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CHOOSE YOUR IDEAL ENCLOSURE GUIDE

MODULAR VS. UNIBODY



ENCLOSURES

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SOFTWARE & SERVICES



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OUR STORY BEGINS...

Much too often in life things are an either/or decision. Day and night. Black and white. Yes or no. The same paradigm exists when it comes to industrial enclosures and the complicated relationship between modular versus unibody industrial enclosures, and the misconception that one is better suited for today's global manufacturing landscape while the other is the product of a bygone era.

For automation architects, the term modular is most often associated with a modern or state-of-the-art approach to industrial enclosure design and engineering, while on the other hand the classification of unibody conjures up ideas of legacy enclosures that lack the agility and flexibility to keep pace with the variant-rich nature of today's production cycles. However, this couldn't be further from the truth as there is a time and place for both modular and unibody enclosures within a modern, forward-thinking industrial automation framework.

The trick is a comprehensive, fully-realized understanding of each type of industrial enclosure — not to mention an industrial automation partner with the knowledge and expertise to help guide you toward the right enclosure solution for your application.

From a nuts and bolts perspective:

- Modular enclosures are cabinets designed to protect sensitive electronic components where panels, doors, or other mission-critical component parts can be altered or swapped without time-intensive tasks such as cutting or welding. Essentially, a modular industrial enclosure is a one-size-fits-all hat that can be sized (or scaled) up and down based on need.
- Unibody enclosures are designed and engineered as stand-alone cabinets that are ideal for elevated levels of protection and security in harsh manufacturing environments. While alterations on unibody enclosures are not as simple as with modular enclosures, the unibody construction allows for greater panel or wire volume and configuration within the enclosure, which is a key operational aspect for a variety of industries like the food & beverage space.

No two production facilities are the same, especially in today's manufacturing sphere where companies operate multiple production sites across the globe and where space constraints, governmental regulations, labor availability, and a variety of other factors make both modular and unibody enclosures necessary for optimized efficiency and productivity.

Rittal's innovative approach to modular and unibody enclosures with the TS 8 and VX SE respectively helps manufacturers around the world simplify the enclosure production and integration process. Our partnership with the design software platform EPLAN offers a complete digitalization of the design and engineering process for each type of enclosure.

The unified, connected, and end-to-end visibility from procurement to production results in digital twins, shared schematics between key stakeholders, detailed panel wiring models, and more to give automation architects the power to configure their ideal enclosure precisely and rapidly.

But the question still remains: What are the primary manufacturing variables or considerations to account for when deciding on a modular enclosure versus a unibody enclosure? What common production scenarios dictate one enclosure over the other?

This guide will not only help navigate the decision between modular and unibody by examining a handful of situations automation architects find themselves in, but it will also help you better understand how the right enclosure — and the right enclosure solution partner — can help you unlock new opportunities for performance and growth.

IF EASY, STREAMLINED ASSEMBLY IS A PRIORITY, JUMP TO A UNIBODY ENCLOSURE

For the very foreseeable future, automation architects across all industries will be asked to do more with less. Supply chain instability, labor shortages, governmental regulations, and the continued development of sustainability initiatives contribute to manufacturers searching for long-term methods of reducing costs, increasing efficiency, and optimizing processes to acquire new segments of market share and expand their footprint.

This is where an industrial enclosure solution that requires minimal ordering assembly time, provides superior protection to reduce fault or failure, and is designed for an Industry 4.0 world is an immense value proposition. And this is where Rittal's VX SE is the unibody enclosure of choice for automation architects whose enclosure needs center on fast, easy, and virtually error-free integration.

SEAMLESS INTEGRATION STARTS WITH STREAMLINED DESIGN

In a partnership that reimagines the industrial automation process from design to deployment and all points in between, Rittal and EPLAN bring together a modular engineering philosophy, precise and automated Rittal Automation Systems machines, and powerful, database-driven electrical engineering to provide maximum efficiency and visibility to mission-critical manufacturing and automation control processes.

EPLAN's comprehensive software suite includes:

- EPLAN Electric P8: Database-driven platform for electrical controls design — digitalized control data forms the foundation for the automated creation of machine and plant documentation
- EPLAN Pro Panel: Design and build of control cabinets, manufacturing and automation solutions, and power distribution systems for energy supply, all in 3D
- EPLAN Data Portal: Integrated, web-based data portal with up-to-date device data from over 350 leading component manufacturers
- EPLAN Preplanning: CAE software that enables you to capture engineering data from the start of the engineering phase, for example, the actuators and sensors for a plant, machine, or building

With EPLAN and Rittal, manufacturers have unparalleled design power and superior engineering at their fingertips to create a game-changing industrial automation framework.

