

Soft starters

Altistart 48 soft start - soft stop units

Selection criteria for an Altistart 48 soft start - soft stop unit

The Altistart 48 must be selected on the basis of 3 main criteria:

- Two line power supply voltage ranges are available for selection:
 - Three-phase a.c. voltage: 230 - 415 V
 - Three-phase a.c. voltage: 208 - 690 V
- The power and the nominal current indicated on the motor name plate
- The type of application and the operating cycle:
To simplify selection, the applications are categorised into 2 types:
 - Standard applications
 - Severe applicationsStandard or severe applications define the limiting values of the current and the cycle for motor duties S1 and S4.

Standard application

In standard applications, the Altistart 48 is designed to provide:

- Starting at 4 I_n for 23 seconds or at 3 I_n for 46 seconds from a cold state (corresponding to motor duty S1)
- Starting at 3 I_n for 23 seconds or at 4 I_n for 12 seconds with a load factor of 50% and 10 starts per hour or an equivalent thermal cycle (corresponding to motor duty S4)
The motor thermal protection must conform to protection class 10 (see page 60526/4).
Example: centrifugal pump

Severe application

In severe applications, the Altistart 48 is designed to provide:

- Starting at 4 I_n for 48 seconds or at 3 I_n for 90 seconds from a cold state (corresponding to S1 motor duty)
- Starting at 4 I_n for 25 seconds with a load factor of 50% and 5 starts per hour or an equivalent thermal cycle (corresponding to S4 motor duty)
The motor thermal protection must conform to protection class 20 (see page 60526/4).
Example: grinder

Motor duties

S1 motor duty corresponds to starting followed by operation at constant load enabling the thermal equilibrium to be reached.

S4 motor duty corresponds to a cycle comprising starting, operation at constant load and an idle period.

This cycle is characterised by a load factor of 50%.

Selecting the starter

Once the appropriate application has been selected from the following page, select the starter from pages 60522/2 to 60522/5 according to the supply voltage and the motor power.

Caution:

If the Altistart 48 is installed inside an enclosure, observe the mounting and derating recommendations (see page 60523/5).

Application areas

Depending on the type of machine, the applications are categorized as standard or severe based on the starting characteristics, which are given as examples only, in the table below.

Type of machine	Application	Functions performed by the Altistart 48	Starting current (% I _n)	Starting time (s)
Centrifugal pump	Standard	Deceleration (reduction in pressure surges) Protection against underloads or inversion of the phase rotation direction	300	5 to 15
Piston pump	Standard	Control of running dry and direction of rotation of the pump	350	5 to 10
Fan	Standard Severe if > 30 s	Detection of overloads caused by clogging or underloads (motor fan transmission broken) Braking torque on stopping	300	10 to 40
Cold compressor	Standard	Protection, even for special motors	300	5 to 10
Screw compressor	Standard	Protection against inversion of direction of phase rotation Contact for automatic draining on stopping	300	3 to 20
Centrifugal compressor	Standard Severe if > 30 s	Protection against inversion of direction of phase rotation Contact for automatic emptying on stopping	350	10 to 40
Piston compressor	Standard	Protection against inversion of direction of phase rotation Contact for automatic emptying on stopping	350	5 to 10
Conveyor, transporter	Standard	Overload control for detecting faults or underload control for detecting breaks	300	3 to 10
Lifting screw	Standard	Overload control for detecting hard spots or underload control for detecting breaks	300	3 to 10
Drag lift	Standard	Overload control for detecting jamming or underload control for detecting breaks	400	2 to 10
Lift	Standard	Overload control for detecting jamming or underload control for detecting breaks Constant starting with variable load	350	5 to 10
Circular saw, band saw	Standard Severe if > 30 s	Braking for fast stop	300	10 to 60
Pulper, butchery knife	Severe	Torque control on starting	400	3 to 10
Agitator	Standard	The current display indicates the density of the product	350	5 to 20
Mixer	Standard	The current display indicates the density of the product	350	5 to 10
Grinder	Severe	Braking to limit vibrations during stopping, overload control to detect jamming	450	5 to 60
Crusher	Severe	Braking to limit vibrations during stopping, overload control to detect jamming	400	10 to 40
Refiner	Standard	Torque control on starting and stopping	300	5 to 30
Press	Severe	Braking to increase the number of cycles	400	20 to 60

