

The Sign of Quality  
Made in Germany

# KG-T 500

Kühlgerät  
Cooling unit

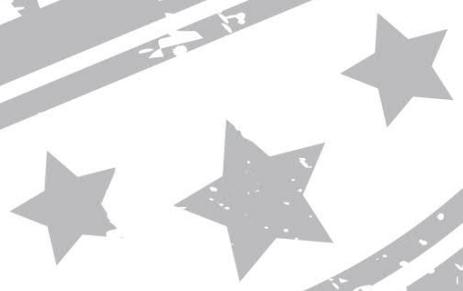




**HIGH QUALITY**

**100%**

**MADE IN  
GERMANY**



**EXCELLENT SERVICE**

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## 1. General description

The cooling unit KG-T 500 is controlled by an internal microprocessor. It has been designed to run high speed spindles like in cool ambience conditions. You are able to use it nearly for all types of spindles and cooling blocks. The maximum range of spindle power is 2000W.

The KG-T 500 has an integrated and intelligent cooling fluid control. It depends on the temperature of the cooling fluid. According to requirements the fan power will be set to get more or less cooling power. This system runs always in an automatic mode and the users do not need any setting before starting or during operating.

On the front panel you have a LCD-Display. It shows all modes of run and errors.

Display shows:

- ✓ Operating hours and Software Version
- ✓ Temperature of return  $T_R$  [°C] and air temperature  $T_A$  [°C]
- ✓ Fan power [30-100%]
- ✓ Cooling fluid flow \* [l/min]
- ✓ Error messages

An internal relay shows the status of 'ready to operate' of the KG-T500. This relay has the opportunity to be used as a normally open or as a normally close contact. By power on or in standby the relay will be energized. In an error case it will be set off.

The tank of the cooling fluid has a volumetric capacity about 1,5 liters. Use distilled water with additives as cooling fluid. The current fluid level is shown at the front panel, look at marks for maximum and minimum range.

The KG-T 500 has an integrated follow-up timer. When a STOP signal was send to the cooling unit, the cooling process will still keep going on for a defined time. Therefore the endurance of your spindle will be extended and spindle services will be coming at a later date. So you are able to reduce costs.

## 2. Safety instructions

In case of current overload or short circuit you have to be ensured, that the KG-T 500 will be disconnected to power supply.



The cooling unit should never operate in an unsupervised run.

Be careful by filling the tank of the KG-T 500. Wrong bearing fluid should be immediately taken off by a sponge or a try cloths.

Before filling the KG-T 500 with cool fluid, please check the power supply. It should be separated from the cooler und control the de-energized mode of the system.

Before starting the KG-T 500 please check all screw connection, cables, pipes and gaskets.

Use only specified pipes like described in capture 3.

## 3. Technical Data

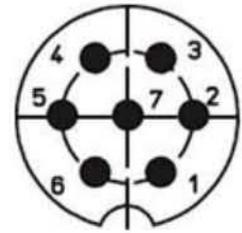
TECHNICAL DATA	
Nominal Voltage	100 - 250 V <sub>AC</sub> / f=50Hz
Start input voltage	max. 24V <sub>DC</sub>
Power input	80W
Cooling power	max. 500W by ambient temperature <23°C
Relais details	max. 30W (30V <sub>DC</sub> / 1A)
Fuses	2A
LCD-Display	16x2 Matrix
Dimension (WxHxD mm)	438 x 131,5 x 308
Pipe aperture	Ø8 mm (outside diameter)
Cool fluid	Distilled water additives to protection against corrosion) (with
Tank volume	1,5 l
Flow rate	max. 3,6 l/min.
Pressure	1,4 bar

## 4. Connector pin list

### 4.1 Connector electric

#### ✓ Pinning of Control-Connector X1 (female)

Pin 1:	Relay normally open (NO)	Pin 5:	Input (start signal)
Pin 2:	Relay collective contact	Pin 6:	Output 24V <sub>DC</sub>
Pin 3:	Relay normally close (NC)	Pin 7:	disconnected
Pin 4:	GND (0V)		



female connector X1  
KG-T 500

#### ✓ Status of KG-T500: Relay contact on connector X1

Status KG-T500	Status of relay	Normally open (Pin1-2)	Normally close (Pin3-2)
Power ON Standby / KG-T500 in work	energized	Relay contact close	Relay contact Open
Error / Power OFF	not energized	Relay contact open	Relay contact Close

