



User manual Technical parameters

multimax

Load management system

3D6



**Your partner for
network analysis**

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1 Introduction

Thank you for choosing this **KBR quality product**.

In order to familiarize yourself with the operation and configuration of the device, we recommend that you read this manual thoroughly, so that you are able to make use of the entire range of functions of this high-quality product.

The individual chapters serve to explain the technical details of the device and show how to avoid damage by means of proper installation and start-up.

1.1 User manual

This user manual is included in the scope of delivery of the device and must be accessible for the user at all times (e.g. in the switchgear cabinet). Even when the device is resold to third parties, the manual remains part of the device.

Although we used the utmost care in assembling this user manual, we would like to thank you in advance for notifying us about any errors or ambiguous descriptions you might notice.

1.2 Intended use

This device is intended for the optimization of energy consumption and to avoid expensive load peaks.

The system assists you in monitoring the energy consumption of your devices, helps you to make optimum use of your tariff and permanently lower your energy costs.

However, its use cannot replace the careful planning of your system. Furthermore, it is absolutely necessary that you take the time to carefully configure your system in the device and plan how you want to switch-off your consumers before you put it into operation.

1.3 Explanation of safety relevant symbols

This user manual contains notes that must be observed for your personal safety and to avoid damage to equipment. These notes are identified by a warning sign or information symbol, depending on the degree of hazard they represent.



Warning

"Warning" means that death, major injuries or damage may occur in case the appropriate safety measures are not taken.



Caution

"Caution" means that minor injuries or damage may occur in case the appropriate safety measures are not taken.



Note

"Note" is an important information on the product, operation or the respective part of the user manual to which special reference is made.

Disclaimer

The content of this user manual has been carefully reviewed in terms of the hardware and software described. Certain deviations, however, cannot be excluded, and the manufacturer is not liable for complete conformity. The specifications made in this user manual are checked on a regular basis, necessary corrections will be included in the next revision.

1.4 Safety notes

In order to prevent operating errors, operation of this device is kept as simple as possible. This way, you will be able to quickly start working with the device.

In your own interest, however, you should read the following safety notes carefully. During assembly, the applicable DIN / VDE regulations must be observed!

Power supply connection, setup and operation of the device must only be performed by qualified personnel. Qualified personnel in accordance with the safety notes in this user manual are persons authorized to setup, ground and mark devices, systems and circuits in accordance with all applicable standards and regulations.

To avoid the hazard of fire and electrical shock, the device must not be subject to rain or other humidity!

Before the device is connected to its power supply, you will have to check whether the local power supply conditions comply with the specifications on the manufacturer's label.



Caution

A wrong connection may destroy the device!

When connecting the device, observe the connection chart (see chapter "Connection chart") and make sure that no voltage is applied to the connection lines. Only use proper wiring material and watch the correct polarity when wiring!

In order to ensure proper and safe operation of the product, it must be transported, stored, installed and mounted in accordance with the specifications and operated and maintained carefully.

A device showing visible damage must by all means be considered as unfit for operation and must be disconnected from the power supply!

Error detection, repairs and maintenance work may only be carried out in our facilities or after contacting our service team. Every warranty obligation of the manufacturer expires if the device is opened without written consent from our service team. Proper operation can no longer be guaranteed!

Opening the device may expose parts under voltage. Capacitors in the device may still be loaded, even if the device has been disconnected from all voltage sources. It is generally not allowed to operate an open device!

In systems subject to hazard of lightning, lightning protection must be provided for all input and output lines!

1.5 Product liability

You have acquired a high quality product. In its manufacture, only components of the highest reliability and quality were used.

Each device is subject to long-term testing before it is delivered.

Regarding product liability, we refer to our general terms and conditions for electronic equipment, which you can find at www.kbr.de.

The warranted properties of the device apply only if it is operated in accordance with its intended use!

1.6 Disposal

Defective, outdated or no longer used devices must be properly disposed of.

At your request, we will be pleased to dispose of the devices for you.

2 Range of functions

The energy control system **multimax 3D6** can make a considerable contribution to reducing the energy costs in your company.

2.1 Monitoring of the energy consumption

The peak power is an important cost factor for special tariff customers.

By means of intelligent monitoring of the energy consumption, **multimax 3D6** provides optimum distribution of the available power and helps to prevent expensive power peaks.

2.2 Energy optimization system with trend calculation

multimax 3D6 acts as optimization calculator, taking into account the assumed further energy consumption within the measurement period. Careful adjustments are made to the energy consumption to avoid unnecessary shut-downs in consideration of the device properties:

2.3 Switching the consumers using compensation power

Negative compensation power causes a switch-off, positive compensation power triggers hookups. Compensation power is the result from the comparison of the trend power with the target power taking into account the available consumer power.

2.4 Switch-off of consumers via relay outputs

The basic module disposes of 5 non-floating relay contacts to switch off the consumers involved in the optimization.

Using additional 4-stage components, up to 32 switching outputs can be realized (see "Connection of additional modules").

NO or NC contact functions can be programmed to switch off the consumers.

2.5 Decentralization through substations

The **multimax** energy control system with its central component can be expanded by means of substations. Communication is carried out via a bus line.

2.6 Status recording via message modules

By determining the state of the devices that can be optimized, the optimization action can be controlled. A message input can be associated to every output.

The multimax 3 load management system receives important information about the individual consumers via the message inputs. It can be determined whether

- the consumer has been identified as requiring optimization by the input
- the consumer has been identified as inactive

There are additional possibilities:

- External control of the consumer (permanently on (manual_on) or permanently off (manual_off))

2.7 Maximum prewarning contact

On the device side, a maximum prewarning contact is available, which can be connected to any relay output.

- Signaling for manual interventions in production processes.
- Starting a generator (utility station).
- Default as NO contact (if active).

The contact switches for example in case of negative compensation power, if no line is available for switching off and the trend power is higher than the target value.

The hysteresis for switching off is always 10 sec, there is no hysteresis for switching on.

The maximum prewarning contact is activated by assigning the virtual output A48 to a relay output.

2.8 Power measurement by means of energy pulses of the energy supplier

The **multimax** can be adapted to the conditions of the energy supplier. Energy proportional energy pulses are required as characteristic quantity for the power. They are either supplied by the grid operator or created with a pulse generator/counter. The actual power for trend calculation is continuously determined via pulse period measurement and pulse count.

2.9 Counter pulse monitoring

In case the pulses are interrupted, a central error message system can be activated by means of the error message contact.

2.10 Measuring period synchronization by energy supplier pulse

A measuring period synchronous pulse provides for synchronicity of the measuring periods from energy supplier and energy control system. It is usually supplied by the respective energy supplier. If there is no synchronous pulse, the system will generate the measuring period time itself. In a combined system, synchronization will likely be triggered by the eBus Master.

2.11 3 target values for consumption limits

3 individually programmable target values for power are available. Switching between the target values is realized by means of floating contacts (e.g. by the energy supplier).

2.12 Error message functions

A message is issued in case of errors (display).

Emergency switch-off E17 $P_{acc} > P_{targ}$

Emergency switch-off E18 limit $P_{act} - Max$ violated

Emergency switch-off E22 counter pulse 1 failure

Emergency switch-off E23 counter pulse 2 failure

Emergency switch-off E24 counter pulse 3 failure

Emergency switch-off E25 counter pulse 4 failure

Emergency switch-off E26 counter pulse 5 failure

After the error is cleared, the message is automatically reset.

2.13 Long term memory

The energy control system has a battery buffered long term memory.

- Measuring period values for 40 days / 15 min measuring period
- Active energy memory for high and low tariffs
- 4096 switching operations
- 4096 messages (tariff changes, programming interventions, grid failures and errors).

3 Device overview

From left to right:

- Display with function keys
- multimax 3D6 basic module,
- multisio relay module
- multisio digital input module



4 Installation

In this chapter, you will find a description of:

- „Device memory, battery-buffered“
- „Mounting the device“
- „Connections“

4.1 Device memory, battery-buffered

The device is equipped with an internal data memory, which is battery buffered to preserve long-term data. To prevent it from being discharged, this backup battery (e.g. Varta CR 2032) is not built in when the device is delivered, but included separately in the delivery.



Caution

Before the initial start-up of the device, please insert the backup battery first (as described in the following), as otherwise all stored data would be lost in case of a power failure.

4.1.1 Inserting or replacing backup battery:

1. Disconnect the device from the supply voltage.
2. Lift the upper housing cover with a suitable tool (e.g. a small screwdriver).
3. When replacing a battery, remove the empty battery from the clamping bracket with a tool.
4. Push the new battery into the clamping bracket and make sure that it is inserted correctly and has the right polarity.
5. Put the rear housing cover back on and push it down until it clicks into place.
6. Reconnect the device to the supply voltage.

**Caution**

When the battery is empty or has been removed, there is no supply voltage. In this case, not only the storage data are lost, but the time settings have to be reset as well!

4.2 Device installation

During installation, the applicable DIN / VDE regulations must be observed!

Before the device is connected to the power supply, you have to check whether the local power supply conditions comply with the specifications on the manufacturer's label. A faulty connection may destroy the system!

The device must be connected in accordance with the connection chart. For energy and synchronous pulse input, polarity must be observed (contact your energy supplier).

In systems susceptible to lightning, lightning protection must be provided for the control voltage, bus line and pulse lines (e.g. energy supplier pulse lines from the transformer station to the location of the energy control system).

4.3 Connections**Caution**

To keep interfering pulses away from the inputs, a shielded cable must be used for feeding energy and synchronous pulse, and for the connection to the PC (e.g. J-2Y(St) Y 2x2x0.8 mm). (Shielding may only be connected to PE in the vicinity of the main unit).

