



Main

Range of product	Altivar Process ATV900
Product or component type	Variable speed drive
Device application	Industrial application
Device short name	ATV980
Provided equipment	Enclosure for Spacial SF Graphical operating panel in the enclosure door Frequency inverter Main switch Line choke Terminal block for main supply Terminal block for motor Dv/Dt filter choke
Colour of enclosure	Light grey RAL 7035
Asynchronous motor control profile	Constant torque standard Variable torque standard Optimized torque mode
Noise level	75 dB 86/188/EEC - physical agents (noise) directive
Type of polarization	No impedance for Modbus serial
Supply	External supply for digital inputs : 24 V DC (19...30 V) current $\leq$ 1.25 mA (overload and short-circuit protection) Internal supply for digital inputs and STO : 24 V DC (21...27 V) current $\leq$ 200 mA (overload and short-circuit protection) Internal supply for reference potentiometer (1 to 10 kOhm) : 10.5 V DC $\pm$ 0.5 current $\leq$ 10 mA (overload and short-circuit protection)

Complementary

Product destination	Asynchronous motors Synchronous motors
Assembly style	In floor-standing enclosure compact version
Cable entry	Bottom
Type of cooling	Forced convection
[Us] rated supply voltage	380...415 V (- 10...6 %)
Supply frequency	50/60 Hz (+/- 5 %)
Network number of phases	3 phases
Overvoltage category	III
Synchronous motor control profile	Permanent magnet motor
Output voltage	$\leq$ power supply voltage
Permissible temporary current boost	1.2 x In for 60 s (normal duty) 1.5 x In for 60 s (heavy duty)
Nominal switching frequency	2.5 kHz
Switching frequency	2...8 kHz adjustable with derating factor
Speed drive output frequency	0.1...500 Hz
Motor power kW	355 kW (normal duty) 280 kW (heavy duty)
Continuous output current	660 A at 2.5 kHz (normal duty) 520 A at 2.5 kHz (heavy duty)
Maximum transient current	792 A during 60 s per 10 min (normal duty) 780 A during 60 s per 10 min (heavy duty)
Line current	553 A Isc = 50 kA at 400 V (normal duty) 436 A Isc = 50 kA at 400 V (heavy duty)

Apparent power	383 kVA at 400 V (normal duty) 302 kVA at 400 V (heavy duty)
THDI	$\leq 5\%$ full load conforming to IEC 61000-3-12
Short circuit protection	Upstream : 800 A gG fuse (normal duty) Upstream : 630 A gG fuse (heavy duty) Internal : 315 A 3 aR fuse
Energy efficiency ratio	≥ 0.965
Power dissipation in W	13970 W total (normal duty) 10990 W total (heavy duty) 1570 W control part (normal duty) 1240 W control part (heavy duty)
Volume of cooling air	3480 m ³ /h for power 420 m ³ /h for control
Prospective line I _{sc}	50 kA for 100 ms
Electrical connection	Control : removable screw terminals 0.5...1.5 mm ² Main supply : M12 bar Motor : M12 bar
Motor recommended cable cross section	2 x (3 x 185 mm ²) (heavy duty) 3 x (3 x 120 mm ²) (heavy duty) 3 x (3 x 150 mm ²) (normal duty) 4 x (3 x 95 mm ²) (normal duty)
Main supply recommended cable cross section	4 x (3 x 150 mm ²) (normal duty) 3 x (3 x 150 mm ²) (heavy duty) 4 x (3 x 95 mm ²) (heavy duty)
Width	1600 mm
Height	2150 mm
Depth	664 mm
Product weight	1150 kg
Number of preset speeds	16 preset speeds
Communication port protocol	Modbus serial Modbus TCP Ethernet IP
Option module	Slot A : communication module for Profibus DP V1 Slot A : communication module for Profinet Slot A : communication module for DeviceNet Slot A : communication module for EtherCAT Slot A : communication module for CANopen daisy chain RJ45 Slot A : communication module for CANopen SUB-D 9 Slot A : communication module for CANopen screw terminals Slot A/slot B/slot C : digital and analog I/O extension module Slot A/slot B/slot C : output relay extension module Slot B : 5/12 V digital encoder interface module Slot B : analog encoder interface module Slot B : resolver encoder interface module
Safety function	STO (safe torque off) SIL 3 for ≤ 100 ms
Motor slip compensation	Adjustable Automatic whatever the load Can be suppressed Not available in permanent magnet motor law
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	Motor : thermal protection Motor : safe torque off Motor : motor phase break Drive : thermal protection Drive : safe torque off Drive : overheating Drive : overcurrent (between output phases and earth) Drive : overload (output) Drive : short-circuit protection Drive : motor phase break Drive : overvoltage (DC bus) Drive : line supply overvoltage Drive : line supply undervoltage Drive : line supply phase loss Drive : overspeed Drive : break on the control circuit Drive : short-circuit protection with semi-conductor fuse (main supply) Drive : fan monitoring

