

# Measuring and control system H-Control

## OPERATING MANUAL



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## 3. Safety instructions

Regulations in force, functional tests and checks will provide good value, efficiency and long service life of the measuring and regulation system. Nevertheless, these devices can pose a danger if they are operated by untrained personnel or installed and used in conflict with this manual.

### Electrical equipment



*Electrical equipment warning label! Danger of electrical shock!*

- ! The operation of electrical equipment installed inside the switchboard that is accessible without the use of tools (plastic version), may be performed by operators without electrical qualifications.
- ! Operators can control all devices accessible after opening the switchboard door (main switch, fuses elements, the regulator by using the control buttons, etc.)
- ! In the case of a switchboard that is accessible only with a tool (steel plate design), the

## 1. General

This manual contains important technical and safety instructions. Please read the instructions carefully before installation, operation, or any other work on the measurement and regulation system of the air handling unit.

## 2. Description

The set of measuring and regulation system consists of a power unit, auxiliary circuits, sensors, actuators and digital program regulator. Designs differ in the scope of regulatory circuits and equipment of the air handling unit. The core of this procedure is a switchboard containing the appropriate elements for control and regulation of the air handling unit.

operators without electrical qualification can operate only the devices accessible from the outside of the cabinet (main switch, control panel, etc.).

- ! The main switch is designed for service as well as emergency shutdown.
- ! Joining the switchboard to the mains, connecting devices to matching terminals and performing the operation of these devices can be performed only by operators with electrical qualifications in accordance with Decree No. 50/1978 Coll.

#### Other dangers



*Other risks and dangers warning label!*

- ! Parts of air handling unit with this symbol indicate a risk for the operator. In particular, this applies to spinning parts of the ventilators. Before opening the door with this symbol, turn off the air handling unit using the main switch, or possibly the regulator control elements.

## 4. Installation and operation of the machine

Equipment must be installed and connected by persons with electrical qualifications in accordance with Decree No. 50/1978 Coll. and the relevant regulations!

Switchboard installation should be performed according to the design either directly to the air handling unit or on the wall.

After the installation, the main switch must be located in height of 0.6 to 1.9 m above the control plane.

Access door to the air handling unit and switchboard must be closed during operation.

Use suitable installation tools.

Operate only in accordance with the safety instructions and operating conditions of the manufacturer.

## 5. Repairs and handling of the machine

When working with the switchboard in any way turn off the main switch.

In case of failure of individual components of the

switchboard immediately contact the manufacturer.

The manufacturer is not responsible for mechanical and electrical component damage caused by improper handling or improper wiring and operation of the equipment.

## 6. Transport and storage

Switchboards and components of the measurement and control system are to be transported only properly packed and protected from adverse weather.

The equipment should also be protected against shocks and crashes.

Store this equipment according to the ČSN EN 60721-3-1 norm in the IE12 type of warehouses, in dry and dust-free locations without risk of mechanical damage.

For storage periods longer than one year, check the integrity and functionality of individual elements prior to installation.

## 7. Operating conditions

The switchboard is designed for power system TN-S (one point directly earthed, inanimate parts are connected with this point by protective conductors). Protective conductor PE is conducted separately.

**Power source:** 3, N, PE AC 50 Hz 400V TN-S

**Dimension of the supply line:** According to the wiring diagram

**Protection of the supply line:** According to the wiring diagram

**Designated for environments:** AA5, (AA3 only for the outdoor version), AB4, AD3, AE5, AF2, AG1, AH1, AK1, AL1, AN3, AP1, AQ1, AR2, AS2, BA1

- ! The proper functioning of the air handling unit is conditioned by connecting it to other required systems (heating, cold source, condensate drain, etc.).
- ! Observe the installation and operating instructions of the manufacturer of the controlled air handling unit.

## 8. Putting into operation

Equipment must be installed and connected by persons with electrical qualifications in accordance with Decree No. 50/1978 Coll. and the relevant regulations!

Before connecting to the electrical system, check the air handling unit connection to the grounding system.

To connect the switchboard to the electrical system, remove the front cover plate mounted using four self-tapping screws (RVP switchboard).

Before connecting the mains supply switch off the main circuit breaker of the supply line.

