} + R_{105} + R_{106}}$$



2.5 Regulating amplifier



Due to its switching possibilities the regulating amplifier can universally be used. Its basic functions are preselectable via programme switch, so that the following functions can always be executed:

Programme switch

Use

S4	S5	S6	S7	S8
X	X	X		
X	X	X		

inverting add amplifier

PI-controller

PD-controller

PID-controller

reciprocal value former

output signal 0...-10V (0...+10V)

output signal 0...+10V (0...-10V)

The values in brackets are valid, if terminal 20 is bridged with GND.

output signal
-10V...+10V

Bridge between terminals 21a20 causes inversion of output signal U19.

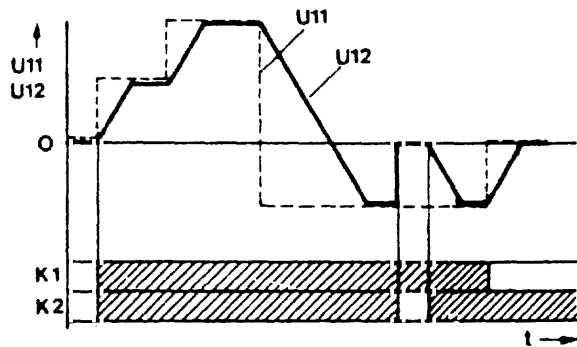
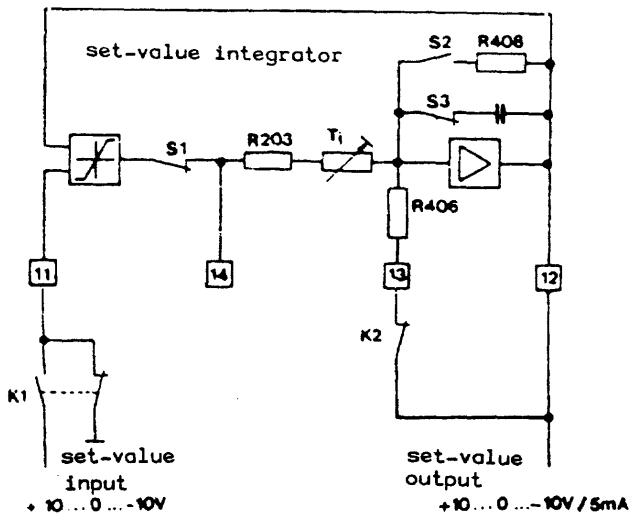
We have provided for additional components for applications beyond these possibilities.

When operating the regulating amplifier with closed switch S4, remove the capacitor C301.

3. Application examples

3.1 Set-value integrator

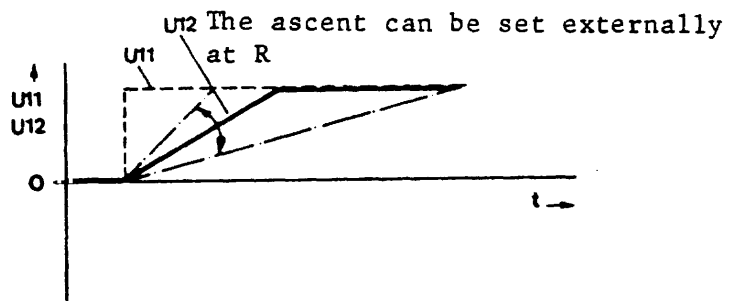
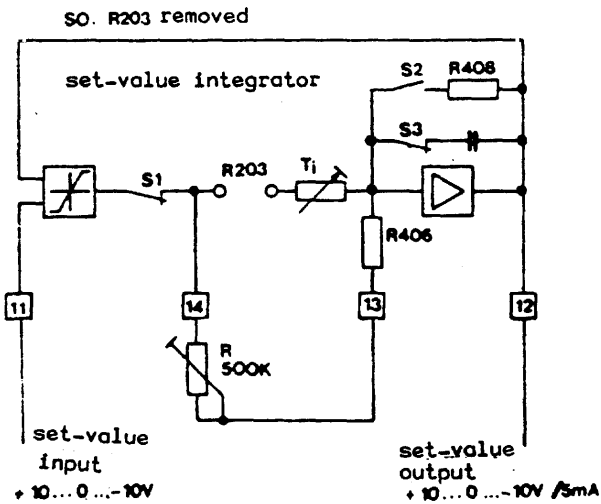
3.1.1 Set-value selection with constant ascent and variable final value



Use: Deceleration of rotational or speed set-values to limit the acceleration values.

