

# Product data sheet

Specifications



variable speed drive, Altivar Process  
ATV600, ATV650, 5.5kW,  
400...480V, IP55

ATV650U55N4EU

**Product availability: Non-Stock - Not normally stocked in distribution facility**

## Main

|                                                |                                                                                                            |
|------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Range of Product                               | Altivar Process ATV600                                                                                     |
| Product Specific Application                   | Process and utilities                                                                                      |
| Product or Component Type                      | Variable speed drive                                                                                       |
| Variant                                        | With disconnect switch                                                                                     |
| Device short name                              | ATV650                                                                                                     |
| Mounting Mode                                  | Wall mount                                                                                                 |
| Communication Port Protocol                    | Ethernet<br>Modbus TCP<br>Ethernet                                                                         |
| [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                         | 12.7 A                                                                                                     |
| IP degree of protection                        | IP55                                                                                                       |
| Product destination                            | Asynchronous motors<br>Synchronous motors                                                                  |
| EMC filter                                     | Integrated 164.04 ft (50 m) IEC 61800-3 category C2<br>Integrated 492.1 ft (150 m) IEC 61800-3 category C3 |
| IP degree of protection                        | IP55IEC 60529<br>IP55IEC 61800-5-1                                                                         |
| Degree of protection                           | UL type 12 UL 508C                                                                                         |
| Type of cooling                                | Forced convection                                                                                          |
| Supply frequency                               | 50...60 Hz - 5...5 %                                                                                       |
| Motor power kW                                 | 4 kW heavy duty)<br>5.5 kW normal duty)                                                                    |
| Maximum Horse Power Rating                     | 5 hp heavy duty<br>7.5 hp normal duty                                                                      |
| Line current                                   | 9.1 A 480 V normal duty)<br>8 A 380 V heavy duty)<br>7.2 A 480 V heavy duty)<br>10.4 A 380 V normal duty)  |
| Continuous output current                      | 9.3 A 4 kHz heavy duty<br>12.7 A 4 kHz normal duty                                                         |
| Speed drive output frequency                   | 0.1...500 Hz                                                                                               |
| Safety function                                | STO (safe torque off) SIL 3                                                                                |

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

|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Option card | Slot A communication module, PROFINET<br>Slot A communication module, DeviceNet<br>Slot A communication module, Modbus TCP/EtherNet/IP<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 digital and analog I/O extension module<br>Slot A/slot B output relay extension module<br>Slot A communication module, Ethernet IP/Modbus TCP/MD-Link<br>communication module, BACnet MS/TP<br>communication module, Ethernet Powerlink<br>Slot A communication module, Profibus DP V1 |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Complementary

