



The Simplatron-460-range of controllers comprises 7 circulating current modules with powers between 0,6 kW and 22 kW. The types 463 to 465 are 2 pulse circulating current type 4 quadrant controllers and enable a continuous speed and torque reversal.

1. Special features of the Range of Controllers

- Fuse protection against mains short circuit, earth fault, reversal of polarity.
- Field fuse fitted, field fuse surveillance.
- Operation with tachometer or with armature voltage feedback and $I \times R$ compensation.
- Better dynamic response with discontinuous current pulses through current control adaptation.
- Self synchronisation of the phase shifter with 50 or 60 Hz mains.
- Pulse series control in the power section.
- Free adaptable inputs and outputs carried outside on additional terminals enable applications free of problems.
- Temperature surveillance with transistor output.
- Standstill indicator with transistor output.

2. Technical data

Type	463	464	465	type	463	464	465
output power	3,2kW	5,5kW	10kW	max. speed	$n_{\max} = 1 \div 0,75 n_N$		
armature current	21A	21A	38A	armature current limit	$I_A _{0 \div 21A}$ $I_A _{0 \div 38A}$		
cyclic current	appr. 3A	appr. 3A	appr. 4,3A	Nom. Tacho Voltage	$U_{TN} _{10 \div 180 V}$		
mains current	35A	35A	56A	Nom. Master Voltage	$U_{LN} _{10 \div 180 V}$		
mains voltage L1, N 50-60 Hz L1, L2	190÷265V 340÷460V			Dimensions	345 x 300 x 140 mm		
Armature voltage	$U_A _{150V}$ $U_A = 260V$			Packed weight	7,5kg	7,5kg	9 kg
Field voltage	$U_F = 0,9 \times U_L$ 1.1, N			Art.-No.	310418	310419	310420
Field current	$I_F = 3,5 A$						
Set value potentiometer	$R_l = 10 k\Omega$ 1W Lin						

Fuses

Unit	Power Board F1, F2	Field F3, F5	Electronics F4	armature circuit F6	Fuseholder for F6
463	22x58 FF40A/600V art.-No. 307175	6,3x32 FF8A/ 500V art.No. 307213	5x25 F1A/450V art.No. 307290	22x58 FF40A/600V art.-No. 307175	art.-No. 308291
464	22x58 FF40A/600V art.-No. 307175	6,3x32 FF8A/ 500V art.No. 307213	5x25 F1A/450V art.No. 307290	22x58 FF40A/600V art.-No. 307175	art.-No. 308 291
465	22x58 FF63A/600V art.-No. 305239	6,3x32 FF8A/ 500V art.No. 307213	5x25 F1A/450V art.No. 307290	22x58 FF63A/600V art.No. 305239	art.-No. 308 291

Bearb. DRAWN	EK15/GK	4.3.82	MASCHINENFABRIK STAHLKONTOR WESER LENZE GMBH & CO, 3250 HAMELN	Zeichnungs-Nr.	Drawing-No.
Geprüft: checked:				MB33.0626 e B1. 1	GB

3. Components delivered with the Open Controllers

The controllers come with fuses F1 to F5 fitted and a set value potentiometer 10 kOhm. You must order separately mains choke, 4 off circulating current chokes, armature circuit fuse, fuse holder and knob and scale for set value potentiometer. Heat Sink Control board 463/464 or 465

