Soft start/soft stop units Altistart 48

for asynchronous motors

Catalog

October 2014

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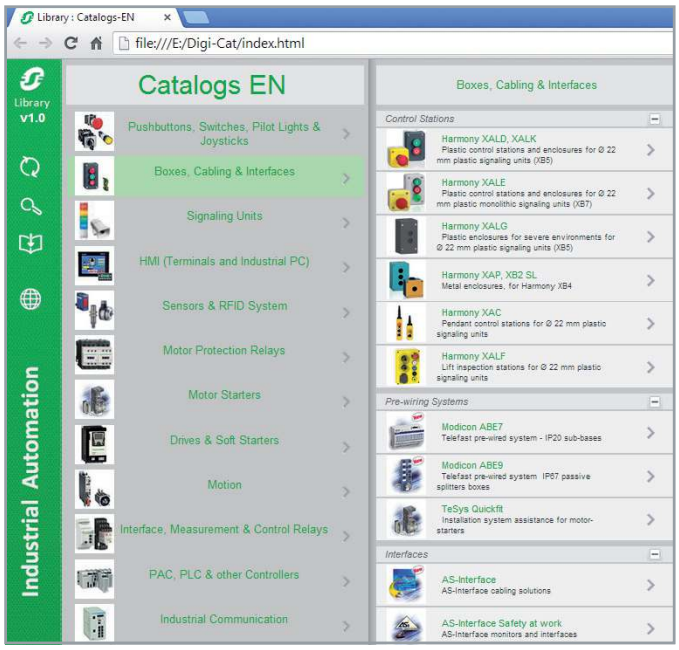

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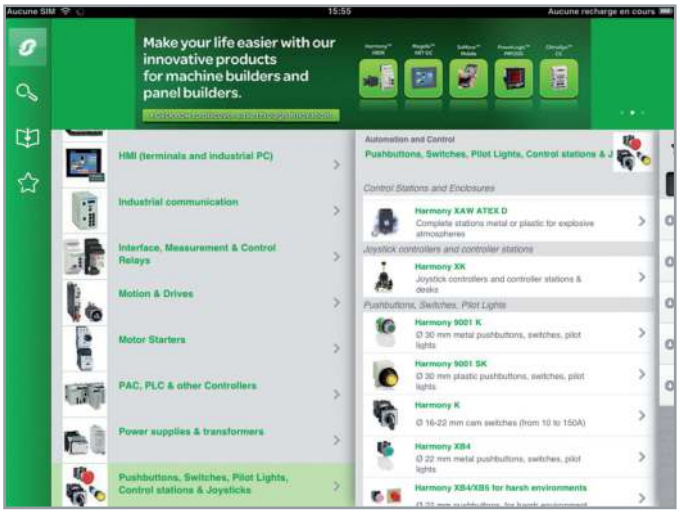

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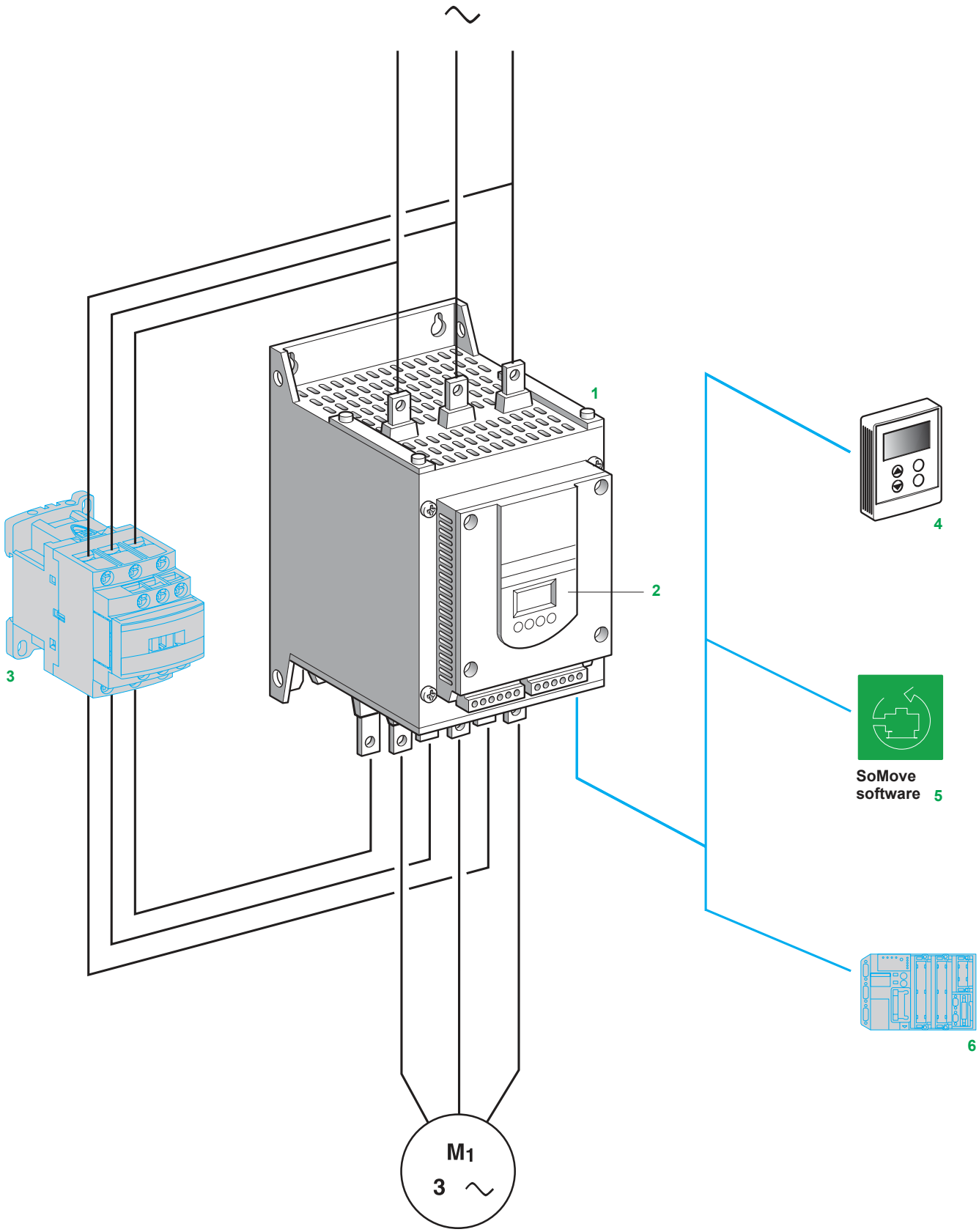
Soft starters for asynchronous motors

Applications		Starting simple machines	Controlled starting and deceleration of simple machines
Power range for 50…60 Hz line supply (kW/*HP*) (connection to the motor power supply line)		**0.37…11/*0.5...15***	**0.75…15/*1...20***
	Single-phase 110…230 V (kW)	0.37…2.2	–
	Three-phase 200…240 V (kW/*HP*)	–	0.75…7.5/*1...10*
	Three-phase 200…480 V (kW/*HP*)	0.37…11/*0.5...15*	–
	Three-phase 208…600 V (kW/*HP*)	–	
	Three-phase 208…690 V (kW/*HP*)	–	
	Three-phase 230…415 V (kW)	–	
	Three-phase 230…440 V (kW)	–	
	Three-phase 380…415 V (kW)	–	1.5…15
	Three-phase 440...480 V (*HP*)	–	*2...20*
Drive	Number of controlled phases	1	2
	Type of control	–	
	Operating cycle	–	
Functions Bypass		Integrated	
Number of I/Os	Analog inputs	–	
	Logic inputs	–	
	Analog outputs	–	
	Logic outputs	–	
	Relay outputs	–	
Communication	Integrated	–	
	Available as an option	–	
Standards and certifications		IEC/EN 60947-4-2 CE, UL, CSA, C-Tick, and CCC	
References		**ATS01N1●●●●**	**ATS01N2●●●●**
Pages		Please refer to the Altistart 01 catalog.	

