

# Building Better Factory Automation: Crucial Role of Aluminum Structural Framing

## Five Key Factors To Consider When Selecting Framing Systems

## The five factors are:

- **The breadth and depth of a structural framing portfolio**
- **How framing system quality impacts long-term value and savings**
- **A system's flexibility and ease of use**
- **Integration of manual and automated production systems**
- **Digital support tools to enable faster design and engineering**

The recent, rapid introduction of new manufacturing and automation technologies has led machine builders and manufacturing end users to make major investments in advanced factory automation platforms. Their goal: build production systems that incorporate the best technology and make their plants more efficient, productive and able to deliver their highest return on their substantial investment.

It is common to focus attention on advances in the complex controls, drives, sensors, linear components and conveyor systems in these production platforms. However, aluminum structural framing systems also play a critical role in helping create state-of-the-art manufacturing systems that are efficient, well-engineered, versatile and flexible enough to meet the constantly changing production and market challenges today's manufacturers face.

Framing systems do more than just provide durable, cleanly designed components to build the structures that house automated manufacturing systems. They are also essential to building a host of ergonomic manual production platforms that form a critical component in many lean manufacturing operations.

### **SELECTING THE RIGHT FRAMING SYSTEM**

Factory automation OEMs and end users of both automated and manual production systems recognize the value and contribution structural framing makes to their production platforms and operations. A major challenge they face is

choosing the best system for their unique requirements. There are a wide range of choices available in the market, with many suppliers offering similar systems: profiles, connector devices, accessories such as cover caps, doors and fittings, feet and wheels and mounting systems. Some companies offer basic product lines and often compete on pricing and the ability to quickly deliver products, even though their offerings, options and product quality may be limited.

However, low cost and fast delivery of product is not the best criteria for selecting a profile system. The risk of treating framing as a commodity product is that the wrong system could lead to poorly fitting profiles, extra work to connect components together, less durability and degrading condition of machine frames and workstations over the long term.

With the wide range of structural framing options available, there are a number of factors to consider when selecting a system. They can be applied whether you need framing for a single machine or for a whole line of automation production platforms, or when you are developing manual production systems for your factory.

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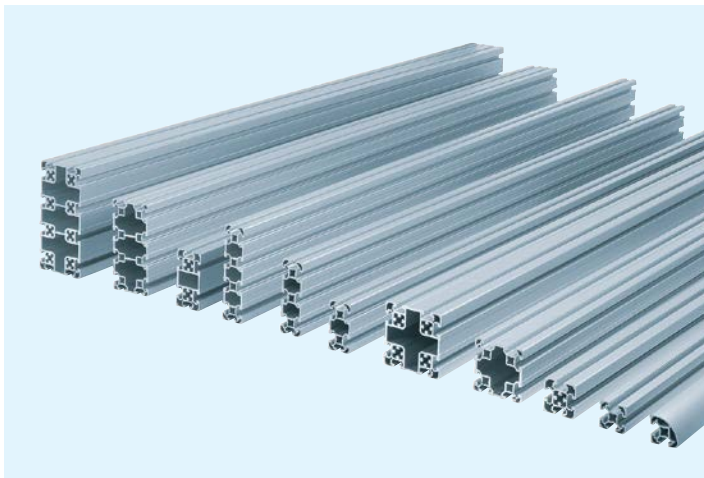
- The breadth and depth of a structural framing portfolio
- How framing system quality impacts long-term value and savings
- A system's flexibility and ease of use
- Integration of manual and automated production systems
- Digital support tools to enable faster design and engineering

Understanding these factors can help ensure that factory automation OEMs and end users have a more complete view of the role and value structural framing systems contribute to successful factory automation solutions and make intelligent choices about the framing systems you choose.

### **Factor 1: Breadth and depth of structural framing portfolio**

Every manufacturing operation and factory automation system is built to satisfy each company's unique requirements. A structural framing system needs to be broad enough, with a range of components and options, to make it easier for OEMs to quickly obtain the framing products they need to satisfy machine-specific design factors and production environment conditions.

Bosch Rexroth's aluminum profile system has been developed and expanded over 40 years to deliver those choices. Over the years, Bosch Rexroth has continually invested in creating new components and options, refining the quality, durability and flexibility of the system through continuous engagement with machine builders and manufacturers for decades.



*With over 120 different profile cross-sections with perfectly adjusted modular dimensions, combined with versatile connectors and accessories, our aluminum profiles offer almost unlimited design freedom.*

The Bosch Rexroth framing system features one of the industry's largest offerings: over 120 profile cross sections with finely adjusted modular dimensions, strengthened to provide an economical solution for any load scenario. The system also includes 28 connector types, some of which come in various sizes and feature highly stable joints that can be adjusted to multiple angles for greater flexibility when designing working environments.

