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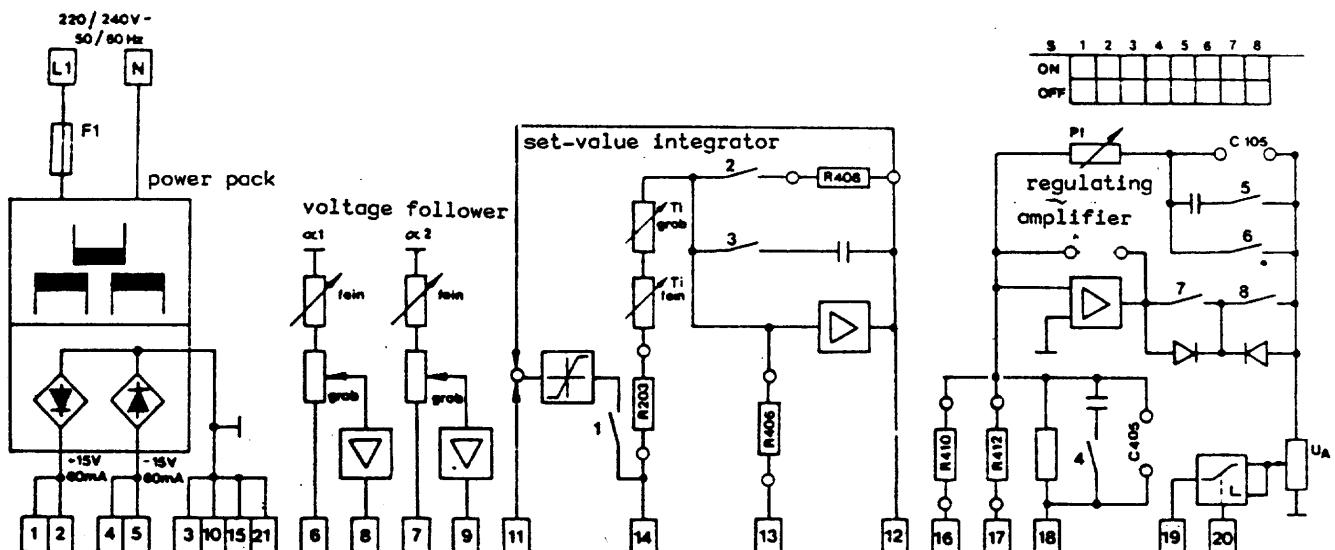
*Betriebsanleitung
Operating Instructions*

