

Lenze

Power Transmission

Technical description

Inverter drives

Range 7800

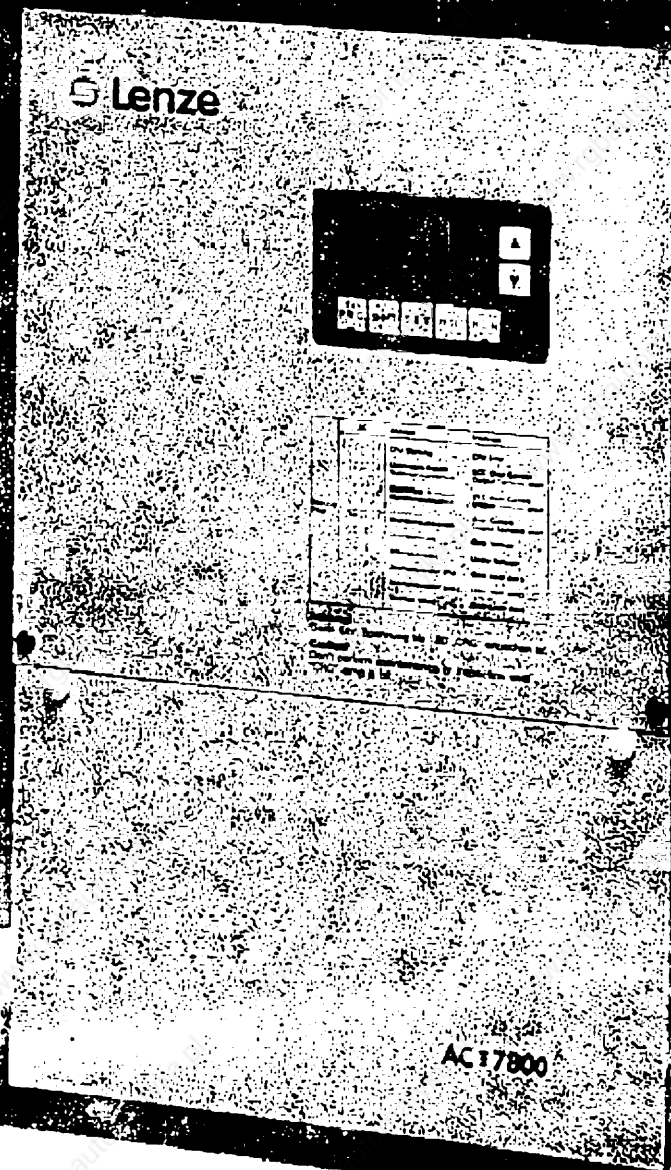


Table of contents		page
1.	Features	2
2.	Specifications	2
3.	Connecting diagram	3
4.	Installation instructions	4
5.	Connecting instructions	4
5.1	External set-value adjustment	4
5.1.1	Using potentiometer	4
5.1.2	Using master voltage	4
5.1.3	Using current loop control	4
5.2	Controller inhibit	5
5.3	Reversing and braking	5
5.4	Selection of fixed frequencies (speeds)	6
5.5	External temperature switch	7
5.6	External TRIP reset	7
5.7	Switching of the acceleration and deceleration ramp	7
5.8	Standstill indication	8
5.9	"Identical frequency" indication	8
5.10	Overload indication	9
5.11	TRIP relay	9
5.12	Frequency output	10
5.13	Mains connection	10
5.14	Motor connection	11
5.15	Connection of braking resistor(s)	11
6.	Display and operating panel	12
7.	Modification of factory-set parameters	13
7.1	Keyboard operation	13
7.2	Function code	14
7.3	Description of the function code	15
8.	Fault diagnosis	27
9.	Dimensions and weights	28
10.	Mains chokes	29
11.	Semiconductor fuses and fuse holders	30
12.	Braking resistors	31
13.	Radio interference suppression	32
14.	Part numbers	32
15.	Items supplied	32

The Lenze inverter series 7800 comprises 8 frequency inverters for standard three-phase motors of powers from 2.0 to 20 kW.

1. Features

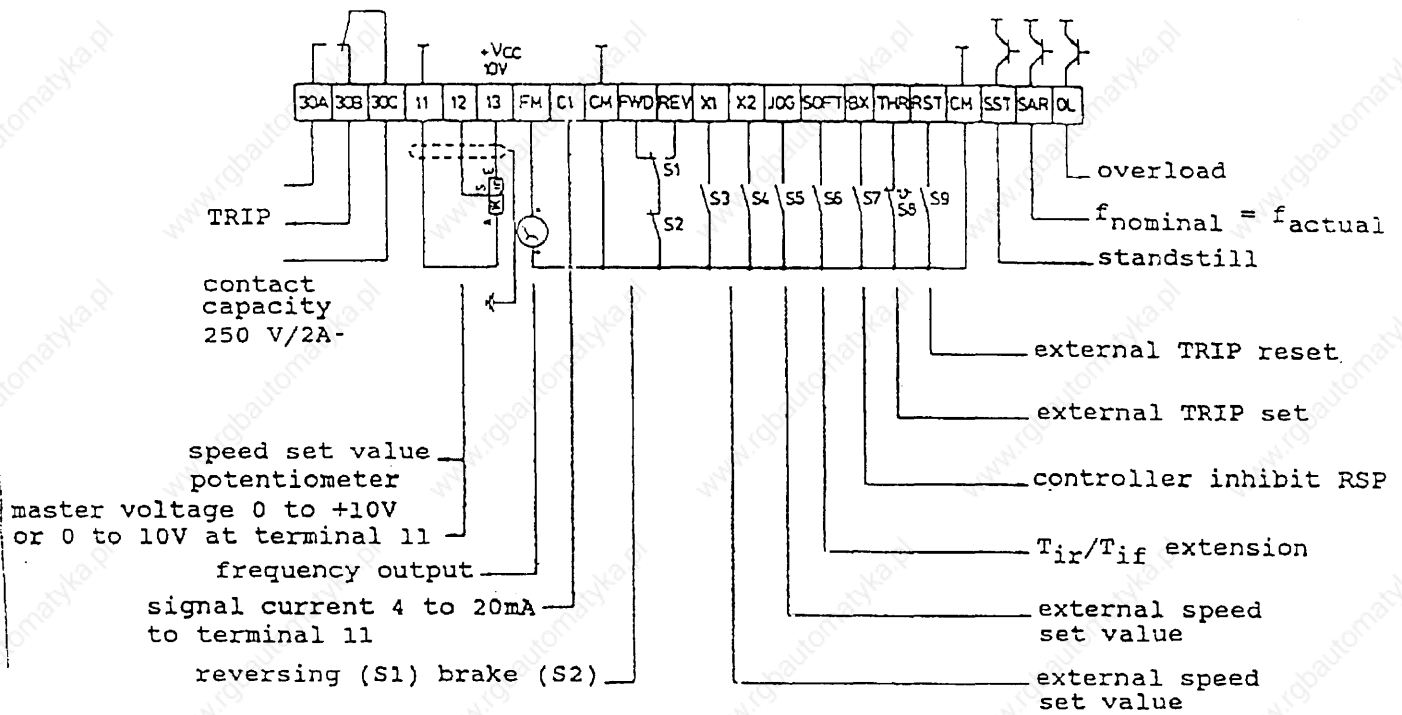
- Sinusoidal pulse width modulation
- Isolated control inputs
- Control either externally or via keyboard
- Power outputs are short- and earth-circuit protected
- Set-value integrator with separately programmable acceleration and deceleration ramp
- U/f control
- Fault indication system including TRIP indication
- Integrated braking chopper
- Reversing
- Preselection of 4 fixed speeds
- Option boards can be retrofitted

2. Specifications

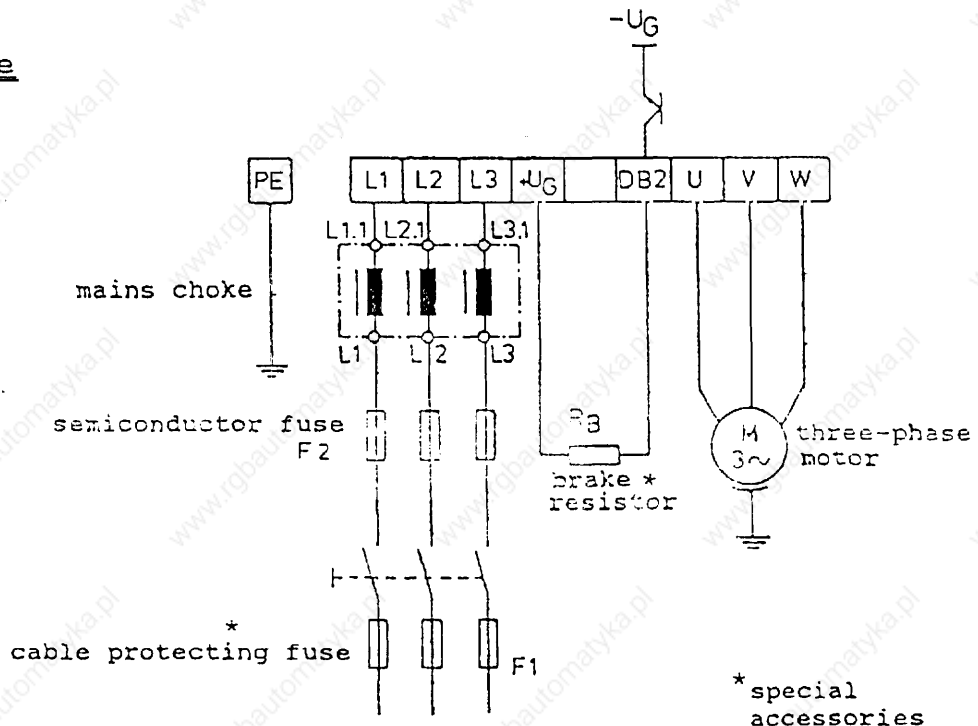
Type	Output power	Output voltage	Mains voltage 50-60 Hz	Mains current at nom. power	Nomin. motor power	Power loss at I_N $f=50\text{Hz}$	Nomin. current	Maximum current	Output frequency	maximum master voltage/ master current	Ambient temperature	Dimensions H x L x D Weight
	S_{el}/kVA	$U_{\text{phase}}/\text{V}$	$U_{\text{mains}}/\text{V}$	$I/\text{A eff}$	P_N/kW	P_V/W	I_N/A	I_{max}/A	f/Hz	U_{LN}/V	$T_U/^\circ\text{C}$	mm
7811	3.3	0 .. U_{mains}	3x340 505V +0%	4	2.0	100	5	7.5	0.5 ... 360Hz	0..+/-10V 4 ..20 mA	0 ... 40°C	430x240x235 9 kg
7812	5.6			7.5	3.7	180	8.5	13				430x240x235 10 kg
7813	8			10.5	5.5	270	12	18				430x240x235 10.5 kg
7814	12			16.5	7.5	360	18	27				430x240x235 11 kg
7815	15			21.5	11	510	23	35	480x280x235 16 kg			
7816	19			27.5	14	640	29	44	480x280x235 18.5 kg			
7817	24			35	17	760	37	55	565x280x235 20.5 kg			
7818	28			41	20	860	43	64	565x280x235 21.5 kg			