|                                     |                                                                                                                                                                                                                                                                       |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discrete input number               | 8                                                                                                                                                                                                                                                                     |
| Discrete input type                 | DI7, DI8 programmable as pulse input 0...30 kHz, 24 V DC <= 30 V)                                                                                                                                                                                                     |
| Discrete input logic                | 16 preset speeds                                                                                                                                                                                                                                                      |
| Discrete output number              | 0                                                                                                                                                                                                                                                                     |
| Discrete output type                | Relay outputs R1A, R1B, R1C 250 V AC 3000 mA<br>Relay outputs R1A, R1B, R1C 30 V DC 3000 mA<br>Relay outputs R2A, R2C 250 V AC 5000 mA<br>Relay outputs R2A, R2C 30 V DC 5000 mA<br>Relay outputs R3A, R3C 250 V AC 5000 mA<br>Relay outputs R3A, R3C 30 V DC 5000 mA |
| Analogue input number               | 3                                                                                                                                                                                                                                                                     |
| Analogue input type                 | AI1, AI2, AI3 software-configurable voltage 0...10 V DC 31.5 kOhm 12 bits<br>AI1, AI2, AI3 software-configurable current 0...20 mA 250 Ohm 12 bits<br>AI2 voltage analog input - 10...10 V DC 31.5 kOhm 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 10 bits<br>Software-configurable current DQ-, DQ+ 30 V DC<br>Software-configurable current DQ-, DQ+ 100 mA                                     |
| Relay output number                 | 3                                                                                                                                                                                                                                                                     |
| Relay output type                   | Configurable relay logic R2 sequence relay NO 100000 cycles<br>Configurable relay logic R3 sequence relay NO 100000 cycles<br>Configurable relay logic R1 fault relay NO/NC 100000 cycles                                                                             |
| Maximum switching current           | Relay output R1, R2, R3 resistive, cos phi = 1 3 A 30 V DC<br>Relay output R1, R2, R3 inductive, cos phi = 0.4 7 ms 2 A 250 V AC<br>Relay output R1, R2, R3 inductive, cos phi = 0.4 7 ms 2 A 30 V DC<br>Relay output R1, R2, R3 resistive, cos phi = 1 3 A 250 V AC  |
| Minimum switching current           | Relay output R1, R2, R3 5 mA 24 V DC                                                                                                                                                                                                                                  |
| Phase                               | 3 phase                                                                                                                                                                                                                                                               |
| Physical interface                  | Ethernet<br>2-wire RS 485                                                                                                                                                                                                                                             |
| Method of access                    | Slave Modbus TCP                                                                                                                                                                                                                                                      |
| Transmission Rate                   | 10, 100 Mbits<br>4800 bps, 9600 bps, 19200 bps, 38.4 Kbps                                                                                                                                                                                                             |
| Transmission frame                  | RTU                                                                                                                                                                                                                                                                   |
| Output voltage                      | <= power supply voltage                                                                                                                                                                                                                                               |
| Permissible temporary current boost | 1.5 x In 60 s heavy duty)<br>1.1 x In 60 s normal duty)                                                                                                                                                                                                               |
| Data format                         | 8 bits, configurable odd, even or no parity                                                                                                                                                                                                                           |
| Type of polarization                | No impedance                                                                                                                                                                                                                                                          |
| Frequency resolution                | Analog input 0.012/50 Hz<br>Display unit 0.1 Hz                                                                                                                                                                                                                       |

