Harmony® XB5R
Application Manual

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The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Safety Information

Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book

At a Glance

Document Scope

This document presents the most common problematics that you can encounter in your systems or machinery. For each case, an appropriate solution is proposed by using Harmony XB5R wireless and batteryless pushbutton.

With XB5R, you can easily install new or additional control command in a better and/or mobile place.

The problematics and their XB5R proposed solutions are sort in main themes:
- Mobility: some installations need too much operator/machine moves
- Productivity loss: you can increase your installation productivity
- Flexibility: you can upgrade your system quickly with a reduced cost

Why Wireless?

Schneider-Electric proposes industrial wireless and batteryless pushbuttons solution for remote control application.

The wireless offers freedom for connectivity transformed to machine flexibility, mobility, and comfort.

This solution enhance machine performances and productivity gain and can also solves pain points during machine life cycles.

In the future, the devices will be connected all together for more performances and wiring simplification. When flexibility or mobility will be requested, the wireless architectures will become more and more the best solution.

General Presentation of Harmony XB5R

Harmony XB5R wireless and batteryless pushbutton are used for remote control of a receiver relay using a transmitter pushbutton. A radio-coded message is sent, in a single pulse, to one or more receiver(s) located several tens of meters away. One receiver can also be activated by different transmitters.

This technology is used for remote control application but not for hoisting applications or safety applications.

Validity Note

This documentation is valid for Harmony XB5R.

The technical characteristics of the devices described in this document also appear online. To access this information online:

Step	Action
1	Go to the Schneider Electric home page *www.schneider-electric.com*.
2	In the **Search** box type the reference of a product or the name of a product range. ● Do not include blank spaces in the reference or product range. ● To get information on grouping similar modules, use asterisks (*).
3	If you entered a reference, go to the **Product Datasheets** search results and click on the reference that interests you. If you entered the name of a product range, go to the **Product Ranges** search results and click on the product range that interests you.
4	If more than one reference appears in the **Products** search results, click on the reference that interests you.
5	Depending on the size of your screen, you may need to scroll down to see the data sheet.
6	To save or print a data sheet as a .pdf file, click **Download XXX product datasheet**.

The characteristics that are presented in this manual should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the manual and online information, use the online information as your reference.

Related Documents

Title of Documentation	Reference Number
Harmony XB5R Wireless and Batteryless Pushbutton	960562 (Eng), 960563 (Fre), DIA5ED2110402EN (Eng), DIA5ED2110402FR (Fre)
Harmony XB5R Expert Instruction Sheet	EIO0000000812 (Eng), EIO0000000813 (Fre), EIO0000000814 (Ger), EIO0000000815 (Spa), EIO0000000816 (Ita), EIO0000000817 (Chs), EIO0000000818 (Por)
Harmony XB5R ZBRN1/ZBRN2 User Manual	EIO0000001177 (Eng), EIO0000001178 (Fre), EIO0000001181 (Ger), EIO0000001179 (Spa), EIO0000001180 (Ita), EIO0000001182 (Chs), EIO0000001184 (Por) EIO0000001183 (Jap) EIO0000002153 (Rus)
Wireless and Batteryless Pushbutton Catalog Module	36174
ATEX Transmission Devices Instruction Sheet	HRB29193
ATEX Reception Devices Instruction Sheet	HRB41321
Rope Pull Switch Instruction Sheet	S1B90581
ZBRN1 Instruction Sheet	S1B87888
ZBRN2 Instruction Sheet	S1B87941
ZBRCETH Instruction Sheet	S1B88209
Packages Instruction Sheet	S1A57199
Receivers Instruction Sheet	S1A57202
Transmitter with Metal or Plastic Head and Cap Instruction Sheet	S1A57198
Relay Antenna Instruction Sheet	S1A57194
Mobile Box Instruction Sheet	S1A57210

You can download these technical publications and other technical information from our website at http://download.schneider-electric.com

Product Related Information

The application of this product requires expertise in the design and programming of control systems.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Only persons with expertise in the design and programming of control systems are allowed to program, install, alter, and apply this product.

Follow all local and national safety codes and standards.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Chapter 1
Mobility

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Operator Mobility	10
Machine Mobility	12

Operator Mobility

Problematic Overview

The operator needs possibility to control an automated system from a certain distance without physical link.