The system also features a fully developed range of accessories, such as cover caps, feet and wheels, doors and fittings and other components, tailored precisely to the modular profile system, enabling easy mounting in the profile slot or central bore.

By providing this range of choices, machine designers and plant operations personnel have access to the kinds of options that make it easier to develop new manufacturing systems without having to resort to time-consuming customization. They won't need to modify profiles to fit unique machine dimensions or create connectors or facings in their own machine shops — a full-featured framing system portfolio lets you order essentially everything that's needed from one supplier.

This kind of resource is what more and more factory automation users are seeking: technology portfolios that have the depth and breadth to provide complete system solutions, without forcing OEMs or end users to have to invest time and resources to integrate and adjust components and equipment from multiple suppliers.

### **Factor 2: Framing quality equals long-term value and savings**

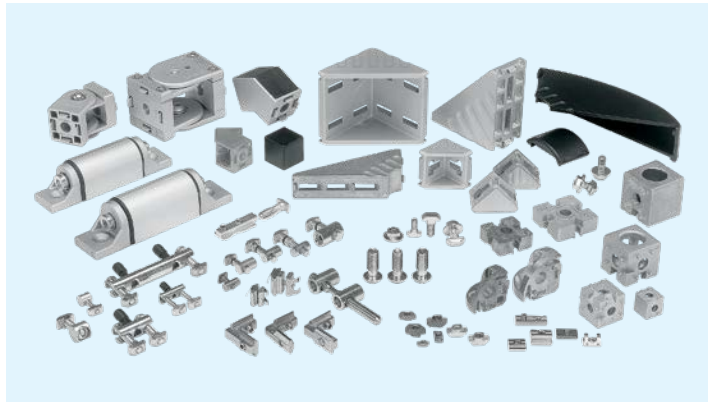
A full-featured portfolio is a critical factor to consider — and it needs to be paired with understanding the quality of the framing system products. Machine enclosures, workstations, partition walls, flow racks and other manufacturing equipment need to serve for years in environments with high vibration levels, dust, electrostatic charges and other factors that can degrade poorly manufactured profile systems.

Framing systems are assembled — and that means they need to be engineered and manufactured to provide the highest levels of fit and finish. Well-engineered systems like Bosch Rexroth's feature profiles and connectors that lock together tightly. They also have cover strips and end caps that fully seal joints and mountings to prevent dirt and dust infiltration or separation over time.

All the components of Bosch Rexroth's structural framing system are engineered and manufactured to strict tolerances. Their performance is regularly tested, and the results documented, and all components can be supplied with extensive technical data validating that they meet the highest quality and sustainability requirements.



Framing systems that provide superior fit and finish offer more than durability; fit and finish also provides a key element of industrial aesthetics. Factory automation customers want their production systems, partitions, flow racks, material shuttles and other plant components to have a clean, well-engineered appearance that contributes to an appealing work environment.



*Offering more flexibility in the construction of frames, apparatuses, machines and special installations, our framing connection technology is engineered and tested to strict standards of durability to ensure clean, tight fit and finish to every construction.*

The Bosch Rexroth system provides a wealth of accessories to augment the basic profile and connector components – which themselves have been designed to provide a clean balance of form and function. Elements such as protective panels, mounting rims, cable holders and brackets, along with many others, fit cleanly into the profiles.

This attention to detail is something that leading machine builders take into consideration when picking framing systems. Modernizing the work environment and enhancing the visual appeal of today’s factories has been shown to be a key factor in attracting a new generation of production workers, factory management, programmers and engineering professionals.

**Factor 3: Flexibility and ease of use**

As factory automation OEMs and end users work to develop more sophisticated and productive manufacturing systems, they also are in search of products and systems that can simplify their development efforts and help them deliver new technology to the factory floor faster.

The right aluminum structural framing system can make a valuable contribution to those goals. For example, Bosch Rexroth has refined its framing system to make assembling workstations, flow racks or machine enclosures a snap. No special training is required, and simple tools such as screwdrivers and Allen wrenches are usually all that are needed to assemble whatever is being built.

In addition, Bosch Rexroth’s framing system is not a one-time-use system. More and more frequently, factories need to reconfigure their plant floor layouts to accommodate new machines, changes in market demand or new production flows. The system’s profiles, connectors and other components are designed for easy disassembly and reconfiguration without negatively impacting the quality or durability of the framing. This can help manufacturers meet sustainability goals and save costs if reconfiguration is needed.



