Instruction Manual

Controller

Typ: SV1-2-10Z

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Dangers caused by Electric Power

Emergency !
In the case of danger caused by electric power, shut-down the machine immediately by means of the main switch!

Warning!
Damages on the machine may result therefrom.

Operate the controller only with faultless condition of the electrical equipment. When damages are recognized: Immediate shut-down of the controller, switch-off by means of the main switch and have it repaired! Put controller back to use only, if the faultless condition of the electrical equipment has been verified by an electrician.

In the case of disturbances in the electrical power supply, the controller must be switched off immediately!

Only use original fuses with the current intensity specified in the Technical data sheet!

Connecting cables and leads must be laid so that damages and dangers are excluded and impossible.

Work on the electrical equipment may only be carried out by electricians or instructed personnel under the supervision of electricians, according to the electrical-technical regulations in force.

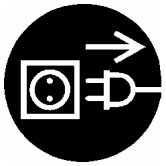
Safety-Technical Indications for the User

The following indications are for the purpose of personal safety of the operators, as well as for the safety of the described products and the connected devices.
Non-observance may result in death, serious injuries of the body or damage to property!

Warning!

Before opening the device

the mains plug must be disconnected.



- Before setting the device into operation the accordance of the mains voltage of the controller and the feeding device with the local mains voltage must be verified.
- Set and connect plugs, plug link, slide switch according to technical description!
- The set-up is to be carried out by technically qualified personnel!
- Only inductive loads may be connected to the controller!
- Check the electrical equipment of the controller at least once a week for visible damages and defaults on the outside!
- Detected defaults as well as changes in the operation behavior must be reported immediately to the person / dept. in charge. Immediate shut-down and securing of the controller, if required!

Check the electrical equipment of the controller regularly in accordance with the respective national regulations.

General Description of the Device

Power unit

The SV1-2-10Z is a control device for oscillation conveyor drives with electromagnets and works according to the principle of a frequency converter. This control is setting standards as regards feeding performances, operating comfort and energy savings.

In spite of its very compact construction design the control device SV1-2-10Z covers the performance range that is usual with vibration feeding devices. As standard finish the device is equipped with soft start and soft run-out, which can both be adapted at any time to the connected oscillation conveyor drive.
By means of the external, potential-free control input 10 - 30V AC or DC, the SV1-2-10Z can be enabled or disabled.
In applications with frequent switching functions (e.g. level control), the controller may be not constantly switched via the mains voltage! In this case the control input must be used, since otherwise the life span of the controller is limited!
All settings, like e.g. set-point input or frequency input are done by means of menue-assisted key inputs at the front plate.
A 16-digit LC-Display and a status LED inform at any time about the current state of the SV1-2-10Z.
The electronic current control prevents a possible overload of the control device and the conveyor system.
Within the indicated limit values there is no setting required for the mains voltage and mains frequency.

Power supply

The SV1-2-10Z disposes of a switch-controlled 24V DC power pack. It is used for the supply the internal time function elements, the connected proximity switches and the outputs (blast air, control output). The power pack is short circuit-proof and can supply current of max. 1,5A.

Time function elements

The integrated time function elements have an extensive logic (see page 10+11). A total of 8 times is available enabling the realisation of different functions. These times can be set from 0,0 to 25,0 seconds.