Controlled starting and deceleration of simple and complex machines		
4…400/*3...500*	**3…630**	**3...900/*3...1,200***
–		
–		
–		
4…400/*3...500*	–	
–		3…900/*3...1,200*
–	3…630	–
4…355	–	
–		
–		
3		
Configurable voltage ramp	TCS (Torque Control System)	
Standard	Standard and severe	
Integrated	Available as an option	
1 PTC probe		
3	4	
–	1	
–	2	
2 (CO)	3	
Modbus		
–	Fipio, PROFIBUS DP, DeviceNet, Modbus TCP	
IEC/EN 60947-4-2, EMC class A CE, UL, CSA, C-Tick, GOST, CCC	IEC/EN 60947-4-2, EMC class A and B CE, UL, CSA, DNV, C-Tick, GOST, CCC, NOM, SEPRO, and TCF	
ATS22●●●●	**ATS48●●●Q**	**ATS48●●●Y**
Please refer to the Altistart 22 catalog.	10	12

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units



References:
pages 10 to 13

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Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

Applications

The Altistart 48 soft start/soft stop unit is a controller with 6 thyristors used for torque-controlled soft starting and stopping of three-phase squirrel cage asynchronous motors, for power ratings between 4 and 900 kW.

It offers soft starting and deceleration functions along with machine and motor protection functions, as well as functions for communicating with control systems.
These functions are designed for use in the most common applications for centrifugal machines, pumps, fans, compressors and conveyors, which are primarily to be found in the construction, food and beverage and chemical industries. The high-performance algorithms of the Altistart 48 contribute significantly to its ruggedness, safety and ease of setup.

The Altistart 48 soft start/soft stop unit is a cost-effective solution which can:
- reduce machine operating costs by reducing mechanical stress and improving machine availability,
- reduce the stress on the electrical distribution system by reducing line current peaks and voltage drops during motor starts.
- The Altistart 48 soft start/soft stop unit offer comprises 2 ranges:
  - three-phase voltages 230 V to 415 V, 50/60 Hz,
  - three-phase voltages 208 V to 690 V, 50/60 Hz.

In each voltage range, the Altistart 48 soft start/soft stop units are sized for standard and severe applications.

Functions

The Altistart 48 soft start/soft stop unit **1** is supplied ready for use in a standard application with class 10 motor protection.

It comprises an integrated display terminal **2**, which can be used to modify the programming, adjustment or monitoring functions in order to adapt and customize the application to meet individual customer requirements.

- **Drive performance functions**:
  - exclusive Altistart torque control (patented by Schneider Electric),
  - constant control of the torque supplied to the motor during acceleration and deceleration periods (significantly reducing pressure surges),
  - ease of adjusting the ramp and the starting torque,
  - option of bypassing the starter using a contactor **3** at the end of the starting period whilst maintaining electronic protection (bypass function),
  - wide frequency tolerance for generator set power supplies,
  - option of connecting the starter to the motor delta terminals in series with each winding.
- **Machine and motor protection functions:**
  - built-in motor thermal protection,
  - processing of information from PTC thermal probes,
  - monitoring of the starting time,
  - motor preheating function,
  - protection against underloads and overcurrents in steady state.
- **Functions to ease integration into control systems:**
  - 4 logic inputs, 2 logic outputs, 3 relay outputs and 1 analog output,
  - plug-in I/O connectors,
  - function for configuring a second motor and easy-to-adapt settings,
  - display of electrical values, the state of the load and the operating time,
  - RS 485 serial link for connection to Modbus serial link.

Advantage of starting with Altistart 48

- Conventional electronic starting

To resolve problems such as:
- mechanical stress on starting,
- hydraulic transients on acceleration and deceleration in pumping applications, conventional electronic starting methods use a number of current limits, or switch several voltage ramps.

This makes adjustment complex and it has to be modified each time the load changes.

- Starting with the Altistart 48

Altistart 48 torque control enables starting without mechanical stress and smooth control of hydraulic transitions, with a single acceleration ramp.
Making adjustments is quick and easy, whatever the load.

Options

- A remote terminal can be mounted on the door of a wall-fixing or floor-standing enclosure **4**.
- SoMove setup software for PC **5**:

SoMove software incorporates various functions for the device setup phases:
- configuration preparation,
- commissioning,
- maintenance.

For more detailed information, please consult our “SoMove - Setup software for motor control devices” specialist catalogue which can be downloaded from our website www.schneider-electric.com.
- A wiring accessories offer making it easy to connect the starter to PLCs on a Modbus serial link connection **6**.
- Communication options for Ethernet, Fipio, DeviceNet and Profibus DP buses and networks.

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

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

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

- Two line supply voltage ranges are available for selection:
  - 3-phase AC supply: 230 – 415 V,
  - 3-phase AC supply: 208 – 690 V.

- The power and nominal current on the motor rating plate.

- The type of application and the operating cycle.

To simplify selection, applications are categorized as one of 2 types:
- standard applications,
- severe applications.

Standard or severe applications define the limit 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 In for 23 seconds or at 3 In for 46 seconds from cold state (corresponding to motor duty S1).

- Starting at 3 In for 23 seconds or at 4 In 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.
Example: centrifugal pump.

Severe application

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

- Starting at 4 In for 48 seconds or at 3 In for 90 seconds from cold state (corresponding to motor duty S1).

- Starting at 4 In for 25 seconds with a load factor of 50% and 5 starts per hour or an equivalent thermal cycle (corresponding to motor duty S4).

The motor thermal protection must conform to protection class 20.
Example: grinder.

Motor duties

S1 motor duty is based on starting followed by operation at constant load, making it possible to achieve thermal equilibrium.
S4 motor duty is based on a cycle consisting of starting, operation at constant load and an idle period.
This cycle is characterized by a load factor of 50%.

Selecting the starter

Once the appropriate application has been selected from the following page, select the starter from page 10 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.