The main supply is dimensioned according to the wiring diagram and is applied to the input terminals of the main switch. Connect the phase conductors starting on the left "U" "V" "W", conductors "N" and "PE" connect to the matching terminals.

Install the cable ducts from the top, bottom or from the side of the switchboard bottom while maintaining the required IP protection.

### 8.1. External devices

External devices unconnected in the factory setting should be attached to the switchboard according to the wiring diagram and instructions for installation or assembly of the individual devices.

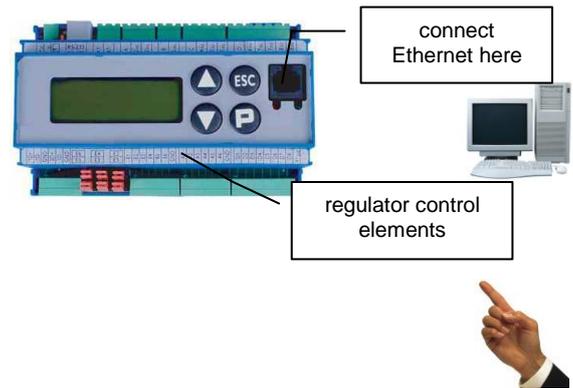
In case of failure of individual components, please contact the manufacturer.

The manufacturer is not responsible for mechanical and electrical component damage caused by improper handling, wiring or installation of the equipment.

## 9. Control options

The air handling unit can be operated in several ways:

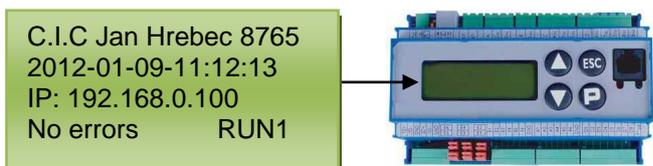
- a) Manual control:  
You control the regulator by buttons on the control panel of the regulator, which is located inside the switchboard.
- b) Ethernet:  
You connect the UTP network cable via connector in front of the regulator by the RJ45 connector. To connect directly to the network card of your PC, use a crossover cable. To connect to the network using a hub, use straight cable (straight-through). For viewing, you can use any internet browser (Internet Explorer, Mozilla Firefox, Opera, Google Chrome, etc.) that supports JavaScript.
- c) Room controller:  
Connect the room controller to the programmable regulator via the RJ12 connector (wiring according to the diagram). The connector is placed on top of the regulator.
- d) Connecting a master system  
In case of control via a master system, the switchboard is equipped with the proper equipment to connect these systems; the connections are described in special instructions.



## 10. Operation and control

### 10.1. Controlling the programmable regulator

The regulator display is able to show 4x20 characters and it serves to show the main operating states of the unit.



*Regulator display*

#### First line

C.I.C. Jan Hrebec 8765

*Displays the company logo and serial number of the unit/switchboard.*

#### Second line

2012-01-09-11:12:13

*Displays the current system time. If the time changes gradually, the regulator works properly. In case the system time has stopped, it is necessary to restart the regulator by disconnecting the power supply.*

#### Third line

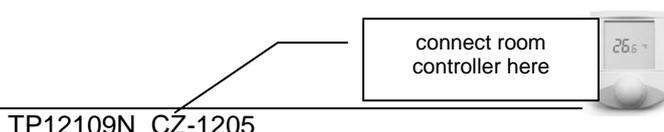
IP: 192.168.0.100

*IP address of the regulator web interface*

The regulator is accessible on the [http:// xxx.xxx.xxx.xxx](http://xxx.xxx.xxx.xxx), website, where you replace xxx with the actual regulator IP address.

#### Forth line

Bez poruchy RUN1



Displays the current state of the system

## 10.2. Manual control (by regulator controls)

### STOP of the machine

Pressing "P" on your regulator keyboard allows you to switch between the STOP state when the unit is stopped and RUN when the unit runs automatically according to set operating points, or time schedule. The bottom right corner of the display shows STOP or RUN a number of operating point, according to which the unit works at the time. If the unit is in the STOP state, it cannot be brought into action in any other way.

### 10.3. Error acknowledgment

Some errors or warnings that may occur when operating the device are displayed until the operator confirms their acceptance (acknowledgment). Such errors can be acknowledged using a Web browser in the "Alarms" window or by the "ESC" button on the regulator keyboard.

The buttons ▲ ▼ are not used.

