Modular conveyors for flexible manufacturing from Bosch Rexroth

The first name in assembly conveyors
Bosch Rexroth –
A worldwide leader in
conveyors for assembly and more

More products are assembled on Rexroth conveyors than any other. We were a pioneer in developing flexible, non-synchronous assembly conveyors over 30 years ago, and today have thousands of assembly and test systems operating around the world.

Your first choice when time-to-market is critical
The pressure to get products to market quickly has never been so intense. Add the complexity of small lot sizes and model changes, and assembly line flexibility is absolutely vital. That’s where Bosch Rexroth can help.

Our modular, pallet-based TS series conveyors are designed to integrate and install quickly, to meet even the most aggressive deadline. Their proven power and free principle lets you combine manual and automated workstations (e.g., pick-and-place operations, testing, inspection) on the same line. And should cycle rates vary so much that parallel operations are necessary, TS conveyors can be configured as cycle-independent loops to balance line flow and keep throughput on-target. So whatever your layout, you’re always in complete control.

Our VarioFlow™ modular plastic chain conveyor brings similar flexibility to unit handling. Its exceptionally strong chain (tensile strength up to 1250 N) allows heavier loads and more accumulation, using fewer drives.

Bosch Rexroth can help you improve productivity…
For all the traditional ways to improve productivity — increased throughput, higher system reliability and fewer product defects — Bosch Rexroth can make major contributions to your bottom line. Count on us if you want to streamline material flow or implement Just-In-Time procedures to reduce work-in-process.

…and enhance manufacturing flexibility
Accommodating change is another major advantage. Both the TS Series and the VarioFlow system are built on Rexroth modular structural framing, so product or process changes can be easily implemented without obsoleting your initial investment… or incurring prolonged downtime. Operating efficiency stays high and manufacturing costs stay low.

…and achieve better product quality…
Rexroth conveyors also help improve product quality in many ways. First, they integrate diverse operations to give you the right manufacturing mix. Second, their high positioning repeatabi-

If you need to manufacture multiple products on one line, that’s no problem. Rexroth conveyors even accommodate lot sizes of one, so you can respond to customer needs quickly, with minimal effort.
Modular plastic chain conveyors and pallet-based conveyors integrate easily to handle different processes in an automated assembly system.

Ergonomic designs improve the productivity of manual operations.

High repeatability at high or low cycle rates simplifies automated assembly.
Modular designs suit today’s ever-changing manufacturing environment

With the broadest line-up of non-synchronous assembly conveyors available anywhere, Bosch Rexroth offers a flexible solution to virtually any manufacturing challenge. Choose from a variety of pallet-based, power-and-free conveyors (TS) or a flexible chain system that handles inclines with ease (VarioFlow).

**TS4plus**
Pallet sizes: 443 x 443 mm to 1243 x 1243 mm

**TSplus**
Pallet sizes: 160 x 160 mm to 1040 x 1040 mm

**TS1**
Pallet sizes: 80 x 80 mm to 160 x 160 mm

The TS family can accommodate anything from small space requirements to payloads of up to 550 pounds (250 kg).

**Simple system development and maintenance**
This modular concept greatly simplifies integration, so your design process can be shortened significantly. Installation is simple, with just a few tools, and start-up problems are rare. Once in operation, our standardized modules even reduce maintenance costs, because they can be serviced without disrupting the entire line.

**Ergonomic design improves productivity**
The modular approach is popular with operators, too, because it gives designers so many ways to maximize comfort and minimize fatigue. All modules operate cleanly and quietly, and are easy to integrate with other Rexroth productivity tools, such as modular workstations and aluminum structural framing.

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**Respond to changing needs quickly and easily**
All our conveyors are made from pre-engineered modules, making them easy to expand, reconfigure or relocate as your needs change. You might begin with a simple conveyor for basic assembly work, then add workstations (even build up to a fully automated system) when volumes increase or product designs are updated.

With Bosch Rexroth, you only have to buy as much system as you need right now, so your up-front capital investment is minimal. Even so, it couldn’t be simpler to optimize your production scheduling. Our binary coding system lets you run multiple products on one line, assemble lots of one, and everything in between. Try that with a synchronous system!
Every Rexroth module passes rigorous testing procedures, and the simple controls interface further enhances reliability. And on a very practical level, standardization means you’ll never have to wait for answers. Complete documentation (operation, assembly, installation, spare parts… you name it) is always available, because it’s all been done before.
The variety of Rexroth conveyor types and modules allows you to design a system that makes the best use of space while meeting your specific production requirements. Typical criteria include:

1) product size and weight,  
2) space constraints,  
3) cycle time,  
4) process complexity, and  
5) environmental conditions.