Designed for manufacturing environments where space is at a premium such as the material handling industry, the VX SE is ideal when Rittal's TS 8 modular enclosure is too big but the AX/KX compact enclosure is too small - or when buying enclosures is not required. Engineered with Industry 4.0 and IIoT in mind for a connected, integrated manufacturing sphere, the VX SE helps ensure enhanced electromagnetic compatibility (EMC) for integration into existing systems without fear of electrical failure or fault to help ensure production runs continuously without disruption.

From a construction and assembly point-of-view, the VX SE is at the top of its class. The unibody design requires minimal ordering and assembly due

to solid panel and roof construction, and the single-piece carbon or stainless steel frame construction allows for maximum stability and torsional rigidity.

This approach to main frame construction also makes the VX SE a true workhorse in the protection of sensitive and/or mission-critical electronics. This high-level of physical security is achieved by the elimination of gaps between side panels, roof, and frame to combat the potential ingress of contaminants that could result in production disruption or downtime. IP 66/NEMA 4/4X ratings make the VX SE a rugged, durable enclosure solution that can make an instant impact within your automation architecture.

IF YOU NEED TO SCALE OR PIVOT ENCLOSURE INFRASTRUCTURE BASED ON PRODUCTION PARAMETERS, CHOOSE A MODULAR ENCLOSURE

Nothing in today's fast-paced, interwoven world is static. Nothing stays the same. This is a sentiment automation architects know all too well as there is no better example of constant evolution and change than the current manufacturing climate where to scale or pivot based on customer or consumer demand, supply chain hiccups, or availability of labor is just part of the game.

Modular enclosures like Rittal's TS 8 demonstrate their true value when the unpredictable happens and instability arrives by helping manufacturers adapt without missing a beat. Through its modular design and capacity for rapid, virtually error-free reconfiguration based on production needs, the TS 8 provides superior flexibility and scalability in industries such as automotive and material handling where manufacturers are often leveraging multiple production streams in various locations for different markets.

What makes the Rittal TS 8 modular enclosure a metaphorical Swiss Army Knife for manufacturers in variant-rich production sandboxes is an innovative design concept that provides:

- 30% more available mounting space compared with other modular enclosures to maximize production floor real estate and simplify integration into existing automation frameworks
- Internally removable floor and side panels for streamlined highly-customizable wiring installation and alterations based on production or space needs
- Quick release hinges for rapid modification, maintenance, or replacement
- UL, cUL, and additional global standard approvals for compliance and immediate deployment by manufacturers with a global production network



BUILDING FOR THE FUTURE TODAY

You see electric vehicles (EVs) more and more these days. In fact, industry experts predict that it could only be a matter of years before they're just as common as their traditional counterparts.

As of December 31, 2021, Canadian EV drivers had access to 15,723 chargers at 6,723 public charging stations, according to data from Natural Resources Canada (NRCan). While it is true that currently there are double the number of gas stations in Canada, it is important to remember that the move toward electric vehicles is in the infant stage, and Canada's EV charging stations are growing exponentially, with fast charger installations up by 39 per cent as of December 2021.⁽¹⁾

Rittal's TS 8 modular enclosure system is ideal for housing and protecting the sensitive electronics necessary to help power electric vehicle charging stations. Designed and engineered with customization in mind, innovative modular frame structures create both inner and outer mounting options inside the cabinet, which allows for more electronics within the enclosure. Increased opportunities

for buying on all sides of the enclosure allow for integration into spaces with size limitations, and a variety of connection configurations make for easy cabinet wiring regardless of how the enclosure is deployed.

Faster, more efficient configurations, simplified installations, and interchangeable panels also help create optimized efficiency by streamlining tedious, time-wasting manual processes that once required high degrees of human intervention and inflated operational costs.

Rittal's TS 8 large enclosure is ideal when unique wiring needs and assembly challenges are often encountered, and where enclosure design and production need to be easily scaled based on the parameters of deployment. Additionally, because of the modular approach to enclosure design and assembly, individual panels can be removed, altered, or exchanged as necessary to account for manual errors, unexpected changes in schematics, or fluctuations in scale.

[1] Canada's EV charging networks grow, with fast charger installations up 39 per cent in 2021: <https://electricautonomy.ca/2022/03/31/canadas-public-charging-networks-2021/>

FOR FOOD & BEVERAGE PRODUCERS, TURN TO A UNIBODY CONSTRUCTION FOR PROTECTION AND HIGH DEGREES OF SANITATION AND CLEANLINESS

History is instructive, and if there's one lesson food and beverage producers have learned during the last 18 months it's that a high degree of cleanliness and sanitation in production facilities is top of mind for consumers. In fact, a recent study revealed that 56% of consumers actively look for and seek information on the sanitary conditions in food and beverage facilities.

