Product data sheet
Characteristics

ATV950C25N4F
Variable speed drive, Altivar Process ATV900, floor standing ATV950, 250 kW, 400/440 V, w/o braking unit, IP54

Main

Device application	Industrial application
Device short name	ATV950
Product destination	Asynchronous motors Synchronous motors
EMC filter	Integrated conforming to EN/IEC 61800-3 category C3
IP degree of protection	IP54 conforming to IEC 61800-5-1 IP54 conforming to IEC 60529
Type of cooling	Forced convection
Supply frequency	50...60 Hz +/- 5 %
Network number of phases	3 phases
Motor power kW	250 kW (normal duty) 200 kW (heavy duty)
Line current	432 A at 400 V (normal duty) 353 A at 400 V (heavy duty) 453 A at 380 V (normal duty) 369 A at 380 V (heavy duty)
Continuous output current	477 A at 2.5 kHz for normal duty 370 A at 2.5 kHz for heavy duty
Maximum transient current	572 A during 60 s (normal duty) 555 A during 60 s (heavy duty)
Speed drive output frequency	0.1…599 Hz
Safety function	STO (safe torque off) SIL 3
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 communication module for Ethernet Powerlink
Range of product	Altivar Process ATV900
Product or component type	Variable speed drive
Variant	With load break switch Without braking chopper
Mounting mode	Floor-standing
Communication port protocol	Modbus TCP Modbus serial EtherNet/IP
[Us] rated supply voltage	380...440 V - 15...10 %
IP degree of protection	IP54

Complementary

Output voltage	<= power supply voltage
Frequency resolution	Display unit: 0.1 Hz Analog input: 0.012/50 Hz
Electrical connection	Control: removable screw terminals 0.5...1.5 mm² Line side: M12 bar Motor: M12 bar
Motor recommanded cable cross section	2 x (3 x 150 mm²) (normal duty) 3 x (3 x 95 mm²) (normal duty) 2 x (3 x 120 mm²) (heavy duty) 3 x (3 x 120 mm²) (heavy duty)
Main supply recommanded cable cross section	2 x (3 x 185 mm²) (normal duty) 3 x (3 x 95 mm²) (normal duty) 2 x (3 x 120 mm²) (heavy duty) 3 x (3 x 70 mm²) (heavy duty)
Connector type	2 RJ45 for Ethernet IP/Modbus TCP on the control block 1 RJ45 for Modbus serial on the control block
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 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 short-circuit protection Internal supply for reference potentiometer (1 to 10 kOhm): 10.5 V DC +/- 5 %, <10 mA, protection type: overload and short-circuit protection Internal supply for digital inputs and STO: 24 V DC (21…27 V), <200 mA, protection type: overload and short-circuit protection
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 EN/IEC 61131-2 DI7, DI8: pulse input level 1 PLC conforming to IEC 65A-68 STOA, STOB: discrete input level 1 PLC conforming to EN/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
Variable speed drive application selection	Mixer Food and beverage processing Conveyor Food and beverage processing Shredder Food and beverage processing Process crane Hoisting Thruster Marine Winch Marine Press Material working (wood, ceramic, stone, pvc, metal) Extruder Material working (wood, ceramic, stone, pvc, metal) Other application Mining mineral and metal Drilling rig Oil and gas Progressive cavity pump Oil and gas Rod pump Oil and gas Swapping pump Oil and gas Compressor for regasification Oil and gas Separator Oil and gas Other application Oil and gas Separator Water and waste water
Power range	250…500 kW at 380…440 V 3 phases
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
Number of preset speeds	16 preset speeds
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 12 bits
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
Method of access	Slave Modbus TCP
Asynchronous motor control profile	Variable torque standard Optimized torque mode Constant torque standard
Synchronous motor control profile	Permanent magnet motor Synchronous reluctance motor
Acceleration and deceleration ramps	Linear adjustable separately from 0.01...9999 s
Motor slip compensation	Adjustable Automatic whatever the load Not available in permanent magnet motor law Can be suppressed
Switching frequency	2.5...8 kHz with derating factor 2...8 kHz adjustable

Nominal switching frequency	2.5 kHz
Braking to standstill	By DC injection
Apparent power	299 kVA at 400 V (normal duty) 244 kVA at 400 V (heavy duty)
Prospective line Isc	50 kA
Power dissipation in W	5750 W, switching frequency 2.5 kHz (normal duty) 4340 W, switching frequency 2.5 kHz (heavy duty)
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
Width	600 mm
Height	2350 mm
Depth	669 mm
Product weight	420 kg

