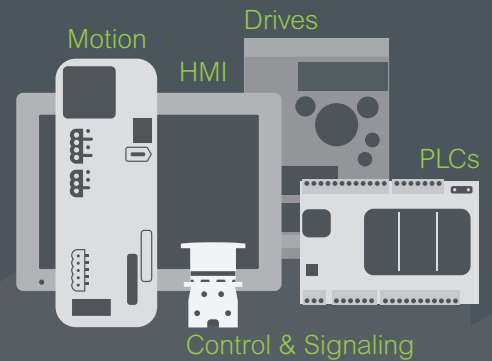




Introducing the **Easy Series**

Essential automation & control products

When just enough is just right!



Easy Altivar 305

Variable speed drives

For applications from 0.37 to 5.5 kW/0.5 to 7.5 HP

Make precise

IMPACT

with Easy Altivar 305 drives



Flexibility



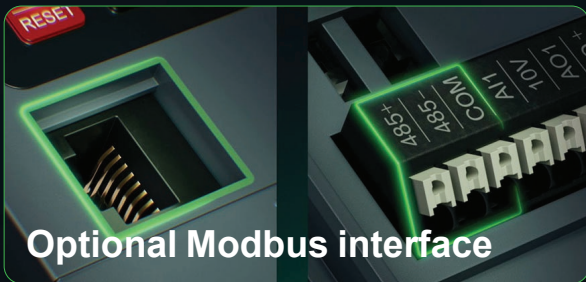
Robustness



Adaptability



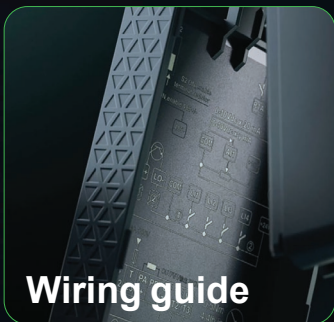
Spring control terminals



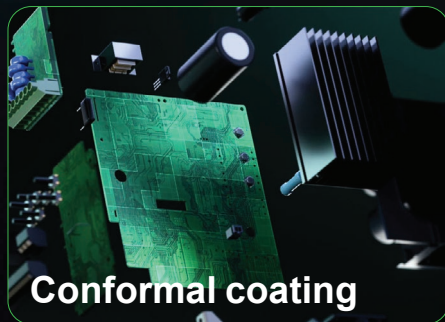
Optional Modbus interface



Compact book design



Wiring guide



Conformal coating



PM motor control

Life Is On

Schneider
Electric

General contents

Easy Altivar 305 variable speed drives

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Variable speed drives

Easy Altivar 305

Presentation, applications, and functions



Logistics machine



Packaging machine



Food and beverage line

Presentation

The Easy Altivar 305 drive is a frequency inverter for three-phase asynchronous and synchronous motors rated from 0.37 to 5.5 kW/0.5 to 7.5 HP and operating at a supply voltage of 380 to 460 VAC.

The compact book size of this drive, its flexibility of installation and wiring, its robustness of design, are based on the principle of Plug & Play. Its highly adaptable integrated functions make it particularly suitable for material handling machines in logistics, packaging, and F&B segments.

By taking account of the constraints governing installation and use at the product design stage, we have been able to offer a dependable, cost-effective solution to manufacturers of compact machines (OEMs).

The Easy Altivar 305 has been developed without compromising quality.

Applications

This drive incorporates functions that are suitable for the most common applications, including:

- Material handling
- Packaging and printing machines
- Food and beverage

Functions

In addition to the functions usually available on this type of drive, the Easy Altivar 305 drive also features the following:

Motor control functions (1)

- Support both IM and PM motor control
- Motor control profiles: standard, performance, pump/fan, and synchronous motor control
- Cooling fan thermal control
- Switching frequency management
- Boost torque
- Motor noise reduction
- Current limitation
- Auto DC injection

Application functions (1)

- Frequency skip
- Preset speeds
- PID regulator
- S ramp, U ramp, ramp switching
- Jog operation
- +/- speed around reference
- Freewheel stop, fast stop
- Catch on the fly

(1) For more information on how to implement functions, please refer to the User Manual on our website.



