

The Simplatron-470-range comprises five 1-quadrant controllers with powers between 1,3 and 13 kW of compact design.

1. Special Features

- Compact single control board units with potential-free heat sink
- Mains isolation through current transformer
- Operation with tachometer or with armature voltage feedback with I x R compensation
- Self-synchronisation of the phase shifter with 50 or 60 Hz mains.
- Highest possible interference protection by means of fitted synchronizing filter
- Pulse series control in the power section
- Highest safety in operation is obtained through fitted static and dynamic voltage surveillance
- Operational display via LED's
- Freely adaptable control points for set-value delay (471, 472: C2o3, 473-475:C3o5), actual value differential element, speed-controller- readjusting time (dimensioning see service instructions)
- Set-value integrator may additionally be equipped with subprint 2oo3

2.- Technical data:

Unit		471	472	473	474	475	
output	Pel	1,3	2,5	4	7	9	13 kW
mains voltage L1,N				190 ± 265			V
50±60Hz L1, L2	U	190 ± 265		340 ± 460			V
field voltage	U <sub>F</sub>	0,9 x U <sub>L1,N</sub>					V
field current	I <sub>F</sub>	0,8	1,5	3			A
armature voltage	U <sub>A</sub>	160		260			V
armature current	I <sub>A</sub>	8	16	27	35	50	A
form factor without choke	F <sub>F</sub>	1,4					
with choke		1,2	1,2	1,2	1,2	1,2	
current limit	I <sub>max</sub>	0±8	0±16	0±27	0±35	0±50	A
Nom. Master Voltage	U <sub>LN</sub>	10 ± 180					V
Nom. Tacho Voltage	U <sub>TN</sub>	10 ± 180					V
min. speed	n <sub>min</sub>	-0,1 ± 0,25					n <sub>N</sub>
Fuse Power Section art.No.	S <sub>i</sub>	2xFF16A/600V 1x38 3o9 1o6		2xFF25A/600V 14x51 3o7 959		External fuse (see accessories)	
Fuse Electronics art.No.	S <sub>i</sub>	/		1xFF4A/500V 6,3x32 3o8 o54		1xFF8A/500V 6,3x32 3o7 213	
temperature range	T <sub>u</sub>			0±45			
Set-value potentiometer	R <sub>1</sub>	10 kOhm/1 WLin.					