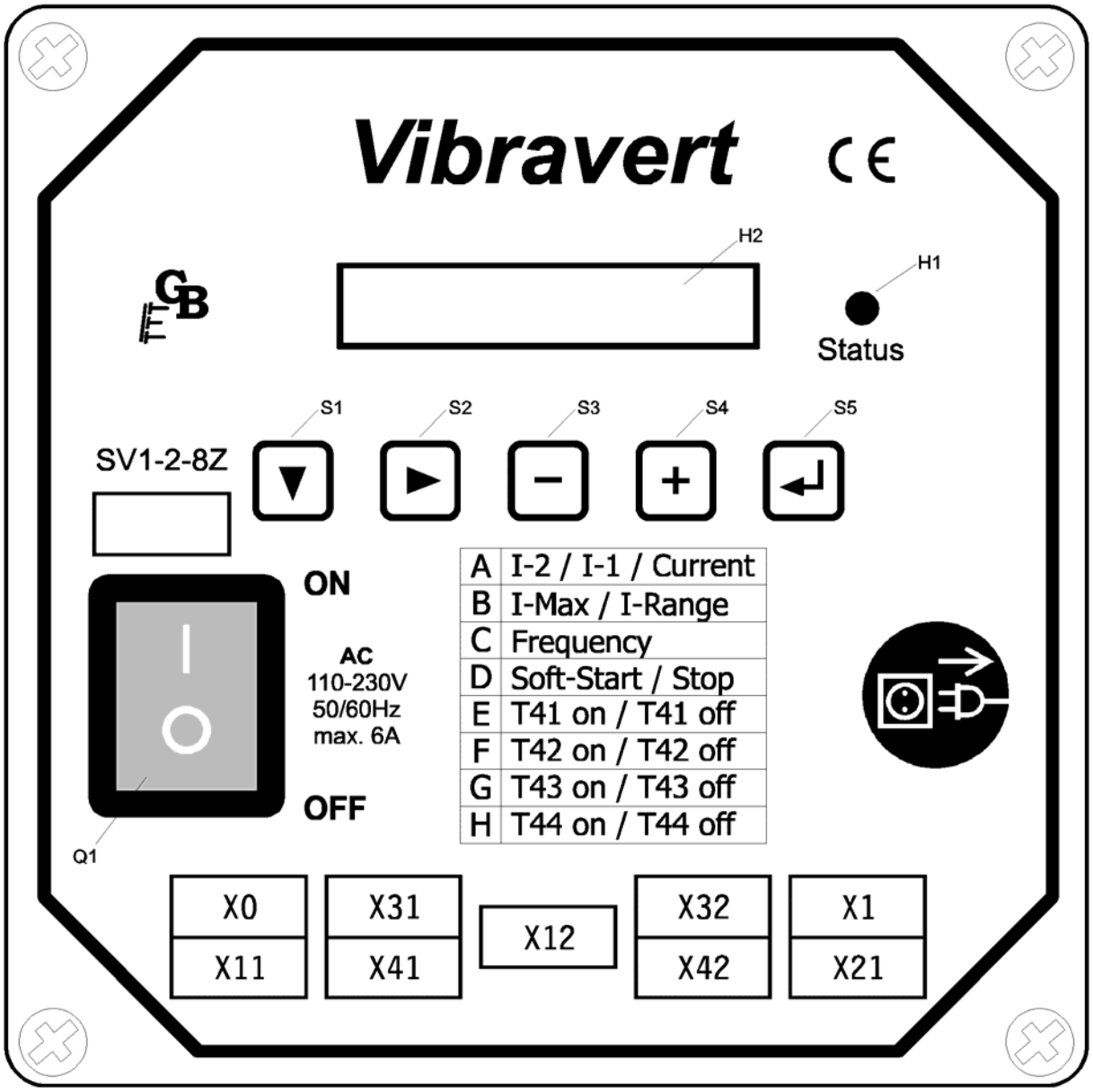
The SV1-2-10Z is compatible with control SV1-2-10Z. Furthermore, by means of an optional Input a 2-Sensor min/max level control is also possible.

By a second, adjustable, set-point value e.g. single counter operations can be dosed more exactly.

