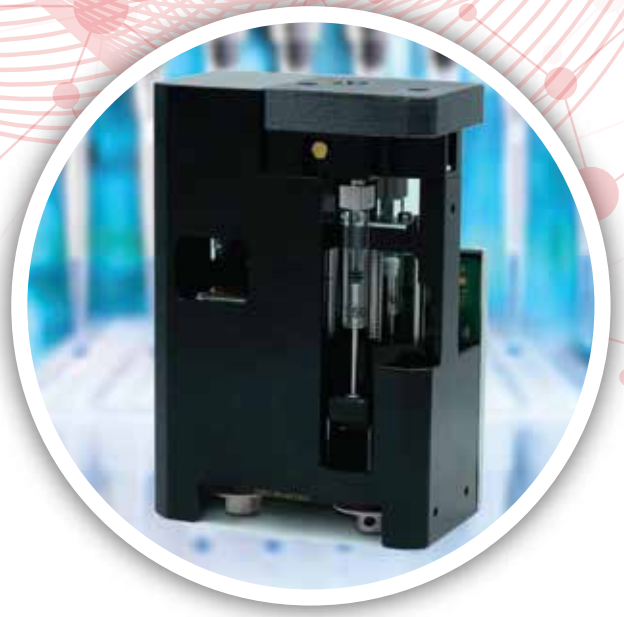
V-BMB



Precision Control Solutions
Made Simple

CONTENTS

VBMB PTE LTD (V-BMB)

V-BMB (Venture Biotech Modules Business) specializes in advanced precision control technology solutions ranging from ready-to-use, plug-and-play modules to bespoke, customized modules in precision thermal control, optical systems, motion and fluidic controls. V-BMB also offers customized consumable solutions and liquid handling modules for the Life Science and Medtech industries.

As a wholly-owned subsidiary of Venture Corporation Limited, a leading global provider of technology services, products and solutions, V-BMB leverages on Venture's decades of proven design experience, technical expertise and a global R&D and manufacturing footprint that spans Southeast Asia, China, the U.S. and Europe. V-BMB was created to harness the deep knowledge and expertise that Venture has amassed over the years in developing advanced instrumentation in the Life Science domain and other industrial applications.

When it comes to creating the extraordinary, V-BMB pushes the limits to design, innovate and build industry-leading products and solutions, partnering with its customers to scale up, lower development cost and risk, and achieve faster time-to-market.

For more information on V-BMB, please visit www.v-bmb.com
For more information on Venture Corporation, please visit www.venture.com.sg

V-BMB MODULES BENEFITS

Broad Portfolio

We offer a comprehensive suite of precision control modules, encompassing a wide range of categories. This extensive portfolio empowers you to address diverse application needs without the hassle of sourcing components from multiple vendors. Our modules encompass thermal, optical, motion, fluidic, and liquid handling functionalities, providing a one-stop shop for streamlined integration and simplified project management.

Best-In-Class Performance

We prioritize delivering exceptional value. Our modules achieve industry-leading performance at a competitive price point. This advantage stems from our commitment to continuous innovation. By implementing cutting-edge technologies and optimizing production processes, we ensure you receive high-performance solutions that maximize your return on investment. Experience superior functionality without compromising your budget.

Accelerated Development and Streamlined Integration

Our modules are designed to expedite your development process and simplify system integration:

Unified API

Streamlined Development with a Unified API: VBMB modules feature a universal API accessible via USB or RS-485 connection through a USB bridge module. Our middleware API library simplifies development by acting as an intermediary between your application and the module firmware. This eliminates the need for low-level firmware coding, saving you time. Choose between our IO Manager (IOM) for user-friendly communication or the Python Library (pip installable) for Python environments for easy integration and rapid prototyping.

OS Independent Library

Cross-Platform Compatibility: The provided API libraries, including the VBMB IO Manager (IOM) and the Python library, are operating system independent. This ensures seamless functionality on both Windows and Linux systems, offering exceptional flexibility for your development environment.

