

# Product data sheet

Specifications



## Variable speed drive, Altivar Solar, 4.0kW, 380 to 500V, 3 phases, compact

ATV320U40N4C412

**Product availability: Stock - Normally stocked in distribution facility**

### Main

|                              |                                              |
|------------------------------|----------------------------------------------|
| Range of Product             | Altivar Solar                                |
| Product or Component Type    | Variable speed drive                         |
| Product Specific Application | Pumping applications                         |
| Variant                      | Standard version                             |
| Format of the drive          | Compact                                      |
| Mounting Mode                | Wall mount                                   |
| Communication Port Protocol  | Modbus serial<br>CANopen                     |
| Option card                  | communication module, Ethernet IP/Modbus TCP |
| [Us] rated supply voltage    | 380...500 V - 15...10 %                      |
| Nominal output current       | 9.5 A                                        |
| Motor power kW               | 4.0 kW heavy duty                            |
| EMC filter                   | Class C2 EMC filter integrated               |
| IP degree of protection      | IP20                                         |

### Complementary

|                        |                                                                                                                                                                                                                    |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discrete input number  | 7                                                                                                                                                                                                                  |
| Discrete input type    | STO safe torque off, 24 V DC1.5 kOhm<br>DI1...DI6 logic inputs, 24 V DC 30 V)<br>DI5 programmable as pulse input 0...30 kHz, 24 V DC 30 V)                                                                         |
| Discrete input logic   | Positive logic (source)<br>Negative logic (sink)                                                                                                                                                                   |
| Discrete output number | 3                                                                                                                                                                                                                  |
| Discrete output type   | Open collector DQ+ 0...1 kHz 30 V DC 100 mA<br>Open collector DQ- 0...1 kHz 30 V DC 100 mA                                                                                                                         |
| Analogue input number  | 3                                                                                                                                                                                                                  |
| Analogue input type    | AI1 voltage 0...10 V DC 30 kOhm 10 bits<br>AI2 bipolar differential voltage +/- 10 V DC 30 kOhm 10 bits<br>AI3 current 0...20 mA (or 4-20 mA, x-20 mA, 20-x mA or other patterns by configuration) 250 Ohm 10 bits |
| Analogue output number | 1                                                                                                                                                                                                                  |
| Analogue output type   | Software-configurable current AQ1 0...20 mA 800 Ohm 10 bits<br>Software-configurable voltage AQ1 0...10 V DC 470 Ohm 10 bits                                                                                       |
| Relay output number    | 2                                                                                                                                                                                                                  |

Price is "List Price" and may be subject to a trade discount – check with your local distributor or retailer for actual price.