**Terminals
1 (L) / 2 (N)
and PE**

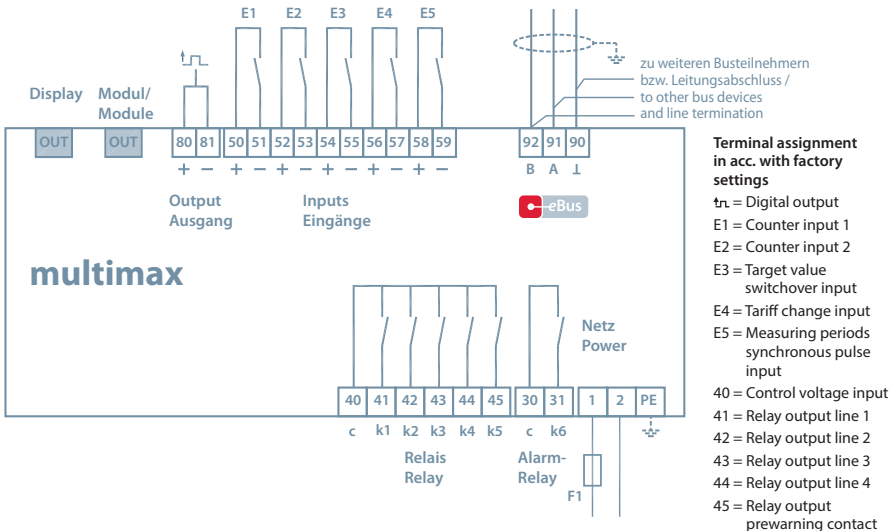
Power supply connection. The device is powered from the auxiliary supply. For technical data please refer to the manufacturer's label.

**Terminal 90
(ground),
91 (A), and
92 (B)**

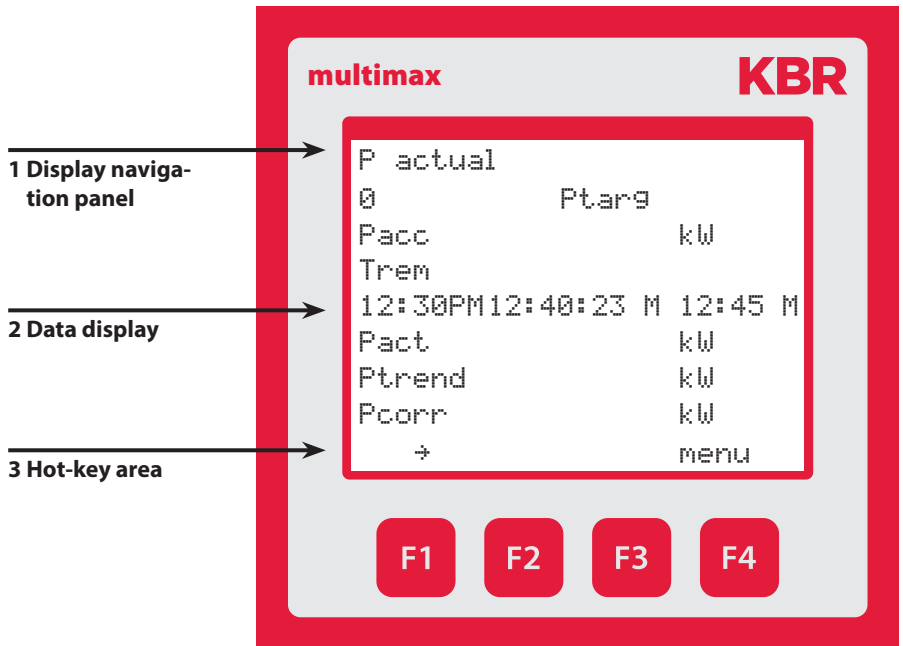
Interface connection for communication at the Energy Bus

Terminal40 (C)	Connection for voltage supply to the relay outputs terminals 41 to 45 The relays for the control outputs share the same connection to the supply voltage.
Terminals 41 (k1) to 45 (k5)	Wet relay contacts These contacts serve as controls outputs. In a currentless state of the device, the contacts are opened for stages that are not hooked up. Maximum switching capacity of 2A at 250V AC
Terminal 30 (C)	Connection for voltage supply of the relay output terminal 31 (k6)
Terminal 31 (k6)	Dry relay contact. This contact serves as a message or alarm output. During operation, an audible or visual message may be activated, or a consumer shut down. The contact is open as long as the device is currentless, and if there is an active message. Maximum switching capacity of 2A at 250V AC
Terminals 80 and 81	Digital output
Terminals 50 to 59,	Digital inputs, for example for pulse counter

Connection diagram



5 Control and display panel



5.0 Description of buttons and displays, factory settings, setting ranges

1 Display navigation panel

The navigation panel shows the main menu selected, considerably simplifying operation of the device.

The operator can immediately see which menu he is in.

2 Unit display

The DOT matrix display is normally used to show measured values.

In some submenus, this display area is used to show additional information to assist operation.

3 Hot key area

The text line corresponds to the function keys lying below it and is used to issue messages and text. The interaction of key and accompanying display enables convenient and self-explanatory operation.

I/O parameters		Basic module	Function	
Inputs	E01	Pulse counter		Terminals 50 and 51
	E02	Pulse counter		Terminals 52 and 53
	E03	Target value switching	NO contact	Terminals 54 and 55
	E04	Tariff switching input	NO contact	Terminals 56 and 57
	E05	Measuring period synchronous pulse	NO contact	Terminals 58 and 59
Outputs	A01	Relay output		Terminals 40 and 41
	A02	Relay output		Terminals 40 and 42
	A03	Relay output		Terminals 40 and 43
	A04	Relay output		Terminals 40 and 44
A48	Relay output prewarning contact	NO contact		Terminals 40 and 45
A49	Alarm relay	NC contact, currentless and opened in case of error		Terminals 30 and 31
A50	Digital output	Digital output		Terminals 80 and 81
Module number Input number	M00.1	Pulse counter E 01	inverse	no
			t Pact => 0	0 sec.
			Pulse value	1 p/kWh
			U primary	1V
			U secondary	1V
			I primary	1A
I secondary	1A			

Module number Input number	M00.2	Pulse counter E 02	inverse	no	
			t Pact => 0	0 sec.	
			Pulse value	1 p./kWh	
			U primary	1V	
			U secondary	1V	
			I primary	1A	
			I secondary	1A	
			E 03	not inverse	
			E 04	not inverse, HT, if active = LT	
			E 05	not inverse	
			A 01	not inverse , relay group 0	
			A 02	not inverse , relay_group 0	
A 03	not inverse , relay group 0				
A 04	not inverse , relay group 0				
A 48	not inverse , relay_group 0				
A 49	inverse				
A 50	not inverse , relay_group 0				
Module number Output number	M00.3	Digital input target value switching			
			M00.4	Tariff switching input	
			M00.5	Synchronous input	
			M00.6	Relay output	
			M00.7	Relay output	
			M00.8	Relay output	
			M00.9	Relay output	
			M00.10	Relay output prewarning contact	
			M00.11	Alarm relay	
			M00.12	Digital output	

Parameters		Setting ranges
General parameters 1	TYPE	oneValue, switching input, list of target values
	Target value 1	0 to 50000 kW
	Degree of optimization	80% to 100%
	Period duration	1, 10, 15, 30, 60 minutes
	Switching interval	2 to 30 seconds
	Synchronization	Input, internal, bus, tariff
General parameters 2	Minimum value monitoring	yes, no
	Target value tracking	off, month, year
	Target value tracking	0% to 100%
	external correction value	yes, no
	Energy type	0 to 99
	Unit	kW, MW, m ³ /h
General parameters 3 <i>hidden for TYPE one value</i>	Target value 2	0 to 50000 kW
	Address target value 2 - selection	E00 to E50
	Address target value 3 - selection	E00 to E50
	*Limit max. Pact 2	0 to 60000 kW
	*Limit max. Pact 3	0 to 60000 kW
General parameters 4	Tariff switching	bus, internal, input
	Start LT	00:00 to 24:00
	End LT	00:00 to 24:00
	*Limit max. Pact 1	0 to 60000 kW
	*LIM min. Pact	0 to 50000kW
	Address *LIM relay max. Pact	A41 to A47, A40 = deactivated
	Address *LIM relay min. Pact	A41 to A47, A40 = deactivated

*LIM = limit value

Parameters of the prewarning contact:	
TYPE	negative compensation power higher than available breaking capacity
	Cumulated power higher than power warning threshold
	Trend power higher than power warning threshold
	Off (output deactivated)
Warning threshold	30 to 150 seconds
Hysteresis	0 to 50000 kW
Minimum on time	0 to 999 minutes
Minimum off time	0 to 999 minutes
Period time-out	0 to 999 minutes
Address prewarning contact	fixed A48

Parameter		Setting ranges
Line parameters	Power	0 to 9999 kW
	Priority	01 to 32
	TYPE	standard, therm. consumer
	at switch-off	open, closed
	active	yes, no
	Mode	auto, on, off
	Address feedback input	E00 to E50
	Type of feedback	release, manual on, manual off
	Address Pact real	E00 to E50
	switch off in case of error	yes, no
	Period time-out	0.0 to 999 minutes
	Lead time	0 to 999 seconds
	Follow-up time	0 to 999 seconds
	Minimum on time	0 to 24 hours
	Minimum on time	0 to 999 minutes
	Minimum off time	0 to 999 minutes
Maximum down time	0 to 999 minutes	

Parameter		Setting ranges
Counter inputs	Input 1	+/- E 00 to E 50
	Input 2	+/- E 00 to E 50
	Input 3	+/- E 00 to E 50
	Input 4	+/- E 00 to E 50
	Input 5	+/- E 00 to E 50
	Counter pulse monitoring	00:00 h to 23:59 h
	max. distance Z1	0 to 999 seconds
	max. distance Z2	0 to 999 seconds
	max. distance Z3	0 to 999 seconds
	max. distance Z4	0 to 999 seconds
	max. distance Z5	0 to 999 seconds
Module management	Basic module	
	No additional module	max. 20 additional modules, optionally Relay output module or digital scan mode
	Module bus scan timeout (basic module)	0 to 5 seconds
	Module bus timeout (additional modules)	0 to 5 seconds
I/O parameters	Basic module	
	Inputs 1 to 5	pulse counter, tariff switching, synchronous input, digital input
	Outputs 1 to 6	relay output, error message relay limit relay
	Output 7	digital output
	inverse	yes, no
Clock time / date	Daylight saving time	auto, off
	Start	Month 01 to 12
	End	Month 01 to 12
Bus parameters	Bus address	0 to 9999
Display parameters	Contrast	60 to 100 %
	Brightness	0 to 100 %
	inverse	yes, no
	Language	German, English
	Dimmer brightness	0 to 100 %
	Dimmer time	0 to 255 minutes

Error message dialog:

Parameter		Setting ranges
	E01 Power failure	message, message and alarm relay, off
	E02 Limit violated	message, message and alarm relay, off
	E04 Synchronous pulse is missing	message, message and alarm relay, off
	E05 Reset has been performed	message, message and alarm relay, off
	E07 Error message	message, message and alarm relay, off
	E09 Ptarg exceeded	message, message and alarm relay, off
	E15 Module bus error	message, message and alarm relay, off
Emergency shut-down	E17 Pacc > Ptarg	message, message and alarm relay, off
Emergency shut-down	E18 Limit value Pact-Max violated	message, message and alarm relay, off
	E19 Limit value Pact-Min violated	message, message and alarm relay, off
Emergency shut-down	E22 Counter pulse 1 failure	message, message and alarm relay, off
Emergency shut-down	E23 Counter pulse 3 failure	message, message and alarm relay, off
Emergency shut-down	E24 Counter pulse 3 failure	message, message and alarm relay, off
Emergency shut-down	E25 Counter pulse 4 failure	message, message and alarm relay, off
Emergency shut-down	E26 Counter pulse 5 failure	message, message and alarm relay, off
Password	Code	digits (four)

By the **immediate** targeted switch-off of selected consumers (the emergency switch-off must be activated at the optimization line), an exceedance of the maximum (target value) is avoided.

