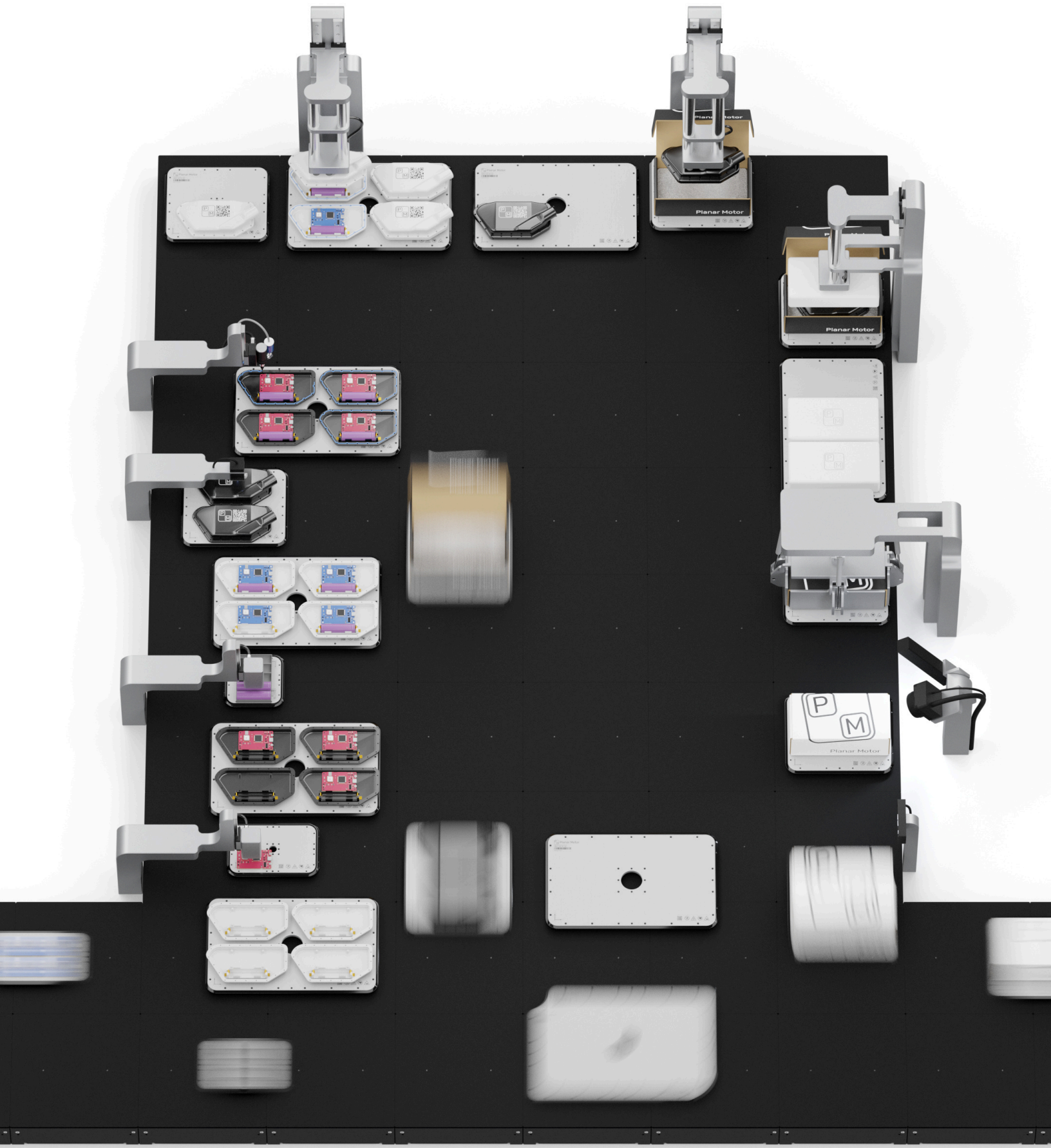