*Aluminum framing from Bosch Rexroth includes a range of special components, like workstations that need internal communications and power cabling.*

Many framing systems claim to offer flexibility and ease of use. It's important for machine builders and end users to assess these claims. Look for targeted solutions within a framing system offering that meet unique needs. For example, Bosch Rexroth offers:

- EcoSafe protective fencing – This is a complete package of protective devices and safety fences tailored to meet safety enclosure needs on automation systems, including emerging robot and cobot platforms. It is designed and tested to meet all current safety standards and regulations, saving time and development effort for applications requiring this protection.
- Function-integrated profiles – As more and more workstations and work cells have computers and production equipment requiring power and communications cabling, these newly available profiles provide completely internal cable guides to enable the safe and space-saving laying of cables, data lines and hoses, simplifying both design and installation of equipment.



*function-integrated profiles that make it easier to build enclosures and*

## **Factor 4: Integration of automation and manual production platforms**

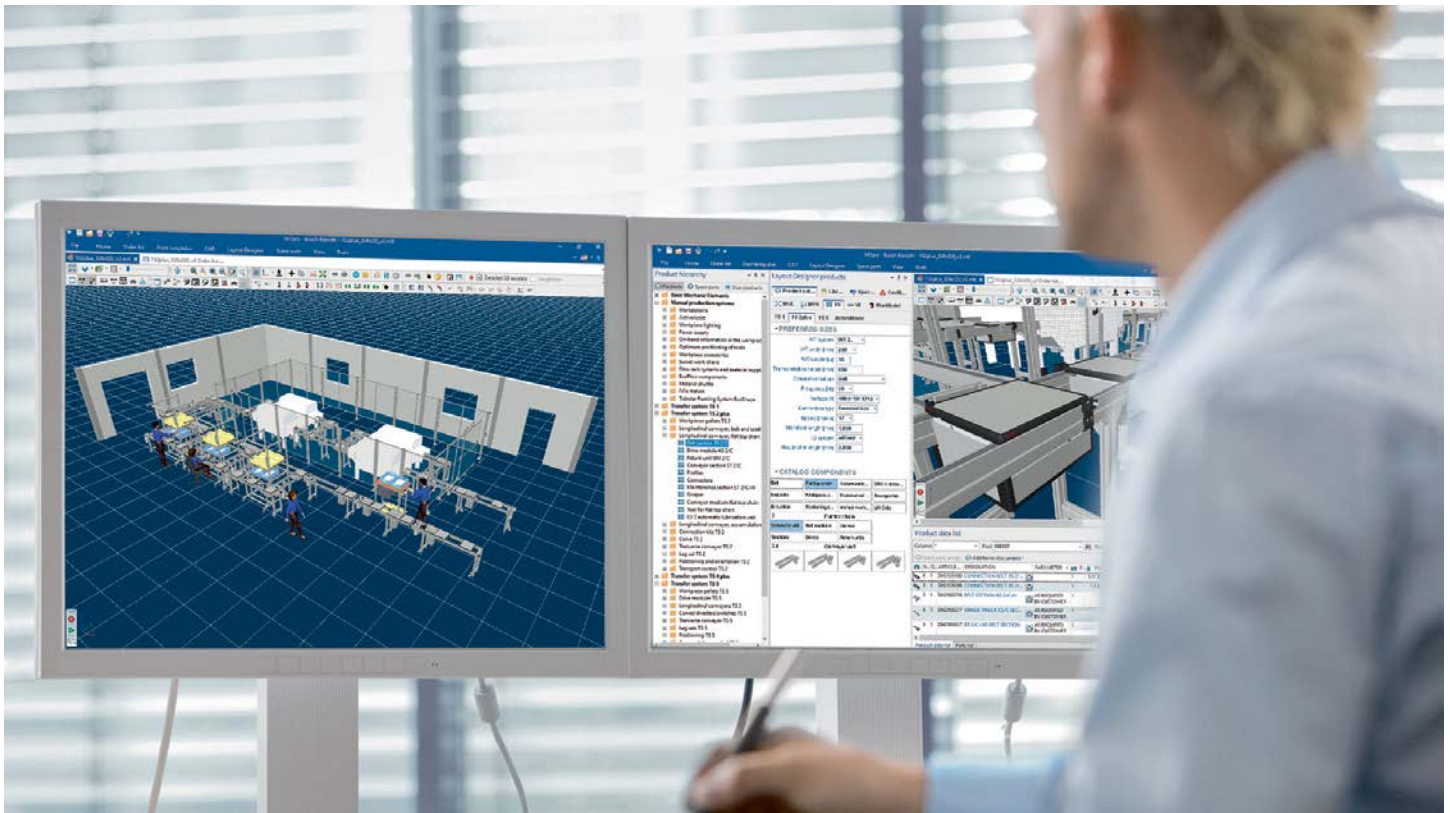
Most automated factories aren't 100% automated – it is common to integrate manual production systems into many production lines, from medical devices and electronics to automotive component manufacturing. So, building better factory automation often entails making sure you have the right manual systems.



