

Ideen leben

häwa 

Always a little more flexible:
X-frame



X



www.mfcp.com



Our X-frame machine racks are customized solutions, developed from a modular system. You have special requirements for a machine enclosure and are looking for a solution that can grow continuously with increasing demands? We have the solution for you!

Lutz Georgi, production manager Bad Wörishofen

Please contact one of our häwa consultants to discuss your requirements:

As your personal häwa consultant,
I support you in all issues



X - frame machine rack

Each machine rack is functionally different, but they all have one thing in common: they are designed to your specific requirements and must be able to grow with your demands. That's why we developed X-frame – a modular system providing maximum flexibility.

The patented solution of the machine housing reduces the design work and costs and also simplifies commissioning. The machine racks feature an above-average load-bearing capacity.

The X-frame racks are used in almost all areas of technology. Clean rooms, laser applications, robotics or the medical field - an X-frame machine rack is always the perfect solution.



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Functional frame:

- Components and electrical equipment can be mounted directly in the functional frame.



Integrated control cabinet:

- We integrate control cabinets and enclosures as load-bearing elements in machine racks according to your specifications.



X-frame studs:

- Cable ducts are no longer required as it is possible to install all cables directly in the X-frame rack.



Integrated mounting panel:

- Visible pneumatic area with quick access and direct cable routing to all areas, including integrated mounting panels.

What is **X**- frame ?

X-frame is the optimum solution for machine racks that have to meet individual requirements. Since 2008 we have been planning, designing, and assembling machine racks of the häwa patented X-frame modular system.

Our decades-long experience and know-how in manufacturing cabinets and enclosures is second to none.

Due to the continuous integration of various proven designs, we developed and refined the X-frame program into a standard modular system, which can be individually extended and adapted to customer requirements.

Our engineers use this modular system to implement the optimum solution for your individual requirements.

Due to the simple modular structure, you can already save time and money during the project planning and design phase.

The modular design of the X-frame system provides the highest level of comfort and maximum flexibility for machine racks. A modular system with (almost) no restrictions. The X-frame modular system is being continuously optimized and refined. The perfect standard for a variety of product ranges, one-off designs and customized solutions.

UL-certified machine racks



UL is one of the world's most important independent bodies for the testing and certification of materials, components and end products in the field of product safety. If products, in particular machine racks, are exported to the USA and Canada, they should be certified. The certification process according to North American standards for electrotechnical products considerably simplifies market access.

The patented X-frame machine frames are supplied with UL label, which greatly simplifies acceptance and commissioning. Our customers in the USA and Canada therefore have the security of not taking any risks when using häwa products.



X - frame machine racks – your advantages



Modular design

Complex can be quite simple. From the very beginning, the modular design and the associated advantages were a basic idea when we developed the X-frame machine racks. Our racks are subdivided into modular assemblies with matching designs that can be interchanged and mounted. All features are available in a modular system from which the customer can select solutions for a wide range of applications and projects. **X-frame – the answer to your requirements.**



Save time and money

Time is money! Due to the partitioning of the racks into interchangeable modules, it is possible to realize valuable synergies and short assembly times. Furthermore, it is possible to integrate control cabinets into all levels. Additional cable ducts are not required. Advantages that häwa passes on directly to its customers by offering an attractive cost/performance ratio. **X-frame – because it's your money and your time.**



Design and ergonomics

We want to use the design to emphasize values such as quality, a modern spirit, reliability, ease of maintenance and efficiency, and thus the concept of our X-frame system was born. Each component can be supplied to your color, material and positioning requirements. The product family is distinguished by an ergonomic, clear design, individual color choices, as well as material selections (powder coated sheet steel or stainless steel); making each machine rack unique. **X-frame – because functionality can also be beautiful.**