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

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 (% In)	Starting time (s)
Centrifugal pump	Standard	Deceleration (reduction in pressure surges) Protection against underload or reversal of phase rotation direction	300	5 to 15
Piston pump	Standard	Control of pump priming and the pump's direction of rotation	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 reversal of phase rotation direction Contact for automatic draining on stopping	300	3 to 20
Centrifugal compressor	Standard Severe if > 30 s	Protection against reversal of phase rotation direction Contact for automatic draining on stopping	350	10 to 40
Piston compressor	Standard	Protection against reversal of phase rotation direction Contact for automatic draining on stopping	350	5 to 10
Conveyor, transporter	Standard	Monitoring of overloads for incident detection or underloads for break detection	300	3 to 10
Lifting screw	Standard	Monitoring of overloads for hard spot detection or underloads for break detection	300	3 to 10
Drag lift	Standard	Monitoring of overloads for jamming detection or underloads for break detection	400	2 to 10
Elevator	Standard	Monitoring of overloads for jamming detection or underloads for break detection 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 material	350	5 to 20
Mixer	Standard	The current display indicates the density of the material	350	5 to 10
Grinder	Severe	Braking to limit vibrations during stopping, monitoring of overloads for jamming detection	450	5 to 60
Crusher	Severe	Braking to limit vibrations during stopping, monitoring of overloads for jamming detection	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

Presentation:
page 4

References:
page 10

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

Special uses

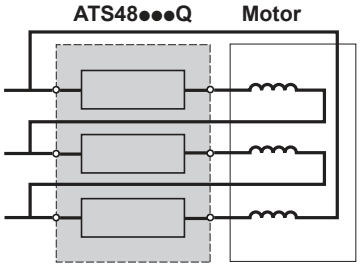
Other criteria can influence selection of the Altistart 48 rating:

Starter wired to the motor delta terminals

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 terminals in series with each winding (see figure below). The starter current is lower by a ratio of $\sqrt{3}$ than the line current absorbed by the motor. 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 (current indicated on the rating plate 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. 140 A (ATS48C14Q for a standard application).
To avoid the need to do this calculation, simply use the table on page 11.

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.

Starter bypassed by a contactor

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 needs to 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.

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

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 be less than the nominal current of the starter chosen according to the type of application). Provide thermal protection for each motor.

Slip-ring motors

The Altistart 48 can operate with a bypassed rotor resistance motor or with a threshold resistor. The starting torque is modified according to the rotor resistance. If necessary, keep a low-value resistor in order to obtain the required torque to overcome the resistive torque on starting.
A bypassed slip-ring motor has very low starting torque. A high stator current is required to obtain sufficient starting torque.
Oversize the starter in order to have a limiting current 7 times that of the nominal current.

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

Comment: 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 demagnetization 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 27).

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.

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

Line voltage 230...415 V

Connection in the motor supply line

106762SE

ATS48D17Q

106761SE

ATS48C14Q

106758SE

ATS48M12Q

For standard applications

Motor		Starter 230...415 V - 50/60 Hz				
Motor power *(1)*		Nominal current (IcL) *(2)*	Factory setting current *(4)*	Dissipated power at nominal load	Reference	Weight
230 V	400 V					
kW	kW	A	A	W		kg/*lb*
4	7.5	17	14.8	59	**ATS48D17Q**	4.900/*10.803*
5.5	11	22	21	74	**ATS48D22Q**	4.900/*10.803*
7.5	15	32	28.5	104	**ATS48D32Q**	4.900/*10.803*
9	18.5	38	35	116	**ATS48D38Q**	4.900/*10.803*
11	22	47	42	142	**ATS48D47Q**	4.900/*10.803*
15	30	62	57	201	**ATS48D62Q**	8.300/*18.298*
18.5	37	75	69	245	**ATS48D75Q**	8.300/*18.298*
22	45	88	81	290	**ATS48D88Q**	8.300/*18.298*
30	55	110	100	322	**ATS48C11Q**	8.300/*18.298*
37	75	140	131	391	**ATS48C14Q**	12.400/*27.337*
45	90	170	162	479	**ATS48C17Q**	12.400/*27.337*
55	110	210	195	580	**ATS48C21Q**	18.200/*40.124*
75	132	250	233	695	**ATS48C25Q**	18.200/*40.124*
90	160	320	285	902	**ATS48C32Q**	18.200/*40.124*
110	220	410	388	1339	**ATS48C41Q**	51.400/*113.317*
132	250	480	437	1386	**ATS48C48Q**	51.400/*113.317*
160	315	590	560	1731	**ATS48C59Q**	51.400/*113.317*
–	355	660	605	1958	**ATS48C66Q**	51.400/*113.317*
220	400	790	675	2537	**ATS48C79Q**	115.000/*253.531*
250	500	1000	855	2865	**ATS48M10Q**	115.000/*253.531*
355	630	1200	1045	3497	**ATS48M12Q**	115.000/*253.531*

For severe applications

Motor		Starter 230...415 V - 50/60 Hz				
Motor power *(1)*		Nominal current *(3)*	Factory setting current *(4)*	Dissipated power at nominal load	Reference	Weight
230 V	400 V					
kW	kW	A	A	W		kg/*lb*
3	5.5	12	14.8	46	**ATS48D17Q**	4.900/*10.803*
4	7.5	17	21	59	**ATS48D22Q**	4.900/*10.803*
5.5	11	22	28.5	74	**ATS48D32Q**	4.900/*10.803*
7.5	15	32	35	99	**ATS48D38Q**	4.900/*10.803*
9	18.5	38	42	116	**ATS48D47Q**	4.900/*10.803*
11	22	47	57	153	**ATS48D62Q**	8.300/*18.298*
15	30	62	69	201	**ATS48D75Q**	8.300/*18.298*
18.5	37	75	81	245	**ATS48D88Q**	8.300/*18.298*
22	45	88	100	252	**ATS48C11Q**	8.300/*18.298*
30	55	110	131	306	**ATS48C14Q**	12.400/*27.337*
37	75	140	162	391	**ATS48C17Q**	12.400/*27.337*
45	90	170	195	468	**ATS48C21Q**	18.200/*40.124*
55	110	210	233	580	**ATS48C25Q**	18.200/*40.124*
75	132	250	285	695	**ATS48C32Q**	18.200/*40.124*
90	160	320	388	1017	**ATS48C41Q**	51.400/*113.317*
110	220	410	437	1172	**ATS48C48Q**	51.400/*113.317*
132	250	480	560	1386	**ATS48C59Q**	51.400/*113.317*
160	315	590	605	1731	**ATS48C66Q**	51.400/*113.317*
–	355	660	675	2073	**ATS48C79Q**	115.000/*253.531*
220	400	790	855	2225	**ATS48M10Q**	115.000/*253.531*
250	500	1000	1045	2865	**ATS48M12Q**	115.000/*253.531*

(1) Value indicated on the motor rating plate.
(2) Corresponds to the maximum continuous current in class 10. IcL corresponds to the starter rating.
(3) Corresponds to the maximum continuous current in class 20.
(4) The factory setting current corresponds to the nominal current of a standard 4-pole, 400 V, class 10 motor (standard application). Adjust it in line with the current indicated on the motor rating plate.