3. Connecting diagram

Control stage



Power stage



4. Installation instructions

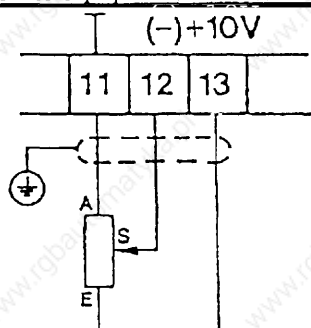
The controller should be fitted vertically with the terminals located at the bottom. Ensure that there is a free space of $\pm 100\text{mm}$ at the top and bottom, and 50 mm at the sides in order to maintain the flow of air through the heat sink and controller. The maximum ambient temperature must not exceed 40°C .

In case of an earth circuit fault, the mains choke limits the current rise and improves the mains current factor. The 7800 inverter series must only be operated with specified mains choke and semi-conductor fuses (see point 10./11.).

5. Connecting instructions

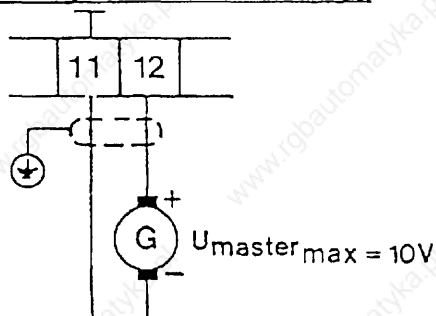
5.1 External set-value

5.1.1 Using potentiometer

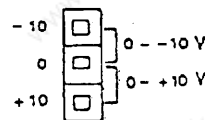


- Connect the enclosed potentiometer $1\text{ k}\Omega$ linear (part no.: 304 651) to terminals 11, 12, 13, ensuring that the wiper of the potentiometer is connected to 12.

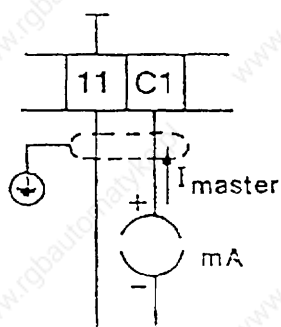
5.1.2 Using master voltage



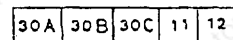
- Connect the external master voltage source to terminals 11 and 12.
 $U_{\text{master max}} = 10\text{ V}$
- For a master voltage of 0 to -10V the wire link must be connected as shown in the figure.



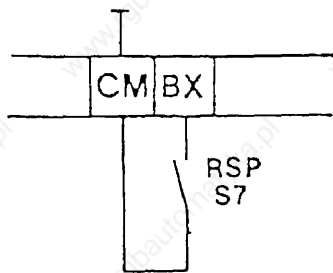
5.1.3 Using current loop control



- Connect the external current source between terminals 11 and C1.
 $I_{\text{master}} = 4 \div 20\text{mA}$
- For giving speed control from a 0 to 20mA current signal, ensure that a $511\ \Omega$ resistor (part no. 325 902) is connected between terminals 11 and 12.



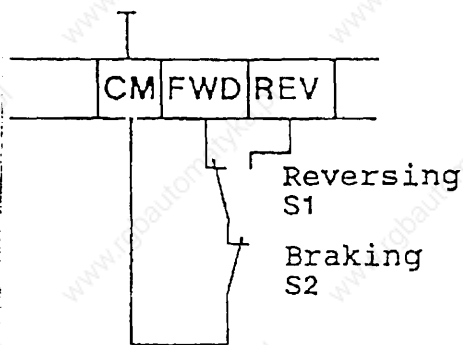
5.2 Controller inhibit



- The controller is inhibited when the RSP switch is closed.
- The controller is released when the RSP switch is opened.

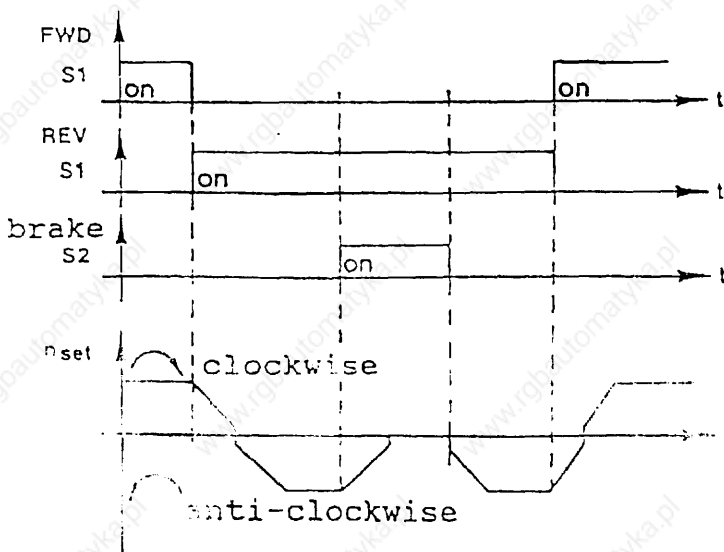
Use low-current contacts (12V/10mA)

5.3 Reversing and braking



- Clockwise rotation occurs with switch S1 in FWD position, assuming correct phase connection of the motor
- Anti-clockwise rotation occurs with switch S1 in REV position assuming correct phase connection of the motor
- Braking occurs when switch S2 is opened

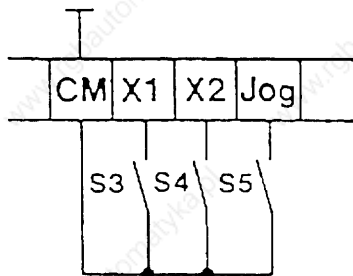
Use low-current contacts (12V/10mA)



During reversal, the drive is slowed down according to the deceleration ramp, reverses at $n_{set} = 0,5\text{Hz}$ and then accelerates to the speed set-value along the acceleration ramp.

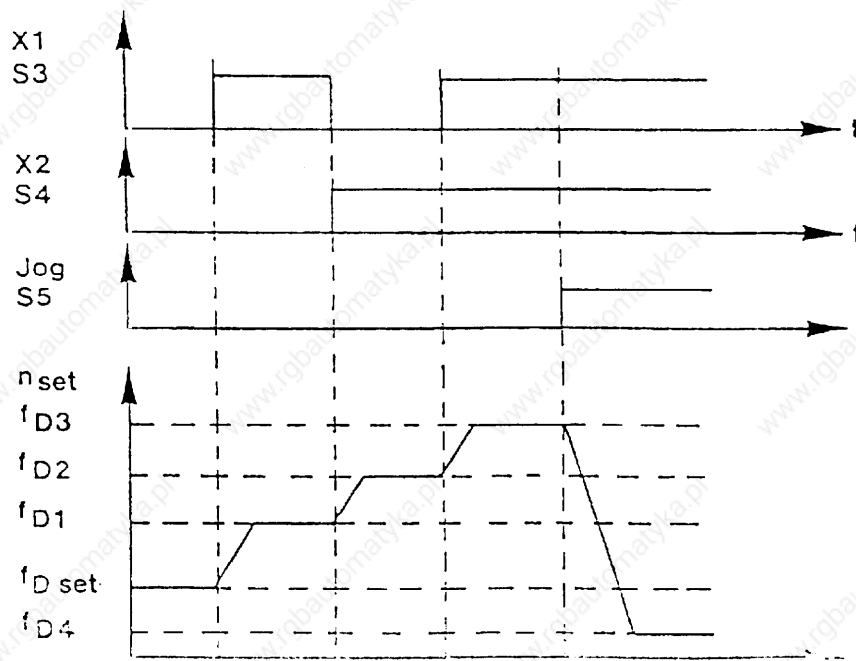
When the switch S2 is opened, the drive is slowed down to standstill according to the value set on the deceleration ramp.