Safety

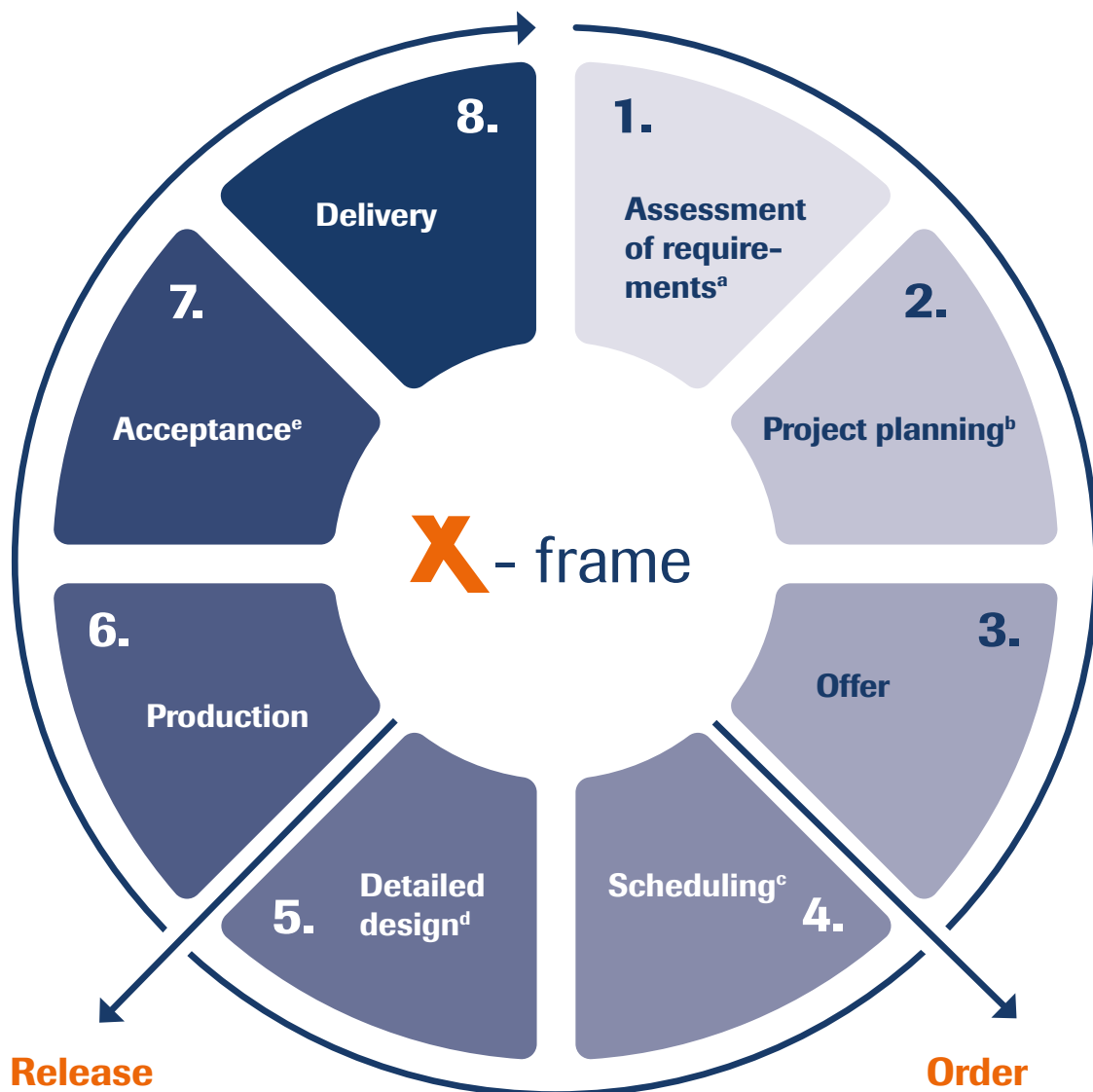
We do not make any compromises with regards to the safety of our products! The compact solution of the modular system reduces space requirements, design time and costs, thus simplifying engineering and commissioning. Effective laser protection, light-proof design for protection against harmful UV light, grounding studs on all standard components, and conductive surfaces – X-frame machine racks will meet all requirements. **X-frame – because safety knows no compromise.**



Patents

Since 2008 a patent has been protecting our X-frame modular system on an international level, making the X-frame system with integrated cable routing in the struts, with flaps for quick access to these areas and with integrated control cabinets unique in the market. Each machine rack from häwa will always be unique and the leading solution in functionality and quality. **X-frame – because our solution is the original.**

Project schedule of your **X**- frame machine rack



^a The requirements can be clarified in several discussions and afterwards we will send you a detailed project description.

^b The technical clarification is a significant element, which we visualize using a simplified CAD design.

^c Milestones are set after receipt of order.

^d Detailed design occurs after clarification of all technical details. Any modifications made after receipt of your approval will be charged.

^e Upon request, the acceptance test of the X-frame machine rack can be performed on häwa's premises.

X - frame struts

X-frame struts are available with various load carrying capacities. The horizontal and vertical frame struts are manufactured in different strengths. Thanks to their modular design, they can be easily combined.

Cables are routed in the horizontal and vertical struts (the cable access of the light-struts is on the inside of the unit). Customized dimensions are possible, enabling us to provide the perfect strut in each area of the frame and to avoid oversizing.