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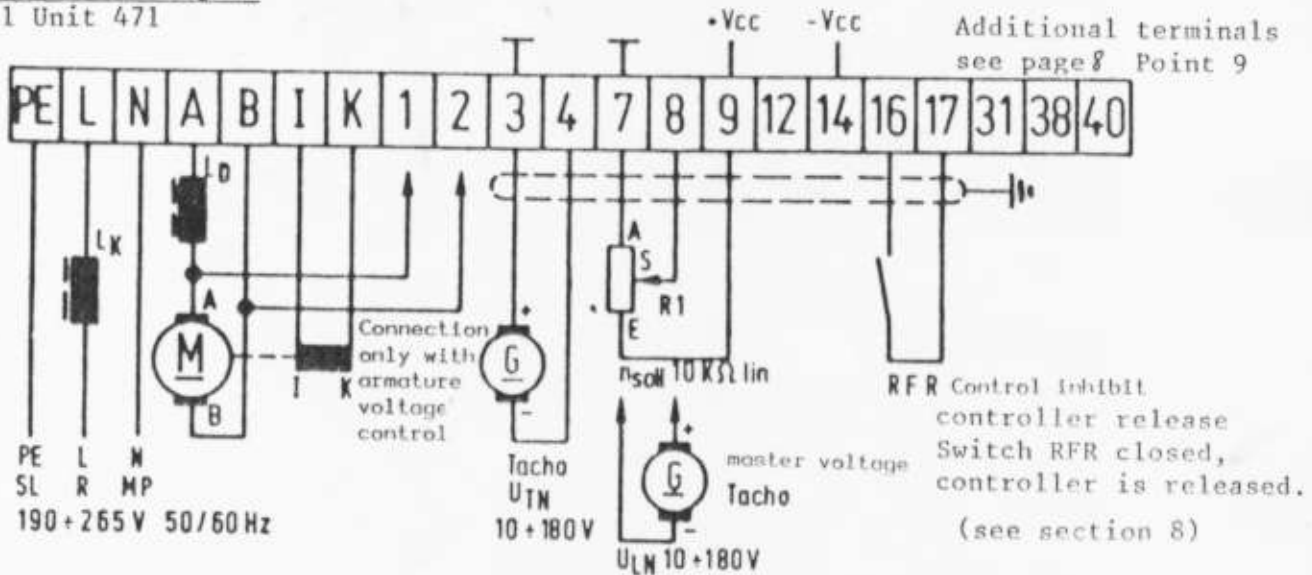
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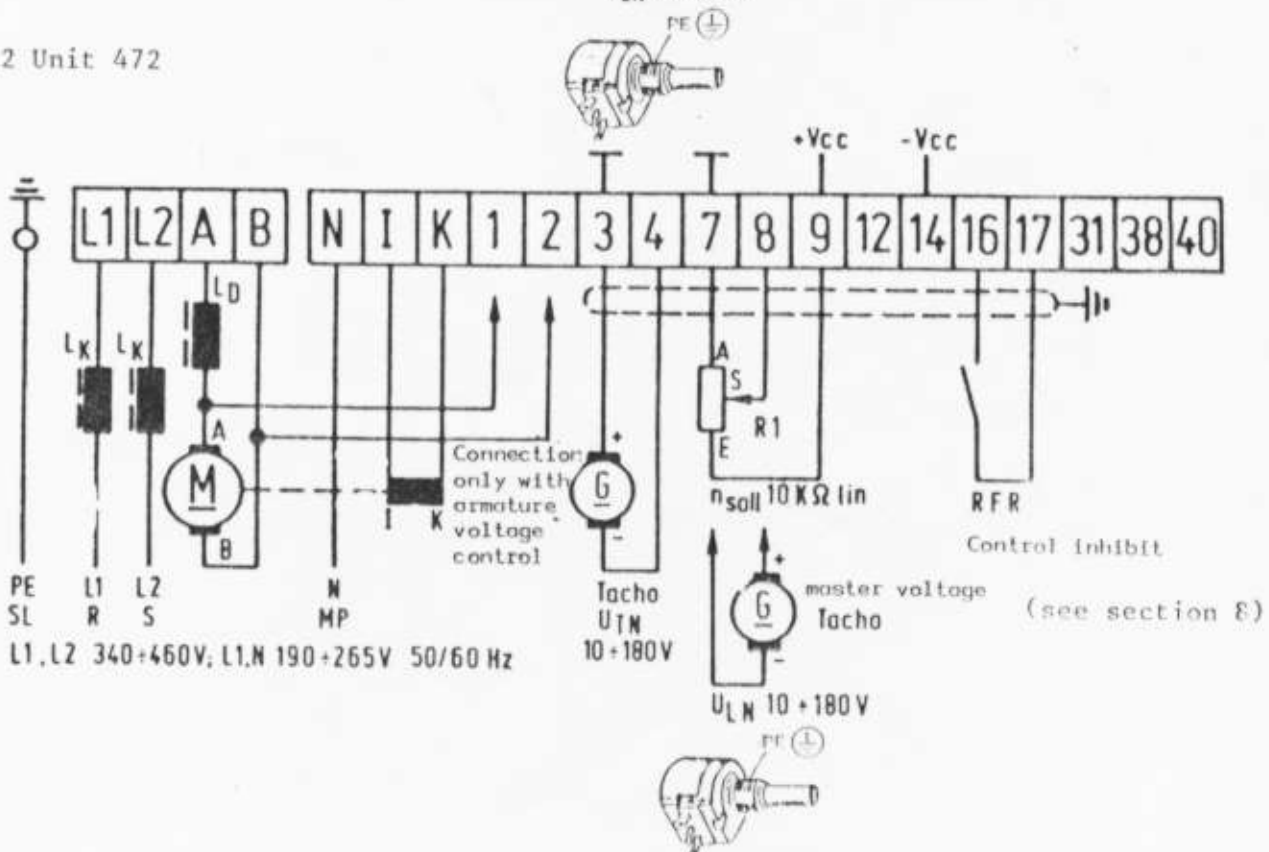
Unit	471	472	473	474	475	
Weight approx.	1,2	2,1	2,8	3,7	4,8	kg
control board art.No.			4073			
			320 382			
Chassis unit E art.No.	320 377	320 378	320 379	320 380	320 381	
Accessories (to be ordered separately)						
recommended mains fuse art.No.			2x FF40A/600V 22x58 307 175	2x FF50A/600V 22x58 307 173	2x FF80A/600V 22x58 307 174	
Fuse holder art.No.			2x 308 291			

