KNX Actuators   24VDC
Application Description
Product Page
SK08-Ventil4   Valve Control 4-fold

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HVAC
ACT

KNX Actuators Heating	Product Group 1

On-wall KNX-Control for Heating Actuators:

The actuator control SK08-Ventil4 enables the control of up to 4 actuators or mixing valves in the heating / cooling system. There are 0-12VDC for linear control valves or a 24VDC PWM for thermal control valves in the heating / cooling system avaiable.

Additional supply of 24 .. 32 VDC necessary

ETS-Application:	**Arcus-Ventil4_v13.knxproj**

SK08-Ventil4	Article	Article Desciption	Article-No.
KNX		Document: 2910_ex_SK08_Ventil4.pdf	
	SK08-Ventil4	Control of up to 4 actuators or mixing valves Additional voltage:: 24 .. 32 VDC Plastic housing: 115 x 65 x 55 mm On-wall mounting IP54/65	65102008

1 Application Description

Operating Principle and Areas of Application

The actuator control **SK08-Ventil4** enables the control of up to 4 actuators or mixing valves in the Heating / cooling system.

There are 0-12VDC for linear control valves or a 24VDC PWM for thermal control valves in the heating / cooling system avaiable.

The **SK08-Ventil4** are set up using the ETS (KNX Tool Software) with the associated application program.
The device is delivered unprogrammed.
All functions are parameterized and programmed by ETS.
The controller can be switched on or off by activation or locking via the KNX bus.

Functions

- Operating modes: heating and cooling
- Flushing function and energy requirement
- Setting options in case of misconduct
- Setting of different types of controller
- up to 4 independently adjustable valves
- Lead temperature

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2 ETS Parameter und Objects

2.1   General

Device: 1.0.1 SK04-Ventil4

General	Timeout on Change of Operation Mode	0	Minutes
Flush Control	Valve 1 .. 4 Current Limit [mA]	250	
Heat Request			
Error Control			
Valve Control			

General - Parameter

Parameter	Setting	Description
Timeout on Change of Operation Mode	0 - 255 minutes	If you switch between heating and cooling, the control for the set time remains inactive.
Valve 1..4 Current Limit [mA]	50 - 500	

2.2 Flush Control

Flush Control   -   Parameter

Parameter	Setting	Description
Direction	Output Input	**Output:** The flushing is performed by time control. **Input:** The flushing is performed by object control.
if „Direction" = Output		
Cycle Time	1 - 12 weeks	Cycle of the automatic flushing
Active Time	0,5 - 10 minutes	Duration of the automatic flushing
Send Cyclically, if active	No Yes	
if „Send Cyclically, if active" = Yes		
Cycle Time	10 - 60 seconds	

Flush Control   -   Objects

Objects	Description
33 : Output, Flush	**Parameter „Direction" = Output** It is issued if the time control flushing is active or inactive.
33 : Input, Flush	**Parameter „Direction" = Input** With this object, the flushing can be activated manually.

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2.3 Heat Request

Heat Request   -   Parameter

Parameter	Setting	Description
Invert	No Yes	Inverts the **Object 35 : Output, Heat Request**
Send Cyclically, if active	No Yes	
if „Send Cyclically, if active" = Yes		
Cycle Time	10 - 60 seconds	

Heat Request   -   Objects

Objects	Description
34 : Input, Heat Request	Heat request with logical „1"
35 : Output, Heat Request	The current value of **Object 34 : Input, Heat Request** is taken over on the **Object 35** and is readable. With the **Parameter „Invert"** the object can be inverted. If the **Parameter „Send Cyclically, if active" = „Yes"**, the **Object 35** are sent cyclically, as indicated in the **Parameter „Cycle Time"**.