**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.

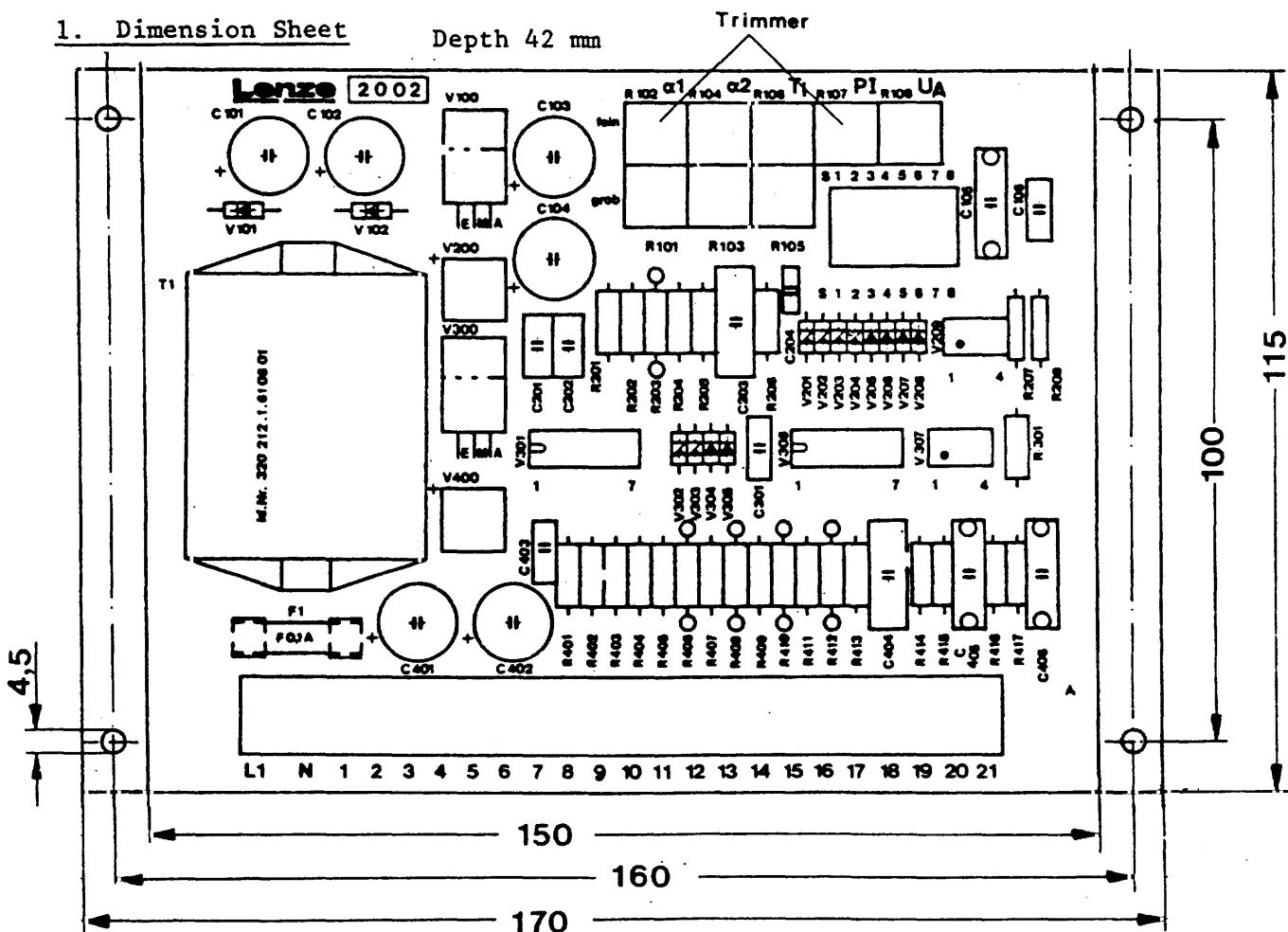
I N D E X 2002 Module

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1. Dimension Sheet

Depth 42 mm



Accessories

fuse 5x20.F0,1A,250V

Item No. 305 715

Snapping socket for quick installation

Item No. 320 280

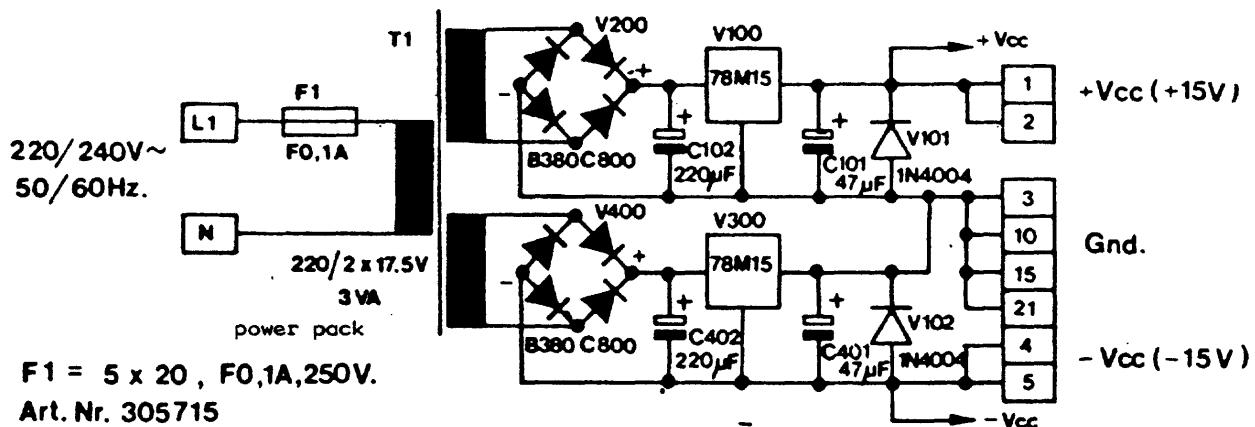
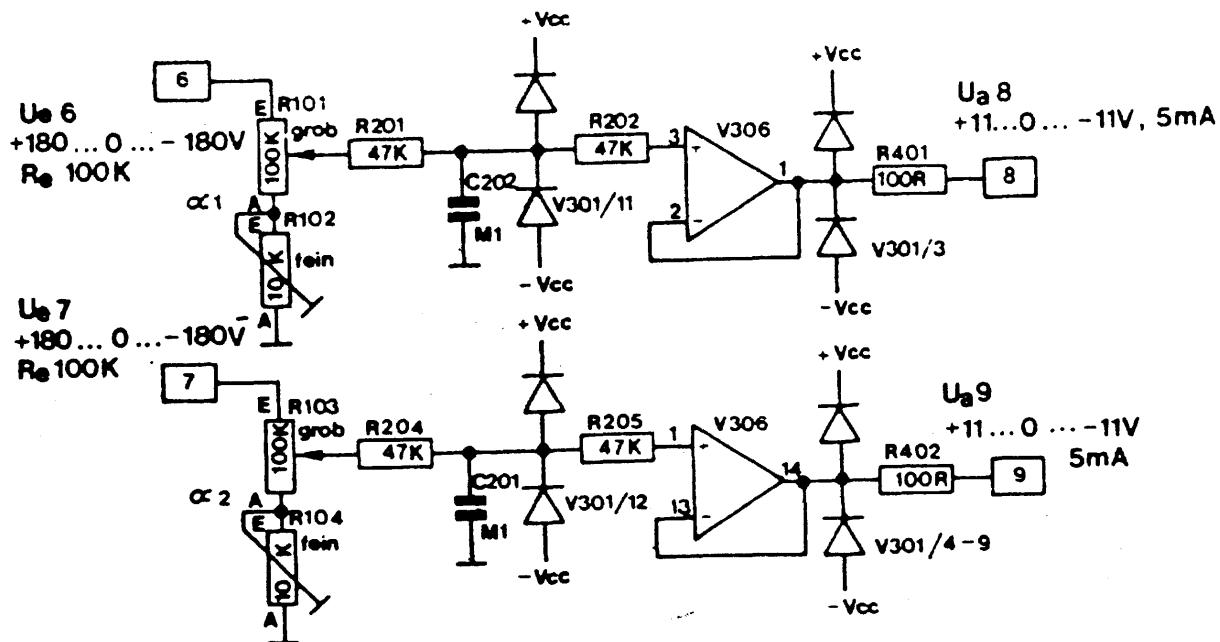