Any programmed measuring period time-outs and minimum on times are not taken into account.

The following problems can trigger a switch-off:

- the cumulated measuring period power is higher than the target value
- Counter pulse failure counter 2
- Counter pulse failure counter 3
- the limit value "maximum actual power" has been exceeded
- Counter pulse failure counter 4
- Counter pulse failure counter 1
- Counter pulse failure counter 5

6 Overview of system parameters

To adapt **multimax 3D6** to the system to be optimized, its parameters have to be configured. The following parameters can be configured:

- "General parameters"
- "Line parameters"
- "Counter inputs"
- "Module management"
- "I/O parameters"
- "Time/date"
- "Bus parameters"
- "Display parameters"
- "Alarm parameters"
- "Password"

The menu guidance of the **multimax 3D6** is self-explanatory.

The operator is guided and supported by the device through operating instructions displayed for the respective situation. The following terms are available for programming:

Para	Return for configuration
EDIT	Perform configuration
→	Submenu or parameter selection
+	Value input
?	Selection
YES	Confirmation to save configuration
NO	Discard configuration
↵	Return

7 Description of parameters

7.0.1 General parameters

In the "general parameters" area, you can set the most important general settings. Depending on your choice of parameters, three or four areas are available.

1. Select **Main menu > General parameters > Enter.**
2. Start the configuration with Edit.

General parameters 1	Programming	Explanation
TYPE	Selection: one value, switching input, list of target values	You can define a fixed value as the target value or configure a switching option with several values. When selecting Switching input , meaning the target value switching via the signal of another input, you can configure these inputs and the respective target values in the General parameters 3 area.
Target value 1	Numerical value in kW, MW, m3/h	Enter the value agreed on with the energy supplier.
Degree of optimization	Numerical value in %	Enter the value of the approximation to the optimal state (100%) the device should reach.
Period duration	Numerical value in min	Enter the value agreed on with the energy supplier.
Switching interval	Numerical value in sec	Time between two switching operations
Synchronization	Selection: internal, input, bus	Defines the type of synchronization for the period start times.

**Note**

The system can be used as both a maximum or minimum monitor.

General parameters 2	Programming	Explanation
Minimum Monitor	On/Off	Monitors the minimum output for self-generated energy and contractually agreed recovery into the energy supplier network.
Target value tracking	Selection: off, mon., year	In case of unplanned violation of the target value, the target value can be temporarily increased in order to utilize the higher tariff of the energy supplier paid anyway. This can be configured for a month or for a year. Afterwards, the target value is set back to the configured value.
Target value tracking	Numerical value in %	Maximum value of target value tracking.
ext. Pcorr preset	On/Off	On deactivates the individual target value setting if a target value is fed in by an external system.
Energy type	Numerical value	Energy form, e.g. 00 = Electro HT
Unit	Selection: kW, MW, m³/h	Defines the type of unit for current or gas

The following types of energy are available:

Energy form	Tariff No.	Description
00	0	Electro high tariff
00	1	Electro low tariff
01	0	Water
01	1	Water
02	0	Gas
02	1	Gas

Energy form	Tariff No.	Description
03	0	Heat
03	1	Heat
04	0	Cold
04	1	Cold

General parameters 3 (only for selection of switching input as TYPE in the "General parameter" area 1)	Programming	Explanation
Target value 2	Numerical value in kW, MW, m ³ /h	Enter the value agreed on with the energy supplier.
Target value 3	Numerical value in kW, MW, m ³ /h	Enter the value agreed on with the energy supplier.
Addr. SW2- selection	Input E..	Input of a connected module for target value switching.
Addr. SW3- selection	Input E..	Input of a connected module for target value switching.
max. Pact2	Numerical value in kW, MW, m ³ /h	Maximum permissible actual value.
max. Pact3	Numerical value in kW, MW, m ³ /h	Maximum permissible actual value.

General parameters 4	Programming	Explanation
TariffSwitching	bus, internal, input	Defines whether the tariff switching time is set via bus, the input for tariff switching, or defined internally. If you select "intrn", the parameters Start LT and End LT are active for configuration of the low tariff period
max. Pact1	Numerical value in kW, MW, m ³ /h	Maximum permissible actual value for this target value.
min. Pact	Numerical value in kW, MW, m ³ /h	Minimum permissible actual value.
Addr. LimMax Pact	Output A41 - A47	Address of the alarm output max. Pact.
Addr. LimMin Pact	Output A41 - A47	Address of the alarm output min. Pact

Maximum prewarning contact:

The default setting of the contact is closed if active.

Parameters of the prewarning contact:

TYPE	Selection	negative compensation power higher than available breaking capacity
		Cumulated power higher than power warning threshold
		Trend power higher than power warning threshold
		Off (output deactivated)
Warning threshold	in % of the active target value	30 to 150 seconds
Hysteresis	in kW	0 to 50000 kW
Minimum on time	in minutes	0 to 999 minutes
Minimum off time	in minutes	0 to 999 minutes
Period time-out	in minutes	0 to 999 minutes
Address prewarning contact	A48	fixed

```

Prewarning9 relay
-----
TYPE          Pcum>Plimit
AlarmLimit    30%

on    min.    0.2 min
off   min.    0.2 min
Per. idle t.  0.0 min
Addr. prewarn.rel.  A48

```

←		↑	Edit
---	--	---	------

Default values:

Prewarning contact active		
TYPE		-Pcorr > Pavailable
Minimum on time	in minutes	0.2 minutes (=12 sec.)
Minimum off time	in minutes	0.2 minutes (=12 sec.)
Period time-out	in minutes	0 minutes
Address prewarning contact	A 48	unchangeable

Function of the default settings:

The contact switches in case of negative compensation power if there is no line for switch-off anymore and the trend power is higher than the target value.

There is no hysteresis for compensation power (if Pcorr deviates by 0)

Activation of the maximum prewarning contact is performed by allocation of the virtual output A48 to a relay output (in the I/O management).

Programming example:

Functional type: Cumulated power higher than power warning threshold

Prewarning contact active		
TYPE		Pcum > Pthreshold
Warning threshold	in % of the active target value	90 percent
Minimum on time	in minutes	0.5 minutes
Minimum off time	in minutes	1.0 minutes
Period time-out	in minutes	10 minutes
Address prewarning contact	A 48	unchangeable

Period target value active:	100kW
Warning threshold:	90% (corresponds 90 kW)
Hysteresis:	10 kW
Minimum on time:	0.5 minutes (corresponds to 30 seconds)
Minimum off time:	1.0 minutes (corresponds to 60 seconds)
Period time-out:	10.0 minutes

This means:

The contact switches if the cumulated power is higher than 90 kW (90% of the target value) and the message **E20 Prewarning contact active** is issued.

There is no hysteresis, since the cumulated power increases with the end of the measuring period.

The contact remains switched until the end of the measuring period. It is discarded at the beginning of the next measuring period, since the cumulated power starts below the alarm threshold again.

However, if the minimum on time is still running, the prewarning contact is not deactivated.

If the contact is switched off, the message **E20 Prewarning contact active** disappears.

If a measuring period is restarted, the function of the prewarning contact is locked for 10 minutes (measuring period time-out). That means that the prewarning contact is not active / is deactivated (if the contact was active at the end of the period before and there is no minimum on time).

The measuring period time-out is always started at the beginning of a measuring period. The minimum on time and the minimum off time take priority over the measuring period time-out.

Programming example:

Functional type: Trend power higher than power warning threshold

Prewarning contact active		
TYPE		Ptrend > Pthreshold
Warning threshold	in % of the active target value	90 percent
Hysteresis	in kW	10 kW
Minimum on time	in minutes	0.5 minutes
Minimum off time	in minutes	1.0 minutes
Period time-out	in minutes	10 minutes
Address prewarning contact	A 48	fixed

period target value active: 100kW
 Warning threshold: 90% (corresponds to 90 kW)
 Hysteresis: 10 kW
 Minimum on time: 0.5 minutes (corresponds to 30 seconds)
 Minimum off time: 1.0 minutes (corresponds to 60 seconds)
 Period time-out: 10.0 minutes

This means:

The contact switches if the trend power is higher than 90 kW (90% of the target value) and the message **E20 Prewarning contact active** is issued.

The reset hysteresis is 10 kW, meaning the contact would switch at a trend power of 80 kW (90% of the target value minus 10kW hysteresis).

The contact remains switched on for 30 seconds, even if the trend power falls below 80 kW in this period of time.

After the contact is switched off, the next switching operation is only possible after 60 seconds due to the minimum off time. When the contact is switched off, the message **E20 Prewarning contact active** disappears.

If a measuring period is restarted, the prewarning contact's function is locked for 10 minutes (measuring period time-out). That means that the prewarning contact is not active / is deactivated if the minimum on time is still running.