5.4 Selection of fixed rotational field frequencies

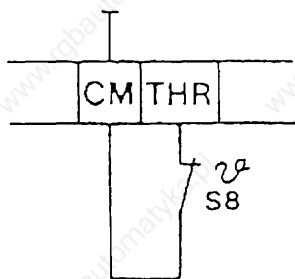


Use low current
contacts (12V/10mA)

- If all 3 switches are opened, the drive is operated by the set-value potentiometer, master voltage, master current or the internal setting.
- If either X1 or X2 or both terminals are connected to CM, a constant programmable field frequency is generated.
- In addition to this, if the terminal marked "JOG", is connected to CM, a fourth programmed frequency is generated, taking precedence over all other preset frequencies. Four different fixed speeds can therefore be selected via simple switching action.



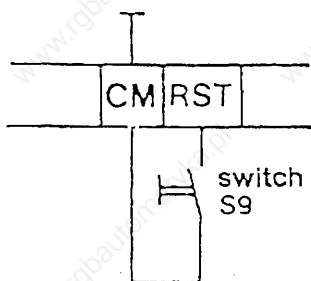
5.5 External temperature switch



Use low-current contacts (12V/10mA)

- Temperature switches can be connected to the terminal marked THR, in order to supervise the motor temperature or monitor the temperature of the external braking chopper resistors. As soon as the contact is opened, the inverter switches to show a fault condition. (This function is self holding). The display shows code OL1.

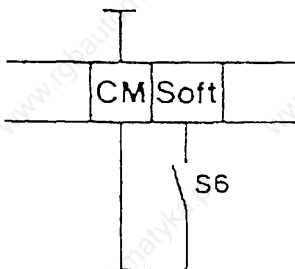
5.6 External TRIP reset



Use low-current contacts (12V/10mA)

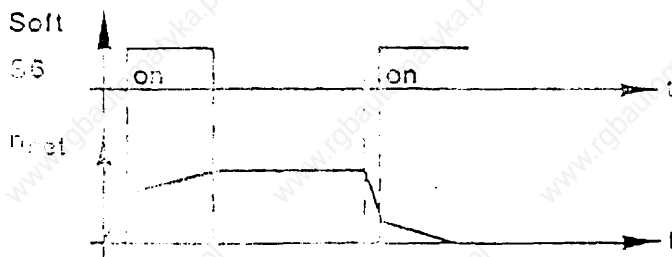
- RST can be used to provide an external TRIP reset.

5.7 Switching of the acceleration and deceleration ramp

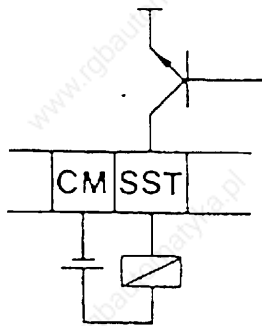


Use low-current contacts (12V/10mA)

- Using the terminal marked "Soft" a second common acceleration and deceleration time can be used.

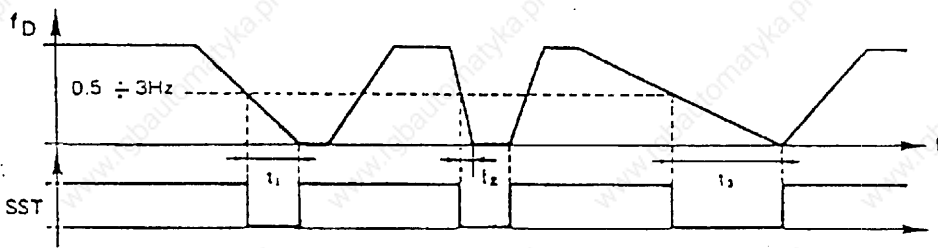


5.8 Standstill indication



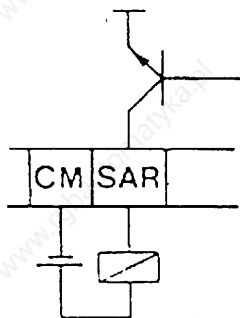
- The open collector transistor used for the standstill indication function opens, when, during the deceleration phase, the pre-programmed frequency is reached. The transistor remains open, until the frequency $f = 0\text{Hz}$ is attained. The minimum switch-on time of the transistor is 100ms.

$I_{\text{max}} = 50\text{mA}$
 $U_{\text{max}} = 27\text{V}$



$t_1 = 100\text{ms}$ $t_2 < 100\text{ms}$ $t_3 > 100\text{ms}$

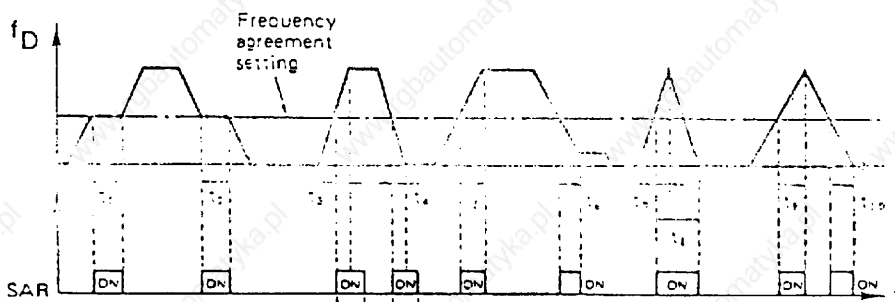
5.9 "Identical frequency" indication



- The Open-Collector transistor for the "frequency identical" indication switches, when a programmed frequency of the acceleration and deceleration phase is reached. The transistor is enabled, until the rotational field frequency is identical with the compared frequency or the acceleration/deceleration phase is not yet finished. The minimum switching time of the transistor is 100ms. (The signal can be used e.g. for switching of the acceleration/deceleration ramp).

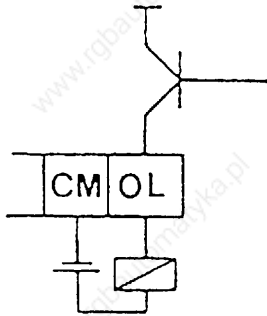
$I_{\text{max}} = 50\text{mA}$
 $U_{\text{max}} = 27\text{V}$

Compared frequency



$t_1, t_2 \geq 100\text{msec}$ $t_3, t_4 \leq 100\text{msec}$ $t_5, t_6 \geq 100\text{msec}$ $t_7 < 100\text{msec}$ $t_8, t_{10} \geq 100\text{msec}$
 $t_9 \geq 100\text{msec}$

5.10 Overload indication

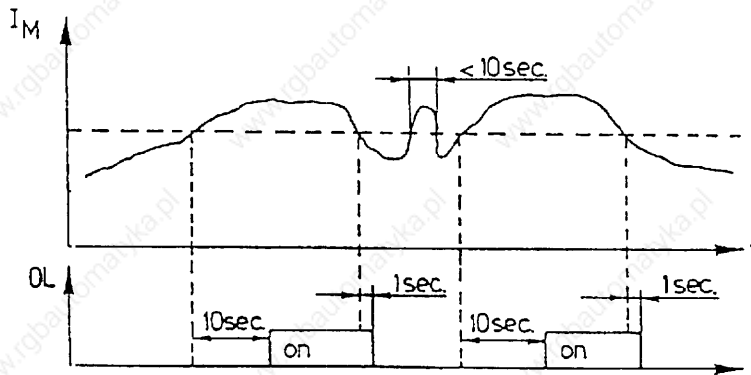


- The open collector transistor used for the overload indication is enabled in case of an overload which is longer than 10 sec, and remains in this state as long as there is an overload. It is disabled one second after the unload.

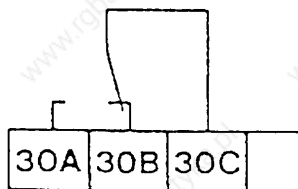
The threshold of the overload indication can be changed by subsequent programming of the device.

$$I_{\max} = 50\text{mA}$$

$$U_{\max} = 27\text{V}$$



5.11 TRIP relay

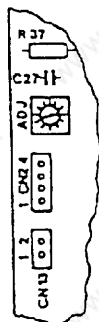
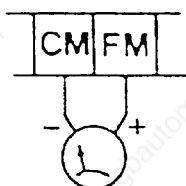


- If the inverter switches to show a fault condition, the TRIP relay is activated. The contact switches from 30B to 30A.