4. Connection diagram

463 - 465

connecting terminals unit 464 and 465

connecting terminals unit 463

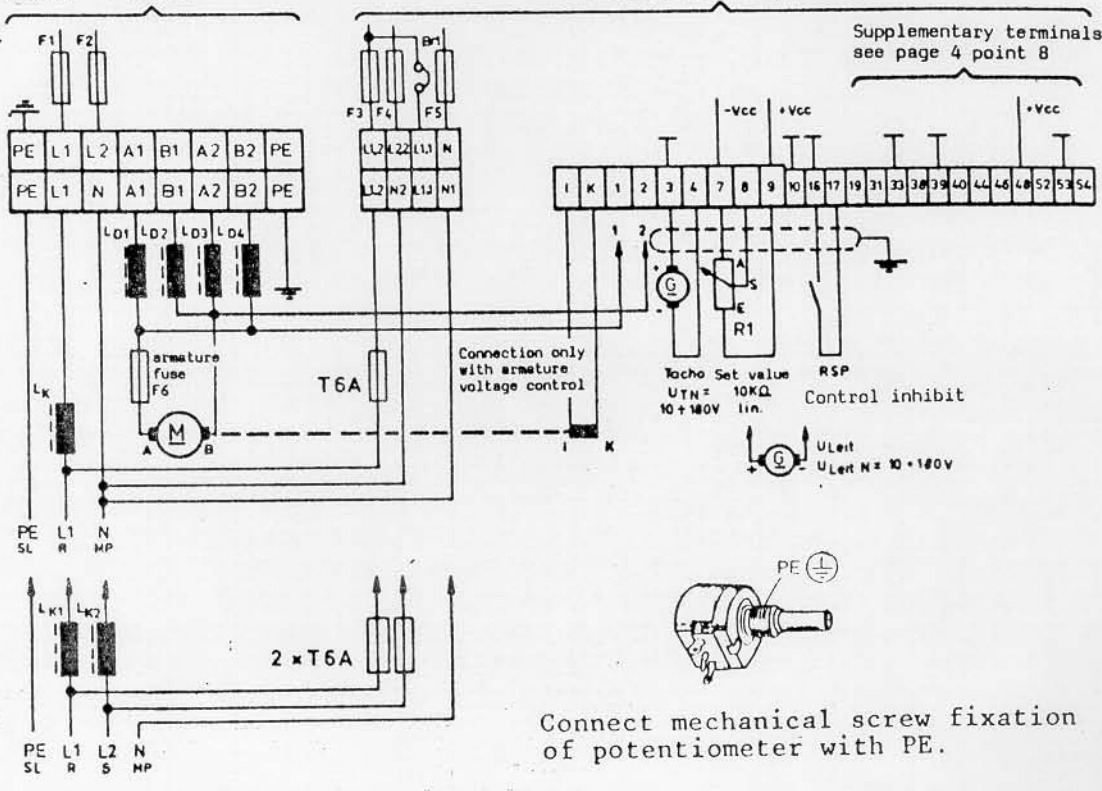
463 Power, Electronic and Field connection

$L, N = 190 \pm 265V$
50/60 Hz

464 - 465

Power, Electronic and Field connection

$L1, L2 = 340 \pm 460V$
 $L1, N = 190 \pm 265V$
50/60 Hz



Connect mechanical screw fixation of potentiometer with PE.

5. Connection and Fitting Instructions

- 5.1 Control cable should be screened and connection to PE at controller only.
- 5.2 When using armature voltage control the control board carries mains potential.
- 5.3 When closing a low voltage contact between terminals 16 & 17 the control inhibit RSP is operated. These cause an internal zeroing of the speed set value. This causes the drive to brake with the current set at the trimmer "I_{max}".
The current adjusted at the trimmer "I_{max}" may also flow during standstill, if drive is correspondingly charged.
(Pay attention to thermal limits of motor, possibly reduce motor current or set on Zero).
- 5.4 Before the mains is switched off the drive must have come to standstill by operating the control inhibit. At first operate RSP. Wait until the drive stands still. Thereafter switch off mains. Automatic mains switch-off see paragraph 8. After descent of the mains contactor this one may only be switched on again after a delay time of $t \geq 0,5$ s.
- 5.5 Mount the controller in such a way that the terminal block points downwards. When fitting into an enclosure the inner temperature must not exceed +45 deg C.
- 5.6 If no loadable neutral is available for field supply for the controllers 464 and 465 see paragraph 7.
- 5.7 Zero speed is achieved when the speed set value potentiometer is in a mean position. (potentiometer "n₈₀₁₁") If only one motor direction (clockwise) is needed then the connection "A" of the set value potentiometer has to be detached from terminal 7 and put on to terminal 10. Zero speed is then achieved at counter clockwise position of the set value potentiometer.
- 5.8 Power board and control electronics only to be switched on at the same time.

Bearb. DRAWN =	EK15/GK	4.5.81	MASCHINENFABRIK STAHLKONTOR WESER	Zeichnungs-Nr.	Drawing-No.
Geprüft: checked:			LENZE GMBH & CO, 3250 HAMELN	MB33.0626 d B1. 2 GB	



5.9 Attention: Do not operate controllers with open armature circuit.

If motor is not connected fuses may fail, as circular current chokes can not take-up the resulting voltage-time surfaces.