Disclaimer: This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications

|                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Relay output type</b>                              | Configurable relay logic R1A 1 NO 100000 cycles<br>Configurable relay logic R1B 1 NC 100000 cycles<br>Configurable relay logic R1C<br>Configurable relay logic R2A 1 NO 100000 cycles<br>Configurable relay logic R2C                                                                                                                                                                                                         |
| <b>Maximum switching current</b>                      | Relay output R1A, R1B, R1C resistive, cos phi = 1 3 A 250 V AC<br>Relay output R1A, R1B, R1C resistive, cos phi = 1 3 A 30 V DC<br>Relay output R1A, R1B, R1C, R2A, R2C inductive, cos phi = 0.4 7 ms 2 A 250 V AC<br>Relay output R1A, R1B, R1C, R2A, R2C inductive, cos phi = 0.4 7 ms 2 A 30 V DC<br>Relay output R2A, R2C resistive, cos phi = 1 5 A 250 V AC<br>Relay output R2A, R2C resistive, cos phi = 1 5 A 30 V DC |
| <b>Minimum switching current</b>                      | Relay output R1A, R1B, R1C, R2A, R2C 5 mA 24 V DC                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Method of access</b>                               | Slave CANopen                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Number of addresses</b>                            | 1...247<br>1...127                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Data format</b>                                    | 8 bits, configurable odd, even or no parity                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Type of polarization</b>                           | No impedance                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>4 quadrant operation possible</b>                  | True                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Asynchronous motor control profile</b>             | Voltage/frequency ratio, 5 points<br>Flux vector control without sensor, standard<br>Voltage/frequency ratio - Energy Saving, quadratic U/f<br>Flux vector control without sensor - Energy Saving<br>Voltage/frequency ratio, 2 points                                                                                                                                                                                        |
| <b>Synchronous motor control profile</b>              | Vector control without sensor                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Maximum output frequency</b>                       | 0.599 kHz                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Acceleration and deceleration ramps</b>            | Linear<br>U<br>S<br>CUS<br>Ramp switching<br>Acceleration/deceleration ramp adaptation<br>Acceleration/deceleration automatic stop with DC injection<br>Automatic adaptation of ramp if braking capacity exceeded, by using resistor<br>Linear adjustable separately from 0.01 to 6000 s                                                                                                                                      |
| <b>Motor slip compensation</b>                        | Automatic whatever the load<br>Adjustable 0...300 %<br>Not available in voltage/frequency ratio (2 or 5 points)                                                                                                                                                                                                                                                                                                               |
| <b>Switching frequency</b>                            | 2...16 kHz adjustable<br>4...16 kHz with derating factor                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Nominal switching frequency</b>                    | 4 kHz                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Braking to standstill</b>                          | By DC injection                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Brake chopper integrated</b>                       | True                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Line current</b>                                   | 13.7 A 380 V heavy duty)<br>10.6 A 500 V heavy duty)                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Maximum Input Current per Phase</b>                | 13.7 A                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Maximum output voltage</b>                         | 500 V                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Apparent power</b>                                 | 9.2 kVA 500 V heavy duty)                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Maximum transient current</b>                      | 14.3 A 60 s                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Short-circuit protection</b>                       | thermal protection                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Network Frequency</b>                              | 50-60 Hz                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Relative symmetric network frequency tolerance</b> | 5 %                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Prospective line Isc</b>                           | 5 kA                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Base load current at high overload</b>             | 9.5 A                                                                                                                                                                                                                                                                                                                                                                                                                         |

|                                                      |                                                                                                                                                                                       |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power dissipation in W                               | Fan 111 W 380 V 4 kHz                                                                                                                                                                 |
| Electrical connection                                | Screw terminal 0.5...1.5 mm² analog input<br>Screw terminal analog output<br>Screw terminal                                                                                           |
| With safety function Safely Limited Speed (SLS)      | True                                                                                                                                                                                  |
| With safety function Safe brake management (SBC/SBT) | False                                                                                                                                                                                 |
| 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                                      | Input phase breaks drive<br>Overcurrent between output phases and earth drive<br>Overheating protection drive<br>Short-circuit between motor phases drive<br>Thermal protection drive |
| Width                                                | 5.5 in (140 mm)                                                                                                                                                                       |
| Height                                               | 7.2 in (184.0 mm)                                                                                                                                                                     |
| Depth                                                | 6.2 in (158.0 mm)                                                                                                                                                                     |
| Net Weight                                           | 4.9 lb(US) (2.2 kg)                                                                                                                                                                   |
| Power factor                                         | 0.563 at 380 V                                                                                                                                                                        |
| Braking torque                                       | 170 % with braking resistor                                                                                                                                                           |
| Local signalling                                     | for drive fault 1 LED (red)<br>for CANopen error 1 LED (red)<br>for CANopen run 1 LED (green)                                                                                         |
| Transient overtorque                                 | 170...200 % of nominal motor torque                                                                                                                                                   |

## Environment

|                        |                         |
|------------------------|-------------------------|
| Operating position     | Vertical +/- 10 degree  |
| Product Certifications | CE<br>UR<br>UKCA<br>RCM |
| Marking                | CE<br>UR<br>UKCA<br>RCM |
| Standards              | IEC 61800-5-1           |
| Assembly style         | With heat sink          |