Contact capacity
250V/2A-

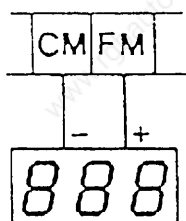
5.12 Frequency output

a) Analogue



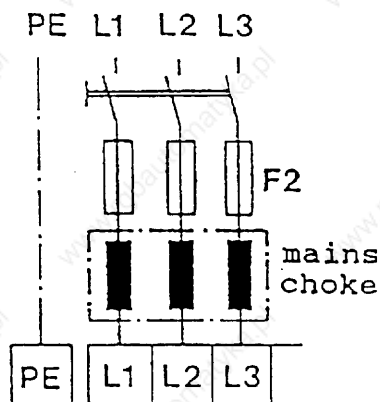
- An analogue measuring instrument can be connected ($R_i \geq 10k\Omega$) which is used to monitor:
 - 0 - 10V for 0 ÷ 60Hz
 - or 0 - 10V for 0 ÷ 120Hz
 Adjustment using trimmer ADJ
- A suitable measuring instrument is a VSC analogue meter, part no. 326 893

b) Digital



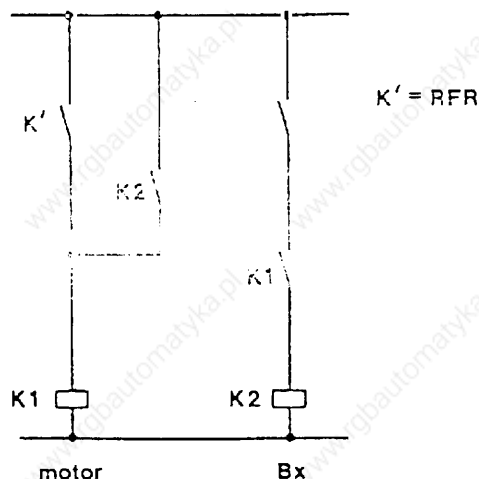
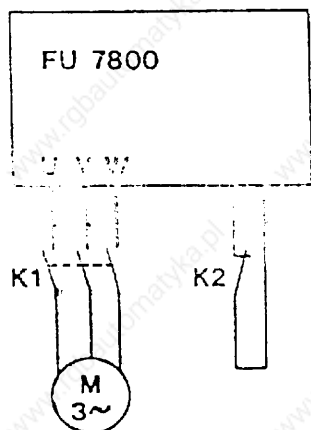
- A digital display device can also be connected giving:
 - $f_{FM} = 24xf_D$ at $f_{D_{MAX}} = 50\text{Hz}$ or 60Hz
 - $f_{FM} = 12xf_D$ at $f_{D_{MAX}} = 100\text{Hz}$ or 120Hz
 - $f_{FM} = 6xf_D$ at $f_{D_{MAX}} = 200\text{Hz}$ or 240Hz
 Such a suitable digital meter would be a 322 unit, part no. 326 884

5.13 Mains connection

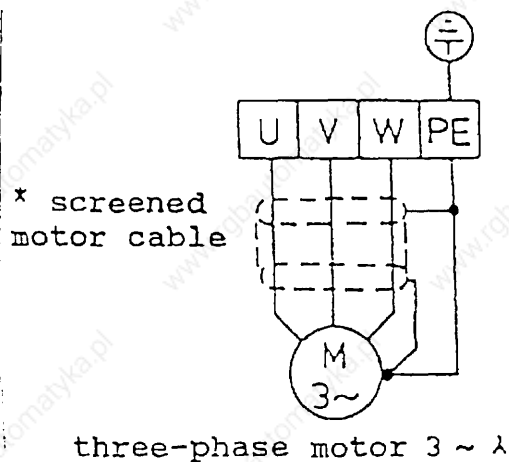


- L1, L2, L3 three-phases 340 to 505V ± 0%.
- Semiconductor fuses and mains chokes are specified in the tables on pages 30/31.
- On-off mains switching should be limited to once in every 3 minutes.

If the motor must be released within periods of less than 3 minutes (e.g. jogging), the following circuit must be used.



5.14 Motor connection



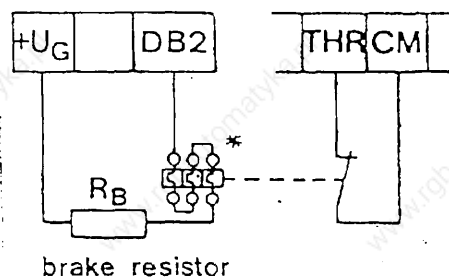
- The nominal motor voltage is normally selected such that it corresponds to the available nominal mains voltage

e.g. 380V motor at 380V mains
460V motor at 460V mains

- If the nominal mains voltage exceeds the nominal motor voltage, the inverter's output characteristic can be programmed as described under function code 10.
- Switching of the phases is only permissible with the circuit as described under point 5.13.

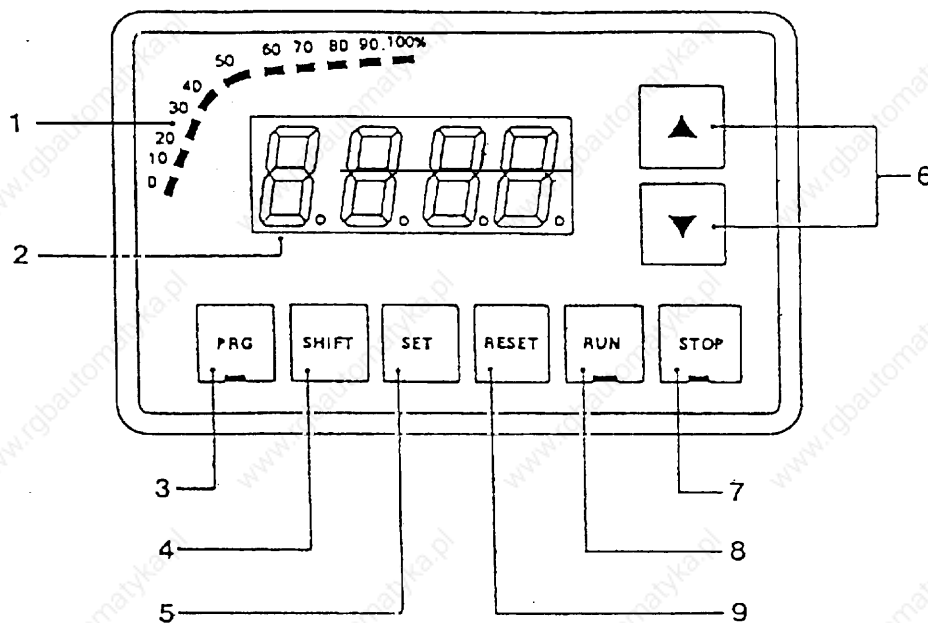
(*) Valid for industrial plants and factories which must have levels of radio interference suppression in compliance with VDE 0871. If necessary, please consult the supplier.

5.15 Connection of braking resistor(s)



- Application: Short braking times with large masses.
- The energy produced in the "generator mode" is fed into the DC link circuit of the inverter and results in an increase of the DC link voltage and current, when operating without a braking chopper. The inverter sets TRIP. Fault indication: OC 2 or OU.
- Using a braking resistor or activating the internal braking chopper (see function code 23) causes the excessive energy to be dissipated as heat.
- The specified brake resistors are listed in the table on page 31.
- * For setting of the release current see table on page 31).

6. Display and operating unit



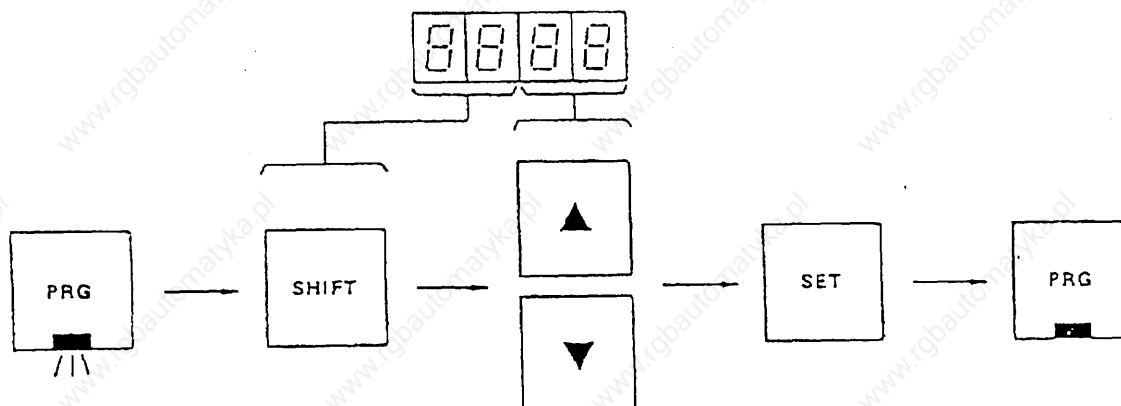
1. Output frequency in percent (related to the maximum frequency).
2. 7-segment display for output frequency/current for normal operation, or alternatively, for the input parameters during programming.
3. Selection key for operating mode or program mode. (S2=0)
4. Switching key for motor current display or motor frequency during normal operation or key for selection of each function code during programming mode.
5. Key for storing new parameters in the program mode and also for storing the rotational field frequency, when set-value is entered via the keyboard.
6. Keys for parameter setting when in the program mode, or for frequency setting when the set frequency is entered via the keyboard.
7. For stopping the motor with internal control.
8. For starting the motor with internal control.
9. Key for TRIP reset.

7. Modification of the factory-set parameters

7.1 Keyboard operation

In order to change the parameters, open the switch S2 (which activates braking) so that the display is flashing. By pressing the "PRG" key, the inverter is switched to the program mode. The function code is displayed in the two left segments. By pressing the "SHIFT" key the desired function code can be selected. After this, the data code can be chosen using the keys marked "▲" and "▼". If this value is the desired new parameter, press the "SET" key.

If you want to change other parameters, select the next function code using the "SHIFT" key. If all parameters are modified as desired, the inverter is switched to the normal operating mode by pressing again the "PRG" key. After re-closing the switch S2, the inverter operates with the new set parameters.