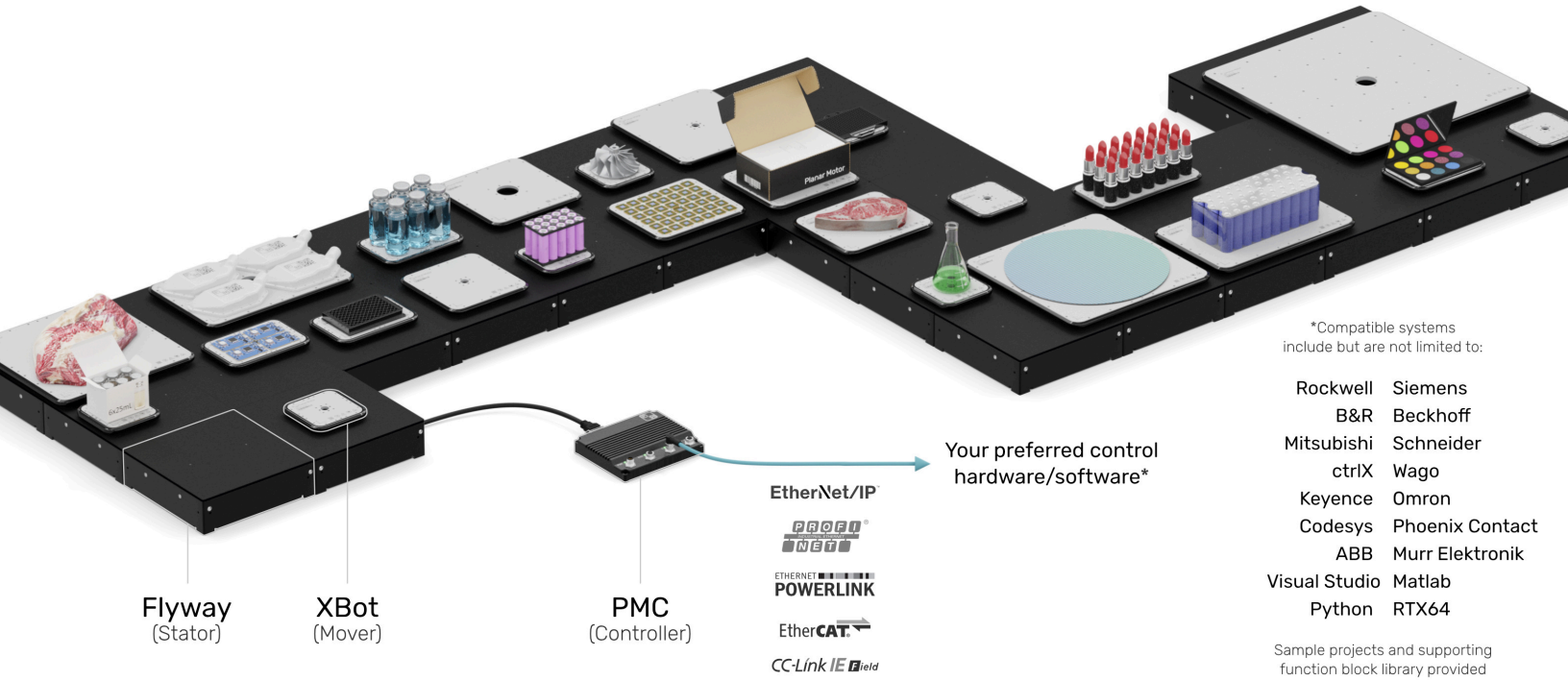