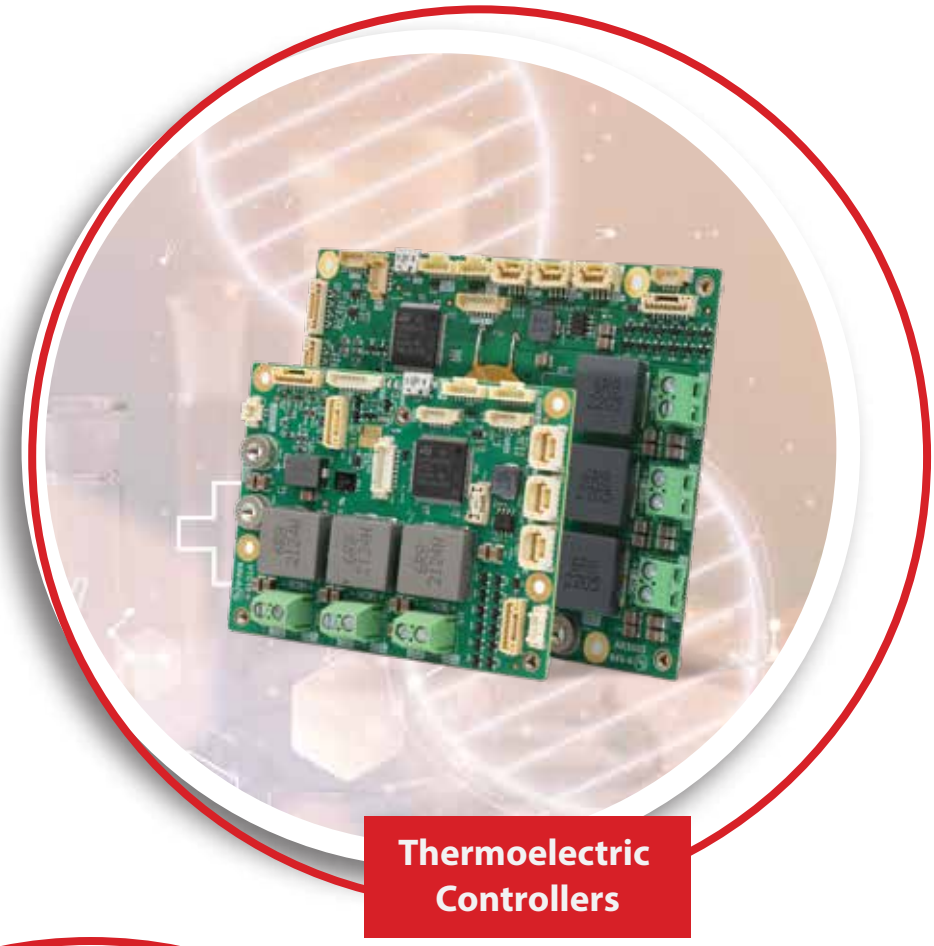
Support Daisy Chain

Effortless Expansion with Daisy Chaining: VBMB modules boast the flexibility of daisy chaining. This connection method allows you to seamlessly connect multiple modules using a single cable, eliminating the need for a dedicated cable for each device. This not only simplifies cable management but also reduces overall cabling costs. Daisy chaining also facilitates easy system expansion by enabling you to add new modules to the chain as needed.

Built-In Controller

Plug-and-Play Simplicity with Built-in Controllers: VBMB modules eliminate the need for external controllers, offering true plug-and-play functionality. Each module integrates a dedicated controller, streamlining your setup process and minimizing configuration complexities. This simplifies system integration and reduces overall component costs. Simply connect the module, and it's ready to operate under the control of our comprehensive software suite.

PRECISION THERMAL CONTROL



Thermoelectric Controllers

Thermoelectric Assembly

THERMOELECTRIC CONTROLLERS

We offer a range of high performance and innovative precision thermoelectric (TEC) controllers for the most demanding thermal control applications.

TEC Controller Selections

Lorem ipsum

1-Channel

VTC1501-A

2-Channel

VTC1502-A

3-Channel

VTC1503-A

6-Channel

VTC2016-A

Superior Efficiency and Stability

Compact

Configurable & Flexible

ABOUT OUR **PRODUCT**

Featuring our innovative patent pending technology, these thermoelectric controllers offer outstanding precision and stability to meet even the most demanding cooling/heating applications. It delivers the highest power efficiency, fits perfectly in tight spaces, and is highly configurable and flexible using supplied software.

Features

- Superior power efficiency without requiring a heatsink on the controller
- Excellent temperature stability
- Compact 6-channel controller, no bigger than most rivals' 2-channel models
- Configurable and flexible using supplied software
- Support wide range of analog and digital temperature sensors
- Independent temperature control per channel, with support for either direct feedback (sensor) or indirect feedback (sensor + thermal model)
- DC bipolar output capability
- PID control with auto tuning capability
- Peltier health monitoring via supplied software API

Specifications

	VTC1501 1-Channel	VTC1502 2-Channel	VTC1503 3-Channel	VTC2016 6-Channel
Input Voltage V_{in}	12–36VDC			
Max input current, A	20	30		60
Limit Output Voltage	Configurable, up to $\pm V_{in}$			
Limit Output Current	Configurable, up to ±16A per channel			
Typical Cooling Power Per Channel	288W (50% of output electrical power)			
Power Control Scheme	Configurable input current limit	Configurable input current limit, dynamic power allocation		
Temperature Stability	±0.002°C (1 hour duration @25°C ambient temperature)			
Power Efficiency	95% @ 50% load, 98% @ 100% load			
Analog Temperature Input	8x (PT100, PT1000, NTC, TMP61, TMP63, TMP64)			
Digital Temperature Input	3x I2C bus (Digital temperature sensor TMP117, TMP1075 etc..)			
Fan Control	3x for speed control & detection			
GPIO (configurable for input / output)	6x			
PID Control	Auto-tune, Manual-tune			
Interface	USB / RS-485 / TTL UART			
Dimensions, mm	90 x 70 x 15			120 x 90 x 15