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electromagnetic compatibility                                    | Electrostatic discharge immunity test level 3 conforming to IEC 61000-4-2<br>Radiated radio-frequency electromagnetic field immunity test level 3 conforming to IEC 61000-4-3<br>Electrical fast transient/burst immunity test level 4 conforming to IEC 61000-4-4<br>1.2/50 $\mu$ s - 8/20 $\mu$ s surge immunity test level 3 conforming to IEC 61000-4-5<br>Conducted radio-frequency immunity test level 3 conforming to IEC 61000-4-6<br>Voltage dips and interruptions immunity test conforming to IEC 61000-4-11 |
| Environmental class (during operation)                           | Class 3C3 according to IEC 60721-3-3<br>Class 3S2 according to IEC 60721-3-3                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Maximum acceleration under shock impact (during operation)       | 150 m/s <sup>2</sup> at 11 ms                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Maximum acceleration under vibrational stress (during operation) | 10 m/s <sup>2</sup> 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                                            | 9959.5 Gal/hr(US) (37.7 m3/h)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Overvoltage category                                             | II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Regulation loop                                                  | Adjustable PID regulator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Speed accuracy                                                   | +/- 10 % of nominal slip 0.2 Tn to Tn                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Noise level                                                      | 52 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| pollution degree                                                 | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Ambient air transport temperature                                | -13...158 °F (-25...70 °C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Ambient air temperature for operation                            | 14...122 °F (-10...50 °C) without derating<br>122...140 °F (50...60 °C) with derating factor                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Ambient Air Temperature for Storage                              | -13...158 °F (-25...70 °C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Operating altitude                                               | 3280.84...6561.68 ft (1000...2000 m) with current derating 1 % per 100 m<br><= 3280.84 ft (1000 m) without derating                                                                                                                                                                                                                                                                                                                                                                                                     |

## Ordering and shipping details

|                   |               |
|-------------------|---------------|
| Category          | US1CP4B22152  |
| Discount Schedule | CP4B          |
| GTIN              | 3606486835920 |
| Returnability     | Yes           |
| Country of origin | US            |

## Packing Units

|                              |                         |
|------------------------------|-------------------------|
| Unit Type of Package 1       | PCE                     |
| Number of Units in Package 1 | 1                       |
| Package 1 Height             | 9.65 in (24.5 cm)       |
| Package 1 Width              | 7.52 in (19.1 cm)       |
| Package 1 Length             | 10.55 in (26.8 cm)      |
| Package 1 Weight             | 6.158 lb(US) (2.793 kg) |
| Unit Type of Package 2       | S06                     |
| Number of Units in Package 2 | 12                      |
| Package 2 Height             | 29.53 in (75 cm)        |
| Package 2 Width              | 23.62 in (60 cm)        |

|                  |                            |
|------------------|----------------------------|
| Package 2 Length | 31.50 in (80 cm)           |
| Package 2 Weight | 102.550 lb(US) (46.516 kg) |

Environmental Data

Schneider Electric aims to achieve Net Zero status by 2050 through supply chain partnerships, lower impact materials, and circularity via our ongoing “Use Better, Use Longer, Use Again” campaign to extend product lifetimes and recyclability.

