

Advantage 12 – Variable Speed AC drives

Save time, money and energy with the only compact drive that offers best-in-class motor performance and an intuitive user interface in an attractive design.



Features & Benefits

- **Small**
- **Intuitive**
- **Reliable**
- **High-performance**

The Advantage I2 drive is superior to other drives in its class and helps you save time and money by offering the following.

Exceptional starting and stopping motor performance – this eliminates the need to oversize the drive

A world-class user interface – an intuitive rotary adjustment and navigation button provides fingertip access that is more common in high-end drives; it also features the ability to program the drive with the power off in its own packaging, which makes setup simple, easy and safe

Power and reliability in a compact package – this gives the Advantage I2 drive the versatility to handle applications from simple to complex across a wide variety of sectors, even in harsh environments

A new generation of components that are designed for improved service life – this adds to your pump life, lowers maintenance costs and improves customer satisfaction (results based on MTBF data)

All of this is in addition to the improved performance and reduced energy consumption you receive from the use of a variable speed drive. Make the Advantage I2 drive your choice for simple pump control and make reliability and performance your go to market strategy

Variable speed drives for three-phase asynchronous motors:

- **0.25 HP to 1 HP, 120 V single-phase power supply**
- **0.25 HP to 3 HP, 240 V single-phase power supply**

Small

The compact size and advanced functions of the Advantage I2 drive mean that it can easily replace any existing drive in its category

Ecological

- An average of 30% energy savings for the majority of applications

Economical

- Design – save time by using the SoMove software
- Commissioning – quicker configuration with the power off download function
- Wiring & mounting – quicker and easier installation with integrated Modbus® communication


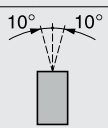


Selection Guide

Single Phase						
kw	hp	Supply Voltage	Amps	Model Number	Weight	
					Pounds lb	(kg)
0.75	1	100...120 V 50/60 Hz	4.2	ATV 12H075F1M	2.87	(1.3)
0.75	1	200...240 V 50/60 Hz	4.2	ATV 12H075M2M	1.76	(0.8)
1.5	2	200...240 V 50/60 Hz	7.5	ATV 12HU15M2M	3.09	(1.4)
2.2	3	200...240 V 50/60 Hz	10	ATV 12HU22M2M	3.09	(1.4)