Easy Altivar 305 range

Functions (continued)

Control functions (1)

- Channel configuration - separate mode or combined mode
- Reference channel selection
- Reverse inhibition
- Force local control
- Store customer parameter settings

Protection and maintenance functions (1)

- Protection of the installation by means of underload and overload detection
- Maintenance functions:
 - HMI password
 - Configuring the logic and analog I/O
 - Viewing the state of the logic inputs on the drive display
 - Status display (drive power on/fan time/process elapsed time)
 - Display of the last four detected faults, detected error log, etc.

An optimized offer

Environment

The entire range conforms to international standards IEC/EN 61800-5-1 and IEC/EN 61800-3 and has been developed to meet the requirements of directives relating to protection of the environment (RoHS, REACH, WEEE). With its independent air flow design and conformal coating, which helps to protect the PCB, the range can be used in the harshest environments. It can withstand a 40 °C/104 °F ambient air temperature around the device without derating (2). It has an IP20 protection rating.

Adaptability and performance

The Easy Altivar 305 has been designed with increased adaptability to different motors and loads.

One of its main features is its starting and braking torque capacity:

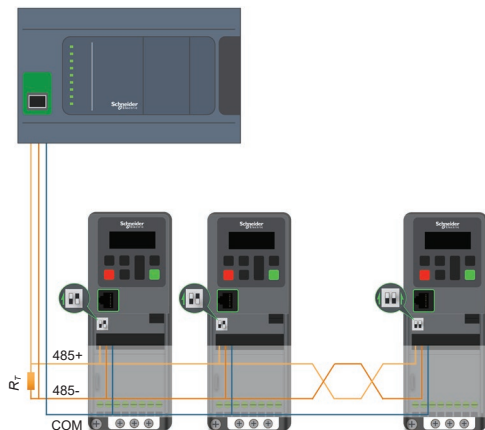
- Braking capacity:
 - Over 70% of the rated motor torque without braking resistor
 - 150% of the rated motor torque with braking resistor (see [page 11](#))
- Torque capacity:
 - Overtorque: 170 to 200%, depending on model (3)
- Synchronous motor control:
 - Supports both SPM and IPM type motors
- All models in the range have an integrated braking unit.

Easy to integrate in system

The Easy Altivar 305 drive integrates the Modbus communication protocol as standard, which can be accessed via the RS485 terminals or the RJ45 connector with a 2-wire RS485 physical interface. To communicate on the network, the drive uses the Modbus RTU transmission mode. A daisy chain connection can be easily implemented via the RS485 terminals.

For more information on the Modbus port characteristics (transmission speed, address, messaging, etc.), please consult the Modbus manual on our website.

Logic inputs (LI1 to LI4) can be configured as source or sink by software, compatible with many PLCs.



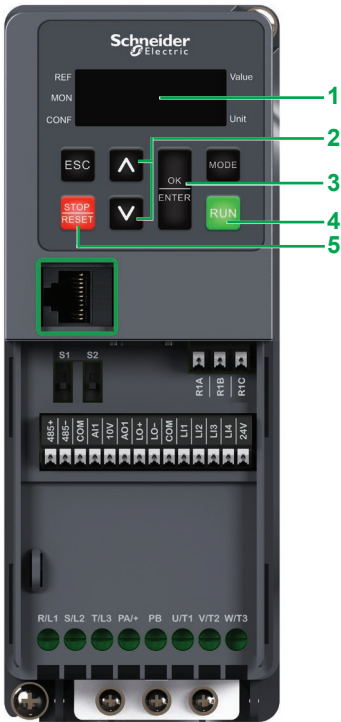
Daisy chain connection by RS485 terminals

(1) For more information on how to implement functions, please refer to the User Manual on our website.
 (2) For more information on temperature conditions and derating curves, please refer to the User Manual.
 (3) For more information, please refer to our website.