Bosch Rexroth offers six basic TS system configurations, each with distinct advantages. For economy, you might choose a carousel configuration for its fewer motors and very simple controls. If floor space is tight, an over/under configuration lets workpiece pallets be returned overhead or underline. Rectangular configurations are preferred in systems requiring flexibility despite a more complex layout. A serpentine layout is ideal for joining two production areas or designing around obstructions, such as a pillar. The parallel

TS conveyors can be used in a variety of layouts, or combined for even greater flexibility. A few common configurations are shown here.
configuration, connected by curve sections or lift-transfer units, provides a very small footprint and fast cycle times.

**Tailored to your needs**
Which TS conveyor system is best for your application? The crucial factors are pallet payload and size, cycle time, and repeatability. You can match these with the appropriate Rexroth conveyor in the following table; descriptions of all three models can be found on the following pages.

<table>
<thead>
<tr>
<th>TS1</th>
<th>TSplus</th>
<th>TS4plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workpiece Pallet Size Range</td>
<td>80 x 80mm, 120 x 120mm, 160 x 160mm</td>
<td>26 sizes, from 160 x 160mm to 1040 x 1040mm</td>
</tr>
<tr>
<td>Workpiece Pallet Load Capacity</td>
<td>Up to 3.0 kg (6.6 lbs.)</td>
<td>Up to 70 kg (154 lbs.)</td>
</tr>
<tr>
<td>Transport Media</td>
<td>Flat belt</td>
<td>Roller Chain, Flat-Top Chain, or Flat Belt</td>
</tr>
<tr>
<td>Transport Rate</td>
<td>9, 12, 15, or 18 m/min.</td>
<td>9, 12, or 18 m/min.</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.015mm (.0006&quot;)</td>
<td>±0.05mm (.002&quot;)</td>
</tr>
<tr>
<td>Typical Industries Served</td>
<td>Electronics, Biomedical, Computer, Communications, Small Appliance</td>
<td>Automotive Components, Electric Motor, Household Appliance, Biomedical, Communications, Personal Healthcare, Computer</td>
</tr>
</tbody>
</table>

Serpentine

Parallel

In-line
The first family of conveyors, for assemblies large and small

TS conveyors come in three sizes, to suit a range of applications: TS1, TSplus and TS4plus. Each offers a complete series of pallet-based transfer, positioning and control modules to satisfy the varied requirements of manual and automated assembly operations. They also provide the rapid configuration flexibility demanded by today’s competitive manufacturing environment.

**TS1 — for small products or small spaces**
TS1 is ideal for assembling or testing small products or sub-assemblies up to 6.6 lbs. (3.0 kg), especially when floor space is at a premium. It provides the highest repeatability of the three TS conveyor lines — ±0.015mm. Typical high-precision applications include electronics, medical devices and critical automotive components.

TS1 workpiece pallets are transported on an electrically conductive flat belt. They are available in three standard sizes and styles to fit every application. Molded plastic pallets and plastic pallets with steel plates are economical solutions for high-mix applications requiring a lower level of precision. For high-precision assembly, the solid aluminum pallet offers the highest repeatability of the three pallet styles.

**TSplus — the standard for performance and flexibility**
Flexibility is the major reason why the TSplus is the world’s leading assembly conveyor. It gives you so many choices — for configuration, speed, pallet size, and transport media — that it’s suitable for virtually any small or medium product.

More parts are assembled on TSplus conveyors than on any other pallet-based system. Choose from three transport media: electrically conductive flat belt, flat-top chain or power-and-free roller chain. The modular design of TSplus lets you mix and match any of these media with any transport, positioning or control modules to fit your application.

TSplus offers 26 standard pallet sizes, with a steel plate or an aluminum plate. Lightweight cast-aluminum plates are ideal for larger pallets, while steel pallet plates are more economical.
**TS4plus — produce 550-lb. assemblies with precision**

TS4plus, the largest and most robust of the TS family of conveyors, is widely used in the assembly of heavy automotive components and large home appliances. With a repeatability factor of ±0.125mm, the TS4plus is the best choice for precision assembly of payloads up to 500 lbs. (250 kg).