Connector Types

Connector Type A

Terminal Block
AWG 14-28

VTC1501/1502/1503/2016-A

Connector Type B

Molex 2002411212
AWG 12-16

VTC1501/1502/1503/2016-B

Connector Type C

Molex 2002411112
AWG 12-16

VTC1501/1502/1503/2016-C

*Variant B & C are available on special order in larger quantity

Accessories

TEC Controller Starter Kit

Temp Sensor Interconnection Cable x2
Fan Cable x3
Temp Sensor Extension Cable x10

VTC-SK-1

SINGLE CHANNEL THERMOELECTRIC ASSEMBLY

VTM100-SC

We offer high performamnce thermoelectric assembly that is suitable for both thermal cycling and isothermal applications.

High Performance

Temperature Sensors

Easy To Customize

ABOUT OUR **PRODUCT**

VTM100 is built based on a deep know-how assembly process using quality components and materials to ensure consistency and long-lasting performance.

Features

- High performance with superior accuracy and uniformity
- Includes a Peltier and 5 temperature probe sensors
- Easy customization by replacing removable top plate
- Supports thermal block temperature range of 4-100°C
- Suitable for both thermal cycling and isothermal applications

Specifications

Temperature Range	4-100°C
Temperature Accuracy	±0.15°C
Temperature Uniformity (max-min)	0.3°C
Maximum Heating Rate	4°C/sec
Maximum Cooling Rate	3°C/sec
Peltiers	1x
Temperature Probe Sensors	1x PT1000 + 4x NTC (1x for ambience, 1x for heat sink, 2x embedded in thermal block plate)
Thermal Block Format	Flat Block
Dimension, WxDxH, mm	100 x 120.4 x 105.7

OPTICAL SOLUTIONS

Villuminator™ Illumination Module

Motorized Filter Wheel

VILLUMINATOR™
Top Hat Illumination Modules

We offer a range of high performance and innovative flat top illumination modules for the most demanding optical illumination applications.

VIL100X | VIL121X / VIL151X | VIL350X

Unrivalled Uniformity

Versatile

Wide Wavelength Selection

ABOUT OUR **PRODUCT**

Featuring our innovative patent-pending flat-fielding technology, by using LEDs as incoherent light sources, Villuminators™ flat top illumination modules are compact long-lasting luminaires with many choices of wavelengths that provide uniform top hat illumination, making them ideal for a variety of applications, including fluorescence imaging, machine vision, projection, display, and more.

Features

- Superior Top Hat Uniformity (>95%)
- Versatile to fit many applications
- Wide Selection of wavelengths
- Long-lasting luminaires
- Customizable

Specifications

	VIL100X	VIL120X	VIL151X	VIL350X[5]
Uniformity[1]	> 95%			
Flat Field Beam Diameter[2]	Ø11mm	Ø13mm	Ø21mm	Ø35mm
Typical Optical Power	Up to 240mW	Up to 140mW	Up to 240mW	Up to 6W
Working Distance[3]	11mm	16mm	19mm	23mm
Weight	90g	140g	150g	580g
Dimension, mm	Ø40, Length 50	Ø40, Length 71	Ø40, Length 77	W97 x D81 x H106
Max Current/Voltage	1.5A / 4V			27A / 5V
Cooling	Passive Heatsink			Active Fan
Accessories	LED Driver (VLD0201)	Field Aperature attachment (VIL-FA-1)[4] LED Driver (VLD0201)		LED Driver (VLD2501)

