FLUKE

Reliability

Deployment Planning Guide

Before you buy

Fluke 3563 Analysis Wireless Vibration Sensor

Deployment Planning Checklist:

- ☑ **Step 1:** Select your assets (equipment) for remote monitoring
- ☑ **Step 2:** Determine test points for sensor installation
- ☑ **Step 3:** Determine number of gateways required
- ☑ **Step 4:** Confirm availability of wireless connectivity

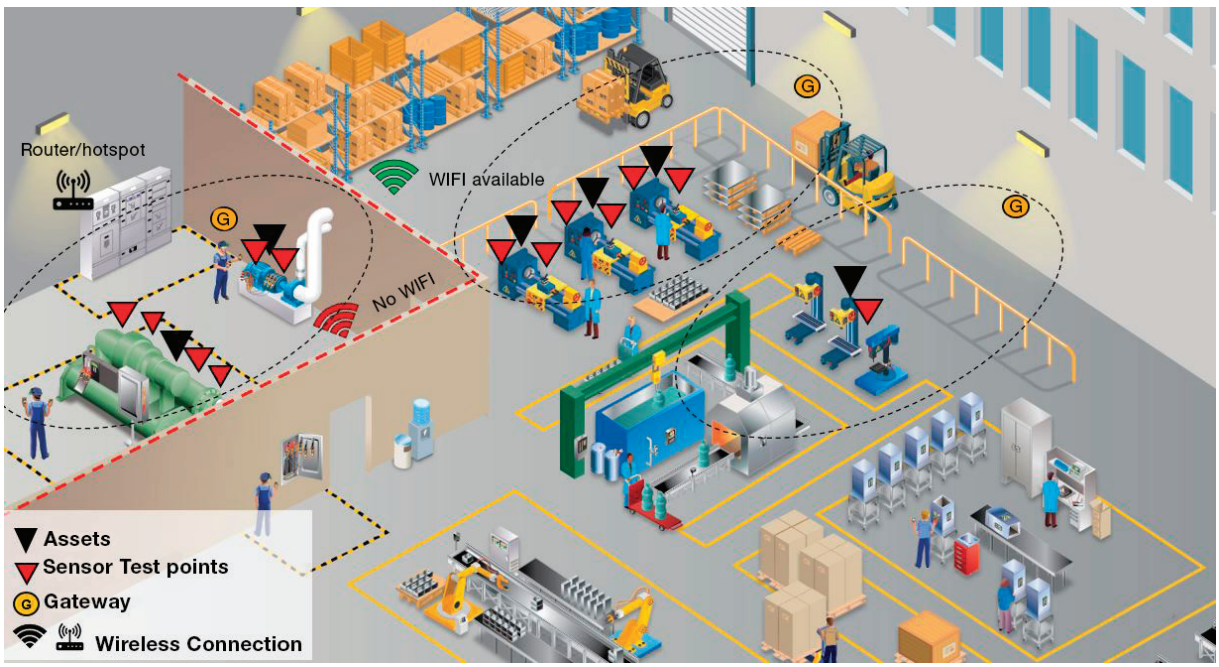
3563 Analysis Vibration Sensor

The Fluke 3563 Analysis Vibration Sensor combines a piezoelectric high-frequency sensor with software analytics to enable maintenance teams to track and analyze vibration readings continuously.