Two workpiece pallet styles are available. The standard aluminum pallet provides a flat surface to mount fixturing or tooling, while the open frame pallet is lightweight and offers easy access from below.

TS4plus pallets are transported on a power-and-free roller chain that accumulates with minimal queuing pressure, allowing accumulation drive loads up to 2,500 kg. Transfer speeds of up to 18m/min. reduce cycle times, and system footprints can be surprisingly small.

Application Corner

**The small and the large:**

TS4plus bring Rexroth flexibility to light and heavy-duty applications.

The same standard-setting features that make the TSplus the most trusted, most flexible assembly conveyor in the world are mainstays of the TS1 and TS4plus as well. Pre-engineered modules maximize layout flexibility and optimize workflow and space utilization.

TS1 provides the highest repeatability (up to ±0.015mm) of the three TS systems. Dependened on for everything from circuit boards to vehicle braking systems, it’s your high-performance choice for high-precision assembly.

TS4plus, which handles workpiece pallets as large as 1243 x 1243mm, is as ideal for bulky automotive drive train assemblies as it is for heavy home appliances. Minimal queuing pressure and transport rates of up to 18m/min. help keep cycle times short.
VarioFlow™ — when flexibility matters most

VarioFlow™, the modular plastic chain conveyor system from Bosch Rexroth, optimizes your flexibility in packaging, optical, machine tool, and assembly applications. It also helps reduce time-to-market, improve product quality and minimize total cost. Featuring Adaptive Modularity™ — a space-efficient concept based on standard, pre-engineered modules — VarioFlow lets you tailor conveyor layouts to specific requirements and adapts quickly and affordably as your needs change.

VarioFlow is an economical solution to a wide range of product handling problems. Engineered to give you more options, productivity, and reliability, it saves you money in several ways. With its Adaptive Modularity, VarioFlow can streamline your project from concept though production. And you can quickly adapt it to changing needs, protecting your original investment.

Innovative design details — e.g., space-saving, low-friction curve technologies and chain tensile strengths of up to 1250 N — accelerate your return on that investment. Ideal for applications requiring long stretches of conveyor and product accumulation, VarioFlow uses fewer drives and less energy, requires less maintenance, and enjoys longer life than conventional conveyors.

VarioFlow is available in seven widths, and offers stainless steel modules to meet even food-grade sanitary standards. A full range of transport modules and 11 chain styles make it easy to customize individual solutions. And VarioFlow is fully compatible with Rexroth aluminum structural framing components, further enhancing its flexibility.

**Conveyor System Widths:**
65, 80, 90, 100, 160, 240, and 320 mm

**Transport Media:**
Flat-Top Chain, Cleated Chain, Roller Cleated Chain, Steel-Top Chain, Friction Chain, Universal Chain, Accumulating Roller Chain, and ESD Chain

**Transport Rates:**
Fixed speed options between 6 and 60 m/min.
Variable speed options between 3 and 108 m/min.

**Typical Industries Served:**
Food and Beverage
Consumer Goods Packaging
Optical Lens Processing
Pharmaceuticals
Electronics
Automotive and Machine Parts
Unsurpassed customer support

When it comes to flexibility, Rexroth technical support meets the same high standards as our conveyors. Without leaving your desk, you can access all the service, parts and documentation you need, as well as project design help (do-it-yourself, or through a qualified systems integrator).

Detailed documentation makes your job even easier
Comprehensive documentation is standard with Bosch Rexroth. Not just for operation, but for installation, maintenance, spare parts, and everything else you need to know. But comprehensive doesn’t mean tedious… every manual is written in plain language, with plenty of helpful diagrams.

CAD software previews your system design in 3-D
Want to see what your system will look like before it’s ordered? Just input your parameters into our easy-to-use CAD program, and you’ll get a detailed, 3-D layout. Bosch’s exclusive FMSsoft™ software works on any CAD system equipped with AutoCAD® 2000, or higher. Ask your sales representative for a copy, or order it from our website. Just go to www.boschrexroth-us.com/fmssoft.

Get a little help, or a turnkey project, from a certified integrator
If you don’t have an in-house systems integration department, you’ll be glad to know that qualified Bosch Rexroth integrators are located in major cities throughout North America. These companies are authorized based on technical expertise, stability and commitment to customer service.

Whatever your project, you can count on Rexroth technical support – and Rexroth conveyor systems – to make it successful.

Call today, and let us show you how flexibility leads to true productivity.

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