Product data sheet
Characteristics

ATV71EXC2C31Y
enclosed variable speed drive ATV71 Plus - 315 kW - 690 V - IP23

Main

Range of product	Altivar 71 Plus
Product or component type	Variable speed drive
Device short name	ATV71 Plus
Product destination	Asynchronous motors Synchronous motors
Product specific application	Complex, high-power machines
Assembly style	In floor-standing enclosure compact version
Product composition	A line choke ATV71HC31Y drive on heatsink An IP65 remote mounting kit for graphic display terminal A switch and fast-acting semi-conductor fuses A wired ready-assembled Sarel Spacial 6000 enclosure Terminals/Bars for motor connection
EMC filter	Integrated
Network number of phases	3 phases
Rated supply voltage	(+/- 10 %)
Supply voltage limits	621...759 V
Supply frequency	50...60 Hz (+/- 5 %)
Network frequency	47.5...63 Hz
Motor power kW	315 kW for 690 V
Line current	371 A for 690 V / 315 kW

Complementary

Apparent power	For 690 V / 315 kW
Prospective line Isc	100 kA with external fuses
Continuous output current	355 A at 2.5 kHz, 690 V / 315 kW
Maximum transient current	533 A for 60 s / 315 kW
Speed drive output frequency	0...500 Hz
Nominal switching frequency	2.5 kHz
Switching frequency	2...4.9 kHz adjustable 2.5...4.9 kHz with derating factor
Speed range	1...100 in open-loop mode, without speed feedback
Speed accuracy	+/- 10 % of nominal slip for 0.2 Tn to Tn torque variation, without speed feedback +/- 0.01 % of nominal speed for 0.2 Tn to Tn torque variation, in closed-loop mode with encoder feedback
Torque accuracy	+/- 5 % in closed-loop mode with encoder feedback +/- 15 % in open-loop mode, without speed feedback
Transient overtorque	220 % of nominal motor torque, +/- 10 % for 2 s 170 % of nominal motor torque, +/- 10 % for 60 s
Braking torque	30 % without braking resistor <= 150 % with braking or hoist resistor
Asynchronous motor control profile	Voltage/Frequency ratio, 2 points Voltage/Frequency ratio, 5 points Flux vector control without sensor, standard Voltage/Frequency ratio - Energy Saving, quadratic U/f Flux vector control without sensor, ENA (energy Adaptation) system Flux vector control without sensor, 2 points Flux vector control with sensor, standard