### 10.4. Control by regulator web access

You connect the UTP network cable via connector in front of the regulator by the RJ45 connector. To connect directly to the network card of your PC, use a crossover cable. To connect to the network using a hub, use straight cable (straight-through).

For viewing, you can use any internet browser (Internet Explorer, Mozilla Firefox, Opera, Google Chrome, etc.) that supports JavaScript.

The regulator is accessible on the [http:// xxx.xxx.xxx.xxx](http://xxx.xxx.xxx.xxx), website, where you replace xxx with the actual regulator IP address.

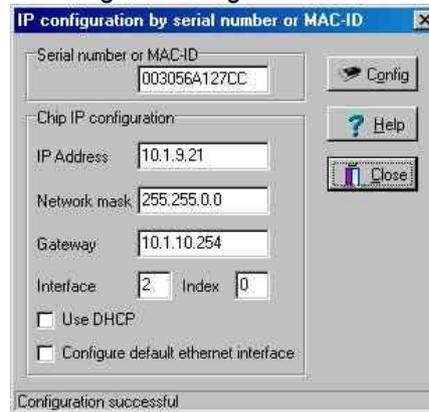
### 10.5. IP address configuration

The IP address of the regulator is best set by the tool "@ CHIPTOOL", which is located on the enclosed CD. After you install and run the program, it automatically finds the regulator, which is located on the local subnet of the computer on which it is running. If the program cannot find the regulator, check the connection (UTP) cables and whether the IP address of the regulator, which is displayed on its screen, is in the subnet of your network connection settings.

The regulator can get the address from the local DHCP server, if it is enabled in the local network, or it can be assigned a fixed IP address, subnet mask and default gateway.



IP address configuration is done in the "@ CHIPTOOL" program, by pressing the right mouse button and selecting "IP Configuration".

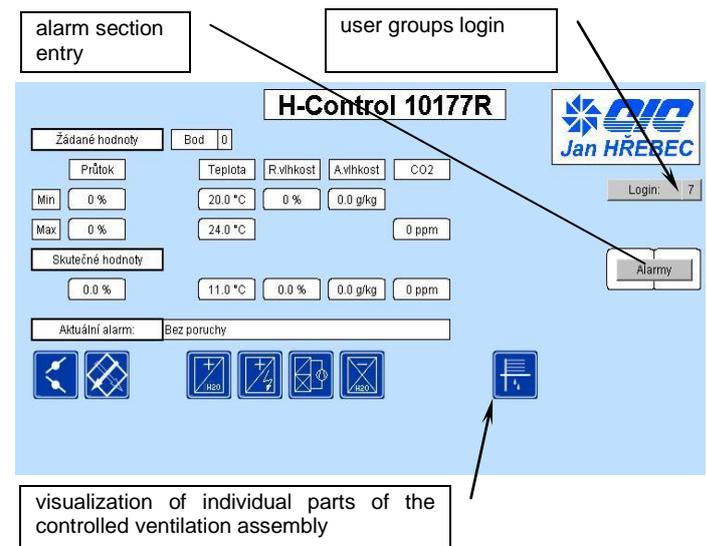


IP address can be set manually, or by checking the "Use DHCP" option you use the address assigned by the DHCP server on your local network. For more information about setting IP addresses see the "Installation H-Control TP12109NI\_CZ" document.

### 10.6. Internet browser

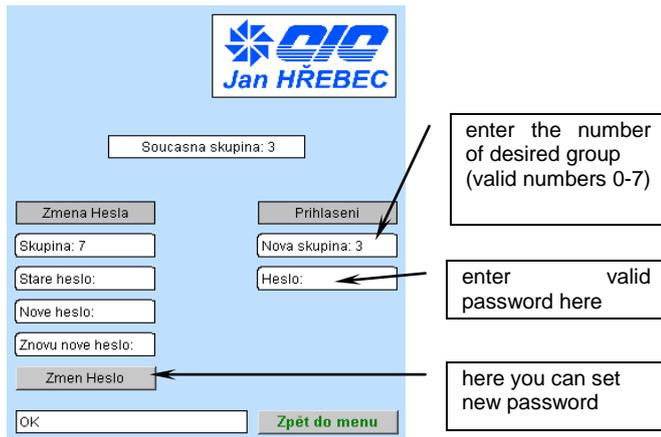
When you start your Internet browser and enter a valid regulator address <http://xxx.xxx.xxx.xxx> (where xxx represents the actual IP address), you will see the main window of the H-Control system.