[Environmental Data explained >](#)

[How we assess product sustainability >](#)

| Environmental footprint                        |                                               |
|------------------------------------------------|-----------------------------------------------|
| Carbon footprint (kg CO2 eq, Total Life cycle) | 2476                                          |
| Environmental Disclosure                       | <a href="#">Product Environmental Profile</a> |

Use Better

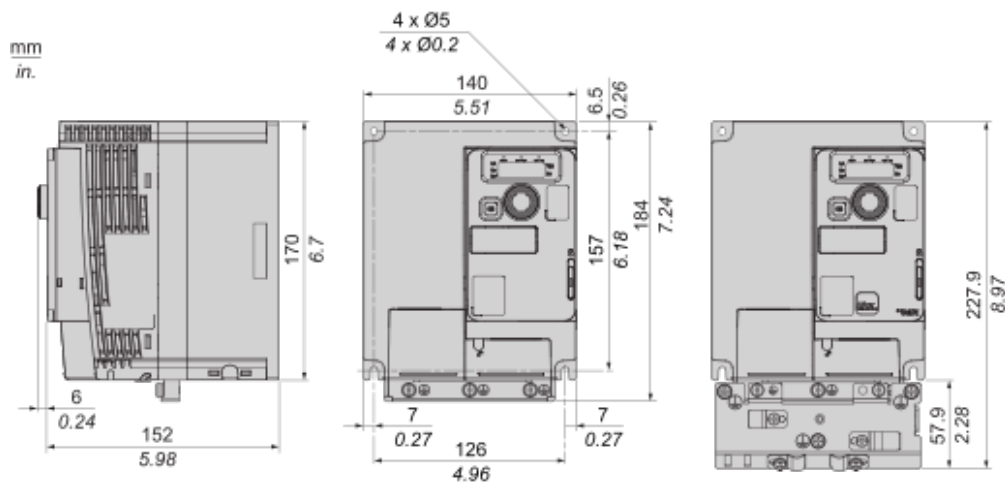
| Materials and Substances               |                                                                                                                                                                                                                                                                                             |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Packaging made with recycled cardboard | Yes                                                                                                                                                                                                                                                                                         |
| Packaging without single use plastic   | Yes                                                                                                                                                                                                                                                                                         |
| SCIP Number                            | 6bbbffbe-8a69-47e2-9c29-bc773d0b789b                                                                                                                                                                                                                                                        |
| 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 <a href="http://www.P65Warnings.ca.gov">www.P65Warnings.ca.gov</a> |

Use Again

| Repack and remanufacture |                                                                                                                                                                                                                  |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Circularity Profile      | <a href="#">End of Life Information</a>                                                                                                                                                                          |
| Take-back                | No                                                                                                                                                                                                               |
| WEEE                     |  The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins. |

Dimensions Drawings

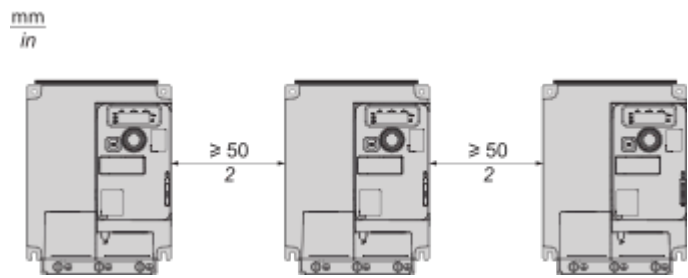
Dimensions



Mounting and Clearance

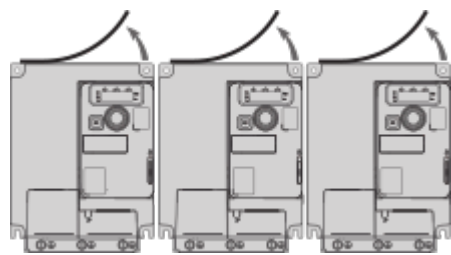
Mounting Types

Individual with Ventilation Cover



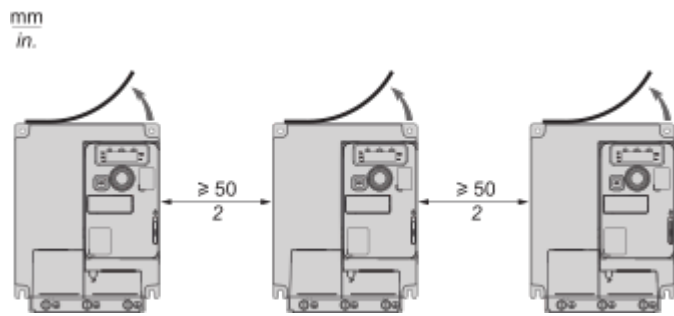
Free space  $\geq 50$  mm (2 in.) on each side, with vent cover fitted.  
Mounting type A is suitable for drive operation at surrounding air temperature less or equal to 50 °C (122 °F)