(When using the snapping socket, the width reduces to 150 mm while the depth will then be 70 mm).

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2. Functions2.1 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.

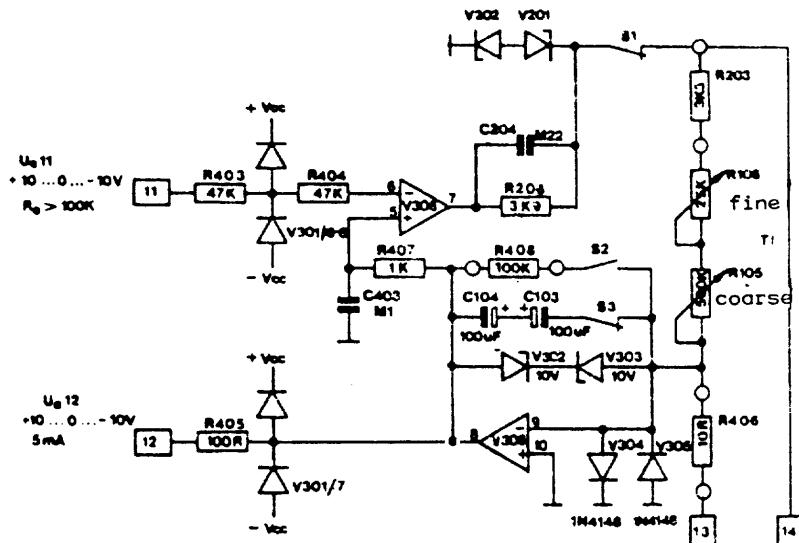
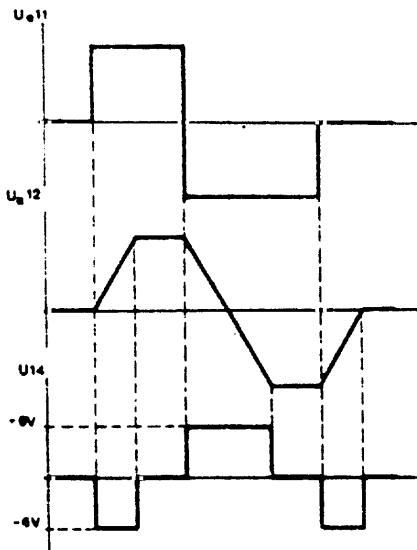
Use: Adaptation and decoupling of master voltage for multi-motor drives.