The measuring period time-out is always started at the beginning of a measuring period. The minimum on time and the minimum off time take priority over the measuring period time-out.

8 Line parameters

You can configure the required settings for your consumers in the line parameters area.

1. In the main menu, select > **Line parameters** > **Enter**

Li	MK	Addr	P	Pr	Ak
Line number	Three-digit number, the first two digits represent the module (00 is the basic module), the third digit represents the number of the contact	Address	Set power / consumption	Switch-off priority of consumers; i.e. the consumer with priority 1 is switched off first, followed by the one with priority 2 and so on.	Consumer deactivated / activated

2. Select a list and start the configuration with **Para** and **Edit**.

Para. Line (1, 2,...)	Programming	Explanation
Power	Numerical value in kW, MW, m³/h	Power of the consumer.
Priority	Numerical value 1-32	Switch-off priority of the consumer. Standard setting is the line number.
TYPE	Standard, therm., signal, controllable	Currently only standard and therm. Electrical load
for switch-off	open, closed	Defines if the consumer is switched off by closing or opening of the contact.
active	on / off	An activated optimization line is integrated into the optimization cycle.
Mode	Auto, off, on	Defines if the consumer is integrated into optimization (Auto), always switched on or always switched off.

3. Configure the address with **Addr** and **Edit**.

Para. Line (1, 2, ...)	Programming	Explanation
Addr. output	Numerical value A01- A32, fixed	Address of the consumer, A01-A04 at the basic device. The subsequent numbers are allocated to the other modules connected.
Addr. feedback	E00-E50	multimax checks if the consumer is switched on or off and if it reports this via a feedback input. If no message is reported, multimax switches independent of the fact if the consumer is on or off and then waits for the set time until the next switching operation has elapsed.

Para. Line (1, 2, ...)	Programming	Explanation
Feedback type	Release, manual_off manual_on	Defines if the consumer is integrated into optimization by its feedback (release), always switched on (manual_on) or switched off independently of the trend calculation (manual_off).
Addr. Pact	Input E..	Address of the message input used to determine the actual power consumption of the consumer using an energy measuring module. -- in development --
switch-off in case of malfunction	on / off	Defines if the consumer is switched off in case of a malfunction.

The following malfunctions can trigger an emergency switch-off:

- the cumulated measuring period power is higher than the target value
- the limit value "maximum actual power" is exceeded
- Counter pulse failure counter 1
- Counter pulse failure counter 2
- Counter pulse failure counter 3
- Counter pulse failure counter 4
- Counter pulse failure counter 5

4. Configure the time-dependent parameters of the consumer with **Time and **Edit**.**

Times line (1, 2,...)	Programming	Explanation
Per. Time-out	Numerical value in min	Defines the time the consumer definitely stays switched on from the beginning of the period
Lead time	Numerical value in sec	Defines the time which the consumer is switched on earlier, since it only achieves its power after this time has elapsed.

Continuation of step 4

Times line (1, 2,...)	Programming	Explanation
Follow-up time	Numerical value in sec	Defines the time which the consumer is switched off earlier, since its power only decreases to zero after this time has elapsed.
Minimum switch-on time / day	Numerical value in hours	Minimum time which the consumer has to be switched on per day
On min. Off min. Off max.	Numerical value in min	Minimum / maximum time which the consumer must be switched on or off in relation to a period.

**Note**

The following consumer types are available:

Standard:

For this type of consumer, the standard parameters are set.	
Parameter (example):	
Power	18 kW
Priority	01
Type	standard
for switch-off	opened
active	yes
Mode	Automatic
Period time-out	0 minutes
Lead time	0 seconds
Follow-up time	0 seconds
Minimum on time / day	0 hours
Minimum on time	0 minutes
Minimum off time	0 minutes
Maximum off time	0 minutes

Thermal consumers:

For this type of consumer, additional parameters are available.

Parameters (example):

Power	18 kW
Priority	01
Type	Thermal consumer
for switch-off	opened
active	yes
Mode	Automatic
Main switch address input	E06
Thermo switch address input	E07
Optimization in the heating up phase	yes
Optimization in the continued heating phase	yes
Maximum on time	0 minutes
Period time-out	0 minutes
Lead time	0 seconds
Follow-up time	0 seconds
Minimum on time / day	0 hours
Minimum on time	0 minutes
Minimum off time	0 minutes
Maximum off time	0 minutes

Application examples:

Optimization in the heating up phase	yes
Optimization in the heating up phase	yes

Initial state:

Main switch address input	opened (=main switch on the consumer is switched off)
Thermo switch address input	closed (=consumer heats up)
Reason for switching the optimization line	on / release / 0

This means:

Since there is no feedback on the operating state of the consumer, the consumer is switched on to incorporate it into optimization.

Main switch is switched on:

Main switch address input	closed
Thermo switch address input	closed (=consumer heats up)
Reason for switching the optimization line	on / optimization / 1
That means:	
The consumer is switched on, feedback on the operating state of the consumer is available and the consumer may be switched off for optimization purposes.	

Thermo switch opens:

Main switch address input	closed
Thermo switch address input	opened (=consumer has reached its temperature)
Reason for switching the optimization line	on / optimization / 1
That means:	
The consumer is in the continued heating phase (after the first opening of the thermo switch) and may be switched off for optimization purposes.	

No optimization in the heating up phase:

Main switch address input	E06
Thermo switch address input	E07
Optimization in the heating up phase	no
Optimization in the continued heating phase	yes
Main switch address input	closed
Thermo switch address input	closed
Reason for switching the optimization line	on / heating / 1
That means:	
The consumer is in its heating up phase but cannot be switched off for optimization purposes.	

The thermo switch is not monitored:

Main switch address input	E06
Thermo switch address input	E00
Optimization in the heating up phase	yes
Optimization in the continued heating phase	yes
Main switch address input	closed
Thermo switch address input	open (=is not monitored)
Reason for switching the optimization line	on / optimization / 1
That means:	
The consumer is in its continued heating phase immediately and may be switched off for optimization purposes.	

Chopping operation (no forced chopping!):

For chopping a consumer, only the times of

- Maximum on time
- Maximum off time

are configured.

Under some circumstances, waiting until these times have elapsed is not required, if

- for max out, the free power is already sufficient to stop chopping
- for max on, optimization needs to be performed earlier

Display for configured chopping operation:

Line state on => The consumer is switched on all the time and the free power is sufficient, so that no chopping is required.

Line state off => The consumer is chopped, as there is not enough free power for continuous operation.

Message in the event memory => **Line switched off, reason optimization.**

The switching interval (in sec.) set in the general parameters is not taken into account for chopping operation.

8.1 Counter inputs

In the **Counter inputs** area, you can define and configure inputs for counters.

1. Select **Main menu > Counter inputs > Enter**.

2. Start the configuration with **Edit**.

Counter inputs	Programming	Explanation
Input 1, 2, ...	+/- E..	a + in front of the counter input adds the values of the counter, a - subtracts them from the total power, e.g. if a counter meters self-generated supply of energy.

3. You can display the individual counter values via **Pact**. This is only possible at this point.

4. To configure counter pulse monitoring, use **Para**.

Counter pulse monitoring	Programming	Explanation
monitor from / to	Time	Defines the time for checking if the counters emit pulses.
max distance Z1, 2, ...	Numerical value in sec	Defines the maximum time that may elapse until the counter sends a pulse. There is a message that this time is exceeded, e.g. due to a defective counter.

8.2 Module management

In the module management area, you can manage and configure basic and additional modules.

Select **Main menu > Module management > Enter**.

Select a module.

CAUTION: If required, start a module scan using **scan**. This function detects connected modules, however only one after the other and only if they are set to scan mode.

Select a module from the list and start the configuration with **Para**.

Para. Module (0, 1, 2,...)	Programming	Explanation
Timeout	Numerical value in sec	Defines the time permitted for feedback of the module in network operation. This is especially useful in slow networks, in order to prevent unnecessary error messages.
Flashing	on / off	Makes the LEDs on the selected module flash one after the other, to be able to allocate a connected module to its number.
Removal	on / off	Logs an additional module off from the basic module.

8.3 I/O parameters

In the I/O parameters area, you can define and configure inputs and outputs.

1. Select Main menu > I/O parameters > Enter.

2. Select an input or output from the list and define it with Edit.

- Inputs available are synchronous input, tariff input, digital input and pulse counter input.
- Outputs available are relay output, alarm output, limit message output and digital output.

3. Select an input or output from the list and start the configuration with Para.

e.g. in case of definition as pulse counter

Para. (...) Input	Programming	Explanation
Log address	E..	Fixed logical address
inverse	on / off	Defines whether the input reacts to positive or negative pulses.
t Pact -> 0	Numerical value in sec	Defines the time it takes until the power drops to 0.
P. value	Numerical value in I/kW, MW, m³	Pulse value according to the energy supplier.
I/U prim/ sec	Numerical value in A/V	Transformer ratio current or voltage

e.g. in case of definition as relay output

Para. (...) Outputs	Programming	Explanation
Log address	A..	Configurable line can be allocated to a terminal. The terminal is defined in the hardware.
inverse	on / off	Defines if a relay reacts to positive or negative pulses.
Relay group	Numerical value in sec	Assigns the relay to a relay group (switches independently of the multimax)

8.4 Clock time / date

In the **Clock time / date** area, you can set the time and date as well as make settings for daylight saving time.

1. Select **Main menu > Clock time / date > Enter**.
2. Start the configuration with **Edit**.

Clock / date	Programming	Explanation
Time	Numerical value in HH:MM:SS	Defines the time if it has not been already set by an external system (eBus).
Date	Numerical values in DD:MM:YYYY	Defines the date if it has not been already set by an external system (eBus).
Daylight saving time	AUTO / OFF	AUTO activates the automatic daylight saving time according to the entries for Start and End.

Clock / date	Programming	Explanation
Start	Numerical value from 1 to 12	Beginning of daylight saving time. Standard is 03 (March).
End	Numerical value from 1 to 12	Beginning of daylight saving time. Standard is 10 (October).
Runtime	Numerical value in DD HH:MM:SS	Information how long the multimax is already in continuous operation.

8.5 Bus parameters

In the **Bus parameters** area, you can set the **KBR eBus** address.