Special uses

Other criteria can influence the selection of the Altistart 48:

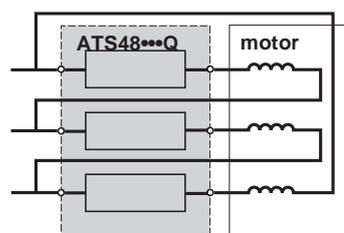
Starter wired to the motor delta terminal

(see the recommended application diagram on page 60524/4)

In addition to the most frequently encountered wiring layouts, where the starter is installed in the line supply of the motor and the motor is connected in star or delta configuration, the Altistart 48 ATS48***Q can be wired to the motor delta terminal in series with each winding (see the application diagram below). The starter current is lower than the line current absorbed by the motor by a ratio of $\sqrt{3}$. This type of installation enables a starter with a lower rating to be used.

Example: For a 400 V/110 kW motor with a line current of 195 A (nominal current for the delta connection), the current in each winding is equal to $195/\sqrt{3}$, i.e. 114 A. Select the starter rating with a maximum permanent nominal current just above this current, i.e. 140A (ATS48C14Q for a standard application). To avoid making this calculation, simply use the table on page 60522/3.

This type of installation only permits freewheel stopping and is not compatible with the cascade and preheating functions.



Starter wired in series with the motor windings

Note: The nominal current and limiting current settings as well as the current displayed during operation are on-line values (so do not have to be calculated by the user).

Caution: For this type of installation, observe the wiring scheme and the associated recommendations on page 60524/4.

Starter bypassed by a contactor

(see the recommended application diagram on page 60524/3)

The starter can be bypassed by a contactor at the end of starting (to limit the heat dissipated by the starter). The bypass contactor is controlled by the starter and the current measurements and protective mechanisms remain active when the starter is bypassed.

The starter is selected on the basis of the 3 main criteria and one of the following criteria:

- If the starter is bypassed at the end of starting, the motor is always started from cold state and the starter can be oversized by one rating.

Example: Select an ATS 48D17Q for an 11 kW motor in a standard 400 V application.

- If the starter must be able to operate without the bypass contactor at the end of starting, it does not have to be derated.

Example: Select an ATS 48D17Q for a 7.5 kW motor in a standard 400 V application.

Special uses (continued)

Motors in parallel

Motors may be connected in parallel provided that the power limit of the starter is not exceeded (the sum of the motor currents must not exceed the nominal current of the starter selected depending on the type of application). Provide thermal protection for each motor.

Brush motor

The Altistart 48 can operate with a bypassed stator resistance motor or with a resistance lug. The starting torque is modified in accordance with the rotor resistance. If necessary, maintain a low resistance in order to obtain the required torque to overcome the resistive torque on starting.

A bypassed brush motor has a very low starting torque. A high stator current is required to obtain the sufficient starting torque.

Oversize the starter in order that the value of the limiting current is 7 times that of the nominal current.

Note: Ensure that the starting torque of the motor, equal to 7 times the nominal current, is greater than the resistive torque.

Note: The Altistart 48 torque control enables excellent soft starting despite the limiting current being 7 times the nominal current required to start the motor.

Dahlander motor and 2-speed motor

The Altistart 48 can operate with a 2-speed motor. A motor demagnetisation period must elapse before changing from low speed to high speed in order to avoid antiphases between the line supply and the motor, which would generate very high currents.

Select the starter using the 3 main criteria.

Very long cable

Very long motor cables cause voltage drops due to the resistance of the cable. If the voltage drop is significant, it could affect the current consumption and the torque available. This must therefore be taken into account when selecting the motor and the starter.

Starters in parallel on the same line supply

If several starters are installed on the same line supply, line chokes should be installed between the transformer and the starter (see page 60528/3).

Recommendations for use

Caution: Do not use the Altistart 48 upstream of loads other than motors (for example transformers and resistors are forbidden).

Do not connect power factor correction capacitors to the terminals of a motor controlled by an Altistart 48.