Variable speed drives

Easy Altivar 305

An optimized offer



Integrated keypad and terminals

An optimized offer (continued)

Easy to install

The Easy Altivar 305 drive can be easily and quickly installed:

- Spring type control terminals improve wiring efficiency.
- They can be identified by the rating label beside the RJ45 port.
- Drives $\geq 1.5 \text{ kW}/2 \text{ HP}$ can be mounted side by side to save cabinet space.
- Power terminals are easily identified and differentiated.
- A connection guide is shown inside the cover plate.

Easy to commission

Human-Machine Interface (integrated keypad)

The 4-digit display **1** can be used to display status and detected fault information.

The UP and DOWN buttons **2** and the OK/ENTER button **3** can be used in combination to access and modify parameters.

The RUN button **4** and STOP/RESET button **5** are only active after being configured.

Remote display terminal

The Easy Altivar 305 drive can be connected to a remote display terminal, available as an option. This terminal can be mounted on an enclosure door with IP54 or IP65 degree of protection. The maximum operating temperature is $50 \text{ }^\circ\text{C}/122 \text{ }^\circ\text{F}$. It provides access to the same functions as the Human-Machine interface.

Simple Loader and Multi-Loader configuration tools

The Simple Loader tool enables one powered-up drive's configuration to be duplicated on another powered-up drive. Operation is very simple.

The Multi-Loader tool enables configurations from a PC or drive to be copied and duplicated on another drive; the drives do not need to be powered up. The configuration can be loaded into the drive without taking it out of its packaging.

Easy to maintain

The drive alerts the user when it is necessary to clean the heatsink or replace the cooling fan. The fan, which is the only wearing part (see [page 7](#)), can be changed without the need for any tools.

An access code allowing authorized people to configure applications and settings in Configuration mode helps to ensure system security. Non-authorized users are only able to use Monitoring mode (parameter display).

Main characteristics

Analog input AI1

One software-configurable voltage or current analog input:

- Voltage analog input: 0...10 V $\overline{\text{---}}$, impedance 30 k Ω
 - Analog current input: X-Y mA by programming X and Y from 0–20 mA, impedance 250 Ω
- Sampling time: \pm 20 ms
 Resolution: 10 bits
 Accuracy: \pm 1% at 25 °C/77 °F
 Linearity: \pm 0.3% of the maximum scale value
 Factory setting: Input configured as voltage type 0 to 10 V $\overline{\text{---}}$

Logic input plus LIU

- When the inverter input is in positive logic connection (source mode), AI1 can be used as a logic input by setting the AI1 type to LIU and adding the pull-up resistor (15 k Ω).
- When the inverter input is in negative logic connection (sink mode), AI1 does not support this use as the LIU logic input.
- When AI1 is used as a logic input, the input impedance is 30 k Ω ; the maximum input voltage of AI1 port is 20 V (for internal or external power supply):
 - If \leq 3 V, state 0
 - If \geq 7 V, state 1

Analog output AO1

One software-configurable voltage or current analog output:

- Analog voltage output: 0...10 V $\overline{\text{---}}$, minimum load impedance 470 Ω
 - Analog current output: 0–20 mA, maximum load impedance 800 Ω
- Sampling time: < 10 ms
 Resolution: 8 bits
 Accuracy: \pm 1% at 25 °C/77 °F

Relay outputs R1A, R1B, R1C

One protected relay output, 1 NO contact, and 1 NC contact with common point

Response time: 30 ms maximum

Minimum switching capacity: 5 mA for 24 V $\overline{\text{---}}$

Maximum switching capacity:

- On resistive load ($\cos \varphi = 1$ and $L/R = 0$ ms): 3 A at 250 V \sim or 4 A at 30 V $\overline{\text{---}}$
- On inductive load ($\cos \varphi = 0.4$ and $L/R = 7$ ms): 2 A at 250 V \sim or 30 V $\overline{\text{---}}$