*Bosch Rexroth's Manual Production Systems (MPS) take full advantage of the flexibility and durability of our structural framing systems, with a wide range of MPS solutions developed to satisfy critical requirements of lean production and ergonomic efficiency.*

Bosch Rexroth's Manual Production Systems (MPS) take full advantage of the flexibility and durability of our structural framing systems. Whether they're workstations, material shuttles, material supply and flow racks or other products for manual manufacturing, our MPS offering has been developed to satisfy critical requirements of lean production and ergonomic efficiency.

The main concern of modern production – manual, automated or a hybrid manufacturing environment – is to avoid waste. With MPS, factory end users and production system OEMs have an integrated system with a uniform implementation. This enables faster customization of all the major elements of a manual production system, because all the components come from one supplier and are engineered to fit together with ease.



*The best, most efficient way to make creative use of Bosch Rexroth's aluminum framing is through our MTpro software. It supports the full range of engineering tasks, including product selection, configuration, layout and ordering of all structural framing products, all from one integrated platform.*

Ergonomics is equally critical to ensuring that waste is avoided, and efficiency is maximized in manual production. Bosch Rexroth has conducted extensive research and continuous improvement in all of its MPS components. For example, even a simple device such as a grab container has been analyzed and refined using Methods-Time Measurement, which calculates the standard time that a task should be performed. Depending on the task, this can guide an MPS designer to select a grab ledge over a grab container, or vice versa.

For manufacturers that are using both manual and automated systems, there can be significant engineering time and cost savings that can be achieved by working with a single supplier for both structural framing and manual production systems; since Bosch Rexroth's MPS is built on its structural framing system products, those advantages can be quickly realized.

### **Factor 5: Digital engineering tools and support**

One of the most critical factors to consider when selecting a structural framing solution is purely digital: How robust and usable are a supplier's design, engineering and ordering tools? There are some framing suppliers that provide only minimal design tool support and will leave it to your engineering staff to do the work of identifying the right products, do the dimensioning, create the drawings and CAD models and enter all the orders.

Bosch Rexroth has leveraged its decades of expertise to build one of the industry's most powerful, all-in-one tools: MTpro. It provides a complete platform for designing assembly technology systems, including framing, MPS and Rexroth conveyor systems. It supports the full range of tasks, including product selection, configuration, layout and ultimately ordering structural framing products, all from one integrated platform.



The software lets engineers quickly drag and snap components together to build layouts. It features configuration and connection rules to help avoid invalid configurations. It incorporates technical calculations such as load capacities and deflections, helping to prevent errors such as over dimensioning of conveyor or framing designs, which can lead to more expensive solutions than a given application may require.

It also incorporates ManModel software to support the design of ergonomic workstations through simulation of reach zones and field of vision; this can be invaluable to help prevent the creation of manual production workstations that would need to be reconfigured or rebuilt once workers start using them.

MTpro also streamlines and simplifies the ordering process, setting up a full bill of materials with exact ordering information, as well as providing complete technical documentation, such as data sheets, assembly instructions, CAD models and spare parts information, with a single click. This kind of support is critical for OEMs and end users who need to be confident that the layouts they are developing and the framing, MPS and conveyor products they are ordering will fully fit their needs when delivered and assembled; the alternative can be costly and time-consuming rework on the shop or factory floor to get everything to fit together.

## **BETTER AUTOMATION COMES FROM COMPLETE SOLUTIONS**

Factory automation machine builders and end users seeking to build better manufacturing systems can benefit from recognizing that, far from being a commodity product, structural framing systems play a critical role in making their automation solutions more flexible and productive.

Taking into consideration these five decisive factors – breadth of portfolio; proven framing quality; ease of use; integration of automation and manual systems; and digital tools – can help OEMs and end users fully and effectively evaluate the right choice for each project.

There can be significant advantages to working with a supplier like Bosch Rexroth, whose industry-leading portfolio of complete automation solutions includes one of most complete framing and MPS offerings, along with a full range of automation controls, drives, material transport and mechatronics technologies.

We use these automation systems in our global manufacturing facilities. We draw on that experience, as well as lessons learned through automation solutions provided for manufacturers across the globe, to improve our products and apply our expertise to work with you to develop the complete solutions you need to improve the performance and value of factory automation systems.

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**Do you have technical advice worthy of an article?**

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