#### ✓ Connector X1 digital signals:

X1/4: GND (internal 0V)

X1/5: Input start signal	→	$U_{\text{Input}} = 24 \text{ V}_{\text{DC}}$	→ KG-T 500 = ON
	→	$U_{\text{Input}} = 0 \text{ V}_{\text{DC}}$	→ KG-T 500 = OFF
X1/6: Output power supply		$U_{\text{out}} = 24 \text{ V}_{\text{DC}}$	( $I_{\text{max}} = 50\text{mA}$ )

#### ✓ Mains voltage:

Input voltage: 100 ... 250 V<sub>AC</sub>

### 4.2 Connector cooling fluid

Connector A1      Flow forward (fluid to spindle)

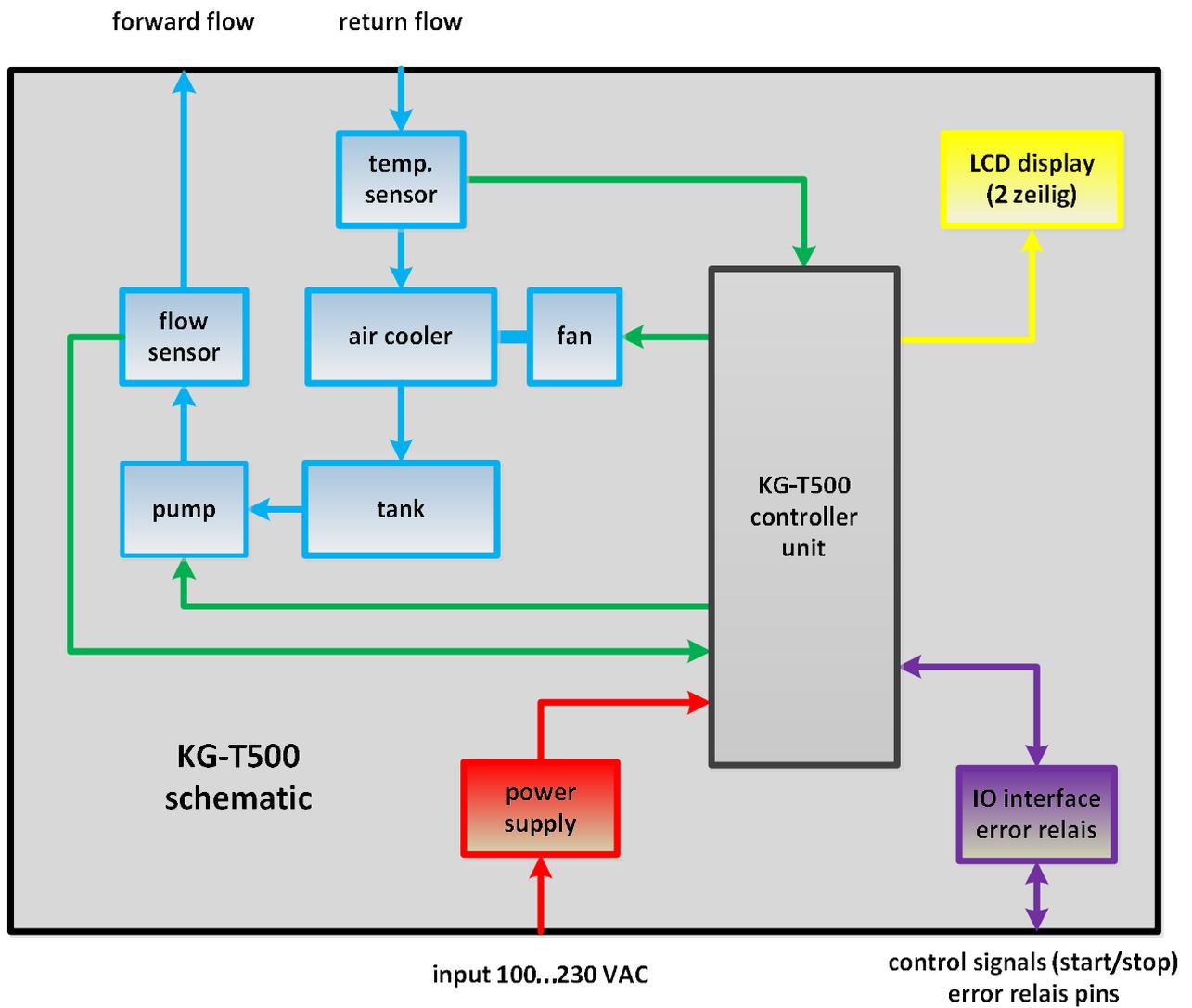
Connector A2      Flow return (fluid from spindle)