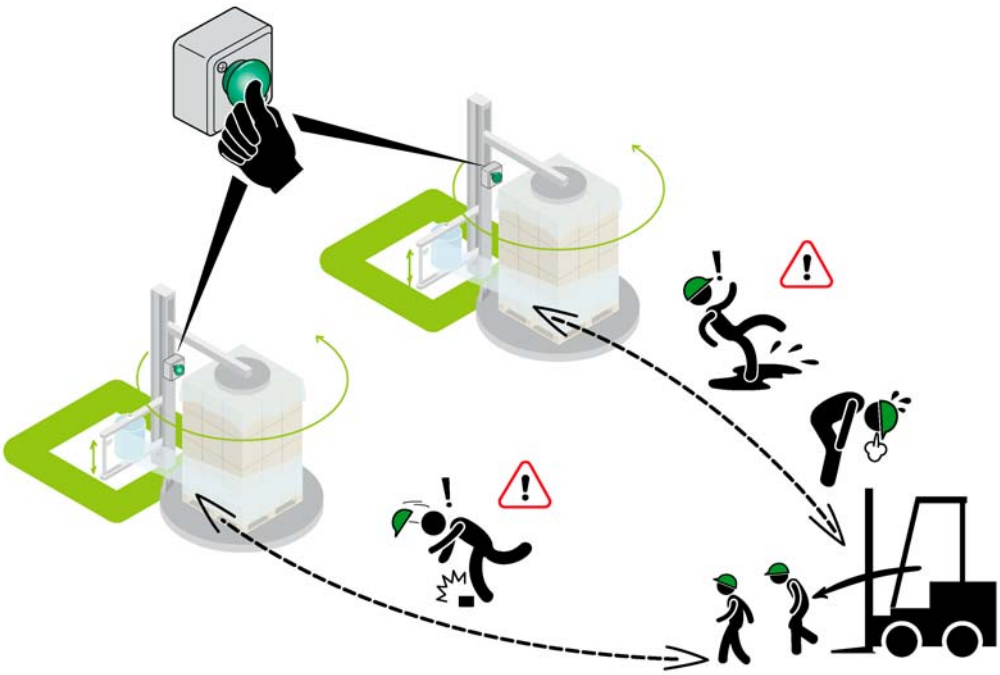
Constraints of a hardwired solution	Advantages of a wireless solution
● Limited length of the remote cable ● Risks due to the cable between the machine and the remote	● Reduce or avoid operator risky moves ● Reduce or avoid operator tiredness

Problematic Example

An operator stacks boxes on two auto-wrap machines. The operator uses a forklift.

Once a machine is full, the operator must:

- Stop and get off its forklift
- Go to the auto-wrap machine, push the start pushbutton.
- Return to its forklift
- Continue with the second auto-wrap machine.



XB5R Solution Example

You just have to:

- Use 2 XB5R pushbuttons in the forklift (one per auto-wrap machine)
- Install one receiver in each auto-wrap machine command panel (in parallel with the existing start pushbutton).

The operator can command the auto-wrap machines directly from the forklift without stopping and getting out of it.

XB5R References

Reference	Description	Link
XB5R	Wireless and batteryless pushbutton	Harmony XB5R Expert Instruction Sheet EIO0000000812
ZBRR•	Programmable receivers	
ZBRM22A0	Remote control box equipped with 2 buttons and transmitters	
ZBRACS	Support for remote control to equip each forklift used with the remote	

Machine Mobility

Problematic Overview

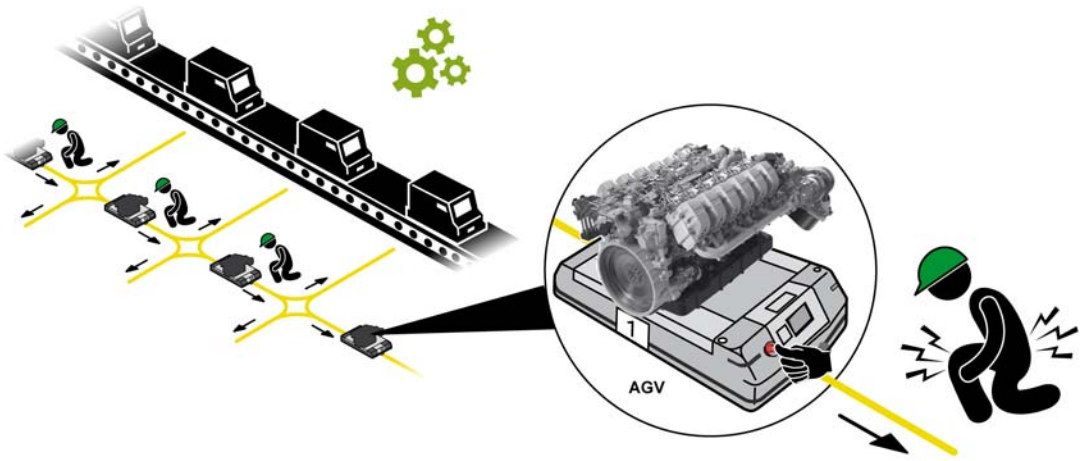
The operator needs possibility to control an AGV (Automatic Guided Vehicles) from a certain distance without physical link