X - frame light-struts

Due to their small cross-section, the X-frame light-struts provide maximum access width when space is at a premium.



Fig.: X-frame light-strut

X - frame welded racks

To meet specific accuracy requirements for machine racks as well as for heavy loads and special shapes, häwa manufactures high-quality welded racks with maximum precision. Tube cross-sections are adapted to the requirements. To prevent subsequent deformations, the welded racks can be annealed stress-free. The racks are processed with flatbed or portal milling machines and are coated with the requested surface finish for providing the optimum result.

X - frame standard struts 1.5 mm

X-frame struts are used for systems with weight loads up to 1 ton. A special feature of this program is our 90° corner strut flanged 13 times for maximum load carrying capacity.

X - frame Pro-X-struts 3 mm

Our Pro-X-struts made of 3 mm sheet steel are used for machine racks with high load carrying capacity.

X - frame robot struts 13 mm

We developed specific robot struts for highly dynamic applications. With wall thicknesses of up to 13 mm, they are resistant to high torques by guaranteeing high pick accuracy. We also provide FEM calculations which can be used to verify quality.



Fig.: X-frame, Pro-X and robot struts look the same from the outside.

FEM calculation

We provide FEM calculations for systems with highly static and dynamic requirements.

The finite element method (FEM) is a numerical system for visualizing all mechanical properties and for determining the stability, peak loads and quality of the system.

Thanks to a FEM calculation, selective optimization measures can be taken and designs can be adapted at an early stage to prevent time-consuming and cost-intensive rework.

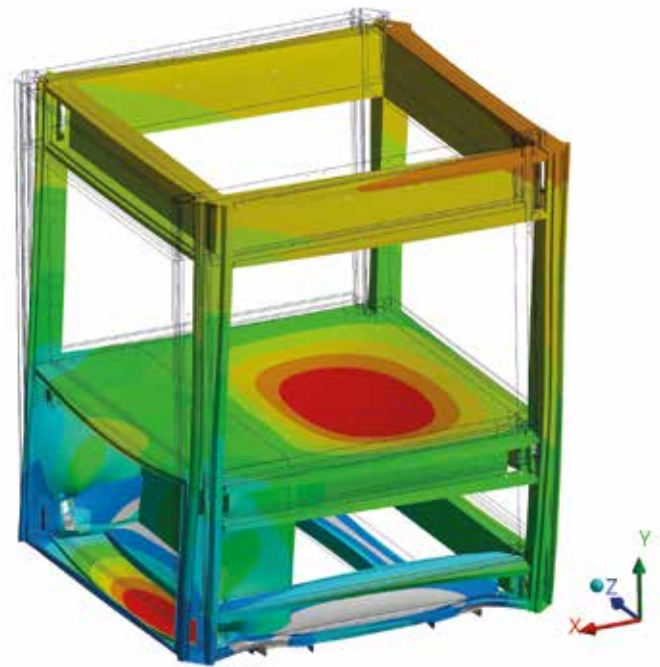


Fig.: FEM calculations

X - frame materials (sheet steel, stainless steel V2A, V4A)

X-frame machine racks are made of sheet steel and feature a high-quality powder coating. For special applications, all components can be supplied in stainless steel V2A or V4A.



Fig.: Powder coated sheet steel



Fig.: Stainless steel

Assembly cells

Assembly cells are the most complex customized enclosures, combining all common manufacturing processes.

Assembly units are produced either as a one-off at small manual workstations or as a mass product in complex production lines.

There are various options for the implementation. Manual, semi-automatic and automatic manufacturing processes are required for the production of the assembly units.

To meet all these requirements without having to design a new customized rack for each process, we have developed X-frame, a very flexible,

modular machine rack that can be adapted to all requirements.

The advantages of this program are that we summarized our extensive experience to create simple, standardized basic components which meet individual requirements and which can be assembled to highly complex systems.



Fig.: Assembly cell with continuous base

Design of the assembly cells

X-frame standard components meet most of the requirements for assembly cells.



Fig.: Mobile assembly cell with control panel "Push" and integrated light curtains

Test cells and stands

Checking, measuring and testing individual components is of major importance.

For this purpose, häwa manufactures small systems and racks, designed to meet the highest requirements e.g. overpressure systems, burst protection cells with bullet-proof windows as well as test cells for hydraulic components, including tanks and collecting pans made of

stainless steel according to WHG. Integrated granite blocks as well as optimum sound insulation and vibration damping are only part of the physical requirements to which häwa offers the perfect solution.



Fig.: Test cell with integrated control cabinets

Customized solutions

We also develop customized solutions with specific physical requirements.