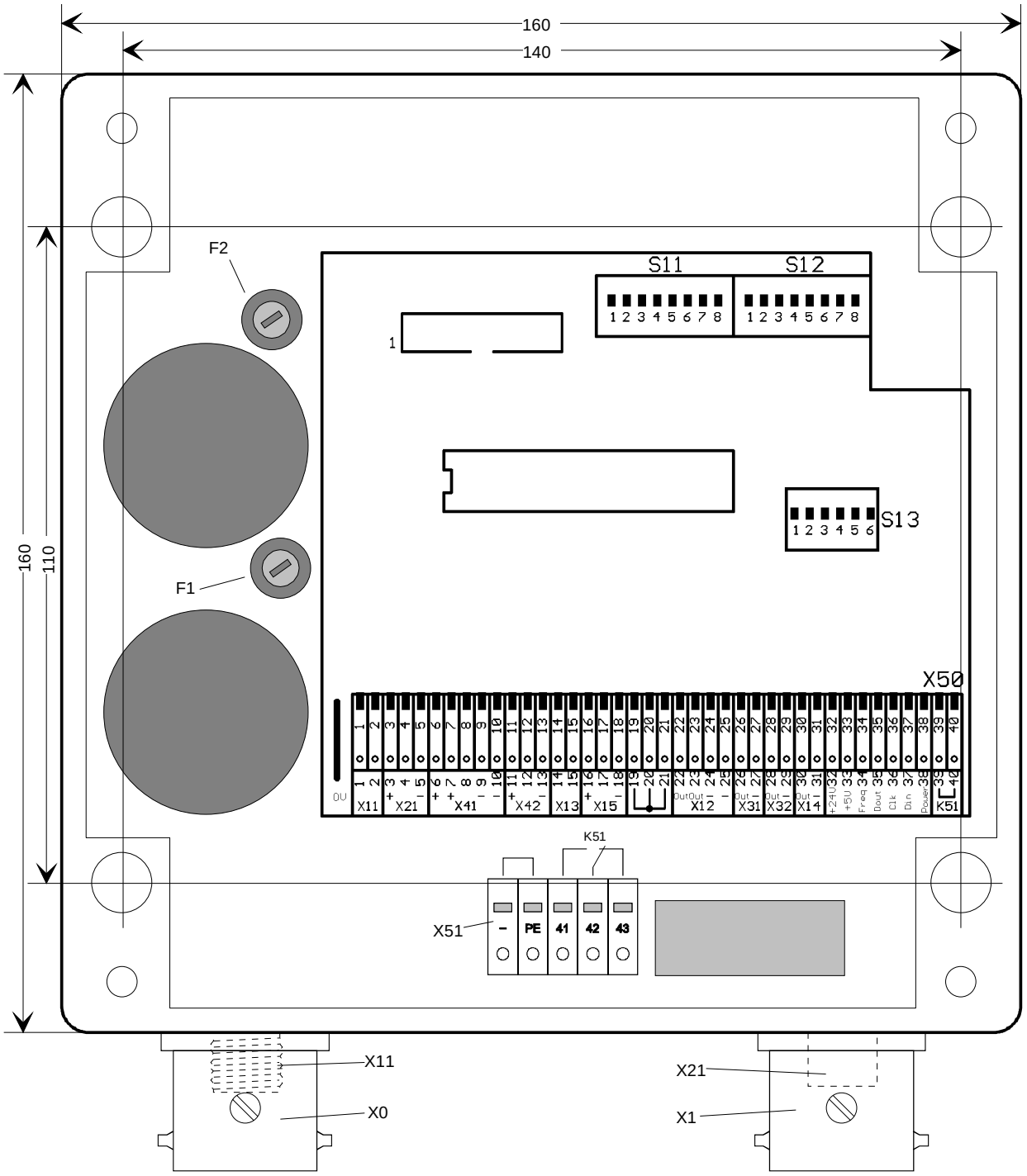
Technical Data

Mains voltage	110 - 230V AC +/-10%
Mains frequency	50 / 60Hz +/-1%
Output voltage	0 - 220V (at 230V mains voltage)
Output current per feeding device	max. 2,5 / 6,0A internal selectable. With heat sink max. 10,0A
Output frequency	10,0 - 150,0Hz (resolution 0,1Hz)
Load	max. 2200 VA. Only inductive loads are allowed to be connect!
Device fuse	6,3A melting fuse (5x20mm)
Control fuse	1A melting fuse
Electronic over-current disabling	At approx.. 3,5 / 14,0A
Control input	10 – 30V AC or DC (potential-free) Insulation Voltage Input/Output 0,5kV
Input for set-point selection	10 – 30V AC or DC (potential-free) Insulation Voltage Input/Output 0,5kV
Inputs for proxmity switches	4 inputs: 10-30V DC
Outputs	4 pnp-outputs: 24V DC, max. 0,5A 1 relay-output: 230V, max. 5A
Soft start	1,0 – 5,0 seconds
Soft run-out	0,2 – 5,0 seconds
Time function elements	4 time function elements with adjustable turn-on/turn-off delay (0,0 – 25,0 seconds)
Display	16 digit LCD and status-LED
Ambient temperature	0 – 40°C
Dimensions	Aluminum housing 160 x 160 x 90mm
Type of protection	IP54