Environment

Insulation resistance	> 1 MOhm 500 V DC for 1 minute to earth
Noise level	70 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 EN/IEC 60721-3-3 Dust pollution resistance class 3S3 conforming to EN/IEC 60721-3-3
Pollution degree	2 conforming to EN/IEC 61800-5-1
Relative humidity	5…95 % without condensation conforming to IEC 60068-2-3
Ambient air temperature for operation	-15…40 °C (without derating) 40…50 °C (with derating factor)
Standards	UL 508C EN/IEC 61800-3 Environment 2 category C3 EN/IEC 61800-3 EN/IEC 61800-5-1 IEC 61000-3-12 IEC 60721-3 IEC 61508 IEC 13849-1
Operating altitude	<= 1000 m without derating 1000...4800 m with current derating 1 % per 100 m
Operating position	Vertical +/- 10 degree
Product certifications	TÜV CSA
Marking	CE
Maximum THDI	<48 % full load conforming to IEC 61000-3-12
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
Volume of cooling air	1300 m3/h
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 Weight	500 kg
Package 1 Height	238.5 cm
Package 1 width	120 cm
Package 1 Length	110 cm

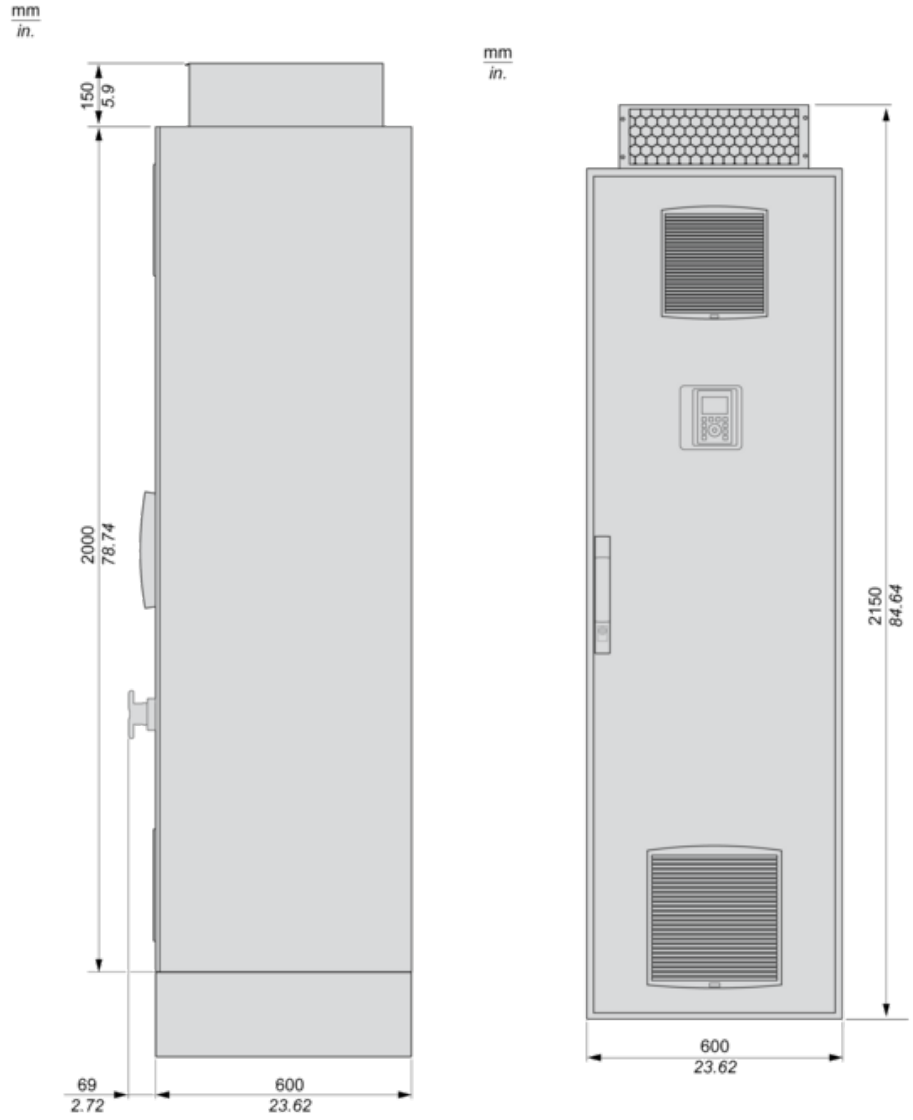
Offer Sustainability

Sustainable offer status	Green Premium product
REACh Regulation	REACh Declaration
EU RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope) EU RoHS Declaration
Mercury free	Yes
RoHS exemption information	Yes
China RoHS Regulation	China RoHS declaration
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
Take-back	Take-back program available