|                                            |                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Electrical connection</b>               | Line side screw terminal 4...6 mm <sup>2</sup><br>Motor screw terminal 4...6 mm <sup>2</sup><br>Control removable screw terminals 0.5...1.5 mm <sup>2</sup>                                                                                                                                                                                         |
| <b>Connector type</b>                      | RJ45 on the remote graphic terminal)Modbus serial<br>RJ45 on the remote graphic terminal)Ethernet/Modbus TCP                                                                                                                                                                                                                                        |
| <b>Exchange mode</b>                       | Half duplex, full duplex, autonegotiation Ethernet/Modbus TCP                                                                                                                                                                                                                                                                                       |
| <b>Number of addresses</b>                 | 1...247 Modbus serial                                                                                                                                                                                                                                                                                                                               |
| <b>Supply</b>                              | 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<br>External supply for digital inputs 24 V DC 19...30 V), <1.25 mA overload and short-circuit protection |
| <b>Local signalling</b>                    | 3 LEDs (dual colour) for embedded communication status<br>4 LEDs (dual colour) for communication module status<br>1 LED (red) for presence of voltage<br>3 LEDs for local diagnostic                                                                                                                                                                |
| <b>Input compatibility</b>                 | DI5, DI6 discrete input level 1 PLC IEC 65A-68<br>STOA, STOB discrete input level 1 PLC IEC 61131-2<br>DI1...DI6 discrete input level 1 PLC IEC 61131-2                                                                                                                                                                                             |
| <b>Discrete input logic</b>                | Positive logic (source) DI1...DI8), < 5 V, > 11 V<br>Negative logic (sink) DI1...DI8), > 16 V, < 10 V                                                                                                                                                                                                                                               |
| <b>Sampling duration</b>                   | 5 ms +/- 1 ms DI5, DI6) - discrete input<br>5 ms +/- 0.1 ms AI1, AI2, AI3) - analog input<br>10 ms +/- 1 ms AO1) - analog output<br>2 ms +/- 0.5 ms DI1...DI4) - discrete input                                                                                                                                                                     |
| <b>Accuracy</b>                            | +/- 1 % AO1, AO2 for a temperature variation 60 °C analog output<br>+/- 0.6 % AI1, AI2, AI3 for a temperature variation 60 °C analog input                                                                                                                                                                                                          |
| <b>Linearity error</b>                     | AO1, AO2 +/- 0.2 % analog output<br>AI1, AI2, AI3 +/- 0.15 % of maximum value analog input                                                                                                                                                                                                                                                          |
| <b>Refresh time</b>                        | Relay output R1, R2, R3)5 ms +/- 0.5 ms)                                                                                                                                                                                                                                                                                                            |
| <b>Isolation</b>                           | Between power and control terminals                                                                                                                                                                                                                                                                                                                 |
| <b>Enclosure mounting</b>                  | Wall mounted                                                                                                                                                                                                                                                                                                                                        |
| <b>4 quadrant operation possible</b>       | False                                                                                                                                                                                                                                                                                                                                               |
| <b>Asynchronous motor control profile</b>  | Constant torque standard<br>Optimized torque mode<br>Variable torque standard                                                                                                                                                                                                                                                                       |
| <b>Synchronous motor control profile</b>   | Synchronous reluctance motor<br>Permanent magnet motor                                                                                                                                                                                                                                                                                              |
| <b>Maximum output frequency</b>            | 500 kHz                                                                                                                                                                                                                                                                                                                                             |
| <b>Acceleration and deceleration ramps</b> | Linear adjustable separately from 0.01...9999 s                                                                                                                                                                                                                                                                                                     |
| <b>Motor slip compensation</b>             | Adjustable<br>Can be suppressed<br>Not available in permanent magnet motor law<br>Automatic whatever the load                                                                                                                                                                                                                                       |
| <b>Switching frequency</b>                 | 4...12 kHz with derating factor<br>2...12 kHz adjustable                                                                                                                                                                                                                                                                                            |
| <b>Nominal switching frequency</b>         | 4 kHz                                                                                                                                                                                                                                                                                                                                               |
| <b>Braking to standstill</b>               | By DC injection                                                                                                                                                                                                                                                                                                                                     |
| <b>Brake chopper integrated</b>            | False                                                                                                                                                                                                                                                                                                                                               |
| <b>Maximum Input Current per Phase</b>     | 10.4 A                                                                                                                                                                                                                                                                                                                                              |
| <b>Maximum output voltage</b>              | 480.0 V                                                                                                                                                                                                                                                                                                                                             |
| <b>Apparent power</b>                      | 6 kVA 480 V heavy duty)<br>7.6 kVA 480 V normal duty)                                                                                                                                                                                                                                                                                               |

|                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maximum transient current                            | 14 A 60 s heavy duty)<br>14 A 60 s normal duty)                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Network Frequency                                    | 50-60 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Prospective line Isc                                 | 50 kA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Base load current at high overload                   | 9.3 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Base load current at low overload                    | 12.7 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| With safety function Safely Limited Speed (SLS)      | False                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 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)               | False                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 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                                      | 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<br>Thermal protection motor |
| Quantity per Set                                     | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Width                                                | 10.4 in (264 mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Height                                               | 26.7 in (678 mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Depth                                                | 11.8 in (300 mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Product Weight                                       | 23.6 lb(US) (10.7 kg)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## Environment

|                       |                                                                                                                     |
|-----------------------|---------------------------------------------------------------------------------------------------------------------|
| Insulation resistance | > 1 MOhm 500 V DC for 1 minute to earth                                                                             |
| Noise level           | 52 dB 86/188/EEC                                                                                                    |
| Pollution degree      | 2 IEC 61800-5-1                                                                                                     |
| Vibration resistance  | 1 gn (f= 13...200 Hz) conforming to IEC 60068-2-6<br>1.5 mm peak to peak (f= 2...13 Hz) conforming to IEC 60068-2-6 |
| Shock resistance      | 15 gn 11 ms IEC 60068-2-27                                                                                          |
| Relative humidity     | 5...95 % without condensation IEC 60068-2-3                                                                         |

