

Altivar Offer Selection Guide



10 VFD Selection Procedure

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Selection Procedure

- 1. Business Model
- 2. Voltage Power
- 3. Application Focus
- 4. Braking Requirements
- 5. Communication Protocols
- 6. Environmental Conditions
- 7. Installation Type
- 8. Harmonic Solutions
- 9. Motor Protection
- 10. Options and Accessories





Step 1: Identify the Business Model Type

Power Requirement

- Less than 90kW / 125HP:
 - Transactional Business Model
- Up to 315kW / 500HP:
 - Transactional or Project Business Model
- More than 315kW / 500HP:
 - Project Business Model and MV Drives

Support in the Selling Process

- Transactional Business Model:
 - SE sales channels including:
 - Distributors, PnB, SI, OEMs, and others.
- Project Business Model:
 - Global Drives Presales Team and the Local Country Technical and Commercial Team.
 - PAEs, SAEs, KAM, PM, and others.

Step 2: Voltage and Power Selection

	Voltage	HP	kW
Altivar 12	115	0.25 - 1	0.18 - 0.75
	208/230	0.25 - 5	0.18 - 4
Altivar 320 Compact	208/230	0.25 - 20	0.18 - 15
	480	0.5 - 5	0.37 - 4
	600	1 - 20	0.75 - 15
Altivar 320 Book	208/230	0.25 - 20	0.18 - 15
	480	0.5 - 20	0.37 - 15
Altivar 320 washable drives	208/230	0.25 - 3	0.18 - 2.2
	480	0.5 - 10	0.37 - 7.5
Altivar 340	480	1 - 100	0.75 - 75
Altivar 630	208/230	1 - 100	0.75 - 75
	480	1 - 900	0.75 - 800
	600	1 - 200*	0.75 - 150
	690	1 - 900*	0.75 - 800
Altivar 650	480	1 - 125	0.75 - 90
Altivar 930	208/230	1 - 100	0.75 - 75
	480	1 - 900	0.75 - 800
	600	1 - 200	0.75 - 150
	690	1 - 900	0.75 - 800
Altivar 950	480	1 - 125	0.75 - 90

* 600V & 690V 125 HP+ are enclosed Drives Nema 1 or w 12

Step 3: Application Focus

✓ Recommended ✓ Possible

Machinery Complexity			
Reference	Simple Machines	Advanced Machines	Complex Machines
ATV12	✓	✓	
ATV320	✓	✓	
ATV340	✓	✓	✓
ATV212	✓	✓	
ATV600	✓	✓	✓
ATV900	✓	✓	✓
ATV6000	✓	✓	
ATV6100	✓	✓	

- Simple machines are often stand-alone, semi-automated machines.
- Advanced machines are often equipped with a PLC in a cabinet or distributed architectures.
- Complex machines are typically integrated into fully automated production processes based on a PLC and fieldbus communication.

Targeted Use						
Reference	Water Pumps	Torque Control	High Cycling Machines	Hoisting and dragging loads	Medium Voltage	Solar Applications
ATV12	✓		✓			
ATV320	✓		✓	✓		
ATV340	✓	✓	✓	✓		✓
ATV212	✓					
ATV600	✓					
ATV900	✓	✓	✓	✓		
ATV6000	✓	✓			✓	
ATV6100	✓	✓			✓	

- Water or liquid pumping applications.
- Torque control such as paper, cable, and other winding machines or applications.
- High cycle machines where fast response and high accuracy is required.
- Lifting and dragging loads such as downhill conveyors or similar.
- Medium voltage motors and pumps driven by solar systems where AC power is not available.

Step 4: Braking Requirements

✓ Build-in ✓ On Request

Reference	Adaptive Deceleration Ramp	Braking Transistor	Braking Resistor	Regenerative Module	Regenerative Technology AFE
ATV12	✓				
ATV320	✓	✓	✓	✓	
ATV340	✓	✓	✓	✓	
ATV212	✓				
ATV600	✓				✓
ATV900	✓	✓	✓	✓	✓
ATV6000	✓				
ATV6100	✓				

- **Adaptive deceleration** means that the drive adjusts the deceleration ramp to achieve the desired deceleration time without using brake resistors.
- **Braking Units:** It's the power transistor needed to power the braking resistors.
- **Braking Resistor:** It's the device used to dissipate the energy generated during motor braking.
- **Regen units:** This device can replace the braking resistors in regenerating the braking energy back to the grid. Used in drives products.
- **AFE Regenerative Technology:** Does the same as Regen Units, but it's integrated into the drive for Drive Systems.

Step 5: Communication Capabilities

✓ Build-in ✓ On Request

Reference	Modbus RTU	Modbus TCP	Ethernet IP	Profibus	Profinet	CanOpen	DeviceNet	Bacnet	Metasys	Apogee	Lonworks
ATV12	✓										
ATV320	✓	✓	✓	✓	✓	✓	✓				
ATV340	✓	✓	✓	✓	✓	✓	✓				
ATV212	✓							✓	✓	✓	✓
ATV600	✓	✓	✓	✓	✓	✓	✓	✓			
ATV900	✓	✓	✓	✓	✓	✓	✓				
ATV6000	✓	✓	✓	✓	✓	✓	✓				
ATV6100	✓	✓	✓	✓	✓	✓	✓				

Step 6: Protection Degree

✓ Available

Environmental Conditions											
Reference	IP00	IP20	IP21	IP23	IP31	IP41	IP42	IP54	IP55	IP65	IP66
ATV12		✓									
ATV320		✓								✓	✓
ATV340		✓									
ATV212			✓						✓		
ATV600	✓	✓	✓	✓				✓	✓		
ATV900	✓	✓	✓	✓				✓	✓		
ATV6000					✓	✓	✓				
ATV6100					✓	✓	✓				

- A combination of letters and numbers indicates the VSD's protection against ingress of foreign objects and water.