[1, 2, 3, 4] Refer to page 2 for more information

[5] Currently only offered with white LED and not for microscopy applications

Part Number and Ordering Information

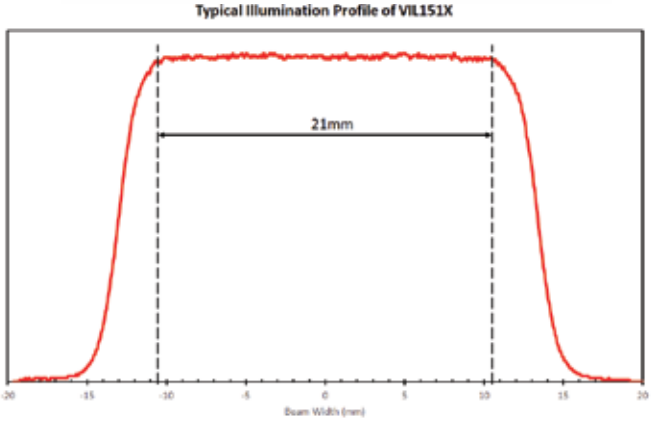
VIL□□□□

Model — Wavelength Identifier

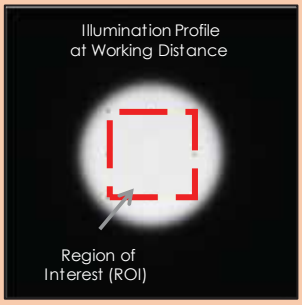
Only for VIL120X and VIL151X modules

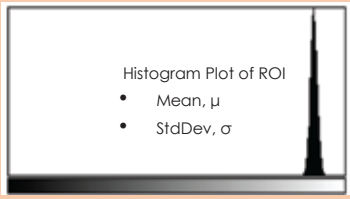
Identifier	Wavelength/Color	Identifier	Wavelength/Color
A	CWH(Cool White)	L	505(Cyan)
B	NWH(Neutral White)+	M	523(Green)+
C	WWH(Warm White)	N	555(Lime)
D	365(Ultra Violet)	O	590(Amber)
E	385(Ultra Violet)+	P	617(Red-Orange)
F	395(Violet)	Q	630(Red)+
G	405(Violet)	R	660(Deep Red)
H	448(Royal Blue)	S	740(Far Red)
I	457(Blue)	T	850(Infrared)
J	460(Dental Blue)	U	940(Infrared)
K	470(Blue)+		

+Popular Wavelength



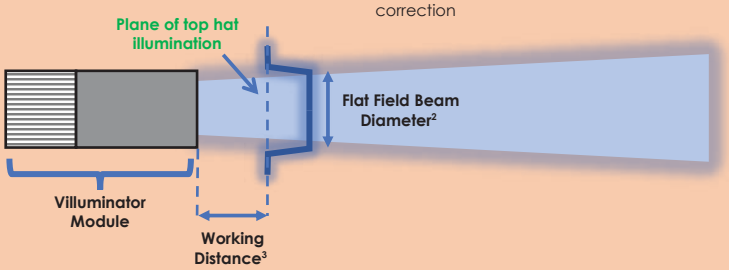
Definitions



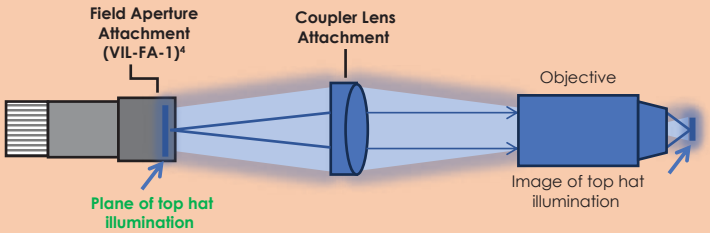


ROI Uniformity[1] = $\frac{Min}{Max} \times 100\%$

Note: Min/Max is Mean±2σ within the entire ROI, where σ is the standard deviation after noise correction



Accessories

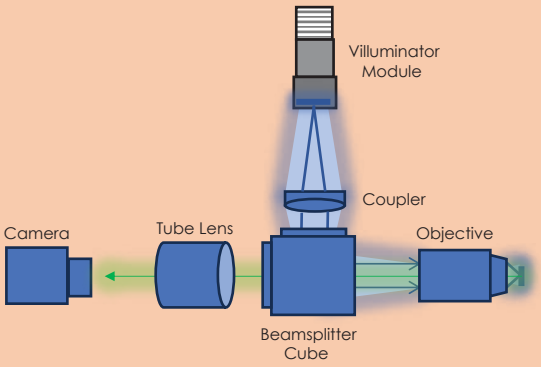


General example for microscopy

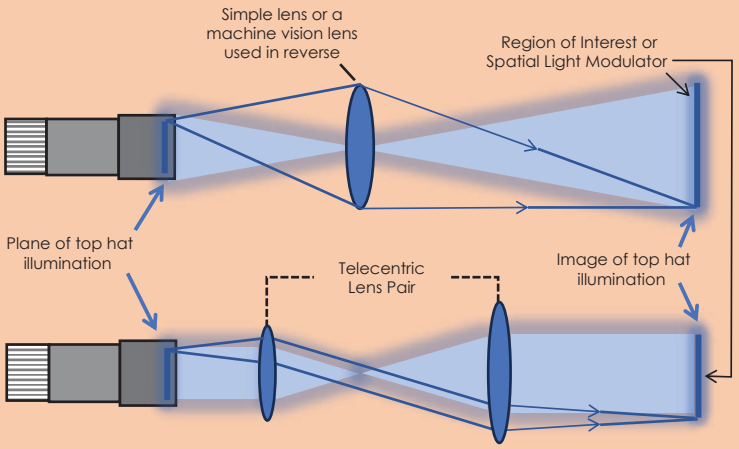
Applications

FLUORESCENCE MICROSCOPY

Only for VIL120X and VIL151X modules

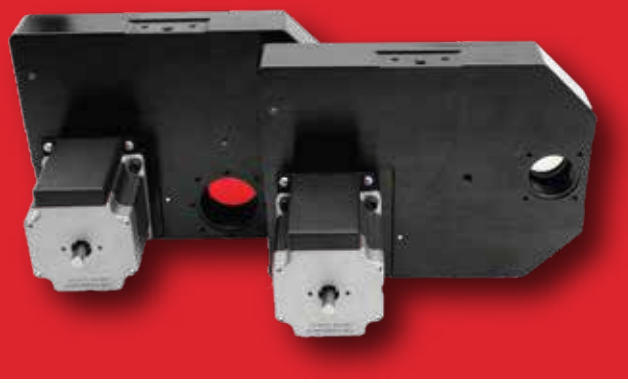


GENERAL PROJECTION



MOTORIZED FILTER WHEELS

We offer a range of high performance motorized filter wheel modules with integrated controller for the most demanding optical imaging applications.



