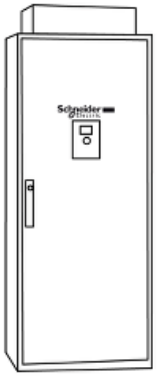
Product data sheet
Characteristics

ATV71EXA5M15Y
enclosed variable speed drive ATV71 Plus - 1500 kW - 690V - IP54

ATV cabinets



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 with separate air flows With integrated cooling circuit
Product composition	A switch and fast-acting fuses An IP65 remote mounting kit for graphic display terminal A wired ready-assembled Sarel Spacial 6000 enclosure Terminals/bars for motor connection Control transformer for 230 V Integrated drive system ATV71EM15YE1
EMC filter	Integrated
Network number of phases	3 phases
Rated supply voltage	690 V (+/- 10 %)
Supply voltage limits	621...759 V
Supply frequency	50...60 Hz (+/- 5 %)
Network frequency	47.5...63 Hz
Motor power kW	1500 kW 3 phases for 690 V
Line current	1514 A for 690 V / 1500 kW

Complementary

Apparent power	1809 kVA for 690 V / 1500 kW
Prospective line Isc	100 kA with external fuses
Continuous output current	1580 A at 2.5 kHz, 690 V / 1500 kW
Maximum transient current	2370 A for 60 s / 1500 kW
Speed drive output frequency	0.1...500 Hz
Nominal switching frequency	2.5 kHz
Switching frequency	2.5...4.9 kHz with derating factor 2...4.9 kHz adjustable
Speed range	1...100 asynchronous motor in open-loop mode, without speed feedback 1...50 synchronous motor in open-loop mode, without speed feedback

	1...1000 asynchronous motor in closed-loop mode with encoder feedback
Speed accuracy	+/- 0.01 % of nominal speed for 0.2 Tn to Tn torque variation, in closed-loop mode with encoder feedback +/- 10 % of nominal slip for 0.2 Tn to Tn torque variation, without speed feedback
Torque accuracy	+/- 15 % in open-loop mode, without speed feedback +/- 5 % in closed-loop mode with encoder feedback
Transient overtorque	170 % of nominal motor torque for 60 s 220 % of nominal motor torque for 2 s
Braking torque	<= 150 % with braking or hoist resistor 30 % without braking 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 - mounted in the front door
Output voltage	<= supply voltage
Isolation	Electrical between power and control
Type of cable for external connection	IEC cable - 40 °C, copper 70 °C / PVC UL 508 cable - 40 °C, copper 75 °C / PVC
Electrical connection	Terminal - 2.5 mm² / AWG 14 (R1A, R1B, R1C, R2A, R2B) bottom entry Screw clamp terminals - 1.5 mm² (AI1-/AI1+, AI2, AO1, LI1...LI6, PWR) bottom entry Bar M12 - 16 x 240 mm² (L1/R, L2/S, L3/T) bottom entry at 6-pulse operation Bar M12 - 8 x 240 mm² (L1/R, L2/S, L3/T) bottom entry at 12-pulse operation Bar M12 - 24 x 240 mm² (U/T1, V/T2, W/T3) bottom entry
Motor recommanded cable cross section	6 (3 x 240) mm² 7 (3 x 185) mm²
Short-circuit protection	2500 A fuse protection type gI - power supply upstream - at 6-pulse operation 1250 A fuse protection type gI - power supply upstream - at 12-pulse operation
Supply	External supply : 24 V DC (19...30 V) - 1 A Internal supply for reference potentiometer : 10 V DC (10...11 V) - <= 10 mA Internal supply : 24 V DC (21...27 V) - <= 100 mA
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 voltage : (AO1) 0...10 V DC - 470 Ohm - sampling time: 1.5...2.5 ms - resolution: 10 bits Software-configurable current : (AO1) 0...20 mA/4...20 mA - 500 Ohm - sampling time: 1.5...2.5 ms - resolution: 10 bits
Discrete output number	2
Discrete output type	Configurable relay logic : (R1A, R1B, R1C) NO/NC - 6.5...7.5 ms - 100000 cycles Configurable relay logic : (R2A, R2B) NO - 6.5...7.5 ms - 100000 cycles
Minimum switching current	3 mA at 24 V DC (configurable relay logic)
Maximum switching current	5 A at 250 V AC on resistive load - cos phi = 1 (R1, R2) 5 A at 30 V DC on resistive load - L/R = 0 ms (R1, R2) 2 A at 250 V AC on inductive load - cos phi = 0.4 (R1, R2) 2 A at 30 V DC on inductive load - L/R = 7 ms
Discrete input number	7