Characteristics

Environmental characteristics

Conformity to standards		Advantage 12 drives have been developed to conform to the strictest international standards and the recommendations relating to electrical industrial control equipment (IEC, EN), in particular: IEC/EN 61800-5-1 (low voltage), IEC/EN 61800-3 (conducted and radiated EMC immunity and emissions).	
EMC immunity		IEC/EN 61800-3, Environments 1 and 2 (EMC requirements and specific test methods) IEC/EN 61000-4-2 level 3 (electrostatic discharge immunity test) IEC/EN 61000-4-3 level 3 (radiated, radio-frequency, electromagnetic field immunity test) IEC/EN 61000-4-4 level 4 (electrical fast transient/burst immunity test) IEC/EN 61000-4-5 level 3 (surge immunity test) IEC/EN 61000-4-6 level 3 (immunity to conducted disturbances, induced by radio-frequency fields) IEC/EN 61000-4-11 (voltage dips, short interruptions and voltage variations immunity tests)	
Conducted and radiated EMC emissions for drives	ATV 12 ●●●● F1 ATV 12H018M3 ATV 12 ●037M3... ● U22M3	With additional EMC filter: ■ IEC/EN 61800-3, Environment 1 (public network) in restricted distribution: <input type="checkbox"/> Category C1, at 2, 4, 8, 12 and 16 kHz for a shielded motor cable length ≤ 5 m <input type="checkbox"/> Category C2, from 2 to 16 kHz for a shielded motor cable length ≤ 20 m ■ IEC/EN 61800-3, Environment 2 (industrial network): <input type="checkbox"/> Category C3, from 2 to 16 kHz for a shielded motor cable length ≤ 20 m	
	ATV 12 ●●●● M2	■ IEC/EN 61800-3, Environment 1 (public network) in restricted distribution: <input type="checkbox"/> Category C1, at 2, 4, 8, 12 and 16 kHz for a shielded motor cable length ≤ 5 m <input type="checkbox"/> Category C2: ATV 12H018M2... ● 075M2, from 2 to 12 kHz for a shielded motor cable length ≤ 5 m and at 2, 4, 16 kHz for a shielded motor cable length ≤ 10 m <input type="checkbox"/> Category C2: ATV 12HU15M2...HU22M2, from 4 to 16 kHz for a shielded motor cable length ≤ 5 m and at 2, 4, 8, 12 and 16 kHz for a shielded motor cable length ≤ 10 m With additional EMC filter: ■ IEC/EN 61800-3, Environment 1 (public network) in restricted distribution: <input type="checkbox"/> Category C1, at 2, 4, 8, 12 and 16 kHz for a shielded motor cable length ≤ 20 m <input type="checkbox"/> Category C2, from 2 to 16 kHz for a shielded motor cable length ≤ 50 m ■ IEC/EN 61800-3, Environment 2 (industrial network): <input type="checkbox"/> Category C3, from 2 to 16 kHz for a shielded motor cable length ≤ 50 m	
CE marking		The drives are marked CE according to the European low voltage (2006/95/EC) and EMC (2004/108/EC) directives	
Product certifications		UL, CSA, NOM, GOST and C-Tick	
Degree of protection		IP 20	
Vibration resistance	Drive not mounted on rail 	According to IEC/EN 60068-2-6: <input type="checkbox"/> 1.5 mm peak from 3 to 13 Hz <input type="checkbox"/> 1 gn from 13 to 200 Hz	
Shock resistance		15 gn for 11 ms according to IEC/EN 60068-2-27	
Maximum ambient pollution Definition of insulation		Degree 2 according to IEC/EN 61800-5-1	
Environmental conditions Use		IEC 60721-3-3 classes 3C3 and 3S2	
Relative humidity		%	5...95 non condensing, no dripping water, according to IEC 60068-2-3
Ambient air Operation temperature around the device	ATV 12H018F1, H037F1 ATV 12H018M2...H075M2 ATV 12H018M3...H075M3 ATV 12P ●●●●●	°C	-10...+40 without derating Up to +60, with the protective blanking cover removed and current derating of 2.2% per additional degree
	ATV 12H075F1 ATV 12HU15M2, HU22M2 ATV 12HU15M3...HU40M3	°C	-10...+50 without derating Up to +60, with the protective blanking cover removed and current derating of 2.2% per additional degree
Storage	ATV 12 ●●●●●	°C	-25...+70
Maximum operating altitude	ATV 12 ●●●●●	m	1000 without derating
	ATV 12 ●●●● F1 ATV 12 ●●●● M2	m	Up to 2000 for single-phase networks and corner grounded distribution networks, with current derating of 1% per additional 100 m
	ATV 12 ●●●● M3	m	Up to 3000 meters for three-phase networks, with current derating of 1% per additional 100 m
Operating position Maximum permanent angle in relation to the normal vertical mounting position			

Drive characteristics

Output frequency range	Hz	0.5...400
Configurable switching frequency	kHz	Nominal switching frequency: 4 kHz without derating in continuous operation Adjustable during operation from 2 to 16 kHz Above 4 kHz in continuous operation, apply derating to the nominal drive current of: ■ 10% for 8 kHz ■ 20% for 12 kHz ■ 30% for 16 kHz Above 4 kHz, the drive will reduce the switching frequency automatically in the event of excessive temperature rise.
Speed range		1...20
Transient overtorque		150...170% of the nominal torque depending on the drive rating and the type of motor
Braking torque		■ Up to 70% of the nominal torque without resistor ■ Up to 150% of the nominal motor torque with braking unit (optional) at high inertia
Maximum transient current		150% of the nominal drive current for 60 seconds
Motor control profiles		■ Standard profile (voltage/frequency ratio) ■ Performance profile (sensorless flux vector control) ■ Pump/fan profile (Kn ² quadratic ratio)

Electrical power characteristics

Power supply	Voltage	V	100 - 15% to 120 + 10% single-phase for ATV 12●●●● F1 200 - 15% to 240 + 10% single-phase for ATV 12●●●● M2 200 - 15% to 240 + 10% three-phase for ATV 12●●●● M3	
	Frequency	Hz	50... 60 ± 5%	
	Isc (short-circuit current)	A	≤1000 (Isc at the connection point) for single-phase power supply ≤5000 (Isc at the connection point) for three-phase power supply	
Drive supply and output voltages			Drive supply voltage	Drive output voltage for motor
	ATV 12 pppp F1	V	100...120 single-phase	200...240 three-phase
	ATV 12 pppp M2	V	200...240 single-phase	
	ATV 12 pppp M3	V	200...240 three-phase	
Maximum length of motor cable (including tap links)	Shielded cable	m	50	
	Unshielded cable	m	100	
Drive noise level	ATV 12H018F1, H037F1 ATV 12H018M2...H075M2 ATV 12H018M3...H075M3 ATV 12P ppppp	dBA	0	
	ATV 12H075F1 ATV 12HU15M2, HU22M2	dBA	45	
	ATV 12HU15M3...HU40M3	dBA	50	
Electrical isolation			Electrical isolation between power and control (inputs, outputs, power supplies)	