7-Position

VFW1007

10-Position

VFW1010

Ultra Fast Switching

Built-In Smart Controller

Easy to Use

ABOUT OUR **PRODUCT**

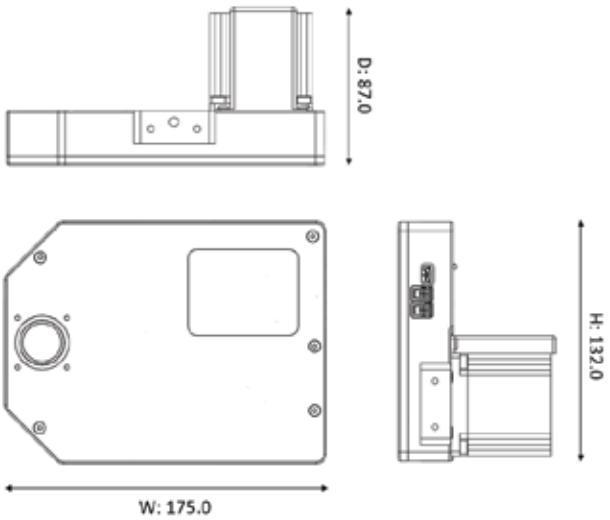
Featuring our innovative motion control algorithm and enhanced encoder resolution technology, motorized filter wheel modules are compact long-lasting filters changers that provide smooth and fast adjacent filter change with ultra-fast switching time between filters, making them ideal for a variety of applications, including fluorescence microscopy, spectroscopy, machine vision, and more.

Features

- Ultra-fast switching with adjacent filter switching time of 35ms (10 positions wheel) and 45ms (7 positions wheel)
- Convenient with built-in smart controller
- Easy to use with supplied software Application Programming Interface (API)
- Versatile to fit many applications
- Flexible with capability to daisy-chain with other V-BMB modules
- Available in two filter sizes with filter holder for 25mm optics (10 positions) or 32mm optics (7 positions)

Specifications

	VFW1007 (7-Position)	VFW1010 (10-Position)
No. of Filter Holder Positions	7	10
Switching Time, ms (Adjacent Filter)	45	35
Motor Type	Stepper (2 phase, hybrid)	
Range	360°	
Controller	Built In, Daisy-Chain with other V-BMB products	
Accuracy (Unidirectional)	0.2°	
Repeatability	<0.04°	
Backlash	<0.19°	
Speed Resolution	0.0035°/sec	
Maximum Speed	2800°/sec	
Limit or Home Sensing	Magnetic home sensor	
Communication Interface	USB / RS-485 / TTL UART	
Daisy-Chain Capability	Yes	
Input Voltage	24VDC	
Input Max Current, A	2.0	
Compatible Filter Diameter, mm	31-32	25
Clear Aperture, mm	30	23.5
Compatible Filter Thickness, mm	Up to 6.5	
Weight, kg	1.66	1.69
Dimension, WxDxH, mm	175 x 87 x 132	



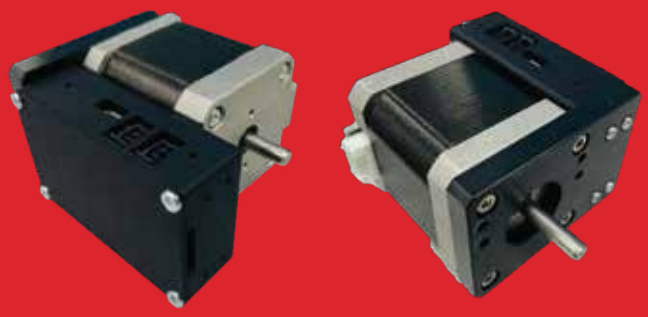
PRECISION MOTION CONTROL

Precision Motion Actuator

Vertical Z Focusing Stage

PRECISION MOTION ACTUATORS

We offer a range of precision motion actuator modules with integrated controller for the most demanding motion control applications.



NEMA-8

VMA1008

NEMA-17

VMA1017

Ultra High Precision

Compact

Daisy Chain Capability

ABOUT OUR **PRODUCT**

Featuring our innovative motion control algorithm and enhanced encoder resolution technology, our precision motion actuator modules with integrated controller are compact and easy to use for providing smooth and precise motion, making them ideal for a variety of applications with tight spaces and ultra-high precision, including mircomanipulation, laser alignment, optical focusing, automated test & measurement, robotics & machine automation, and more.

