

MachineMotion 2 One-Drive Datasheet

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Introduction

MachineMotion v2 One-Drive 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 One-Drive 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 One-Drive can be programmed through MachineLogic – Vention's code-free visual sequence editor – or through Vention's Python SDK.

Features

- Control one 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 2 One-Drive 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	3A @ 120 VAC
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Typical Current	1.5A @ 120 VAC
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Typical Power	250 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 120 V	3.00m, NEMA 5-15P to IEC 320-C13, SJT
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Power Cord 230 V	2.5m, CEE 7/7, Right Angle to IEC 320-C13 H05VV-F
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Drive Ports

Name(s)	DRIVE 1
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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
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
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
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Safety Relay

Manufacturer	Dold
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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)

VENTION Configuration Manual Control MachineLogic **App Launcher** Network **STOP**

Available Apps

Pick and place app
last modified: ---

Sequence Status

Main sequence Instruction #0	Not started
Initialization Instruction #0	Not started
Pick Instruction #0	Not started
Inspect Instruction #0	Not started
Drop - Good Bin Instruction #0	Not started

SW v2.0 & HW v2.A

Manual Control

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

VENTION Configuration Network **Manual Control** MachineLogic App Launcher **STOP**

Actuators

X
Drives: 1,2
Ball Screw

Y
Drive: 3
Timing Belt with Gearbox

Z
Drive: 4
Belt Conveyor

System

Max. Speed mm/s

Max. Acceleration mm/s²

Axis

Direction Unknown	Position 25.0 mm
Endstop Sensors Home End	Brake <input type="button" value="Lock"/> <input type="button" value="Unlock"/>

Move

Jog Increment mm

Position Command mm

MachineLogic

- Create automation programs in a simple graphical interface

The screenshot shows the Vention MachineLogic interface. The top navigation bar includes Configuration, Manual Control, MachineLogic (active), App Launcher, Network, and a STOP button. On the left, a 'Tree View' shows a hierarchy: Application #1 > Variables > Sequences > Main Sequence > Execute child sequence 1 > Execute child sequence 2 > Child Sequence 1. The main area displays the configuration for 'Child Sequence 1' with three steps:

- Step 1:** Actuator 3, Motion: Move to Position, Position / Variable: 54 mm.
- Step 2:** Actuator 2, Motion: Move to Home.
- Step 3:** Wait for, Milliseconds/Variable: 54 ms.

Buttons for 'Upload /download', 'Add Application', 'Add Sequence', and 'Add Command' are at the bottom left. A play button and a stop button are at the bottom center. The version 'V.1.14' is in the bottom right.

Network Configuration

- Configure the Ethernet ports and WiFi settings of the MachineMotion controller

The screenshot shows the Vention Network configuration interface. The top navigation bar includes Configuration, Network (active), Manual Control, MachineLogic, App Launcher, and a STOP button. On the left, 'Ethernet Connections' shows LAN 1, LAN 2 (selected), and Gateway. 'Available WiFi Networks' shows 'Company WiFi' (Connected) and two 'Bell0989' networks (Not connected). The main area displays 'Current Network Settings' with input fields for IP and Netmask, and three mode selection buttons: 'Use Static Mode' (green), 'Use Dynamic Mode' (red), and 'Use Auto Setup Mode' (dark blue).

Software & Communication Protocol Specifications

Available Control API

Python

Communication Protocol for Ethernet Adapter

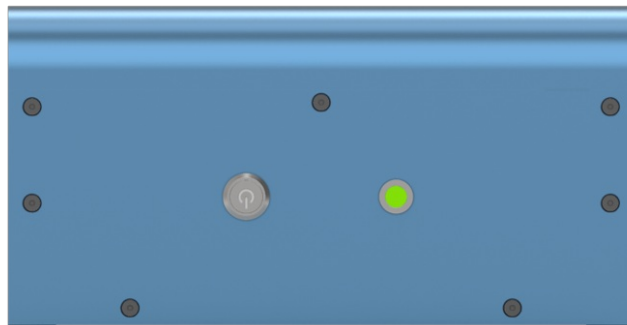
web-socket

Communication Protocol for Fieldbus

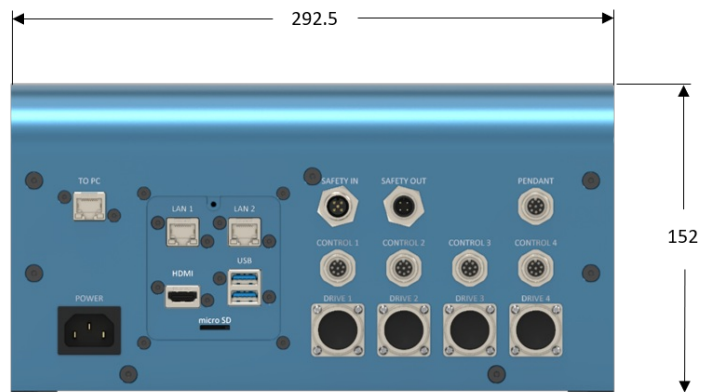
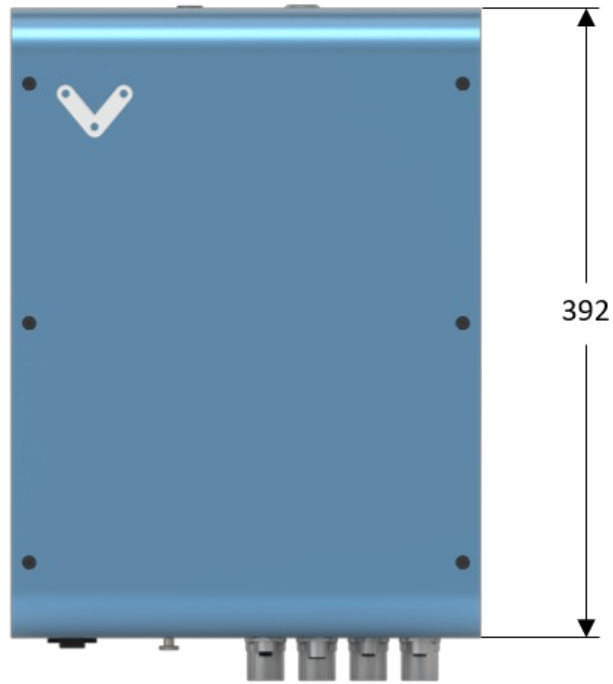
Physical Unit



Functional Pinout



Unit Dimensions



Compatible Hardware

Plug and Play Automation Components

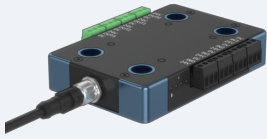
MachineMotion™ Pendant
CE-TP-004-0001



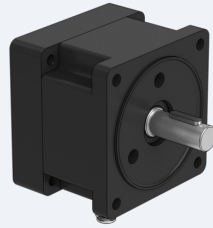
M18 Inductive Proximity Sensor
CE-SN-004-0001



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