Connector A3      Fill port

#### Info:

The scope of delivery include 2 plug nipples (Typ NW5/DN5) for a hose with an inside diameter of 6mm.

## 5. Block diagram

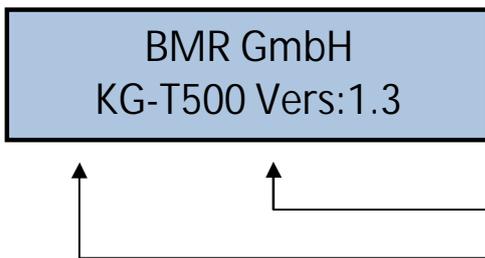


## 6. Display

On the front panel you have a 16x2 LCD display which shows all modes of the KG-T 500.

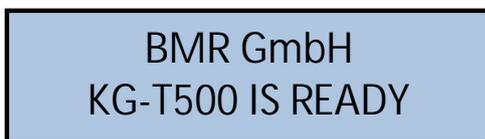
All these messages are possible:

- ✓ Startup:

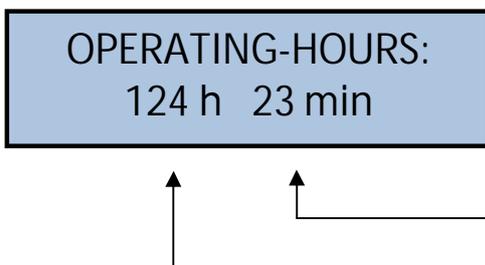


Software Version  
Typ of cooler

- ✓ Ready mode (waiting for a start signal):



- ✓ Operating time:



Minutes (0 – 59 min)  
Hours (max. 60.000 h)

✓ Normal mode (RUN):

Tr: 23C      \*1,2 L/min  
Ta: 21C      FAN: 80%

← Flow



Fanpower (30 – 100%)

Temperatures: Return Tr and Air Ta

✓ Error message: FAN

ERROR! FAN STOP  
Check FAN

Fan failed

✓ Error message: FLOW

ERROR! NO FLOW  
Check FLOW

Flow is less than 0,5l/min

✓ Error message: Over temperature

ERROR! TEMP>50C  
!!! STOP !!!

Fluid temperature to high

✓ Nachlaufsteuerung:

STOP in 5 Min.  
Temp. RL: 26C

← Follow-up timer

No start signal, autocontrol activ

## 7. Initial operation

At first, check the KG-T 500 for external damages of transport.

Connect the fluid pipes of the spindle with the KG-T 500 :

- Fluid from the KG-T 500 to the spindle set on connector 1 (Flow forward)
- Fluid from the spindle to KG-T 500 set on connector 2 (Flow return).



**DANGER: Before filling the tank with cool fluid, please check the power supply. It should be separated from the cooler unit and control the de-energized status of the system.**



Now open the tank and fill it to its maximum level. Be careful by doing this.

Now use the BMR power cable to set the main supply of 100 ... 250V<sub>AC</sub> to the system.

Start the KG-T 500 with the main power bottom at the front panel.

When you read "KG 500 IS READY" on the display you are able to go on with the initial operation.

Next step you need an external start signal of 24V<sub>DC</sub> on connector block X1/5. You have the possibility to use the internal start voltage on pin X1/6. Therefore you have to make a bridge between pin X1/5 and pin X1/6.

By the first time of running you have to refill again the tank to its maximum level. How often you have to repeat that, depends on the length of your pipe system. Refill your KG-T 500 so often until you reached a constant fill level and your tank is free from air bubbles.

