

VACON 5X
SMALL AND ROBUST AC DRIVE

VACON
DRIVEN BY DRIVES

THE SIMPLE DRIVE FOR HARSH ENVIRONMENTS

The Vacon 5X is a small and robust range of AC drives designed for the harsh environments found in most process industries and on building sites. The powers available are from 0.37 kW to 7.5 kW (220 V, single-phase, 220 V and 400 V three-phase). The Vacon 5X range is suited for all types of applications, typically industrial conveyors, fans and pumps.

The rugged IP55 enclosure allows installation directly on the wall or other suitable place without further protection in most environments. The Vacon 5X range offers alternatives with or without an integrated RFI filter and with or without an integrated main switch, providing solutions for the most differing needs.

The Vacon 5X is easy to install and commission. There are only a dozen basic parameters to adjust (related to ramp times and motor data), and the I/O interface is simple. The simple keypad and programming matches that of the Vacon 50X and 500X ranges, creating a compatible family of AC drives for tough environments. The Modbus RTU is included as standard, making integration into fieldbus control systems easy.

Industrial segments

- Food processing
- Bottling lines
- Pumping
- Chemical
- Wastewater
- HVAC

Features

- Small footprint
- Integrated main switch available
- Designed for a harsh and wet environment
- Simple in construction
- Easy to use due to advanced features
- Fast setup: 14 basic parameters handle most applications
- Display of motor current and motor rpm
- Modbus RTU included
- Control location can be chosen: I/O, keypad or fieldbus
- Integrated brake chopper for sizes 2 and 3
- I_H sizing: 50% overload for 1 minute
- 75% overload for 2 seconds
- Optional memory stick programming for easy copying of data between drives
- Programmable via a PDA or smart phone



SIZES AND RATINGS

Motor nominal power (kW)	Drive nominal current (A)	Order type code	Main switch (optional) Add	EMC4 (optional) Add	Frame	Measurements (mm) WxHxD	Weight (kg)
1 x 220 VAC							
0.37	2.3	VACON0005-1L-0002-2-X-1	+CILS	+EMC4	F1	78x172x123	1.1
0.75	4.3	VACON0005-1L-0004-2-X-1	+CILS	+EMC4	F1	78x172x123	1.1
1.5	7	VACON0005-1L-0007-2-X-1	+CILS	+EMC4	F1	78x172x123	1.1
1.5	7	VACON0005-1L-0007-2-X-2	+CILS	+EMC4	F2	104x220x150	2.6
2.2	10.5	VACON0005-1L-0011-2-X-2	+CILS	+EMC4	F2	104x220x150	2.6
3 x 200 – 240 VAC							
0.37	2.3	VACON0005-3L-0002-2-X-1	+CILS	+EMC4 *	F1	78x172x123	1.1
0.75	4.3	VACON0005-3L-0004-2-X-1	+CILS	+EMC4 *	F1	78x172x123	1.1
1.5	7	VACON0005-3L-0007-2-X-1	+CILS	+EMC4 *	F1	78x172x123	1.1
1.5	7	VACON0005 3L-0007-2-X-2	+CILS	+EMC4	F2	104x220x150	2.6
2.2	10.5	VACON0005-3L-0011-2-X-2	+CILS	+EMC4	F2	104x220x150	2.6
4	14	VACON0005-3L-0014-2-X-3	+CILS	+EMC4	F3	140x250x160	4
3 x 380 – 480 VAC							
0.75	2.2	VACON0005-3L-0002-4-X-1	+CILS	+EMC4	F1	78x172x123	1.1
1.5	4.1	VACON0005-3L-0004-4-X-1	+CILS	+EMC4	F1	78x172x123	1.1
1.5	4.1	VACON0005-3L-0004-4-X-2	+CILS	+EMC4	F2	104x220x150	2.6
2.2	5.8	VACON0005-3L-0006-4-X-2	+CILS	+EMC4	F2	104x220x150	2.6
4	9.5	VACON0005-3L-0010-4-X-2	+CILS	+EMC4	F2	104x220x150	2.6
5.5	14	VACON0005-3L-0014-4-X-3	+CILS	+EMC4	F3	140x250x160	4
7.5	18	VACON0005-3L-0018-4-X-3	+CILS	+EMC4	F3	140x250x160	4

* = Only +EMC4 version available

Options

+CILS = Main switch version available
+EMC4 = Version for the category C4 available
(Providing no EMC protection: requires centralized action, for industrial environments)

I/O CONNECTIONS

- 2 analog inputs: configurable 0...10 V, 0/4...20 mA (speed reference and actual value signal)
- 3 digital inputs (0/24 V): one of which is one of the analog inputs as well
- 1 analog/digital output 0...10 V or 0/4...20 mA analog; 24 V max as digital output
- 1 NO relay
- 10 V reference voltage out
- 24 V I/O supply voltage

External brake resistors

AC drive	Minimum brake resistance
200 V single- and three-phase models	47 ohms
400 V models, frame size 2	100 ohms
400 V models, frame size 3	22 ohms

TECHNICAL DATA

Mains connection	Input voltage U_{in}	208...240 V; 380...480 V; –10%...+10%
	Input frequency	48...62 Hz
Motor connection	Output voltage	0...U_{in}
	Continuous output current	Ambient temperature max. +40°C, overload 1.5 x I_H (1 min./10 min.)
	Output frequency	0...500 Hz
	Frequency resolution	0.1 Hz
Control characteristics	Control method	U/f Control
	Switching frequency	4...32 kHz effective
	Frequency reference Analogue input Panel reference	Analog (0...10 V, 0...20 mA, 4...20 mA) Digital (keypad) PI control (integral) Modbus RTU
	Field weakening point	25...500 Hz
	Acceleration time	0...600 sec
	Deceleration time	0...600 sec
	Braking torque	DC brake: 30% x T_N (without brake option)
Ambient conditions	Ambient operating temperature	–10°C (no frost)...+40°C: I_H
	Storage temperature	–40°C...+60°C
	Relative humidity	0 to 95% RH, non-condensing, non-corrosive, no dripping water
	Altitude	100% load capacity (no derating) up to 1,000 m 1% derating for each 100 m above 1,000 m max. 2,000 m with UL, max. 4,000 m without UL
	Enclosure class	IP55
EMC	Immunity	Fulfils EN61800-3, first and second environment
	Emissions	Fulfils EN61800-3, first and second environment
Safety		EN 61800-5-1 (2003), EN 60204-1 (2006), CE, UL, cUL, C-tick; (see unit nameplate for more detailed approvals)
Control connections	Analogue input voltage	0...+10 V, R_i = 72 kΩ Resolution 0.025%, linearity < 1% deviation
	Analogue input current	0(4)...20 mA, R_i = 500 Ω
	Digital inputs (3)	Positive logic; 18...30 VDC Logic 0: 0...2 V, Logic 1: 8...30 V
	Auxiliary voltage	+24 V, ±5%, max. voltage ripple < 100 mV; max. 100 mA
	Output reference voltage	+10 V, +3%, max. load 10 mA
	Analogue output	Analog output: 0...10 V (20 mA max). Resolution: 10 bits, linearity < 2% deviation
	Digital outputs	Digital output: 0 V / 24 V push-pull, 20 mA max
	Relay outputs	1 NO relay output Switching capacity: 30 VDC / 5 A, 250 VAC / 6 A, Min. switching load: 5 V / 10 mA
Protections	Overvoltage trip limit Undervoltage trip limit	For 400 V 3-phase supply drives: Overvoltage trip level: 835 V Undervoltage trip level: 478 V (rising volts), 320 V (falling volts) For 230 V supply drives: Overvoltage trip level: 418 V Undervoltage trip level: 239 V (rising volts), 160 V (falling volts)
	Earth fault protection	In case of earth fault in motor or motor cable, only the frequency converter is protected
	Mains supervision	Trips if any of the input phases is missing
	Motor phase supervision	Trips if any of the output phases is missing
	Overcurrent protection	Yes
	Unit overtemperature protection	Yes
	Motor overload protection	Yes
	Motor stall protection	Yes
	Motor underload protection	Yes
	Short-circuit protection of +24 V and +10 V reference voltages	Yes

Vacon Partner

BC00357A

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VACON 50X
TOUGH INDUSTRIAL AC DRIVE

VACON
DRIVEN BY DRIVES

BUILT FOR YOU AND THE WORLD YOU WORK IN

The Vacon 50X is designed to do more than run an AC drive in ideal conditions. It has been designed to keep on driving demanding processes in harsh environments from 0.37 to 132 kW (220 V, three-phase and 400 V, three-phase). It is built tough from the ground up to survive in hostile environments and still be simple to use and adaptable to the real world applications and requirements that you encounter every day.

The Vacon 50X range has been designed for worldwide use – with a dual voltage rating for 400 V and 460 V 50/60 Hz supplies as well as a dual power rating to adapt to all applications. The control is flexible, as it allows the control source to be the keypad, remote signals, computers or any combination. The built-in 9-step PLC functionality improves the usability of the AC drive and might, in some cases, even eliminate the need for a separate external PLC.

The rugged design of the Vacon 50X allows you to mount it close to the motors they drive. The IP66 enclosure (IP55 for bigger drives) allows you to use pressure water to clean the drive – at a pressure of 70 bars from 15 cm. The thick polycarbonate cover and the high-grade aluminium heatsink withstand the influence of most aggressive chemicals. The double labyrinth seal between cover and heatsink keeps dust, dirt, oil and water from entering the enclosure.

The small Vacon 50X AC drives are convection-cooled – no fan to worry about. In keeping with the tough basic design, the Vacon 50X has a built-in heater to allow use in frigid temperatures – as long as power is available. The standard "built-In" Dynamic Braking Resistor virtually eliminates nuisance trips, providing more uptime, and the 60:1 constant torque turn-down ratio provides low-speed performance when you need it.

Features

- Large voltage and power range
- Designed for industrial environments
- Macros for easy operation of various basic applications
- Rugged IP66 enclosure for industrial use
- Clear multilingual text display
- Download parameters via IR



High overload		Low overload		Order type code	Frame	Measurements WxHxD (mm)	Weight (kg)
Motor nominal power (kW)	Drive nominal current (A)	Motor nominal power (kW)	Drive nominal current (A)				
3 x 220 VAC*), EMC category C4 (no EMC classification)							
0.37	2.2	0.75	4.2	VACON0050-3L-0005-2-X	S0/IP66	165x241x155	3.9
0.75	4.2	1.5	6.8	VACON0050-3L-0008-2-X	S0/IP66	165x241x155	3.9
1.5	6.8	2.2	9.6	VACON0050-3L-0011-2-X	S0/IP66	165x241x155	3.9
2.2	9.6	4	15	VACON0050-3L-0018-2-X	S1/IP66	221x306x166	6.4
4	15.2	5.5	22	VACON0050-3L-0025-2-X	S1/IP66	221x306x166	6.4
5.5	22	7.5	28	VACON0050-3L-0037-2-X	S2/IP66	273x442x201	13
7.5	28	11	42	VACON0050-3L-0048-2-X	S2/IP66	273x442x201	13
11	42	15	54	VACON0050-3L-0062-2-X	S3/IP66	286x513x314	23
15	54	18.5	68	VACON0050-3L-0078-2-X	S3/IP66	286x513x314	23
3 x 380 – 460 VAC, EMC category C4 (no EMC classification)							
0.55	1.8	0.75	2.4	VACON0050-3L-0002-5-X	S0/IP66	165x241x155	3.9
0.75	2.4	1.5	3.8	VACON0050-3L-0004-5-X	S0/IP66	165x241x155	3.9
1.5	3.8	2.2	5.1	VACON0050-3L-0005-5-X	S0/IP66	165x241x155	3.9
2.2	5.1	4	8.9	VACON0050-3L-0009-5-X	S1/IP66	221x306x166	6.4
4	8.9	5.5	12	VACON0050-3L-0012-5-X	S1/IP66	221x306x166	6.4
5.5	12	7.5	15.6	VACON0050-3L-0016-5-X	S1/IP66	221x306x166	6.4
7.5	15.6	11	23	VACON0050-3L-0023-5-X	S2/IP66	273x442x201	13
11	23	15	31	VACON0050-3L-0031-5-X	S2/IP66	273x442x201	13
15	31	18.5	37	VACON0050-3L-0037-5-X	S2/IP66	273x442x201	13
18.5	37	22	43	VACON0050-3L-0043-5-X	S2/IP66	273x442x201	13
22	43	30	61	VACON0050-3L-0061-5-X	S3/IP66	286x513x314	23
30	61	37	71	VACON0050-3L-0071-5-X	S3/IP66	286x513x314	23
37	71	45	86	VACON0050-3L-0086-5-X	S4/IP66	326x745x351	43
45	86	55	105	VACON0050-3L-0105-5-X	S4/IP66	326x745x351	43
55	105	75	140	VACON0050-3L-0140-5-X	S4/IP66	326x745x351	43
75	140	90	168	VACON0050-3L-0168-5-X	S5/IP55	414x1296x429	138
90	168	110	205	VACON0050-3L-0205-5-X	S5/IP55	414x1296x429	138
110	205	132	240	VACON0050-3L-0240-5-X	S5/IP55	414x1296x429	138
3 x 380 – 460 VAC, EMC category C3							
2.2	5.1	4	8.9	VACON0050-3L-0009-5-X+EMC3	S1/IP66	221x306x166	6.4
4	8.9	5.5	12	VACON0050-3L-0012-5-X+EMC3	S1/IP66	221x306x166	6.4
5.5	12	7.5	15.6	VACON0050-3L-0016-5-X+EMC3	S1/IP66	221x306x166	6.4
7.5	15.6	11	23	VACON0050-3L-0023-5-X+EMC3	S2/IP66	273x442x201	13
11	23	15	31	VACON0050-3L-0031-5-X+EMC3	S2/IP66	273x442x201	13
15	31	18.5	37	VACON0050-3L-0037-5-X+EMC3	S2/IP66	273x442x201	13
18.5	37	22	43	VACON0050-3L-0043-5-X+EMC3	S2/IP66	273x442x201	13
22	43	30	61	VACON0050-3L-0061-5-X+EMC3	S3/IP66	286x513x314	23
30	61	37	71	VACON0050-3L-0071-5-X+EMC3	S3/IP66	286x513x314	23
37	71	45	86	VACON0050-3L-0086-5-X+EMC3	S4/IP66	326x745x351	43

*) For single-phase applications, derate the nominal current by 50%

TECHNICAL DATA

Mains connection	Input voltage U_{in}	200...230 V; 380...460 V; –15%...+15%
	Input frequency	48...62 Hz
	Maximum source kVA	10 times rated unit kVA, maximum 65 kA
Motor connection	Output voltage	0...U_{in}
	Continuous output current	Ambient temperature max. +40°C, overload 1.2 x I_N (1 min./10 min.)
	Output frequency	0.1...400 Hz
	Frequency resolution	0.1 Hz
Control characteristics	Control method	Open Loop Sensorless Vector Control
	Switching frequency	1...16 kHz
	Frequency reference Analogue input Panel reference	Analog (0...10 V, 0...20 mA, 4...20 mA, 0-5-10 V bipolar) Digital (keypad) Pulse train < 100 kHz
	Field weakening point	25...400 Hz
	Acceleration time	0.1...3200 sec
	Deceleration time	0.1...3200 sec
	Braking torque	DC brake: 30% x T_N (without brake option)
Ambient conditions	Ambient operating temperature	–10°C (no frost)...+40°C: I_H
	Storage temperature	–20°C...+65°C
	Relative humidity	0 to 95% RH, non-condensing, non-corrosive, no dripping water
	Altitude	100% load capacity (no derating) up to 1,000 m. 1% derating for each 100 m above 1,000 m; max. 2,000 m with U_L, max. 4,000 m without U_L
	Vibration EN50178/EN60068-2-6	5...150 Hz Displacement amplitude 1 mm (peak) at 5...15.8 Hz Max. acceleration amplitude 1 G at 15.8...150 Hz
	Shock EN50178, EN60068-2-27	UPS Drop Test (for applicable UPS weights) Storage and shipping: max 15 G, 11 ms (in package)
	Enclosure class	IP66, IP55
EMC	Immunity	Fulfils EN61800-3, first and second environment
	Emissions	Fulfils EN61800-3, second environment, class C4, class C3 with +EMC3 option
Safety		EN 50178 (1997), EN 60204-1 (2006), CE, UL, cUL (see unit nameplate for more detailed approvals)
Control connections	Analogue input voltage	0...+10 V, R_i = 200 kΩ. Resolution 0.1%, accuracy ±1%
	Analogue input current	0(4)...20 mA, R_i = 250 Ω differential
	Digital inputs (3)	Positive or negative logic; 18...30 VDC
	Output reference voltage	+10 V, +3%, max. load 10 mA
	Analogue output	0(4)...20 mA; R_L max. 500 Ω. Resolution 10 bits, accuracy ±2%
	Digital outputs	2 open collector output, 50 mA / 24 V
	Relay outputs	2 NO/NC relay output. Switching capacity: 130 VAC / 1 A, 250 VAC / 0.5 A Min. switching load: 5 V / 10 mA
Protections	Overvoltage trip limit	200 V class, 406 VDC; 400 V class, 814 VDC
	Undervoltage trip limit	200 V class, 199 VDC; 400 V class, 397 VDC
	Earth fault protection	In case of earth fault in motor or motor cable, only the frequency converter is protected
	Mains supervision	Trips if any of the input phases is missing (programmable ON/OFF)
	Motor phase supervision	Trips if any of the output phases is missing
	Overcurrent protection	Yes
	Unit overtemperature protection	Yes
	Motor overload protection	Yes
	Motor stall protection	Yes
	Motor underload protection	Yes
	Short-circuit protection of +10 V reference voltages	Yes

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