Product data sheet
Characteristics

ATV930U22N4
variable speed drive, Altivar Process ATV900, ATV930, 2.2kW, 400 to 480V, with braking unit, IP21



Main

Range of product	Altivar Process ATV900
Product specific application	Process for industrial
Product or component type	Variable speed drive
Variant	Standard version With braking chopper
Device application	Industrial application
Product destination	Synchronous motors Asynchronous motors
Network number of phases	3 phases
Mounting mode	Wall mount
Continuous output current	5.6 A at 4 kHz for normal duty 4 A at 4 kHz for heavy duty
Communication port protocol	Modbus TCP EtherNet/IP Modbus serial
Option card	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 communication module for Ethernet Powerlink
[Us] rated supply voltage	380...480 V - 15...10 %
[Us] rated supply voltage	380...480 V
Relative symmetric mains voltage tolerance	10 %
Relative symmetric network frequency tolerance	5 %
Nominal output current	5.6 A
Motor power kW	2.2 KW for normal duty 1.5 KW for heavy duty
EMC filter	Integrated With EMC plate option
IP degree of protection	IP21
Degree of protection	UL type 1

Complementary

Electrical connection	Control: screw terminal 0.5...1.5 mm²/20 AWG...16 AWG Line side: screw terminal 2.5...6 mm²/14 AWG...10 AWG Motor: screw terminal 2.5...6 mm²/14 AWG...10 AWG DC bus: screw terminal 2.5...6 mm²/14 AWG...10 AWG
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 Ethernet IP/Modbus TCP
Data format	8 bits, configurable odd, even or no parity for Modbus serial
Type of polarization	No impedance for Modbus serial
Number of addresses	1…247 for Modbus serial
Supply	External supply for digital inputs: 24 V DC (19…30 V), <1.25 mA, protection type: overload and sho Internal supply for reference potentiometer (1 to 10 kOhm): 10.5 V DC +/- 5 %, <10 mA, protection Internal supply for digital inputs and STO: 24 V DC (21…27 V), <200 mA, protection type: overloa
Local signalling	Local diagnostic: 3 LED (mono/dual colour) Embedded communication status: 5 LED (dual colour) Communication module status: 2 LED (dual colour) Presence of voltage: 1 LED (red)
Input compatibility	DI1...DI8: discrete input level 1 PLC conforming to IEC 61131-2 DI7, DI8: pulse input level 1 PLC conforming to IEC 65A-68 STOA, STOB: discrete input level 1 PLC conforming to IEC 61131-2
Discrete input logic	Positive logic (source) (DI1...DI8), < 5 V (state 0), > 11 V (state 1) Negative logic (sink) (DI1...DI8), > 16 V (state 0), < 10 V (state 1) Positive logic (source) (DI7, DI8), < 0.6 V (state 0), > 2.5 V (state 1) Positive logic (source) (STOA, STOB), < 5 V (state 0), > 11 V (state 1)
Sampling duration	2 Ms +/- 0.5 ms (DI1...DI8) - discrete input 5 Ms +/- 1 ms (DI7, DI8) - pulse input 1 Ms +/- 1 ms (AI1, AI2, AI3) - analog input 5 Ms +/- 1 ms (AQ1, AQ2) - analog output
Accuracy	+/- 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input +/- 1 % AQ1, AQ2 for a temperature variation 60 °C analog output
Linearity error	AI1, AI2, AI3: +/- 0.15 % of maximum value for analog input AQ1, AQ2: +/- 0.2 % for analog output
Refresh time	Relay output (R1, R2, R3): 5 ms (+/- 0.5 ms)
Isolation	Between power and control terminals
Discrete input number	10
Discrete input type	DI1...DI8 programmable, 24 V DC (<= 30 V), impedance: 3.5 kOhm DI7, DI8 programmable as pulse input: 0…30 kHz, 24 V DC (<= 30 V) STOA, STOB safe torque off, 24 V DC (<= 30 V), impedance: > 2.2 kOhm
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
Analogue input number	3
Analogue input type	AI1, AI2, AI3 software-configurable voltage: 0...10 V DC, impedance: 30 kOhm, resolution 12 bits AI1, AI2, AI3 software-configurable current: 0...20 mA/4...20 mA, impedance: 250 Ohm, resolution
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
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
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
Minimum switching current	Relay output R1, R2, R3: 5 mA at 24 V DC
Discrete input logic	16 preset speeds
Physical interface	Ethernet 2-wire RS 485