This means today's producers need panel and enclosure solutions that are designed for strenuous cleaning and sanitation processes without compromising productivity and protection. Rittal's VX SE enclosure system and its unibody design is equipped to meet the elevated hygienic standards of consumers and the governmental regulations such as the Food Modernization and Safety Act.

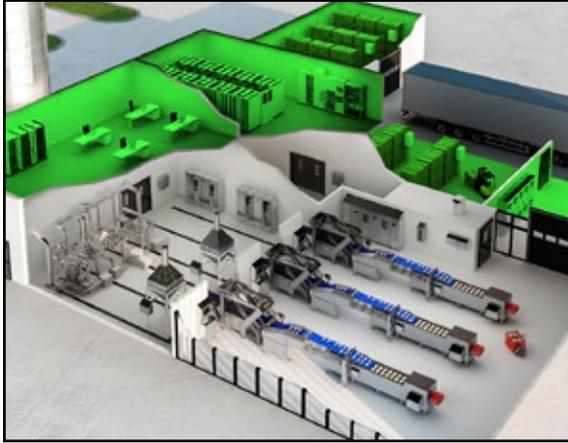
The VX SE helps producers meet the hygienic needs of their production facilities through:

- Smooth stainless steel construction with brushed grain 400 to prevent water pooling and buildup that can result in bacterial contamination on enclosure surfaces
- Unibody construction from a single piece for maximum stability and torsional rigidity
- High protection ratings like the aforementioned IP 66/NEMA 4/4X to withstand strenuous cleaning procedures and the use of powerful cleaning agents without risk of damage to the enclosure

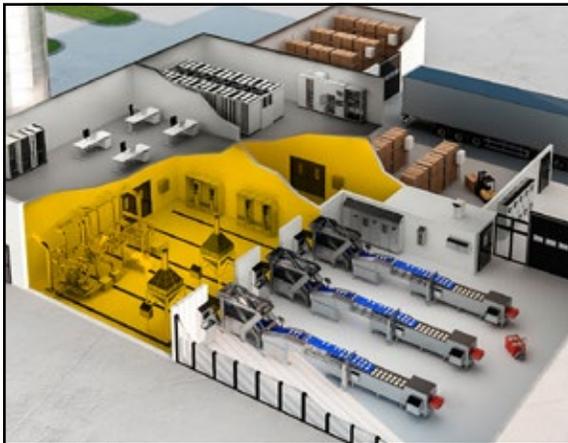
In addition, the space-saving nature of the VX SE allows system integrators to scale based on demand or space constraints of the production room floor. The VX SE offers a wide range of dimensions with widths up to 1800 mm to replace up to three baying enclosures, and depths of up to 300 mm for confined production applications.

THE ZONES TO KNOW

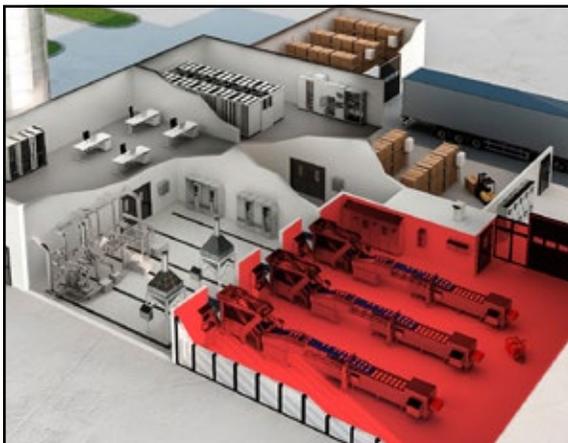
The layout of common food and beverage production room floors can be divided into three main zones, each with their own unique and distinct challenges in reducing energy consumption, eliminating inefficiencies, and creating an environment built on long-term efficiency.



Basic Hygiene Zone has no open production processes where food or beverage products can come in contact with contaminants, airborne or otherwise. In addition, there are no wash down requirements. Typical applications in this zone include building systems, packaging, and storage and/or conveyors.



Medium Hygiene Zone contains food and beverage processing with equipment like tanks, vats, vessels, piping, and other storage or transferring apparatus. While there are no open processes in the medium zone, all equipment is flushed, washed, drained, and sanitized. This means industrial panels, enclosures, and accessories must be engineered for easy water runoff or drainage to prevent pooling, as well as interaction with chemicals and cleaning agents without corrosion.



High Hygiene Zone contains a variety of open processes exposed to a variety of surfaces and thus requires the highest degree of sanitation. Industrial panels and enclosures must have the greatest degree of protection against corrosion from cleaning agents and must facilitate runoff to prevent pooling from frequent wash downs. In addition, equipment in the high hygiene zone must be able to withstand elevated degrees of water pressure and water temperature.