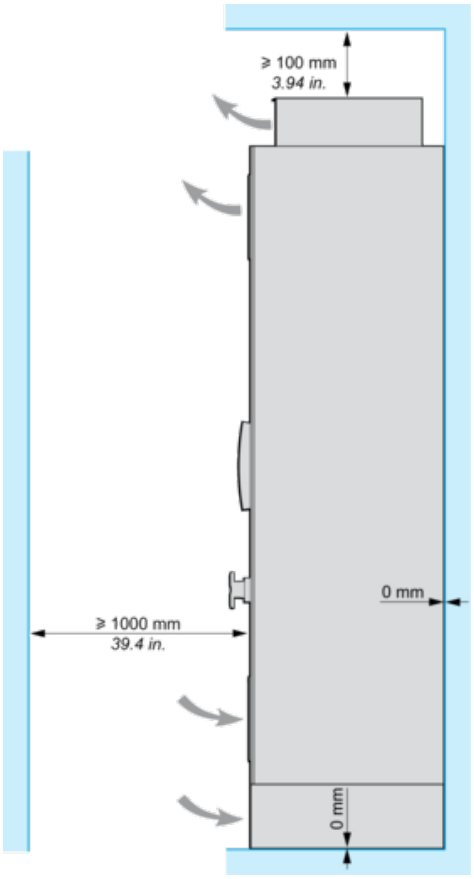
ATV950C25N4F

Dimensions

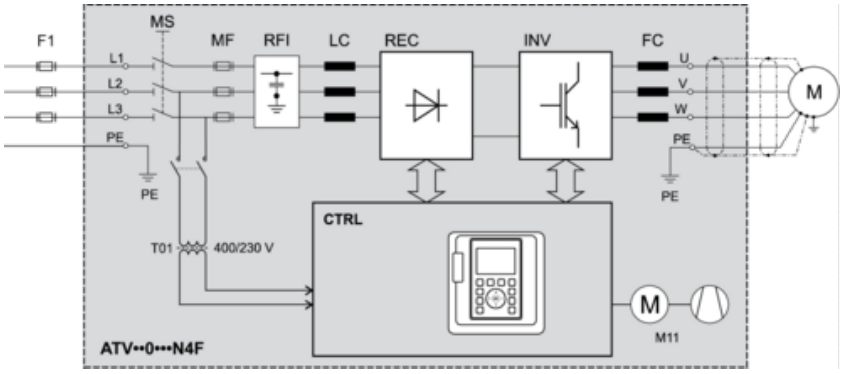
Right and Front View



Clearances

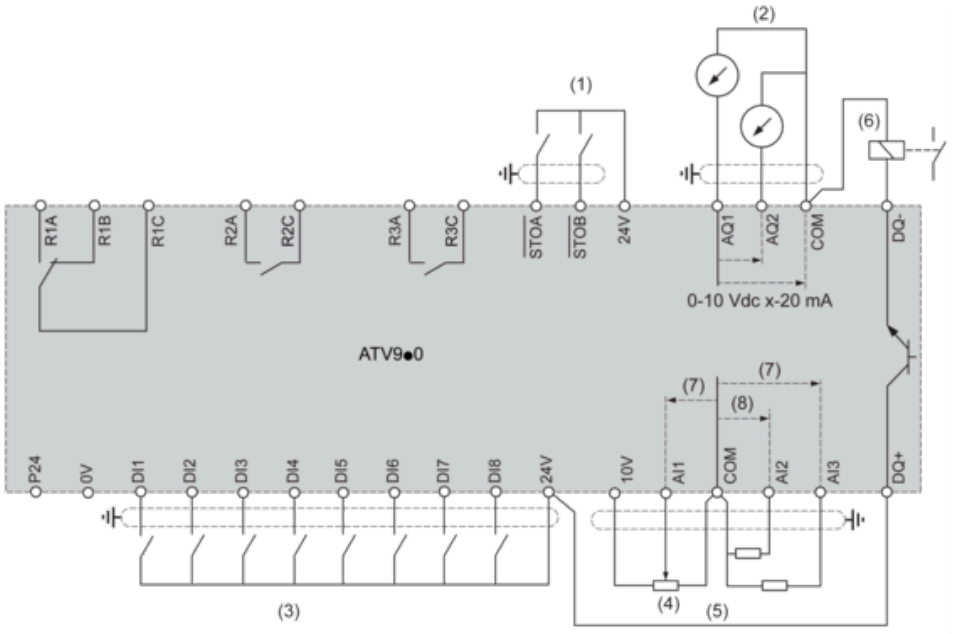


Floor Standing Drive Circuit Diagram



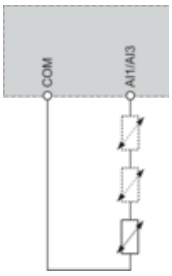
F1 External pre-fuse or circuit breaker
MS Built-in main switch (only available on IP54 drives)
T01 Control transformer 400 / 230 V AC
MF aR fuses
RFI Built-in RFI filter
LC Line reactor choke
REC Rectifier module
INV Inverter module
FC dv/dt filter (from 355 kW the dv/dt filter choke 150 m is built-in as standard)
CTRL Control panel
M11 Fan in enclosure door