Planar Motor

Planar Motor System



*Compatible systems include but are not limited to:

Rockwell	Siemens
B&R	Beckhoff
Mitsubishi	Schneider
ctrlX	Wago
Keyence	Omron
Codesys	Phoenix Contact
ABB	Murr Elektronik
Visual Studio	Matlab
Python	RTX64

Sample projects and supporting function block library provided

A Planar Motor System is composed of one or more XBots (movers) and a stationary surface made up of modular Flyways (stators). Each XBot is independently controlled and suspended with the ability to operate 6 degrees-of-freedom.

The system does not require any lubrication nor generate any contamination. It is ideal for applications requiring high cleanliness such as food, cosmetics, and pharmaceutical manufacturing as well as industries with harsh environments such as those that require water and dust proofing.

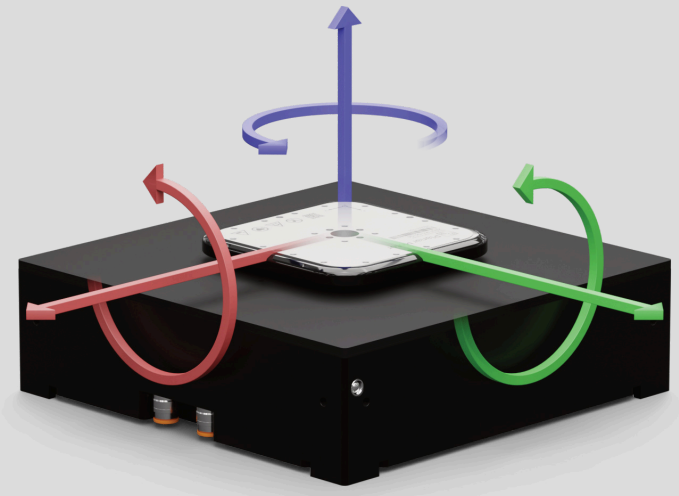
Flyways are made from identical modular tiles and are fully extendable and reconfigurable. Thanks to the versatile motion of Xbots, many traditionally needed robot arms can be eliminated.

The Planar Motor System redefines intelligent production lines for smart manufacturing, with unprecedented flexibility, reliability, agility, and efficiency to meet your dynamic market needs.

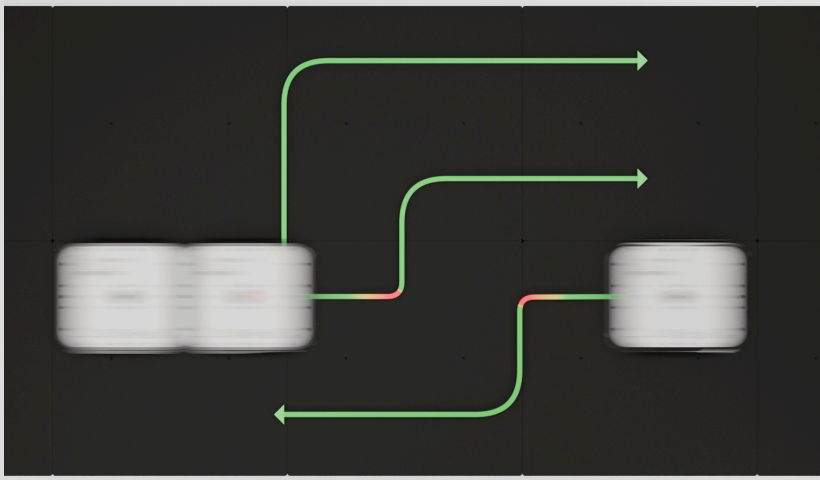
Features

Payloads from 0.6 to 15kg
(1.3 ~ 32lb)