Connector type	2 RJ45 1 RJ45
Method of access	Slave Modbus TCP
Transmission rate	10, 100 Mbits 4.8 kbps 9600 bit/s 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
Asynchronous motor control profile	Constant torque standard Optimized torque mode Variable torque standard
Synchronous motor control profile	Permanent magnet motor Synchronous reluctance motor
Maximum output frequency	599 Hz
Acceleration and deceleration ramps	Linear adjustable separately from 0.01...9999 s
Motor slip compensation	Can be suppressed Not available in permanent magnet motor law Adjustable Automatic whatever the load
Switching frequency	2...16 kHz adjustable 4...16 kHz with derating factor
Nominal switching frequency	4 kHz
Braking to standstill	By DC injection
Brake chopper integrated	True
Line current	4.3 A at 380 V (normal duty) 3.1 A at 380 V (heavy duty) 3.8 A at 480 V (normal duty) 2.9 A at 480 V (heavy duty)
Maximum input current	4.3 A
Maximum output voltage	480.0 V
Apparent power	3.2 KVA at 480 V (normal duty) 2.4 KVA at 480 V (heavy duty)
Maximum transient current	6.7 A during 60 s (normal duty) 6 A during 60 s (heavy duty)
Network frequency	50...60 Hz
Prospective line Isc	50 KA
Base load current at high overload	4.0 A
Base load current at low overload	5.6 A
Power dissipation in W	Natural convection: 30 W at 380 V, switching frequency 4 kHz Forced convection: 60 W at 380 V, switching frequency 4 kHz
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
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 Safe torque off: motor Motor phase break: motor Thermal protection: drive Safe torque off: drive Overheating: drive Overcurrent between output phases and earth: drive Overload of output voltage: drive Short-circuit protection: drive Motor phase break: drive Overvoltages on the DC bus: drive Line supply overvoltage: drive Line supply undervoltage: drive Line supply phase loss: drive Overspeed: drive Break on the control circuit: drive
Quantity per set	1
Width	144 Mm
Height	350 Mm
Depth	206 Mm
Net weight	4.5 Kg

Environment

Insulation resistance	> 1 MOhm 500 V DC for 1 minute to earth
Noise level	54.5 DB conforming to 86/188/EEC
Vibration resistance	1.5 mm peak to peak (f= 2…13 Hz) conforming to IEC 60068-2-6 1 gn (f= 13…200 Hz) conforming to IEC 60068-2-6
Shock resistance	15 gn for 11 ms conforming to IEC 60068-2-27
Environmental characteristic	Chemical pollution resistance class 3C3 conforming to IEC 60721-3-3 Dust pollution resistance class 3S3 conforming to IEC 60721-3-3
Relative humidity	5…95 % without condensation conforming to IEC 60068-2-3
Ambient air temperature for operation	-15…50 °C (without derating) 50…60 °C (with derating factor)
Operating altitude	<= 1000 m without derating 1000...4800 m with current derating 1 % per 100 m
Operating position	Vertical +/- 10 degree
Product certifications	CSA[RETURN]UL[RETURN]TÜV
Marking	CE
Standards	UL 508C IEC 61800-3 IEC 61800-5-1 IEC 61000-3-12 IEC 60721-3 IEC 61508 IEC 13849-1
Maximum THDI	<48 % full load conforming to IEC 61000-3-12
Assembly style	Enclosed
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 µs - 8/20 µs surge immunity test level 3 conforming to IEC 61000-4-5 Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-6
Environmental class (during operation)	Class 3C3 according to IEC 60721-3-3 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
Volume of cooling air	38 M3/H
Overvoltage category	III
Regulation loop	Adjustable PID regulator
Noise level	54.5 DB
Pollution degree	2
Ambient air transport temperature	-40…70 °C
Ambient air temperature for storage	-40…70 °C

Packing Units

Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Height	31.000 Cm
Package 1 Width	19.000 Cm
Package 1 Length	41.000 Cm
Package 1 Weight	6.016 Kg
Unit Type of Package 2	S06
Number of Units in Package 2	6
Package 2 Height	75.000 Cm
Package 2 Width	60.000 Cm
Package 2 Length	80.000 Cm
Package 2 Weight	49.120 Kg

Offer Sustainability

Recyclability potential, in %	77
Total lifecycle Carbon footprint	1 553 kg CO2 eq.
Carbon footprint of the manufacturing phase [A1 to A3]	80.19361670637913
Carbon footprint of the manufacturing phase [A1 to A3]	80 kg CO2 eq.
Carbon footprint of the distribution phase [A4]	1.0546097856882495
Carbon footprint of the distribution phase [A4]	1 kg CO2 eq.
Carbon footprint of the installation phase [A5]	3.289645525722328
Carbon footprint of the installation phase [A5]	3 kg CO2 eq.
Carbon footprint of the use phase [B2, B3, B4, B6]	1462.4293920850955
Carbon footprint of the use phase [B2, B3, B4, B6]	1 462 kg CO2 eq.
Mercury free	Yes
Sustainable packaging	Yes
Carbon footprint of the end-of-life phase [C1 to C4]	6.034589565971237
Carbon footprint of the end-of-life phase [C1 to C4]	6 kg CO2 eq.
Environmental Disclosure	Product Environmental Profile
Total lifecycle Carbon footprint	1553
Average percentage of recycled plastic content	3 %
Average percentage of ASI certified metals	100 %
Packaging made with recycled cardboard	Yes
Packaging without single use plastic	Yes
SCIP Number	4de62941-2f5a-4018-a63f-6ca03d378705
REACh Regulation	Reference contains Substances of Very High Concern above the threshold
EU RoHS Directive	Compliant By Exemption
California proposition 65	WARNING: This product can expose you to chemicals including: Lead and lead compounds, w
Product contributes to saved and avoided emissions	Yes
End of life manual availability	End Of Life Information
Removable battery	Yes
Take-back	No
WEEE Label	The product must be disposed on European Union markets following specific waste collection a

Contractual warranty

Warranty (in months)	18

Product Life Status : Commercialised