### 3 Connection diagram

#### 3.1 Unit 471



#### 3.2 Unit 472



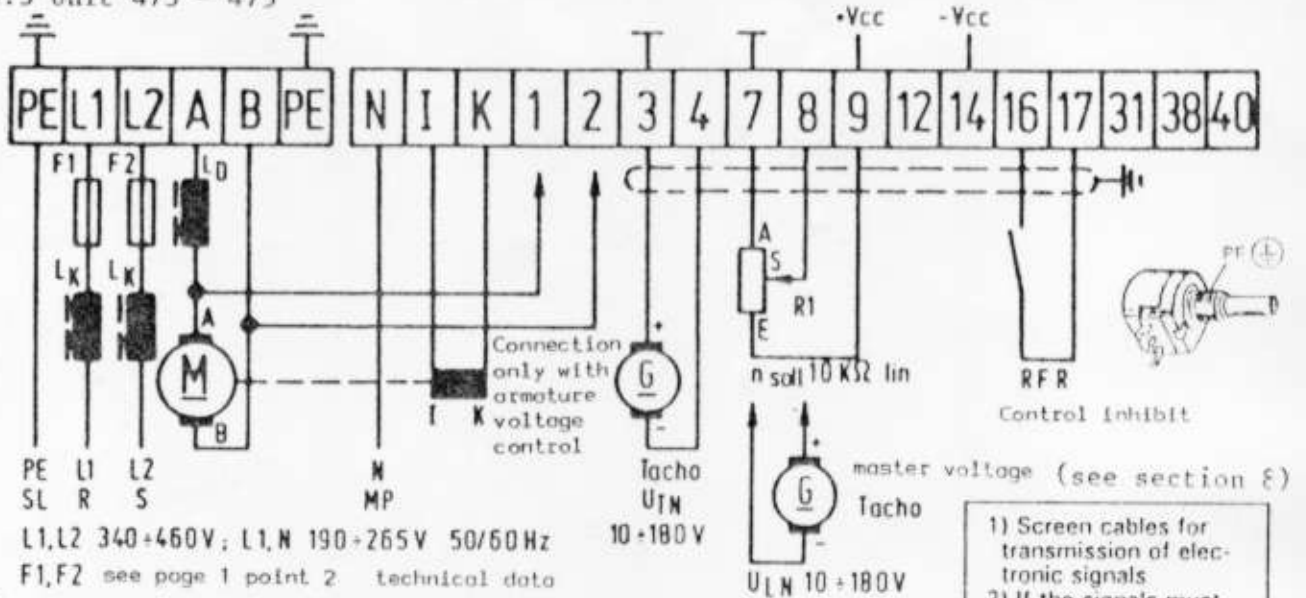
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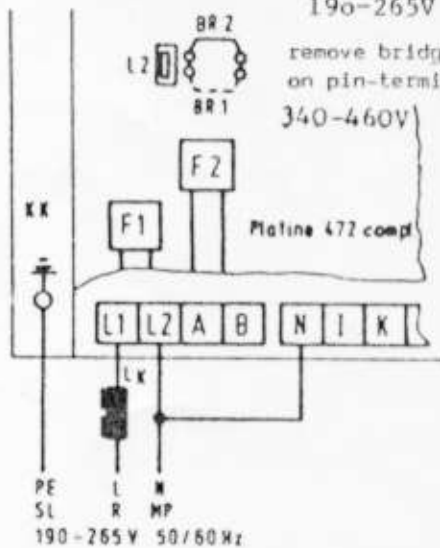
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3.3 Unit 473 - 475