Fig.: Test cell with "Touch" control panel

Production lines

häwa benefits from a decade-long know-how in the project planning and realization of large-scale systems.

We have developed innumerable complex systems and production lines for our customers - some grew over longer periods of time. The goal is always the same: to develop an universal standard that can be used in the various production stages.

Thanks to the modular structure of the X-frame system, the basic rack of a production line can be quickly and easily modified into an individual customized cell.

The major advantage is the integrated cable routing in the X-frame struts. Combined with our häwa control cabinets, it is possible to install highly complex electrical systems in your production line.

Cable separation and cross-sections of the struts are matched to the volume of the required cables. In advanced stages of assembly, pre-lasered cable cut-outs provide optimized cable routing even in places that were initially not designated, allowing quick access to the cable-bearing X-frame rack without tools.

Result for our customer: A highly effective, time-saving assembly of the individual system segments at their own site.

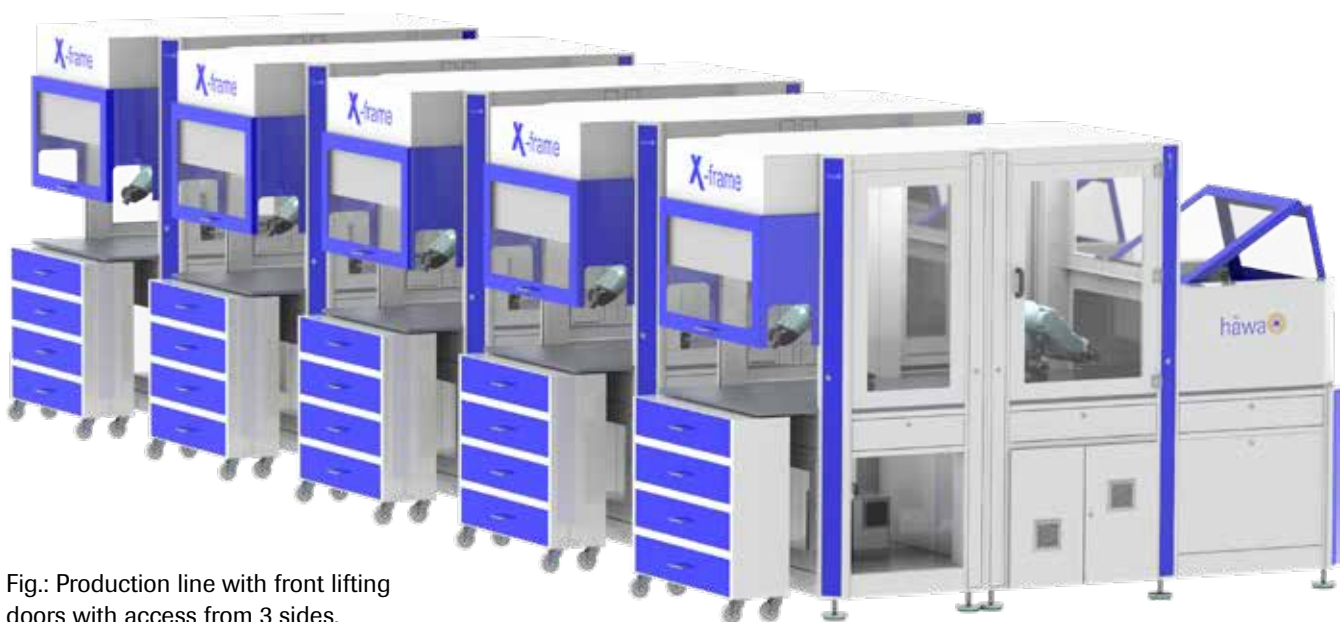


Fig.: Production line with front lifting doors with access from 3 sides.

Machine housings

häwa is also your perfect partner for protective housings for production areas without load-bearing function.

Whether you require housings for complete production lines with palletizers, base-adapted robots, rotary indexers or other options - we have the solution.

Our detailed project planning makes these systems more effective and service-friendly. The integrated cable routing in the X-frame struts, including cable separation and direct access

to the control cabinets, is a frequently used standard.

Accessible levels, automatic door systems and the necessary safety technology are additional components of our systems' project planning.



Fig.: Machine housing with optimized cable routing

Your logo as an eye catcher on your machine housing?

Logo cut-outs can be highlighted by colored sheet steel plates or illuminated windows!

Please feel free to contact us:
info@haewa.com

Robot cells

Robotics is one of the leading disciplines of the 21st century.

Particularly the industrial sector makes use of this technology to advance automation with highly developed robot applications. The sensitive industrial robots generate high torques and must be protected with particularly robust robot cells.