6 Degrees of Freedom
Precision movement for any situation



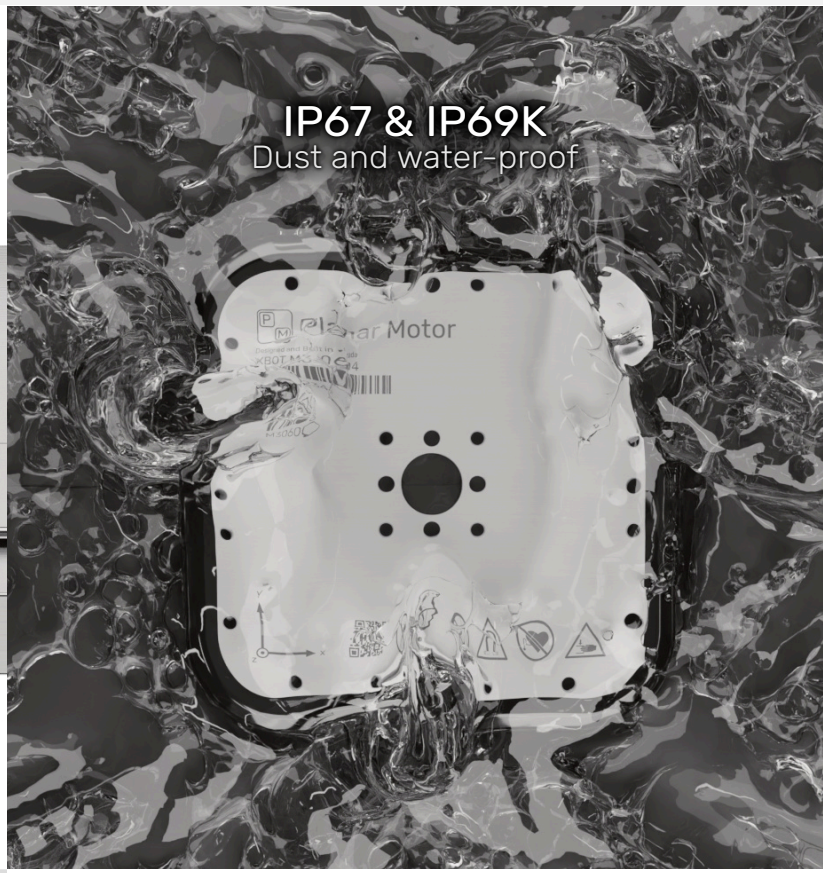
Planar Motor Controller
Manage up to 250 Flyways and XBots



Intelligent Routing
Built-in path finding

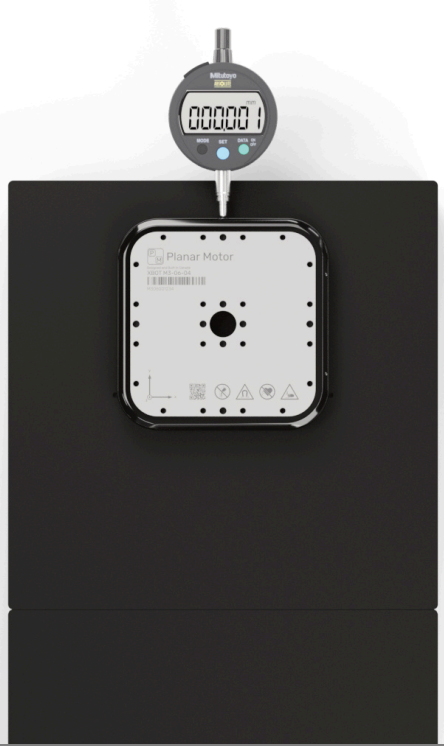
Features

Hygienic/Aseptic XBots
Fully enclosed in 316-L stainless steel



Unique Identification
Know where your payloads are in real time

Precise up to 1 micron
High repeatability in all axes



Specifications

General	
Maximum number of Flyways	Unlimited
Maximum number of Xbots	Unlimited
Speed	3 m/s
Acceleration	> 20 m/s^2
Repeatability	< 5 micron
Levitation Height	0.4 - 4 mm
Flyway Dimensions	240 x 240 x 70 mm^3
Wash Down	Yes
Auto Routing	Yes
Collision Avoidance	Built-in