Step 6: Chemical and Mechanical Active Substances

✓ Build-in

Environmental Conditions - IEC60721						
Reference	Chemical Active Substance 3C1	Chemical Active Substance 3C2	Chemical Active Substance 3C3	Mechanical Active Substance 3S1	Mechanical Active Substance 3S2	Mechanical Active Substance 3S3
ATV12			✓		✓	
ATV320			✓		✓	
ATV340			✓		✓	
ATV212	✓				✓	✓
ATV600		✓	✓		✓	✓
ATV900		✓	✓		✓	✓
ATV6000		✓		✓		
ATV6100		✓		✓		

- Chemical Active Substances** refers to Sea Salts, Sulphur dioxide, Hydrogen Sulfide, Chlorine, Ammonia, Nitrogen Oxide. 3C1 is the lowest and 3C4 is the highest protection classification according to the standard.
- Mechanical Active Substances** refers to Sand, Dust, and Sedimentation. 3S1 is the lowest and 3S3 the highest protection classification according to the standard.

Step 7: Installation Type

✓ Available

Reference	Inside Cabinet	Directly on the machine	Wall Mounting	Modular	Floor Standing	Liquid Cooling	High Reduced
ATV12	✓	✓					
ATV320	✓	✓	✓				
ATV340	✓	✓		✓			
ATV212	✓		✓				
ATV600	✓	✓	✓	✓	✓	✓	✓
ATV900	✓	✓	✓	✓	✓	✓	✓
ATV6000					✓		
ATV6100					✓		

- **Modular** allows paralleling drives to get a higher power.
- **Floor standing** includes the cabinet integration and it's ready to connect.
- **Liquid cooling** involves a dedicated water circuit for cooling the drive.
- **High reduced** drives are integrated in a cabinet, but the cabinet's height is reduced compared with the other versions.

Step 8: Harmonic Solutions

✓ Build-in ✓ Some Sizes ✓ On request

Reference	Integrated DC Choke	Line Chokes	C-Less Technology	Passive Filters	Active Front End	Multipulses
ATV12						
ATV320		✓				
ATV340	✓	✓				
ATV212			✓			
ATV600	✓	✓		✓	✓	✓
ATV900	✓	✓		✓	✓	✓
ATV6000						✓
ATV6100						✓

- **DC Choke** is the internal inductance located in the DC Bus for harmonics reduction. THD ~ 40%
- **Line Chokes** are external inductance located at the drive's input for harmonic reduction. THD ~ 35%
- **C-Less** is the technology that reduces the harmonics down to 30% without any accessories thanks to its low capacitance DC Bus.
- **Passive Filters** are located at the drive's input for harmonic reduction. THD ~ 5–10%
- **Active Front End** is the technology for harmonic reduction and regenerative braking energy. THD ~ 2%
- **Multipulse** is the technology used in MV Drives to keep the THD less than 5%.

Step 9: Motor Protection against dV/dt and reflected waveform

✓ Build-in
✓ Cabinet Integrated
✓ On request

Reference	Motor Choke	dV/dt Filter	Sinus Filter	Multi-Level Technology
ATV12	✓			
ATV320	✓			
ATV340		✓		
ATV212	✓		✓	
ATV600		✓	✓	
ATV900		✓	✓	
ATV6000				✓
ATV6100				✓

- **Motor Choke and dV/dt Filters** are output filters to reduce the dV/dt and reflected waveform, protecting the motor's windings insulation and the motor's cable insulation.
- **Sinus Filters:** Output filter to transform the PWM voltage into sinus voltage, being motor-friendly and allowing an increase in the motor cable up to 1 km.
- **Multilevel Technology** refers to the power electronic architecture inside the drive to produce the voltage provided to the motor trying to simulate a sinus voltage waveform by providing voltage steps.



Options and Accessories

- **Communication Cards:** Extend the communication protocols capabilities e.g., Profibus.
- **Input and Output Expansions Cards:** Extend the number of Digital and Analog I/O.
- **Special functions cards:** E.g., Safety Functions or Encoder card.
- **Graphic Keypad:** Improve the customer interaction by adding a graphic keypad.
- **Braking Units:** It's the Power Transistor required to supply the braking resistors.
- **Braking Resistors:** It's the device used to dissipate the energy producing during braking the motor.
- **Regen Units:** This device can replace the braking resistors in regenerate the braking energy back to the grid.
- **Passive Filters:** Input filters to reduce the harmonic distortion produced by the drive down to 5% or 10%.
- **Line Chokes:** Input filters to reduce the harmonic distortion produced by the drive down to 40% approx.
- **dV/dt Filters:** Output filter to reduce the dV/dt and reflected waveform protection the motor friendly.
- **RFI filters:** Input filter that protect the grid from the high frequency noise produced by the PWM.

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