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

2.3. Set-value integrator

If the input signal U_{11} jumps, the output signal U_{12} 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.

U_{14} 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.

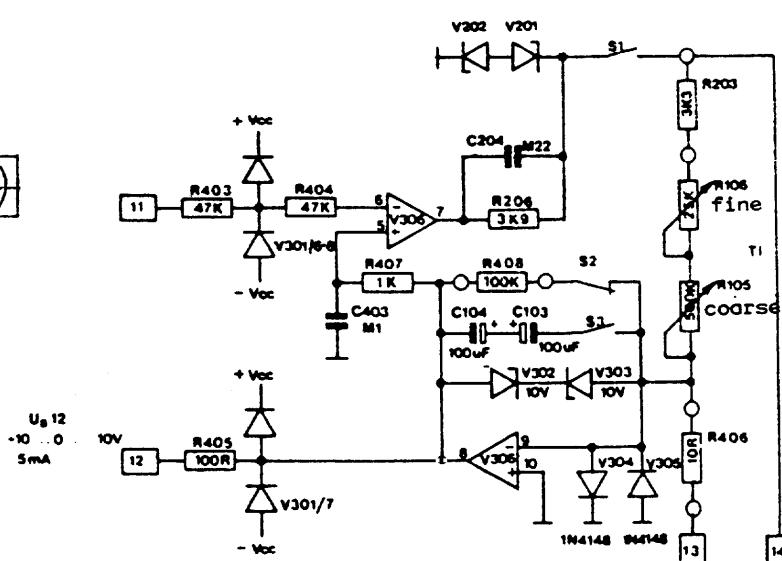
Via input 14 of the standard component it is possible to adjust amplifications of 0.2 ... 30. Range enlargements are possible by adapting the resistors R 408, R 203 and R 406 placed on soldering positions.

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

$$U_{12} = - \left(U_{13} \frac{R408}{R406} + U_{14} \frac{R408}{R203+R105+R106} \right)$$

$$V_{13} = \frac{R408}{R406}$$

$$V_{14} = \frac{R408}{R203+R105+R106}$$

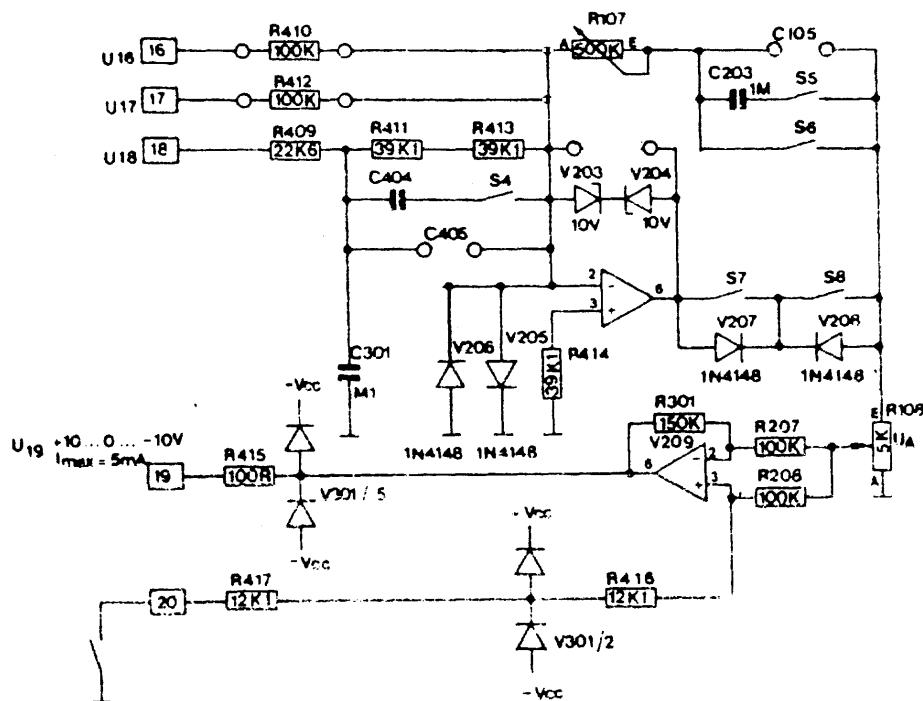


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2.5 Regulating amplifier

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

Programme switchUse

S4	S5	S6	S7	S8
X	X	X		
X	X	X		

inverting add amplifierPI-controllerPD-controllerPID-controllerreciprocal value formeroutput signal 0...-10V (0...+10V)output signal 0...+10V (0...-10V)output signal
-10V...+10VThe values in brackets are valid, if terminal 20
is bridged with GND.