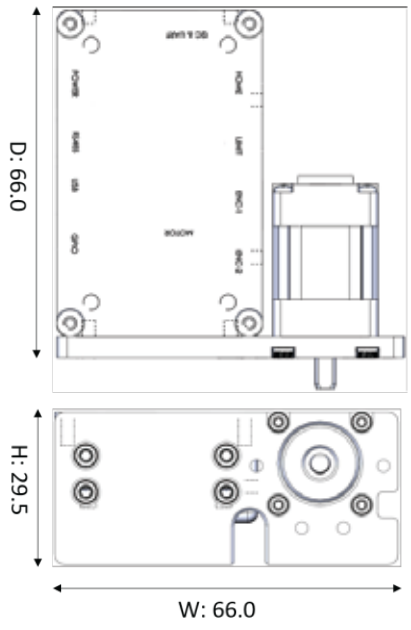
Features

- Ultra High precision (Repeatability: <0.02°)
- Compact with built-in motor controller
- Flexible with daisy-chain capability
- Support wide range of motorized linear and rotary stages
- Versatile to fit many applications
- Easy to use with supplied software
- Wide range of offering, with motor sizes from NEMA-8 to NEMA-23

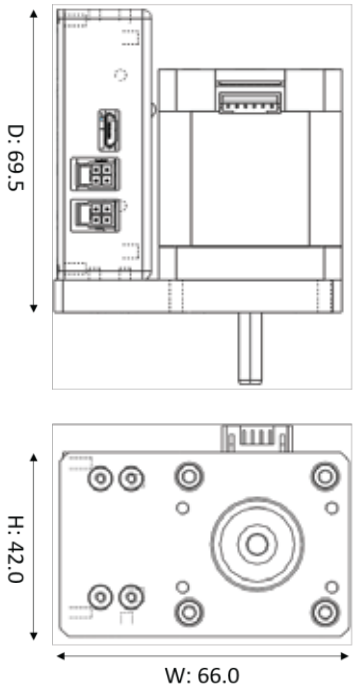
Specifications

	VMA1008	VMA1017
Motor Size	NEMA-8	NEMA-17
Motor Type	Stepper (2 phase, hybrid)	
Controller	Built In, Daisy-Chain with other V-BMB products	
Resolution	0.007°	
Accuracy (Unidirectional)	0.1°	
Repeatability	<0.02°	
Speed Resolution	0.0035°/sec	
Minimum Speed	0.0035°/sec	
Maximum Speed (No Load)	18000°/sec	
Input Voltage	12-48VDC	
Communication Interface	USB / RS-485 / TTL UART	
Daisy-Chain Capability	Yes	
Holding Torque, Nm	0.032	0.24
Motor Rated Current, A	0.5	1.5
Weight, kg	0.090	0.444
Dimension, WxDxH, mm	66 x 66 x 29.5	66 x 69.5 x 42

VMA1008



VMA1017



Part Number and Ordering Information

V M A 1 0 □ □

Model

Motor Size
Range from NEMA-8 to NEMA23
(08 to 23)

Motor Size	VMA10XX
NEMA-8	VMA1008+
NEMA-10	VMA1010
NEMA-14	VMA1014
NEMA-17	VMA1017+
NEMA-23	VMA1023

+Popular Models

COMING SOON

VERTICAL Z FOCUSING STAGE

We offer a ultra high resolution Z focusing stage with a focus on performance, reliability and versatility to meet the most most demanding requirements of Z focusing applications.

Vertical Z Focusing Stage

VFS0850

Ultra Precise Movement

Wide Travel Range

Lightweight

ABOUT OUR **PRODUCT**

Featuring a innovative vertical Z focusing stage, this precision solution offers exceptional performance, precision and value. With ultra precise movement, this stage delivers unparalleled accuracy and detail, making it ideal for demanding applications like nanotechnology and high-resolution imaging. Its wide travel range easily adapts to different setups and requirements, ensuring flexibility and convenience. Additionally, the stage's lightweight construction makes it easy to handle and integrate into various systems, saving valuable space and reducing installation complexity.