6. Setting instructions

6.1 Trimmers "I_{xR}", "V_p", "U_{Leit grob}", "n_{max}" to be fully anti-clockwise. Trimmer "U_{Leit fein}" in mean position. Operate control inhibit.

6.2 Set value adjustment

Set value potentiometer to be fully clockwise or adjust master voltage on nominal value. Switch on mains. Open control inhibit. Connect measuring instrument at terminal 10 (-) and measuring point M1 (+). Trimmer "U_{Leit grob}" to be turned clockwise until 10 V are attained. (Use measuring instrument with $R_i \geq 100 \text{ k}\Omega$). Switch off mains.

6.3 Setting of the current limit

This is only necessary when the motor current is smaller than the controller nominal current. In this case, act as follows: Trimmer "I_{max}" fully anticlockwise. Connect moving coil ammeter for current measurement into the armature circuit, observing polarity. With positive set value the motor terminal "A" is positive and motor terminal "B" is negative. With negative set value the motor terminal "A" is negative and motor terminal "B" is positive.

Stall the motor armature or disconnect the field with the controller switched off. With armature voltage control disconnect the wire from terminal 1. Switch on mains. LED's marked "+Vcc" and "RSP" now light up. Open control inhibit. LED "RSP" now goes out. Turn speed set value potentiometer fully clockwise or master voltage to nominal value. LED "I_{max}" now lights up. Trimmer "I_{max}" to be turned clockwise until the desired armature current flows. The maximum controller output current must not be exceeded, 463 and 464 is "I_{max}" = 21 A, 465 is "I_{max}" = 38 A. Switch control inhibit. Switch off mains. Reconnect field. With armature voltage control, reconnect wire to terminal 1.

6.4 Setting of Upper Speed "N_{max}"

Moving coil instrument to be connected as a voltmeter to terminals A and B of the motor. For speed setting it must be observed that the armature voltage must not exceed the permissible value for controller 463 $U_{A \text{ max}} = 150 \text{ V}$ and for controllers 464 and 465 $U_{A \text{ max}} = 260 \text{ V}$.

Set the speed potentiometer fully clockwise or master voltage at nominal value. Switch on mains and open control inhibit. By turning the trimmer "n_{max}" bring speed approximately on desired nominal value. Effect precise adjustment of upper speed at trimmer "U_{Leit fein}". Attention! The armature voltage must not exceed $U_{A \text{ max}} = 150 \text{ V}$ or 260 V !

As the controller reinforcement "V_p" is not yet adjusted, the drive may slightly swing; if necessary turn trimmer "V_p" somewhat clockwise.

6.5 Trimmer "n_{offs}"

The offset of the speed controller is set by the works, but should a correction be necessary then with a set value of 0 volts the zero point can be corrected with the trimmer n Offs.

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Geprüft: checked:				MB 33.0626	Bl. 3 GB

6.6 Control dynamics and I x R compensation

Only adjust trimmer "IxR" when using U-control. When using tacho feedback the IxR trimmer must be turned anti-clockwise. The values in the following table are approximate values and must be checked after the setting in the complete speed range and if necessary be corrected.

Trimmer	Setting High Control accuracy	To High Control Dynamics
Vp	Trimmer to be turned clockwise until drive becomes unstable Thereafter turn Vp back by about 15%. 	Thereafter turn Vp back by about 5%. 
I x R	Trimmer with load change to be turned until the smallest possible speed loss occurs.	I x R influence to be kept as low as possible.

7. Field connection

7.1 Field connection with loadable neutral.

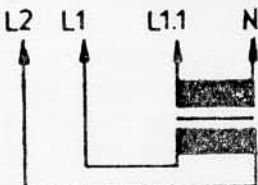
If the mains allows a loadable neutral, then this neutral must be connected to terminal N. If no loadable neutral is available for controllers 464 and 465 then the field can be supplied via an autotransformer or an isolating transformer.

7.2 Field voltage by autotransformer



Input voltage between L1,L2	340-460V
Output voltage between L1,N	190-265V
Field voltage between I, K	0,9xL1,N

7.3 Field Connection by Isolating transformer

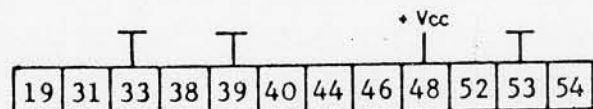


Wire bridge Br.1 is to be removed from the board. This defeats the field fuse supervision.