Model	Dimensions	Payload
M3-06	120 x 120 x 10 mm^3	0.6 kg
M3-08	120 x 180 x 10 mm^3	1.0 kg
M3-09	120 x 240 x 10 mm^3	1.5 kg
M3-10	180 x 180 x 10 mm^3	1.8 kg
M3-11	180 x 210 x 10 mm^3	2.0 kg
M3-12	210 x 210 x 10 mm^3	2.4 kg
M3-13	240 x 240 x 10 mm^3	3.6 kg
M3-15	210 x 330 x 12 mm^3	4.2 kg
M3-17	300 x 300 x 12 mm^3	6.0 kg
M3-18	330 x 330 x 12 mm^3	7.2 kg
M3-25	450 x 450 x 16 mm^3	14.4 kg

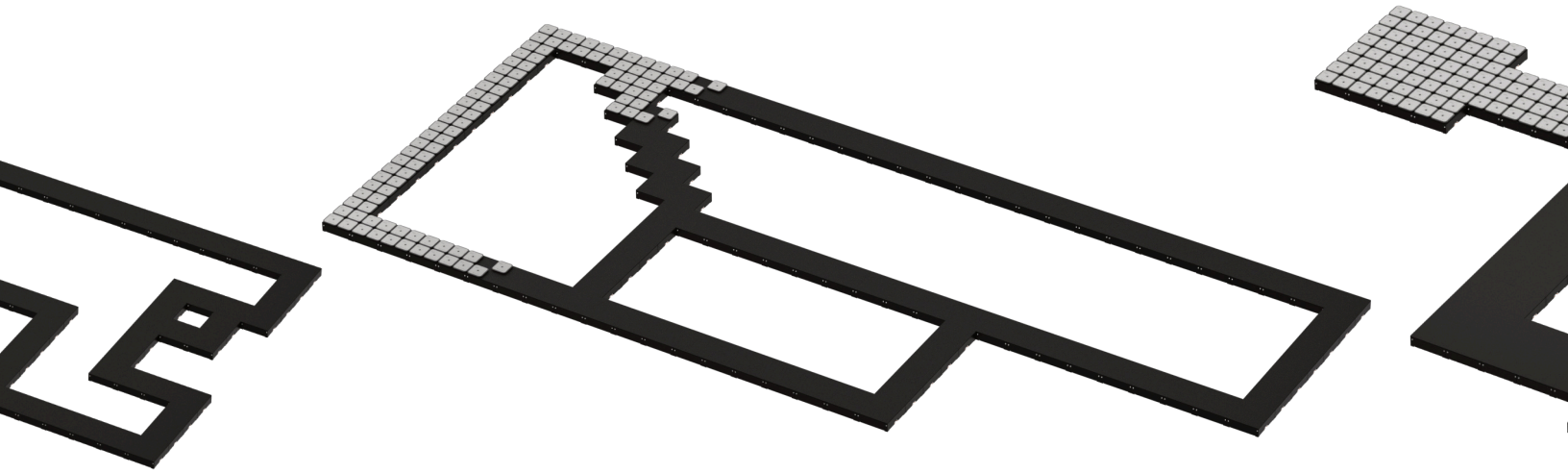
Turnkey Systems

System	K3-100	K3-64	K3-32	K3-16	K3-8	K3-4A	K3-4B	K3-2A	K3-2B	K3-1
Flyways	100	64	32	16	8	4	2	2	1	1
XBots	100	64	32	16	8	4	4	2	2	1