Constraints of a hardwired solution	Advantages of a wireless solution
● Limited length of the remote cable ● Risks due to the cable between the machine and the remote	● Reduce or avoid operator risky moves ● Reduce or avoid operator tiredness

Problematic Example

On a motor assembly line, each motor is installed on an AGV (Automatic Guided Vehicles). The AGV stops automatically at each workstation and wait for a command to go to the next workstation.

A command pushbutton is already installed on the AGV but is not easily accessible.

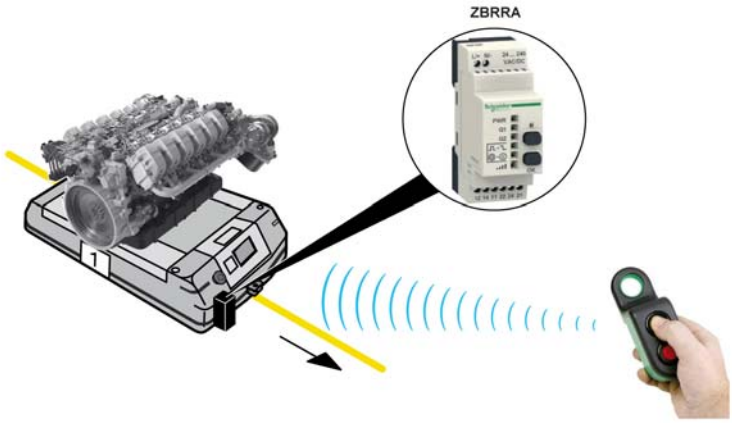


XB5R Solution Example

You just have to:

- Use 1 XB5R pushbutton at each workstation.
- Install one receiver in each AGV (in parallel with the existing start pushbutton).

The operator can command the AGV directly without using the pushbutton of the AGV (not easily accessible).



NOTE: When several AGV are in the same zone, use the 4 independent outputs of a ZBRRC receiver to correctly manage the AGV by the correct pushbutton.

XB5R References

Reference	Description	Link
XB5R	Wireless and batteryless pushbutton	Harmony XB5R Expert Instruction Sheet EIO0000000812
ZBRR•	Programmable receivers	
ZBRM21A0	Remote control equipped with a pushbutton and a transmitter	
XALD01 + ZBR5RTA	Wireless pushbutton and transmitter	

Chapter 2
Productivity Loss

Productivity Loss

Problematic Overview

In a simplified way, Productivity Loss can be due to inefficient operator moves or production stopped during too long time.

The operator needs availability of 1 or more pushbutton:

- On an adequate / useful position,
- For an existing function or a new one.

Constraints of a hardwired solution	Advantages of a wireless solution
Production loss during the wiring of the installation	Much faster installation
Constraints for the evolution of the machine Missing wire Missing cable tray	Complete freedom to place/move the wireless pushbutton anywhere No wire needed on the machine No battery: System always available
Risk to damage the existing cables of the machine by installing a new cable	No impact on existing wiring
Long machine, input channel needed for the new pushbutton far from the position (long wire),	No distance limitation (possible to add antennas for long distances)
Missing free input channel on PLC to connect the new pushbutton	Limited inputs needed by the PLC: several pushbuttons can command a receiver or possible to use a receiver on a fieldbus

Problematic Example

A bottling chain contains several adjustment zones. The machine has only one HMI.