Logic inputs LI1...LI4

Four programmable logic inputs, compatible with PLC level 1, standard IEC/EN 61131-2

24 V $\overline{\text{---}}$ internal power supply or 24 V $\overline{\text{---}}$ external power supply (min. 18 V, max. 30 V)

Sampling time: < 20 ms

Sampling time tolerance: \pm 1 ms

Factory-set with 2-wire control in "transition" mode for machine usability reasons:

- LI1: forward
- LI2...LI4: not assigned

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

Logic output LO1

One 24 V $\overline{\text{---}}$ 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: 100 mA (1)

Impedance: 1 k Ω

Sampling time: 20 ms \pm 1 ms

(1) The maximum current for logic output LO1 is 100 mA when the internal or external 24 V power supply powers LO1 only. If the internal 24 V power supply also powers the logic inputs, the maximum current is 80 mA.

Variable speed drives

Easy Altivar 305

Drives for asynchronous and synchronous motors



ATV305HU037N4...U22N4



ATV305HU30N4...U55N4

Drives for asynchronous and synchronous motors										
Three-phase supply voltage: 380...460 V 50/60 Hz										
Motor	Line supply				Easy Altivar 305					
Power indicated on rating plate (1)	Max. line current (3)		Apparent power		Maximum continuous output current (In) (1)	Maximum transient current for 60 s	Dissipated power at maximum output current (In) (1)	Reference	Weight (4)	
HD: Heavy duty (2)	380 V		460 V		380 V		W			kg/ lb
	kW	HP	A	A	kVA	A				
HD	0.37	0.5	2.1	1.8	1.4	1.5	2.3	19.5	ATV305H037N4	1/ 2.205
HD	0.75	1	3.5	3.1	2.5	2.3	3.5	28.2	ATV305H075N4	1/ 2.205
HD	1.5	2	6.5	5.4	4.3	4.1	6.2	45.3	ATV305HU15N4	1.1/ 2.43
HD	2.2	3	8.8	7.2	5.7	5.5	8.3	57.5	ATV305HU22N4	1.1/ 2.43
HD	3	4	11.1	9.2	7.3	7.1	10.7	81.1	ATV305HU30N4	1.2/ 2.646
HD	4	5	13.7	11.4	9.1	9.5	14.3	117	ATV305HU40N4	1.2/ 2.646
HD	5.5	7.5	21.3	14.3	11.4	12.6	18.9	172	ATV305HU55N4	1.35/ 2.976

Dimensions (overall)		
Drives with heatsinks	W x H x D	
	mm	in.
ATV305H037N4 ATV305H075N4 ATV305HU15N4 ATV305HU22N4	65 x 170 x 157	2.56 x 6.69 x 6.18
ATV305HU30N4 ATV305HU40N4 ATV305HU55N4	70 x 192 x 167	2.76 x 7.56 x 6.57

- (1) These values are given for a nominal switching frequency of 4 kHz, for use in continuous operation. If operation above 4 kHz needs to be continuous, the nominal drive current should be derated by 10% for 8 kHz and 20% for 12 kHz. The switching frequency can be set between 2 and 12 kHz for all ratings. Above 4 kHz, the drive will reduce the switching frequency automatically in the event of an excessive temperature rise. See the derating curves in the User Manual, available on our website.
- (2) Values given for applications requiring significant overload (up to 150% for 60 s).
- (3) Line current network requirement: network short circuit current $I_{sc} \leq 5$ kA.
- (4) Weight of product without packaging.