Voltage between L1,L2	340-460V
Voltage between L1.1,N	190-265V
Voltage between I, K	0,9xL1.1,N

The transformers must be rated for the type power of 1,5 kVA.

8. Additional terminals for the control electronics



19 Transistor Output Error Signal.

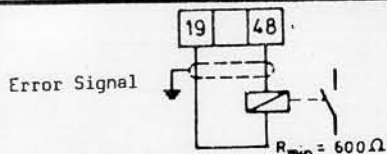
The temperature of the semi-conductors is supervised by a temperature sensor. If the cooling block exceeds the temperature limit = 90 deg. C then the control inhibit RSP is operated and the current pulses are shifted into the inverter and position ip. the motor becomes without current and stops. An electrical latch prevents the controller restarting on it's own after cooling down. (this latch can only be removed by disconnecting and reconnecting the mains). Terminal 19 goes to zero volts when the over temperature latch operates. The output is loadable maximum with $R_{min} = 600 \text{ Ohm}$ and can be used for the direct connection of a relay.

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Geprüft: checked:					



TECHNICAL DESCRIPTION
Simplatron Controllers 463 - 465

ELEKTRONISCHE
ANTRIEBSTECHNIK



E.g. Relay REL/TRP-15
Art.-No. 321 351

With applications where the motor must not automatically become free of current when the cooling fin temperature exceeds the limit, then the resistance R 611 (on solder points) has to be removed. In this case when the controllers show an excess temperature only an error signal is supplied.

Caution: The error cause has to be removed very quickly otherwise the safety of the controller is no longer ensured.

31 Output armature current former

The armature current former forms the difference $I_{\text{bridge}} - I_{\text{circuit}} = I_{\text{armature}}$. On output 31 a voltage is available that is proportional to armature current. This armature current actual value can be used for current ratio controls or for the direct indication of the current by using a measuring instrument. This terminal 31 may be loaded with maximum 3 mA.

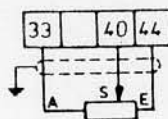
33 $|U_{31}| = 0 \div 5 \text{ V}$ when $|I_A| = 0 \div I_{\text{max}}$
GND 0 Volts.

38 Freely usable speed controller Input
Terminal 38 (Ri 50 kOhm) leads to the summation point of the speed controller. The permissible input voltage range lies between +10V and -10V. When operating the control inhibit the input is switched to zero. In this case Ri 25 kOhm.

In the case of positive set value or positive master voltage and negative feedback value the positive armature voltage adjusts at connection A.

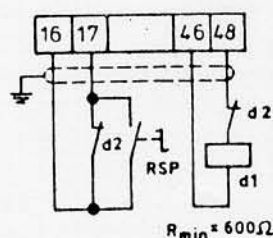
40 Input for current controller Ri 10 kOhm.

44 Output speed controller Ri 200 Ohm. The terminals 40 and 44 are internally connected by a resistance R 117 = 100 Ohm (on solder points). With current ratio control or when fitting an external current potentiometer to terminals 33, 40 and 44 this resistance has to be removed. The desired maximum armature current is set on the integral trimmer I_{max} with the external set current potentiometer turned up.

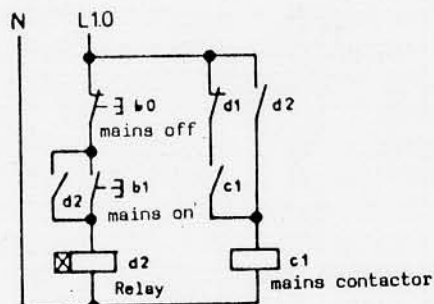


Current set value, R117 to be removed.
10K/1W linear

46 Output standstill logic
The transistor output terminal 46 switches to 0 volts when the speed is below $n_{\frac{I_{\text{max}}}{50}}$. This output can be used for an automatic mains switch off.



