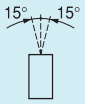
Soft starters
Altistart 46 soft start - soft stop units

General

The asynchronous motor associated with the Altistart must be capable of starting the load to be driven when it is supplied with reduced voltage.
The products are defined for normal or heavy duty. In cases of heavy duty, check with the motor manufacturer that any derating is compatible with the operating cycle and the starting times. This will avoid tripping the thermal overload protection integrated within the Altistart 46, which may result from abnormal rises in the motor temperature.

Environment

Conformity to standards			The electronic soft start - soft stop units have been developed and performance tested in accordance with the following international standards and recommendations relating to industrial electrical control gear (IEC, NF C, VDE), IEC 947-4-2, UL and CSA.
CE marking			The products have CE marking in accordance with the low voltage and electromagnetic compatibility directives.
Degree of protection	Starters ATS-46D17N to 46C14N Starters ATS-46C17N to 46M12N		IP 20 (IP 10 when no connections are present) IP 00
Shock resistance	Conforming to IEC 68-2-27 Starters ATS-46D17N to 46D38N		15 gn for 11ms
Vibration resistance			Conforming to IEC 68-2-6, NFC 2076 and BV1
Ambient air temperature around the unit	For operation	**°C**	0…+ 40 without derating (between + 40 and + 60, derate the Altistart current by 1.2 % for each °C)
	For storage	**°C**	- 25…+ 70
Maximum relative humidity	Conforming to IEC 68-2-3		93 % without condensation or dripping water
Maximum ambient pollution	Conforming to IEC 664		Degree 3
Maximum operating altitude		**m**	1000 without derating (above this, derate the Altistart current In by 0,5 % for each additional 100 m)
Operating position (1) Permanent maximum angle in relation to the normal vertical mounting position			

Electrical characteristics

Category of use	Conforming to IEC 947-4-2		AC - 53 a
3-phase supply voltage (U)		**V**	208 - 10 %…240 + 10 % 380 - 15 %…415 + 10 % 440 - 15 %…500 + 10 %
Frequency		**Hz**	50 or 60 self-adapting
Nominal current (In)		**A**	17…1200 in 21 ratings
Motor power		**kW**	2.2…800
Voltage indicated on the motor rating plate		**V**	208…240 380…415 440…500

(1) In certain (marine) applications, the starter can temporarily tolerate an angle of ± 45° in relation to the vertical.

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Electrical characteristics (continued)

Current adjustment		The motor nominal current In is adjustable from 0.5 to 1.3 times the product rating Adjustment of maximum starting current from 2 to 7 times the motor nominal current, limited to 5 times the starter current limit		
Starting method		By torque control (1), the starter current limited to 5 In Factory setting: 3 In for standard duty on torque ramp of 10 s and 3.5 In for severe duty on torque ramp of 15 s		
Method of stopping				
Freewheel		"Freewheel" stop by default		
Stop controlled by torque ramp		Adjustable by programming from 0.5 to 60 s		
Braked stop		Automatically controlled by the flux		
LED display		Off	On	Flashing
Locking (red)		–	Fault	Automatic reset
Supply on (green)		–	Supply on	–
Output relays (2 relays)		**R1**		**R2**
Contacts		1 "N/O" + 1 "N/C" (2 separate contacts)		1 "N/C"
Factory setting		Safety relays, Only R1 can be reassigned (for isolation on stopping)		End of start relay
Maximum operating power with ∿ 220 V	**VA**	Inrush 1200, maintained 120		
Minimum switching capacity		100 mA - 24 V		
Nominal operating current	**A**	0.5. Categories AC-14, AC-15 (∿ 240 V) and DC-13 (⎓ 48 V)		
Nominal thermal current	**A**	5		
Maximum operating voltage	**V**	∿ 400		
Mechanical durability		50 million operating cycles		
Analog output AO		Current output 0-20 mA or voltage output 0-10 V with 500 Ω impedance, can be reassigned to 4-20 mA Maximum load impedance: 800 Ω Precision ± 3 %, linearity ± 3 %		
Logic outputs LO		2 logic outputs LO1 and LO2 with 0V common Maximum voltage 40 V, minimum voltage 10 V Maximum output current: 200 mA		
Available internal power supply		1 isolated output + 24 V (PL) Precision ± 20 % Maximum 100 mA		
Logic inputs LI		3 logic inputs with 3.5 kΩ impedance Power supply + 24 V State 0 if < 5 V, state 1 if > 11 V		
Protection		Integrated thermal protection for motor and starter unit		
Mains supply protection		Phase failure and imbalance, indicated by output relay		
Thermocontacts		On fan-cooled units, 75 to 1200 A ratings		
Short circuits		Protection against short circuits less than 13I cL		
Selection of starter unit		The Altistart 46 must be selected according to the normal power of the motor and the duty One starter power can be used for standard or severe duty For severe duty, the starter and the motor are derated The Altistart 46 can be overrated if the product is by-passed at the end of starting.		