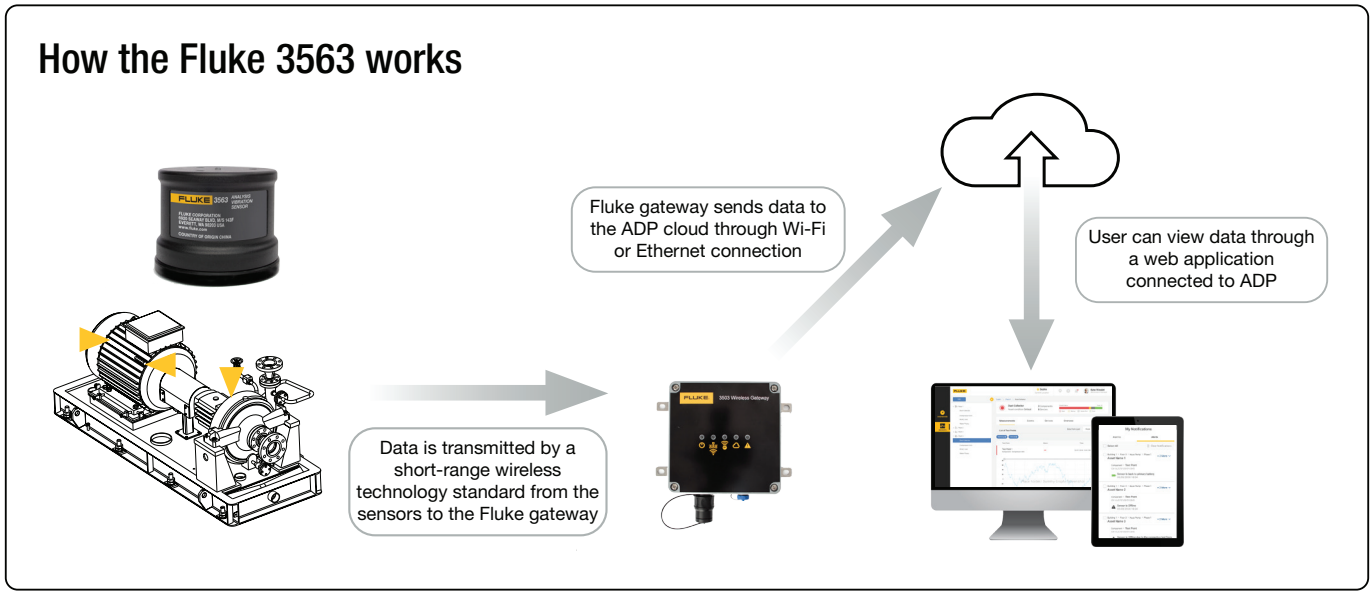
- It enables the monitoring of an extensive portfolio of critical and semi-critical assets.
- Vibration data is transmitted wirelessly to the Fluke 3503 Gateway and the cloud via Ethernet or Wi-Fi.
- The information is viewable in the Live-Asset™ Portal, which displays trending graphs and machine health dashboards.
- With a single view, you can assess a facility's overall asset health or do a deep dive into the health of a specific asset.

Simple steps for program success:

A little planning and preparation will help you smoothly install the 3563 Vibration Sensor system. Quickly and easily plan the deployment of your wireless vibration program by following the steps in this guide. Learn how to select your assets, sensor locations, gateway locations and network connectivity options. Perform a site survey with the Worksheet: Asset Information Table (Appendix) to assist in gathering information needed for deployment planning, ordering the right hardware, and preparing for installation of sensors. Print out pages 9–10 of the Appendix to take with you on your site survey.



3563 Wireless Vibration System – At a glance:



- Long battery life rate
- User-friendly experience
- Wireless and scalable
- Insightful data enabling powerful analysis

Program Steps – Before, During, and After the installation

1. **Before Installation – Survey your plant and order the initial system components**
   A little planning and preparation will help you smoothly install the Fluke 3563 Analysis Vibration Sensor system. By following the steps in our Deployment Planning Guide, you'll learn how to select your machines, and then the sensor and gateway locations.

2. **During Installation – Follow the simple process in the Getting Started Manual for a successful setup:**

3. **Mature the new program – Monitor your success and grow the program to cover more assets**
   Document your saves to get buy-in and support from managers to purchase components for the next implementation phase. This process to start small and grow is a proven method to implement a new program successfully. Remember to use Fluke 3562 Screening Vibration Sensors in conjunction with the Fluke 3563 Analysis Sensors to build a complete condition monitoring system.

4. **Sustain the reliability program over the years to come**
   Reliability is a journey, not a destination. Ensure that you continue to document saves and accomplishments, then report to upper management so that they will not forget the reason for your success. We need to remind everyone that reliability is an investment in our future, not a cost of doing business.

Step 1 Select your assets (equipment) for remote monitoring

A. Determine scope and goals of pilot program and phases

It is very important to set realistic expectations for the success of the growing program and sustainment over many years:

- Don't start too big—instead start small, show success, get buy-in and budget, then grow the program.
- Select matrixes to validate the success of the new program along with targets and tollgates for reviews, assessments, and evaluation.