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

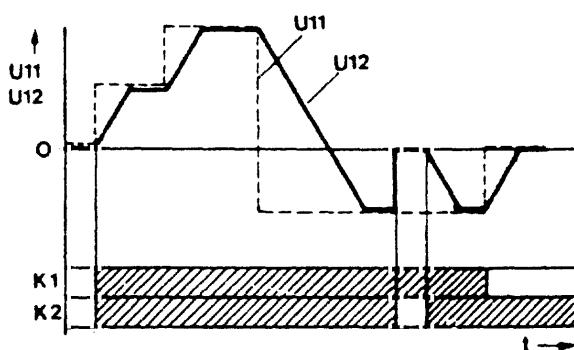
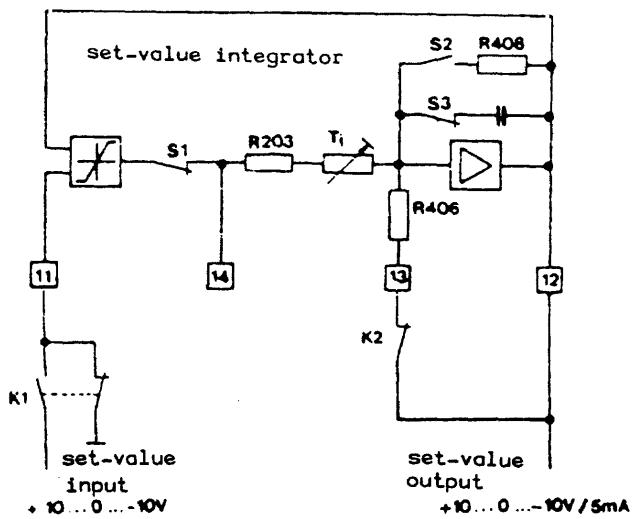
We have provided for additional components for applications beyond these possibilities.

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

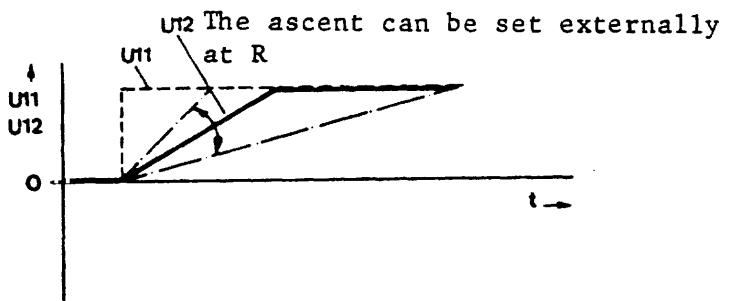
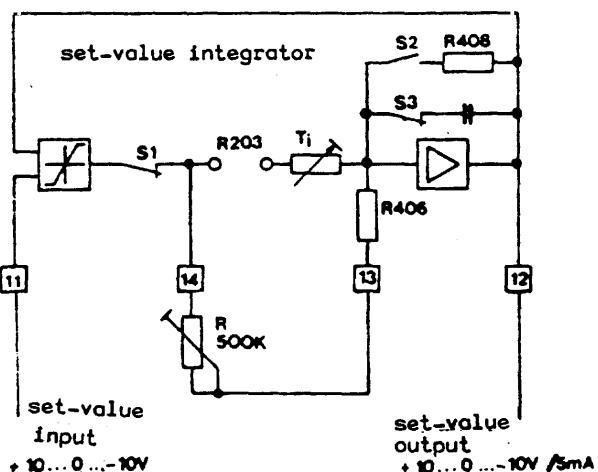


Use: Deceleration of rotational or speed set-values to limit the acceleration values.