2.4 Error Control

Error Control   -   Parameter

Parameter	Setting	Description
Inactivity Timeout	none : 0,5 - 10 minutes	If a valve is not responding, an error is issued. This time setting for all **Parameters „Use Inactivity Timeout"** valid.
Send Cyclically, if active	No Yes	
if „Send Cyclically, if active" = Yes		
Cycle Time	10 - 60 seconds	

Error Control   -   Objects

Objects	Description
37 : Output, Error Valves	DPT 27.001 Bit combined info On/Off
38 : Output, Error Values	DPT 27.001 Bit combined info On/Off

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www.arcus-eds.de

Rigaer Str. 88 , 10247 Berlin
sales@arcus-eds.de

Tel.:   +49 / (0)30 / 2593 3914
Fax.:   +49 / (0)30 / 2593 3915

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2.5 Valve Control

Valve Control   -   Parameter

Parameter	Setting	Description
Controller Type	none PI Controller with PWM Output PI Controller with Steady Output Steady Input with PWM Output Steady Input with Steady Output Switching Input with Switched Output 2 Point Controller with switched Output	
Use Break Detection	No Yes	Current Min >= 10% Current Limit
Lead Temperature	No Yes	**Yes:** It opens a parameterization possibility for the lead temperature. *see 2.6 Lead Temperature* The **Object 36 : Lead Temperature** is active

Valve Control - Objects

Objects	Description
0, 8, 16, 24 Input, Temperature Valve 1-4	
1, 9, 17, 25 : Input, Setpoint Valve 1-4	
2, 10, 18, 26 : Output, Steady Controller Valve 1-4	
3, 11, 19, 27 : Input, Switched Controller Valve 1-4	
4, 12, 20, 28 : Output, PWM Controller Valve 1-4	
5, 13, 21, 29 : Input, Lock Controller Valve 1-4	With these inputs can lock the corresponding controller.
6, 14, 22, 30 : Input, Force Controller Valve 1-4	With these inputs, the valves can put in a forced position. *see 2.7 Valve X*
7, 15, 23, 31 : Input, Operating Mode Valve 1-4	With these inputs, the control direction is determined „0" oder „1".
36 : Input, Reference Temperature	*see 2.6 Lead Temperature*

2.6 Lead Temperature

Lead Temperature - Parameter

Parameter	Setting	Description
Minimum Reference [°C]	-30 - 100	It can be realized a weather-compensated temperature control.
Maximum Reference [°C]	-30 - 100	To determine the reference variable to affect the set point, these three parameters are indicated.
Setpoint adjustment [°C at Maximum Reference	-30 - 100	$\Delta x_W = \Delta x_{max} * (W - W_{min}) / (W_{min} - W_{max})$

Example:
To cool a room, the set point, when set at 22° C, should be raised in such a way that the temperature difference between outside and inside is not greater than 6 K. This applies when the outdoor temperature increases to between 28°C to 38°C. The parameters should be set in the following way: Wmin = 28, Wmax = 38, ÄXmax = + 10.
For an outdoor temperature of 30°C, the set point of the temperature controller would increase by 10*(30 - 28)/(38 - 28)=2K to 22+2=24°C.
At 38°C outdoor temperature the set point remains constant at 32°C.

An increase in the set point produces a positive parameter value while a decrease in the set point produces a negative parameter value for ΔX_{max} .

Lead Temperature - Objects

Objects	Description
36 : Input, Lead Temperature	Lead Temperature, e.g. from an external sensor.

2.7 Valve X

Valve X   -   Parameter

Parameter	Setting	Description
Send Period	0 - 255 minutes	Sending period of the controller outputs. If „0" is only sent when changed. Not available if **Parameter „Valve Control" Controller Type = Steady Input with Steady Output** set.
Force Value [%]	0 - 100	Percentage forced position of the valve when the **Object 6 : Input, Force Controller X = 1**
Use Inactivity Timeout	No Yes	**Yes:** If an inactivity (error behavior) over a defined time, the valve is set in a forced position. The position is specified with the **Parameter „Error Value [%]".** The time is set with the **Parameter „Error Control" - „Inactivity Timeout"**
if „Use Inactivity Timeout" = Yes		
Error Value [%]	0 - 100	Tantamount as **Parameter „Force Value [%]".** However, in the event of a fault automatically.
Not available if Parameter „Valve Control" Controller Type = Steady Input with Steady Output is set.		
Minimum Gap	0 - 20	Values above zero, the valve at a certain distance from the stop is considered closed.
Maximum Gap	80 - 100	Values below 100, the valve at a certain distance from the stop is considered open.