The ascent of set-value voltage can be set at the trimmers Ti_{coarse} and Ti_{fine} .

3.1.2 Set-value selection with variable ascent and variable final value



$$U_{12} \approx \frac{125}{R} \cdot t$$

(R) k
(t) s
(U) v

Use: Operational change-over of limiting time for automatic adaptation in one switching sequence.

e.g. for drives with frequently varying moment of inertia (grinding wheel test stand)

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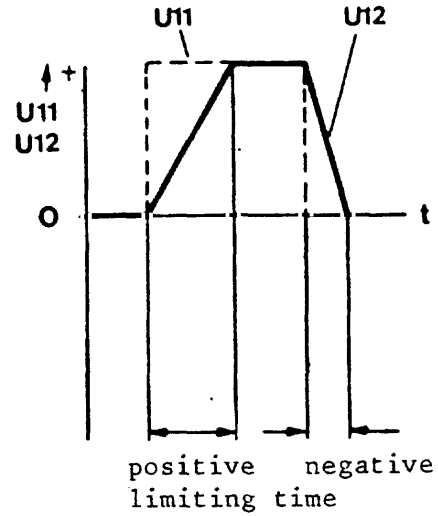
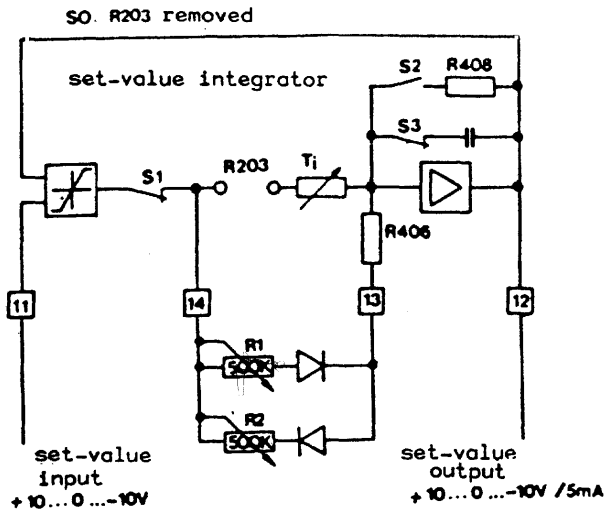
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3.1.3 Set-value selection with different acceleration and deceleration time



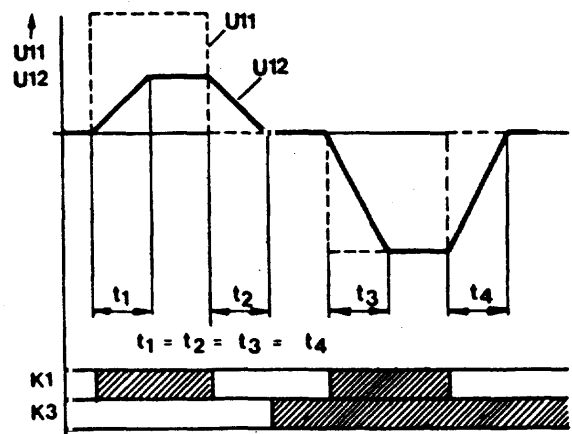
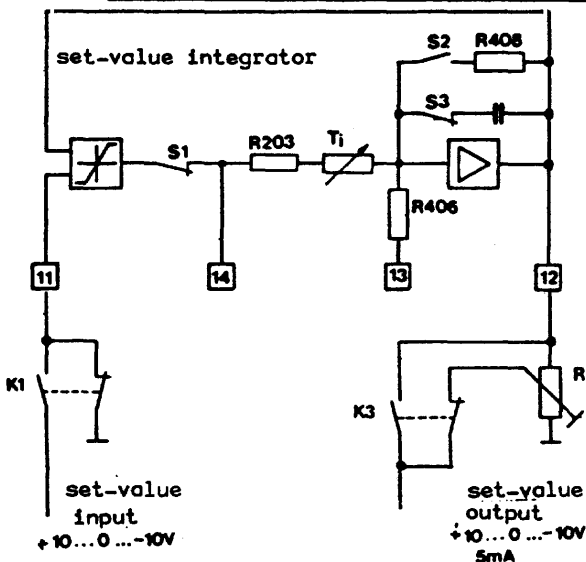
The acceleration time is adjustable with this circuit at R2, the deceleration time at R1.