#### 10.6.1. H-Control system main window



### 10.6.2. System log-in

To edit operating parameters and system settings, log-in by any of the user groups.



To move between user groups use the "Login" button in the main window.

Login groups are selected according to permission to change the operating and service operations of the system.

### Group overview

**7**  
Default setting, no password. Enables to show the main window and alarms.

**6**  
Default setting, no password. Enables to show alarms and weekly schedules.

**5**  
Default setting, no password. Enables to set desired values and weekly schedule.

**4**  
Maintenance setting, with password. Enables to set desired values, weekly schedule and erase the alarm log.

**3**  
Service setting 3, with password. Enables to enter the service level, set the frequency converter, inputs/outputs and operating parameters.

**2**  
Service setting 2, with password. Enables to enter the service level and operate Modbus.

**1**  
Service setting 1, with password. Enables to enter the service level, operate Modbus and set the frequency converter, inputs/outputs, operating parameters and PI regulators.

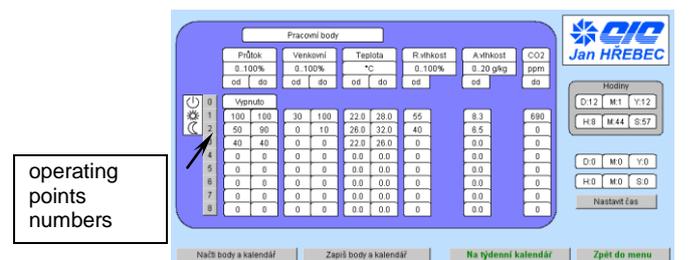
**0**  
Default setting, with password. Enables to change all the parameters.

The factory default password for level "4 Maintenance" is "33". For password for level "Service", ask at the installation/service organization of this system.

### 10.7. Configuration and control of operation

- 1) In case of request for stopping the unit (STOP), the unit stops as a priority (alarm request, the "P" button on the regulator display, EPS digital input, turning off using the remote control).
- 2) If there is no request to stop (STOP) and there is a request for operation according to a certain operating point (digital inputs, switching from the remote control, etc.), the unit works by this point. **If there is a request of running multiple operating points at once, the item with the higher number is activated.** The request for operation according to the given operating point is active immediately.
- 3) If there is neither request to stop (STOP) nor request for operation of the unit and there is a set time schedule, the unit works according to this time schedule specified by the Internet user interface. Run by the time schedule is updated every minute, so any online changes take effect after this update.

You activate the setting of actual operating points values after proper log into system and pressing the "Týdenní program" ("Weekly schedule") button.



Here you enter the values for individual operating points. Depending on the configuration of the unit, you can choose in what range the regulator will maintain:

**required air flow**  
entered in % of rated speed of the fan

**percentage of outside air:**  
gives the mixing ratio of supply of outdoor and indoor air into the unit

**required air temperature:**  
gives the required reference temperature (inlet, outlet, spatial)

**required air humidity:**  
gives the required reference humidity (inlet, outlet, spatial)

**required air quality:**  
gives the required reference quality (inlet, outlet, spatial)

- If the “from” value equals the “to” value, the device works with this value
- If the value is different, the device can regulate the quantity in the selected range

In the case of the request to preserve the values entered even after turning the regulator on/ off, save them using the "Enter points and Calendar" button.

The "Load points and Calendar" button reads the previously saved values from the regulator memory.

If there is override of required values of the current operating point, this change is reflected in the operation of the unit only upon the change of operating point.

Individual entered operating points can be activated by digital inputs of the regulator, remote control, regulator buttons, software thermostats, master system, and weekly calendar or directly by pressing the button at the web interface. **If you require run under more operating points at once, the point with the higher number is activated.**

The “Na týdenní kalendář” (“**Weekly calendar**”) button on the screen sets the weekly schedule.

In one day, you can set up to 6 instants when there is a change of operating point. In the first two fields, enter the hour and minute of the change, in the gray box enter the number of operating point (point 0 = off). **For correct operation of setting choose the time data for individual days in ascending order.** If the time data are not arranged in ascending order or the same activation times are chosen for one day, the time schedule will not work (see a sample picture of weekly schedule setting).