Presentation:
pages 4 and 5

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

Line voltage 230...415 V

Connection to the motor delta terminals

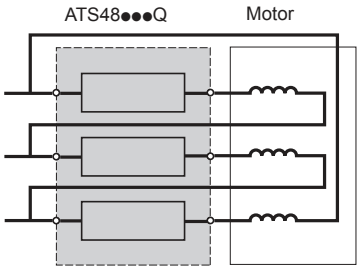


Figure 1
Special use:
starter connected to the motor delta terminals, in series with each winding.

For standard applications according to figure 1

Motor		Starter 230...415 V - 50/60 Hz				
Motor power *(1)*		Nominal current *(2)*	Factory setting current *(4)*	Dissipated power at nominal load	Reference	Weight
230 V	400 V					
kW	kW	A	A	W		kg/*lb*
7.5	15	29	14.8	59	**ATS48D17Q**	4.900/*10.803*
9	18.5	38	21	74	**ATS48D22Q**	4.900/*10.803*
15	22	55	28.5	104	**ATS48D32Q**	4.900/*10.803*
18.5	30	66	35	116	**ATS48D38Q**	4.900/*10.803*
22	45	81	42	142	**ATS48D47Q**	4.900/*10.803*
30	55	107	57	201	**ATS48D62Q**	8.300/*18.298*
37	55	130	69	245	**ATS48D75Q**	8.300/*18.298*
45	75	152	81	290	**ATS48D88Q**	8.300/*18.298*
55	90	191	100	322	**ATS48C11Q**	8.300/*18.298*
75	110	242	131	391	**ATS48C14Q**	12.400/*27.337*
90	132	294	162	479	**ATS48C17Q**	12.400/*27.337*
110	160	364	195	580	**ATS48C21Q**	18.200/*40.124*
132	220	433	233	695	**ATS48C25Q**	18.200/*40.124*
160	250	554	285	902	**ATS48C32Q**	18.200/*40.124*
220	315	710	388	1339	**ATS48C41Q**	51.400/*113.317*
250	355	831	437	1386	**ATS48C48Q**	51.400/*113.317*
–	400	1022	560	1731	**ATS48C59Q**	51.400/*113.317*
315	500	1143	605	1958	**ATS48C66Q**	51.400/*113.317*
355	630	1368	675	2537	**ATS48C79Q**	115.000/*253.531*
–	710	1732	855	2865	**ATS48M10Q**	115.000/*253.531*
500	–	2078	1045	3497	**ATS48M12Q**	115.000/*253.531*

For severe applications according to figure 1

Motor		Starter 230...415 V - 50/60 Hz				
Motor power *(1)*		Nominal current *(3)*	Factory setting current *(4)*	Dissipated power at nominal load	Reference	Weight
230 V	400 V					
kW	kW	A	A	W		kg/*lb*
5.5	11	22	14.8	46	**ATS48D17Q**	4.900/*10.803*
7.5	15	29	21	59	**ATS48D22Q**	4.900/*10.803*
9	18.5	38	28.5	74	**ATS48D32Q**	4.900/*10.803*
15	22	55	35	99	**ATS48D38Q**	4.900/*10.803*
18.5	30	66	42	116	**ATS48D47Q**	4.900/*10.803*
22	45	81	57	153	**ATS48D62Q**	8.300/*18.298*
30	55	107	69	201	**ATS48D75Q**	8.300/*18.298*
37	55	130	81	245	**ATS48D88Q**	8.300/*18.298*
45	75	152	100	252	**ATS48C11Q**	8.300/*18.298*
55	90	191	131	306	**ATS48C14Q**	12.400/*27.337*
75	110	242	162	391	**ATS48C17Q**	12.400/*27.337*
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110	160	364	233	580	**ATS48C25Q**	18.200/*40.124*
132	220	433	285	695	**ATS48C32Q**	18.200/*40.124*
160	250	554	388	1017	**ATS48C41Q**	51.400/*113.317*
220	315	710	437	1172	**ATS48C48Q**	51.400/*113.317*
250	355	831	560	1386	**ATS48C59Q**	51.400/*113.317*
–	400	1022	605	1731	**ATS48C66Q**	51.400/*113.317*
315	500	1143	675	2073	**ATS48C79Q**	115.000/*253.531*
355	630	1368	855	2225	**ATS48M10Q**	115.000/*253.531*
–	710	1732	1045	2865	**ATS48M12Q**	115.000/*253.531*

(1) Value indicated on the motor rating plate.
(2) Corresponds to the maximum continuous current in class 10.
(3) Corresponds to the maximum continuous current in class 20.
(4) For this type of connection, the factory setting current must be adjusted in line with the current indicated on the motor rating plate.

Presentation:
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Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

Line voltage 208...690 V
Motor power given in HP

106762SE

ATS48D17Y

106761SE

ATS48C14Y

106758SE

ATS48M12Y

For standard applications

Motor				Starter 208...690 V - 50/60 Hz				
Motor power (1)				Nominal current (IcL) (2)	Factory setting current (4)	Dissipated power at nominal load	Reference	Weight
208 V	230 V	460 V	575 V					
HP	HP	HP	HP	A	A	W		kg/lb
3	5	10	15	17	14	59	ATS48D17Y	4.900/10.803
5	7.5	15	20	22	21	74	ATS48D22Y	4.900/10.803
7.5	10	20	25	32	27	104	ATS48D32Y	4.900/10.803
10	–	25	30	38	34	116	ATS48D38Y	4.900/10.803
–	15	30	40	47	40	142	ATS48D47Y	4.900/10.803
15	20	40	50	62	52	201	ATS48D62Y	8.300/18.298
20	25	50	60	75	65	245	ATS48D75Y	8.300/18.298
25	30	60	75	88	77	290	ATS48D88Y	8.300/18.298
30	40	75	100	110	96	322	ATS48C11Y	8.300/18.298
40	50	100	125	140	124	391	ATS48C14Y	12.400/27.337
50	60	125	150	170	156	479	ATS48C17Y	12.400/27.337
60	75	150	200	210	180	580	ATS48C21Y	18.200/40.124
75	100	200	250	250	240	695	ATS48C25Y	18.200/40.124
100	125	250	300	320	302	902	ATS48C32Y	18.200/40.124
125	150	300	350	410	361	1339	ATS48C41Y	51.400/113.317
150	–	350	400	480	414	1386	ATS48C48Y	51.400/113.317
–	200	400	500	590	477	1731	ATS48C59Y	51.400/113.317
200	250	500	600	660	590	1958	ATS48C66Y	51.400/113.317
250	300	600	800	790	720	2537	ATS48C79Y	115.000/253.531
350	350	800	1000	1000	954	2865	ATS48M10Y	115.000/253.531
400	450	1000	1200	1200	1170	3497	ATS48M12Y	115.000/253.531

For severe applications

Motor				Starter 208...690 V - 50/60 Hz				
Motor power (1)				Nominal current (3)	Factory setting current (4)	Dissipated power at nominal load	Reference	Weight
208 V	230 V	460 V	575 V					
HP	HP	HP	HP	A	A	W		kg/lb
2	3	7.5	10	12	14	46	ATS48D17Y	4.900/10.803
3	5	10	15	17	21	59	ATS48D22Y	4.900/10.803
5	7.5	15	20	22	27	74	ATS48D32Y	4.900/10.803
7.5	10	20	25	32	34	99	ATS48D38Y	4.900/10.803
10	–	25	30	38	40	116	ATS48D47Y	4.900/10.803
–	15	30	40	47	52	153	ATS48D62Y	8.300/18.298
15	20	40	50	62	65	201	ATS48D75Y	8.300/18.298
20	25	50	60	75	77	245	ATS48D88Y	8.300/18.298
25	30	60	75	88	96	252	ATS48C11Y	8.300/18.298
30	40	75	100	110	124	306	ATS48C14Y	12.400/27.337
40	50	100	125	140	156	391	ATS48C17Y	12.400/27.337
50	60	125	150	170	180	468	ATS48C21Y	18.200/40.124
60	75	150	200	210	240	580	ATS48C25Y	18.200/40.124
75	100	200	250	250	302	695	ATS48C32Y	18.200/40.124
100	125	250	300	320	361	1017	ATS48C41Y	51.400/113.317
125	150	300	350	410	414	1172	ATS48C48Y	51.400/113.317
150	–	350	400	480	477	1386	ATS48C59Y	51.400/113.317
–	200	400	500	590	590	1731	ATS48C66Y	51.400/113.317
200	250	500	600	660	720	2073	ATS48C79Y	115.000/253.531
250	300	600	800	790	954	2225	ATS48M10Y	115.000/253.531
350	350	800	1000	1000	1170	2865	ATS48M12Y	115.000/253.531

(1) Value indicated on the motor rating plate.
(2) Corresponds to the maximum continuous current in class 10. IcL corresponds to the starter rating.
(3) Corresponds to the maximum continuous current in class 20.
(4) The factory setting current corresponds to the nominal current of a standard NEC, 460 V, class 10 motor (standard application). Adjust it in line with the current indicated on the motor rating plate.

Presentation:
pages 4 and 5

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

Line voltage 208...690 V
Motor power in kW

For standard applications

Motor							Starter 208...690 V - 50/60 Hz				
Motor power (1)							Nominal current (IcL) (2)	Factory setting current (4)	Dissipated power at nominal load	Reference	Weight
230 V	400 V	440 V	500 V	525 V	660 V	690 V					
kW	kW	kW	kW	kW	kW	kW	A	A	W		kg/lb
4	7.5	7.5	9	9	11	15	17	14	59	**ATS48D17Y**	4.900/10.803
5.5	11	11	11	11	15	18.5	22	21	74	**ATS48D22Y**	4.900/10.803
7.5	15	15	18.5	18.5	22	22	32	27	104	**ATS48D32Y**	4.900/10.803
9	18.5	18.5	22	22	30	30	38	34	116	**ATS48D38Y**	4.900/10.803
11	22	22	30	30	37	37	47	40	142	**ATS48D47Y**	4.900/10.803
15	30	30	37	37	45	45	62	52	201	**ATS48D62Y**	8.300/18.298
18.5	37	37	45	45	55	55	75	65	245	**ATS48D75Y**	8.300/18.298
22	45	45	55	55	75	75	88	77	290	**ATS48D88Y**	8.300/18.298
30	55	55	75	75	90	90	110	96	322	**ATS48C11Y**	8.300/18.298
37	75	75	90	90	110	110	140	124	391	**ATS48C14Y**	12.400/27.337
45	90	90	110	110	132	160	170	156	479	**ATS48C17Y**	12.400/27.337
55	110	110	132	132	160	200	210	180	580	**ATS48C21Y**	18.200/40.124
75	132	132	160	160	220	250	250	240	695	**ATS48C25Y**	18.200/40.124
90	160	160	220	220	250	315	320	302	902	**ATS48C32Y**	18.200/40.124
110	220	220	250	250	355	400	410	361	1339	**ATS48C41Y**	51.400/113.317
132	250	250	315	315	400	500	480	414	1386	**ATS48C48Y**	51.400/113.317
160	315	355	400	400	560	560	590	477	1731	**ATS48C59Y**	51.400/113.317
–	355	400	–	–	630	630	660	590	1958	**ATS48C66Y**	51.400/113.317
220	400	500	500	500	710	710	790	720	2537	**ATS48C79Y**	115.000/253.531
250	500	630	630	630	900	900	1000	954	2865	**ATS48M10Y**	115.000/253.531
355	630	710	800	800	–	–	1200	1170	3497	**ATS48M12Y**	115.000/253.531

For severe applications

Motor							Starter 208...690 V - 50/60 Hz				
Motor power (1)							Nominal current (3)	Factory setting current (4)	Dissipated power at nominal load	Reference	Weight
230 V	400 V	440 V	500 V	525 V	660 V	690 V					
kW	kW	kW	kW	kW	kW	kW	A	A	W		kg/lb
3	5.5	5.5	7.5	7.5	9	11	12	14	46	**ATS48D17Y**	4.900/10.803
4	7.5	7.5	9	9	11	15	17	21	59	**ATS48D22Y**	4.900/10.803
5.5	11	11	11	11	15	18.5	22	27	74	**ATS48D32Y**	4.900/10.803
7.5	15	15	18.5	18.5	22	22	32	34	99	**ATS48D38Y**	4.900/10.803
9	18.5	18.5	22	22	30	30	38	40	116	**ATS48D47Y**	4.900/10.803
11	22	22	30	30	37	37	47	52	153	**ATS48D62Y**	8.300/18.298
15	30	30	37	37	45	45	62	65	201	**ATS48D75Y**	8.300/18.298
18.5	37	37	45	45	55	55	75	77	245	**ATS48D88Y**	8.300/18.298
22	45	45	55	55	75	75	88	96	252	**ATS48C11Y**	8.300/18.298
30	55	55	75	75	90	90	110	124	306	**ATS48C14Y**	12.400/27.337
37	75	75	90	90	110	110	140	156	391	**ATS48C17Y**	12.400/27.337
45	90	90	110	110	132	160	170	180	468	**ATS48C21Y**	18.200/40.124
55	110	110	132	132	160	200	210	240	580	**ATS48C25Y**	18.200/40.124
75	132	132	160	160	220	250	250	302	695	**ATS48C32Y**	18.200/40.124
90	160	160	220	220	250	315	320	361	1017	**ATS48C41Y**	51.400/113.317
110	220	220	250	250	355	400	410	414	1172	**ATS48C48Y**	51.400/113.317
132	250	250	315	315	400	500	480	477	1386	**ATS48C59Y**	51.400/113.317
160	315	355	400	400	560	560	590	590	1731	**ATS48C66Y**	51.400/113.317
–	355	400	–	–	630	630	660	720	2073	**ATS48C79Y**	115.000/253.531
220	400	500	500	500	710	710	790	954	2225	**ATS48M10Y**	115.000/253.531
250	500	630	630	630	900	900	1000	1170	2865	**ATS48M12Y**	115.000/253.531

(1) Value indicated on the motor rating plate.
(2) Corresponds to the maximum continuous current in class 10. IcL corresponds to the starter rating.
(3) Corresponds to the maximum continuous current in class 20.
(4) The factory setting current corresponds to the nominal current of a standard NEC, 460 V, class 10 motor (standard application). Adjust it in line with the current indicated on the motor rating plate.