1. Select **Main menu > Bus parameters > Enter**.
2. If required, start a bus scan via **scan**.
3. Start the configuration with **Edit**.

Bus parameters	Programming	Explanation
TYPE	eBus is fixed	Currently, the KBR eBus is the only bus intended.
Address	Numerical value 0-9999	Defines the bus address. You can either enter a fixed bus address or detect and allocate the bus address in the SCAN mode (separately for each device).
Baud rate	Numerical value kBd	Is defined by KBR and serves as an indication of the bus speed.

8.6 Display parameters

In the **Display parameters** area, you can set the properties of the LED display.

1. Select **Main menu > Display parameters > Enter**.
2. Start the configuration with **Edit**.

Display parameters	Programming	Explanation
Contrast	Numerical value in %	Defines the contrast of the text to the background.
Brightness	Numerical value in %	Defines the brightness of the background illumination.
inverse	on / off	Defines whether a dark font on a light background or a light font and a dark background is displayed.
Language	Selection from German and English	Defines the display language.
Dimmer brightness	Numerical value in %	Decreases the display brightness to the percentage set.
Dimmer time	Numerical value in min	Decreases the display brightness to the value set for Dimmer brightness after the set time. This makes sense if you want to keep working with the device for some time and then want to have it dimmed to save energy. Press any key to have the display brightness return to the original value.
Version	Combination of numbers / letters	Information on the display version.

3. Test the display for defective pixels using **test**.
 4. Confirm with **OK** if the horizontal lines are displayed correctly.
 5. Confirm with **OK** if the vertical lines are displayed correctly.
 6. Test the function keys by following the instructions on the device display.
- After confirming all function keys, the menu is displayed.

8.7 Alarm parameters

In the **Alarm parameters** area, you can define the type of message for different alarms.

1. Select **Main menu > Alarm param. > Enter.**
2. Start the configuration with **Edit.**

Alarm param.	Programming	Explanation
Type of the alarm parameter	Message, alarm+M, off	<p>Message only issues a message for a alarm of this type.</p> <p>Alarm+M issues a message and activates a alarm relay.</p> <p>Off does not trigger any action.</p>

You can find a list of all parameters under "Alarm parameters menu".

8.8 Password / reset

In the **Password** area, you can define a password and this way lock the device against unauthorized entries, or reset an existing password. You can also restore the device default settings here.

1. Select **Main menu > Password > Enter.**
The device displays Free, meaning the standard value of 9999 was not changed and you do not need a password to make entries.
2. Start the configuration with **Edit.**
3. Enter a four-digit number as the password.

The device displays **Saved**. As of now, you need to enter a password to make entries at the device.

If you enter the password, the device stays unlocked for some minutes and is then locked again automatically.

RESETTING PASSWORD

If a password is no longer necessary, you can unlock the device again.

- Unlock the device with its current password and then enter **9999** in the **Password** menu again.

The device displays **Free**, meaning the standard value of **9999** has been restored and you do not need a password to make entries.

RESET

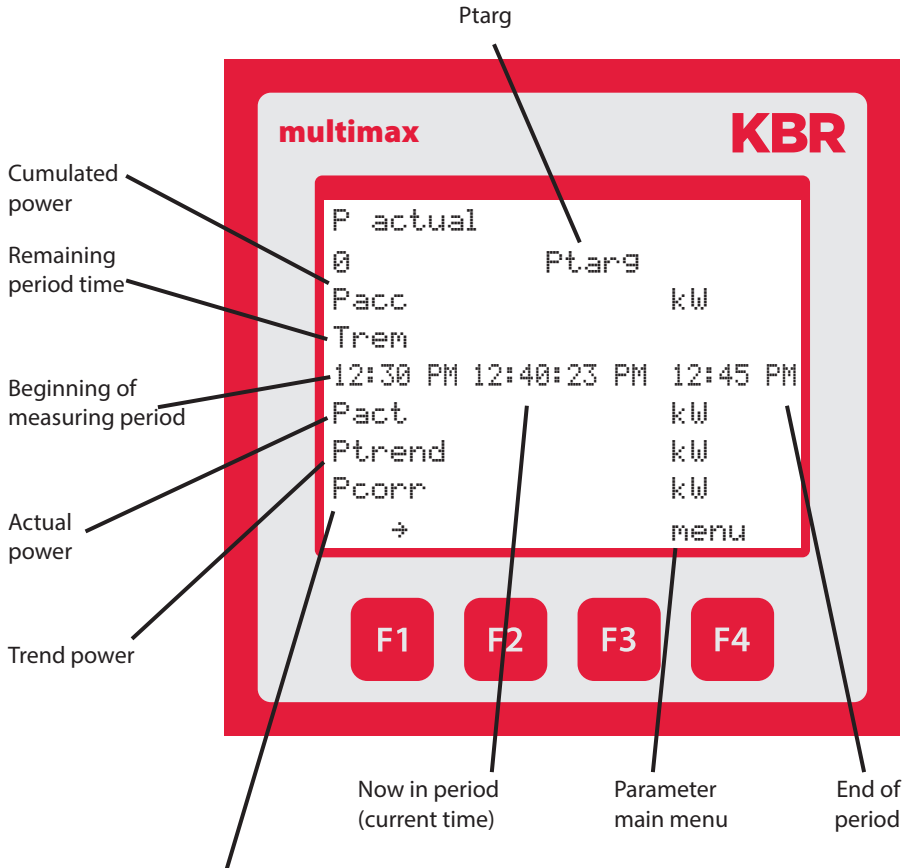
If you do not need your current settings any longer, you can also restore the device default settings.

1. Select **Reset**.
2. Select **Edit**.
3. Activate **Reset to default settings**.
4. Confirm with **Yes**.

All your settings are lost and the device is reset.

9 Description of the display

9.1 Pactual



If this value reaches the value of a configured consumer, a consumer is switched off (in case of a negative compensation value) or switched on (in case of a positive compensation value) in accordance with the stage parameters.

9.2 Potential

Power values of all consumers that can still be switched off.

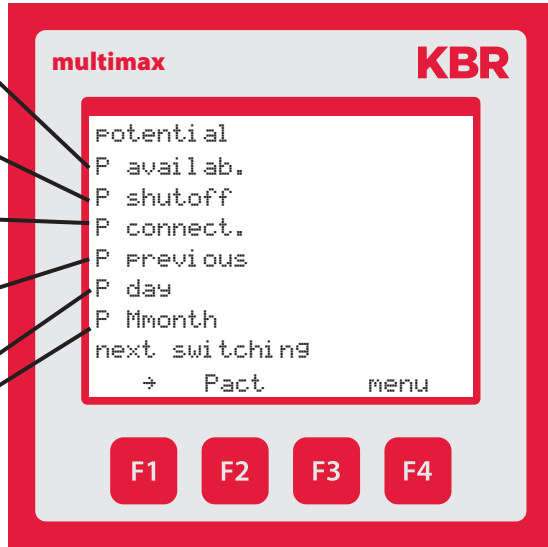
Lines with this power have already been switched off

Lines with this power are switched on

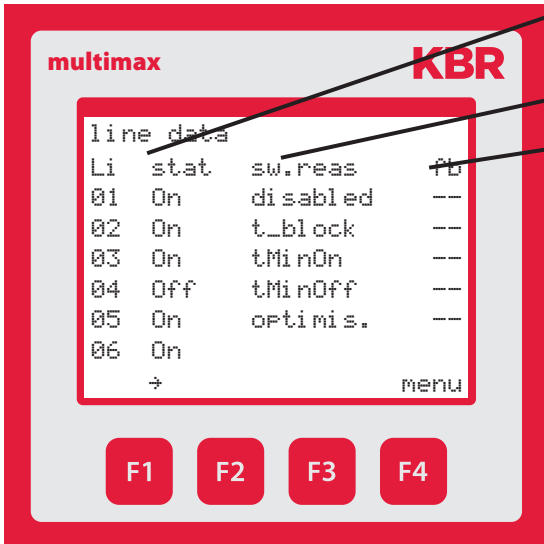
Power of previous period (exceeded, target value reached, fallen below)

Highest period value of the day

Highest period value of the month



9.3 Line data



State of the consumers

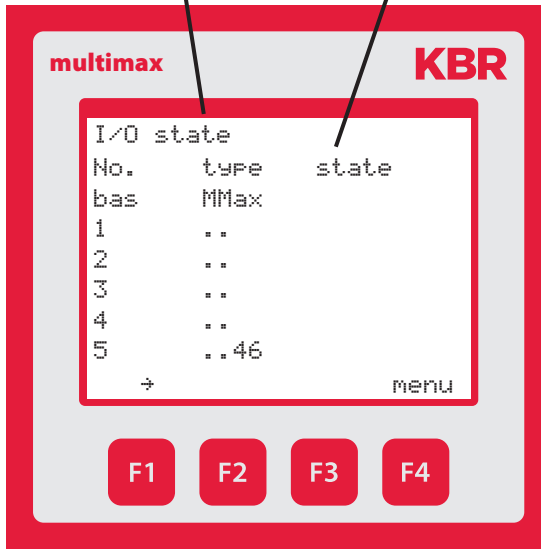
Reason for switching

Feedback from the consumer

9.4 I/O status

Status recording of inputs/outputs

switched / not switched



Possible messages:

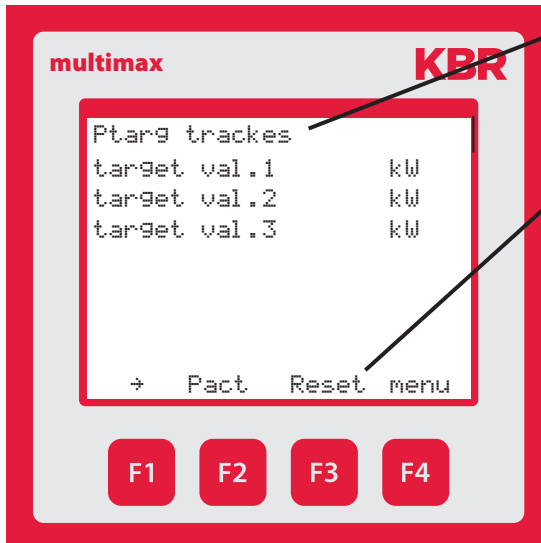
i no pulse at the pulse input (low level)