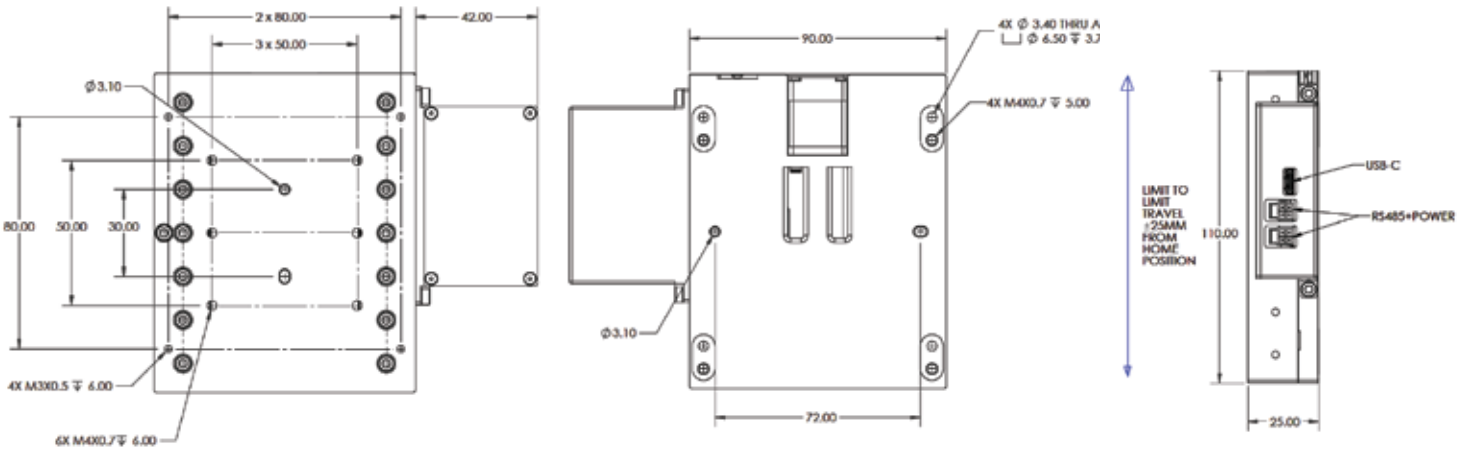
Features

- Ultra precise movement (12nm) with exceptional precision & repeatibility
- Wide travel range of 50mm
- Lightweight, saving space and reducing installation complexity
- Enhanced stability with cross roller guide system
- Integrated solution with built-in smart controller
- Supports daisy-chaining with other V-BMB modules for more optimized cable management

Specifications

	VFS0850 (Vertical Z Focusing Stage)
Travel Range	50mm
Motor Type	Nema-8 Linear Actuator with Anti-Backlash Nut
Guide	Cross Roller Guide
Encoder Resolution	12nm
Accuracy[1] (2σ)	10μm
Bi-directional Repeatability (2σ)	0.5μm
Homing Repeatability	0.5μm
Minimum Move	12nm
Holding Stability	25nm
Load Capacity	Up to 1.0kg
Maximum Acceleration[2]	1.67mm/s^2
Maximum Velocity[2]	13.3mm/s
Flatness & Straightness	3μm
Weight	0.672kg
Moving Mass	0.153kg
Travel Life[3]	>1 million cycles
Yaw / Orthogonality, μrad	150 / <=50
Power Requirement	Input Voltage: 24-48VDC, Max Input Power: 5W
Connectivity	USB / RS-485 / TTL UART
Daisy-Chain Capability	Yes
Dimension, WxDxH, mm	90 x 110 x 25 / 132 x 110 x 25 (without / with Control Box)

[1] Accuracy has 2 point slope correction applied
[2] The maximum acceleration and velocity is encoder and load dependent
[3] Calculated based on the maximum focusing distance of 50mm + 50mm



PRECISION FLUIDIC CONTROL

Dual Syringe Smart Pump

2-Port Single Syringe Pump

DUAL SYRINGE SMART PUMP

VSP1002-A

We offer a highly innovative air displacement pump that can deliver wide range of pump volume and precision at low volume to meet the most demanding pumping applications

High Precision and Accuracy

Compact

Reduce Complexity

ABOUT OUR **PRODUCT**

Featuring an innovative air displacement pump that boasts a unique dual syringe design, delivering an extensive range of flow rates without sacrificing precision and accuracy, even at the lowest volumes. It replaces two conventional syringe pumps in your instrument, reducing cost, size and system complexity.

Features

- High precision and accuracy at low volume in a single pump
- Compact footprint and reduces system complexity with innovative dual syringe design
- Intelligently switches between 2 syringes based on the pump volume
- Easy to interface and configure using high level API and Utility Software
- Supports a wide range of flow rates and syringes

Specifications

Travel Distance	30mm
Speed	1.2s to 150s
Resolution	5669 increments (encoder mode) 192,000 increments (microstep mode)
Life	4 million
Syringe Sizes Supported	50µl, 100µl, 250µl, 500µl, 1.0ml
Precision (1ml syringe)	≤0.05% CV (full stroke) ≤0.5% CV (10% stroke)
Accuracy (1ml syringe)	≤1.0%
Dimension, WxDxH, mm	95 x 55 x 140
Weight	0.8kg
Connectivity	USB / RS-485 / TTL UART
Power Requirement	Max input current 1.5A @ 24VDC

COMING SOON

2-PORT SYRINGE PUMP

We offer an ultra high resolution syringe pump delivering exceptional precision across a wide range of flow rates to meet the most demanding pumping applications.

2-Port Syringe Pump

VSP5002

Ultra High Resolution

Long-lasting Solenoid Valve

Daisy Chain Capability

ABOUT OUR **PRODUCT**

Featuring unmatched resolution and built-to-last durability, this next-generation single-syringe pump redefines liquid handling performance. Engineered for exceptional precision and consistency, this pump ensures reliable and repeatable results for your most critical applications. Incorporating a long-lasting solenoid valve minimizes downtime and ensures uninterrupted operation, enhancing overall efficiency.