Make a leak test at the end of your first run.

## 8. Description of operation

After power on the KG-T 500 shows the software version on the display. After a few seconds the operating hours appear on the LCD. When you can read „KG 500 IS READY“ the initiation has been finished. The KG-T 500 is ready to start. The status relay will be energized until the system is ready or in a cooling process. In an error case the status relay will be de-energized.

You need an external start signal on connector X1/5 to start cooling process. If there is no start signal the KG-T500 will be set into a standby mode.

The fan power depends on the temperature measurement and it will be automatically controlled by the mainboard. The minimum fan power is 30%, the maximum range is 100%. The control of the fan power will be set in steps of 10%.

To start the KG-T 500 you have to set an external signal of 24V<sub>DC</sub> von Pin X1/5. The cooling unit starts with a power of 30%. Under a temperature of 26°C the fan control will be set to 30% constantly. By a temperature more than 26°C the fan control will be switched on. By an increasing fluid temperature the fan power will be forced up, too.

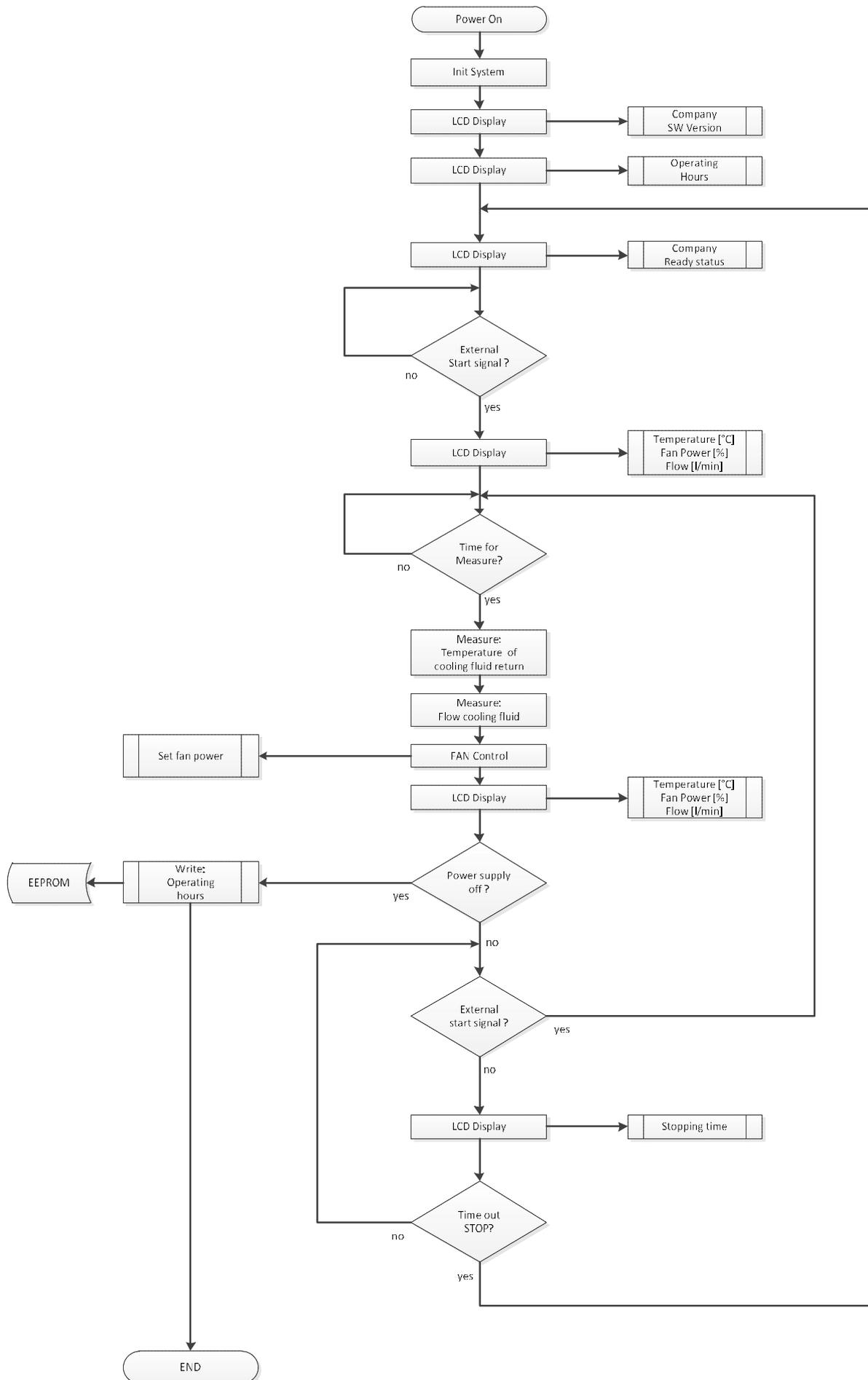
When the cooling fluid temperature suddenly increases more than 40°C, the KG-T 500 turns into an “QuickCooling” mode. In this mode the fan power will be set to its maximum range of 100%. By falling fluid temperature, the fan power will be reduced to a minimum necessary level.