The screenshot shows a weekly calendar interface with a grid for setting operating points. The grid has columns for days of the week (Po, Út, St, Čt, Pa, So, Ne) and rows for hours (HH, MM, Bod). The 'Bod' column contains numbers from 0 to 23, representing the operating point. Below the grid are buttons: 'Načti body a kalendář', 'Zapiš body a kalendář', 'Na nastavení Pracovních bodů', and 'Zpět do menu'.

### 10.7.1. Error messages – Alarms

You can enter the alarm section from the main window by pressing the “**Alarmy**” (“**Alarms**”) button after proper login.

There are two types of errors.



#### Warning (marked yellow)

minor error or emergency operating state without a significant impact on the operation of the air handling unit.

#### Alarm (marked red)

major error or unacceptable operating state with a significant impact on the operation of the air handling unit.

Some errors are still reported even after their termination and you must confirm their acceptance (acknowledge them). For this purpose, there is the “**Kvitovat poruchy**” (“**Acknowledge errors**”) button, which erases the error (if its cause has disappeared) from the list of active errors.

### 10.7.2. Error states

The list of errors:

#### (\* 00 \*) 'Bez poruchy' (No errors)

quiescent condition without errors

#### (\* 02 \*) 'Externi STOP' (External STOP)

stopping the unit by external NC – EPS input

#### (\* 03 \*) 'Pr. filtr1 zanesen' (Sup. filter1 clogged)

it is necessary to change the 1. supply filter

### Alarm Log - Záznam poruch

Cas	Akce	c.	Porucha
Time	Event	No	Alarm
2011-11-24-19:15:08	RLSD	1	Zapnutí jednotky
2011-11-24-19:15:29	START	2	Externi STOP
2012-01-09-11:47:58	START	24	OG Dochlazovani
2011-11-24-19:15:39	START	7	Porucha pr menice
2011-11-24-19:17:43	RLSD	1	Zapnutí jednotky

#### (\* 04 \*) 'Pr. filtr2 zanesen' (Sup. filter2 clogged)

it is necessary to change the 2. supply filter

#### (\* 05 \*) 'Odv.filtr1 zanesen' (Ex. filter1 clogged)

it is necessary to change the 1. exhaust filter

#### (\* 06 \*) 'Odv.filtr2 zanesen' (Ex. filter2 clogged)

it is necessary to change the 2. exhaust filter

- (\* 07 \*) **'Porucha pr. menice' (In. inverter error)**  
error in communication between regulator and input inverter
- (\* 08 \*) **'Porucha odv.menice' (Out. inverter error)**  
error in communication between regulator and output inverter
- (\* 09 \*) **'ZZT porucha menice' (HR inverter error)**  
error in communication between regulator for HRV, or its failure
- (\* 10 \*) **'ZZT PMO' (HR AFP)**  
antifreeze protection of plate exchanger
- (\* 11 \*) **'OV mráz!' (WH freeze!)**  
antifreeze protection of water heater
- (\* 12 \*) **'OV mráz var.' (WH freeze warn.)**  
antifreeze protection of water heater activated
- (\* 13 \*) **'OE prehrati 60' (EH overheating 60)**  
slight (operational) overheating of electrical heater (60 °C)
- (\* 14 \*) **'OE prehrati 80' (EH overheating 80)**  
serious overheating of electrical heater (80 °C – protective elements must be started manually)
- (\* 15 \*) **'TC-Nizky.tlak' (HP-low pressure)**  
heat pump – there is a refrigerant leak or circuit blockage
- (\* 16 \*) **'TC-Vys.tlak' (HP-high pressure)**  
heat pump –blocked circuit or insufficient condenser cooling
- (\* 17 \*) **'Sled fazi' (Phase sequence)**  
in the power system there has been a change in phase sequence. Heat pump blocked.
- (\* 18 \*) **'Porucha zvlhcovace' (Humidifier failure)**  
steam humidifier failure
- (\* 19 \*) **'Watchdog'**  
system restart
- (\* 20 \*) **'TC-Vysoka KonTeplota' (HP-High ConTemp)**  
low or no condenser cooling, condenser fan not working
- (\* 21 \*) **'CI-Porucha invertoru' (CI-Inverter failure)**  
inverter condensing unit failure
- (\* 22 \*) **'CV-Zamrz. vymeniku' (WC-Exchanger freezing)**  
water cooler antifreeze protection
- (\* 23 \*) **'TC-Porucha kompresor' (HP-Compressor failure)**  
error in communication between regulator and compressor inverter, or its failure
- (\* 24 \*) **'OG Dochlazovani' (GH Additional cooling)**  
operational additional cooling of gas heater
- (\* 25 \*) **'OG Porucha horaku' (GH Burner failure)**  
gas burner failure
- (\* 26 \*) **'CP Porucha kond.jedn' (CP Cond. u. failure)**  
condensing unit failure
- (\* 27 \*) **'OV Porucha cernadla' (WH Pump failure)**  
overheating or failure of water heater circulation pump