Features

- Ultra high resolution (1.5M increments) with exceptional precision
- Long-lasting solenoid valve designed to minimize downtime & service
- Supports daisy-chaining with other V-BMB modules for more optimized cable management
- Compact size, allowing for easy integration into instruments
- Easy to interface and configure using high level API and Utility Software
- Supports an extensive range of flow rates and syringes

Specifications

	VSP5002 (2-Port Syringe Pump)
Travel Distance	30mm
Speed[1]	1.2s to 427hours / full stroke
Resolution	1,536,000 increments
Life	4 million cycles
Syringe Sizes Supported	50µl, 100µl, 250µl, 500µl, 1.0ml, 2.5ml, 5.0ml
Precision (1ml syringe)	≤0.05% CV (full stroke) ≤0.5% CV (10% stroke)
Accuracy (1ml syringe)	≤1.0%
Valve Type	Solenoid Valve
Valve Material	EPDM / FKM / Kalrez
Valve Manifold Material	PEEK
Valve Response Time, ms	<10
Operational Pressure, psi	29
Allowed fluid temperature	0 to 50°C (No freezing)
Flow Rate[2]	50µl syringe: 2nl/min to 42µl/s 100µl syringe: 3.9nl/min to 83µl/s 250µl syringe: 9.8nl/min to 208µl/s 500µl syringe: 19.5nl/min to 417µl/s 1000µl syringe: 39nl/min to 833µl/s 2500µl syringe: 97nl/s to 2ml/s 5000µl syringe: 195nl/s to 4.2ml/s
Power Requirement	Input Voltage: 24-48VDC, Max Input Power: 15W
Connectivity	USB / RS-485 / TTL UART
Daisy-Chain Capability	Yes
Weight, kg	0.73
Dimension, WxDxH, mm	43 x 130.5 x 114

[1] Speed depends on syringe size and tubing.

[2] Max flow rate depends on tubing ID, tubing length and fluid viscosity. Ensure the system pressure is within the range of Operational Pressure when a fluidics system is designed.

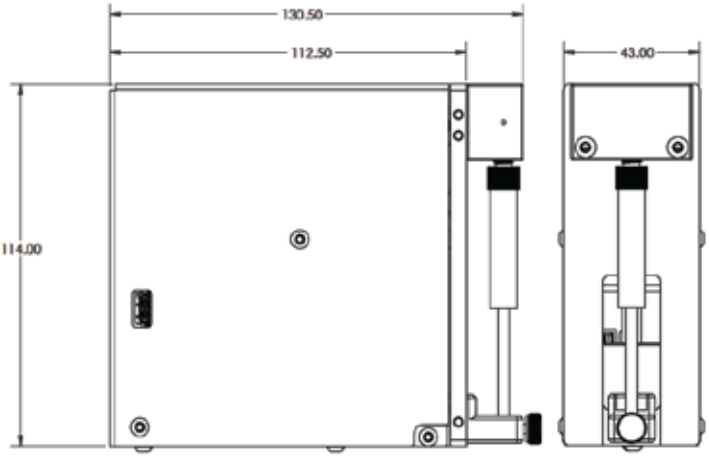
Part Number and Ordering Information

V S P 5 0 0 2 □

Model

Valve Material (A to C)

Valve Material	Part Number
EPDM	VSP5002A
FKM	VSP5002B
Kalrez	VSP5002C



Products

Precision Thermal Control		
Part Number	Description	Picture
VTC1501-A/B/C	1- Channel TEC Controller	
VTC1502-A/B/C	2- Channel TEC Controller	
VTC1503-A/B/C	3- Channel TEC Controller	
VTC2016-A/B/C	6- Channel TEC Controller	
VTC-SK-1	TEC Starter Kit	
VTM100-SC	1- Channel TEC Assembly	

Optical Solutions		
Part Number	Description	Picture
VIL100X	11mm Villuminator™ Illumination Module	
VIL120X	13mm Villuminator™ Illumination Module	
VIL151X	21mm Villuminator™ Illumination Module	
VIL350X	35mm Villuminator™ Illumination Module	
VIL-FA-1	Field Aperture Attachment	
VLD0201	LED Driver	
VFW1007	7- Position Motorized Filter Wheel	
VFW1010	10 - Poition Motorized filter Wheel	

Precision Motion Control		
Part Number	Description	Picture
VMA1008	NEMA-8 with Built-In Controller	
VMA1010	NEMA-10 with Built-In Controller	
VMA1014	NEMA-14 with Built-In Controller	
VMA1017	NEMA-17 with Built-In Controller	
VMA1023	NEMA-23 with Built-In Controller	
VFS0850	Vertical Z Focusing Stage	

Precision Fluidic Control		
Part Number	Description	Picture
VSP1002-A	Dual Syringe Smart Pump	
VSP5002-A/B/C	2-Port Syringe Pump	

V-BMB

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