Technical Data



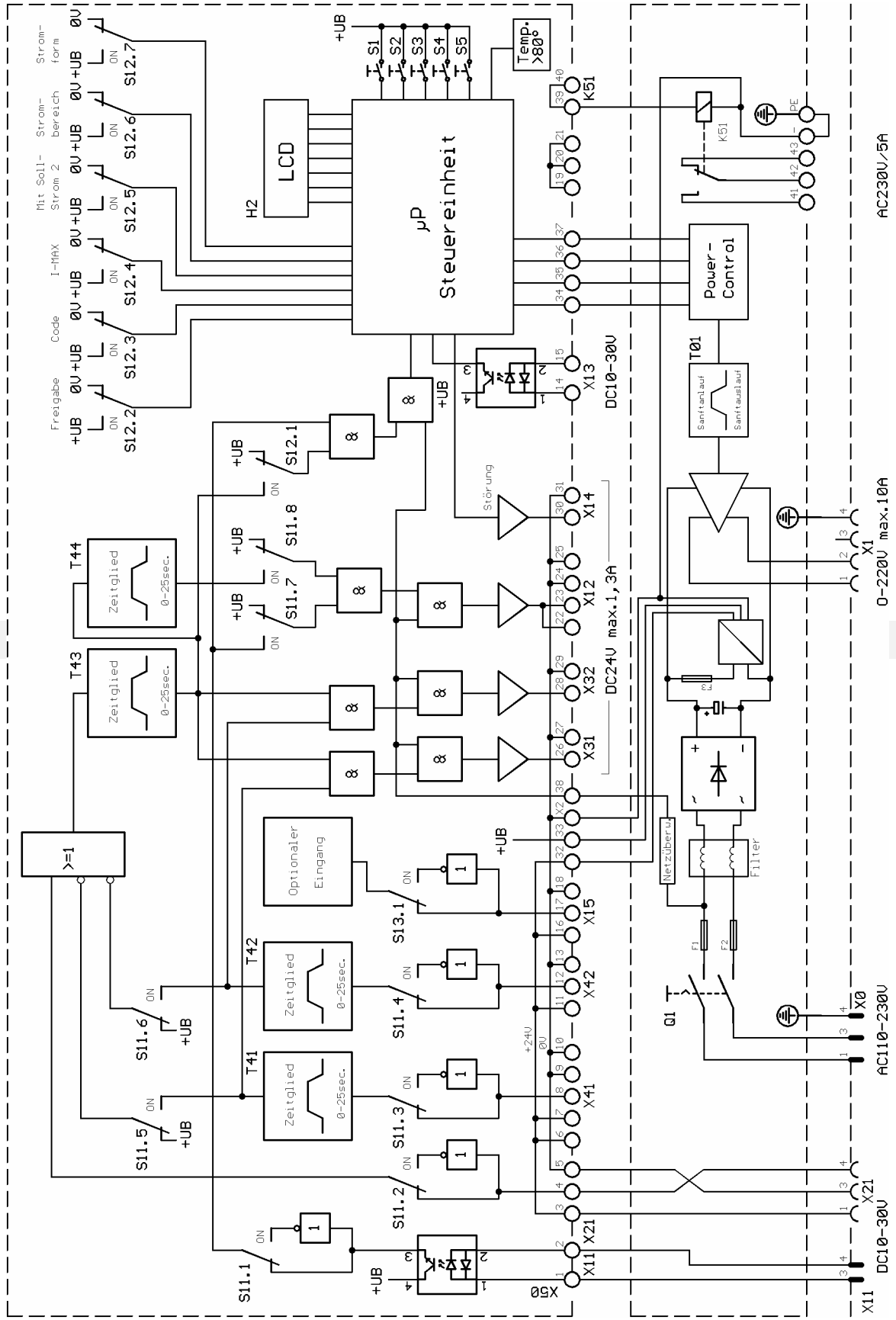
Technical Data



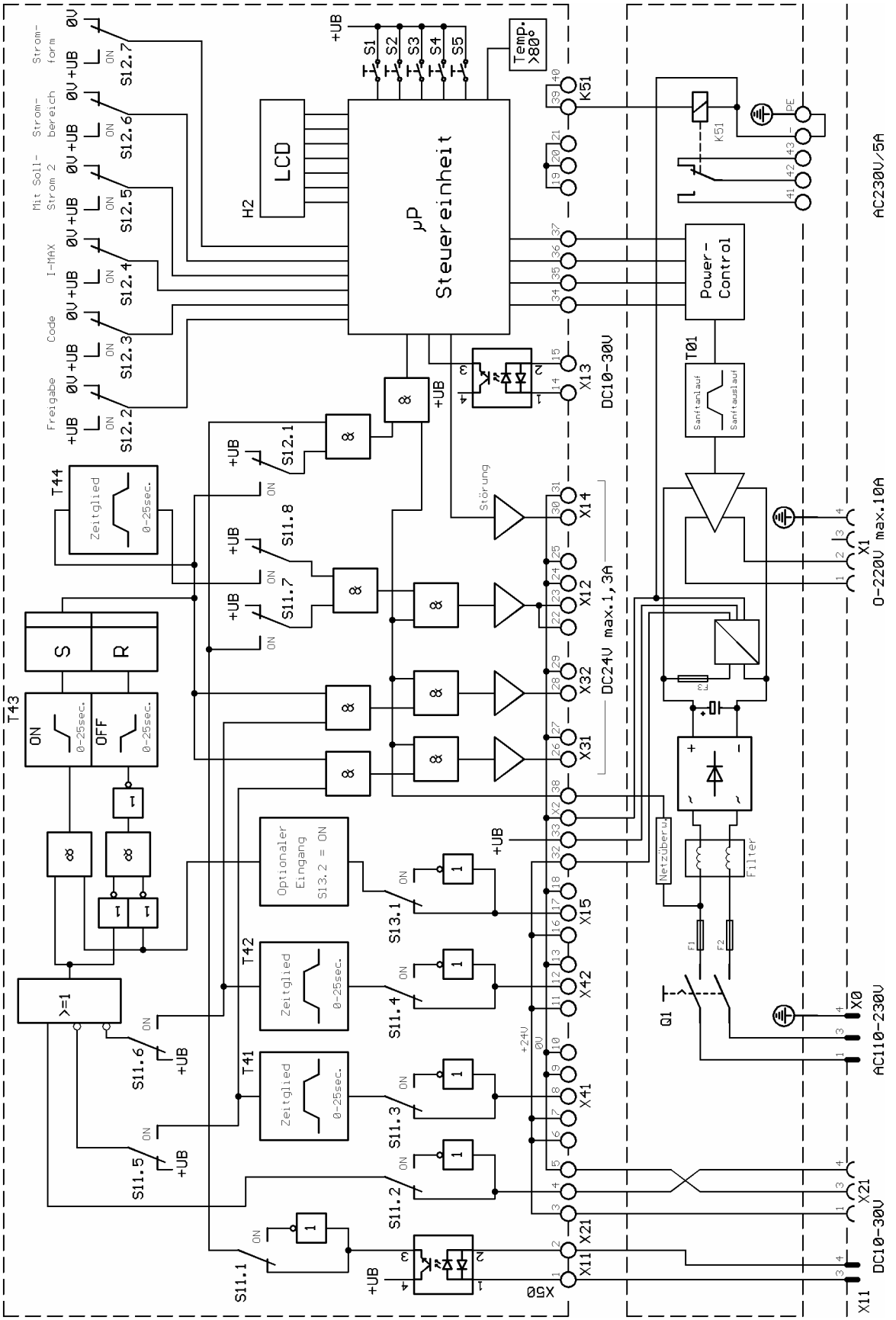
Technical Data

X0	Connection for mains voltage
X1	Connection for feeding device
X11	Connection for external control input
X12	Connection for control output
X13	Connection for set-point selection
X14	Connection for malfunction output
X15	Connection for optional input
X21	Connection for proximity switch
X31	Connector for blast air valve 1
X32	Connector for blast air valve 2
X41	Connection for proximity switch
X42	Connection for proximity switch
X50	Connection for inputs, outputs and time function elements
X51	Bridge -/PE, relay contacts K51
Q1	Main switch
H1	Status-LED
H2	LC-Display
S1	Key ‚Menue‘
S2	Key ‚Cursor‘
S3	Key ‚Minus‘
S4	Key ‚Plus‘
S5	Key ‚Enter‘
S11	DIP-switch for miscellaneous settings (page 15)
S12	DIP-switch for miscellaneous settings (page 15)
S13	DIP-switch for miscellaneous settings (page 15)
F1	Melting fuse 6,3A
F2	Melting fuse 6,3A
F3	Melting fuse 1A

Wiring Diagram



Wiring Diagram (Min/Max-Mode)



Technical Description

Pin assignment X0 (Voltage supply)

Pin 1: L1
Pin 2: free
Pin 3: N
Pin PE: PE

Pin assignment X1 (Feeding device)

Pin 1: output
Pin 2: output
Pin 3: free
Pin PE: PE

Pin assignment X11 (Control input)

Pin 1: free
Pin 2: free
Pin 3: 10-30V DC or AC
Pin 4: 10-30V DC or AC
As for the control input, the polarity of the voltage need not be taken into account.

X12 (Connection for control output)

X50 / Pin 23: output (Out)
X50 / Pin 25: -DC

X13 (Connection for set-point selection)

X50 / Pin 14: 10-30V DC oder AC
X50 / Pin 15: 10-30V DC oder AC