Simple loader configuration tool



Multi loader configuration tool



Remote terminal with cover open

Configuration tools

Description	Reference
Simple loader tool For duplicating one drive configuration on another drive. The drives must be powered-up. The tool is supplied with a cordset equipped with two RJ45 connectors.	VW3A8120

Multi loader tool For copying a configuration on a PC or drive and duplicating it on another drive. The drives do not need to be powered-up. Supplied with the tool: <ul style="list-style-type: none"> ■ One cordset equipped with two RJ45 connectors ■ One cordset equipped with a USB type A connector and a USB Mini-B type connector ■ 1x 2 GB SD memory card ■ Four AA/LR6 1.5 V batteries 	VW3A8121
---	----------

Remote display terminals and associated cordsets

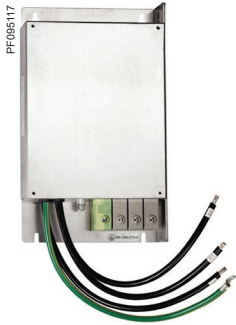
Description	Degree of protection	Reference	Weight kg/ lb
Remote display terminals For mounting the Human-Machine interface on an enclosure door with IP54 or IP65 degree of protection. A remote-mounting cordset VW3A1104R●● is also required.	IP54	VW3A1006	0.250/ 0.55
	IP65	VW3A1007	0.275/ 0.61
Remote-mounting cordsets equipped with two RJ45 connectors For connecting the VW3 A1 006 or VW3A1007 remote display terminal to the Easy Altivar 305 drive	Length: 1 m/3.28 ft	VW3A1104R10	0.05/ 0.11
	Length: 3 m/9.84 ft	VW3A1104R30	0.15/ 0.33

Dimensions (overall)

Remote display terminal	W x H x D	
	mm	in.
VW3A1006	50 x 70 x 22.7	1.97 x 2.76 x 0.89
VW3A1007	66 x 106 x 26.7	2.6 x 4.17 x 1.05

Replacement parts

Fan kit			
Description	For drives	Reference	Weight kg/ lb
Power fan for IP20 drives	ATV305HU15N4...U22N4	VX5V305S1001	0.02/ 0.04
	ATV305HU30N4...U55N4	VX5V305S2001	0.03/ 0.07



VW3A4422

Presentation

EMC filters

The additional EMC input filters enable the drives to meet more stringent requirements:

- They are designed to reduce conducted emissions on the line supply below the limits of standard IEC 61800-3 category C3.
- They extend the maximum motor cable length of IEC 61800-3 category C3.

References

EMC filters

Drive reference	380 V line input current	EMC filter reference	EN 61800-3	
			Conduct emission	Radiated emission
	A			
ATV305H037N4	2.1	VW3A4422	C3 max. shielded cable 25 m/82 ft	C3 max. shielded cable 5 m/16 ft
ATV305H075N4	3.5			
ATV305HU15N4	6.5			
ATV305HU22N4	8.8			
ATV305HU30N4	11.1	VW3A31406		
ATV305HU40N4	13.7			
ATV305HU55N4	21.3			

PF142110



VW3A4551

Presentation

Line chokes

A line choke can be used to provide improved protection against overvoltages on the line supply and to reduce harmonic distortion of the current produced by the drive.

The recommended chokes limit the line current. They have been developed in line with standard EN 50178 (VDE 0160 level 1 high energy overvoltages on the line supply).

The choke values are defined for a voltage drop between phases of between 3% and 5% of the nominal supply voltage. Values higher than this will cause loss of torque.

These chokes should be installed upstream of the drive.

The use of line chokes is recommended in particular under the following circumstances:

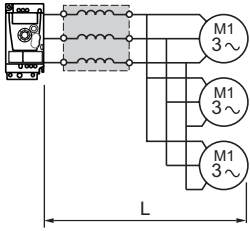
- Line supply with significant disturbance from other equipment (interference, overvoltages)
- Line supply with voltage imbalance between phases above 1.8% of the nominal voltage
- Drive supplied by a line with very low impedance (in the vicinity of a power transformer 10 times more powerful than the drive rating)
- Installation of a large number of frequency inverters on the same line
- Reducing overloads on the cosφ correction capacitors, if the installation includes a power factor correction unit

