

MachineMotion 2 Four-Drive Datasheet

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Introduction

MachineMotion v2 datasheet contains detailed technical specifications, such as: functional pinout, input & outputs, specifications, input / output capabilities by model, electronics & embedded software specifications and unit dimensions.

Overview

MachineMotion v2 is a plug and play industrial controller that contains the necessary infrastructure to execute motion and control applications through a library of modular components. Equipment powered by MachineMotion v2 can be programmed through MachineLogic – Vention’s code-free visual sequence editor – or through Vention’s Python SDK.

Features

- Control up to four 250 W high performance step-servos with accurate and automatic position adjustments. This allows the actuator to always reach the user-specified position, thanks to a built-in encoder that enables the motors to operate in closed control loops.
- Step-servo junction box with simple cabling, where the brake, home and end-stop sensors can be directly wired to the motor.
- Status light on servo motors and controller for quick diagnostics
- Loaded with code-free software including:
 - Control Center
 - MachineLogic
 - Python
- Open source development tools including:
 - Cloud 9 IDE
 - Javascript
 - Operator mode
 - Manual joggers
- The MachineMotion v2 controller is certified by CSA for UL61800-5
- IP30 rated enclosure for industrial applications, with active cooling and replaceable filters
- Connect digital I/O and analog modules to control I/O devices
- Single continuous flex cable to power an actuator, sensors and power-off brake
- Plug and play with all Vention actuators
- Native support for Universal Robots with URcap

- Plug and play safety system with physical and software reset
- Directly connect peripherals locally or remotely using the teach pendant, keyboard, mouse, and monitor

Applications

- Automated equipment
- Cartesian robot
- Functional and reliability test benches
- Conveyor system
- Inspection cells

Electrical Specifications

Certifications

Electrical Safety	CSA
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Applicable Standards	UL61800-5
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Power Port

Name	POWER
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Rated Voltage	85 to 264 VAC
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Rated Current	9A @ 120 VAC
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Typical Current	4.5A @ 120 VAC
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Typical Power	1200 W
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Standby Current	0.7 A (@ power factor 0.55)
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Standby Power	84 W
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Emergency Mode Current	0.4 A (@ power factor 0.3)
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Emergency Mode Power	48 W
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Connector	NEMA C14
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Power Cord	3.00m, NEMA 5-15P to IEC 320-C13, SJT
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Drive Ports

Name(s)	DRIVE 1, DRIVE 2, DRIVE 3, DRIVE 4
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Motor Type	Servo-Stepper
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Output Peak Voltage	50 V
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Maximum Output Current	10 A
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Maximum Output Power	350 W
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Phase Current Peak	0 - 10 A
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Phase Current Adjustment (Internal)	Software controlled
Control Interface (Internal)	CAN/(Step-Dir-Enable) Signals
Motor Drivers Certification	CE
Connector	M23 Amphenol Sine
Pin 1	24 V
Pin 2	0 V
Pin 3	motor phase A+
Pin 4	motor phase A-
Pin 5	motor phase B+
Pin 6	motor phase B-
Pin 7	Encoder A+
Pin 8	Encoder A-
Pin 9	Encoder B+
Pin 10	Encoder B-
Pin 11	Encoder Index+
Pin 12	Encoder Index-
Pin 13	NC
Pin 14	NC
Pin 15	Home/End Limit Switch S1
Pin 16	Home/End Limit Switch S2
Pin 17	24V Safety Switched
Control (1,2,3,4) Ports	
Name(s)	Control 1, Control 2, Control 3, Control 4
Connectivity Type	Communication
Connectivity Physical Layer	CAN/RS485
Connector	M12, female, 8-pin, A-Keyed
Pin 1	24 V
Pin 2	0 V

Pin 3	RS485 A
Pin 4	RS485 B
Pin 5	CAN H
Pin 6	CAN L
Pin 7	NC
Pin 8	24V Safety Switched

To PC Port

Name(s)	To PC
Connectivity Type	Ethernet
Connectivity Physical Layer	IEEE 802.3, Ethernet
Connector	RJ45

LAN Ports

Name(s)	LAN 1, LAN 2
Connectivity Type	Ethernet
Connectivity Physical Layer	IEEE 802.3, Ethernet
Connector	RJ45

USB Ports

Name(s)	USB 1, USB 2
Connectivity Type	USB
Connectivity Physical Layer	USB 2.0
Connector	USB-A 2.0

HDMI Ports

Name(s)	HDMI
Connectivity Type	HDMI
Connectivity Physical Layer	HDMI
Connector	HDMI Type A

Safety In Port

Name(s)	Safety In
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Type	Redundant Dry Contacts + Reset
Connector	M12, female, 12-pin, A-Keyed
Pin 1	24 V
Pin 2	0 V
Pin 3	Channel 1 Contact 1
Pin 4	Channel 1 Contact 2
Pin 5	Channel 2 Contact 1
Pin 6	Channel 2 Contact 2
Pin 7	Reset Contact 1
Pin 8	Reset Contact 2
Pin 9	NC
Pin 10	NC
Pin 11	NC
Pin 12	NC

Safety Out Port

Name(s)	Safety Out
Type	Redundant Dry Contacts + Reset
Connector	M12, female, 12-pin, A-Keyed
Pin 1	24 V
Pin 2	0 V
Pin 3	Channel 1 Contact 1
Pin 4	Channel 1 Contact 2
Pin 5	Channel 2 Contact 1
Pin 6	Channel 2 Contact 2
Pin 7	Reset Contact 1
Pin 8	Reset Contact 2
Pin 9	NC
Pin 10	NC

Pin 11	NC
Pin 12	NC
Pendant Port	
Name(s)	PENDANT
Connectivity Type	Ethernet (PoE)
Connectivity Physical Layer	IEEE 802.3, Ethernet
Connector	M12, 12-pin, A-Key
Pin 1	24 V
Pin 2	0 V
Pin 3	Pendant EM C 1+
Pin 4	Pendant EM C 1-
Pin 5	Pendant EM C 2+
Pin 6	Pendant EM C 2-
Pin 7	NC
Pin 8	NC
Pin 9	Ethernet TX+
Pin 10	Ethernet TX-
Pin 11	Ethernet RX+
Pin 12	Ethernet RX+
Ethernet Port	
Name(s)	ETHERNET
Connectivity Type	Standard Ethernet
Physical Layer	IEEE 802.3, Ethernet
Connector	RJ45, 8p8c
Pin 1	NC
Pin 2	TX+
Pin 3	TX-
Pin 4	RX+

Pin 5	RX-
Pin 6	NC
Pin 7	NC
Pin 8	NC
Default Ethernet or 192.168.7.2 Port	
Name	DEFAULT ETHERNET or 192.168.7.2
Status	Unused

Embedded & Computing Specifications

Single Board Computer	
Processor	TI AM5729
OS	Debian 10
Memory	32GB SD-micro
Certification	CE
Motion Controller	
Processor	Natotec CL4
Interface	CAN
Protocol	G-code
Fieldbus Compatible Modules	
Digital IO Module	CE-MD-001-0001
Analog IO Module	CE-MD-003-0000 *available soon
Push-Button Module	CE-MD-004-0000

Safety Specifications

Implementation	
Safety Rating	Suited up to SIL3, Performance Level e, CAT 4
Safety Relay	
Manufacturer	Dold
Model Number	LG5925-48-61-24

Type	Emergency Stop
Safety Relay Data - Values per EN ISO 13849-1	
Category	4 (EN 954-1)
Performance Level	PLe
MTTF _d	> 100 years
DC _{avg}	99%
Safety Relay Data - Values per IEC/EN 62061 / IEC/EN 61508	
SIL CL	3 (IEC/EN 62061)
SIL	3 (IEC/EN 61508)
HFT (hardware failure tolerance)	1
DC _{avg}	99%
SFF	99.70%
PFH _D	2.66E-10 h ⁻¹

