VACON 10 MACHINERY
HOW WOULD YOU LIKE YOUR AC DRIVE TODAY?

vacon
DRIVEN BY DRIVES

EASY ADAPTATION FOR CUSTOMER REQUIREMENTS

The Vacon 10 Machinery is an extremely compact AC drive for machine makers in the power range from 0.25 kW to 5.5 kW. Vacon 10 Machinery offers ultimate flexibility in integrating the customer requirements into the AC drive.

Its architectural construction allows easy integration into environments of all kinds, according to the customer needs. The unique Application Interface Board provides pre-defined interfaces, and a possibility of customer-specified interfaces. Vacon 10 Machinery is specifically suited to the needs of machine builders.

Vacon's new drive is one of the smallest drives in the market today. The size of the drive saves valuable installation space and fits into the smallest of places. Despite the small size, the drive is packed with features such as integrated EMC filters, intelligent navigation and a flexible customer interface. Furthermore, the design of the drive makes it possible for the customer to design their own interfaces if necessary.

The Vacon 10 Machinery is suited to the machine builders particularly due to its flexible interface – it will satisfy a wide variety of needs with few modifications. The drive will also take its place as an all-round general drive when equipped with the Vacon standard interfaces, which offers Modbus communication as standard.

PRODUCT RANGE

VACON 10 MACHINERY, 208...240 V, 1~ (3~ MOTOR)

AC drive type	Motor shaft power (230 V) and current			Frame size
	P (kW)	I_N	1.5 x I_N	MI
Vacon 10 -1L-0001-2	0.25	1.7	2.6	MI1
Vacon 10 -1L-0002-2	0.37	2.4	3.6	
Vacon 10 -1L-0003-2	0.55	2.8	4.2	
Vacon 10 -1L-0004-2	0.75	3.7	5.6	
Vacon 10 -1L-0005-2	1.1	4.8	7.2	MI2
Vacon 10 -1L-0007-2	1.5	7.0	10.5	
Vacon 10 -1L-0011-2	2.2	11.0	16.5	MI3

VACON 10 MACHINERY, 380...480 V, 3~ (3~ MOTOR)

AC drive type	Motor shaft power (400 V) and current			Frame size
	P (kW)	I_N	1.5 x I_N	MI
Vacon 10 -3L-0001-4	0.37	1.3	2.0	MI1
Vacon 10 -3L-0002-4	0.55	1.9	2.9	
Vacon 10 -3L-0003-4	0.75	2.4	3.6	
Vacon 10 -3L-0004-4	1.1	3.3	5.0	
Vacon 10 -3L-0005-4	1.5	4.3	6.5	MI2
Vacon 10 -3L-0006-4	2.2	5.6	8.4	
Vacon 10 -3L-0008-4	3.0	7.6	11.4	MI3
Vacon 10 -3L-0009-4	4.0	9.0	13.5	
Vacon 10 -3L-0012-4	5.5	12.0	18.0	

MAIN DIMENSIONS

	H	W	D
MI1	157	66	98
MI2	195	90	102
MI3	251	100	109

VACON 10 MACHINERY TYPE CODE

VACON 0010-1L-0001-4 MACHINERY +IPN1 +SM02

Product	Input phase	Current rating	Voltage rating	Version	Changes to default setup
					+IPN1 = IP20->NEMA 1 +SM02 = API Full->API RS-485

Type codes by default contains the following features:

- EMC H
- API - Full
- IP20
- General application software

CONTROL I/O

Vacon 10 Machinery is an easily tailored drive to meet the control requirements of the customer.

The Vacon 10 Machinery architecture is created keeping in mind easy and fast tailoring. This is achieved by the control card of the Vacon 10 Machinery, the Application Interface – API. The API is the interface of the drive, providing the main tailoring element for the customer. A set of API boards is offered as standard, but the API construction also gives the customers a free hand to create applications. Additionally, it even allows the API specification to be implemented in the design by the customer.

Standard API

Vacon offers a set of APIs as standard, which is available from the shelf.

- API - Full
- API - Limited
- API – RS-485

API FULL

Terminal		Signal, default settings
1	+10 Vref	Reference voltage
2	AI1	Analog input 0/4-20 mA
3	GND	I/O ground
6	+24 Vout	24 V auxiliary voltage
7	GND	I/O ground
8	DIN1	Start forward
9	DIN2	Start reverse
10	DIN3	Fault reset
A	A	Serial bus (Modbus RTU)
B	B	Serial bus
21	RO11	Relay output 1, FAULT, Change over
22	RO12	Relay output 1, FAULT, NC
4	AI2	Analog input 0-10 V
5	GND	I/O ground
13	GND	I/O ground
14	DI4	Preset speed 1
15	DI5	Preset speed 2
16	DI6	Preset speed 3
18	AO	Analogue output, output frequency
20	DO	Ready
25	RO21	Relay output 2, RUN, NO
26	RO22	Relay output 2, RUN, NO
23	RO13	Relay output 1, FAULT, NO