2.8 Controller PI-Internal

Controller PI-Internal   -   Parameter

Parameter	Setting	Description
Temperature Settings		
Offset	(-10) - 10	Offset setting for the temperature value (measured value)
Use Internal Setpoint	No Yes	
If „Use Internal Setpoint" = Yes		
Setpoint	0 - 100	Setting of the setpoint value in °C
Store External Setpoint	No Yes	

Controller PI-Internal   -   Parameter   (Fortsetzung)

Parameter	Setting	Description
Regulator Settings		
Type	Symmetrical Asymmetrical	If the system is heating **or** cooling, the setting is preferable Symmetrical. If the system is heating **and** cooling, the setting is preferable Asymmetrical.
Proportional Band	0 - 10	*see 2.13 Notes*
Integration Time	0 - 255 minutes	*see 2.13 Notes*
Steady Controller		
Hysteresis	0 - 15%	With the hysteresis immediate response of the controller can be avoided by short-term fluctuations of the actual temperature.
Operation Mode	Cooling Heating	Operating mode changeover

2.9 PWM Output

PWM Output - Parameter

Parameter	Setting	Description
Send Cyclical	No Yes	
Period	10 seconds at 100 minutes	Period duration of the PWM
Hysteresis [%]	0 - 100	With the hysteresis an unwanted occurrence of intermediate pulses can be avoided.
Invert Output	No Yes	

2.10   Steady Output

Steady Output   -   Parameter

Parameter	Setting	Description
Send Cyclical	No Yes	
Minimum Linear Voltage	0 - 12	Setting the minimum and maximum output voltage.
Maximum Linear Voltage	0 - 12	
24V Always On	No Yes	**No:** 24VDC not available at the terminal. **Yes:** 24VDC is constantly at the terminal.
if „24V Always On" = No		
24V On (Vout > 0)	No Yes	**No:** 24VDC not available at the terminal. **Yes:** 24VDC is available at the terminal if Vout > 0.

2.11 Valve X / Switched Output

Valve X / Switched Output   -   Parameter

Parameter	Setting	Description
Force Value	0 1	Forced position of the valve when the ***Object 6 : Input, Force Controller X = 1***
Use Inactivity Timeout	No Yes	**Yes:** If an inactivity (error behavior) over a defined time, the valve is set in a forced position. The position is specified with the **Parameter „Error Value"**. The time is set with the **Parameter „Error Control" - „Inactivity Timeout"**
if „Use Inactivity Timeout" = Yes		
Error Value	0 1	Tantamount as **Parameter „Force Value"**. However, in the event of a fault automatically.
Switched Output		
Invert Output	No Yes	

2.12 Switched Output

Switched Output   -   Parameter

Parameter	Setting	Description
Send Cyclical	No Yes	
Temperature Settings		
Offset	(-10) - 10	Offset setting for the temperature value (measured value)
Use Internal Setpoint	No Yes	
if „Use Internal Setpoint" = Yes		
Setpoint	0 - 100	Setting of the setpoint value in °C
Store External Setpoint	No Yes	
Temperature Hysteresis	0 - 5 °C	A hysteresis can be set.
Operation Mode	Cooling Heating	

2.13   Notes

Controller models available are the PI controller or a two-position controller. Both controllers are equipped with pulsed output.
The pulsed two-position controller works with constant duty cycle, which like the cycle duration is parameterized.
The duty cycle of the pulsed PI controller is variable and depends on the control variable (pulse-width modulation).
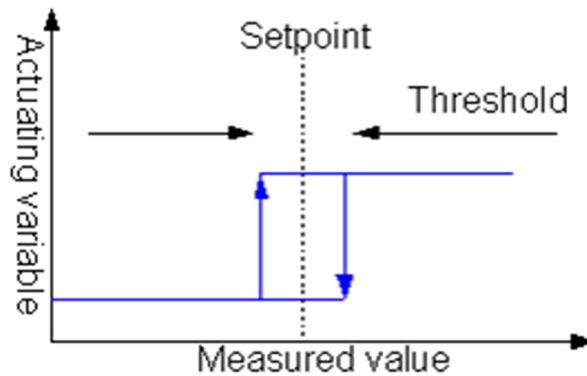
Two-Position Control

Two-position control is a very simple way of controlling.
Once the actual value (± half the switching difference) exceeds or falls below the set point a switch-on or switch-off command is sent to the bus.
Set the differential gap large enough to keep bus load to a minimum and configure the differential gap small enough to avoid extreme actual value fluctuations.