B. Asset Selection

Survey the machine space where you plan to deploy the vibration sensors and select the assets to monitor. The sensors notify teams when faults start developing, enabling them to take further testing or plan repair actions.

C. Record Asset Information—Asset Hierarchy (machine tree)

Collect the basic information about your assets and complete the 1st section of the Worksheet (in the Appendix). See the example below.

1. List Critical Assets (machines)		2. List Test Points (sensor locations)		3. Sensors needed		
Asset Group (Location)	Asset (Machine name)	Test Point - Sensor (Bearing location)	Notes about Test Point location - obstructions / issues	Sensors needed	Adapters needed	Gateways needed
Boiler Room	Horizontal Water Pump 1	Motor Drive End	Top of motor bearing, no fins	1	1	1
Boiler Room	Horizontal Water Pump 1	Pump Drive End	Top of pump bearing, center	1	1	
Boiler Room	Horizontal Water Pump 2	Motor Drive End	Top of motor bearing, no fins	1	1	
Boiler Room	Horizontal Water Pump 2	Pump Drive End	Top of pump bearing, center	1	1	
Boiler Room	Horizontal Water Pump 3	Motor Drive End	Top of motor bearing, no fins	1	1	
Boiler Room	Horizontal Water Pump 3	Gearbox Input	Top of gearbox, motor input	1	1	
Boiler Room	Horizontal Water Pump 3	Pump Drive End	Top of pump bearing, center	1	1	
Boiler Room	Vertical Water Pump 1	Motor Free End	Side of lower motor bearing	1	1	
Boiler Room	Vertical Water Pump 2	Motor Drive End	Side of lower motor bearing	1	1	
Boiler Room	Blower 1	Motor Drive End	Top of motor bearing, near fan	1	1	
Boiler Room	Blower 2	Motor Drive End	Top of motor bearing, near fan	1	1	
Compressor Room	Air Compressor 1	Motor Drive End	Top of motor bearing, near belt	1	1	1
Compressor Room	Air Compressor 1	Compressor Drive End	Top of compressor bearing, near belt	1	1	
Compressor Room	Fan 1	Motor Drive End	Top of motor bearing, near belt	1	1	
Compressor Room	Fan 1	Fan Drive End	Top of fan bearing, near belt	1	1	
Compressor Room	Fan 1	Fan Free End	Top of fan bearing, near fan	1	1	
				16	**16**	**2**

Step 2

Determine test points for sensor installation

Next, determine how many test points are required on each monitored machine for sensor installation.

Machine basics for rotating machines

For vibration monitoring, we can simplify a machine to one or two shafts with two bearings each, something connecting the shafts, and something hanging off the end. Look at your machine and identify the shaft(s), bearings, coupling, and driven component. We recommend one sensor per bearing.

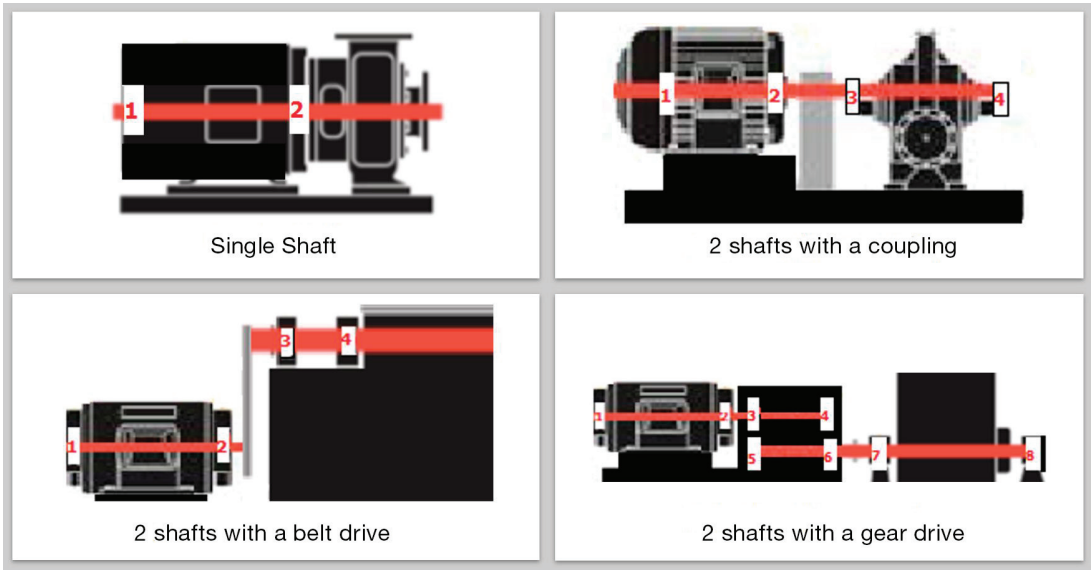
How to select locations for mounting sensors?