As for the set-point selection, the polarity of the voltage need not be taken into account.

X14 (Connection for malfunction output)

X50 / Pin 30: Output (Out)
X50 / Pin 31: - DC

X15 (Connection for optional input)

X50 / Pin 16: +24V DC
X50 / Pin 17: Signal
X50 / Pin 18: - DC

PIN assignment X21 (Proximity switch)

Pin 1: +24V DC
Pin 2: free
Pin 3: -DC
Pin 4: Signal

Technical Description

X31 (connector for blast air valve 1)

X50 / Pin 27: output (Out)
X50 / Pin 28: - DC

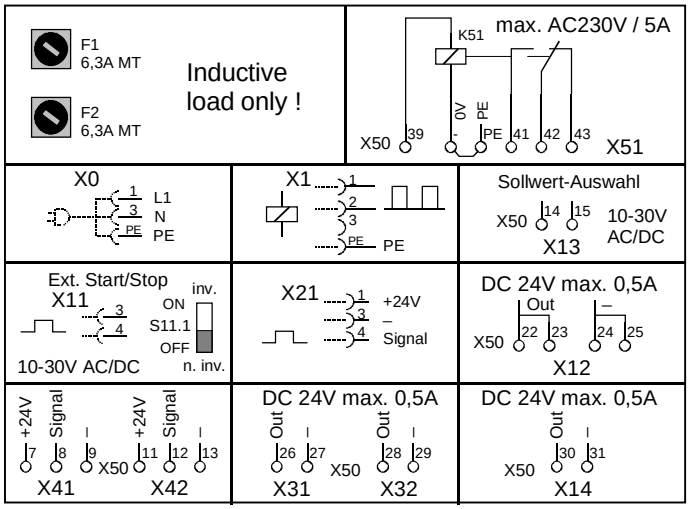
X32 (connector for blast air valve 2)

X50 / Pin 29: output (Out)
X50 / Pin 30: - DC

X41 (Proximity switch)

X50 / Pin 13: +24V DC
X50 / Pin 14: Signal
X50 / Pin 15: - DC

Adhesive label inside the controller



Technical Description

Soft start T01 ON

When switching the controller on by means of the mains voltage or by the control input or a time function element, the feeding device does not start feeding abruptly with the set performance; it is „accelerated“ by means of a time ramp. The length of the time ramp can be set in menue line “D” and is about approx. 5 seconds maximum.

Soft run-out T01 OFF

If the controller is disabled via the control input or time function element, the feeding device does not stop abruptly; it is „decelerated“ by means of a time ramp. The length of the time ramp can be set in menue line “D” and is about approx. 5 seconds maximum.

Time function elements T41-T45

The time function elements have a rise-delay time (ON) and a down-delay time (OFF). Die Times can be set in the menue lines “E” – “H”.

Status display H1

With the aid of the status-LED the current state of the SV1-2-10Z controller can be instantly recognised.