Discrete input type	Programmable (LI1...LI5) 24 V DC (<= 30 V) , with level 1 PLC - 3.5 kOhm - sampling time: 1.5...2.5 ms Switch-configurable (LI6) 24 V DC (<= 30 V) , with level 1 PLC - 1.5 kOhm - sampling time: 1.5...2.5 ms Safety input (PWR) 24 V DC (<= 30 V) - 1.5 kOhm
Discrete input logic	Positive logic (source) (PWR) , 0...2 V (state 0), 17...30 V (state 1) Positive logic (source) (LI1...LI5) , 0...5 V (state 0), 11...30 V (state 1) Negative logic (sink) (LI1...LI5) , 16...30 V (state 0), 0...10 V (state 1)
Acceleration and deceleration ramps	Linear adjustable separately from 0.01 to 9000 s S, U or customized
Braking to standstill	By DC injection
Protection type	Overheating protection for drive Thermal protection for drive Short-circuit between motor phases for drive Overcurrent between output phases and earth for drive Overvoltages on the DC bus for drive Break on the control circuit for drive Against exceeding limit speed for drive Line supply undervoltage for drive Line supply overvoltage for drive Against input phase loss for drive Thermal protection for motor Motor phase break for motor Input phase breaks for drive Power removal for motor
Dielectric strength	3535 V DC between earth and power terminals 5092 V DC between control 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
Connector type	1 RJ45 for Modbus on front face 1 RJ45 for Modbus on terminal Male SUB-D 9 on RJ45 for CANopen
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 4800 bps, 9600 bps, 19200 bps, 38.4 Kbps for Modbus on terminal 9600 bps, 19200 bps for Modbus on front face
Data format	8 bits, 1 stop, even parity for Modbus on front face 8 bits, odd even or no configurable parity for Modbus on terminal
Type of polarization	No impedance for Modbus
Number of addresses	1...247 addresses for Modbus 1...127 addresses for CANopen
Method of access	Slave for CANopen
Option card	Controller inside programmable card Communication card for Profibus DP Basic I/O extension card Extended I/O extension card Encoder interface cards Communication card for Fipio Communication card for Modbus/Uni-Telway Communication card for Modbus Plus Communication card for Ethernet/IP Communication card for DeviceNet Communication card for Profibus DP V1 Communication card for Interbus-S Communication card for CC-Link Communication card for Modbus TCP/IP
Options for enclosure configuration	Safe standstill for power circuit PTC relay for power circuit Pt100 relay for power circuit Insulation monitoring for power circuit Design for IT networks for power circuit External 230 V supply terminals for power circuit Buffer voltage 24 V DC power supply for power circuit Enclosure lighting for power circuit

	Key switch (local/remote) for power circuit Motor heating for power circuit External motor fan for power circuit Voltmeter for power circuit Door handle for main switch for power circuit Line contactor for power circuit 12-pulse supply for power circuit Ammeter for power circuit Enclosure heating for power circuit Motor choke for power circuit Cable entry via the top for power circuit Enclosure plinth for power circuit Relay output C/O for control circuit External 24 V DC supply terminals for power circuit Circuit breaker for power circuit Control terminals for control circuit Adaptor for 115 V logic inputs for control circuit Isolated amplifier for control circuit Line reactor for power circuit Door handle for circuit breaker for power circuit
Operating position	Vertical +/- 10 degree
Colour of enclosure	Light grey RAL 7035
Colour of base of enclosure	Dark grey RAL 7022
Height	2009 mm
Width	3400 mm
Depth	642 mm
Product weight	1925 kg