|                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ambient air temperature for operation                            | 104...122 °F (40...50 °C) (with derating factor)<br>5...104 °F (-15...40 °C) (without derating)                                                                                                                                                                                                                                                                                                                                  |
| Operating altitude                                               | 1000...4800 m with current derating 1 % per 100 m<br><= 3280.84 ft (1000 m) without derating                                                                                                                                                                                                                                                                                                                                     |
| Operating position                                               | Vertical +/- 10 degree                                                                                                                                                                                                                                                                                                                                                                                                           |
| Product Certifications                                           | ATEX INERIS<br>ATEX zone 2/22<br>UL<br>DNV-GL<br>CSA<br>TÜV<br>ABS                                                                                                                                                                                                                                                                                                                                                               |
| Marking                                                          | CE                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Standards                                                        | IEC 61800-3 environment 1 category C2<br>EN/IEC 61800-3 environment 2 category C3<br>IEC 61800-5-1<br>IEC 61000-3-12<br>IEC 60721-3<br>IEC 61508<br>IEC 13849-1<br>IEC 61800-3                                                                                                                                                                                                                                                   |
| Maximum THDI                                                     | <48 % full load IEC 61000-3-12                                                                                                                                                                                                                                                                                                                                                                                                   |
| Electromagnetic compatibility                                    | 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 µs - 8/20 µs 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>Electrostatic discharge immunity test level 3 conforming to IEC 61000-4-2 |
| 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                                                                                                                                                                                                                                                                                                                                                                                                         |
| Noise level                                                      | 52 dB                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Pollution degree                                                 | 3                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 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

|                   |               |
|-------------------|---------------|
| Category          | US1CP4E22205  |
| Discount Schedule | CP4E          |
| GTIN              | 3606480906893 |
| Returnability     | Yes           |
| Country of origin | CN            |

## Packing Units

|                        |     |
|------------------------|-----|
| Unit Type of Package 1 | PCE |
|------------------------|-----|

|                       |                       |
|-----------------------|-----------------------|
| Nbr. of units in pkg. | 1                     |
| Package 1 Height      | 21.3 in (54.0 cm)     |
| Package 1 Width       | 15.4 in (39.2 cm)     |
| Package 1 Length      | 31.5 in (80.0 cm)     |
| Package weight(Lbs)   | 46.3 lb(US) (21.0 kg) |

## Contractual warranty

|                      |    |
|----------------------|----|
| Warranty (in months) | 18 |
|----------------------|----|



## 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

|                                                        |                                               |
|--------------------------------------------------------|-----------------------------------------------|
| Total lifecycle Carbon footprint                       | 2 327 kg CO2 eq.                              |
| Carbon footprint of the manufacturing phase [A1 to A3] | 153 kg CO2 eq.                                |
| Carbon footprint of the distribution phase [A4]        | 3 kg CO2 eq.                                  |
| Carbon footprint of the installation phase [A5]        | 17 kg CO2 eq.                                 |
| Carbon footprint of the use phase [B2, B3, B4, B6]     | 2 135 kg CO2 eq.                              |
| Carbon footprint of the end-of-life phase [C1 to C4]   | 19 kg CO2 eq.                                 |
| Environmental Disclosure                               | <a href="#">Product Environmental Profile</a> |

## Use Better



### Materials and Substances

|                                        |                                                                                                                                                                                                                                                                                                    |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Packaging made with recycled cardboard | Yes                                                                                                                                                                                                                                                                                                |
| Packaging without single use plastic   | No                                                                                                                                                                                                                                                                                                 |
| SCIP Number                            | 787b365c-1873-4754-9a59-b7356bc1cf3b                                                                                                                                                                                                                                                               |
| EU RoHS Directive                      | <a href="#">Compliant By Exemption</a>                                                                                                                                                                                                                                                             |
| REACH Regulation                       | <a href="#">Reference contains Substances of Very High Concern above the threshold</a>                                                                                                                                                                                                             |
| California proposition 65              | <b>WARNING:</b> 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> |



### Energy efficiency

|                                                    |     |
|----------------------------------------------------|-----|
| Product contributes to saved and avoided emissions | Yes |
|----------------------------------------------------|-----|

## Use Longer



### Lifetime extension

|        |    |
|--------|----|
| Repair | No |
|--------|----|

## Use Again



### Repack and remanufacture

|                               |                                         |
|-------------------------------|-----------------------------------------|
| Recyclability potential, in % | 85                                      |
| Circularity Profile           | <a href="#">End of Life Information</a> |
| Removable battery             | Yes                                     |

Take-back

No

WEEE Label



The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins.