# Product data sheet
## Characteristics

# ATV950D22N4U
Variable speed drive, Altivar Process ATV900, ATV950, 22kW/30 hp, 380...480 V, IP55/UL type 12

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## Main

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|---|---|
| Range of Product | Altivar Process ATV900 |
| Device Application | Industrial Application |
| Product or Component Type | Variable speed drive |
| Product destination | Asynchronous motors<br>Synchronous motors |
| Product Specific Application | Process for industrial |
| Variant | With braking chopper<br>Standard version |
| Phase | 3 phase |
| Mounting Mode | Wall mount |
| Communication Port Protocol | Modbus TCP<br>Modbus serial<br>EtherNet/IP |
| [Us] rated supply voltage | 380...480 V - 15...10 % |
| Motor power kW | 22.0 KW normal duty<br>18.5 kW heavy duty |
| Maximum Horse Power Rating | 30.0 Hp normal duty<br>25.0 hp heavy duty |
| Continuous output current | 46.3 A 4 kHz normal duty<br>39.2 A 4 kHz heavy duty |
| EMC filter | Integrated<br>With EMC plate option |
| IP degree of protection | IP55 |
| Degree of protection | UL type 12 |
| Option module | Slot A communication module Profibus DP V1<br>Slot A communication module PROFINET<br>Slot A communication module DeviceNet<br>Slot A communication module EtherCAT<br>Slot A communication module CANopen daisy chain RJ45<br>Slot A communication module CANopen SUB-D 9<br>Slot A communication module CANopen screw terminals<br>Slot A/slot B/slot C digital and analog I/O extension module<br>Slot A/slot B/slot C output relay extension module<br>Slot B 5/12 V digital encoder interface module<br>Slot B analog encoder interface module<br>Slot B resolver encoder interface module<br>Communication module Ethernet Powerlink |
| Discrete input logic | 16 preset speeds |
| Asynchronous motor control profile | Optimized torque mode<br>Constant torque standard<br>Variable torque standard |
| Synchronous motor control profile | Permanent magnet motor<br>Synchronous reluctance motor |
| Maximum output frequency | 599 Hz |
| Switching frequency | 2...16 kHz adjustable<br>4...16 kHz with derating factor |
| Nominal switching frequency | 4 kHz |
| Line current | 39.6 A 380 V normal duty)<br>34.1 A 380 V heavy duty)<br>34.4 A 480 V normal duty)<br>29.9 A 480 V heavy duty) |
| Apparent power | 28.6 KVA 480 V normal duty)<br>24.9 kVA 480 V heavy duty) |
| Maximum transient current | 55.6 A 60 s normal duty)<br>58.8 A 60 s heavy duty) |

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| Network Frequency | 50-60 Hz |
| Prospective line Isc | 50 kA |

## Complementary

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| Discrete input number | 10 |
| Discrete input type | DI1...DI8 programmable, 24 V DC <= 30 V)3.5 kOhm<br>DI7, DI8 programmable as pulse input 0…30 kHz, 24 V DC <= 30 V)<br>STOA, STOB safe torque off, 24 V DC <= 30 V)> 2.2 kOhm |
| Discrete output number | 2 |
| Discrete output type | Logic output DQ+ 0…1 kHz <= 30 V DC 100 mA<br>Programmable as pulse output DQ+ 0…30 kHz <= 30 V DC 20 mA<br>Logic output DQ- 0…1 kHz <= 30 V DC 100 mA |
| Analogue input number | 3 |
| Analogue input type | AI1, AI2, AI3 software-configurable voltage 0...10 V DC 30 kOhm 12 bits<br>AI1, AI2, AI3 software-configurable current 0...20 mA/4...20 mA 250 Ohm 12 bits |
| Analogue output number | 2 |
| Analogue output type | Software-configurable voltage AQ1, AQ2 0...10 V DC 470 Ohm 10 bits<br>Software-configurable current AQ1, AQ2 0...20 mA 500 Ohm 10 bits |
| Relay output number | 3 |
| Relay output type | Configurable relay logic R1 fault relay NO/NC 100000 cycles<br>Configurable relay logic R2 sequence relay NO 1000000 cycles<br>Configurable relay logic R3 sequence relay NO 1000000 cycles |
| Maximum switching current | Relay output R1 resistive, cos phi = 1 3 A 250 V AC<br>Relay output R1 resistive, cos phi = 1 3 A 30 V DC<br>Relay output R1 inductive, cos phi = 0.4 7 ms 2 A 250 V AC<br>Relay output R1 inductive, cos phi = 0.4 7 ms 2 A 30 V DC<br>Relay output R2, R3 resistive, cos phi = 1 5 A 250 V AC<br>Relay output R2, R3 resistive, cos phi = 1 5 A 30 V DC<br>Relay output R2, R3 inductive, cos phi = 0.4 7 ms 2 A 250 V AC<br>Relay output R2, R3 inductive, cos phi = 0.4 7 ms 2 A 30 V DC |
| Minimum switching current | Relay output R1, R2, R3 5 mA 24 V DC |
| Physical interface | Ethernet<br>2-wire RS 485 |
| Connector Type | 2 RJ45<br>1 RJ45 |
| Method of access | Slave Modbus TCP |
| Transmission Rate | 10, 100 Mbits<br>4.8 kbps<br>9600 bit/s<br>19200 bit/s |
| Transmission frame | RTU |
| Number of addresses | 1…247 |
| Data format | 8 bits, configurable odd, even or no parity |
| Type of polarization | No impedance |
| 4 quadrant operation possible | True |
| Acceleration and deceleration ramps | Linear adjustable separately from 0.01...9999 s |
| Motor slip compensation | Automatic whatever the load<br>Not available in permanent magnet motor law<br>Adjustable<br>Can be suppressed |
| Braking to standstill | By DC injection |
| Brake chopper integrated | True |
| Maximum Input Current per Phase | 39.6 A |
| Maximum output voltage | 480.0 V |
| Relative symmetric network frequency tolerance | 5 % |
| Base load current at high overload | 39.2 A |
| Base load current at low overload | 46.3 A |
| With safety function Safely Limited Speed (SLS) | True |
| With safety function Safe brake management (SBC/ SBT) | True |
| With safety function Safe Operating Stop (SOS) | False |
| With safety function Safe Position (SP) | False |
| With safety function Safe programmable logic | False |