A. Machine survey

Break your machine down to basic parts:

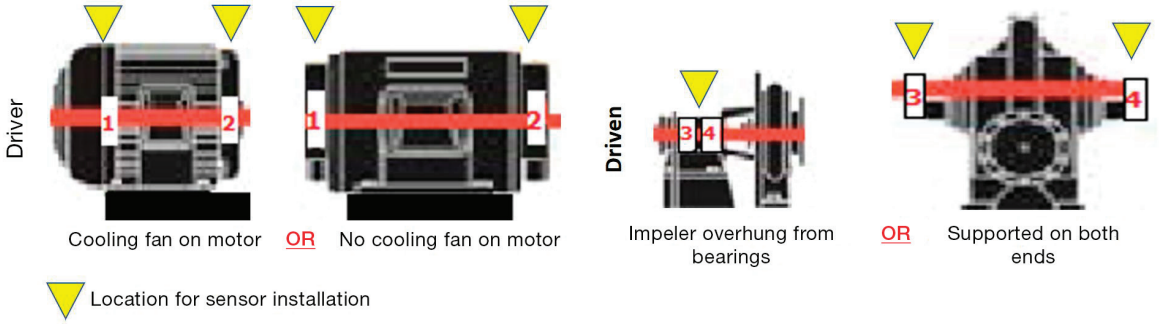
- Shaft(s)
- Bearings, coupling, belt, or gearbox
- Driven element (pump, fan, compressor, blower, etc.)

Find the configuration of your machine to determine bearing location for sensor installation.



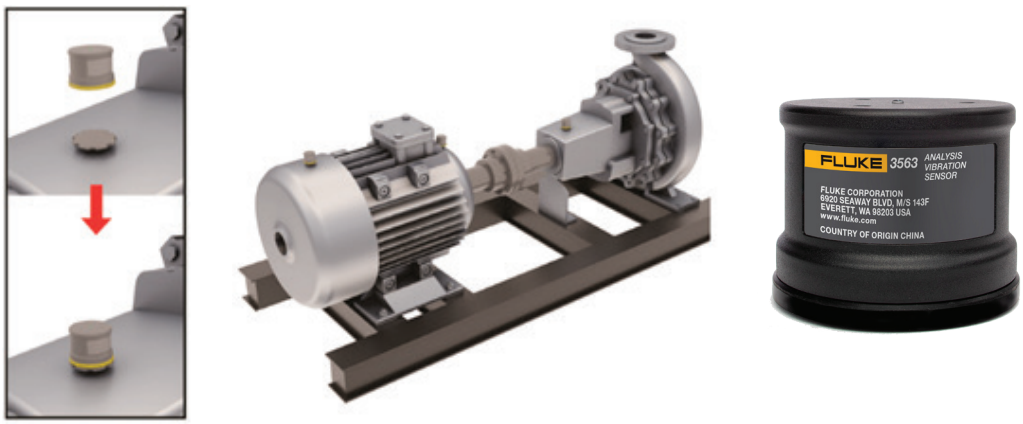
B. Sensor location identification

Determining the bearing location depends on the driving element (motor) type and the driven element (such as a pump).



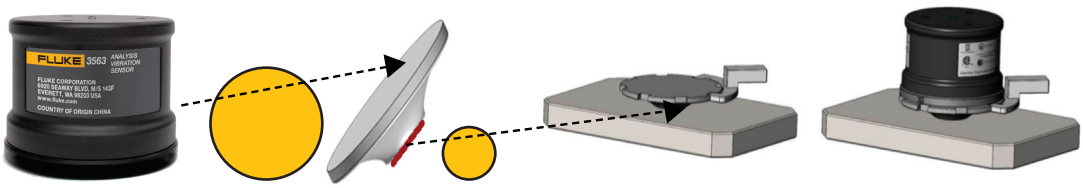
C. Determine number of sensors depending on size

Vibration transmits about 36 inches (1 meter) before it is lost through the machine. There is no need to measure every bearing on small machines. Transmission path should be as short and solid as possible— from rotating shaft, to bearing, to bearing housing and into the sensor.