- 1) Screen cables for transmission of electronic signals
- 2) If the signals must be changed-over via relays, use suitable relay contacts (e.g. gold-plated contacts).

4. Connection unit 472 for mains connection 190 + 265 V

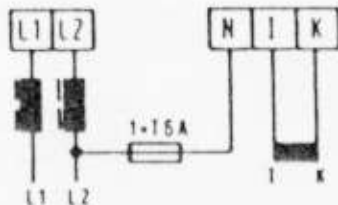


U <sub>mains</sub>	190 + 265 V
U <sub>A</sub>	160 V
I <sub>A</sub>	16 A
P <sub>el</sub>	2.5 kW

1x mains choke L<sub>K</sub> | 0.98 mH 35A  
 art.No. | 308 122

5. Special field voltages for 472, 473, 474 and 475

5.1 Field voltage > 0,9 x U<sub>L1, N</sub>



U<sub>mains</sub> L1, L2 = 340+460 V  
 U<sub>input</sub> L1, N = 340+460 V  
 U<sub>field</sub> I, K = 0,9 x U<sub>L1, L2</sub>

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OK 16/6

Technical description  
Simplatron Controllers 471 - 475

Lenze

6. Installation Instructions

Adequate ventilation of the unit must be ensured if installed in a housing. The ambient temperature must not exceed +45°C. Install the unit vertically with terminals pointing downwards.

Control cables must be shielded. One side of the shielding must be connected to the protective conductor on the unit.

The control electronics are not potential free in the "armature voltage control with 1 x R compensation" mode. Defective fuses must only be replaced by the prescribed type.

The feedback effect of the thyristor equipment on the supply mains is reduced by connecting mains chokes in series. It is only necessary to fit mains chokes if the inductance of the feed cable between mains and control unit is less than the values specified below.

Connect mechanical screw fixation of potentiometer with PE.

Allocation of mains chokes:

Unit	471	472	473	474	475
Mains choke	2,5 mH 18 A	0,98 mH 35 A	0,84 mH 35 A	0,61 mH 45 A	0,44 mH 65 A
Art.No.	308 121	308 122	308 123	308 124	308 125
Number per unit	1x	2x	2x	2x	2x

7. Adjustment Instructions

Trimmer  $n_{min}$ ,  $n_{max}$ ,  $V_p$ , 1xR to left-hand stop. Trimmers  $U_{Leit\ grob}$  and  $U_{Leit\ fein}$  are adjusted at the works for the standard set value potentiometer connection. Only when operating with a master voltage is it necessary to take  $U_{Leit\ grob}$  to the left-hand stop and  $U_{Leit\ fein}$  to the centre position in order finally to be able to make the basic adjustment.

Trimmer  $I_{max}$  is set to the nominal current of the unit at the works.

7.2 Setting the current limit (only necessary if the nominal motor current is smaller than the nominal current of the unit)

Connect a moving coil instrument for measuring the current into the armature cable. Lock armature or disconnect field. Switch on mains and turn trimmer  $n_{min}$  to right-hand stop. Turn trimmer  $I_{max}$  in order to adjust the armature current. Finally place trimmer  $n_{min}$  at left-hand stop.