Status-LED	**State**
Green continuous light	Selection via control input available. Feeding device is ON
Green flashing light	No selection via control input. Feeding device is OFF
Red continuous light	Over-current has occurred → Display on Indicator , *!!! OVERLOAD !!!* ‘. **or** Over-temperature has occurred →Display on Indicator , *OVERTEMPERATURE!* ‘.
Green flashing light + red continuous light	The mains voltage supply has just been switched OFF → Display on Indicator , *POWER OFF !* ‘.
LED dark	No voltage supply.

Technical Description

DIP-switch S11

OFF	DIP-switch S11	ON
No inverting of control input X11	1	Inverting of control input X11
No inverting of input X21	2	Inverting of input X21
No inverting of input X41	3	Inverting of input X41
No inverting of input X42	4	Inverting of input X42
Without blast air 1 (X31)	5	With blast air 1 (X31)
Without blast air 2 (X32)	6	With blast air 2 (X32)
Control output X12 without control input X11	7	Control output X12 with control input X11
Control output X12 for following device without T44	8	Control output X12 for following device with T44

DIP-switch S12

OFF	DIP-switch S12	ON
Feeding device X1 without T43	1	Feeding device X1 with T43
Standard OFF	2	Change of access enable
Standard OFF	3	Change code
Standard OFF	4	Change I-MAX
Without Set-point value 2	5	With Set-point value 2
Current range 2,5A	6	Current range 10A
Current waveform ‚Trapez‘	7	Current waveform ‚Sinus‘
Always on OFF	8	---

DIP-switch S13

OFF	DIP-switch S13	ON
No inverting of input X15	1	Inverting of input X15
Standard mode	2	Min/Max mode
Reserve	3	Reserve
Reserve	4	Reserve
Reserve	5	Reserve
Reserve	6	Reserve

Delivery settings:

S11.1	S11.2	S11.3	S11.4	S11.5	S11.6	S11.7	S11.8
ON	ON	ON	ON	OFF	OFF	ON	ON

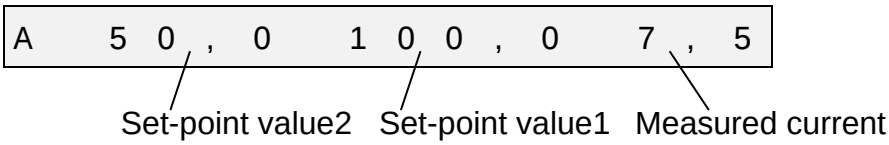
S12.1	S12.2	S12.3	S12.4	S12.5	S12.6	S12.7	S12.8
ON	OFF	OFF	OFF	OFF	ON	ON	OFF

S13.1	S13.2	S13.3	S13.4	S13.5	S13.6
OFF	OFF	OFF	OFF	OFF	OFF

Technical Description

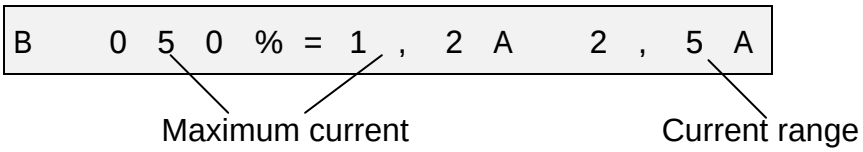
Menue lines

Menue line ‚A‘



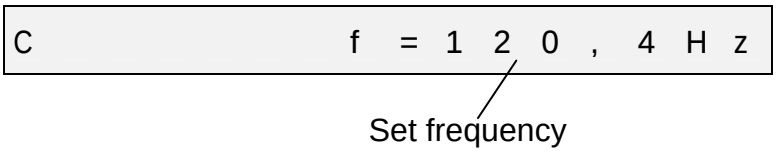
In Menue line ‚A‘ the two set-point values as well as the measured current (in A) are displayed. The set-point values can be set in 0,5% steps between 0,0% and I-MAX (see Menue line ‚B‘). This directions refer always to the set output current range (see DIP-Switch S12.6). The set-point value 2 is only displayed if it has been released by switch S12.5. The changeover between set-point value 1 and 2 is done by Input X13. If this input is selected, set-point 2 is active, otherwise set-point1.

Menue line ‚B‘



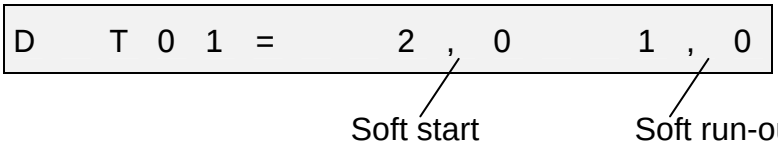
In menue line ‚B‘ the maximum output current can be limited. Through that, the connected feeding device can be protected from overloading. Furthermore, the current range set with DIP-Switch S12.6 is displayed.
Attention: In this menue the value can only be changed by actuating DIP-Switch S12.4.

Menue line ‚C‘



In this menue the output frequency is displayed resp. adjusted. An adjustment between 10,0 and 150,0 Hz is possible.