Frequency resolution	Display unit : 0.1 Hz Analog input : 0.012/50 Hz
Type of connector	2 RJ45 (on the control block) for Ethernet IP/Modbus TCP 1 RJ45 (on the control block) for Modbus serial
Physical interface	2-wire RS 485 for Modbus serial
Transmission frame	RTU for Modbus serial
Transmission rate	10/100 Mbit/s for Ethernet IP/Modbus TCP 4.8, 9.6, 19.2, 38.4 kbit/s for Modbus serial
Exchange mode	Half duplex, full duplex, autonegotiation for Ethernet IP/Modbus TCP
Data format	8 bits, configurable odd, even or no parity for Modbus serial
Number of addresses	1...247 for Modbus serial
Method of access	Slave for Modbus TCP
Local signalling	LCD display unit, located on front door for operation function, status and configuration
Analogue input number	3
Analogue input type	Software-configurable voltage AI1, AI2, AI3 : 0...10 V DC impedance 30 kOhm, resolution 12 bits Software-configurable current AI1, AI2, AI3 : 0...20 mA impedance 250 Ohm, resolution 12 bits
Discrete input number	10
Discrete input type	Programmable DI1...DI8 : 24 V DC (≤ 30 V) impedance 3.5 kOhm Programmable as pulse input DI7, DI8 0...30 kHz : 24 V DC (≤ 30 V) Safe torque off STOA, STOB : 24 V DC (≤ 30 V) impedance > 2.2 kOhm
Input compatibility	Discrete input DI1...DI8 : level 1 PLC conforming to EN/IEC 61131-2 Pulse input DI7, DI8 : level 1 PLC conforming to IEC 65A-68 Discrete input STOA, STOB : level 1 PLC conforming to EN/IEC 61131-2
Discrete input logic	DI1...DI8, positive logic (source) : < 5 V (state 0) > 11 V (state 1) DI1...DI8, negative logic (sink) : > 16 V (state 0) < 10 V (state 1) DI7, DI8, positive logic (source) : < 0.6 V (state 0) > 2.5 V (state 1) STOA, STOB, positive logic (source) : < 5 V (state 0) > 11 V (state 1)
Analogue output number	2
Analogue output type	Software-configurable voltage AQ1, AQ2 : 0...10 V DC impedance 470 Ohm, resolution 10 bits Software-configurable current AQ1, AQ2 : 0...20 mA impedance 500 Ohm, resolution 10 bits
Discrete output number	2
Discrete output type	Logic output DQ+ : 0...1 kHz (≤ 30 V) DC, < 100 mA Programmable as pulse output DQ+ : 0...30 kHz (≤ 30 V) DC, < 20 mA Logic output DQ- : 0...1 kHz (≤ 30 V) DC, < 100 mA
Sampling duration	Discrete input DI1...DI8 : 2 ms (+/- 0.5 ms) Pulse input DI7, DI8 : 5 ms (+/- 1 ms) Analog input AI1, AI2, AI3 : 1 ms (+/- 1 ms) Analog output AQ1, AQ2 : 5 ms (+/- 1 ms)
Accuracy	Analog input AI1, AI2, AI3 : +/- 0.6 % for a temperature variation 60 °C Analog output AQ1, AQ2 : +/- 1 % for a temperature variation 60 °C
Linearity error	Analog input AI1, AI2, AI3 : +/- 0.15 % of maximum value Analog output AQ1, AQ2 : +/- 0.2 %
Relay output number	3
Relay output type	Configurable relay logic R1 : fault relay NO/NC electrical durability 100000 cycles Configurable relay logic R2 : sequence relay NO electrical durability 1000000 cycles Configurable relay logic R3 : sequence relay NO electrical durability 1000000 cycles
Refresh time	5 ms +/- 0.5 ms R1, R2, R3 relay output
Minimum switching current	Relay output R1, R2, R3 : 5 mA at 24 V DC
Maximum switching current	Relay output R1 on resistive load ($\cos \phi = 1$) : 3 A at 250 V AC Relay output R1 on resistive load ($\cos \phi = 1$) : 3 A at 30 V DC Relay output R1 on inductive load ($\cos \phi = 0.4$ and $L/R = 7$ ms) : 2 A at 250 V AC Relay output R1 on inductive load ($\cos \phi = 0.4$ and $L/R = 7$ ms) : 2 A at 30 V DC Relay output R2, R3 on resistive load ($\cos \phi = 1$) : 5 A at 250 V AC Relay output R2, R3 on resistive load ($\cos \phi = 1$) : 5 A at 30 V DC Relay output R2, R3 on inductive load ($\cos \phi = 0.4$ and $L/R = 7$ ms) : 2 A at 250 V AC Relay output R2, R3 on inductive load ($\cos \phi = 0.4$ and $L/R = 7$ ms) : 2 A at 30 V DC
Isolation	Between power and control terminals