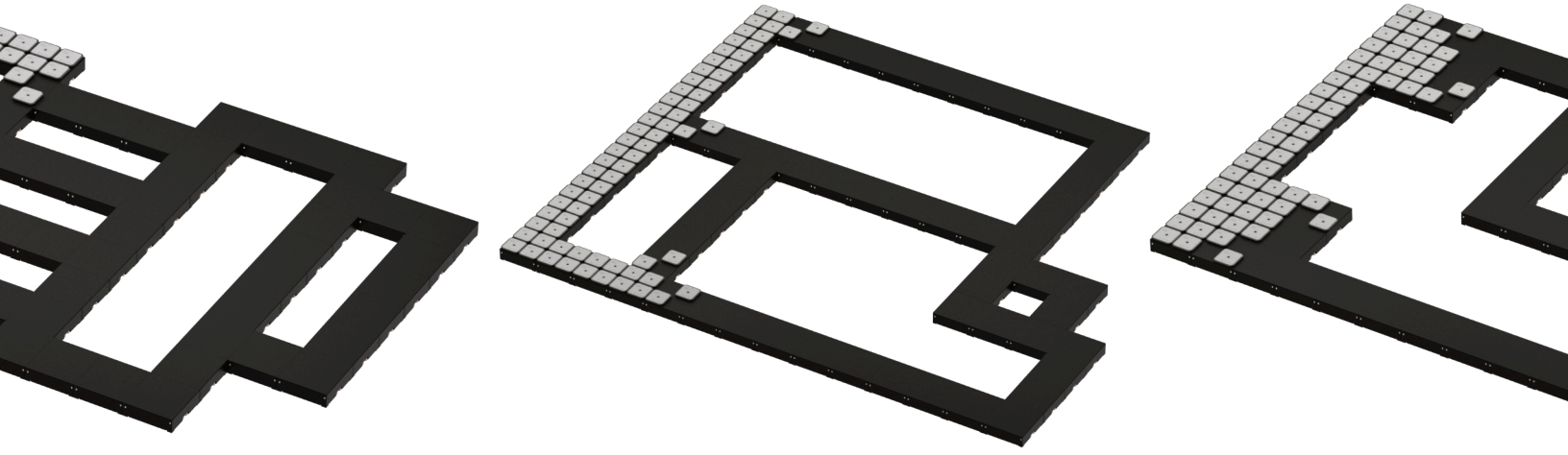
All Turnkey Systems come with:

- Control System Hardware and Software
- PLC Interface via PROFINET, EtherCAT, POWERLINK, EtherNet/IP and others
- Real-time Emulator
- Configuration and Diagnostic Tools
- On-site Training
- 1 Year Development Support