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

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

SO. R203 removed



$$U_{12} \approx \frac{125}{R} \cdot t \quad (R) \text{ k} \Omega \quad (t) \text{ s} \quad (U) \text{ v}$$

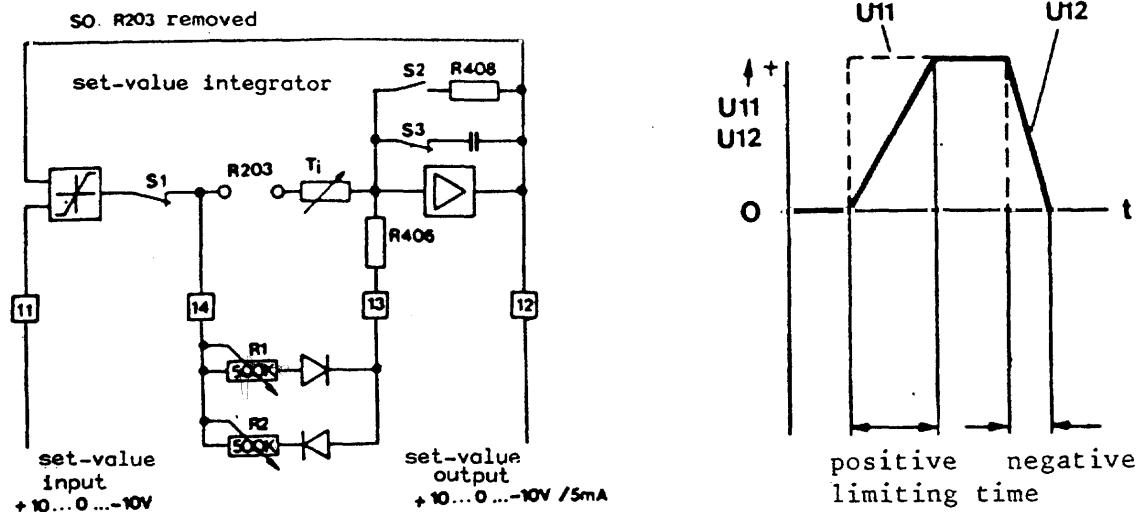
Use: Operational change-over of limiting time for automatic adaptation in one switching sequence.

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

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3.1.3 Set-value selection with different acceleration and deceleration time



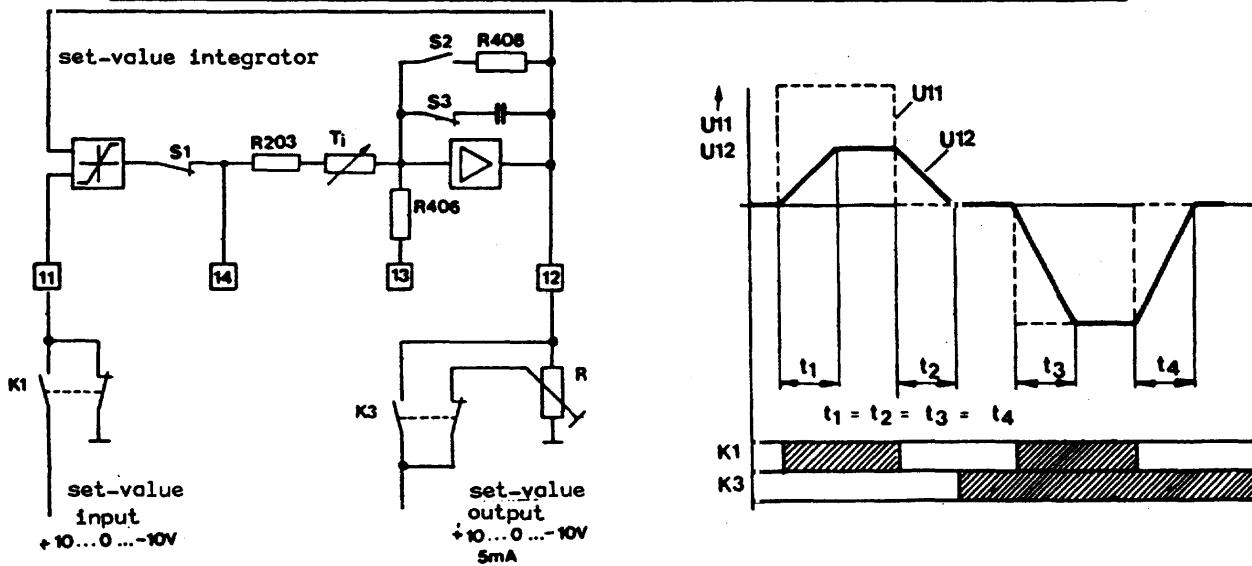
The acceleration time is adjustable with this circuit at R2, the deceleration time at R1.

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.