References

Line chokes

For drives

	Duty	Line current without choke		Line current with choke		Choke Reference	Weight
		380 V	460 V	380 V	460 V		
		A	A	A	A		
ATV305H037N4	HD	2.1	1.8	1.1	1	VW3A4551	1.5/ 3.31
ATV305H075N4	HD	3.5	3.1	1.9	1.7		
ATV305HU15N4	HD	6.5	5.4	3.5	2.9	VW3A4552	3.7/ 8.16
ATV305HU22N4	HD	8.8	7.2	5.1	4.4		
ATV305HU30N4	HD	11.1	9.2	6.6	5.6	VW3A4553	4.1/ 9.04
ATV305HU40N4	HD	13.7	11.4	8.5	7.7		
ATV305HU55N4	HD	21.3	14.3	11.6	9.9		



VW3A455●
Motor choke

Presentation

Motor chokes

Motor chokes are required:

- When connecting more than two motors in parallel
- When the motor cable length (L), including tap-offs, is:
 - 25 m/82 ft maximum for a shielded motor cable (1)
 - 50 m/164 ft maximum for an unshielded motor cable (1)

Motor chokes can be inserted between the Altivar 305 drive and the motor to:

- Limit the dv/dt at the motor terminals (500 to 1500 V/μs) for cables longer than 50 m/164 ft
- Filter interference caused by the opening of a contactor placed between the filter and the motor
- Reduce the motor ground leakage current
- Smooth the motor current wave form to reduce motor noise

References

Motor chokes (2)

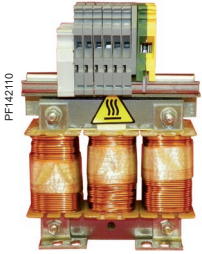
Drive reference	Duty	Rated current A	Power loss W	Choke reference
ATV305H037N4	HD	4	45	VW3A4551
ATV305H075N4	HD			
ATV305HU15N4	HD	10	65	VW3A4552
ATV305HU22N4	HD			
ATV305HU30N4	HD			
ATV305HU40N4	HD	17	75	VW3A4553
ATV305HU55N4	HD			

Dimensions (overall)

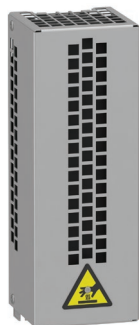
Line chokes or motor chokes	W x H x D	
	mm	in.
VW3A4551	100 x 135 x 60	3.94 x 5.31 x 2.36
VW3A4552	130 x 155 x 90	5.12 x 6.1 x 3.54
VW3A4553		

(1) Motor cable length given for a switching frequency of 4 kHz.

(2) With motor chokes, all the drives in the range can be used for a maximum 100 m/328 ft with shielded motor cables and 200 m/656 ft with unshielded motor cables.



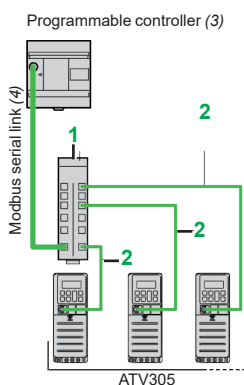
VW3A455●



VW3A7730

Braking resistors					
For drives	Minimum Ohmic value	Ohmic value at	Power available at	Reference	Weight
		20° C/68 °F	50° C/122 °F (1)		
	Ω	Ω	W		kg/lb
Unprotected resistor (IP00) (2)					
ATV305HU15N4	80	100	28	VW3A7723	0.6/1.32
ATV305HU22N4	60				
ATV305HU30N4	36	100	35	VW3A7725	0.85/1.87
ATV305HU40N4					
Protected resistor (IP20 or IP23)					
ATV305H037N4	80	100	100	VW3A7730	1.5/3.306
ATV305H075N4					
ATV305HU15N4					
ATV305HU22N4	60				
ATV305HU30N4	36				
ATV305HU40N4					
ATV305HU55N4	28	60	160	VW3A7731	2/4.409