Vention ControlCenter Software

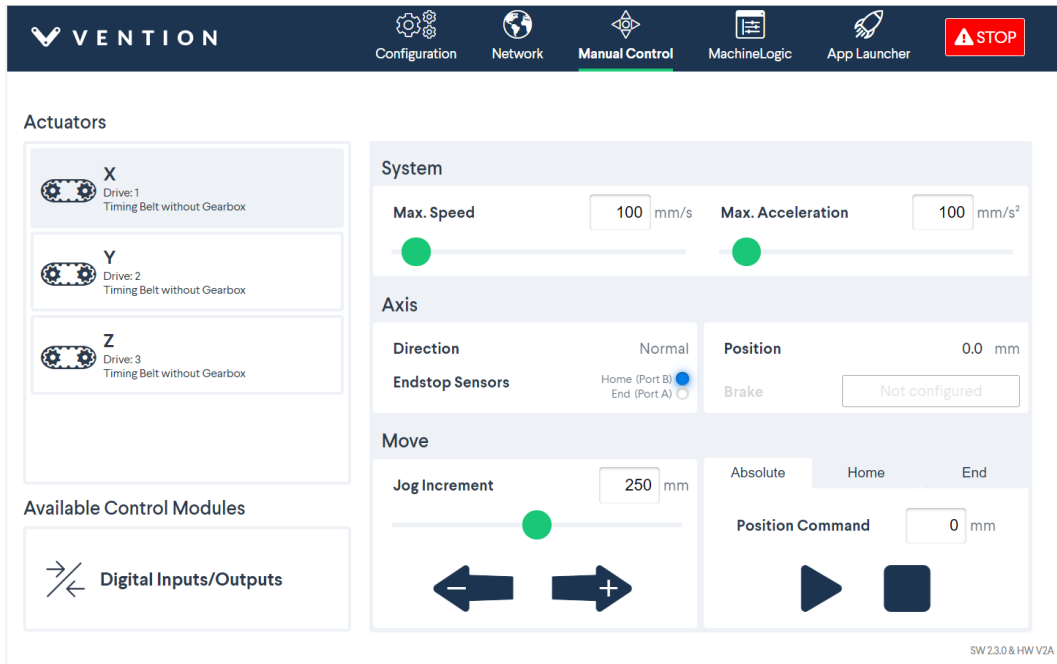
MachineMotion comes with pre-loaded control and machine operations software – all of which is accessible through the MachineMotion pendant or via computer with a USB or Ethernet connection.

Application Launcher

- Launch MachineLogic Applications
- Launch Python Applications
- Configure programs in auto-launch mode (executes automatically after power-ON)