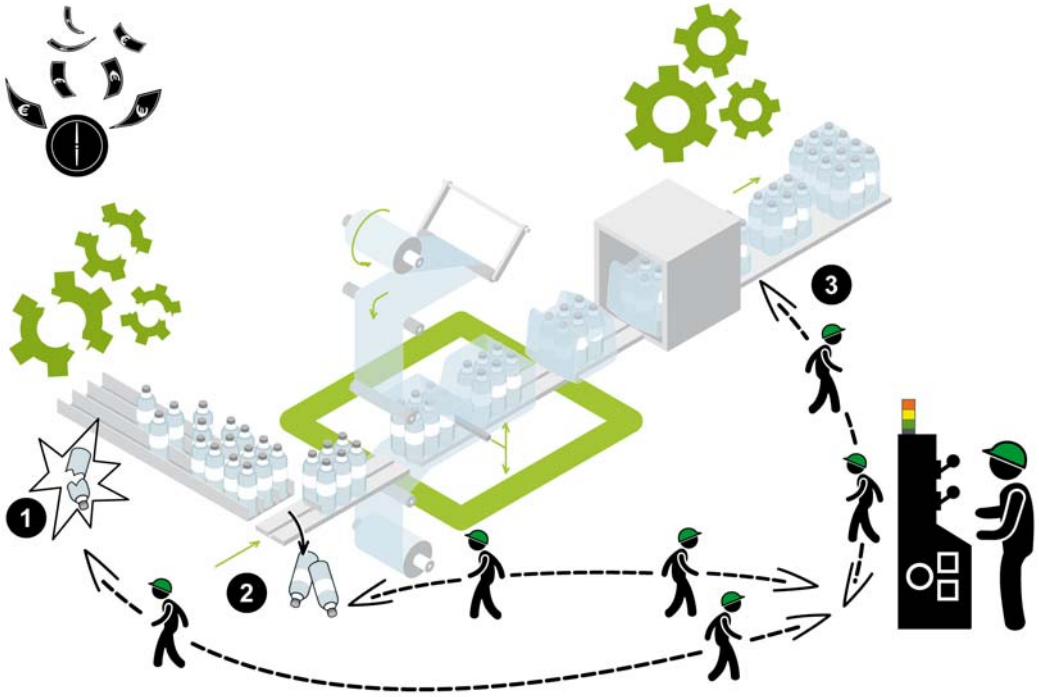
When a default occurs in an adjustment zone, the machine stops, the operator must:

- Go to the adjustment zone
- Realize the needed adjustment to solve the default.
- Go to the HMI
- Reset the default on the HMI

In many cases, the default cannot be solved at the first time.

If the default occurs again, the operator has to repeat these steps until the default is solved.

All the moves between the adjustment zone and the HMI are productivity loss.



XB5R Solution Example

You just have to:

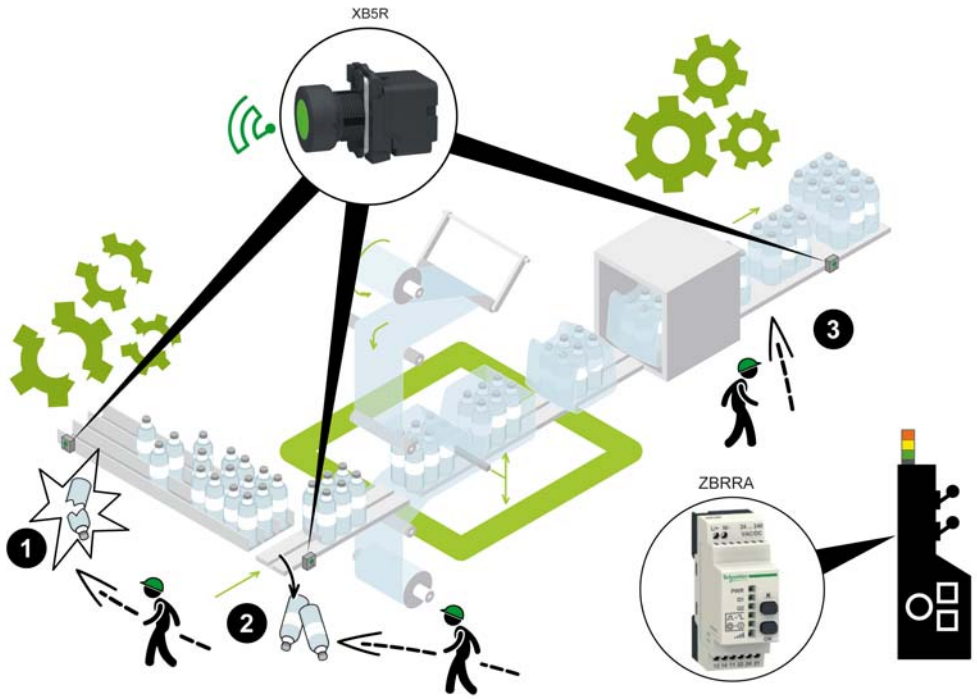
- Install one XB5R pushbuttons at each adjustment zone,
- Install receiver(s):
  - ZBRR• one for 32 pushbuttons up to 4 independent outputs
    or
  - ZBRN•: one for 60 pushbuttons (Modbus Serial or Modbus TCP protocol)