Presentation:
pages 4 and 5

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

230 V power supply
Type 1 coordination

Compatible components according to standards IEC 60947-4-1 and IEC 60947-4-2

Use either a circuit-breaker (light green columns), contactor, starter combination or a switch/fuse (dark green columns), contactor, starter combination

Motor		Starter (1)		Circuit-breaker		Type of contactor	Type of switch or switch disconnector (bare unit)	aM fuses			
		Class 10 Standard applications	Class 20 Severe applications	Reference	Rating			Unit reference (3)		Size	Rating
kW	A				A			Without striker	With striker		A
M1		A1		Q1		KM1, KM2, KM3					
3	11.5	–	ATS48D17●	GV2L20	18	LC1D18	LS1D32	DF2CA16	–	10 x 38	–
				NS80HMA	12.5	LC1D18	LS1D32	DF2CA16	–	10 x 38	16
4	14.5	ATS48D17●	ATS48D22●	GV2L20	18	LC1D18	LS1D32	DF2CA16	–	10 x 38	16
				NS80HMA	25	LC1D18	LS1D32	DF2CA16	–	10 x 38	16
5.5	20	ATS48D22●	ATS48D32●	GV2L22	25	LC1D25	LS1D32	DF2CA25	–	10 x 38	25
				NS80HMA	25	LC1D25	LS1D32	DF2CA25	–	10 x 38	25
7.5	27	ATS48D32●	ATS48D38●	GV2L32	32	LC1D32	GK1EK	DF2EA32	DF3EA32	14 x 51	32
				NS80HMA	50	LC1D32	GK1EK	DF2EA32	DF3EA32	14 x 51	32
9	32	ATS48D38●	ATS48D47●	GV3L40	40	LC1D38	GK1EK	DF2EA40	DF3EA40	14 x 51	40
				NS80HMA	50	LC1D38	GK1EK	DF2EA40	DF3EA40	14 x 51	40
11	39	ATS48D47●	ATS48D62●	GV3L65	65	LC1D50A	GS1K	DF2FA50	DF3FA50	22 x 58	50
				NS80HMA	50	LC1D50A	GS1K	DF2FA50	DF3FA50	22 x 58	50
15	52	ATS48D62●	ATS48D75●	GV3L65	65	LC1D65A	GS1K	DF2FA80	DF3FA80	22 x 58	80
				NS80HMA	80	LC1D65A	GS1K	DF2FA80	DF3FA80	22 x 58	80
18.5	64	ATS48D75●	ATS48D88●	NS80HMA	80	LC1D80	GS1K	DF2FA80	DF3FA80	22 x 58	80
22	75	ATS48D88●	ATS48C11●	NSX100●MA (2)	100	LC1D115	GS1K	DF2FA100	DF3FA100	22 x 58	100
30	103	ATS48C11●	ATS48C14●	NSX160●MA (2)	150	LC1D115	GS1K	DF2FA125	DF4FA125	22 x 58	125
37	126	ATS48C14●	ATS48C17●	NSX160●MA (2)	150	LC1D150	GS1L	DF2GA1161	DF4GA1161	0	160
45	150	ATS48C17●	ATS48C21●	NSX250●MA (2)	220	LC1F185	GS1N	DF2HA1201	DF4HA1201	1	200
55	182	ATS48C21●	ATS48C25●	NSX250●MA (2)	220	LC1F225	GS1N	DF2HA1201	DF4HA1201	1	200
75	240	ATS48C25●	ATS48C32●	NSX400● (2) Micrologic 1.3M	320	LC1F265	GS1QQ	DF2JA1251	DF4JA1251	2	250
90	295	ATS48C32●	ATS48C41●	NSX400● (2) Micrologic 1.3M	320	LC1F330	GS1QQ	DF2JA1311	DF4JA1311	2	315
110	356	ATS48C41●	ATS48C48●	NSX630● (2) Micrologic 1.3M	500	LC1F400	GS1S	DF2KA1401	DF4KA1401	3	400
132	425	ATS48C48●	ATS48C59●	NSX630● (2) Micrologic 1.3M	500	LC1F500	GS1S	DF2KA1501	DF4KA1501	3	500
160	520	ATS48C59●	ATS48C66●	NS630b● (2) Micrologic 5.0 LR Off	630	LC1F630	GS1S	DF2KA1631	DF4KA1631	3	630
200	630	ATS48C66●	ATS48C79●	NS800● (2) Micrologic 5.0 LR Off	800	LC1F800	GS1S	DF2KA1631	DF4KA1631	3	630
220	700	ATS48C79●	ATS48M10●	NS800● (2) Micrologic 5.0 LR Off	800	LC1F800	GS1V	DF2LA1801	DF4LA1801	4	800
250	800	ATS48M10●	ATS48M12●	NS1000● (2) Micrologic 5.0 LR Off	1000	LC1BM33	GS1V	DF2LA1101	DF4LA1101	4	1000
355	1115	ATS48M12●	–	NS1250● (2) Micrologic 5.0 LR Off	1250	LC1BP33	–	DF2LA1251	DF4LA1251	4	1250

(1) Replace ● with Q or Y according to the starter's voltage range.
(2) Replace ● with F, N, H, S, L or LB according to the breaking capacity (see the breaking capacity table below).
(3) DF2CA, DF●EA, DF●FA: sold in lots of 20.
DF●GA, DF●KA: sold in lots of 3.
DF●LA: sold singly.

Maximum starter prospective short-circuit current according to standard IEC 60947-4-2

Starter	Iq (kA)
ATS48D17● to ATS48C32●	50
ATS48C41● to ATS48M12●	70

Breaking capacity of circuit-breakers according to standard IEC 60947-4-2

230 V	Icu (kA)
GV2L20	100
GV2L22, GV2L32, GV3L40, GV3L65	50

230 V	Icu (kA)					
	F	N	H	S	L	LB
NS80HMA	–	–	100 kA	–	–	–
NSX100/160/250	85 kA	90 kA	100 kA	120 kA	150 kA	–
NSX400/630	85 kA	90 kA	100 kA	120 kA	150 kA	–
NS630b/800L/LB	–	–	–	–	150 kA	200 kA
NS1000L	–	–	–	–	150 kA	–
NS1250	–	50 kA	70 kA	–	–	–

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Schneider Electric

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

230 V power supply
Type 2 coordination

Compatible components according to standards IEC 60947-4-1 and IEC 60947-4-2: circuit-breakers, contactors, fast-acting fuses, starters

Combination: circuit-breaker, contactor, starter

Motor		Starter *(1)*		Circuit-breaker		Type of contactor
		Class 10	Class 20	Reference	Rating	
kW	A	Standard applications	Severe applications		A	
M1		A1		Q1		KM1, KM2, KM3
3	11.5	–	**ATS48D17●**	**GV2L20**	18	**LC1D40A**
				NS80HMA	12.5	**LC1D40**
4	14.5	**ATS48D17●**	**ATS48D22●**	**GV2L20**	18	**LC1D40A**
				NS80HMA	25	**LC1D40**
5.5	20	**ATS48D22●**	**ATS48D32●**	**GV2L22**	25	**LC1D40A**
				NS80HMA	25	**LC1D40**
7.5	27	**ATS48D32●**	**ATS48D38●**	**GV2L32**	32	**LC1D40A**
				NS80HMA	50	**LC1D80**
9	32	**ATS48D38●**	**ATS48D47●**	**GV3L40**	40	**LC1D80**
				NS80HMA	50	**LC1D80**
11	39	**ATS48D47●**	**ATS48D62●**	**GV3L65**	65	**LC1D80**
				NS80HMA	50	**LC1D80**
15	52	**ATS48D62●**	**ATS48D75●**	***NS80HMA***	80	**LC1D80**
18.5	64	**ATS48D75●**	**ATS48D88●**	***NS80HMA***	80	**LC1D80**
22	75	**ATS48D88●**	**ATS48C11●**	***NSX100●MA*** *(2)*	100	**LC1D115**
30	103	**ATS48C11●**	**ATS48C14●**	***NSX160●MA*** *(2)*	150	**LC1D115**
37	126	**ATS48C14●**	**ATS48C17●**	***NSX160●MA*** *(2)*	150	**LC1D150**
45	150	**ATS48C17●**	**ATS48C21●**	***NSX250●MA*** *(2)*	220	**LC1F185**
55	182	**ATS48C21●**	**ATS48C25●**	***NSX250●MA*** *(2)*	220	**LC1F225**
75	240	**ATS48C25●**	**ATS48C32●**	***NSX400●*** *(2)* ***Micrologic 1.3M***	320	**LC1F265**
90	295	**ATS48C32●**	**ATS48C41●**	***NSX400●*** *(2)* ***Micrologic 1.3M***	320	**LC1F330**
110	356	**ATS48C41●**	**ATS48C48●**	***NSX630●*** *(2)* ***Micrologic 1.3M***	500	**LC1F400**
132	425	**ATS48C48●**	**ATS48C59●**	***NSX630●*** *(2)* ***Micrologic 1.3M***	500	**LC1F500**
160	520	**ATS48C59●**	**ATS48C66●**	***NS630bL/LB Micrologic 5.0 LR Off***	630	**LC1F630**
200	626	**ATS48C66●**	**ATS48C79●**	***NS800L/LB Micrologic 5.0 LR Off***	800	**LC1F800**
220	700	**ATS48C79●**	**ATS48M10●**	***NS800L/LB Micrologic 5.0 LR Off***	800	**LC1F800**
250	800	**ATS48M10●**	**ATS48M12●**	***NS1000L Micrologic 5.0 LR Off***	1000	**LC1BM33**
355	1115	**ATS48M12●**	–	***NS1250●*** *(3)* ***Micrologic 5.0 LR Off***	1250	**LC1BP33**

(1) Replace ● with Q or Y according to the starter's voltage range.
(2) Replace ● with F, N, H, S, L or LB according to the breaking capacity (see the breaking capacity table on page 14).
(3) Type 2 coordination is only possible if the fast-acting fuses remain in the motor supply circuit and are not bypassed at the end of starting.

Maximum starter prospective short-circuit current according to standard IEC 60947-4-2

Starter	Iq (kA)
ATS48D17● to ATS48C79●	**50**
ATS48M10● and ATS48M12●	**85**

Fast-acting fuse (essential for type 2 coordination) and starter combinations

Starter	Fast-acting fuses with microswitch			
Reference	Unit reference *(4)*	Size	Rating	I²t
			A	kA².s
A1	Q3			
ATS48D17●	**DF3ER50**	14 x 51	50	2.3
ATS48D22● and ATS48D32●	**DF3FR80**	22 x 58	80	5.6
ATS48D38● and ATS48D47●	**DF3FR100**	22 x 58	100	12
ATS48D62● and ATS48D75●	**DF400125**	00	125	45
ATS48D88● and ATS48C11●	**DF400160**	00	160	82
ATS48C14● and ATS48C17●	**DF430400**	30	400	120
ATS48C21● to ATS48C32●	**DF431700**	31	700	490
ATS48D75●	**DF433800**	33	800	490
ATS48C48● and ATS48C59●	**DF4331000**	33	1000	900
ATS48C66●	**DF42331400**	2 x 33	1400	1200
ATS48C79●	**DF4441600**	44	1600	1600
ATS48M10● and ATS48M12●	**DF4442200**	44	2200	4100

(4) DF3ER, DF3FR: sold in lots of 10.
DF4: sold singly.

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page 10

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

380 V, 400 V, 415 V power supply
Type 1 coordination

Compatible components according to standards IEC 60947-4-1 and IEC 60947-4-2

Use either a circuit-breaker (light green columns), contactor, starter combination or a switch/fuse (dark green columns), contactor, starter combination