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| With safety function Safe Speed Monitor (SSM) | False |
| With safety function Safe Stop 1 (SS1) | True |
| With sft fct Safe Stop 2 (SS2) | False |
| With safety function Safe torque off (STO) | True |
| With safety function Safely Limited Position (SLP) | False |
| With safety function Safe Direction (SDI) | False |
| Protection type | Thermal protection motor<br>Safe torque off motor<br>Motor phase break motor<br>Thermal protection drive<br>Safe torque off drive<br>Overheating drive<br>Overcurrent between output phases and earth drive<br>Overload of output voltage drive<br>Short-circuit protection drive<br>Motor phase break drive<br>Overvoltages on the DC bus drive<br>Line supply overvoltage drive<br>Line supply undervoltage drive<br>Line supply phase loss drive<br>Overspeed drive<br>Break on the control circuit drive |
| Quantity per Set | 1 |
| Width | 10.39 in (264 mm) |
| Height | 26.69 in (678 mm) |
| Depth | 11.77 in (299 mm) |
| Net Weight | 45.42 lb(US) (20.6 kg) |
| Electrical connection | Control screw terminal 0.5...1.5 mm² AWG 20...AWG 16<br>Line side screw terminal 10...16 mm² AWG 8...AWG 6<br>DC bus screw terminal 10...16 mm² AWG 8...AWG 6<br>Motor screw terminal 16 mm² AWG 6 |
| Transmission Rate | 10/100 Mbit/s Ethernet IP/Modbus TCP<br>4.8, 9.6, 19.2, 38.4 kbit/s Modbus serial |
| Exchange mode | Half duplex, full duplex, autonegotiation Ethernet IP/Modbus TCP |
| Data format | 8 bits, configurable odd, even or no parity Modbus serial |
| Type of polarization | No impedance Modbus serial |
| Number of addresses | 1…247 Modbus serial |
| Supply | External supply for digital inputs 24 V DC 19…30 V), <1.25 mA overload and short-circuit protection<br>Internal supply for reference potentiometer (1 to 10 kOhm) 10.5 V DC +/- 5 %, <10 mA overload and short-circuit protection<br>Internal supply for digital inputs and STO 24 V DC 21…27 V), <200 mA overload and short-circuit protection |
| Local signalling | Local diagnostic 3 LED mono/dual colour)<br>Embedded communication status 5 LED dual colour)<br>Communication module status 2 LED dual colour)<br>Presence of voltage 1 LED red) |
| Input compatibility | DI1...DI8 discrete input level 1 PLC EN/IEC 61131-2<br>DI7, DI8 pulse input level 1 PLC IEC 65A-68<br>STOA, STOB discrete input level 1 PLC EN/IEC 61131-2 |
| Discrete input logic | Positive logic (source) DI1...DI8), < 5 V, > 11 V<br>Negative logic (sink) DI1...DI8), > 16 V, < 10 V<br>Positive logic (source) DI7, DI8), < 0.6 V, > 2.5 V<br>Positive logic (source) STOA, STOB), < 5 V, > 11 V |
| Sampling duration | 2 Ms +/- 0.5 ms DI1...DI8) - discrete input<br>5 Ms +/- 1 ms DI7, DI8) - pulse input<br>1 Ms +/- 1 ms AI1, AI2, AI3) - analog input<br>5 ms +/- 1 ms AQ1, AQ2) - analog output |
| Accuracy | +/- 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input<br>+/- 1 % AQ1, AQ2 for a temperature variation 60 °C analog output |
| Linearity error | AI1, AI2, AI3 +/- 0.15 % of maximum value analog input<br>AQ1, AQ2 +/- 0.2 % analog output |
| Refresh time | Relay output R1, R2, R3)5 ms +/- 0.5 ms) |
| Isolation | Between power and control terminals |