The X-frame machine rack can be used for a wide variety of robot applications. Pendant and floor-standing robots are possible, as are lateral adaptations. Depending on your requirements, you can select from three different load carrying capacities for the robot cells.

Customized X-frame structures can be developed from these standardized designs. The three systems are compatible with each other for optimum use in any area of your system, thus significantly reducing weight and costs.

If required, high-quality annealed welded racks, machined in a portal milling machine, can be integrated into the X-frame system.

Even mobile cobot units, that are now often used in industrial sectors, can be designed with the X-frame system in the human-robot collaboration.

FEM calculation

We provide FEM calculations for robot cells on a standard basis. See page 11.



Robot housings:

- Integrated control cabinet and protected cable routing with cable separation.



Collaboration human/robot:

- Our mobile cobot units with robust lifting rollers for a safe positioning.



Machine racks for robots:

- Robot racks with machined welded frames for maximum precision.

ESD version



All X-frame machine racks can be manufactured ESD-capable by applying special coatings and using coated windows.



Laser protection cells/light-proof

A laser housing must fulfill two essential basic conditions:
No dangerous laser radiation may escape and sensitive production processes must be protected in an optimum manner against all external influences.

We at häwa design and manufacture customized laser protection cells. With the X-frame system, we have developed a laser protection standard for use up to laser protection class 4.

Regardless of the type of laser, pre-configured laser components are assembled into an effective protection system. The modular system

includes overlapping door systems, laser protection frames, labyrinths and many other components.

Laser protection windows are adapted to your requirements. For high-performance lasers, we offer double-walled protection cells with active laser protection, such as LaserSpy.

Laser protection classes:



Designed for all laser protection classes from 1 - 4, we offer double-walled protection cells for active laser protection.

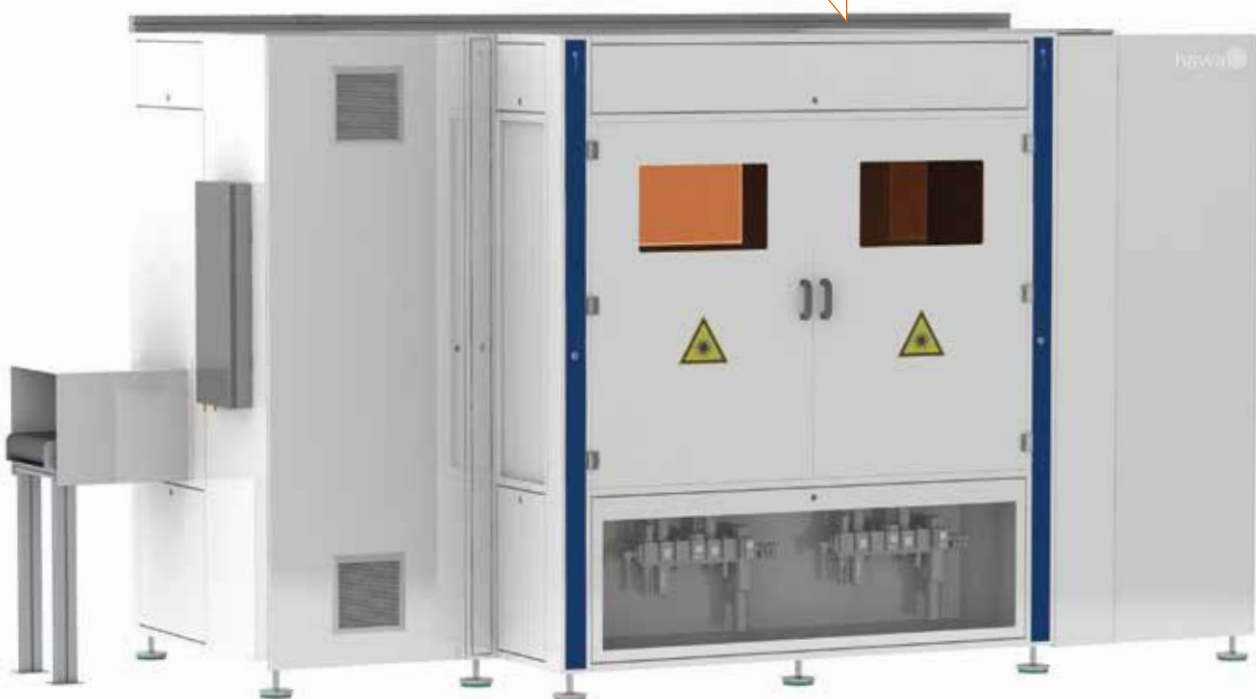


Fig.: Laser protection cell with heat exchanger

Based on laser protection cells, häwa manufactures completely light-tight machine racks. Overlapping surfaces, additional sheets and flanged edges as well as special seals to refract the light are solutions for this kind of application.