Side by Side, Ventilation Cover Removed



Drives mounted side-by-side, vent cover should be removed. The degree of protection becomes IP20.

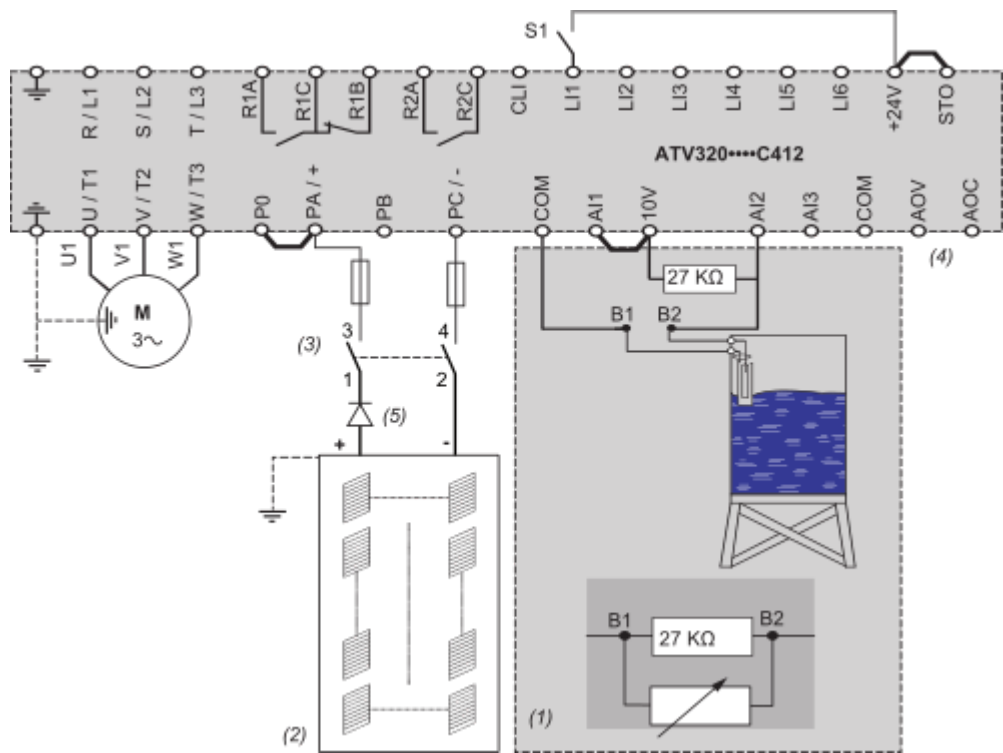
Individual, Ventilation Cover Removed



Free space  $\geq 50$  mm (2 in.) on each side. Vent cover should be removed for operation at surrounding air temperature above 50 °C (122 °F). The degree of protection becomes IP20.

Connections and Schema

Wiring



- (1) Tank water / liquid probe is optional.
- (2) The photovoltaic modules used shall comply with UL 1703. The solar panels and the drive input shall be in compliance with NEC article 690. For the photovoltaic installation ground connection, safety instructions and orientation, refer to the photovoltaic panel user manual.
- (3) Protection according to the concerned voltage, current and according to the photovoltaic arrays manual.
- (4) For AOC or AOV diagnostic values on ATV320 Solar drive.
- (5) On some applications, a blocking diode is mandatory.

**NOTE:** Check that the Logic Input switch is on Source position:



Performance Curves

Derating Curves