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### 7.3.1 Armature voltage control with IxR compensation

Connect terminal A of the motor to terminal 1 of the controller and terminal B of the motor to terminal 2 of the controller as shown on the connection diagram. Set value potentiometer or master voltage to be at zero. Switch on mains. LED "RSP" lights up. LED "+V<sub>cc</sub>" lights up. Adjust set value potentiometer or the master voltage to maximum. In the case of the master voltage mode turn trimmer U<sub>Leit grob</sub> in a clockwise direction until there is +10 V at measuring point M1. Close switch "RFR". LED "RSP" goes out. Turn trimmer n<sub>max</sub> in a clockwise direction until the required upper speed is reached. Adjust set value potentiometer or master voltage to zero. Rotating trimmer n<sub>min</sub> in a clockwise direction increases the lower speed. Check the upper speed setting as trimmers n<sub>max</sub> and n<sub>min</sub> influence each other.

Trimmer U<sub>Leit fein</sub> is used for fine adjustment of the upper speed. Turn trimmer V<sub>p</sub> in a clockwise direction until the drive becomes unstable (speed oscillation), then turn back trimmer V<sub>p</sub> approximately 20% until the drive operates in a stable manner. The speed stabilizer is adjusted at trimmer IxR so that there is the smallest speed change between no load and nominal load at the lowest operating speed. Finally, check the compensation at higher speeds.

### 7.3.2 Speed control with tacho feedback

Set value potentiometer or master voltage at zero. Switch on mains. LED "RSP" lights up. LED "+V<sub>cc</sub>" lights up. Adjust set value potentiometer or master voltage to maximum. In the case of the master voltage mode, turn trimmer U<sub>Leit grob</sub> in a clockwise direction until there is +10 V at measuring point M1. Close switch "RFR". LED "RSP" goes out. Turn trimmer n<sub>max</sub> clockwise until the required upper speed is reached. Adjust set value potentiometer or master voltage to zero. Rotating trimmer n<sub>min</sub> in a clockwise direction increases the lower speed. Check the upper speed setting as trimmers n<sub>max</sub> and n<sub>min</sub> influence each other.

Trimmer U<sub>Leit fein</sub> is used for fine adjustment of the upper speed. Turn trimmer V<sub>p</sub> in a clockwise direction until the drive becomes unstable (speed oscillation), then turn back trimmer V<sub>p</sub> approximately 5% until the drive operates in a stable manner.

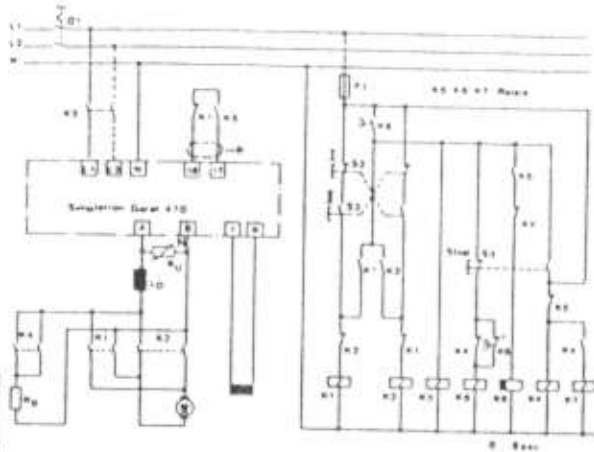
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## 8.4 Reversing



## Reversing Circuit

The direction of rotation is reversed by reversing the armature poles. The motor is braked electro-dynamically until it is stationary. The braking time is to be set at the time relay so that the motor is brought reliably to a stop after reversing the armature poles. A zinc-oxide varistor is to be connected in parallel with the regulator in order to restrict voltage peaks.