In case of scattered light, the cover panels can be continuously foamed with PU seal and the internal cells are coated in matt black to prevent disruptive reflections.

These X-frame machine racks are used in welding and bonding plants to prevent UV light, which is harmful for the eyes, from escaping. Another application is racks for optical measurement.



Fig.: Laser protection cell with integrated rotary indexer



Fig.: Laser protection cell with electric lifting door



Hygiene cells

There are increased hygiene requirements for certain applications.

Not only food and beverage, but also chemical and pharmaceutical industries, cosmetics and biotechnology are typical application fields, which call for relevant legislation and directives.

In order to meet these requirements, we are often using V2A and V4A stainless steel.

X-frame machine racks can be used in wet and dry areas and also in cleanrooms which are particularly relevant in the medical field, ensuring that our customers can always be sure of having the best possible hygiene solution.

Hygienic design

Provided with inclined horizontal surfaces, dripping edges and tight welded seams.

Hygiene gasket

Control cabinets with blue hygiene gaskets to your IP requirements.

Accessories

Matching safety switches, adjustable feet, latch locks and hygiene components according to DIN 40050-9 are available to your requirements.



Fig.: Hygiene cell for dry and wet areas

Cleanroom cells

Working in clean room conditions is standard in electrical and medical engineering as well as pharmaceutical and semiconductor industries and it becomes more and more important in the automotive industry and for its suppliers as well.

Thanks to its large surfaces and minimum interfering contours, X-frame is particularly suitable for use in cleanrooms.

Together with our customer we specify, the shape, the design and the type of coating of the cells to meet the required cleanroom class.

The adaptation and integration of airflows to realize a laminar flow is thereby an integral part. Interference contours are avoided to ensure a free air flow.

Air outlets are adjusted to the generated air volume in order to create an overpressure in the cell, thereby preventing unfiltered bypass air from entering the cells.

Components such as cleanroom feet, handles, switches and other individual parts are adjusted to the respective design. And: Integrated control cabinets, which are designed as load-bearing structures eliminate the need of a frame construction in the control cabinet areas.

For various cleanroom classes

X-frame cells can also be designed for airflow applications for various cleanroom classes.



Fig.: Cleanroom cell with cables, installed in the X-frame rack



Polygonal cells

Rotary indexing systems in hexagonal and octagonal design offer a wide range of possibilities for feeding and discharging materials that are to be processed in the cell.

For large systems, we also build cells with more than eight sides.

Polygonal cells are also an excellent solution for areas with limited space around the cell.

Generally, all X-frame cells can be equipped with the proven standards. High-quality, precisely machined welding frames are manufactured to accommodate large rotary indexers.

häwa supplies the rotary indexing cells with work plates to accommodate the individual process applications.

Individual systems for linear indexers can be designed at any time. Attached swivel arm systems can be rotated by approximately 340 degrees around the cell.

Application-oriented cell format

Polygonal cells are a great solution for applications with limited space around the cell.