7.2 Function code

Function		Function code	Data code	factory-set code value		see page
Display after switching on	Hz	00	00	00	Hz	15
	Amp		01			
3 fixed pre-selectable frequencies (S3/S4)	Freq.1	01	input in Hz	10	10Hz	15
	Freq.2	02		20	20Hz	
	Freq.3	03		30	30Hz	
superimposed fixed freq.		04	input in Hz	5	5Hz	15
first acceleration time		05		15	7.5s	16
first deceleration time		06		16	10s	
second common acceleration and deceleration time (S6)		07		18	20s	
electronic motor protection		08		01	100%	17
U _{min} increase		09		06	medium	18
U/f characteristic (U/f edge point + f _{Dmax})		10		00	0-50Hz	19
chopper frequency		11		05	medium	19
f _{max} limit with offset		12		00	50 Hz	20
f _{min} increase with offset		13		00	0 Hz	20
f _{min} (bias)		14		00	0 Hz	21
Maximum frequency limitation		15	00 limitation at 150 Hz 01 without limit	00	150 Hz	21
3 frequency values to be excluded during acceleration and deceleration in order to avoid resonances		16	input in Hz	00	with-out	22
		17		00		
		18		00		
external U _{min} control automatic U/F	U _{min} control	19	00	00	external U _{min} control	22/23
	automatic U/F		01			
	automatic U _{min}		02			
internal U _{min} control			03			
overcurrent warning		20		01	110%	23
frequency marker		21	input in Hz	50	50 Hz	24
inverter signal at f _{min}		22		00	0.5 Hz	24
idling at < 2 Hz			00			
brake chopper operation		23	01	02	DC braking	24
DC braking at f < 2 Hz			02			
starting current limit		24		01	141%	25
Int./Ext. set-value	external		01	01	external	26
	internal	25	00			
U/f edge point at characteristic 18		26	input in Hz	50	50 Hz	26
optional functions		27		00		26
automatic TRIP reset after mains undervoltage		28		00		27

7.3 Description of the function code

Function code 00

The display can be programmed after mains switch-on mains using this function code.

Data code

- 00: Display of the rotational field frequency
- 01: Display of the motor current (R.M.S.).

By pressing the SHIFT-key, either frequency or current display can be selected during operation.

Function code 01, 02, 03

The inverter is set to one of the three programmable rotational field frequencies, by closing the switches S3 and/or S4. As soon as S3 and/or S4 are closed, any other set-value setting is made inactive.

S3	S4	frequency setting [Hz] using function code	factory setting
closed	open	01	10 Hz
open	closed	02	20 Hz
closed	closed	03	30 Hz

Function code 04

The inverter is set to a fourth, programmed rotational field frequency by closing switch S5. As soon as S5 is closed, any other set-value setting, as well as switches S3 and S4 are inactive. The frequency is set in Hz. (Factory setting is 5 Hz).

Note:

At maximum frequencies higher than 50 or 60Hz, the rotational field frequencies which are set using function codes 01, 02, 03 and 04 are multiplied according to the maximum frequencies.

For example:

- Maximum frequency: 150Hz
- (Function code 10 data code 04)
- Programmed fixed frequency: 20Hz
- (Function code 01, 02, 03 or 04: data code 20)
- Actual fixed frequency: 60Hz

Function code 05, 06 and 07

The first acceleration and deceleration time, as well as the second common acceleration and deceleration time are coded according to the following table:

Data code	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
f _{Dmax} = 50 Hz	0.05	0.07	0.10	0.13	0.19	0.27	0.38	0.50	0.71	1.0	1.4	1.9	2.7	3.8	5.4	7.5
f _{Dmax} = 60 Hz	0.06	0.08	0.12	0.16	0.23	0.32	0.45	0.60	0.85	1.2	1.7	2.3	3.2	4.5	6.5	9.0

Data code	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
f _{Dmax} = 50 Hz	10	14	20	28	38	54	75	104	146	204	283	396	550	771	1083	1500
f _{Dmax} = 60 Hz	12	17	24	33	45	65	90	125	175	245	340	475	660	925	1300	1800

If the switch S6 is opened, the first acceleration and deceleration times apply. If S6 is then closed, the second common acceleration and deceleration time becomes effective.

At maximum frequencies higher than 50 or 60 Hz, the acceleration and deceleration times listed above and the programmable fixed frequencies are multiplied.

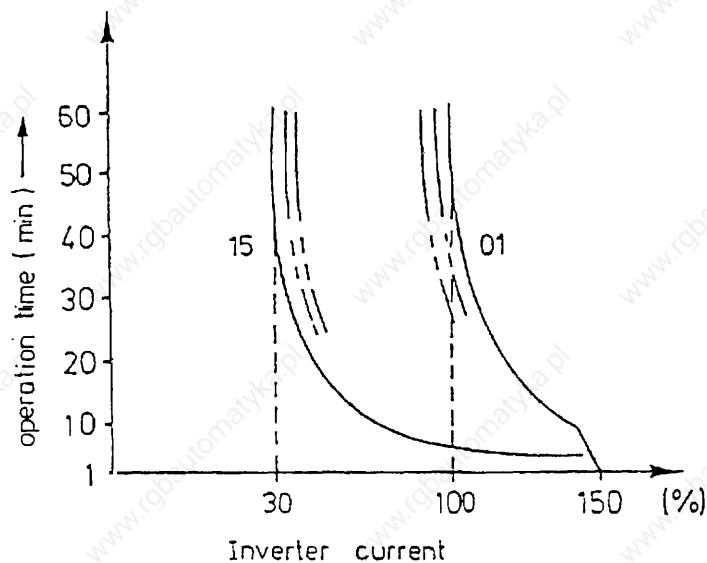
Factory setting:

- first acceleration time 7.5s
- first deceleration time 10s
- second common time 20s

Function code 08

When using this function code a built-in electronic motor protective function can be adapted to smaller motors, which are not dimensioned for the inverter size. The protective function is only valid for four-pole motors and cannot be used for group drives. The data code to be set can be found in the following table.

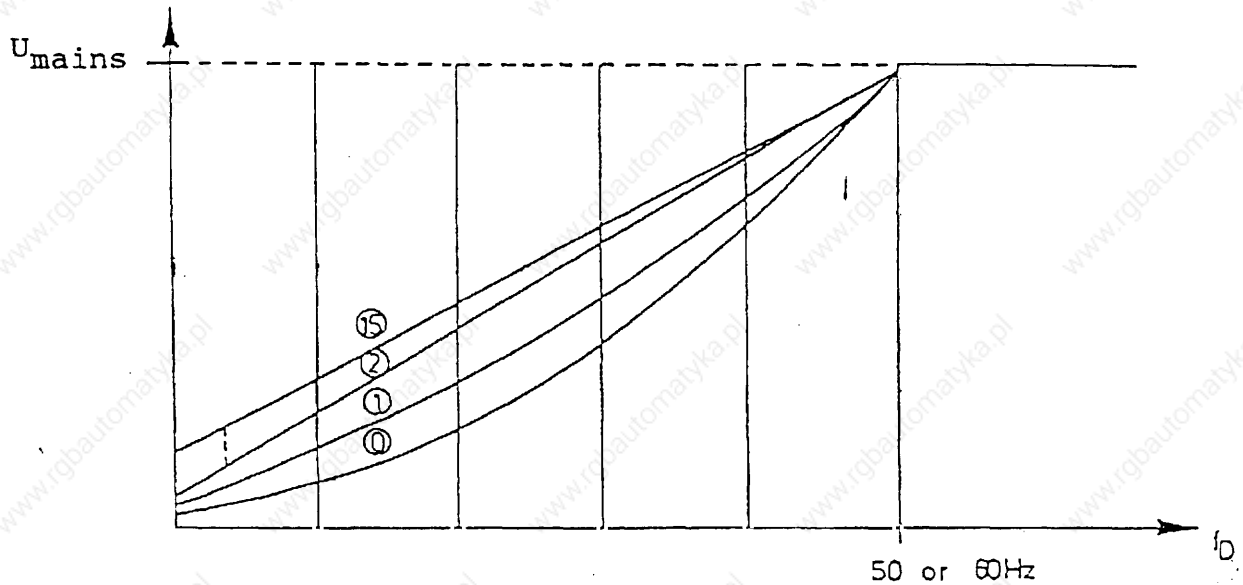
Data code	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Motor/ Inverter current	not active	100	95	90	85	80	75	70	65	60	55	50	45	40	35	30



The protective function considers the reduced motor cooling at lower frequencies (speeds). The characteristic shows the operation at nominal frequency. Lower frequencies result in shorter switch-off times. When the protective function is released, OL2 appears as the fault condition.

Function code 09

At voltage-frequency (U/f) edge points of 50 Hz or 60 Hz, 16 different U_{\min} characteristics can be entered. Using characteristics 0 and 1 the motor is underexcited, whilst characteristics 2 through to 15 allow for a voltage increase in the lower speed range with linear voltage-frequency increase.

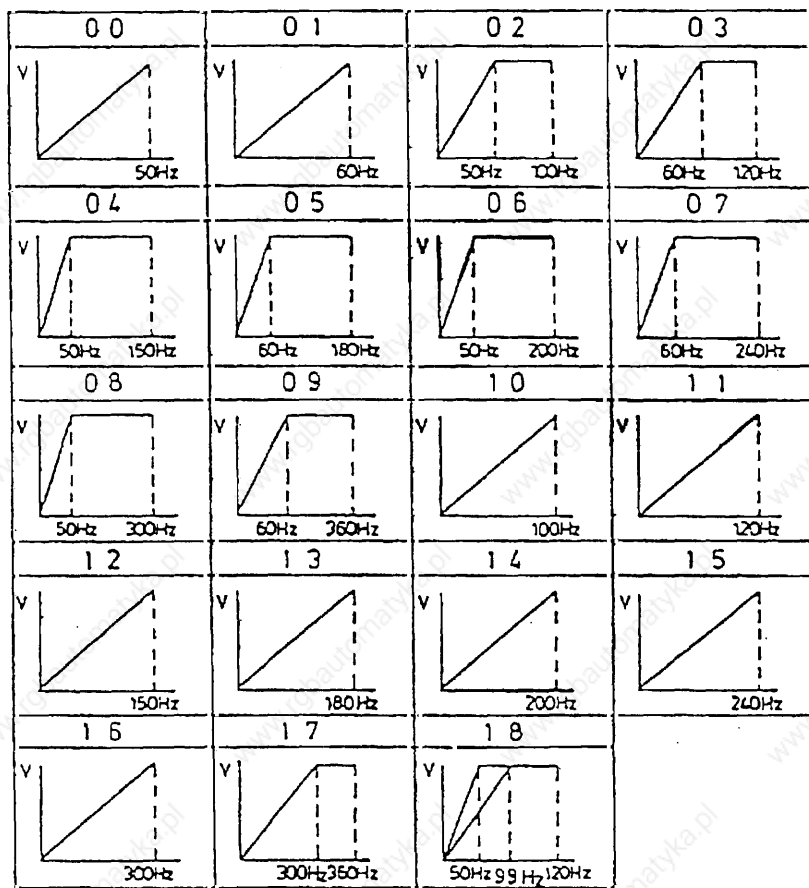


If the U/f edge point is higher than 60 Hz, an underexcitement of the motor is no longer possible. Then, all characteristics (0 to 15) have a linear voltage-frequency increase.