I pulse at the pulse input (high level)

o Passive output (relay or pulse)

O Active output (relay or pulse)

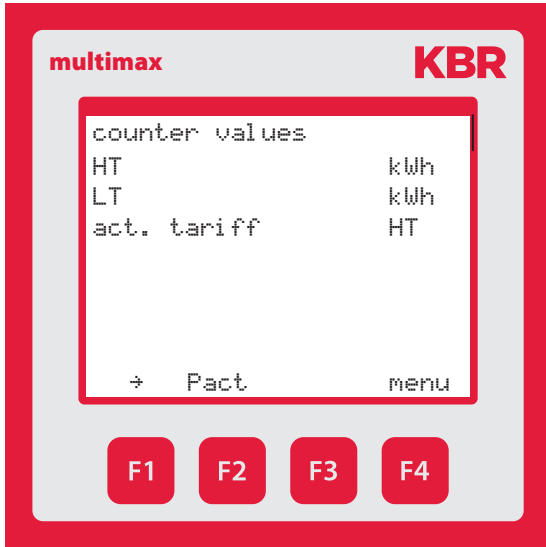
9.5 Ptarg tracks



Display of the set target values or tracked target values (if limit tracking is activated)

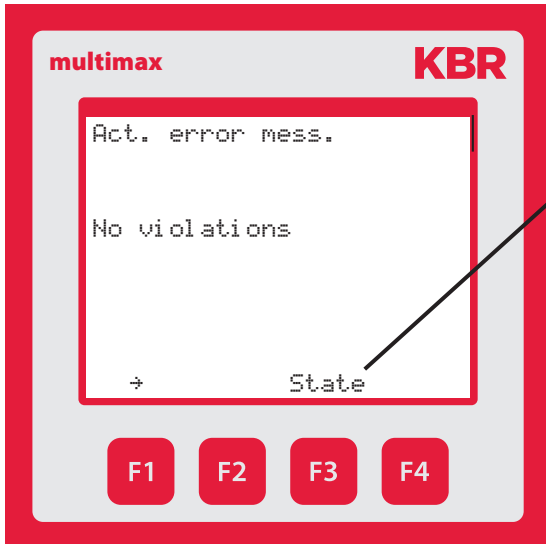
Resets to configured target value

9.6 Counter values



Energy meter
total, continuous

9.7 Current error messages



Active error messages do not have to be acknowledged and disappear as soon as the error is rectified.

Messages that need to be acknowledged (delete) e.g. limit violated, power failure

10 Technical data multimax 3D6

10.1 General technical data of additional modules

Power supply	Via module bus	24VDC / ca. 2W
	Connection	Modular connector RJ12 6P6C
Module bus interface:	serial interface	RS485
	Module bus connection	RJ12 for ready-made KBR system cable, max. length 30 m if placed accordingly
	transmission speed	38400 Bps
	Bus protocol	KBR module bus

Mechanical data (except for multisio 1D4-4RO-ISO):

Top hat rail device	Housing dimensions	90 x 36 x 61 mm (H x W x D)
	Mounting type	Wall mounting on DIN rail 7.5 mm deep, in accordance with DIN EN 50022 Suitable for distribution board mounting
	Weight	approx. 100g

Technical data multisio 1D4-4RO-ISO:

Top hat rail device	Housing dimensions	90 x 70 x 61 mm (H x W x D)
	Mounting type	Wall mounting on DIN rail 7.5 mm deep, in accordance with DIN EN 50022 Suitable for distribution board mounting
	Weight	approx. 130g

Standards and miscellaneous:		
Ambient conditions:	Standards	DIN EN 60721-3-3/A2: 1997-07; 3K5+3Z11; (IEC721-3-3; 3K5+3Z11)
	Operating temperature	-5°C ... +55°C
	Humidity	5% ... 95%, non-condensing
	Storage temperature	-25°C ... +70°C
Electrical safety	Standards	DIN EN 61010-1/A2: 2001 + B1: 2002-11 + B2: 2004-1; (IEC1010-1/A2)
	Protection type	IP20 in accordance with DIN EN 40050 part 9:1993-05
	Electromagnetic compatibility	DIN EN 61000-6-3: 2001 + A11: 2004; (IEC61000-6-3) DIN EN 61000-6-2: 2001 (IEC61000-6-2)

10.2 Technical data of the multimax 3D6 basic module

10.2.1 Operating and display elements

Operation	Pushbutton for reset and scan mode (accessible after removal of housing lid)
Control display	6 green LEDs: 5 x input status, 1 x operating status

10.2.2 Device memory

Energy, data and program memory	2 MB RAM battery-buffered / 256k Flash
Memory type	Ring buffer
Long-term memory for max. 160 days, min. 64 hours, depending on memory configuration	Load profile memory: Maximum of 4*3840 entries; 60 / 30 / 15 / 1 min. period duration configurable
Event memory	A maximum of 4096 entries to record tariff switching commands, mains failures, error messages asf.
Parameter memory	non volatile
Password memory	4-digit code

10.2.3 Power supply

Power supply	85 to 265V AC/DC; 50/60Hz
Power consumption	15 VA

10.2.4 Hardware inputs

Digital inputs	As pulse counter input 1 to 5	Digital input for floating contact S ₀ compatible pulse length ≥ 30ms
	As status input	Digital input for floating contact S ₀ compatible, e.g. for synchronization of measuring period; pulse length ≥ 250ms

10.2.5 Electrical connection

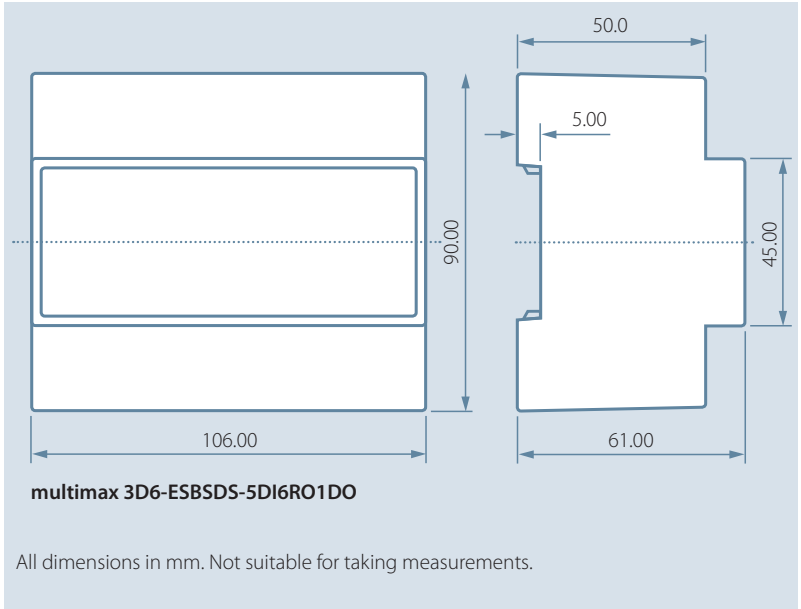
Connection elements		Screw terminals
Max. permissible cross-section of connecting cables		2.5 mm ²
Input power supply	Fuse protection	F1: Recommendation 1A slow-blowing < fuse < 4 A slow-blowing
KBR eBus connection	Connection material	For proper operation please only use shielded twisted-pair cables; e.g. I-Y(St) Y 2x2x0.8
Pulse inputs	Connection and cables	ensure proper polarity!
Synchro-nous input	Connection and cables	ensure proper polarity!
KBR eBus connection	via RS485	Terminal 90 (L) Terminal 91 (A) Terminal 92 (B)

10.2.6 Hardware outputs

Interface	Serial interface	RS 485 for connection to the KBR eBus; a maximum of 32 devices per bus segment, up to 1000 m without bus repeater if placed accordingly, for additional information see installation guide KBR eBus.
	Transmission speed	38400 baud
	Bus protocol	KBR eBus
	KBR eBus address assignment	Can be addressed up to address 9999, scan mode can be activated on the device
Module bus interface	Serial interface	RS 485 (RJ12) for ready-made KBR system cable (modular cable)
Display and configuration interface	Serial interface	RS485 (RJ12)
Relay outputs	Switching stages	5 relays
	Switching capacity	250V (AC) / 2A per relay, potential depending on shared connection
Alarm relay	Switching capacity	250V (AC) / 2A potential-free
1 digital output	S ₀ compatible	max. 35V / 50mA

10.2.7 Mechanical data and dimensioned drawing of the basic module

Top hat rail device	Housing dimensions	90 x 106 x 61 mm (H x W x D)
	Mounting type	Wall mounting on DIN rail 7.5 mm deep, in accordance with DIN EN 50022; suitable for distribution board mounting
	Weight	approx. 650g



10.2.8 Environmental conditions / electrical safety

Ambient conditions	Standards	DIN EN 60721-3-3/A2: 1997-07; 3K5+3Z11; (IEC721-3-3; 3K5+3Z11)
	Operating temperature	-5°C ... +55°C
	Humidity	5% ... 95%
	Storage temperature	-25°C ... +70°C
Electrical safety	Standards and amendments	DIN EN 61010-1: Aug. 2002 (IEC1010-1/A2)
	Protection class	I, in accordance with DIN EN 61010-/August 2002
	Overvoltage category	CAT III: Relay CAT II
	Protection type	IP20 in accordance with DIN EN 40050 part 9: 1993-05
	Electromagnetic compatibility	DIN EN 61000-6-2: 2000-03; (IEC 61000-6-2) DIN EN 61000-6-3: 2000-03; (IEC 61000-6-3); 2005 - 06