K3-100

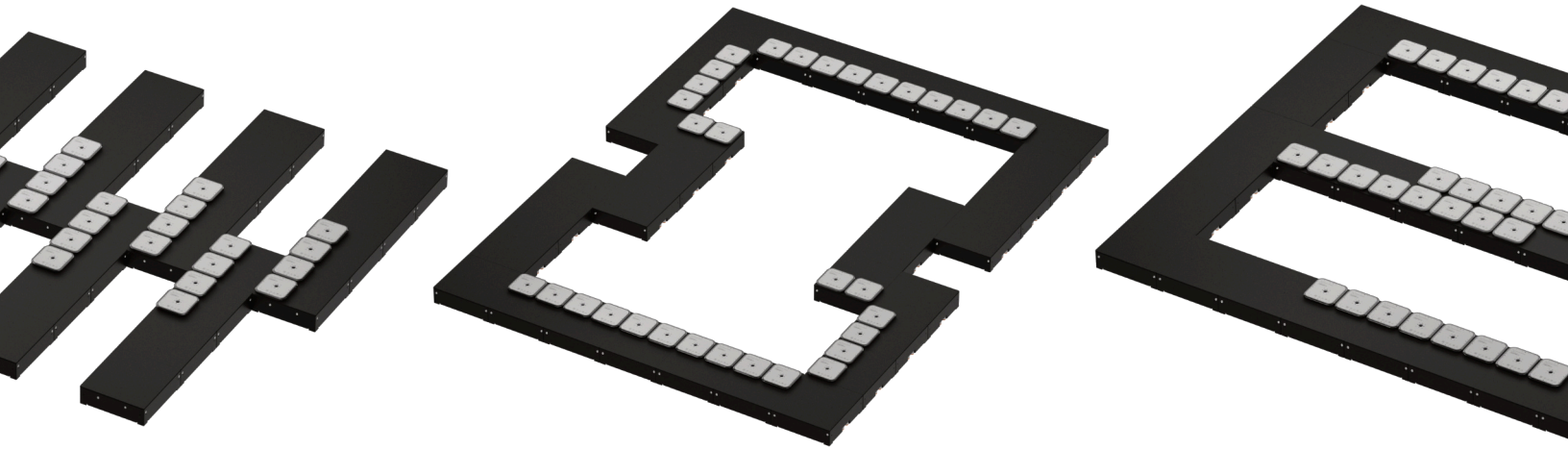


K3-64



Turnkey Systems

K3-32

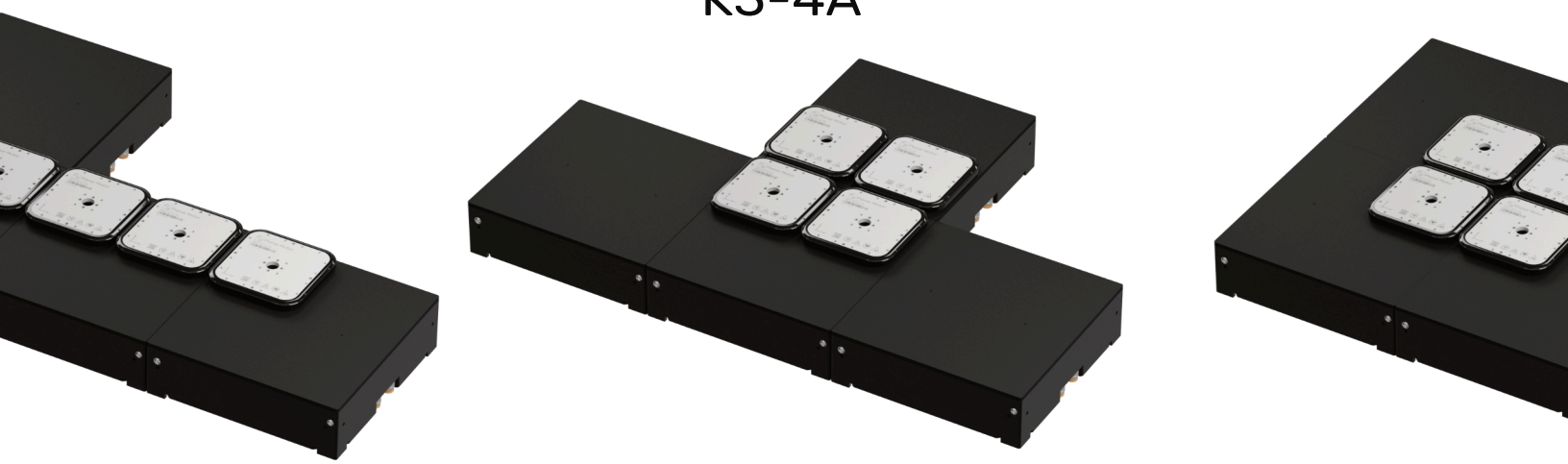


K3-16

K3-8

Turnkey Systems

K3-4A



K3-4B

K3-2A

K3-2B

K3-1

Frequently Asked Questions

System Configuration

What is the limit on the number of Flyways and the number of XBots in a system?

No technical limit on the number of supported Flyways. No limit on the number of XBots, as long as the XBots can geometrically fit inside the Flyway working area.

Any limit on the layout of Flyways?

All Flyways should be aligned with their neighbor Flyways; other than that, there is no limit.

How should the Flyways be mounted?

Customers will be provided a template to make their own application-specific mounting plate. The template will match the four M8 threaded holes in the Flyway bottom side. In each Flyway, one 4 mm pin hole and one 4-mm wide slot are used for alignment on the mounting plate.