## Environment

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| Operating altitude | <= 3280.84 ft (1000 m) without derating<br>1000...4800 m with current derating 1 % per 100 m |
| Operating position | Vertical +/- 10 degree |
| Product Certifications | Bureau Veritas<br>TÜV<br>CSA<br>ATEX INERIS<br>UL<br>DNV-GL<br>ABS |
| Marking | CE |
| Standards | UL 508C<br>EN/IEC 61800-3<br>EN/IEC 61800-5-1<br>IEC 61000-3-12<br>IEC 60721-3<br>IEC 61508<br>IEC 13849-1 |
| Maximum THDI | <48 % from 80...100 % of load IEC 61000-3-12 |
| Assembly style | Enclosed |
| Electromagnetic compatibility | Electrostatic discharge immunity test level 3 IEC 61000-4-2<br>Radiated radio-frequency electromagnetic field immunity test level 3 IEC 61000-4-3<br>Electrical fast transient/burst immunity test level 4 IEC 61000-4-4<br>1.2/50 µs - 8/20 µs surge immunity test level 3 IEC 61000-4-5<br>Conducted radio-frequency immunity test level 3 IEC 61000-4-6 |
| Environmental class (during operation) | Class 3C3 according to IEC 60721-3-3<br>Class 3S3 according to IEC 60721-3-3 |
| Maximum acceleration under shock impact (during operation) | 150 m/s² at 11 ms |
| Maximum acceleration under vibrational stress (during operation) | 10 m/s² at 13...200 Hz |
| Maximum deflection under vibratory load (during operation) | 1.5 mm at 2...13 Hz |
| Permitted relative humidity (during operation) | Class 3K5 according to EN 60721-3 |
| Overvoltage category | III |
| Regulation loop | Adjustable PID regulator |
| Insulation resistance | > 1 MOhm 500 V DC for 1 minute to earth |
| Noise level | 53.7 dB 86/188/EEC |
| Vibration resistance | 1.5 mm peak to peak 2…13 Hz)IEC 60068-2-6<br>1 gn 13…200 Hz)IEC 60068-2-6 |
| Shock resistance | 15 gn 11 ms IEC 60068-2-27 |
| Environmental characteristic | Chemical pollution resistance class 3C3 EN/IEC 60721-3-3<br>Dust pollution resistance class 3S3 EN/IEC 60721-3-3 |
| Relative humidity | 5…95 % without condensation IEC 60068-2-3 |
| Ambient air temperature for operation | 5…104 °F (-15…40 °C) without derating)<br>104…122 °F (40…50 °C) with derating factor) |
| Noise level | 53.7 dB |
| Pollution degree | 2 |
| Ambient air transport temperature | -40…158 °F (-40…70 °C) |
| Ambient Air Temperature for Storage | -40…158 °F (-40…70 °C) |

## Ordering and shipping details

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|---|---|
| Category | 22277-ATV930 FRAMES 3 & 4 |
| Discount Schedule | CP4E |
| GTIN | 3606481284310 |
| Returnability | No |

## Packing Units

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|---|---|
| Unit Type of Package 1 | PCE |
| Number of Units in Package 1 | 1 |
| Package 1 Height | 21.26 in (54 cm) |
| Package 1 Width | 15.43 in (39.2 cm) |
| Package 1 Length | 31.50 in (80 cm) |
| Package 1 Weight | 55.12 lb(US) (25 kg) |

## Offer Sustainability

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| Sustainable offer status | Green Premium product |
| California proposition 65 | WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov |
| REACh Regulation | REACh Declaration |
| EU RoHS Directive | Pro-active compliance (Product out of EU RoHS legal scope) EU RoHS Declaration |
| Mercury free | Yes |
| China RoHS Regulation | China RoHS Declaration |
| RoHS exemption information | Yes |
| Environmental Disclosure | Product Environmental Profile |
| Circularity Profile | End Of Life Information |
| WEEE | The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins. |
| Upgradeability | Upgraded components available |