To stop the cooling process you have to remove the start signal on pin X1/5, set to ground (0V). The cooling unit didn't stop immediately, an autotracking function will be started. The integrated follow-up timer has 2 different times to load. It depends on the last temperature measurement.

- ✓ Temperature > 30°C      Stop in 5 min
- ✓ Temperature ≤ 30°C      Stop in 1 min

The remaining time to stop and the current temperature will be shown on the display. When the KG-T 500 operates in autotracking mode it's possible to make a restart anytime.

## 9. Flow chart



## 10. Error messages

When an error appears, it's shown on a blinky display and you can hear an alarm signal. Until an error exists the status relay will de-energized. The relay is connected to X1 pin1-3.

You have to analyse the reason for the error and you have to eliminate it quickly. When error has been removed the message on the display will be cleared automatically. If there is no more error the status relay will be energized again.

The cooling capacity of the KGT 500 stands during an error message not fully available! The cause of the error should be rectified immediately.

### Error message on display:

✓ **ERROR! FAN STOP**  
Check FAN

Reason: Fan breakdown or closed.

Relief: Send KG-T 500 to BMR Company. Service!

✓ **ERROR! NO FLOW**  
Check FLOW

Reason: Flow of fluid to less ( $< 0,5$  l/min).

Pipes are closed.

Less cooling fluid.

Relief: Check fluid level at front panel, refill the tank.

Check flow forward and return at KG-T 500.

✓ **ERROR! TEMP>50°C**  
**!!! STOP !!!**

Reason: Temperature of cooling fluid to high ( $Tr > 50^{\circ}\text{C}$ ).

Relief: Stop spindle drive immediately.

Check data sheet of the spindle, which temperature range is allowed? Higher temperature range is sometimes possible.

## 11. Installation

To assembly the KG-T 500 into a spindle system you need a horizontal under-floor. We allow an addition to the horizontal of maximum 10°. More addition may be causes failure of fluid run. Leakage fluid can damage the KG-T 500.

The aspirating holes of the cooling unit are on the floor panel. When they are closed the cooling power of the KG-T 500 will be decrease and the efficiency factor decreases, too. Keep them always clean and open.

The air delivery ports are on the rear side. Please keep a distance of minimum 10 cm to a wall.

The coolant hoses should be kept as short as possible. For too long cooling hoses reduce the coolant flow! We also recommend a minimum hose diameter of 6mm.