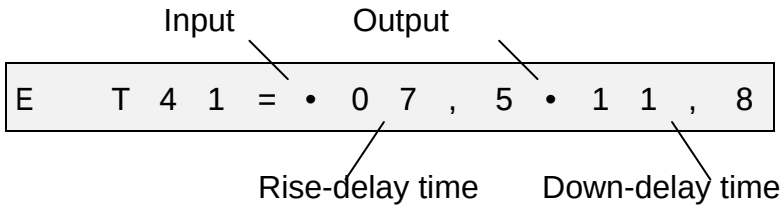
Menue line ‚D‘



In Menue line ‚D‘ the soft start and soft run-out can be set. Values between 1,0 and 5,0 seconds are possible.

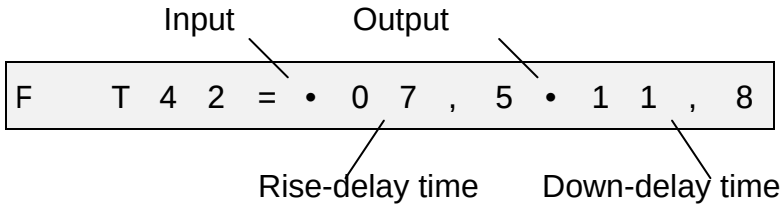
Technical Description

Menue line ‚E‘



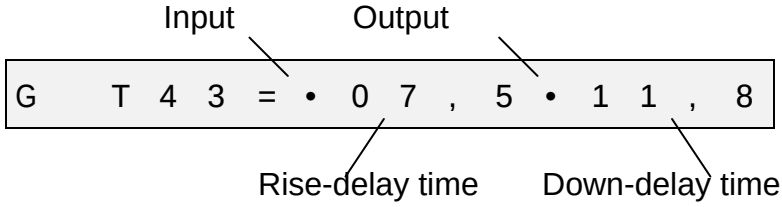
In Menue line ‚E‘ the rise-delay time and down-delay time of the time function element T41 is set. Values between 0,0 and 25,0 seconds are possible. The in- and output of the time function element is represented by a dot in front of the number.

Menue line ‚F‘



In Menue line ‚F‘ the rise-delay time and down-delay time of the time function element T42 is set. Values between 0,0 and 25,0 seconds are possible. The in- and output of the time function element is represented by a dot in front of the number.

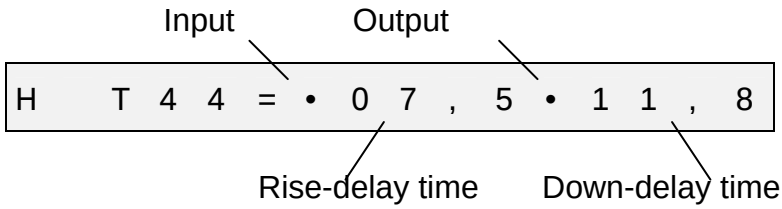
Menue line ‚G‘



In Menue line ‚G‘ the rise-delay time and down-delay time of the time function element T43 is set. Values between 0,0 and 25,0 seconds are possible. The in- and output of the time function element is represented by a dot in front of the number.

Technical Description

Menue line ‚H‘



In Menue line ‚H‘ the rise-delay time and down-delay time of the time function element T44 is set. Values between 0,0 and 25,0 seconds are possible. The in- and output of the time function element is represented by a dot in front of the number.

Key functions

Key ▼ (Menue)

By means of this key it is possible to page among the different menue lines. Upon each key actuation a jump to the next menue line is executed (A → B → C → D → E → F → G → H → A)

Menue line ‚A‘	Set-point values / measured current
Menue line ‚B‘	Maximum output current
Menue line ‚C‘	Output frequency
Menue line ‚D‘	Soft start / soft run-out
Menue line ‚E‘	T41 ON / T41 OFF
Menue line ‚F‘	T42 ON / T42 OFF
Menue line ‚G‘	T43 ON / T43 OFF
Menue line ‚H‘	T44 ON / T44 OFF

Key ↵ (Enter)

By mean of the Enter-Key a jump into the change-mode is executed. Now it is possible to change values, this is displayed by the flashing cursor. By means of the keys − and + the requested value can be set. Shall the new value be permanently stored it has to be confirmed by a second pressing of the ↵. The change mode is now finished. The new set value will be still available after ON/OFF of the SV1-2-10Z. Shall the new value not be permanently stored, the change mode has to be left by key ▼. The new set value remains unchanged only until the next switch OFF of the device.
Attention: There is a possibility to lock several menue lines for the access by the operator. A change into the change-mode is then only possible after correct enter of a 3-digit code word.

Technical Description

Taste ► (Cursor)

While being in the change mode (see key ↵), the flashing cursor is removed to the next possible input position by actuating the key ►. In some menue lines there is only one input position available. In this case the cursor key is out of function.

Key − (Minus)

By means of this key the value to be set can be decreased. To do this change first into the change mode.