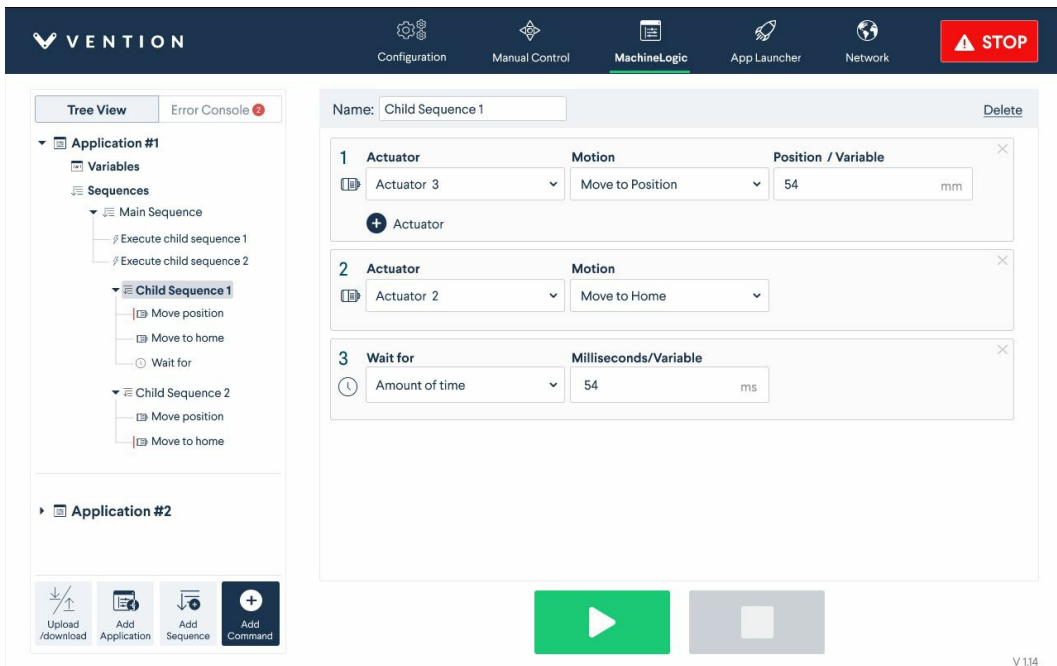
Manual Control

- Send motion commands to actuators
- Configure speed, acceleration and direction
- Monitor the state of end-of-travel sensors and connected control devices



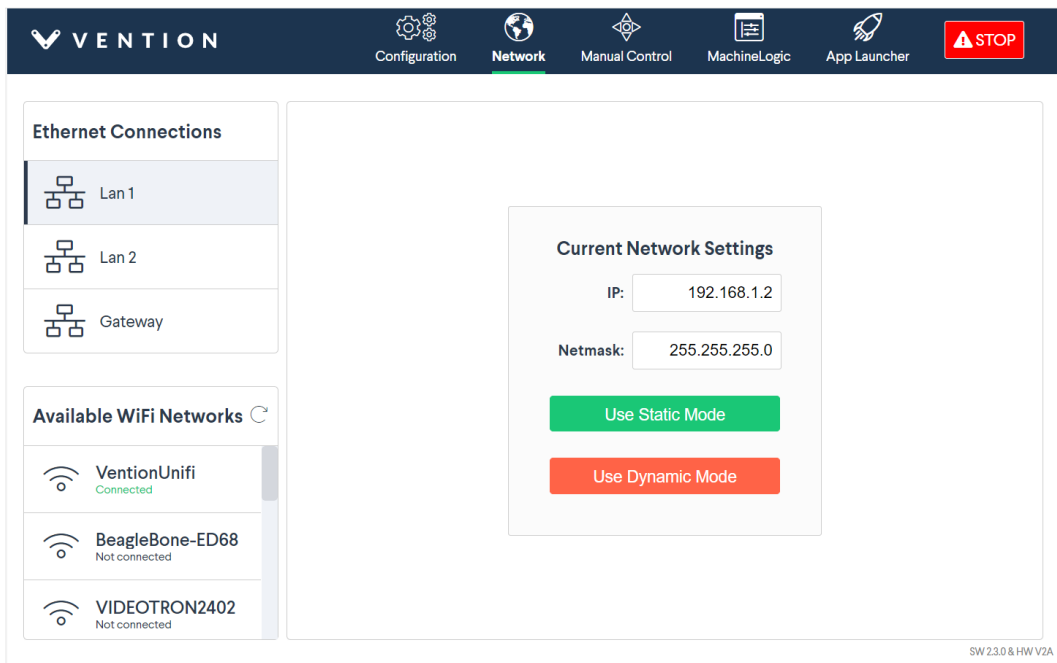
MachineLogic

- Create automation programs in a simple graphical interface



Network Configuration

- Configure the Ethernet ports and WiFi settings (only if the MachineMotion controller is connected to a MachineMotion pendant)