The two-position controller is parameterized using the set point and the switching threshold.

Two-Position Control with Pulsed Output

The controller works analogous to the two-position controller.
The actuating variable emits pulses with fixed duty cycle.

When the control variable reaches 40% in a cycle time of 10 minutes it will repeatedly turned on for 4 minutes and turned off for 6 minutes.
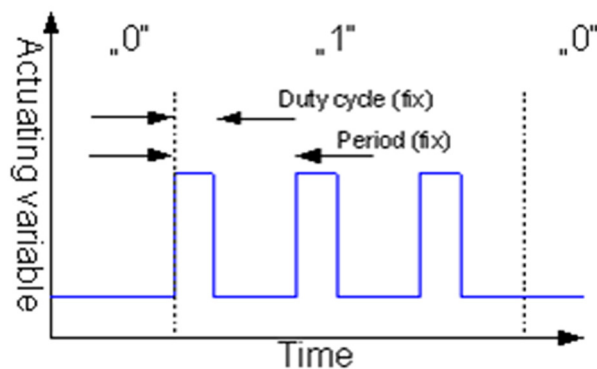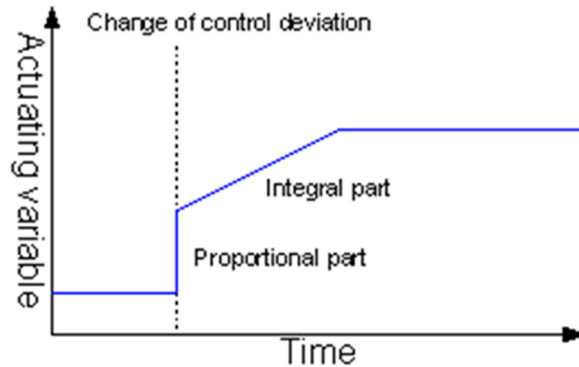
Continuous PI Control

To understand a PI controller one should think of an algorithm consisting of a proportional and integral part.
By combining these two parts it is possible to get a quick and exact adjustment of the actuating variable.

The controller calculates the control variable every second.
It can constantly be updated and is displayed periodically (value parameterized) by the PI controller.

Through the integral part an offset is adjusted to 0 over a certain period of time.

## Continuous PI Control with Pulsed Output (PWM)

The controller works analogous to the PI controller, but the actuating variable emits pulses with a variable duty cycle.

PWM control sets the cycle duration of the transmission interval.
This allows a permanent on and off within the cycle time, which reaches an average valve position.

The duty cycle is determined indirectly via the integration time.
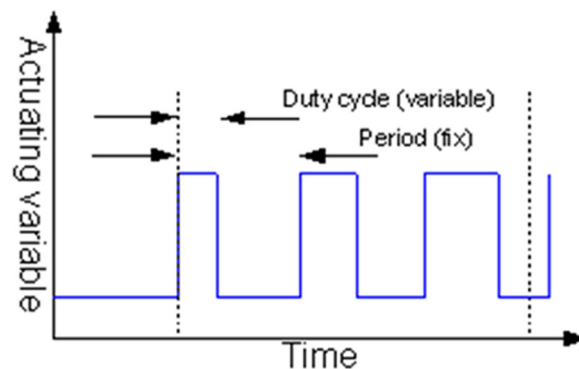
General Rules for Adjusting the PI Parameter

The reset time must be significantly larger than the delay time of the control system.
The proportional area corresponds to the reinforcement of the control circuit.
The smaller the proportional area, the larger the reinforcement is.
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| Parameters	Effect
Low Proportional Area	Quick adjustment to the setpoint. Strong overshoot when setpoint is compensated (continuous oscillation possible).
High Proportional Area	Slow correction of control deviations. No or few overshoots.
Short Integration Time	Rapid correction of control deviations. Danger of continuous oscillation.
Long Integration Time	Slow correction of control deviations. Little danger of overshoots or continuous oscillation.