Synchronous motor control profile	Vector control without sensor, standard Vector control with sensor, standard
Regulation loop	Adjustable PI regulator
Motor slip compensation	Adjustable Automatic whatever the load Not available in voltage/frequency ratio (2 or 5 points) Suppressable
Overvoltage category	Class 3 conforming to EN 50178
Local signalling	LCD display unit - operation function, status and configuration
Output voltage	<= power supply voltage
Isolation	Electrical between power and control
Type of cable for external connection	IEC cable - 40 °C, copper 70 °C / PVC
Electrical connection	Terminal M12 - 3 x 185 mm² (L1/R, L2/S, L3/T) entry from the bottom Terminal M12 - 4 x 240 mm² (U/T1, V/T2, W/T3) entry from the bottom Terminal - 2.5 mm² / AWG 14 (AI1-/AI1+, AI2, AO1, R1A, R1B, R1C, R2A, R2B, LI1...LI6, PWR) entry from the bottom
Motor recommanded cable cross section	2 (3 x 95) mm²
Short circuit protection	500 A fuse protection type gl - power supply upstream
Supply	Internal supply : 24 V DC (21...27 V) - 0...100 mA Internal supply for reference potentiometer : 10 V DC (10...11 V) - 0...10 mA External supply : 24 V DC (19...30 V) - 1 A
Analogue input number	2
Analogue input type	Software-configurable current : (AI2) 0...20 mA/4...20 mA - 250 Ohm - sampling time: 1.5...2.5 ms - resolution: 11 bits Bipolar differential voltage : (AI1-/AI1+) +/- 10 V DC - 24 V max - sampling time: 1.5...2.5 ms - resolution: 11 bits + sign Software-configurable voltage : (AI2) 0...10 V DC - 24 V max - 30000 Ohm - sampling time: 1.5...2.5 ms - resolution: 11 bits
Analogue output number	1
Analogue output type	Software-configurable current : (AO1) 0...20 mA/4...20 mA - 500 Ohm - sampling time: 1.5...2.5 ms - resolution: 10 bits Software-configurable voltage : (AO1) 0...10 V DC - 470 Ohm - sampling time: 1.5...2.5 ms - resolution: 10 bits
Discrete output number	2
Discrete output type	Configurable relay logic : (R2A, R2B) NO - 6.5...7.5 ms - 100000 cycles Configurable relay logic : (R1A, R1B, R1C) NO/NC - 6.5...7.5 ms - 100000 cycles
Minimum switching current	3 mA at 24 V DC (configurable relay logic)
Maximum switching current	2 A at 30 V DC on inductive load - L/R = 7 ms (R1, R2) 2 A at 250 V AC on inductive load - cos phi = 0.4 (R1, R2) 5 A at 30 V DC on resistive load - L/R = 0 ms (R1, R2) 5 A at 250 V AC on resistive load - cos phi = 1 (R1, R2)
Discrete input number	7
Discrete input type	Safety input (PWR) 24 V DC (<= 30 V) - 1.5 kOhm Switch-configurable (LI6) 24 V DC (<= 30 V) , with level 1 PLC - 1.5 kOhm - sampling time: 1.5...2.5 ms Programmable (LI1...LI5) 24 V DC (<= 30 V) , with level 1 PLC - 3.5 kOhm - sampling time: 1.5...2.5 ms
Discrete input logic	Positive logic (source) (PWR) , 0...2 V (state 0), 17...30 V (state 1) Negative logic (sink) (LI1...LI6) , 16...30 V (state 0), 0...10 V (state 1) Positive logic (source) (LI1...LI6) , 0...5 V (state 0), 11...30 V (state 1)
Acceleration and deceleration ramps	Automatic adaptation of ramp if braking capacity exceeded, by using resistor Linear adjustable separately from 0.01 to 9000 s S, U or customized
Braking to standstill	By DC injection
Protection type	Thermal protection for motor Power removal for motor Input phase breaks for motor Thermal protection for drive Short-circuit between motor phases for drive Overvoltages on the DC bus for drive Overheating protection for drive Overcurrent between output phases and earth for drive Line supply undervoltage for drive Line supply overvoltage for drive Input phase breaks for drive Break on the control circuit for drive Against input phase loss for drive Against exceeding limit speed for drive