## 12. Service and care

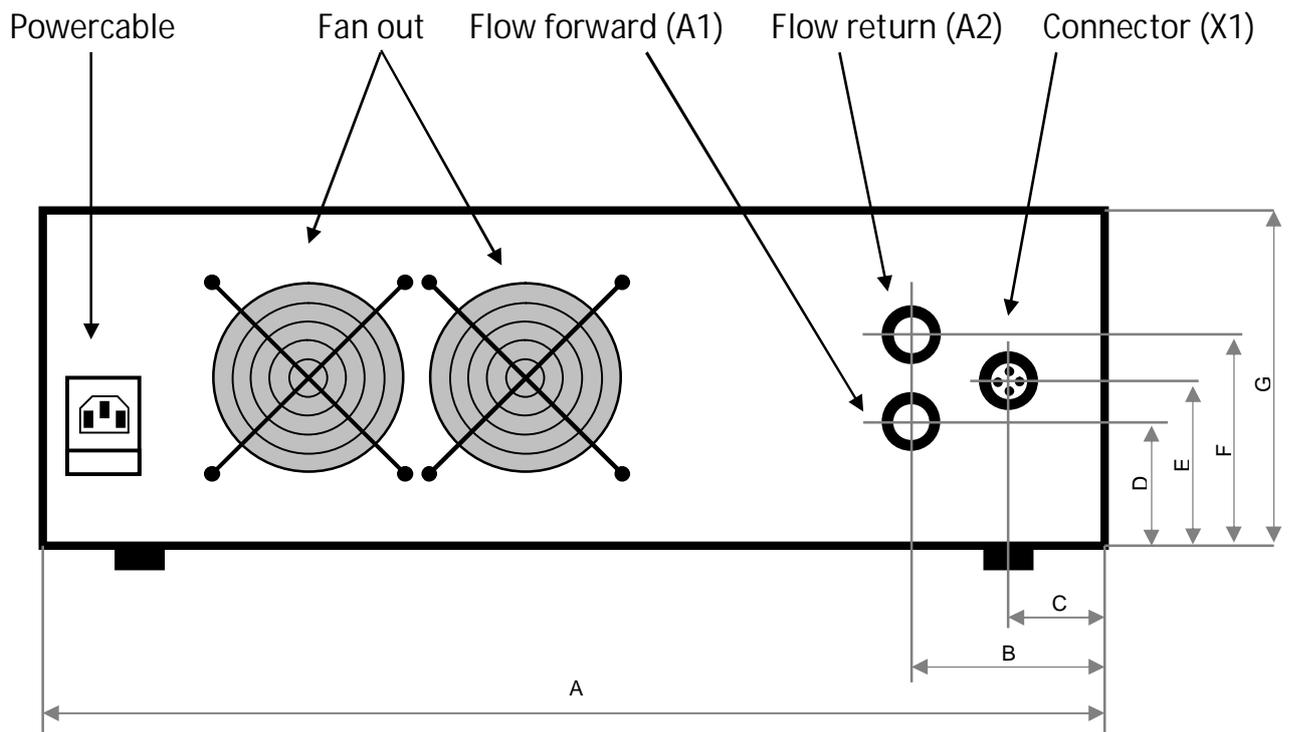
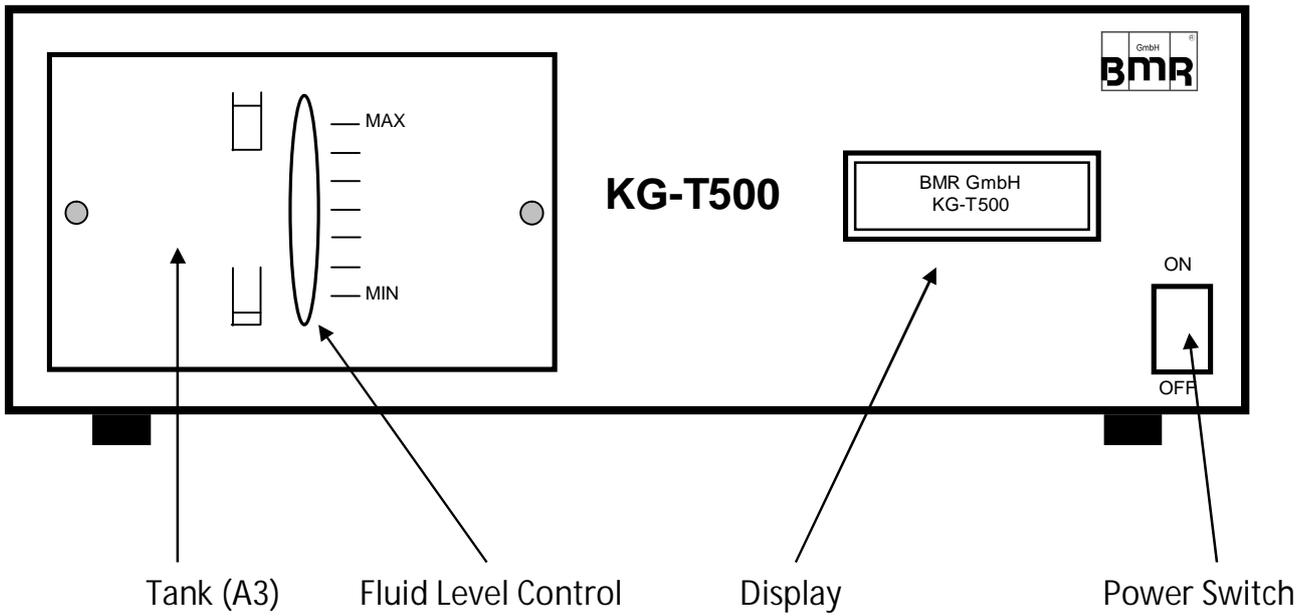
Before starting the KG-T 500 please check the cooling fluid level at the front panel.