- 00: minimum U_{\min} increase
- 06: normal U_{\min} increase
- 15: maximum U_{\min} increase

Function code 10

The following U/f characteristics can be programmed:

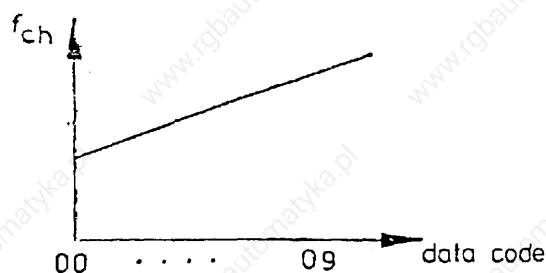


If the maximum frequency of the chosen characteristic is a multiple of 50 Hz or 60 Hz, the acceleration and deceleration times as well as the fixed frequencies of function code 01, 02, 03, 04 and the "SAR" output signal, are multiplied accordingly.

The U/f edge point can be freely selected between 50 Hz and 99 Hz using function code 26, when choosing the last characteristic via data code 18.

Function code 11

The chopper frequency can be set to 10 different values in order to avoid machine resonances.



factory setting
data code 5

Function codes 12, 13

Using function code 12 the upper field frequency can be limited to 62.5 % of the maximum field frequency set via function code 10. When the set-value is adjusted using a potentiometer, the upper range is not effective due to this programmed "null" range.

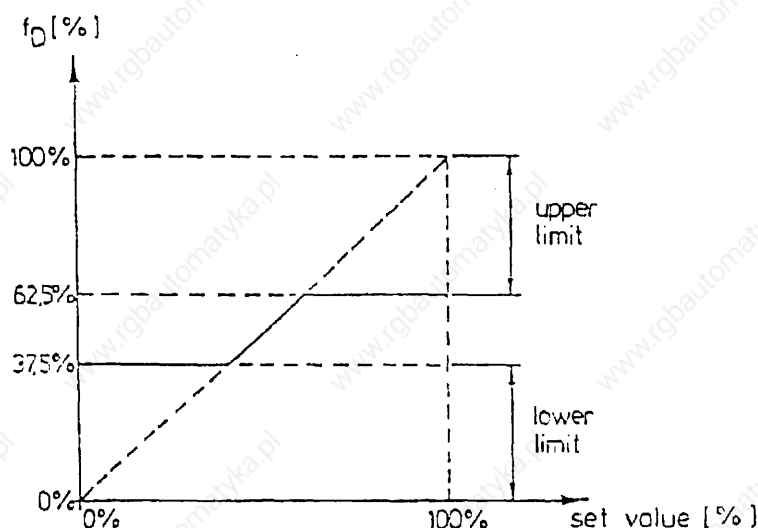
Function code 12

Data code	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Limitation in %	100	97.5	95	92.5	90	87.5	85	82.5	80	77.5	75	72.5	70	67.5	65	62.5

Using function code 13 the lower field frequency can be limited to 37.5 % of the maximum field frequency set via function code 10. When the set-value is adjusted using a potentiometer, the lower range is not effective due to this programmed "null" range.

Function code 13

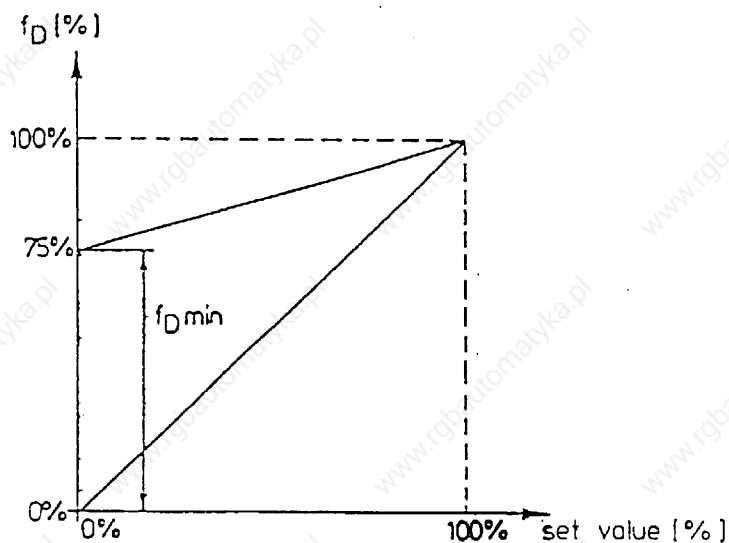
Data code	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Limitation in %	0	2.5	5	7.5	10	12.5	15	17.5	20	22.5	25	27.5	30	32.5	35	37.5



Function code 14

Using the function code 14 a minimum speed of 0% to 75% of the maximum frequency which is set via function code 10, can be programmed at the inverter. This programming does not result in an ineffective range of the set-value potentiometer, but only in a higher resolution of speed adjustment.

Data code	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
f_{Dmin} in %	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75

Function code 15

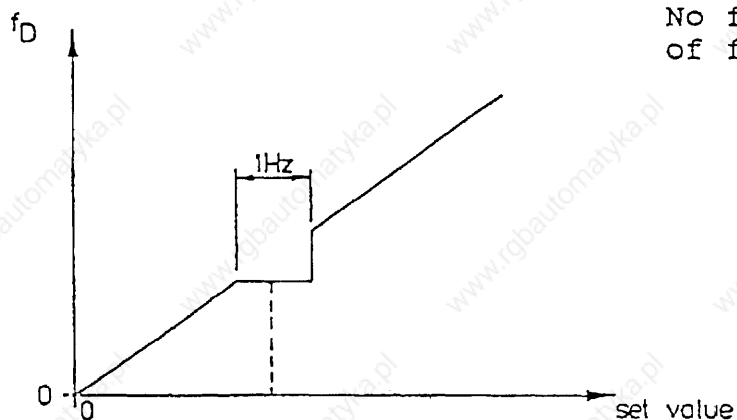
The function code 15 allows for an output frequency limitation at 150 Hz in order to protect the motor and machine.

Data code 00 : frequency limitation at 150 Hz

Data code 01 : no frequency limitation

Function codes 16, 17, 18

In order to avoid machine resonances during acceleration and deceleration, due to the output frequency, 3 frequency notches of 1 Hz each can be programmed in. The parameter variables are in Hz.



No factory setting
of frequency notches

Function code 19

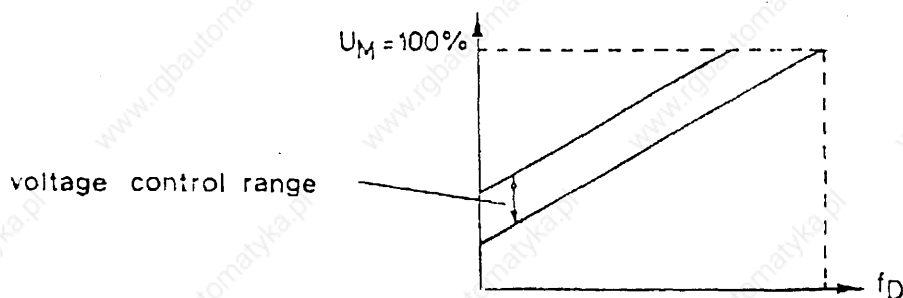
The control mode and the motor voltage control can be set using function code 19, via keyboard or terminals. (Factory setting 00).

- Data code 00

The functions are controlled via the terminal block connections; the "RUN" and "Stop" keys on the keyboard are not effective. The motor voltage depends on the rotational field frequency as set via function codes 09 and 10.

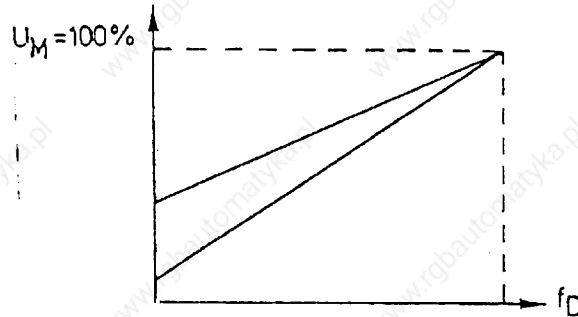
- Data code 01

The functions are also controlled via the terminal block connections; the "RUN" and "Stop" keys are not effective. The motor voltage is set depending on the rotational field frequency and the necessary torque.



- Data code 02

The functions are also controlled via the terminal block; the "RUN" and "Stop" keys are not effective. The motor voltage is set automatically in the stationary operation. During acceleration and deceleration a motor voltage of the data code 8 and function code 9 is set.