When a default occurs in an adjustment zone, the machine stops, the operator must:

- Go to the adjustment zone,
- Realize the needed adjustment to solve the default,
- Push the dedicated XB5R pushbutton.

If the default occurs again, the operator can directly make the adjustment and reset the default without moving to the HMI.

Benefit every time the system is restarted faster during the lifetime.



XB5R References

Reference	Description	Link
XB5R	Wireless and batteryless pushbutton	Harmony XB5R Expert Instruction Sheet EIO0000000812
ZBRR•	Programmable receivers	
XALD01 + ZB5RTA	Control station, pushbutton, and transmitter	
ZBRN•	Access point (receiver on communication bus)	Harmony XB5R ZBRN1/ZBRN2 User Manual EIO0000001177

Chapter 3
Flexibility

Flexibility

Problematic Overview

Flexibility of a system means evolution during the life cycle of a machine or a process.

The operator needs to:

- Move a pushbutton on an adequate/usefull position,
- Add 1 or more pushbuttons for an existing function or a new one,
- Install or manage the **Andon** method in automotive (team leader call).

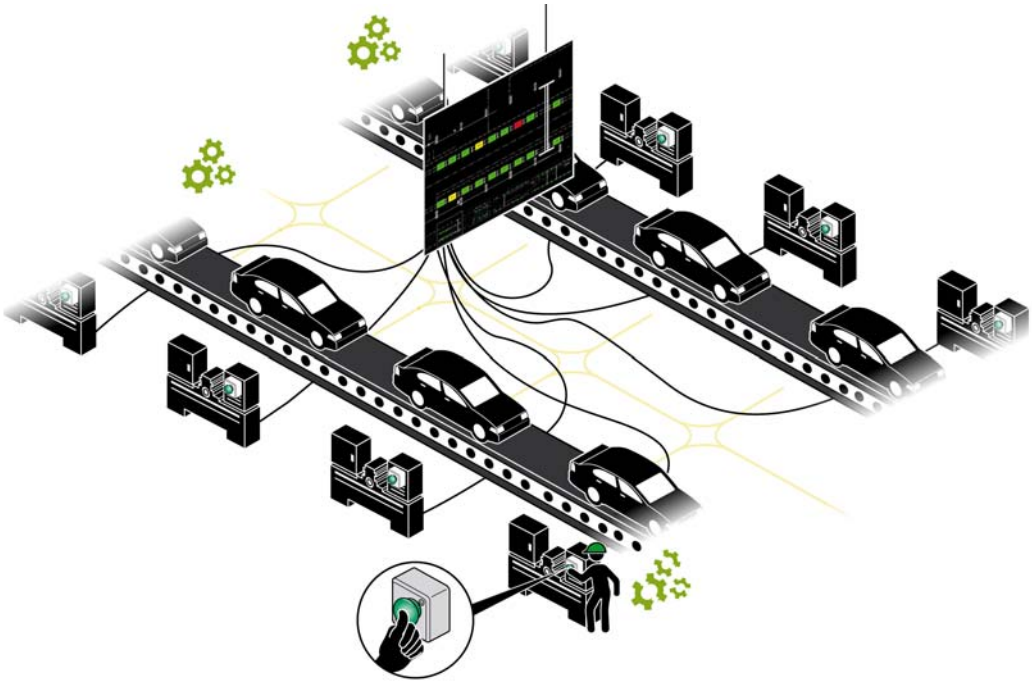
Constraints of a hardwired solution	Advantages of a wireless solution
Production loss during the wiring installation	Much faster installation
Constraints for the evolution of the machine Missing wire Missing cable tray	Complete freedom to place/move the wireless pushbutton anywhere No wire needed on the machine No battery: System always available Less lean manufacturing constraint as less control wires Less installation costs when an aerial work platform is needed
Risk to damage the existing cables of the machine by installing a new cable	No impact on existing wiring
Long machine, input channel far from the position (long wire),	No distance limitation (possible to add antennas for long distances)
Missing free input channel on PLC	Limited inputs needed by the PLC: several pushbuttons can command a receiver or possible to use a receiver on a fieldbus

Problematic Example

Andon system is a part of the Lean Manufacturing approach.