Environment

Electromagnetic compatibility	1.2/50 µs - 8/20 µs surge immunity test level 3 conforming to IEC 61000-4-5 Electrical fast transient/burst immunity test level 4 conforming to IEC 61000-4-4 Electrostatic discharge immunity test level 3 conforming to IEC 61000-4-2 Radiated radio-frequency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3 Voltage dips and interruptions immunity test conforming to IEC 61000-4-11 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-6
Pollution degree	3 conforming to EN/IEC 61800-5-1
IP degree of protection	IP54
Vibration resistance	3M3 conforming to EN/IEC 60721-3-3 1.5 mm peak to peak (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 conforming to EN/IEC 60721-3-3 4 gn for 11 ms conforming to EN/IEC 60068-2-27
Noise level	79 dB conforming to 86/188/EEC
Environmental characteristic	3C2 without condensation conforming to IEC 60721-3-3 3K3 without condensation conforming to IEC 60721-3-3 3S2 without condensation conforming to IEC 60721-3-3
Relative humidity	0...95 %
Ambient air temperature for operation	0...40 °C without derating 40...50 °C with current derating of 1.2 % per °C
Ambient air temperature for storage	-25...70 °C
Volume of cooling air	11000 m3/h
Operating altitude	<= 1000 m without derating 1000...3000 m with current derating 1 % per 100 m
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