D. Determine the Type and Number of Mounting Adapters

Each sensor is accompanied by an adapter plate to reduce the size of the footprint on the machine and to securely mount to the metal surface.



The two choices are Screw mount and Epoxy mount:

Screw mount

- Best frequency response
- Most work needed to install
- Must drill a hole in the bearing surface

Epoxy mount

- Good frequency response
- No drilling, yet permanent

E. Record the Sensor Information

Using the above information, determine the test points for sensor installation and fill in Sections 2 and 3 of the Worksheet (in Appendix). See the example and blank worksheet in the Appendix.

1. List Critical Assets (machines)		2. List Test Points (sensor locations)		3. Sensors needed		
Asset Group (Location)	Asset (Machine name)	Test Point - Sensor (Bearing location)	Notes about Test Point location - obstructions / issues	Sensors needed	Adapters needed	Gateways needed
Boiler Room	Horizontal Water Pump 1	Motor Drive End	Top of motor bearing, no fins	1	1	1
Boiler Room	Horizontal Water Pump 1	Pump Drive End	Top of pump bearing, center	1	1	
Boiler Room	Horizontal Water Pump 2	Motor Drive End	Top of motor bearing, no fins	1	1	

Step 3

Determine number of gateways required

The system gateway is the central bridge between any 3563 Analysis Vibration Sensor and Accelix™ the cloud-based data platform.

The gateway collects measurement data from the sensors then transfers the data to Accelix. A single gateway communicates with up to 20 sensors. The gateway uses a low energy wireless protocol to communicate with the sensor (within 100 m line of site).

Communication between the gateway and Accelix is based on IoT technology (MQTT) and is bidirectional. The measurement data collected by the sensor is processed in Accelix.

To save energy, the low energy wireless protocol connection between the sensor and the gateway is established on demand only, except for alarm signals which are generated if specified thresholds are exceeded. In case of an alarm, the gateway requests the measured overall values from the sensor and sends them to Accelix. At the same time, Accelix triggers the gateway to request the sensor to measure a time waveform signal (TWF).

Step 4

Confirm availability of wireless connectivity

The gateway requires connectivity to stream vibration data to the cloud. Ensure availability of network connectivity in the installation location via one of the three methods described below.

Make sure your network complies with these requirements:

- Wi-Fi: IEEE 802.11 ac/a/b/g/n
- Wi-Fi Security: WPA/WPA2
- Ethernet: 10/100/1000 MBits/s