You can see failure history by pressing the “Log” button (failure history).

You can get back to regulator webpage by pressing the “Back” button in your Internet browser.

## 11. Control by room controller

Room controller is used to display and set basic operational states of the air handling unit.

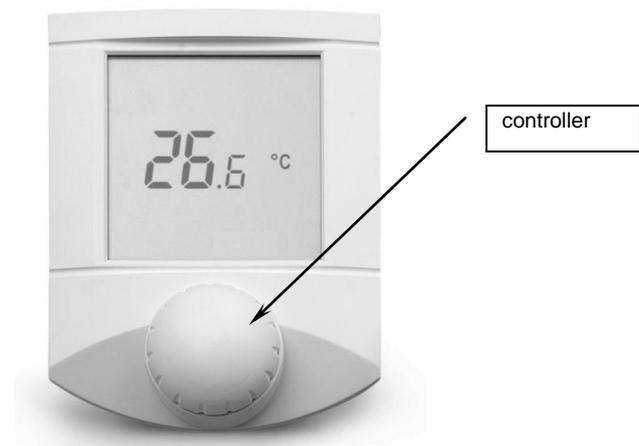
The full control of the air handling unit should only be done using the web interface of the master regulator.

Currently used operating point is shown on the controller display as follows:

0	☰	Off
1	☼	Day operation
2	☾	Night operation
3		Empty building
4		Full building
5		Party
6		Tempering
7		Operating point No. 7
8		Operating point No. 8

By default, the display shows the current temperature and the current time (if the system controls other variables, it is possible to view these as well). These data are periodically alternating. In the case of error of data communication with the unit, there is an interruption of time update on the display.

**Rotate the controller** to change the desired temperature. By pressing it confirm the desired value.



**By pressing the controller** you can switch between the following states:

- ☰ Off
- ☼ Operating point No. 1
- ☾ Operating point No. 2
- ☉ Time Schedule (Operating point No.3)

**By pressing the controller longer** (1.5 s) you open the selection of other adjustable parameters.

You can adjust (by rotating the controller the flashing group changes):

40 % rH

- the desired humidity (in units with humidity regulation)
-  80 % -
- the required minimum amount of fresh air (in units with mixing)
-  ppm CO<sub>2</sub>
- the desired amount of CO<sub>2</sub>
-  A
- the required minimum fan speed:  
A – automatically following the web setting  
M – manually 50/75/100 %

Upon changing the operating point, the data changed via the controller (temperature, humidity) is set back to the original values entered through the web interface. Fan speeds are still set by the room controller.

Other displayed signs:

The numbers 1 2 3 4 5 6 7 indicate the day of the week.

-  unit is heating
-  unit is cooling
-  warning (low priority alarm)
-  alarm – the description of the error is displayed on the regulator display and at its web interface

## 12. Maintenance

The recommended minimum periodic maintenance is to be performed 2 times a year at a time before the coming winter and summer periods. We recommend that you check the overall functionality of the air handling unit and measurement and control system. In particular, check antifreeze protection, rotation flaps, free running of fans, functionality of the control system, correction of thermometers and other sensors, etc. Repair and maintenance work must be performed by trained technical staff in accordance with applicable safety and operating regulations! It is necessary to check the tightness of the motor terminal blocks and other power terminals, if used.

## 13. Warranty terms

The product is under warranty according to the conditions specified in the purchase contract.

## 14. Contacts

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Specifications are subject to change by the manufacturer without notice.