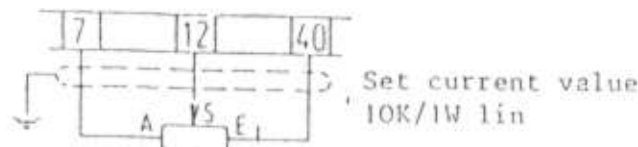
Sizing of brake resistor  $R_B$ :  
see "small collection of formulae"

## 9. Additional terminals

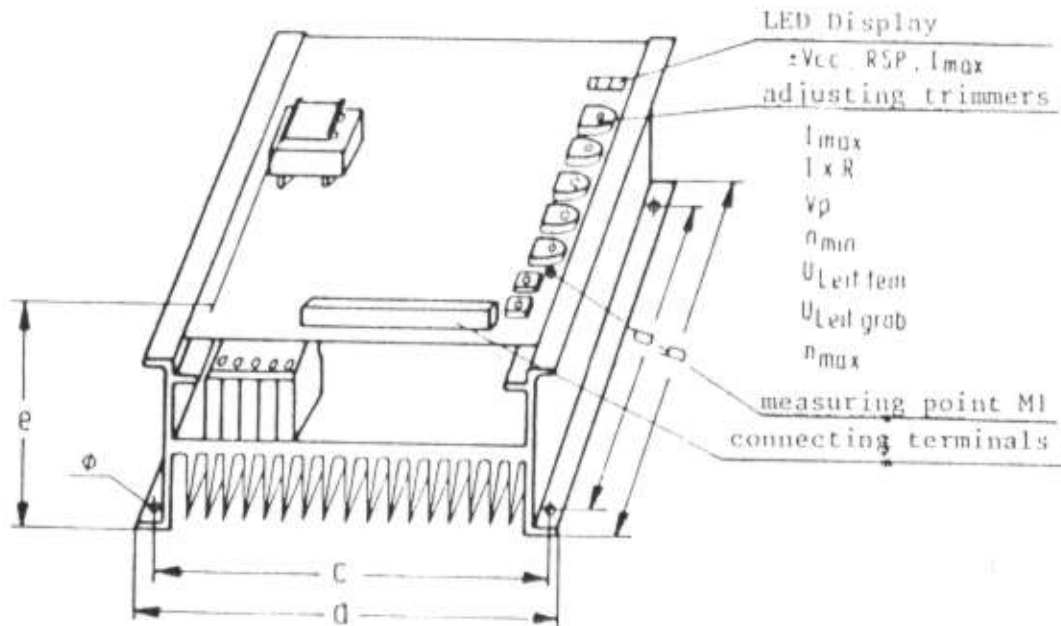
- [12] Current regulator input;  $R_i \approx 10\text{k}\Omega$ ;  $U_{isoll} = 0 \dots -10\text{V}$
- [14]  $-V_{cc} = -15\text{V}$  stabilised.  $-V_{cc}$  can be externally loaded with 7.5 mA.
- [31] Armature current actual value output. Terminal 31 output supplies an output voltage proportional to the armature current.  $U_{31} \approx 10\text{V}$  corresponds to the nominal current of the unit. This output can carry a maximum of 3 mA.
- [38] Freely wired speed regulator input. Terminal 38 leads to the summation point of the speed regulator via  $R_i = 50\text{k}\Omega$ . The permitted input voltage range is between  $-10\text{V}$  and  $+10\text{V}$ .
- [40] Speed regulator output;  $R_i \approx 200\ \Omega$ . Terminals 40 and 12 are interconnected internally via a  $2.2\text{k}\Omega$  resistor (on soldered support points).

2.2 kOhm resistor reference	R818	R207	R406
Unit	471	472	473-475

This resistor is to be removed when an external set value potentiometer is connected.



10. Dimensions



Type	a	b	c	d	e	φ
471	150	220	135	210	70	4,8
472	150	220	140	210	135	4,8
473	240	160	224	140	145	7
474	240	220	224	200	145	7
475	240	330	224	310	145	7

11. Scope of Supply

Units 471 and 472 with built-in mains and electronic fuses.

Units 473 - 475 with built-in electronic fuses.

10 kOhm set value potentiometer.

The following have to be ordered separately:

Mains chokes, armature chokes, knob and scale for set value potentiometer and mains fuses and fuse holders for units 473 + 475.

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Änderungen:  
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