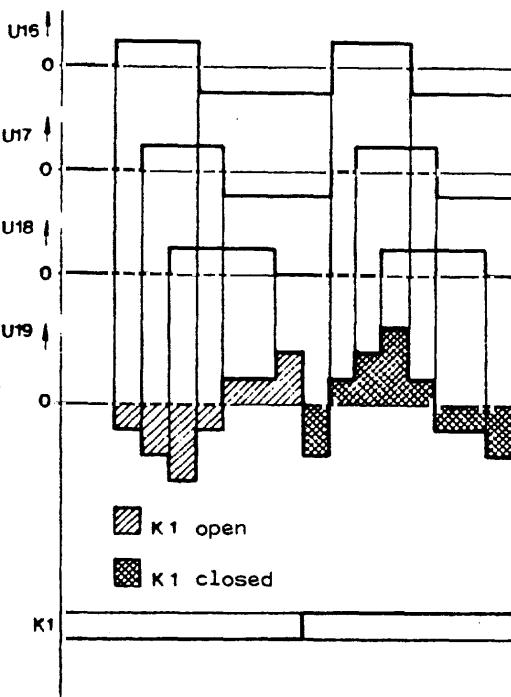
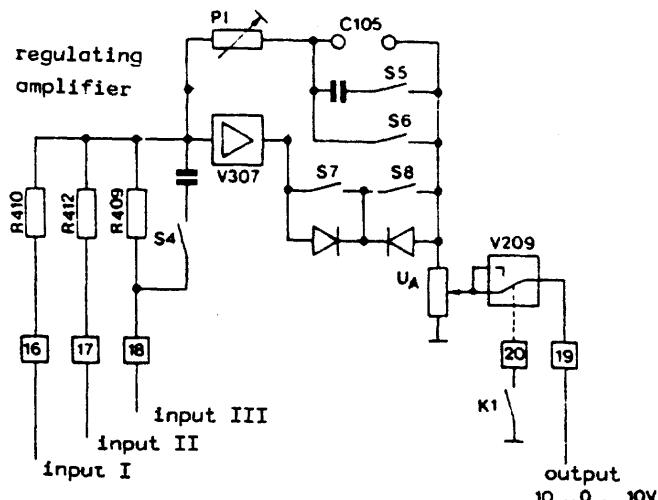
The output signal is to set at resistor R.

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 _____

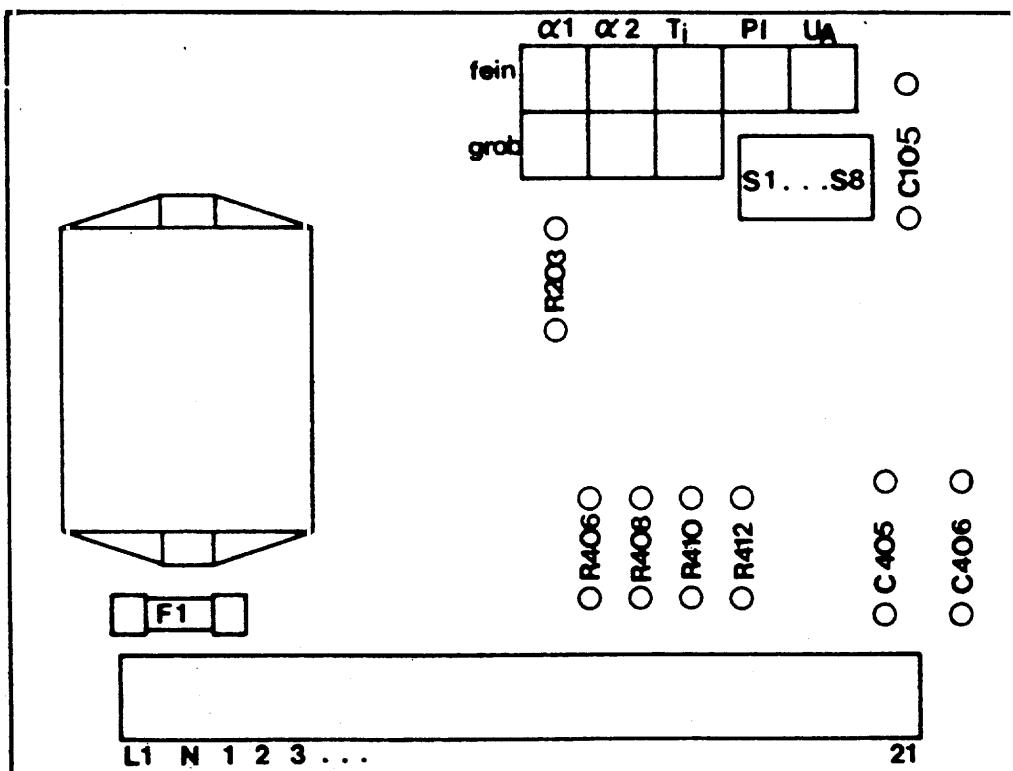
Position _____ in circuit diagram _____

Adjusted:

fine

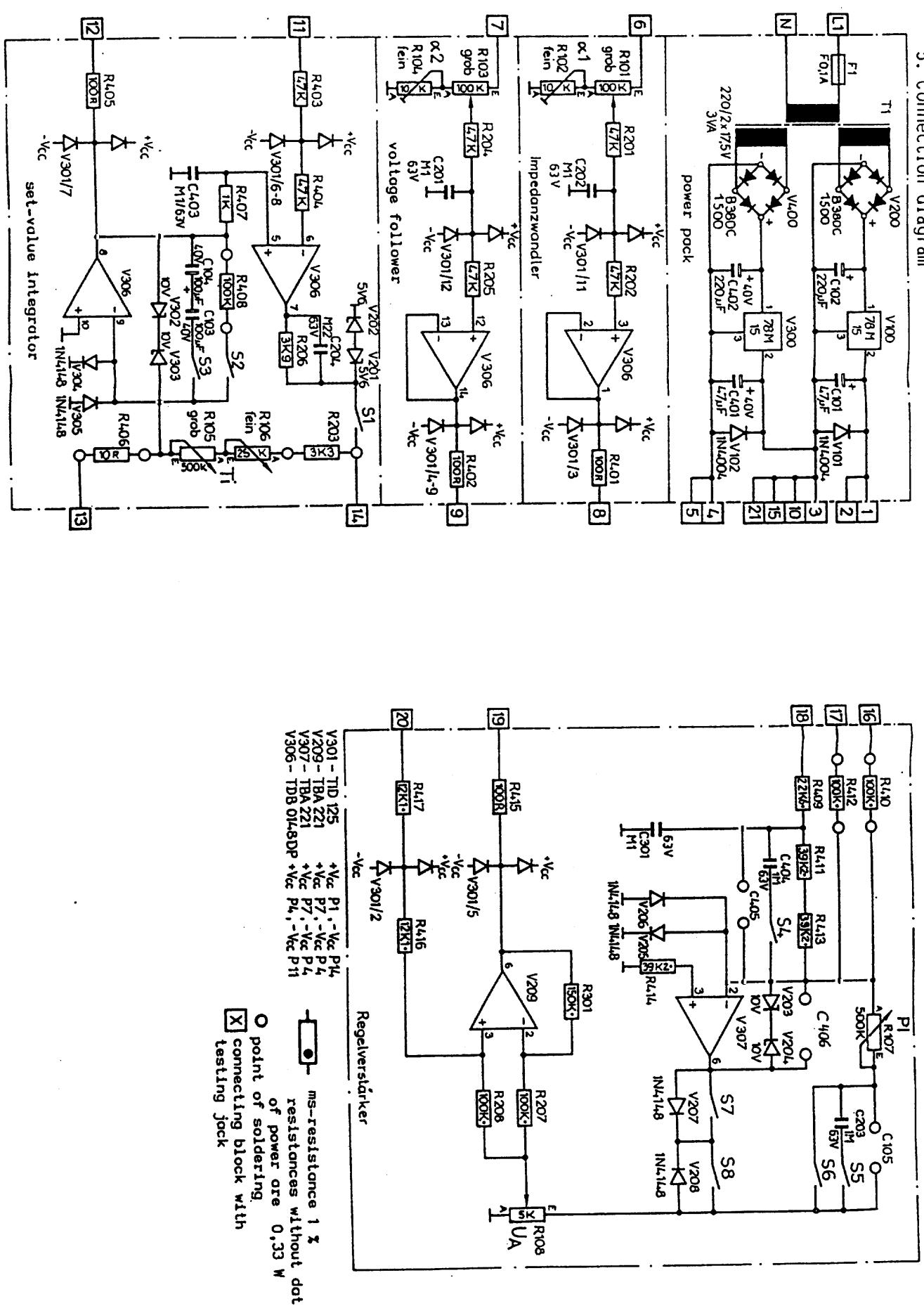
coarse

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



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