We advise you to change the cooling fluid after 4–6 weeks. When you see floating particle inside the tank please change cooling fluid immediately. A lot of floating particle can plug pipes and heat exchanger.

Please control all aspirating holes and delivery ports.

After 2000 operating hours we recommended to send the KG-T 500 to the BMR company for after-sale service and machine care.

### 13. Engineering detail



A = 438mm

D = 40,0mm

G = 131,5mm

B = 81,5mm

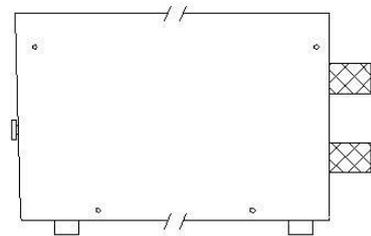
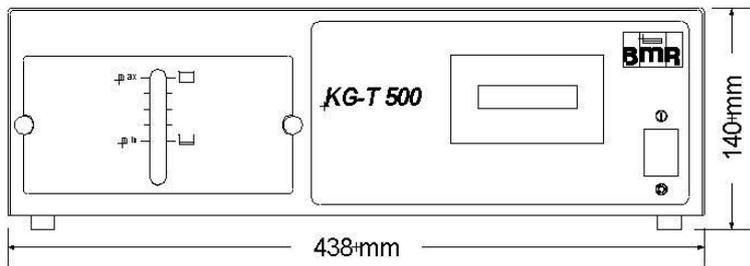
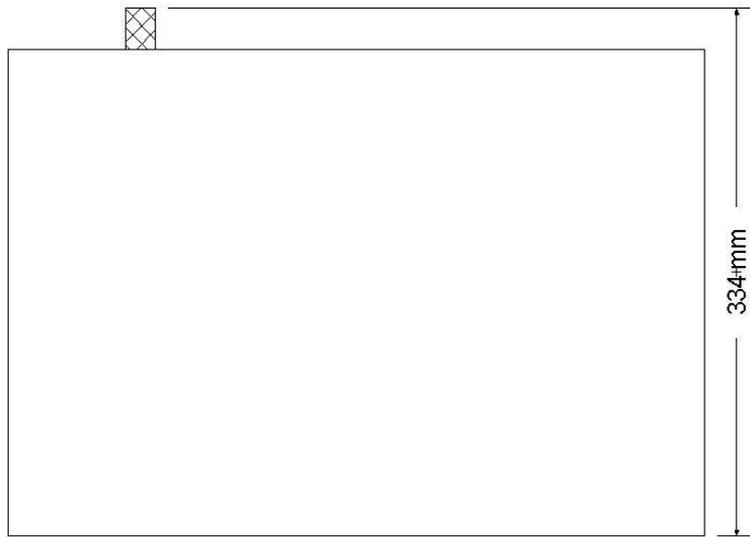
E = 65,5mm