API LIMITED

Terminal		Signal, default settings
1	+10 Vref	Reference voltage
2	AI1	Analog input, 0-10 V (0/4-20 mA)
3	GND	I/O ground
6	+24 Vout	24 auxiliary voltage
7	GND	I/O ground
8	DIN1	Start forward
9	DIN2	Start reverse
10	DIN3	Fault reset
A	A	Serial bus (Modbus RTU)
B	B	Serial bus
21	RO11	Relay output, FAULT, NC
22	RO12	Relay output, FAULT, NC

API RS-485

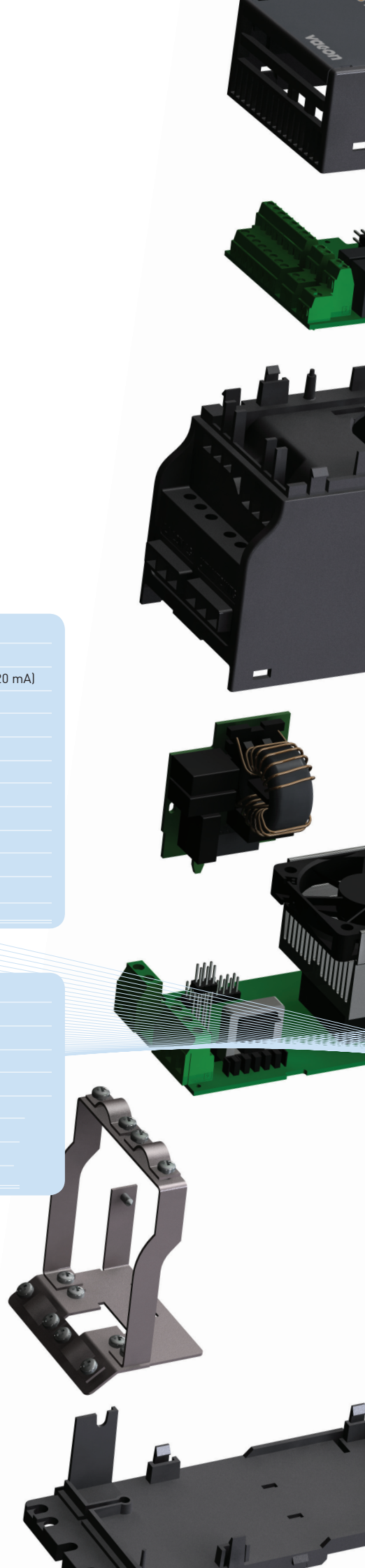
Terminal		Signal, default settings
3	GND	I/O ground
6	+24 Vout	24 V auxiliary voltage
7	GND	I/O ground
8	DIN	Run enable
A	A	Serial bus (Modbus RTU)
B	B	Serial bus
21	RO11	Relay output, FAULT, NC
22	RO12	Relay output, FAULT, NC

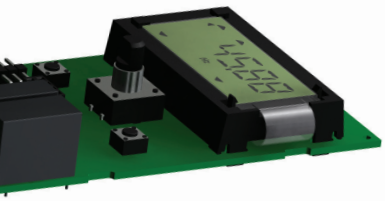
Customer API

Do you have special needs, an interface setup that has become a brand or even a standard in your products? With the API architecture you have a possibility to design your own API board. Vacon's design service helps you to create the specification to develop and to manufacture the desired solution. For further information, please contact your local Vacon representative.

Customer applications

The Vacon 10 Machinery supports Vacon's standard Vacon PC tools. These include for example, Vacon NC61131-3 Engineering Tool, which can be used for creating customer-specific software. The software is a part of Vacon's design service concept but the software can also be created by the customer or a competent third party.





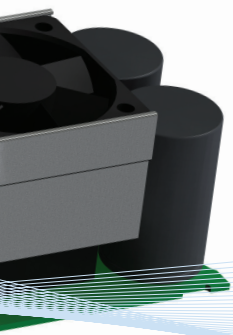
EMC AND INSTALLATION ENVIRONMENT

The standard EN61800-3 (2004) sets limits for both emission and immunity of radio frequency disturbances.

The environment is divided into the 1st and 2nd environments, which, in practice, means public and industrial networks.

Radio Frequency Interference (RFI) filters are typically required to meet the EN61800-3 (2004) standard. The table below gives information how Vacon 10 Machinery fulfils the standard.

Standard EN61800-3 (2004)	Environment	Vacon class	Vacon 10 Machinery 208...240 V	Vacon 10 Machinery 380...480 V
C1	1st (public)	C	Option	Option
C2	1st (public)	H	Integrated as standard	Integrated as standard
C3	2nd (industrial)	L	Integrated as standard	Integrated as standard
C4	2nd (industrial)	N	Option	Option
C4	2nd (industrial)	T	Remove EMC screw (see manual)	Remove EMC screw (see manual)



TOOLS FOR VACON 10

Vacon offers one of the widest range of tools for micro drives in the market. The functionality integrated into Vacon's micro drives gives the customer a possibility to program, commission or monitor the product in a way that they would only normally expect in bigger drives.