10.2.9 Mechanical data and dimensioned drawing of the multimax 3F96-DS display

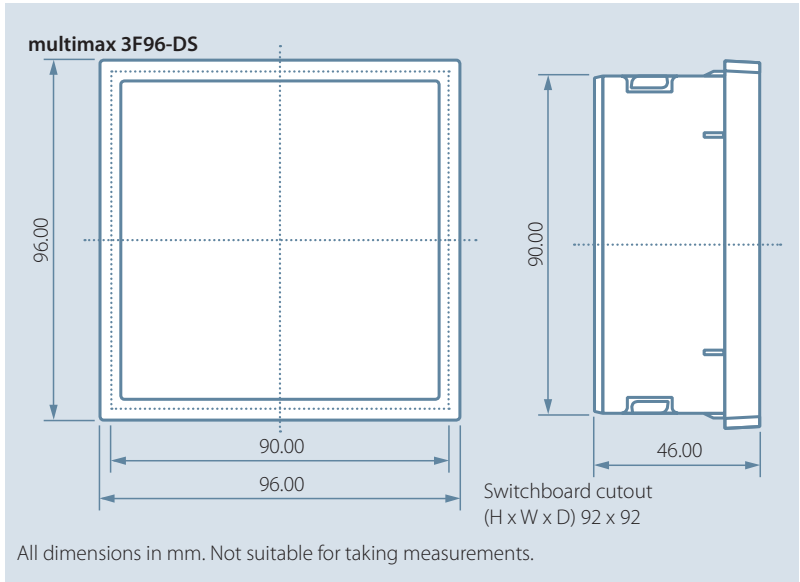
Power supply	Via module bus	ext. 24VDC, 1W,
	Connection	Module bus connector RJ12
Serial interface:	Module bus	RS485 via interface RJ12
	Baud rate	38400
Module bus connection	Connection material	ready-made KBR system cable (6 pole modular cable, unshielded), max. length 30m if placed accordingly

Mechanical data:

Flush-mounted device	Housing dimensions	96 x 96 x 46 mm (H x W x D)
	Assembly cut-out	92 x 92 mm (according to manufacturer's specifications)
	Protection type	Front IP 51
	Weight	approx. 175g

Standards and miscellaneous:

Ambient conditions:	Standards	DIN EN 60721-3-3/A2: 1997-07; 3K5+3Z11; (IEC721-3-3; 3K5+3Z11)
	Operating temperature	-5°C ... +55°C
	Humidity	5% ... 95%, non-condensing
	Storage temperature	-25°C ... +70°C
Electrical safety	Standards	DIN EN 61010-1/A2: 1996-05; (IEC1010-1/A2)
	Protection type	IP20 in accordance with DIN EN 40050 part 9: 1993-05
	Electromagnetic compatibility	DIN EN 61000-6-3: 2005-06; (IEC 61000-6-3) DIN EN 61000-6-2: 2000-03; (IEC 61000-6-2)



10.2.10 Serial interface

Modes of operation and interface configuration

RS 485 bus operation

The RS485 interface of the multimax is designed for operation at the **KBR eBus**. You can operate one or several multimax 3D6 devices together with the **KBR eBus** across great distances. Typically, the bus is connected to the computer via the **KBR eBus TCP** gateway. All bus devices can be configured and displayed with the corresponding Windows® software. We will be glad to provide information on which other devices you can connect to the **KBR eBus** as well as on the functionality of our software.

Information on the structure and technical parameters of the **KBR eBus** can be gathered from our installation guide for the **KBR eBus**. Just send a request for this installation guide.

10.2.11 Protective measures - overvoltage and lightning protection

It is recommended to install overvoltage protection measures to protect our high-quality devices from damage. We also recommend to protect control voltage inputs and pulse lines, if required.

11 Connection of additional modules

With the help of multisio relay output or digital input modules, you can enhance the functionality of your **multimax**. The following section describes the functions of these devices.

11.1 Functional description relay output module multisio 1D4-4RO ISO

The hardware of the **multisio 1D4-4RO ISO** supports 4 floating relay outputs, 5 LEDs and a 8-fold DIP switch.

The relay outputs serve to control contactors of consumers or other systems.

The module can be accessed by a master device (**multimax 3D6**, **multisio 5D6** or higher, or a computer with **visual energy** via **multisys 3D2-ESBS**) using the module bus interface. The master device has to configure the module.

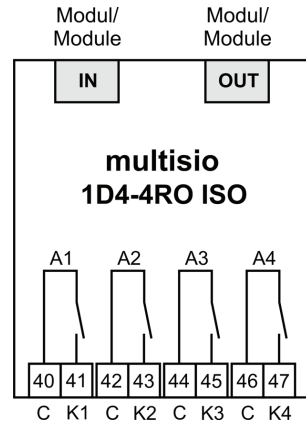
The operating voltage is supplied via the module bus interface.

11.2 Relay output module connection chart

Terminal assignment

- Terminal 40: Input relay 1 (A1)
- Terminal 41: Output relay 1 (A1)
- Terminal 42: Input relay 2 (A2)
- Terminal 43: Output relay 2 (A2)
- Terminal 44: Input relay 3 (A3)
- Terminal 45: Output relay 3 (A3)
- Terminal 46: Input relay 4 (A4)
- Terminal 47: Output relay 4 (A4)

IN / OUT:
Module bus / supply voltage



Note

The module relay outputs are designed as floating outputs.

11.3 Relay output module LED display

In KBR module bus scanning mode, all 4 output LEDs are flashing. In the module detection mode, the output LEDs generate a running light.

The displays are:

LED1 for: Output relay 1 (A1) switched

LED2 for: Output relay 2 (A2) switched

LED3 for: Output relay 3 (A3) switched

LED4 for: Output relay 4 (A4) switched



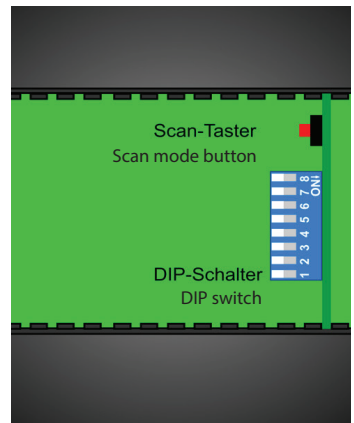
Power LED: Operating voltage

11.4 Function of scan button



Note

If the scan button is pressed briefly, the module enters the scanning mode.



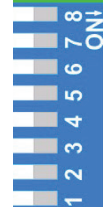
11.5 Function of the DIP switches

Mode of operation:

For every output, the **multisio 1D4-4RO ISO** differentiates between the operating modes "normal" and "manual". Switching is performed via the DIP switches 5 to 8.

The DIP switches are assigned to the outputs as follows:

- DIP switch 5 determines the operating mode of output 1
- DIP switch 6 determines the operating mode of output 2
- DIP switch 7 determines the operating mode of output 3
- DIP switch 8 determines the operating mode of output 4



If the DIP switch is set to off, the respective output is in the normal operating mode. If the DIP switch is set to on, the respective output is in the manual operating mode.

Switch setting illustrated:

OFF = white

ON = gray

Normal operating mode

In the normal operating mode, the state created in the module is issued at the corresponding output.

Manual operating mode

In the manual operating mode, the state of DIP switches 1 to 4 is issued at the corresponding output, instead of the state created in the module. The DIP switches are assigned to the outputs as follows:

- DIP switch 1 determines the state of output 1
- DIP switch 2 determines the state of output 2
- DIP switch 3 determines the state of output 3
- DIP switch 4 determines the state of output 4

If the DIP switch is set to **off**, the output is passive / off. If the DIP switch is set to **on**, the output is active / on.

11.6 DIP switch settings

Mode of operation DIP		State DIP		Explanation
S5	Off	--	--	Output 1 = normal operating mode
	On	S1	Off	Output 1 = manual operating mode passive / off
			On	Output 1 = manual operating mode passive / off
S6	Off	--	--	Output 2 = normal operating mode
	On	S2	Off	Output 2 = manual operating mode passive / off
			On	Output 2 = manual operating mode passive / off
S7	Off	--	--	Output 3 = normal operating mode
	On	S3	Off	Output 3 = manual operating mode passive / off
			On	Output 3 = manual operating mode passive / off
S8	Off	--	--	Output 4 = normal operating mode
	On	S4	Off	Output 4 = manual operating mode passive / off
			On	Output 4 = manual operating mode passive / off

11.7 Functional description digital input module multisiso 2D2-4DI

The hardware of the **multisiso 2D2-4DI** supports four digital outputs.

If the input is shorted out, the module detects it as active. An open input is detected as passive.

When connecting, observe the correct polarity of electronic switches.

The 4 input LEDs indicate the state of the digital inputs, the power LED indicates if there is operating voltage or not.

The digital inputs can be used for different purposes, for example as status input or counter input.

The module can be accessed by a master device (**multimax**, **multisiso xD6** (from 5D6-ESBS- 5DI6RO1DO) with module bus, multicom with module bus or via computer with **visual energy** via **multisys 3D2-ESBS / multisys 3D2-BSES**) using the module bus interface. The master device has to configure the module and read out the data acquired by the module for further processing.

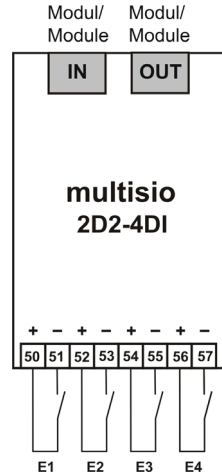
The operating voltage is supplied via the module bus interface.
The module cannot be used on its own.

11.8 Digital input connection chart

Terminal assignment

- Terminal 50: Digital input 1 +
- Terminal 51: Digital input 1 -
- Terminal 52: Digital input 2 +
- Terminal 53: Digital input 2 -
- Terminal 54: Digital input 3 +
- Terminal 55: Digital input 3 -
- Terminal 56: Digital input 4 +
- Terminal 57: Digital input 4 -

IN / OUT:
Module bus / supply voltage



11.9 Digital input module LED display

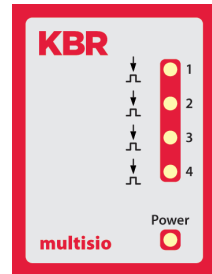
In KBR module bus scanning mode, all 4 input LEDs are flashing.

In the module detection mode, the input LEDs generate a running light.

The displays are:

- LED1 for input 1
- LED2 for input 2
- LED3 for input 3
- LED4 for input 4

Power LED on:
Operating voltage is applied



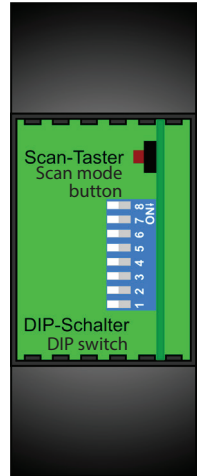
The LEDs at the digital input module indicate the current state of the digital input. If the input is active, the LED is lit. If the input is passive, the LED is off.