(1) Schneider patent.

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Electrical characteristics (continued)

ATS-46 start units		D17N	D22N	D32N	D38N	D47N	D62N	D75N	D88N	C11N	C14N	C17N
Total power dissipated at nominal load	**W**	72	91	104	121	161	206	265	310	342	426	566
ATS-46 start units		**C21N**	**C25N**	**C32N**	**C41N**	**C48N**	**C59N**	**C66N**	**C79N**	**M10N**	**M12N**	
Total power dissipated at nominal load	**W**	670	817	973	1404	1452	1800	2022	2680	3040	3040	

Electromagnetic characteristics (1)

	Standards	**Test levels**	**Examples** (elements causing interference)
Summary of immunity tests performed with the Altistart 46	**IEC 1000-4-2 level 3** Electrostatic discharges: - by contact - in the air	 6 kV discharge 8 kV discharge	 Contact of an electrically charged item
	IEC 1000-4-3 level 3 Radiated electromagnetic fields	10 V/m	Equipment transmitting radio frequencies
	IEC 1000-4-4 level 4 Rapid electrical transients: - power cables - control cables	 4 kV 2 kV	 Opening/closing of a contactor
	IEC 1000-4-5 level 3 Shock wave: - phase/phase - in the air	 1 kV 2 kV	 Lighting circuit
	IEC 1000-4-12 level 3 Damped oscillating waves	1 kV - 1MHz	Oscillating circuit on the mains supply
EMC Radiated and conducted emissions	**IEC 947-4-2, class A:** for all products **IEC 947-4-2, class B:** for products up to 140 A (Sizes 1 and 2). Necessary to by-pass the Altistart at the end of ramp and add récommended line chokes.		

(1)The start units conform to standard IEC 947-4-2 relating to electromagnetic compatibility. This standard guarantees a level of immunity of the products and a level of interference emitted.
In steady state, the interference emitted is lower than the requirement of the standard on electromagnetic compatibility. It may however cause interference on low level loads during acceleration and deceleration. Interference is mainly low frequency interference (harmonics). It can be reduced by using chokes (see page 60515/5) wired between the mains supply and the Altistart.

Note: Power factor correction is only possible upstream of the Altistart, only being brought into circuit at the end of the starting period.
The filters used on the Altistart 46 generate 1 mA earth leakage currents; residual current devices must therefore be sized accordingly.
Injection braking currents generate frequencies which can interfere with protection devices, in particular insulation monitors.
It is recommended that d.c. devices be used.

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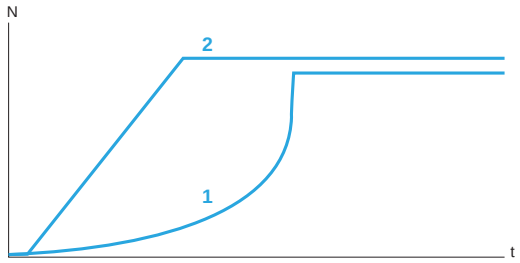
Starting characteristics

Acceleration ramp

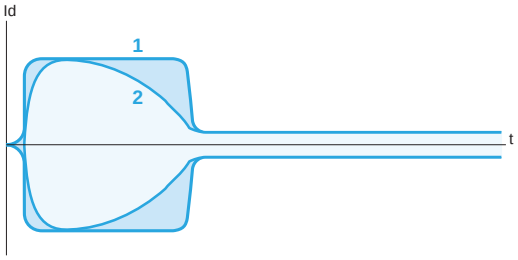


Curve N = f (t)

1 Standard ramp
2 Altistart 46 ramp

More progressive start with Altistart 46

Starting current limit



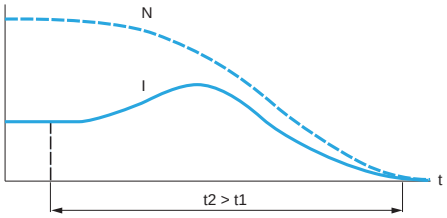
Curve Id = f (t)

1 Standard limit
2 Limit with the Altistart 46

Reduction of losses with Altistart 46. Compared with conventional starters, these losses are reduced by at least 10 to 15 %.

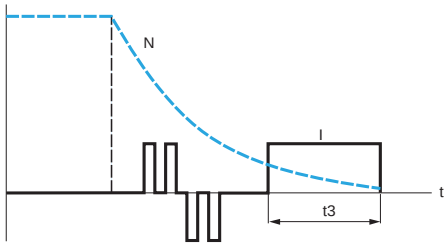
Stopping characteristics

Deceleration ramp



Controlled stopping of motor in a time t2.
t1 = “freewheel” stopping time is a function of the inertia and the resistive torque

Braking by torque control



t3 = d.c. injection time
t3 < t1

Note: For severe braking applications, the Altistart must be used in conjunction with an ATP d.c. injection brake.

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