- Data code 03

The functions "RUN" and "Stop" are controlled via the keyboard. The terminals X1, X2, "Jog" and "Soft" do not have any function.

The motor voltage is set automatically depending on the rotational field frequency as described under data code 00.

Function code 20

The opto-coupler output "OL" can be activated in case of overload using function code 20. The threshold current can be set according to the following table.

Data code	00	01	02	03	04	05
Inverter output current (%)	non active	110	120	130	140	150

Function code 21

This function allows for a comparison between the momentary rotational field frequency and a programmed frequency. If the two frequencies are identical, the output "SAR" is activated for at least 100 msec. The compared frequency is set in Hz. (Factory setting is 50 Hz).

Function code 22

The opto-coupler output "SST" is activated if the rotational field frequency during the deceleration phase is smaller than or equal to the programmed frequency (0 to 3 Hz). The output is active for at least 100 msec. The compared frequency is set according to the following table.

Data code	00	01	02	03	04	05
Inverter output - frequency [Hz]	0.5	1.0	1.5	2.0	2.5	3.0

Function code 23

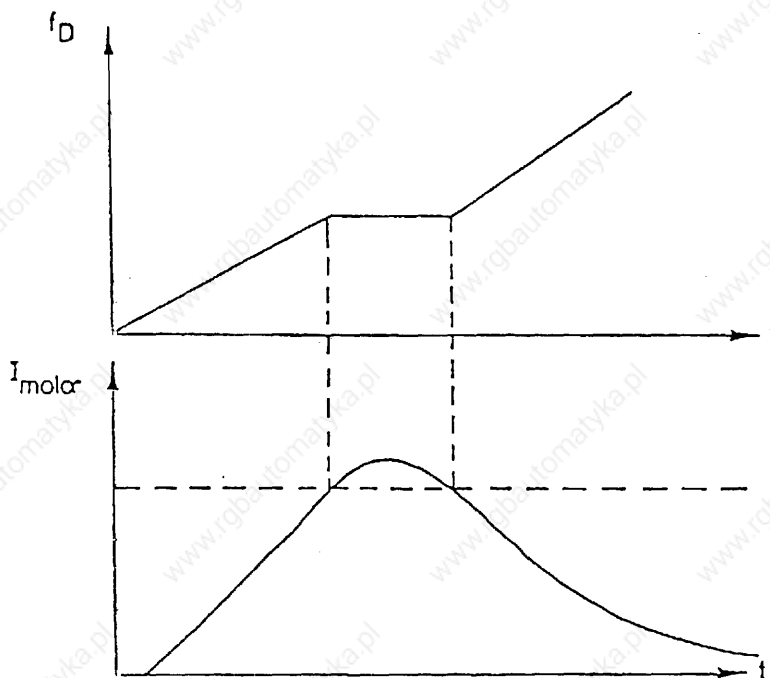
Function code 23 determines the motor's mode of operation in the deceleration phase.

Data code

- 00 : If the rotational field frequency has reduced to < 2 Hz, the motor idles.
- 01 : This data code must be selected, if the inverter is to be operated with the braking chopper.
- 02 : If the rotational field frequency has reduced to < 2Hz, the motor is braked down to standstill with DC injection current.

Function code 24

This function allows for limiting the motor current in the starting phase. If the motor current is higher than the preset maximum current, the inverter output frequency is held constant until the current demand of the motor is smaller than the inverter's preset maximum current value. At this point, the acceleration phase is once again resumed.



The data code for the maximum inverter output current, which must not be exceeded during the starting phase, can be calculated as follows:

$$\text{starting current (\%)} = \frac{\text{maximum inverter output current A}}{\text{nominal inverter current A}} \times 100 \%$$

The coded input of the starting current is achieved according to the following table:

Data code	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Starting current (%)	not active	141	135	127	120	112	105	97	90	82	75	67	60	52	45	37

Function code 25

Using the function code 25 the type of set-value setting to be used, is determined.

Data code

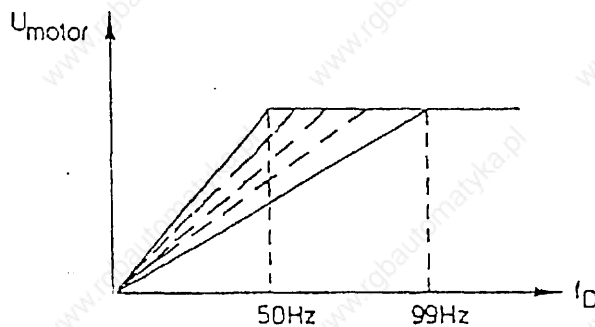
00 : Frequency setting via the keyboard "▽△"

01 : External frequency setting:

- 1.) using set-value potentiometer
- 2.) using master-voltage value 0 to 10 V /DC
- 3.) using master-current value 4 to 20 mA /DC

Function code 26

If the characteristic 18 has been selected using function code 10, the U/f edge point can be set between 50 Hz and 99 Hz using this function code.



Factory setting = 50Hz

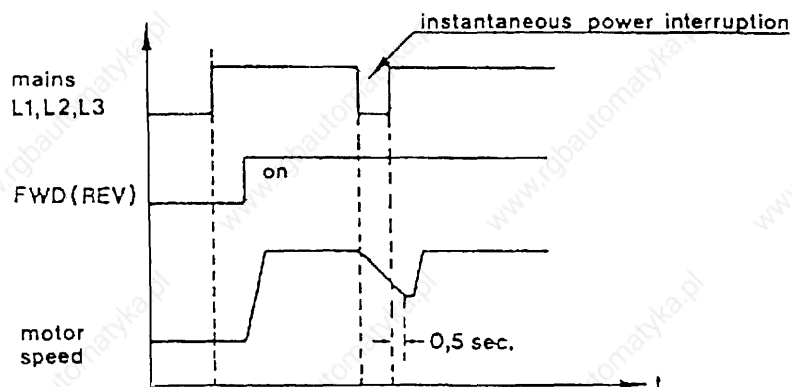
The values are set in Hz.

Function code 27

The function code 27 is provided for using a second, external display (option 7804). If this second display is not used, select data code 00. (2nd display = data code 02).

Function code 28

The function code 28 allows for an automatic connection of the inverter after a short-time mains failure.



The frequency inverter adapts its rotational field frequency to the speed of the idling motor and then connects the motor after subsequent reconnection of the mains. The drive then accelerates to its set-value, following the set acceleration ramp.

Data code:

00

: Function inactive

04

: Function active

8. Fault diagnosis

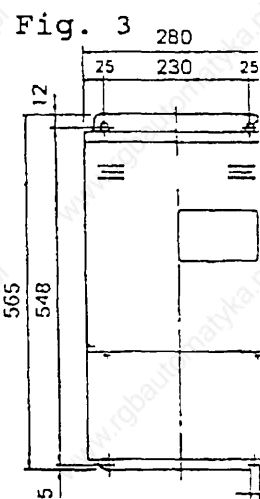
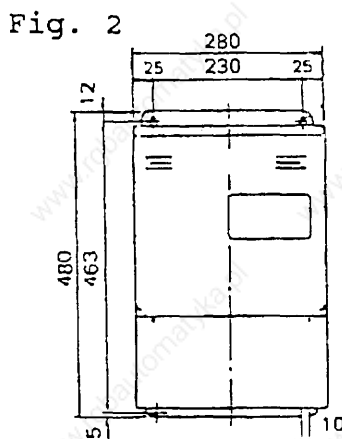
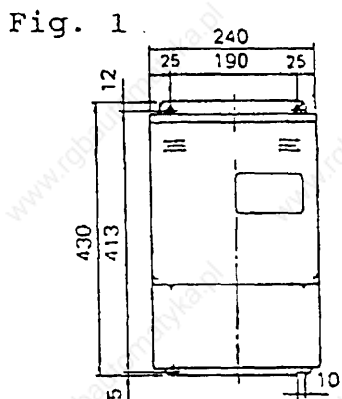
If the inverter sets TRIP, the type of fault is displayed. The coding is given in the following table.

Display	Type of fault
Err 1	Operating fault
Err 3	Controller failure
OC 1	Overcurrent during acceleration
OC 2	Overcurrent during deceleration
OC 3	Overcurrent at constant speed
OU	Overvoltage
LU	Undervoltage
OL 1	Inverter overtemperature "THR" or external temperature switch S8 (external TRIP release)
CL 2	Motor overload

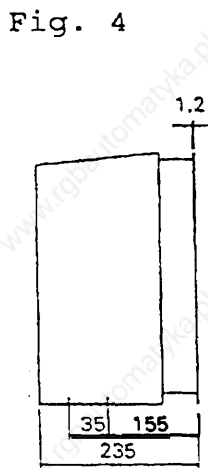
The displays OC1, OC2 and OC3 may also indicate a short-circuit or earth circuit of the motor terminals U, V, W.