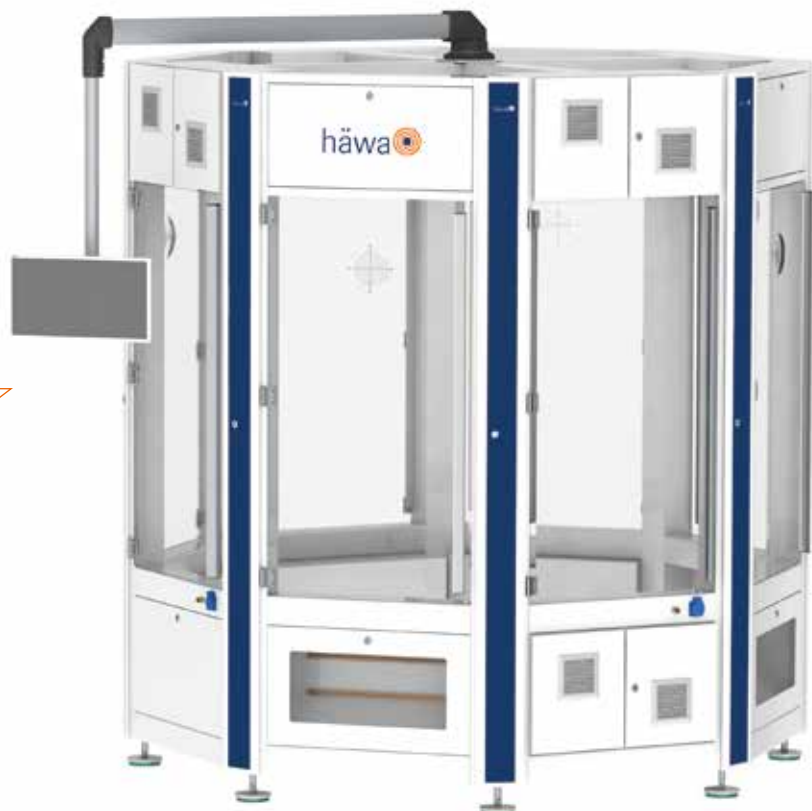


Fig.: Rotary indexing cell with modular structure

Manual workstation racks



Fig.: Workstation with electrical height adjustment

hawa has refined the X-frame components for use on table racks and manual workstations.

By using solid and compact struts, we have developed simple modules ranging from the floor to under the table top.

All modules are designed for cable routing and for housing electrical and pneumatic parts. They are equipped with an externally bolted door that can be fitted with a viewing window. For easy assembly, the struts can be equipped with internal mounting plates for e.g. positioning of pneumatic components. Just two side sections are needed to build simple table racks.

If fitted with control cabinets and other modules from the X-frame modular system, even complex workstations can be configured. Height-adjustable workstations in electrical, pneumatic and hydraulic design and highly robust designs for collaborative robot systems can also be provided.

The workstations are designed in accordance with the ergonomic specifications for workplace design.

ESD design:



All X-frame machine and manual workstation racks are available in ESD design.

Door systems

One of the most important components on a machine rack is the door system, providing quick and free access to the unit.

We have standardized frequently used door configurations for the different X-frame models, including normal **hinged doors**, **sliding** and **lifting doors**, **folding doors** as well as **pneumatic** and **electric door systems**. Furthermore, the customer can choose from a wide range of door locking systems.

häwa is able to use all versions currently available in the market and adapts the door systems accordingly. We select handles, hinges, washers and stops according to the customer's and also to the machine rack's requirements.

The **lifting door systems** developed by häwa are very simple and effective. Thanks to an integrated mechanical feeder, we have been able to develop a cost-effective and space-saving design, eliminating interfering and space-consuming counterweights.

The required guides are mounted intelligently and space-saving in the vertical corner struts.



Hinged doors with viewing window



Hinged door



Plastic and glass door



Bolted door with viewing window



Bolted door



Lifting door



Folding door



Sliding doors



Swinging door

Customized door systems

Systems with special requirements often call for a customized door system. Solutions for safe access are developed based on your specific requirements.



Mobile hoods

We develop special solutions such as vertically adjustable hoods together with you.

Roller doors

The X-frame rack is designed for the installation of rolling doors or electric and pneumatic lifting doors.

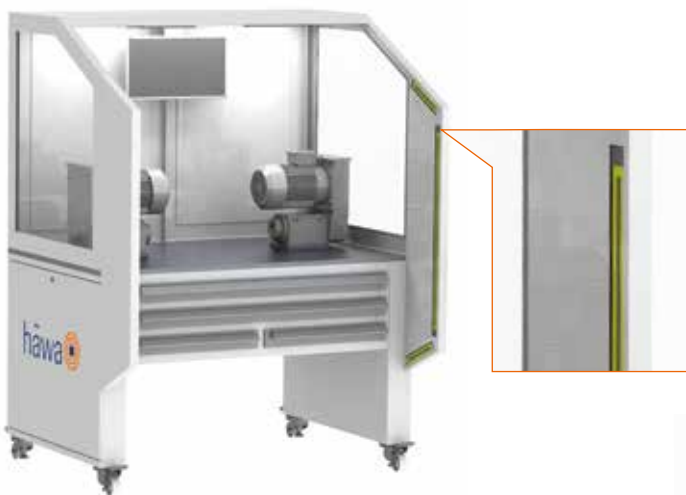


Safety systems

Different security systems are available to protect critical access areas in the unit.

No matter if you need safety switches with actuators, magnetic or reed switches, light curtains, floor scanners, LaserSpy or other systems - we integrate any safety system. You can freely select the manufacturer and type.

And also in this case, we provide maximum flexibility: häwa takes care of the respective safety technology - or it is provided by the customer. Our experienced fitters either install the safety systems - or the customer installs them himself. We offer customized and pragmatic solutions based on the customer's requirements.



Light curtains:

- Light curtains can be installed directly in the machine rack and thus are protected from external influences.