When the direction of the major limiting time is known, then the standard component must not be modified. The major limiting time is then set at the trimmer Ti.

For the minor limiting time is then externally required the corresponding diodes-resistor-combination.

Use: Traversing drives with different acceleration and deceleration times
Multi-motor drives with normal stop and quick stop.

3.14. Set-value selection with constant acceleration time at variable final value



The acceleration time is set at trimmers Ti coarse and fine.

The output signal is to set at resistor R.

Use: Traversing devices with one operating direction and rapid return traverse.

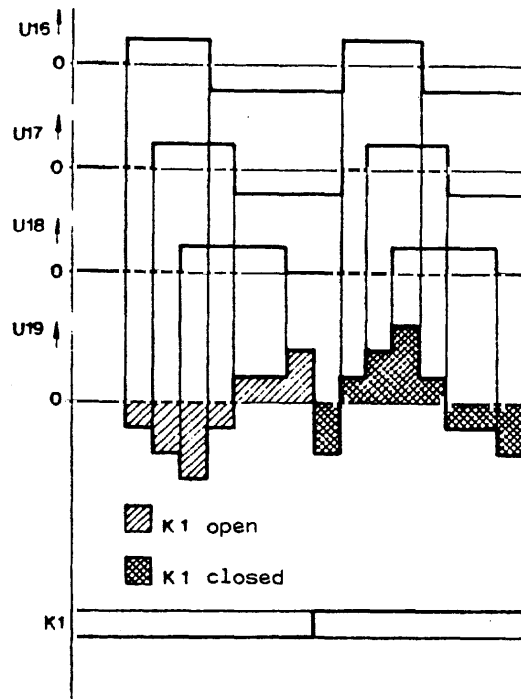
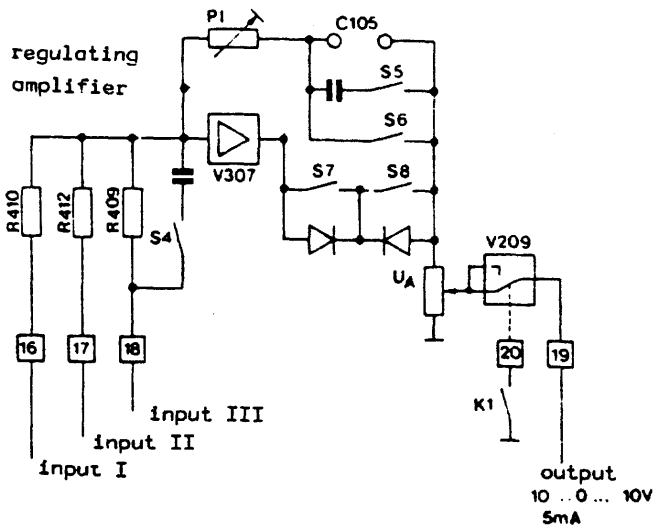
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3.2 Regulating amplifier

3.2.1 Summer with limitation and switch-over of output polarity



The summer operates bipolar, from equivalent inputs (standard design) and a reinforcement $v=1$ results the diagram. Switch-over of output polarity is externally possible via contact k1. The polarity is limited via programme switches S7 and S8.

Use: Addition of master-correction and limiting signals. The polarity switch-over is used for reversal of direction of rotation of 4-Q-drives.