Andon system notifies management, maintenance, and other operators of a quality or process problem. The centerpiece is a signboard incorporating signal lights to indicate which workstation has the problem. The alert can be activated manually by an operator using a pull cord or a pushbutton.

On a car assembly line, the workstations have to be moved regularly. The workstations are powered by power lines but the control data (**Andon** data) must be connected to the **Andon** system. Each move of a workstation engages much wire modification.



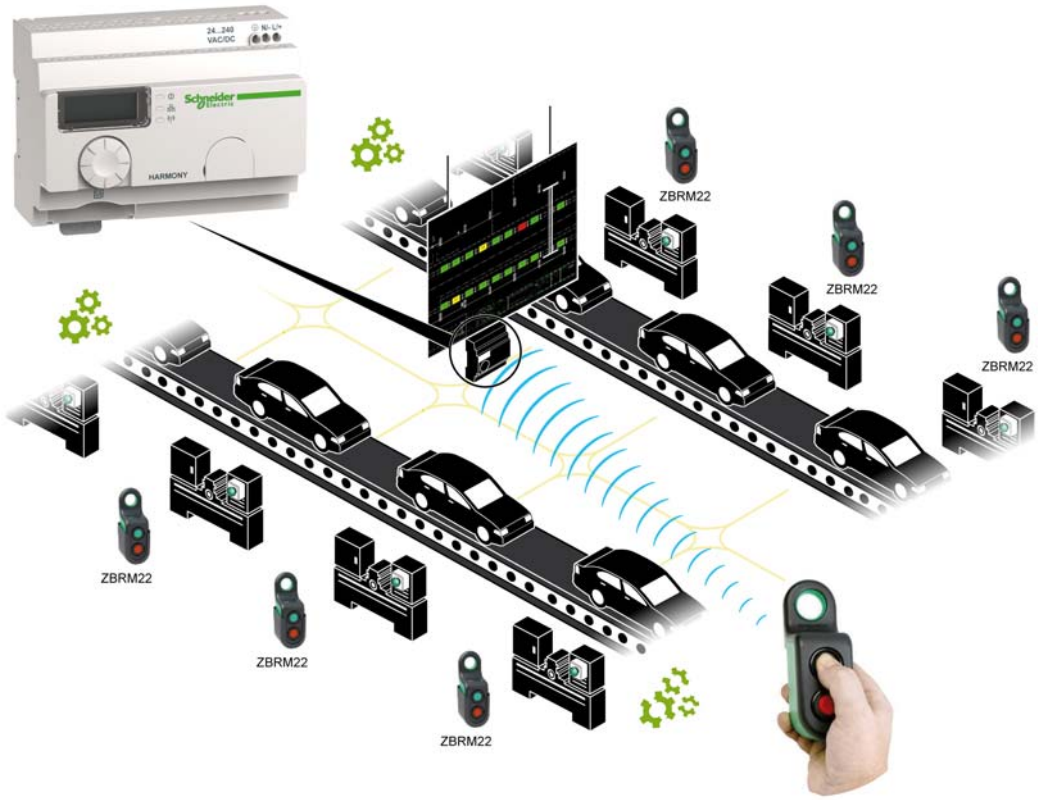
XB5R Solution Example

You just have to:

- Install one XB5R pushbutton at each adjustment workstation zone,
- Install ZBRN• receiver(s) (Modbus Serial or Modbus TCP protocol) in the area to be connected to the **Andon** system

If the XB5R is fixed on the workstation: no operating modification for the operator. The benefit appears when the workstations have to move. No control data wires to move.

In addition, if the XB5R pushbutton is carried by the operator: as soon as a problem occurs, the operator can activate his own alarm.



XB5R References

Reference	Description	Link
XB5R	Wireless and batteryless pushbutton	Harmony XB5R Expert Instruction Sheet EIO0000000812
ZB4RTA•, ZB5RTA•	Pushbuttons and transmitters	
ZBR N•	Access point (receiver on communication bus)	Harmony XB5R ZBRN1/ZBRN2 User Manual EIO0000001177