Fig.: Manual workstation with usable side panels

Safety switch:

- Integrated safety switches are freely selectable for all access areas, based on the customer's requirements.



Fig.: Laser protection cell with electric lifting door

Pendant arm systems / display holders

Pendant arm systems are a major factor in today's mechanical engineering and are therefore a basic component in the häwa product range.

We offer customized solutions for a wide range of applications.

With häwa pendant arm systems, you always have everything at a glance.



Mini pendant arm system:

- The mini pendant is continuously adjustable in height and available in your favored color. The sturdy construction also allows the attachment of screens including keyboard tray or large operating housings.



Pendant arm systems:

- They can be modularly extended. By using intermediate joints, the screen can be positioned around the machine rack and swiveled and tilted by up to 4 axes.

Do you require other systems?

Please contact us!



Integrated control cabinets

Integrated control cabinets are an important part of the X-frame machine rack system. Control cabinets are part of the patented cable routing in the X-frame rack.

Attached control cabinet

Mounting of the attached control cabinets is possible both on and between the vertical corner struts.

Control cabinet below the process level

If required, the control cabinets are stabilized in the base area for the transport of the machine rack.



Fig.: Machine rack with lateral feeding covers



Protective ground conductor test/ potential equalization

We perform protective conductor tests in accordance with DIN EN 60204-1. If required, we also provide a report. For the safety of the X-frame machine frames, we have standardized the potential

equalization of the components. All components of the basic construction are already equipped with grounding studs and therefore it is not necessary to add them to the designs.

Swiveling control cabinet

häwa also offers customized solutions as an alternative to fixed control cabinets, for example, control cabinets fitted in a swing frame.

Swinging the frame out provides free access to the otherwise concealed machine rack.



Closed:

- Control cabinets in swing frame provide a closed rear side of the production line.

Swing frame:

- The swing frame is bolted directly to the machine rack. Cables are routed into the X-frame via an energy chain.



Open:

- Open swing frame allow for free access to the processing area.



As distinct as your requirements in every area: The häwa product range

häwa – the perfect fit for your individual requirements

We are your reliable partner for well thought-out cabinet, console and enclosure systems, smart IT-solutions, effective thermal components, modular machine frames, functional cable ducts and useful tools. Especially, if you require customized and flexible solutions.

From design via construction and production all the way to logistics, and a quick delivery and maintenance service;

from häwa you get all from a single source – always supported by your personal häwa consultant.

More than 400 motivated employees are ready to find the best solution for your challenge and budget. The result: high-quality products which will fully meet or even exceed your expectations – both today and tomorrow.



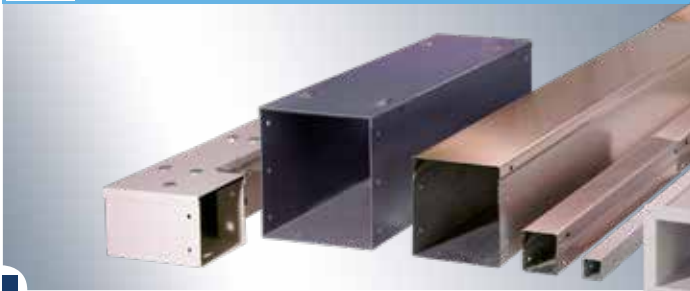
CLIMATE CONTROL



CUSTOMIZED SOLUTIONS



CABLE DUCTS



TOOLS



This is how we develop unique solutions for you:

Customer-focused

We listen, think, advise and support you, in short: As your partner we will work closely with you – thus enabling us to create solutions to exactly match your individual requirements.

Personal

At häwa, we place an emphasis on direct contact – your personal häwa consultant is always available to you, brings your ideas to life and helps you with great motivation and commitment along the way to your ideal solution.

Reliable

Trust in a reliable partner who will always support you – especially when it comes to the safety of components whose functionality is essential. häwa's policy is: We keep our promises. Simple as that.

High-quality

At häwa, we put a high emphasis on the quality of our products which is reflected in our certification according to DIN EN ISO 9001:2015. The same applies to our advice and service. We will not rest on our laurels – but constantly improve for you.








Forward-thinking

We will surprise you with individual ideas and ingenious solutions that will fulfil or even exceed your expectations again and again – both today and tomorrow. We only ever have one goal: the best possible solution for your challenges.

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	CABINET SYSTEMS
	X-FRAME
	ENCLOSURES
	ACCESSORIES
	CLIMATE CONTROL
	CABLE DUCTS
	CUSTOMIZED SOLUTIONS
	TOOLS