9. Dimensions and weights

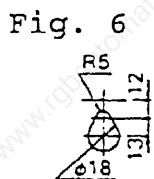
- Front view



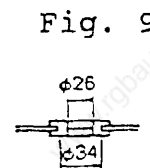
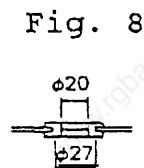
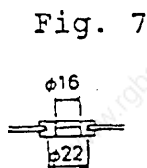
- Side view



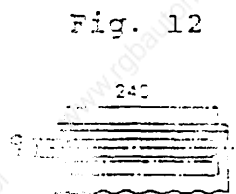
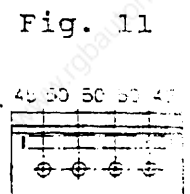
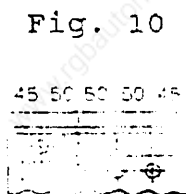
- fixing hole



cable holes



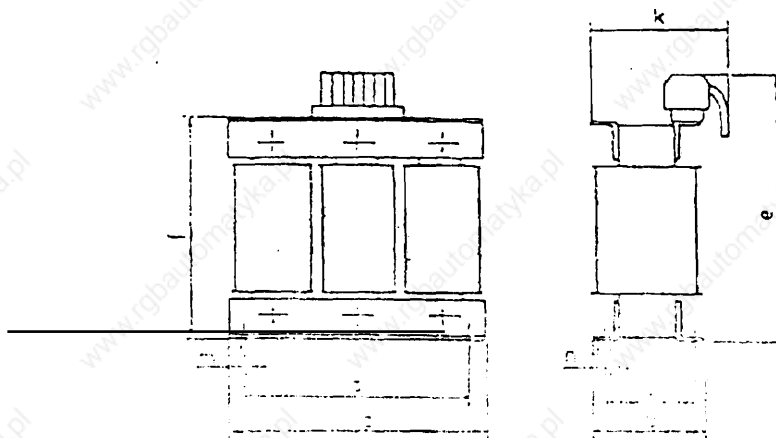
- lower panel



Type	Fig. No.	Weight (kg)
7811.	1,4,6,7,9	9
7812	1,4,6,7,10	10
7813	1,4,6,8,10	10,5
7814	1,4,6,8,10	11
7815	2,5,6,11	16
7816	2,5,6,11	18,5
7817	3,5,6,11	20,5
7818	3,5,6,11	21,5

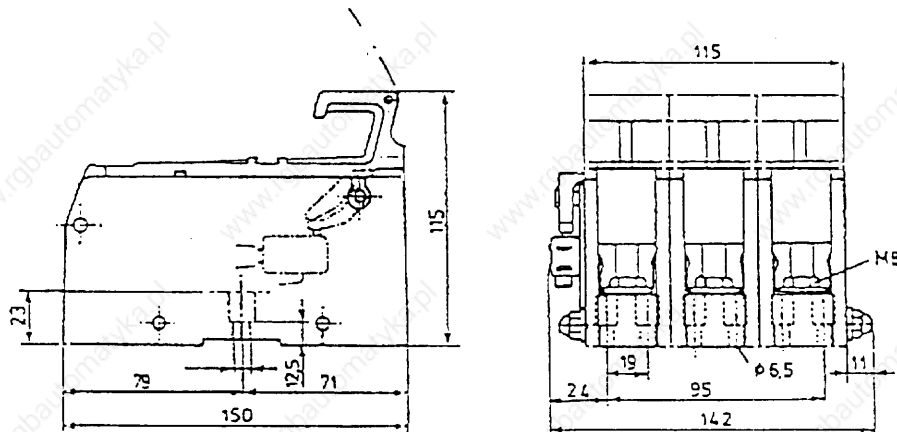
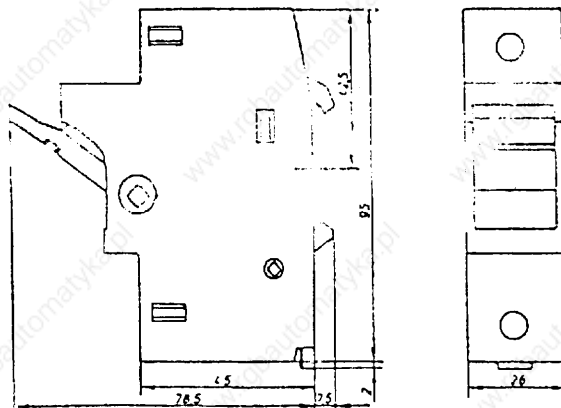
10. Mains chokes

Type	Choke		Part number	Dimensions									
	A	mH		a	b	c	d	e	f	k	m	n	
7811	3x 7	3x 2.5	322 293	SA	120	61	84	45	130	105	73	6.0	11
7812	3x 12	3x 1.6	325 294	SA	150	70	90	54	155	130	81	6.0	11
7813	3x 17	3x 1.2	322 149	SA	120	66	110	53	162	110	80	5.0	10
7814/7815	3x 25	3x 1.2	322 148	SA	150	75	140	60	180	135	95	5.0	11
7816	3x 35	3x 0.880	307 342	SA	180	90	163	74	225	167	120	6.3	11
7817/7818	3x 45	3x 0.750	307 343	SA	180	85	163	69	216	166	120	6.3	11



11. Semiconductor fuses and fuse holders

Type	Fuse holders		Fuses	
	Fig.	part no.	Type	Part no.
7811	2	332 721	FF 12A	307 960
7812	2	332 721	FF 20A	305 321
7813	2	332 721	FF 25A	307 959
7814	2	332 721	FF 32A	307 943
7815	2	332 721	FF 40A	305 240
7816	1	329 807	FF 50A	329 893
7817	1	329 807	FF 63A	329 894
7818	1	329 807	FF 80A	329 895

Fig. 1Fig. 2

12. Brake resistors

Inverter type/nominal power	resistor quantity/type	connection arrangement	total resistance Ω	total power	release current/motor protection relay
7811/2kW	2 x R1	in series	200	200W	0.8A
7812/3.7kW	1 x R2	-	100	250W	1.0A
7813/5.5kW	4 x R1	2 in R.2x in parallel	100	400W	1.5A
7814/7.5kW	1 x R3	-	68	1kW	3.5A
7815/11 kW	1 x R3	-	68	1kW	3.5A
7816/14 kW	2 x R3	in parallel	34	2kW	7.0A
7817/17 kW	2 x R3	in parallel	34	2kW	7.0A
7818/20 kW	2 x R3	in parallel	34	2kW	7.0A

R1:	ZWS 100 W , 100 $\Omega \pm 10\%$	part no. 309 163	Fig.1
R2:	ZWS 250 W , 100 $\Omega \pm 10\%$	part no. 309 164	Fig.2
R3:	RS0 50 x 373, 68 Ω , $\pm 5\%$, 1kW	part no. 333 113	Fig.3

Fig. 1

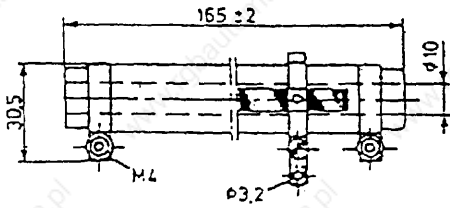


Fig. 2

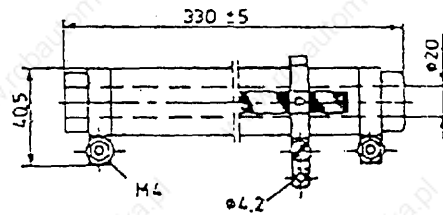
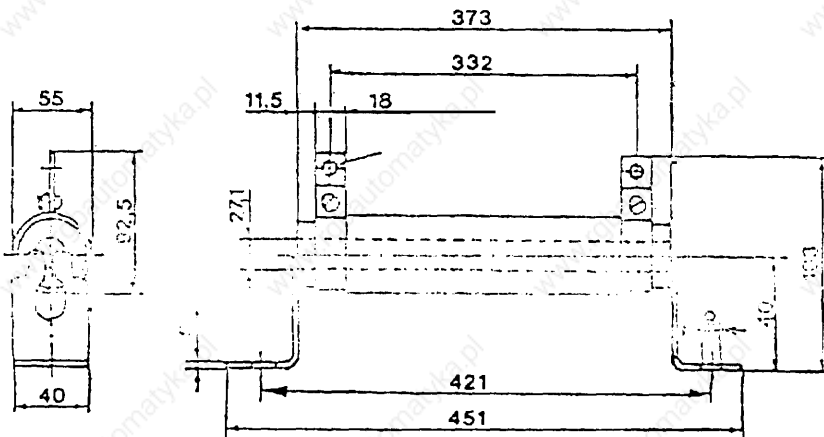


Fig. 3



Caution!

In case of mains overvoltage the braking chopper may be activated. When using resistors without overload protection the resistor(s) may burn-out. Therefore only resistors with integrated or external temperature surveillance devices must be installed. Since temperatures approaching 350°C may occur at the surfaces of the brake resistors, it is recommended that the resistors be additionally installed into a fireproof housing.

If the external brake resistor is connected according to the diagram on page 11, the TRIP indication "OL1" is displayed in case of overload. Since the interference may have been caused by mains overvoltage, the inverter must be disconnected from the mains within 20 seconds.

13. Radio interference suppression

It is permissible to use the controllers without radio interference suppression in electrical systems within connected operation rooms, commercial premises or industrial plants, provided that the limit values according to VDE 0871/6.78, class B are not exceeded. (See CISPR publications 11, CENELEC HD 344). The units should only be used in compliance with local regulations.

In order to improve the electromagnetic compatibility (EMC) of sensitive equipment, e.g. a PLC, the motor cables U, V, W and the control cables should be screened. Apply the screen to both ends. To ensure that the screening is effective it should not be opened or interrupted. It should also begin as close to the device as possible and be placed directly on the motor terminal board. The earth chassis connection requires special attention; it should have as low a resistance and as large a cross-section as possible.

14. Part numbers

Inverter	7811	7812	7813	7814
part no.	329 167	329 168	329 169	329 170

Inverter	7815	7816	7817	7818
part no.	329 171	329 172	329 173	329 174

15. Items supplied

- Chassis unit
- Technical description
- 10 kΩ value potentiometer 1 kΩ/1W.

Mains chokes, semiconductor fuses and fuse holders must be ordered separately.