Insulation resistance	> 1 mOhm 500 V DC for 1 minute to earth
Operating position	Vertical +/- 10 degree
Marking	CE

Environment

IP degree of protection	IP23 conforming to IEC 61800-5-1
EMC filter	Integrated conforming to EN/IEC 61800-3 category C3 shielded cable with 150 m motor cable maxi Integrated conforming to EN/IEC 61800-3 category C4 unshielded cable with 250 m motor cable maxi
Electromagnetic compatibility	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 Electrical fast transient/burst immunity test level 4 conforming to IEC 61000-4-4 1.2/50 μ s - 8/20 μ s surge immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-6
Pollution degree	2 conforming to EN/IEC 61800-5-1
Vibration resistance	1.5 mm peak to peak (f = 3...10 Hz) conforming to IEC 60068-2-6 0.6 gn (f = 10...200 Hz) conforming to IEC 60068-2-6 3M3 conforming to IEC 60721-3-3
Shock resistance	4 gn during 11 ms conforming to IEC 60068-2-27 3M2 conforming to IEC 60721-3-3
Relative humidity	5...95 % without condensation conforming to IEC 60068-2-3
Ambient air temperature for operation	-10...0 °C without derating with option enclosure heating 0...40 °C without derating 40...50 °C with derating factor
Ambient air temperature for storage	-25...70 °C
Operating altitude	<= 1000 m without derating 1000...2000 m with current derating 1 % per 100 m 2000...3800 m with current derating 1 % per 100 m for TT earthing system 2000...3800 m with current derating 1 % per 100 m for TN earthing system 2000...3800 m with current derating 1 % per 100 m for IT earthing system 3800...4800 m with current derating 1 % per 100 m for TT earthing system 3800...4800 m with current derating 1 % per 100 m for TN earthing system
Environmental characteristic	Chemical pollution resistance class 3C3 conforming to EN/IEC 60721-3-3 Dust pollution resistance class 3S3 conforming to EN/IEC 60721-3-3 Humidity resistant class 3K3 conforming to EN/IEC 60721-3-3
Standards	EN/IEC 60204-1 EN/IEC 61800-3 EN/IEC 61800-5-1 EN/IEC 61800-2
Product certifications	ATEX C-Tick EAC