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4. Module 2002

Used as _____

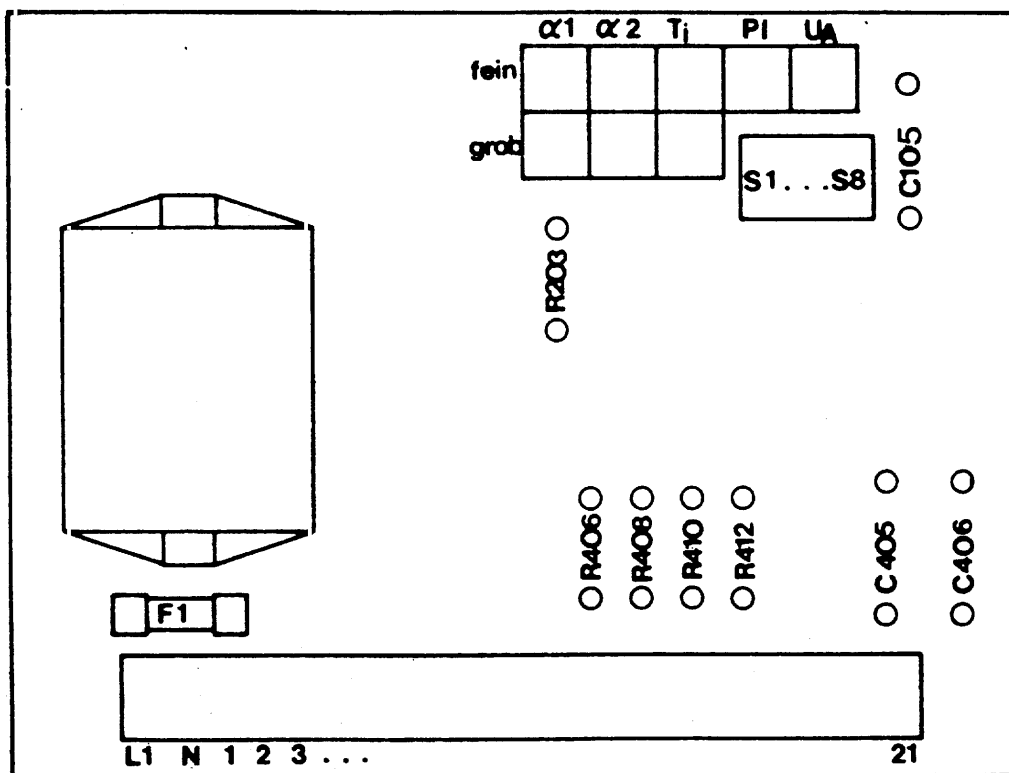
Position _____ in circuit diagram _____

Adjusted:

fine

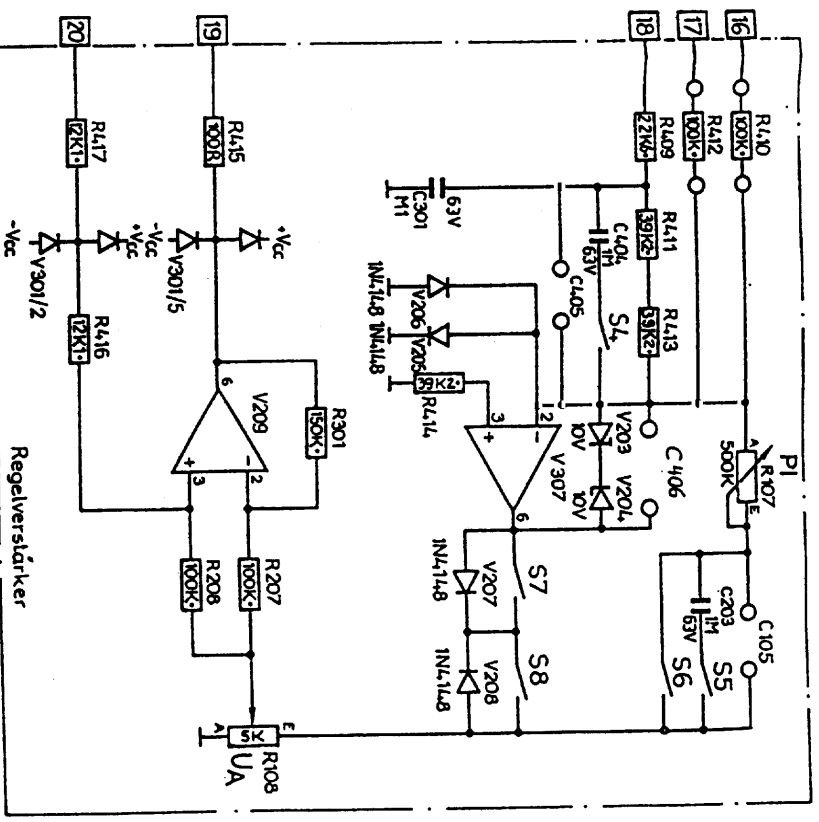
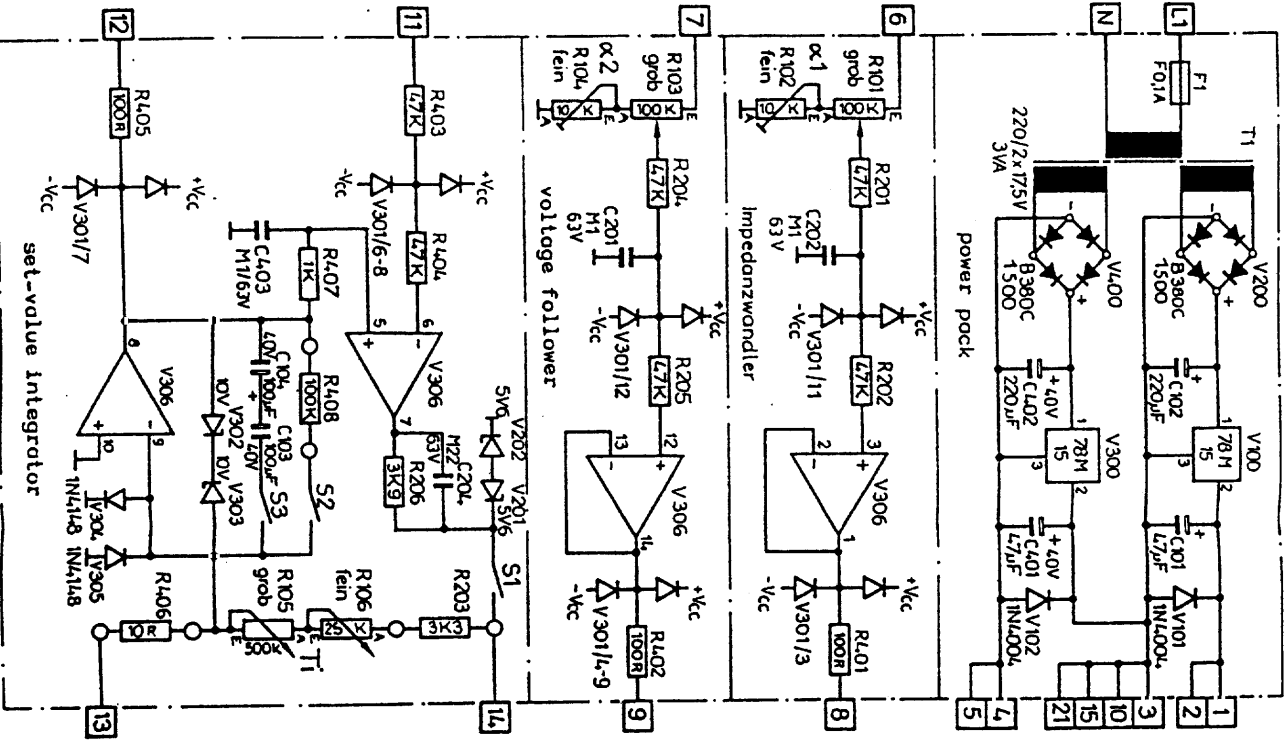
coarse

S	1	2	3	4	5	6	7	8
on								
off								



Special components:	R203	_____	Id-No.	_____
	R406	_____	Id-No.	_____
	R408	_____	Id-No.	_____
	R410	_____	Id-No.	_____
	R412	_____	Id-No.	_____
	C105	_____	Id-No.	_____
	C405	_____	Id-No.	_____
	C406	_____	Id-No.	_____

5. Connection diagram



V301 - TJD 125
 V209 - TBA 221
 V307 - TBA 221
 V306 - TDB 01L8DP

ms-resistance 1%
 resistances without dot
 of power are 0,33 W

○ point of soldering
 ⊠ connecting block with testing jack

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