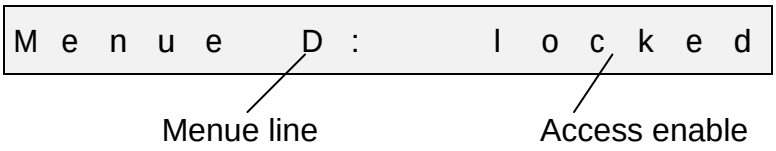
Taste + (Plus)

By means of this key the value to be set can be increased. To do this change first into the change mode.

Additional setting possibilities of control SV1-2-10Z

Change of access enable

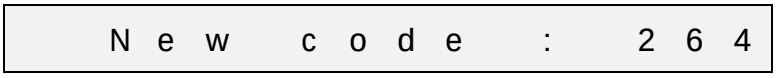
There is a possibility of locking respective menue lines for inputs by the operator resp. to unlock them. To do this one has to change into the desired menue line by means of key ▼ and switch the DIP-Switch S12.2 to position ON. The current status of the access enable is displayed in this menue line.



By means of key + the menue line can now be locked or unlocked. Shall the new set value be permanently stored this has to be confirmed by a second pressing of key ↵. The DIP-Switch S12.2 should then be set back to position OFF. If a menue line is locked the operator has to enter first a 3-digit code to unlock it. In case of an incorrect input the menue line remains locked for modifications.

Change code

To be able to change the unlocking-code the DIP-Switch S12.3 has to be set to position ON.

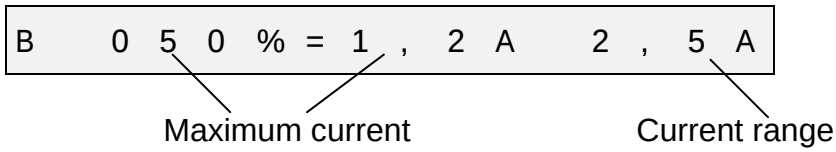


By means of the keys +, − and ► a new code can be entered and stored by means of key ↵. The DIP-Switch S12.3 should then be set back to position OFF. The code is always valid for all menue lines.

Technical Description

Change I-MAX

Upon switching the DIP-Switch S12.4 to position ON, the maximum current, which flows into the connected feeding device can be limited.



By means of the key [+] and [−] a new maximum current can be entered. Values between 10% and 100% are admissible. The given percent values refer always to the set current range (2,5A or 10A). The value is stored upon actuating key [↵]. It must be observed, that the feeding device cannot be overloaded by the operator! After the adjustment the DIP-Switch S12.4 has to be set back to position OFF.

Set-point value 2

By means of the DIP-Switch a second set-point value can be made possible. If the switch is in position ON both set-point values are displayed in menue line “A”. The change over between set-point value 1 and 2 is done by means of Input X13. If this input is selected set-point value 2 is active, otherwise set-point value 1.

Current range

Generally 2 current ranges are available. If the DIP-Switch S12.6 is in position OFF the SV1-2-10Z supplies an output current of 2,5A maximum. In position ON the feeding device disposes of 10A at most.
Attention: In case of currents higher than 6A the device has to be mounted on a heat sink!

Current waveform

Two different output current waveforms are possible which can be selected by the DIP-Switch S12.7. At position OFF the current is trapezoidal at position ON nearly sinusoidal. The current waveform which is better for the respective feeding device (feeding performance, noise level, current input) must be found out by testing. At frequencies less than 40Hz, the sinusoidal current waveform is recommended.

Additional information regarding control SV1-2-10Z

Even if the control unit is switched off by the main switch Q1 or disconnected from the voltage supply the inner side of the device remains energised (dangerous to life). The device is reenergised when , *POWER OFF* ‘ expires on the display and the status LED H1 is dark. This can take up to 20 seconds. Before this the device must not be opened!

Technical Description

Electronic overload limiter

In case of an overload the output of the SV1-2-10Z is switched OFF by an integrated electronic current monitoring.

! ! ! O V E R L O A D ! ! !

After that the control unit has to be switched OFF and may only be taken into operation when the message on the display goes out.

Electronic monitoring of temperature

In case of too high temperatures in the feeding device, the output of the SV1-2-10Z is switched OFF by an electronic temperature monitoring.

O V E R T E M P E R A T U R E !

After that the control unit has to be switched OFF and must only be taken into operation when the message on the display goes out.

Electrical Equipment

The electrical equipment of the controller corresponds to the currently valid laws and regulations, in particular to:

VDE 0113 part 1	**EN 60204-1:1992**
Electrical equipment of machines	
VDE 0875 part 11	**EN 55011**
Limit values and measurement procedures for radio interference of industrial, scientific and medical high frequency devices	
VDE 0839 part 82-2	**EN 50082-2**
Electromagnetic Compatibility (EMV)	
89/392/EEC	
EC Legal Provision Machines	
89/336/EEC	
EC Legal Provision Electromagnetic Compatibility	
73/23/EEC	
EC Legal Provision „Low voltage guideline“	

The service voltage of the controller normally corresponds to the mains nominal voltage on the site of installation. With a mains nominal voltage deviating from the normal values it must be transformed to the service voltage required by the controller by means of a transformer.