FOR HARSH OR EXTREME ENVIRONMENTS, GO WITH A MODULAR ENCLOSURE LIKE THE TS 8 FREESTANDING SYSTEM

It would be nice if all of today's manufacturing processes took place in hermetically sealed environments where temperatures were always ideal and consistent, damage to sensitive electronics from airborne contaminants were not an issue, and the reliability of production sequences were not tied to the durability of your industrial automation solutions.

But today's production room floors can be difficult environments for electronics to exist in, and that's why Rittal's TS 8 is the choice for extreme environmental conditions both indoors and outdoors.

Rittal's TS 8 is designed and engineered specifically with durability and toughness in mind for use in industry applications like the automotive space where faster, more efficient configurations, simplified installations, and interchangeable panels help create optimized efficiency by streamlining tedious, time-wasting manual processes.

The TS 8 provides IP 66/NEMA 4/4X protection through:

- Carbon steel base and enclosure frame, plus zinc-plated carbon steel mounting panels for superior rigidity and support
- Steel folded 16X and close-welded frame for maximum protection and significantly reduced points of failure for optimized production uptime
- Four-point latches and seals to combat the intrusion of harmful or corrosive particles that could damage electronics or decrease the lifespan of the enclosure
- 30% more stability with 15% less frame weight without sacrificing protection or reliability

In addition, modular enclosures like the TS 8 unlock productivity via an innovative modular frame structure that creates both inner and outer mounting levels inside the cabinet to allow for more electronics within the enclosure. Increased opportunities for baying on all sides of the enclosure allow for integration into spaces with size limitations, and a variety of connection configurations make for easy cabinet wiring regardless of how the enclosure is deployed.

Today, distribution hubs in the material handling space are popping up in new and emerging markets, or in challenging environmental conditions. Rittal's TS 8 large enclosure is ideal for the material handling space where unique wiring needs and assembly challenges are often encountered. Modular enclosures like Rittal's TS 8 and its capacity for enhanced automation elements are designed to help material handlers thrive in the complex and ever evolving logistics space.

IF OPTIONS IN CONSTRUCTION MATERIALS ARE KEY, CHOOSE EITHER A MODULAR OR UNIBODY ENCLOSURE

To be fair, this one is a bit of a trick question because it's not necessarily an either-or playground. Truth be told, both of Rittal's TS 8 and VX SE enclosure solutions provide a variety of construction material options for superior flexibility in a variety of industry applications and seamless integration into existing automation systems to minimize downtime.



The choice of construction material is particularly important for material handlers in the retail and logistics space where enclosures can be deployed indoors and outdoors, and in production environments where space is a concern and solutions need to be easily scaled to meet market demand.

Stainless steel construction of the TS 8 provides Rittal's four-point latching system and continuous foamed-in-place gasket provides a water- and dust-proof environmental seal.

The stainless steel model of the TS 8 comes with a load-bearing capacity of 3,000 lbs. and seamless integration with a variety of enclosure accessories due to a symmetrical frame design.

On the VX SE side, painted and carbon steel construction options provide a wealth of unique value propositions ideal for a wide array of deployments. Painted carbon steel utilizes an inner layer of primer and an outer layer of powder coat which produces a durable and scratch-resistant surface. In the case of accidental scratches, touchup paint should be used to cover exposed bare metal. Resistance to solvents, alkalis, and acids is very limited. Painted carbon steel enclosures are mainly used in indoor applications.



On the other hand, stainless steel VX SE construction uses an iron-based alloy containing between 18% and 20% chromium that is oxidation resistant and provides protection from corrosive solvents, alkalis, and some acids for use in indoor and outdoor applications.



HOW THE STORY ENDS IS IN YOUR HANDS...

By now you have a good understanding that the choice between modular and unibody industrial enclosures is not a Door #1 or Door #2 proposition. Today's manufacturers need customizable industrial panel and enclosures solutions that address specific challenges and meet specific needs, and this means modular and unibody enclosures both play an important role in optimizing your automation processes.



EXPLORE SOLUTIONS



Explore our entire line of industrial automation products and solutions at [RITTAL.COM](https://www.rittal.com)

Rittal's commitment to the end-to-end optimization of the enclosure production and modification process is demonstrated by our innovative approach to both unibody and modular enclosure construction with the ultimate goal of simplifying the complexities of global manufacturing sequences. While this guide has provided you with the information and insight automation architects need to make informed decisions about the right enclosure for the application, how your automation journey ends is ultimately in your hands.

The good news is Rittal is a proven industrial automation partner with the tools, resources, and solutions to help you get to where you need to go. Our team can provide **simplified** solutions to your biggest obstacles to help you get the job **done**.

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