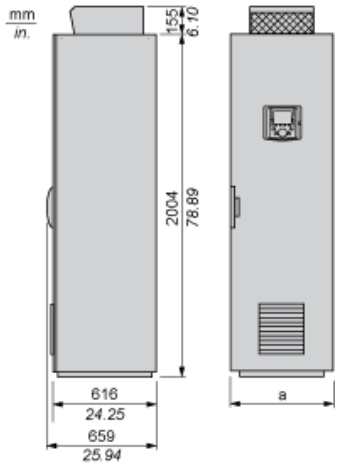
Dielectric strength	5345 V DC between control and power terminals 3110 V DC between earth and power terminals
Insulation resistance	> 1 mOhm at 500 V DC for 1 minute to earth
Frequency resolution	0.1 Hz for display unit 0.024/50 Hz for analog input
Communication port protocol	CANopen Modbus
Type of connector	Male SUB-D 9 on RJ45 for CANopen 1 RJ45 for Modbus on terminal 1 RJ45 for Modbus on front face
Physical interface	2-wire RS 485 for Modbus
Transmission frame	RTU for Modbus
Transmission rate	20 kbps, 50 kbps, 125 kbps, 250 kbps, 500 kbps, 1 Mbps for CANopen 9600 bps, 19200 bps for Modbus on front face 4800 bps, 9600 bps, 19200 bps, 38.4 Kbps for Modbus on terminal
Data format	8 bits, odd even or no configurable parity for Modbus on terminal 8 bits, 1 stop, even parity for Modbus on front face
Type of polarization	No impedance for Modbus
Method of access	Slave for CANopen
Option card	Encoder interface cards Extended I/O extension card Basic I/O extension card Controller inside programmable card Communication card for Modbus TCP/IP Communication card for Profibus DP V1 Communication card for Profibus DP Communication card for Modbus/Uni-Telway Communication card for Modbus Plus Communication card for Interbus-S Communication card for Fipio Communication card for Ethernet/IP Communication card for DeviceNet Communication card for CC-Link
Options for enclosure configuration	Isolated amplifier for control circuit Relay output C/O for control circuit Adaptor for 115 V logic inputs for control circuit Control terminals for control circuit Door handle for circuit breaker for power circuit Braking unit for power circuit Enclosure plinth for power circuit Cable entry via the top for power circuit Motor choke for power circuit Enclosure heating for power circuit Ammeter for power circuit Line contactor for power circuit Circuit breaker for power circuit Door handle for main switch for power circuit Voltmeter for power circuit External motor fan for power circuit Motor heating for power circuit Key switch (local/remote) for power circuit Enclosure lighting for power circuit External 24 V DC supply terminals for power circuit Buffer voltage 24 V DC power supply for power circuit External 230 V supply terminals for power circuit Design for IT networks for power circuit Insulation monitoring for power circuit Pt100 relay for power circuit PTC relay for power circuit Safe standstill for power circuit
Operating position	Vertical +/- 10 degree
Colour of enclosure	Light grey RAL 7035
Height	2162 mm
Width	800 mm
Depth	642 mm
Product weight	550 kg

Environment

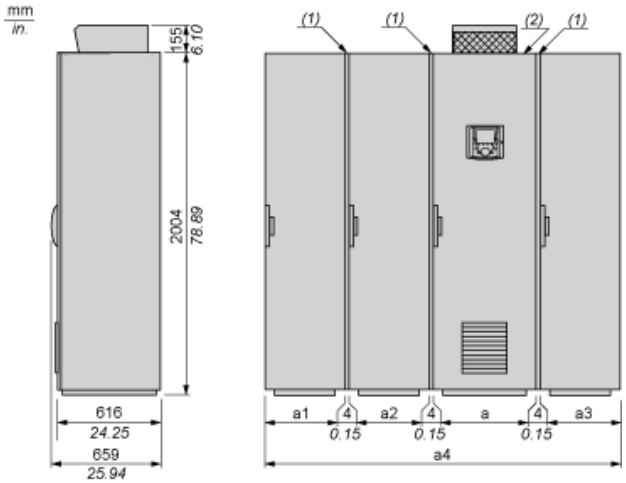
Electromagnetic compatibility	Voltage dips and interruptions immunity test conforming to IEC 61000-4-11 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3 Electrostatic discharge immunity test level 3 conforming to IEC 61000-4-2 Electrical fast transient/burst immunity test level 4 conforming to IEC 61000-4-4 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-6 1.2/50 µs - 8/20 µs surge immunity test level 3 conforming to IEC 61000-4-5
Pollution degree	2 conforming to EN/IEC 61800-5-1
IP degree of protection	IP23
Vibration resistance	3M3 conforming to EN/IEC 60721-3-3 1.5 mm (f = 3...10 Hz) conforming to EN/IEC 60068-2-6 0.6 gn (f = 10...200 Hz) conforming to EN/IEC 60068-2-6
Shock resistance	3M2 EN/IEC 60721-3-3 4 gn 11 ms EN/IEC 60068-2-27
Noise level	66 dB conforming to 86/188/EEC
Environmental characteristic	3S2 without condensation conforming to IEC 60721-3-3 3K3 without condensation conforming to IEC 60721-3-3 3C2 without condensation conforming to IEC 60721-3-3
Relative humidity	<= 95 %
Ambient air temperature for operation	40...50 °C with current derating of 0.6 % per °C 0...40 °C without derating
Ambient air temperature for storage	-25...70 °C
Volume of cooling air	1200 m3/h
Operating altitude	1000...3000 m with current derating 1 % per 100 m <= 1000 m without derating
Standards	EN 55011 class A group 2 EN 61800-3 environments 1 category C3 EN 61800-3 environments 2 category C3 EN/IEC 61800-3 EN/IEC 61800-5-1
Product certifications	ATEX GOST
Marking	CE

IP 23 Floor-Standing Enclosure Compact Version

Standard Compact Floor-Standing Enclosure



Standard Compact Floor-Standing Enclosure + Additional Floor-Standing Enclosures, According to the Configuration



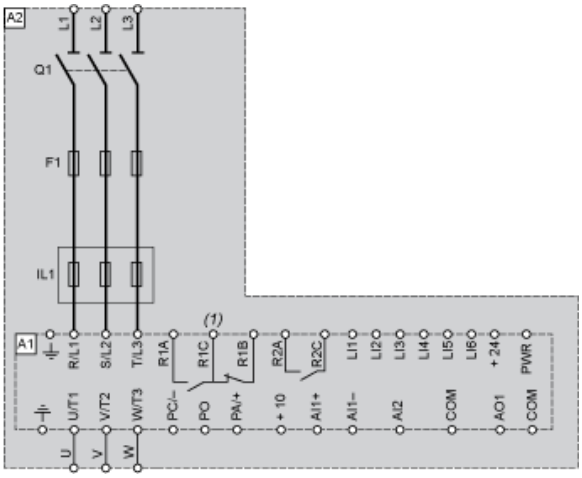
(1) Seal. For each floor-standing enclosure added, allow a 4 mm/0.15 in. space for the seal.
(2) Standard IP 23 compact version floor-standing enclosure.

NOTE: The position of the enclosures must be complied with during installation. The number of additional enclosures can vary according to the chosen configuration.

Options	a	a1	a2	a3	a4
With or without common options or options dependent on the drive rating	816 mm/32.1 in.	–	–	–	816 mm/32.1 in.
Cable entry via the top option	808 mm/31.8 in.	–	408 mm/16 in.	–	1220 mm/48 in.
Braking unit option	808 mm/31.8 in.	–	408 mm/16 in.	–	1220 mm/48 in.
Braking unit + cable entry via the top options	808 mm/31.8 in.	408 mm/16 in.	400 mm/15.7 in.	–	1624 mm/63.9 in.
(3) Except sinus filter option, which requires an additional enclosure. The sinus filter option is not compatible with the cable entry via the top option. (4) The cable entry via the top option is not compatible with the sinus filter option.					

Floor-Standing Enclosure Compact Version

Wiring Diagram



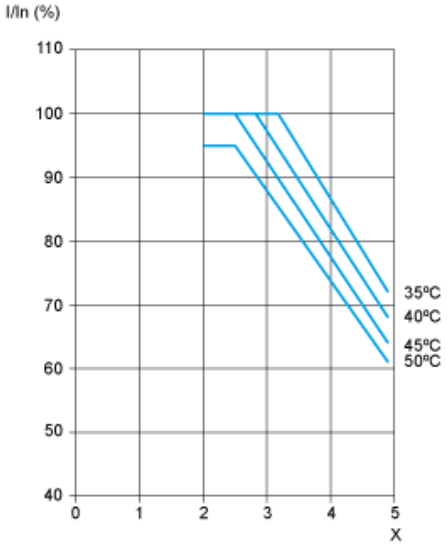
A1 Drive
A2 Enclosure
F1 Fast-acting semi-conductor fuse
IL1 Line choke
Q1 Switch
(1) Fault relay contacts. For remote signalling of drive status.

Floor-Standing Enclosure Compact Version

Derating Curves

The derating curves for the drive nominal current (In) are dependent on the temperature and switching frequency. For intermediate temperatures, interpolate between 2 curves.

NOTE: The drive will reduce the switching frequency automatically in the event of excessive temperature rise.



X Switching frequency (kHz)

NOTE: The temperatures shown correspond to the temperature of the air entering the enclosure.