Connection characteristics (drive terminals for the line supply, the motor output and the braking unit)

Drive terminals		R/L1, S/L2/N, T/L3, U/T1, V/T2, W/T3, PA/+, PC/-		
Maximum wire size and tightening torque	ATV 12H018F1, H037F1 ATV 12H018M2...H075M2 ATV 12H018M3...H075M3 ATV 12P037F1 ATV 12P037M2...P075M2 ATV 12P037M3, P075M3		3.5 mm ² (AWG 12) 0.8 Nm	
	ATV 12H075F1 ATV 12HU15M2, HU22M2 ATV 12HU15M3...HU40M3 ATV 12PU15M3...PU40M3		5.5 mm ² (AWG 10) 1.2 Nm	

Characteristics

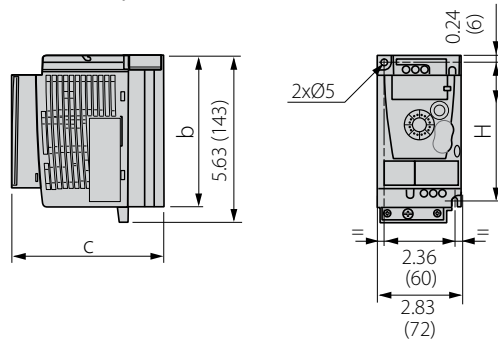
Electrical characteristics (control)

Available internal supplies		<p>Protected against short-circuits and overloads:</p> <ul style="list-style-type: none"> ■ One 5 V $\pm 5\%$ supply for the reference potentiometer (2.2 to 10 k Ω) maximum data rate 10 mA ■ One 24 V $\pm 15\%/+20\%$ supply for the control inputs, maximum data rate 100 mA
Analog input	AI1	<p>1 software-configurable voltage or current analog input:</p> <ul style="list-style-type: none"> ■ Voltage analog input: 0...5 V $\pm 1\%$ (internal power supply only) or 0...10 V $\pm 1\%$, impedance 30 k Ω ■ Analog current input: X-Y mA by programming X and Y from 0...20 mA, impedance 250 Ω <p>Sampling time: < 10 ms Resolution: 10 bits Accuracy: $\pm 1\%$ at 25°C Linearity: $\pm 0.3\%$ of the maximum scale value Factory setting: Input configured as voltage type</p>
Analog output	AO1	<p>1 software-configurable voltage or current analog output:</p> <ul style="list-style-type: none"> ■ Analog voltage output: 0...10 V $\pm 1\%$, minimum load impedance 470 Ω ■ Analog current output: 0 to 20 mA, maximum load impedance 800 Ω <p>Update time: < 10 ms Resolution: 8 bits Accuracy: $\pm 1\%$ at 25°C</p>
Relay outputs	R1A, R1B, R1C	<p>1 protected relay output, 1 N/O contact and 1 N/C contact with common point Response time: 30 ms maximum Minimum switching capacity: 5 mA for 24 V $\pm 1\%$ Maximum switching capacity:</p> <ul style="list-style-type: none"> ■ On resistive load ($\cos \phi = 1$ and L/R = 0 ms): 3 A at 250 V \sim or 4 A at 30 V $\pm 1\%$ ■ On inductive load ($\cos \phi = 0.4$ and L/R = 7 ms): 2 A at 250 V \sim or 30 V $\pm 1\%$
LI logic inputs	LI1...LI4	<p>4 programmable logic inputs, compatible with PLC level 1, standard IEC/EN 61131-2 24 V $\pm 1\%$ internal power supply or 24 V $\pm 1\%$ external power supply (min. 18 V, max. 30 V) Sampling time: < 20 ms Sampling time tolerance: ± 1 ms Factory-set with 2-wire control in "transition" mode for machine safety reasons:</p> <ul style="list-style-type: none"> ■ LI1: forward ■ LI2...LI4: not assigned <p>Multiple assignment makes it possible to configure several functions on one input (for example: LI1 assigned to forward and preset speed 2, LI3 assigned to reverse and preset speed 3) Impedance 3.5 k Ω</p>
	Positive logic (Source)	<p>Factory setting State 0 if < 5 V, state 1 if > 11 V</p>
	Negative logic (Sink)	<p>Software-configurable State 0 if > 16 V or logic input not wired, state 1 if < 10 V</p>
Logic output	LO+	<p>One 24 V $\pm 1\%$ logic output assignable as positive logic (Source) or negative logic (Sink) open collector type, compatible with level 1 PLC, standard IEC/EN 61131-2 Maximum voltage: 30 V Linearity: $\pm 1\%$ Maximum current: 10 mA (100 mA with external power supply) Impedance: 1k Ω Update time: < 20 ms Logic output common (LO-) to be connected to:</p> <ul style="list-style-type: none"> ■ 24 V $\pm 1\%$ in positive logic (Source) ■ 0 V in negative logic (Sink)
Maximum I/O wire size and tightening torque		<p>1.5 mm² (AWG 14) 0.5 Nm</p>
Acceleration and deceleration ramps		<p>Ramp profile:</p> <ul style="list-style-type: none"> ■ Linear from 0 to 999.9 s ■ S ramp ■ U ramp <p>Automatic adaptation of deceleration ramp time if braking capacities exceeded, although this adaptation can be disabled (use of braking unit)</p>
Emergency braking		<p>By DC injection: automatically as soon as the estimated output frequency drops to < 0.2 Hz, period adjustable from 0.1 to 30 s or continuous, current adjustable from 0 to 1.2 I_n</p>
Main drive protection features		<p>Thermal protection against overheating Protection against short-circuits between motor phases Overcurrent protection between motor phases and earth Protection in the event of line overvoltage and undervoltage Input phase loss protection, in three-phase</p>
Motor protection		<p>Thermal protection integrated in the drive by continuous calculation of the I² t</p>
Frequency resolution		<p>Display unit: 0.1 Hz Analog inputs: 10-bit A/D converter</p>
Time constant on a change of setpoint		<p>ms 20 \pm 1 ms</p>