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3 Product Page

The KNX-Modul **SK08-Ventil4** enables the control of up to 4 actuators or mixing valves in the heating / cooling system.

There are 0-12VDC for linear control valves or a 24V DC-PWM for thermal control valves in the heating / cooling system avaiable.

The device has an integrated KNX bus coupler and needs additional voltage (*see 4. Technical Data*).

The transducer is located in a high-strength, extremely robust stable impact ABS plastic housing. Cover and base have a revolving groove and tongue system with neoprene gasket. The housing is IP54/65.

The sensor is configured with ETS (KNX Tool Software) and the application program. Controlling functions such as signal threshold and diverse adjustments are set using ETS (KNX Tool Software).

Article No.: 65102008
SK08-Ventil4
IP54/65
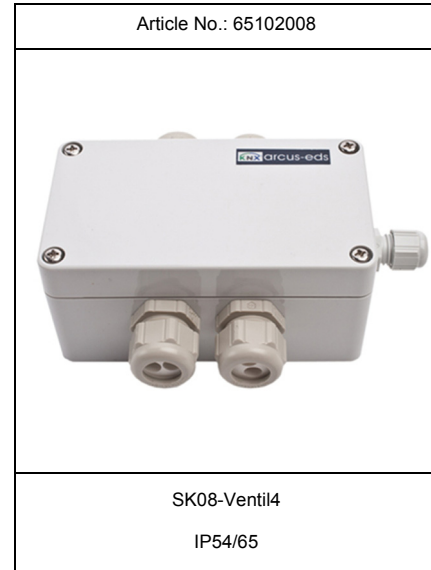
Areas of Application

- control of up to four actuating drives or mixing valves in the heating system
- for linear and thermal control valves

Valves:
linear control valves
thermal control valves

Output
0-12VDC   for linear control valves
24VDC PWM   for thermal control valves

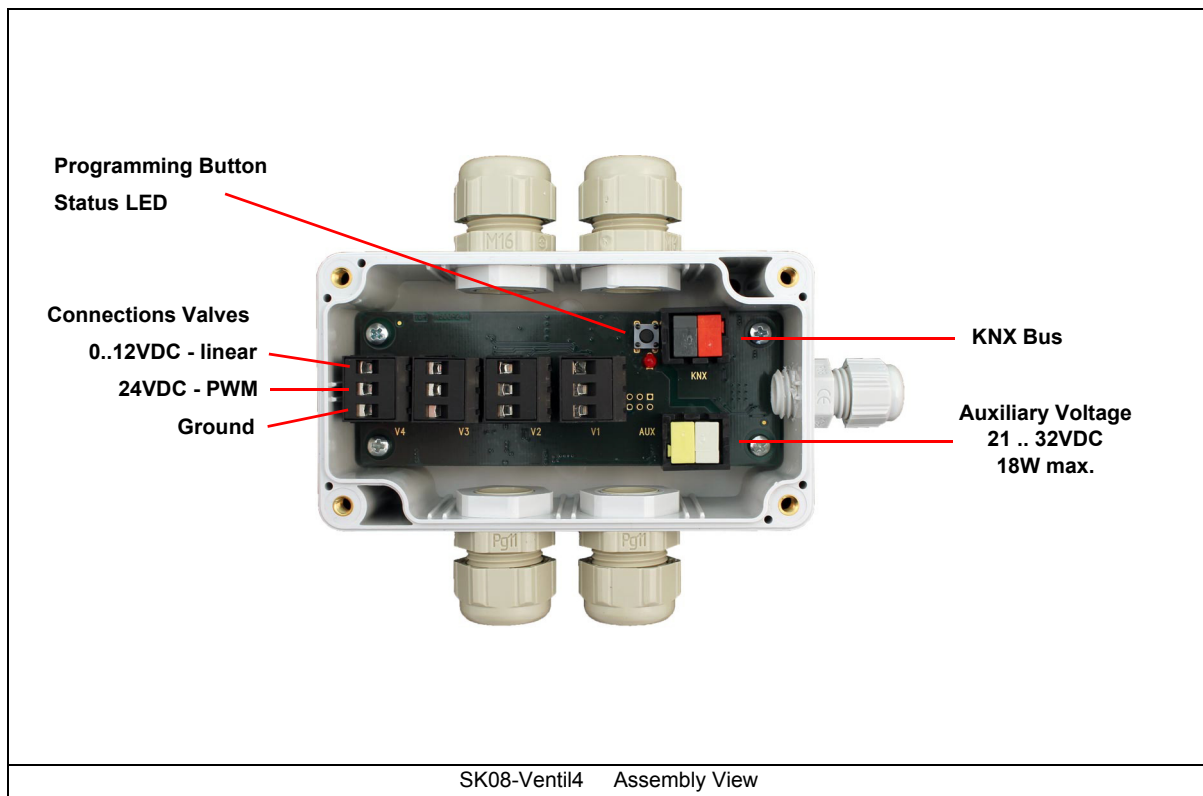|	
Operating Voltage:	21 .. 32VDC
Power Consumption::	approx. 240mW (at 24VDC)
Auxiliary Supply::	9 .. 30VDC / 250mW
Operating Temperature:	-20 .. +45°C
Storage Temperature:	-20 .. +70°C
Protection class:	IP54/65

4 Technical Data

Technical Data   -   SK08-Ventil4

Operating Voltage	KNX Busspannung 21 .. 32VDC
Power Consumption	approx. 240mW (at 24VDC)
Terminal bus voltage	KNX 2-pin terminal (red / black)
Auxiliary Supply	9 .. 32VDC / 18W max.
Terminal Auxiliary Supply	WAGO 2-pin terminal (yellow / white)
Controller Types	PI Controller with PWM Output PI Controller with Steady Output Steady Input with PWM Output Steady Input with Steady Output Switching Input with Switched Output 2 Point Controller with switched Output
Bus Coupler	integrated
Ambient Temperature	Storage -20 .. +85°C Operation -5 .. +45°C
Ambient Humidity	to 95% non-condensing
Start-up with ETS	**Arcus-Ventil4_v13.knxproj**
Protection Class	IP54/65
Casing	ABS plastic grey (115 x 65 x 55) mm (L x W x H)
Article number	65102008

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www.arcus-eds.de   sales@arcus-eds.de   Fax.: +49 / (0)30 / 2593 3915   e3

5 Startup

The KNX Modul **SK08-Ventil4** is set up using the ETS (KNX Tool Software) and the applicable application program.
The sensor is delivered unprogrammed.
All functions are programmed and parameterized with ETS.
Please read the ETS instructions.

The KNX bus are connected via the supplied terminal block (red (+) / black (GND)).
The auxiliary voltage are connected via the supplied terminal block (yellow (+) / white (GND)).
The valves are connected to the terminals according to the wiring diagram (see below).

Programming Button
Status LED
Connections Valves
0..12VDC - linear
24VDC - PWM
Ground
KNX Bus
Auxiliary Voltage
21 .. 32VDC
18W max.

SK08-Ventil4   Assembly View

In Case of Bus Voltage Recurrence

All changes made using the help key for the KNX bus are saved if the device has been correctly parameterized.
The controller and outputs start with their current values and the ETS parameter settings are saved.

Discharge Program and Reset Sensor

In order to delete the programming (projecting) and to reset the module back to delivery status, it must be switched to zero
potential (disconnect the auxiliary supply).
Press and hold the programming button while reconnecting the auxiliary supply and wait until the programming LED
lights up (approx. 5-10 seconds).
Now you can release the programming button.
The module is ready for renewed projecting.
If you release the programming button too early, repeat the aforementioned procedure.

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Editor: Arcus-EDS GmbH, Rigaer Str. 88, 10247 Berlin
Responsible for the contents: Hjalmar Hevers, Reinhard Pegelow
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Please contact us if malfunctions occur. In this case, please send the device including a description of the error to the company's address named below.

Manufacturer

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