F = 90,0mm

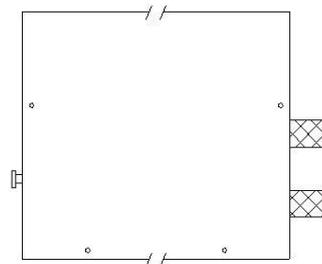
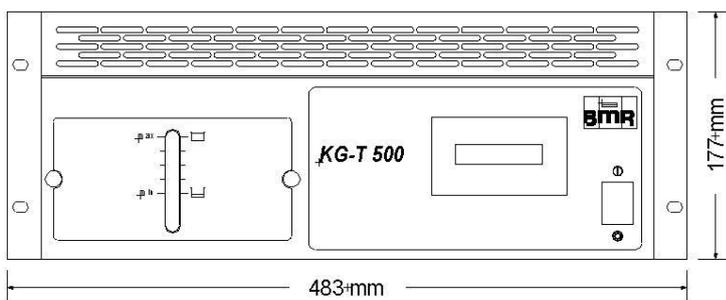
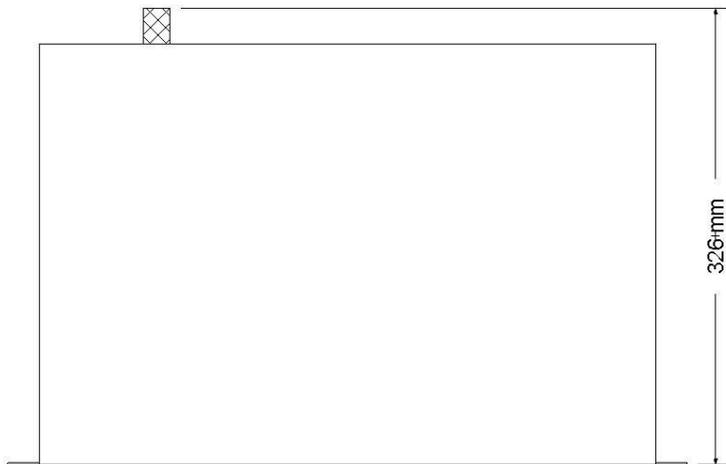
C = 41,5mm

Deepness = 340mm (without any connectors)

## Desktop Device



## 19" Rack



## 14. Scope of delivery

- 1 x Cooling Unit KG-T 500
- 1 x Plug connector (7 pins female)
- 2 x Male coupling NW5 / DN5 for coolant hose (6mm inside diameter)
- 1 x Hooper
- 1 x 2 liter freezing agent or concentrate for 2l
- 1 x power cable

## 15. Accessories

- ✓ 1l freezing agent
- ✓ Male coupling NW5(Ø 6mm diameter)
- ✓ Male coupling NW5(Ø 8mm diameter)
- ✓ Male coupling NW5(Ø 9mm diameter)

# ONE PRODUCT IS NOT ENOUGH MORE PRODUCTS OF BMR GMBH

## Sealing Air Follow-Up Control

Nominal voltage: 24VDC (+/- 10%)  
 Start input voltage: max. 24 V<sub>DC</sub>  
 Power consumption: 7W  
 Relay details: 30V<sub>DC</sub> / 1A; 60V<sub>DC</sub> / 0,3A; 125V<sub>DC</sub> / 0,5A  
 Accu: 12V / 1,5Ah



- ✓ The solution for monitoring and control of the sealing air of the machine
- ✓ Life time extension for all spindles operated in wet ambient conditions
- ✓ Protection against dripping fluids even at power off by sealing air overshoot time
- ✓ Full control for integration into PLC by I/O

## SFU 0156 „Remote-Control“

Als Option ist ein Fernsteuer-Adapter zum direkten Anschluss an das I/O Interface an der Stiftleiste SL2 verfügbar.



- ✓ On option a remote controller is available which can directly be connected with the I/O interface at SL2. By this, the required duty speed can be adjusted with a potentiometer and the converter can be started and stopped with a rocker switch. The status of the digital outputs is indicated on LEDs.
- ✓ All required voltages are generated within this adapter, so the converter can be controlled and tested very easily. A quick test and setting into action of the converter becomes possible even without external control signals.

## Spindle-Illumination-Ring

Don't you know the problem, that despite of lighting systems, exactly at the point where you need to see something, a shadow appears or there is too less light?



With the new spindle illumination ring of BMR GmbH this problem belongs to the past!

## Spindles

High - frequency spindles are essential in today's adaption technology. Each application requires a specific solution.



...and many more!







# OUR QUALITY COMMITMENT

100%	„Made in Germany“
100%	precision
100%	reliability
100%	support
100%	flexibility



**Subject to technical alterations.  
August 2017**



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