What is the tooling mount on XBots?

Our XBots come with standard tooling mount including threaded holes and dowel pin holes. We can provide XBots in customer specified tooling mount as well.

Features and Performance

Is position feedback incremental or absolute? How about homing procedure?

The built-in position sensors provide absolute positions for each XBot instantly after system power up. No homing or initialization process is needed.

Other than going along X or Y, can the XBots move diagonally?

Yes. Each XBot can go along an arbitrary path, specified by external position setpoint stream, pre-configured trajectory, or motion commands.

What is the positioning repeatability of XBots?

XBot repeatability is less than 5 micron in all directions. XBots with less than 1 micron repeatability are also available.

How are XBots identified?

The Flyway's built-in sensors not only measure 6-axis position, but also detect unique "fingerprint" on each XBot right after system power up. With absolute ID feature, each XBot is assigned a unique and consistent ID, despite power cycles.

Frequently Asked Questions

Operation

What is the operating principle?

XBots are propelled by controllable three-dimensional magnetic fields generated from a two-dimensional coil matrix. The resulting forces are used to control the position of the XBots in X, Y, Z and in Rx, Ry, Rz, namely the rotary motion around X, Y, Z, respectively.

How should my machine controller interface with the Planar Motor System?

Planar Motor Systems support all major industry standard communication interface, such as PROFINET RT/IRT, EtherCAT, POWERLINK, and EtherNet/IP. We support all control platforms whenever possible. Our customers can use the controller hardware/software that they are most comfortable with, and there is no need to learn or adapt to a new programming environment.

What drives should I use to drive the Planar Motor?

No additional drives are required. All drive electronics are integrated inside Flyway modules.

How should I control the XBots to avoid collision?

Our system automatically manages collision avoidance without user intervention.

What is the typical learning curve of controlling the Planar Motor System?

Based on our previous experience of system commissioning in America, Asia, Europe, typically our customers can master the control/operation of our Planar Motor Systems in a few hours.

What is the power consumption?

Each Flyway consumes about 6W at standby; each M3-06 Xbot may consume about 13~20W at stationary 1-mm levitation without load and up to 100W momentarily at high acceleration with payload.

What is the operating voltage of the Flyway module?

The Flyways are powered with low voltage DC. The standard supply voltage is 48V DC; on request, we can supply low-voltage version Flyways using 24V DC.

Which environments are Planar Motor Systems suited for?

Planar Motor Systems are well suited for most industrial environments: from harsh/dirty environments to ultra-clean (food, pharmaceutical, aseptic, vacuum) environments. Planar Motor Systems cannot operate in an environment with an abundance of ferrous debris, as ferrous particles will be attached to the Xbot magnet.

Frequently Asked Questions

Reliability and Maintenance

What is the maintenance schedule?

No maintenance requirement, no periodic lubrication, no tightening/alignment effort. Truly maintenance free.

What reliability tests have you done?

Internally, we tested our evaluation system for over 30,000 hours without any failure.

What materials are used to cover Flyway modules?

303/304/316L stainless steel, aluminum, plastic, glass.

Where are Planar Motors manufactured?

Planar Motors are invented, designed, and manufactured in Vancouver, Canada.

Is there a strong magnet field surrounding the XBots?

XBot design ensures magnetic field is confined inside the gap below. Minimum leakage from XBot top and side surfaces.

Other

What is the typical application?

Packaging, assembly, inspection, testing, semiconductor, and various other automated procedures in the factory.

Under a payload, will the levitation height change?

No. Each XBot is precisely controlled in 6 axis. An off-center payload won't affect the X/Y/Z and pitch/yaw/roll position at all.

How about cooling requirements?

Passive cooling by natural convection is usually sufficient. Each Flyway is equipped with push-to-connect fittings. In applications requiring better temperature management or higher acceleration/payload, air or water can be optionally pumped through heat exchange channels inside Flyways.

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