DIMENSIONS:

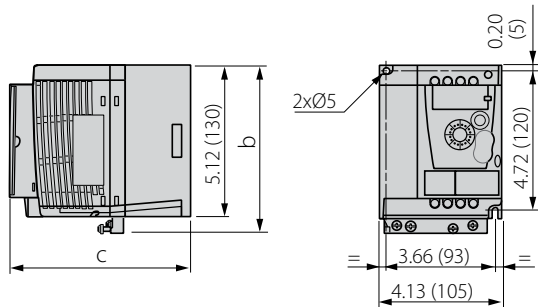
Dimensions are in inches (millimeters). Metric data is presented in ().

ATVH075M2M, ATVH075M3M



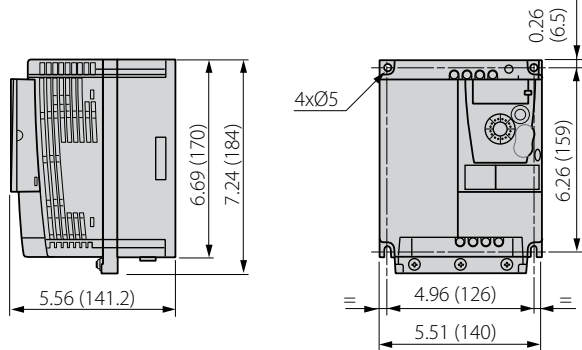
Advantage 12	b	c	H
H075M2M, H075M3M	5.12 (130)	2.48 (63)	4.72 (120)

**ATV12H075F1M, ATV12HU15M2M, ATV12HU22M2M,
ATV12HU15M3M, ATV12HU22M3M**



Advantage 12	b	c
H075F1M, HU15M2M, HU22M2M	5.59 (142)	6.15 (156.2)
HU15M3M, HU22M3M	5.63 (143)	5.17 (131.2)

ATV12HU40M3M





In order to provide the most efficient pump solution to our customers, Taco is now working with Schneider Electric.

This collaboration brings together Taco's pump technology with Schneider Electric Variable Frequency Drives and the drive packaging of Square D enclosures to offer the best overall pumping solution for our customers.



Schneider Electric, the Schneider Electric logo, Square D, the Square D logo, E-Flex, M-Flex, S-Flex, PowerGard, Modbus, FIPIO, and Uni-Telway are trademarks or registered trademarks of Schneider Electric or its affiliates in the United States and other countries, used by permission.



Taco Inc., 1160 Cranston Street, Cranston, RI 02920 / (401) 942-8000 / Fax (401) 942-2360
Taco (Canada) Ltd., 8450 Lawson Road, Unit #3, Milton, Ontario L9T 0J8 / (905) 564-9422 / Fax (905) 564-9436
www.taco-hvac.com