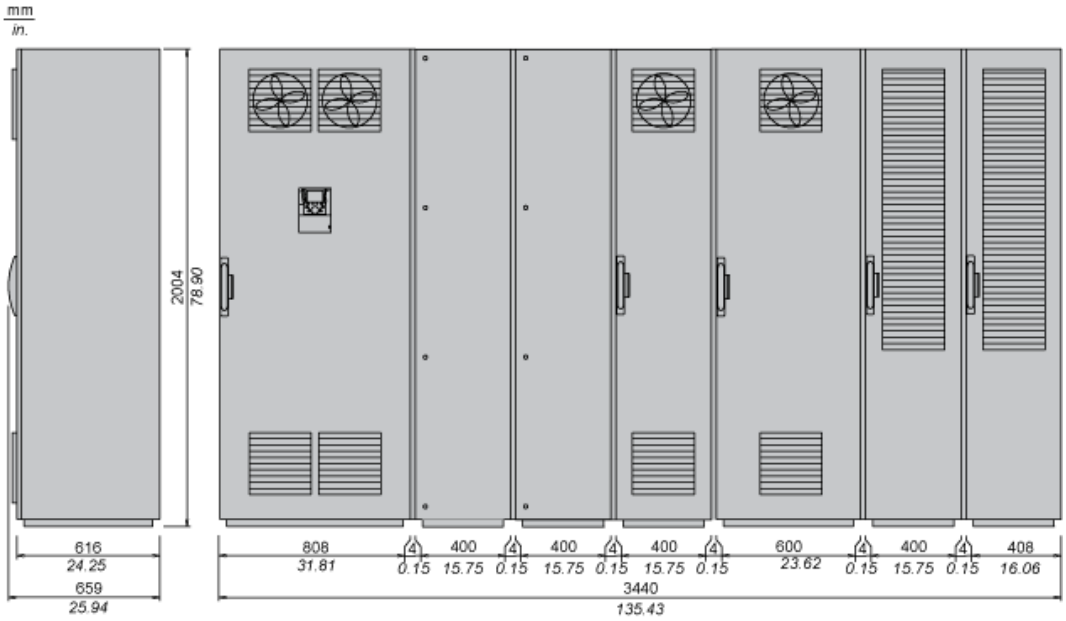
Contractual warranty

Warranty period	18 months

ATV71EXA5M15Y

IP 23 Floor-Standing Enclosure with Separate Air Flows

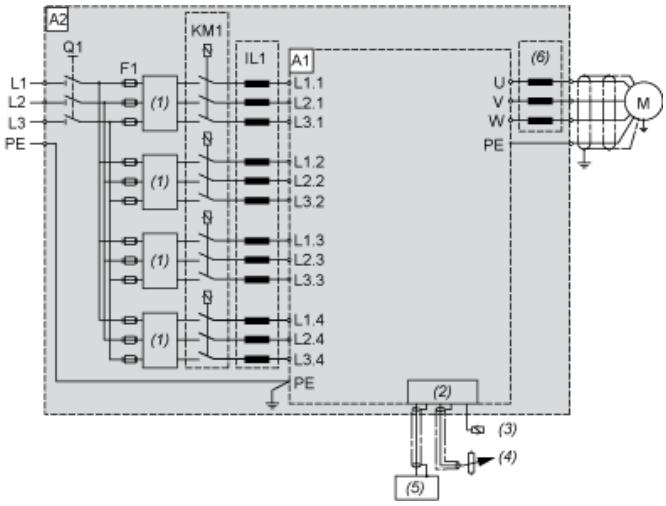
Dimensions



NOTE: For each floor-standing enclosure added, allow a 4 mm/0.15 in. space for the seal.

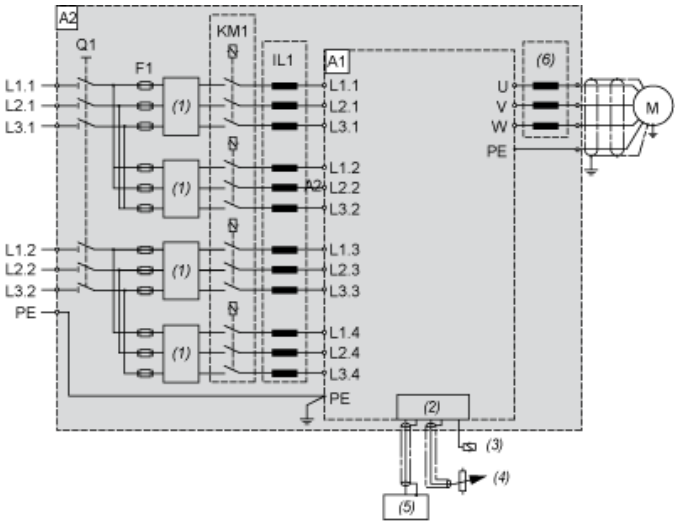
Floor-Standing Enclosure with Separate Air Flows

Standard 6-pulse Design



A1	Drive
A2	Enclosure
F1	Fuses
IL1	Optional line choke
KM1	Optional line contactor
M	Motor
Q1	Switch
(1)	Filter
(2)	Control
(3)	Relay control
(4)	Reference potentiometer
(5)	PLC
(6)	Optional motor choke

Optional 12-pulse Design



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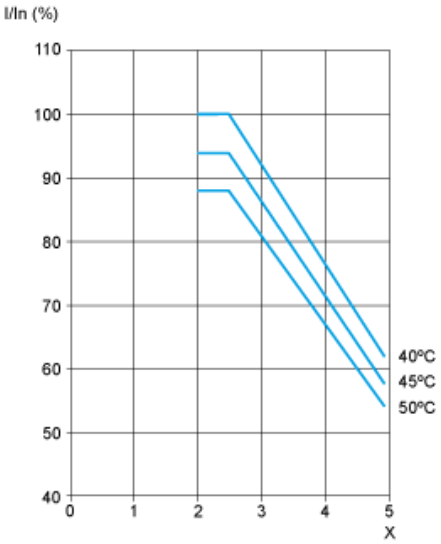
IP 23 Floor-Standing Enclosure with Separate Air Flows

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.