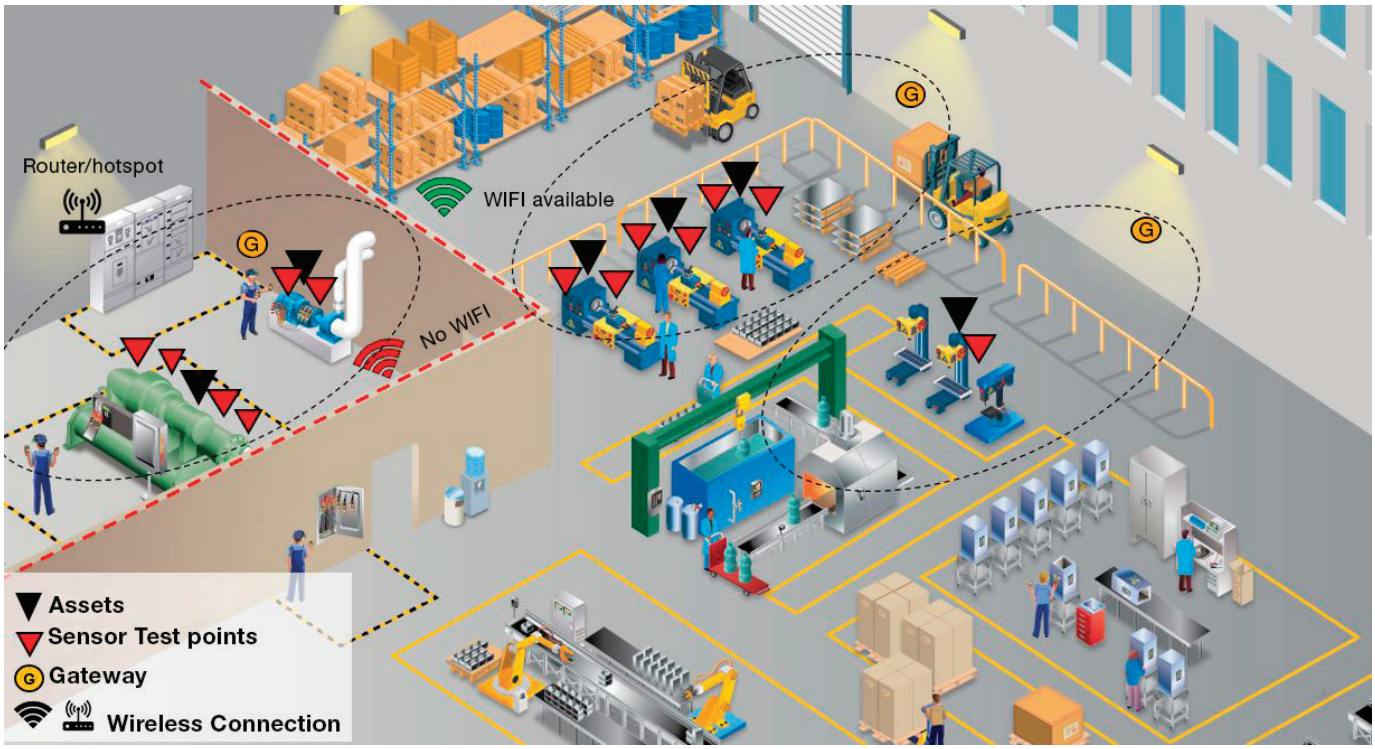
Appendix →

Appendix

Sitemap

For the area where you plan to install, refer to a sitemap to pictorially plan the deployment. If you don't have one, create a simple hand draw site map. This lets you plan gateway and network connectivity to ensure that there is optimal coverage and seamless data streaming.

Sample sitemap with deployment planning



Do's and Don'ts

- ☑ Mount the sensor on solid metal anywhere on or near the bearings but not on thin covers
- ☑ If the machine is small, mount a sensor on one motor bearing and one pump bearing
- ☒ Do not mount sensor on motor winding box – bearings only
- ☒ Do not mount sensor in the middle of motor – bearings only
- ☒ Do not mount sensor on pump casing – bearings only (flow noise)
- ☒ Do not mount sensor on thin cooling fan cover – solid metal only
- ☒ Do not mount sensor on thin cooling fins – solid metal only
- ☒ Do not mount sensor on a coupling or belt guard
- ☒ Do not mount sensor on seals – bearings only

WORKSHEET A – Asset Information Table – Sample

1. List Critical Assets (machines)		2. List Test Points (sensor locations)		3. Sensors needed		
Asset Group (Location)	Asset (Machine name)	Test Point - Sensor (Bearing location)	Notes about Test Point location - obstructions / issues	Sensors needed	Adapters needed	Gateways needed
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Boiler Room	Horizontal Water Pump 3	Motor Drive End	Top of motor bearing, no fins	1	1	
Boiler Room	Horizontal Water Pump 3	Gearbox Input	Top of gearbox, motor input	1	1	
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Compressor Room	Fan 1	Motor Drive End	Top of motor bearing, near belt	1	1	
Compressor Room	Fan 1	Fan Drive End	Top of fan bearing, near belt	1	1	
Compressor Room	Fan 1	Fan Free End	Top of fan bearing, near fan	1	1	
			Totals:	**16**	**16**	**2**

WORKSHEET B – Asset Information Table – For use by customer to fill in

1. List Critical Assets (machines)		2. List Test Points (sensor locations)		3. Sensors needed		
Asset Group (Location)	Asset (Machine name)	Test Point - Sensor (Bearing location)	Notes about Test Point location - obstructions / issues	Sensors needed	Adapters needed	Gateways needed
			Totals:			

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