E.g. Relay d₁
REL/TRP-15
Art.-No. 321 351



Bearb. DRAWN EK15/So 4.3.82
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MASCHINENFABRIK STAHLKONTOR WESER
LENZE GMBH & CO, 3250 HAMELN

Zeichnungs-Nr. Drawing-No.
MB 33.0626 c B1. 5 GB

48 $+V_{cc} = 15 \text{ V}$ stabilised. $+V_{cc}$ is externally loadable up to max. 50 mA.

52 Input bridge current controller 1, $R_i = 40 \text{ k}\Omega$

53 GND 0 Volts.

54 Input bridge current controller 2, $R_i = 40 \text{ k}\Omega$

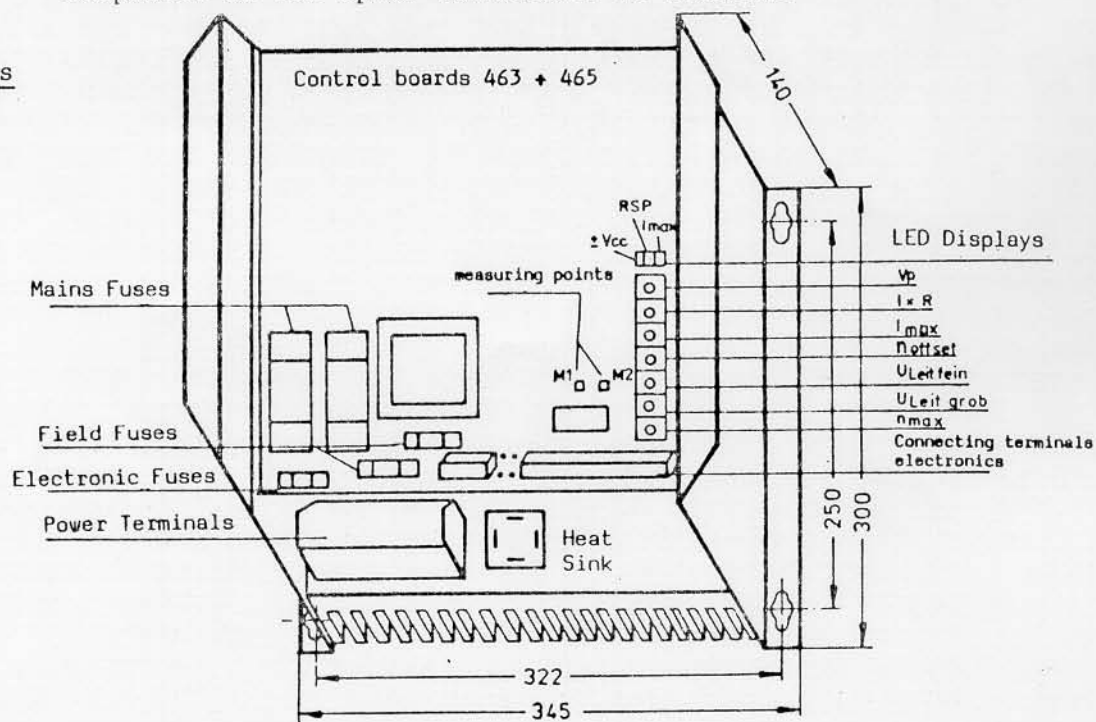
9. Additional Control Points

C 309 Integral component of the speed controller

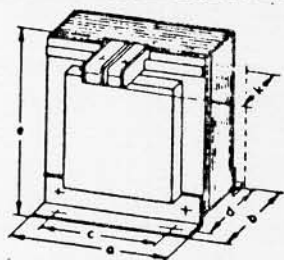
C214, R223 Speed actual value difference (D-component)

R 514 Using here a $100 \text{ k}\Omega$ resistance and operating RSP the integral component of the speed controller is blocked.

10. Dimensions



Mains and Circular Current Chokes



L_D = circulating current choke

L_K = commutation choke
(mains choke)

Type	Pce.	Art.-No.	L (mH)	I (A)	a	b	c	d	e	k
463 L_D	4	310415	13/3,5	2,2/22	120	120	90	103	125	150
464 L_D	4	320260	22/5	2,5/25	150	120	122	102	150	150
465 L_D	4	310416	16/4	5/42	176	102	150	75	280	110
463 L_K	1	308122	0,98	35	80	88	62	70	128	88
464 L_K	2	308123	0,84	35	80	76	62	58	128	76
465 L_K	2	308124	0,62	45	80	100	62	82	128	100

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