PC tools

The Vacon 10 Machinery supports Vacon's existing PC tools for the required functionality. The software is available on our web site, www.vacon.com. The tools are intended for tasks such as commissioning, monitoring, loading various applications and application programming.

The PC is connected to the drive with a Micro Communication Adapter - MCA (option order code) and a cable. There are two options for the cable: standard USB (option order code) and Vacon's own RS485 cable (option order code).

Vacon NCDrive, Vacon NCLoad and Vacon NC61131-3 Engineering Tool all work for required functions with Vacon's micro products.

MCA – Micro Communication Adapter

With MCA the customer can upload and download parameters without powering the drive. This will allow the user to parameterize the drive without first connecting the drive to the mains.

TECHNICAL DATA

Mains connection	Input voltage U_{in}	380...480 V, -15 %...+10 % 3~ 208...240 V, -15 %...+10 % 1~
	Input frequency	45...66 Hz
	Line current THD	>120 %
	Connection to mains	Once per minute or less (normal case)
Motor connection	Output voltage	0...U_{in}
	Output current	Continuous rated current I_N at ambient temperature max. +50°C, overload 1.5 x I_N max. 1 min/10 min
	Starting current / torque	Current 2 x I_N for 2 secs in every 20 sec period Torque depends on motor
	Output frequency	0...320 Hz
	Frequency resolution	0.01 Hz
Control characteristics	Control method	Frequency Control U/f Open loop sensorless
	Switching frequency	1...16 kHz; Factory default 6 kHz
	Frequency reference	Resolution 0.01 Hz
	Field weakening point	30...320 Hz
	Acceleration time	0.1...3000 sec
	Deceleration time	0.1...3000 sec
	Braking torque	100 % x T_N with brake option (only 400 V, 1.5 kW) 30 % x T_N without brake option
Ambient conditions	Ambient operating temperature	–10°C (no frost)...+50°C: rated loadability I_N
	Storage temperature	–40°C...+70°C
	Relative humidity	0...95 % RH, non-condensing, non-corrosive, no dripping water
	Air quality: - chemical vapours - particles	 IEC 721-3-3, unit in operation, class 3C2 IEC 721-3-3, unit in operation, class 3S2
	Altitude	100 % load capacity (no derating) up to 1000 m 1 % derating for each 100 m above 1000 m; max. 2000 m
	Vibration EN60068-2-6	5...150 Hz Displacement amplitude 1 (peak) mm at 5...15.8 Hz Max acceleration amplitude 1 G at 15.8...150 Hz
	Shock IEC 68-2-27	UPS Drop Test (for applicable UPS weights) Storage and shipping: max 15 G, 11 ms (in package)
	Enclosure class	IP20
EMC	Immunity	Complies with EN61800-3 (2004)
	Emissions	230 V: EMC level H: with an internal RFI filter option 400 V: EMC level H: with an internal RFI filter option
Safety		61800-5-1, EN60204-1, CE, UL, cUL, IEC (see unit nameplate for more detailed approvals)
Protections	Overvoltage protection	230 V series: 437 VDC; 400 V series: 911 VDC trip level
	Undervoltage protection	230 V series: 183 VDC; 400 V series: 333 VDC trip level
	Earth-fault protection	Earth fault is tested before every start. In case of earth fault in motor or motor cable, only the frequency converter is protected
	Unit overtemperature	Yes
	Motor overload	Yes
	Motor stall	Yes
	Motor underload	Yes
	Overcurrent protection	Yes, trip limit 4.0 x I_N instantaneously

MORE FEATURES

Easy installation and commissioning

- Intelligent menu navigation
- Small physical size
- DIN rail and screw mountable
- Side by side installation
- Vacon NC61131-3 Engineering Tool for the most demanding use
- Parameter upload and download without the need for a mains power supply

Flexible control architecture

- Modular I/O usage
- RS-485/Modbus as standard
- PI controller as standard
- Several fieldbus options
- External +24 V DC powering to maintain power in API board and field buses in case the main supply is disconnected
- Design service for customer-specific API board development

Extensive hardware

- Integrated EMC filters make the unit suitable for commercial and industrial networks
- Available in enclosure class IP20 as standard, options for IP21 and NEMA1
- Varnished boards as standard
- Brake chopper as standard in 3~, 400 V, 1.5 kW and higher
- Temperature-controlled fan

Environment–friendly

- RoHS compliant
- Recyclable materials
- Energy saving
- Decreased mechanical stress
- Reduced noise levels

Vacon Plc
Runsorintie 7, 65380 Vaasa, Finland
Tel. +358 (0)201 2121, Fax +358 (0)201 212 205
www.vacon.com, email: info@vacon.com

Vacon Partner

BC00245A