Control Block Wiring Diagram



(1) Safe Torque Off
(2) Analog Output
(3) Digital Input
(4) Reference potentiometer
(5) Analog Input
(6) Digital Output
(7) 0-10 Vdc, x-20 mA
(8) 0-10 Vdc, -10 Vdc...+10 Vdc
R1A, R1B, R1C : Fault relay
R2A, R2C : Sequence relay
R3A, R3C : Sequence relay

Sensor Connection



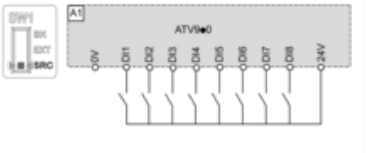
It is possible to connect either 1 or 3 sensors on terminals AI1 or AI3

Sink / Source Switch Configuration

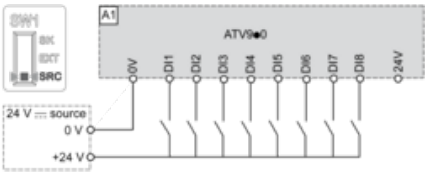
The switch is used to adapt the operation of the logic inputs to the technology of the programmable controller outputs.

- Set the switch to Source (factory setting) if using PLC outputs with PNP transistors.
- Set the switch to Ext if using PLC outputs with NPN transistors.

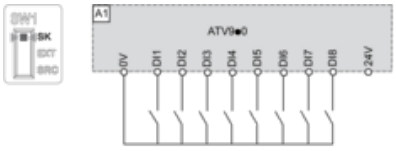
Switch Set to SRC (Source) Position Using the Output Power Supply for the Digital Inputs



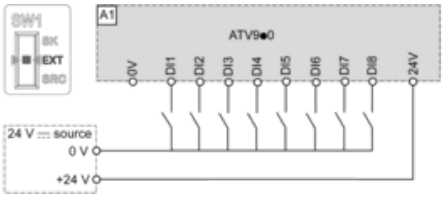
Switch Set to SRC (Source) Position and Use of an External Power Supply for the DIs



Switch Set to SK (Sink) Position Using the Output Power Supply for the Digital Inputs



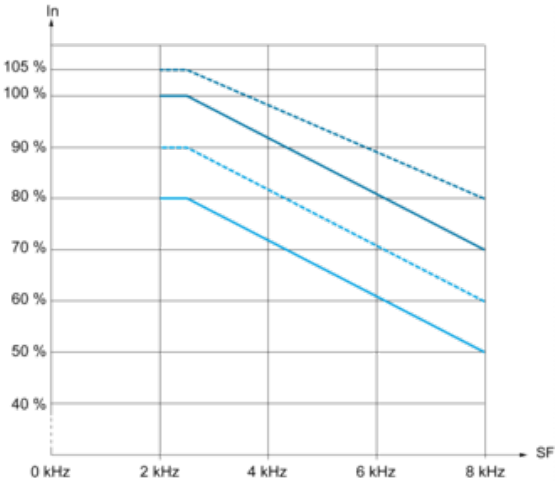
Switch Set to EXT Position Using an External Power Supply for the DIs



ATV950C25N4F

Derating Curves

Normal Duty



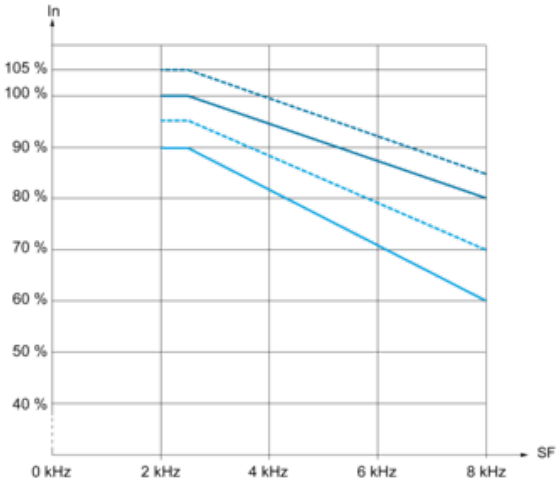
30 °C (86 °F)
40 °C (104 °F)
45 °C (122 °F)
50 °C (140 °F)C

In : Nominal Drive Current

SF : Switching Frequency

Derating Curves

Heavy Duty



30 °C (86 °F)
40 °C (104 °F)
45 °C (122 °F)
50 °C (140 °F)C

In : Nominal Drive Current

SF : Switching Frequency