Software & Communication Protocol Specifications

Available Control API

Python

Communication Protocol for Ethernet Adapter

web-socket

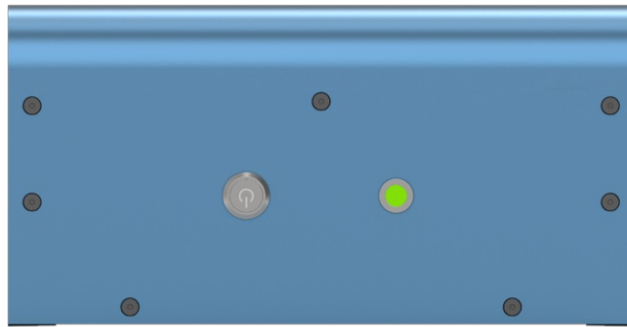
Communication Protocol for Fieldbus

MQTT

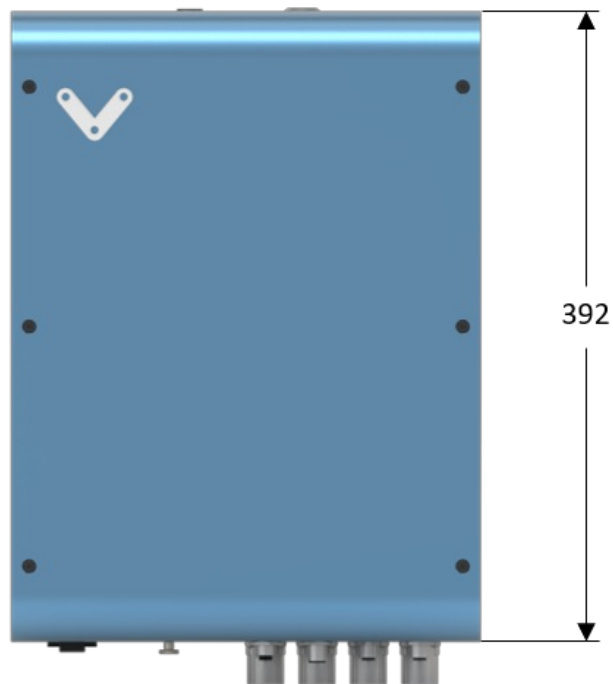
Physical Unit

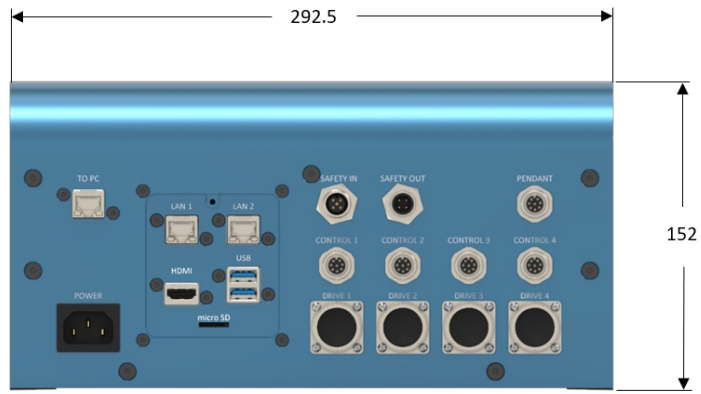


Functional Pinout



Unit Dimensions





Compatible Hardware

Plug and Play Automation Components

MachineMotion™ Pendant
CE-TP-004-0001



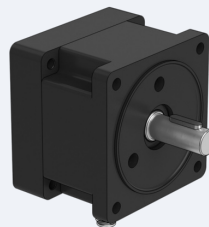
M18 Inductive Proximity Sensor
CE-SN-004-0001



Digital I/O Module
CE-MD-001-0001



Power-Off Brake
MO-PT-002-0001



NEMA34 Servo Motors
MO-SM-01X-0000



Emergency Stop and Reset Module
CE-SA-007-0000