11.10 Function of scan button



Note

If the scan button is pressed briefly, the module enters the scanning mode.



11.11 Function of the DIP switches

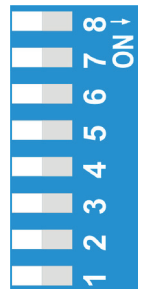
Mode of operation:

For every input, the **multisio 2D2-4DI** differentiates between the operating modes "normal" and "manual". Switching is performed via the DIP switches 5 to 8.

The DIP switches are assigned to the inputs as follows:

- DIP switch 5 determines the operating mode of input 1
- DIP switch 6 determines the operating mode of input 2
- DIP switch 7 determines the operating mode of input 3
- DIP switch 8 determines the operating mode of input 4

If the DIP switch is set to Off, the respective input is in the normal operating mode. If the DIP switch is set to On, the respective output is in the manual operating mode.



Switch setting illustrated:

OFF = white

ON = gray

Normal operating mode

In normal operation, the current state of the respective input is processed.

Manual operating mode

In the manual operating mode, the state of DIP switches 1 to 4 is issued at the corresponding input, instead of the state. The DIP switches are assigned to the inputs as follows:

- DIP switch 1 determines the state of input 1
- DIP switch 2 determines the state of input 2
- DIP switch 3 determines the state of input 3
- DIP switch 4 determines the state of input 4

If the DIP switch is set to **Off**, the input state is processed as passive / off.

If the DIP switch is set to **On**, the input state is processed as active / on.

11.11 DIP switch settings

Mode of operation DIP	State DIP		Explanation	
S5	Off	-- --	Input 1 = normal operating mode	
	On	S1	Off	Input 1 = manual operating mode passive / off
			On	Input 1 = manual operating mode passive / off
S6	Off	-- --	Input 2 = normal operating mode	
	On	S2	Off	Input 2 = manual operating mode passive / off
			On	Input 2 = manual operating mode passive / off
S7	Off	-- --	Input 3 = normal operating mode	
	On	S3	Off	Input 3 = manual operating mode passive / off
			On	Input 3 = manual operating mode passive / off
S8	Off	-- --	Input 4 = normal operating mode	
	On	S4	Off	Input 4 = manual operating mode passive / off
			On	Input 4 = manual operating mode passive / off

**ERKLÄRUNG DER KONFORMITÄT
DECLARATION OF CONFORMITY
DÉCLARATION DE CONFORMITÉ**

Wir **KBR GmbH Schwabach**
We/Nous (Name des Anbieters / supplier's name / nom du fournisseur)

**Am Kieferschlag 7
D-91126 Schwabach**

(Anschrift / address / adresse)

erklären in alleiniger Verantwortung, dass das (die) Produkt(e) /
declare under our sole responsibility that the product(s) / Déclarons sous notre seule responsabilité, que(s) le(s) produit(s)

multimax 3D6-ESBDS-5DI6RO1DO

(Bezeichnung, Typ oder Modell oder Seriennummer / name, type or model or serial number / nom, type ou modèle, N° de lot ou de série)

mit folgenden Europäischen Richtlinien übereinstimmt (übereinstimmen)
is (are) in conformity with the following directives / Répond(e)nt aux directives suivantes

Niederspannungsrichtlinie Nr.
Low Voltage Directive No.
Directive Basse Tension N°

2006/95/EG
2006/95/EC
2006/95/CE

EMV-Richtlinie Nr.
EMV Directive No.
EMV Directive N°

2004/108/EG
2004/108/EC
2004/108/CE

Dies wird nachgewiesen durch die Einhaltung folgender Norm(en)
This is documented by the accordance with the following standard(s) / Justifié par le respect de la (des) norme(s) suivante(s)

DIN EN 61010-1:2001;

DIN EN 61010-1/B1:2002

DIN EN 61010-1/B2:2004

DIN EN 61000-6-1:2007

DIN EN 61000-6-2:2005

DIN EN 61000-6-3:2007

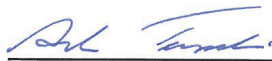
DIN EN 61000-6-4:2007

(Titel und/oder Nr. sowie Ausgabedatum der Norm(en))
Title and/or number and date of issue of the standard(s)
Titre et/ou numéro et date d'édition de la (des) norme(s)



Schwabach, 06.07.2011

(Ort und Datum der Ausstellung)
Place and date of issue
Lieu et date de l'édition)



Geschäftsführer
General manager

Basic settings form	multimax
---------------------	----------

Customer	Date
System	Comment
Put into operation on date, by company, Mr/Ms	

Settings

General parameters	Settings	
Target value selection		one value, switching input, list of target values
Target value 1		kW
Target value 2		kW
Target value 3		kW
Switching input target value 2		E 00 to E 50
Switching input target value 3		E 00 to E 50
Degree of optimization		%
period duration		Min.
Switching interval		sec.
Period synchronization type		external, internal, bus, tariff switching
Minimum monitoring		yes, no
Target value tracking		off, month, year
Value target value tracking		%
external compensation value	—	not supported
Energy type		0 to 99 (0=current)
Unit		kW, MW, m ³ /h
Limit max. Pact 1		kW
Limit max. Pact 2		kW
Limit max. Pact 3		kW
Limit min. Pact		kW
Address limit relay max. Pact		A 40 to A 47
Address limit relay min. Pact		A 40 to A 47
Tariff switching		Bus, internal, input
Start LT		hh:mm
End LT		hh:mm

I/O parameters	Settings	
Synchronous pulse input		E 00 to E 50
Tariff switching input		E 00 to E 50
Alarm relay output A49 open		A 00 to A 50 additional
Prewarning contact A 48 open		A 00 to A 50 additional

General parameters	Settings	
Prewarning contact TYPE		negative compensation power higher than available breaking power
		Cumulated power higher than power warning threshold
		Trend power higher than power warning threshold
		Off (output deactivated)
Warning threshold		%
Hysteresis		kW
Minimum on time		Minutes
Minimum off time		Minutes
Period time-out		Minutes
Output address prewarning contact	—	fixed A48

Counter inputs	Settings	
Input 1		+/- E00 to E 50
Pulse value		P./kWh
Voltage transformer transformation		
Current transformer transformation		
Input 2		+/- E00 to E 50
Pulse value		P./kWh
Voltage transformer transformation		
Current transformer transformation		
Input 3		+/- E00 to E 50
Pulse value		P./kWh
Voltage transformer transformation		
Current transformer transformation		
Input 4		+/- E00 to E 50
Pulse value		P./kWh
Voltage transformer transformation		
Current transformer transformation		

Counter inputs	Settings	
Input 5		+/- E00 to E 50
Pulse value		P./kWh
Voltage transformer transformation		
Current transformer transformation		

Error message dialog	Settings	
E 01 Power failure		message, message and alarm relay, off
E 02 Limit violated		message, message and alarm relay, off
E 04 Synchronous pulse missing		message, message and alarm relay, off
E 05 Reset performed		message, message and alarm relay, off
E 07 Error message		message, message and alarm relay, off
E 09 Ptarg exceeded		message, message and alarm relay, off
E 15 Module bus error		message, message and alarm relay, off
E 17 Pcum > Ptarg		message, message and alarm relay, off
E 18 Limit Pact-Max violated		message, message and alarm relay, off
E 19 Limit Pact-Min violated		Message, message and alarm, off
E 22 Counter pulse 1 failure		message, message and alarm relay, off
E 22 Counter pulse 2 failure		message, message and alarm relay, off
E 22 Counter pulse 3 failure		message, message and alarm relay, off
E 22 Counter pulse 4 failure		message, message and alarm relay, off
E 22 Counter pulse 5 failure		message, message and alarm relay, off
Daylight saving time		auto, off
Start daylight saving time		Month 01 to 12
End daylight saving time		Month 01 to 12
Bus address		KBR eBus
Ethernet IP address		
Subnet mask		
Gateway IP address		
Display parameters		
Contrast		%
Brightness		%
Dimmer brightness		%
Dimmer time		Delay in minutes
Password		digits (four)

Line parameters	Settings	
Line address		A 01 to A 32 (fixed)
Line description		
Consumer power		kW
Priority		1 to 32
Consumer TYPE		Standard, thermal consumers
Switching relay for line switch-off		open / closed
Line active		yes / no
Mode		Auto, manual_on, manual_off
Address feedback input		E 00 to E 50
Type of feedback		Release auto, manual_on, manual_off
Input address Pact real		E 00 to E 50
Emergency switch-off in case of error		yes / no
Period time-out		Minutes
Lead time		Seconds
Follow-up time		Seconds
Minimum on time per day		Hours
Minimum on time		Minutes
Minimum off time		Minutes
Maximum off time		Minutes (e.g. for chopping operation)

Additional parameters thermal consumers		
Input address main switch		E 00 to E 50
Input address thermostat		E 00 to E 50
Optimization in the heating up phase		yes / no
Optimization in the continuous heating phase		yes / no
Maximum on time		Minutes (e.g. for chopping operation)

Settings checked and corrected if required:		
Datum: (Date:)		
Signature KBR service technician:	on behalf of	
Signature customer		

Output lines energy control system

Line No.	Stat. No.	Consumer description	Contact open on switch-off	P_{tar} kW	Line active	Priority	Contact for feedback	Time-out minutes	shortest on time in minutes	longest off time in minutes	shortest off time in minutes	Emergency switch-off in case of malfunction
1.												
2.												
3.												
4.												
5.												
6.												
7.												
8.												
9.												
10.												
11.												
12.												
13.												
14.												
15.												
16.												

Output lines energy control system

Line No.	Stat. No.	Consumer description	Contact open on switch-off	P_{targ} kW	Line active	Priority	Contact for feedback	Time-out minutes	shortest on time in minutes	longest off time in minutes	shortest off time in minutes	Emergency switch-off in case of malfunction
17.												
18.												
19.												
20.												
21.												
22.												
23.												
24.												
25.												
26.												
27.												
28.												
29.												
30.												
31.												
32.												

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