Dimensions (overall)		
Braking resistors	W x H x D	
	mm	in.
VW3A7723	60 x 170 x 30	2.36 x 6.66 x 1.18
VW3A7725	62 x 212 x 36	2.44 x 8.35 x 1.42
VW3A7730	105 x 295 x 100	4.13 x 11.61 x 3.94
VW3A7731	105 x 345 x 100	4.13 x 13.58 x 3.94
VW3A7732	175 x 345 x 100	6.89 x 13.58 x 3.94
VW3A7733	190 x 570 x 180	7.48 x 22.44 x 7.09



Example of Modbus diagram with connection via splitter box and RJ45 connectors

Modbus serial link				
Description	Item no.	Length m/ft	Unit reference	Weight kg/lb
Connection via splitter box and RJ45 connectors				
Modbus splitter box 10 RJ45 connectors and one screw terminal	1	–	LU9GC3	0.5/1.1
Cordsets for Modbus serial link equipped with two RJ45 connectors	2	0.3/0.98	VW3A8306R03	0.025/0.06
		1/3.28	VW3A8306R10	0.6/1.32
		3/9.84	VW3A8306R30	0.13/0.29
Line terminators	–	–	Not Applicable (5)	–

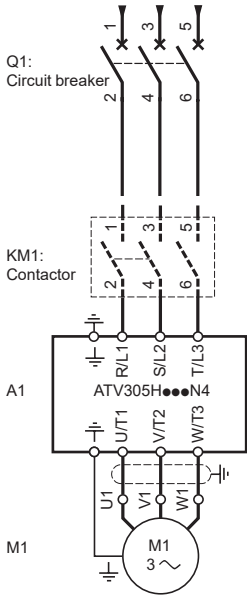
(1) Load factor for resistors: the value of the average power that can be dissipated at 50 °C/122 °F from the resistor into the casing is determined for a load factor during braking that corresponds to the majority of normal applications.

(2) For unprotected resistors, add a thermal overload device.

(3) Please refer to the programmable controller catalog on our website.

(4) Cable depends on the type of controller or PLC.

(5) ATV305 has an integrated terminal resistor which can be enabled via DIP switch S2.



Motor starter with three-phase power supply

Applications

The proposed combinations can:

- Help protect people and equipment (when a short-circuit occurs)
- Maintain protection upstream of the drive in the event of a short-circuit on the power stage

Two types of combination are possible:

- Drive + circuit-breaker: Minimum combination
- Drive + circuit-breaker + contactor: Minimum combination with contactor when a control circuit is needed

Motor starters: Circuit breaker + Contactor + Drive

Three-phase supply voltage: 380...460 V 50/60 Hz

Standard power ratings of 50/60 Hz 4-poles motors (1)		Variable speed drive Reference	Circuit breaker		Contactor
kW	HP		Magnetic protection rating	Easy TeSys/TeSys (2) Reference I _{rm}	Easy TeSys Reference (3)
Three-phase supply: 380...460 V, 50/60 Hz					
0.37	0.5	ATV305H037N4	2.5	GZ1LE07 33.5	LC1E09●●●●
0.75	1	ATV305H075N4	4	GZ1LE08 51	
1.5	2	ATV305HU15N4	10	GZ1LE14 138	LC1E18●●●●
2.2	3	ATV305HU22N4	14	GZ1LE16 170	LC1E32●●●●
3	4	ATV305HU30N4			
4	5	ATV305HU40N4			
5.5	7.5	ATV305HU55N4	25	GZ1LE22 327	LC1E38●●●●

(1) Rated at 400/415 V.

(2) Easy Tesys and Tesys magnetic motor circuit breakers.

(3) For 220 VAC, 50/60 Hz control circuit. For other control voltages, please refer to the Easy TeSys catalog.

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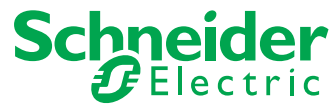
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