Motor		Starter (1)		Circuit-breaker		Type of contactor	Type of switch or switch disconnector (bare unit)	aM fuses			
		Class 10 Standard applications	Class 20 Severe applications	Reference	Rating			Unit reference (3) Without striker	Unit reference (3) With striker	Size	Rating
kW	A				A						A
M1		A1		Q1		KM1, KM2, KM3					
5.5	11	–	ATS48D17●	GV2L20	18	LC1D18	LS1D32	DF2CA16	–	10 x 38	16
				NS80HMA	12.5	LC1D18	LS1D32	DF2CA16	–	10 x 38	16
7.5	14.8	ATS48D17●	ATS48D22●	GV2L20	18	LC1D18	LS1D32	DF2CA16	–	10 x 38	16
				NS80HMA	25	LC1D18	LS1D32	DF2CA16	–	10 x 38	16
11	21	ATS48D22●	ATS48D32●	GV2L22	25	LC1D25	LS1D32	DF2CA25	–	10 x 38	25
				NS80HMA	25	LC1D25	LS1D32	DF2CA25	–	10 x 38	25
15	28.5	ATS48D32●	ATS48D38●	GV2L32	32	LC1D32	GK1EK	DF2EA32	DF3EA32	14 x 51	32
				NS80HMA	50	LC1D32	GK1EK	DF2EA32	DF3EA32	14 x 51	32
18.5	35	ATS48D38●	ATS48D47●	GV3L40	40	LC1D38	GK1EK	DF2EA40	DF3EA40	14 x 51	40
				NS80HMA	50	LC1D38	GK1EK	DF2EA40	DF3EA40	14 x 51	40
22	42	ATS48D47●	ATS48D62●	GV3L65	65	LC1D50A	GS1K	DF2FA50	DF3FA50	22 x 58	50
				NS80HMA	50	LC1D50A	GS1K	DF2FA50	DF3FA50	22 x 58	50
30	57	ATS48D62●	ATS48D75●	GV3L65	65	LC1D65A	GS1K	DF2FA80	DF3FA80	22 x 58	80
				NS80HMA	80	LC1D65A	GS1K	DF2FA80	DF3FA80	22 x 58	80
37	69	ATS48D75●	ATS48D88●	NS80HMA	80	LC1D80	GS1K	DF2FA80	DF3FA80	22 x 58	80
45	81	ATS48D88●	ATS48C11●	NSX100●MA (2)	100	LC1D115	GS1K	DF2FA100	DF3FA100	22 x 58	100
55	100	ATS48C11●	ATS48C14●	NSX160●MA (2)	150	LC1D115	GS1K	DF2FA125	DF4FA125	22 x 58	125
75	131	ATS48C14●	ATS48C17●	NSX160●MA (2)	150	LC1D150	GS1L	DF2GA1161	DF4GA1161	0	160
90	162	ATS48C17●	ATS48C21●	NSX250●MA (2)	220	LC1F185	GS1N	DF2HA1201	DF4HA1201	1	200
110	195	ATS48C21●	ATS48C25●	NSX250●MA (2)	220	LC1F225	GS1N	DF2HA1201	DF4HA1201	1	200
132	233	ATS48C25●	ATS48C32●	NSX400● (2) Micrologic 1.3M	320	LC1F265	GS1QQ	DF2JA1251	DF4JA1251	2	250
160	285	ATS48C32●	ATS48C41●	NSX400● (2) Micrologic 1.3M	320	LC1F330	GS1QQ	DF2JA1311	DF4JA1311	2	315
220	388	ATS48C41●	ATS48C48●	NSX630● (2) Micrologic 1.3M	500	LC1F400	GS1S	DF2KA1401	DF4KA1401	3	400
250	437	ATS48C48●	ATS48C59●	NSX630● (2) Micrologic 1.3M	500	LC1F500	GS1S	DF2KA1501	DF4KA1501	3	500
315	560	ATS48C59●	ATS48C66●	NS630b● (2) Micrologic 5.0 LR Off	630	LC1F630	GS1S	DF2KA1631	DF4KA1631	3	630
355	605	ATS48C66●	ATS48C79●	NS800● (2) Micrologic 5.0 LR Off	800	LC1F780	GS1V	DF2LA1631	DF4LA1631	4	630
400	675	ATS48C79●	ATS48M10●	NS800● (2) Micrologic 5.0 LR Off	800	LC1F780	GS1V	DF2LA1801	DF4LA1801	4	800
500	855	ATS48M10●	ATS48M12●	NS1000● (2) Micrologic 5.0 LR Off	1000	LC1BM33	GS1V	DF2LA1101	DF4LA1101	4	1000
630	1045	ATS48M12●	–	NS1250● (2) Micrologic 5.0 LR Off	1250	LC1BP33	–	DF2LA1251	DF4LA1251	4	1250

(1) Replace ● with Q or Y according to the starter's voltage range.
(2) Replace ● with F, N, H, S, L or LB according to the breaking capacity (see the breaking capacity table below).
(3) DF2CA, DF●EA, DF●FA: sold in lots of 20.
DF●GA, DF●KA: sold in lots of 3.
DF●LA: sold singly.

Maximum starter prospective short-circuit current according to standard IEC 60947-4-2

Starter	Iq (kA)
ATS48D17● to ATS48C32●	50
ATS48C41● to ATS48M12●	70

Breaking capacity of circuit-breakers according to standard IEC 60947-4-2

380 V, 400 V, 415 V	Icu (kA)
GV2L20, GV2L22, GV2L32, GV3L40, GV3L50, GV3L65	50

380 V, 400 V, 415 V	Icu (kA)					
	F	N	H	S	L	LB
NS80HMA	–	–	70	–	–	–
NSX100/160/250	36	50	70	100	150	–
NSX400/630	36	50	70	100	150	–
NS630b/800	–	50	70	–	150	200
NS1000	–	50	70	–	150	–
NS1250	–	50	70	–	–	–

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Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

380 V, 400 V, 415 V power supply
Type 2 coordination

Compatible components according to standards IEC 60947-4-1 and IEC 60947-4-2: circuit-breakers, contactors, fast-acting fuses, starters

Combination: circuit-breaker, contactor, starter

Motor		Starter *(1)*		Circuit-breaker		Type of contactor
		Class 10	Class 20	Reference	Rating	
kW	A	Standard applications	Severe applications		A	
M1		A1		Q1		KM1, KM2, KM3
5.5	11	–	**ATS48D17●**	**GV2L20**	18	**LC1D25**
				NS80HMA	12.5	**LC1D40**
7.5	14.8	**ATS48D17●**	**ATS48D22●**	**GV2L20**	18	**LC1D25**
				NS80HMA	25	**LC1D40**
11	21	**ATS48D22●**	**ATS48D32●**	**GV2L22**	25	**LC1D25**
				NS80HMA	25	**LC1D40**
15	28.5	**ATS48D32●**	**ATS48D38●**	**GV2L32**	32	**LC1D32**
				NS80HMA	50	**LC1D80**
18.5	35	**ATS48D38●**	**ATS48D47●**	**GV3L40**	40	**LC1D50A**
				NS80HMA	50	**LC1D80**
22	42	**ATS48D47●**	**ATS48D62●**	**GV3L50**	50	**LC1D50A**
				NS80HMA	50	**LC1D80**
30	57	**ATS48D62●**	**ATS48D75●**	**GV3L65**	65	**LC1D65A**
				NS80HMA	80	**LC1D80**
37	69	**ATS48D75●**	**ATS48D88●**	***NS80HMA***	80	**LC1D80**
45	81	**ATS48D88●**	**ATS48C11●**	***NSX100●MA*** *(2)*	100	**LC1D115/F115**
55	100	**ATS48C11●**	**ATS48C14●**	***NSX160●MA*** *(2)*	150	**LC1D115/F115**
75	131	**ATS48C14●**	**ATS48C17●**	***NSX100●MA*** *(2)*	150	**LC1D150/F150**
90	162	**ATS48C17●**	**ATS48C21●**	***NSX250●MA*** *(2)*	220	**LC1F185**
110	195	**ATS48C21●**	**ATS48C25●**	***NSX250●MA*** *(2)*	220	**LC1F225**
132	233	**ATS48C25●**	**ATS48C32●**	***NSX400●*** *(2)* ***Micrologic 1.3M***	320	**LC1F265**
160	285	**ATS48C32●**	**ATS48C41●**	***NSX400●*** *(2)* ***Micrologic 1.3M***	320	**LC1F330**
220	388	**ATS48C41●**	**ATS48C48●**	***NSX630●*** *(2)* ***Micrologic 1.3M***	500	**LC1F500**
250	437	**ATS48C48●**	**ATS48C59●**	***NSX630●*** *(2)* ***Micrologic 1.3M***	500	**LC1F500**
315	560	**ATS48C59●**	**ATS48C66●**	***NS630bL Micrologic 5.0 LR Off***	630	**LC1F630**
355	605	**ATS48C66●**	**ATS48C79●**	***NS800L or LB Micrologic 5.0 LR Off***	800	**LC1F780**
400	675	**ATS48C79●**	**ATS48M10●**	***NS800L or LB Micrologic 5.0 LR Off***	800	**LC1F780**
500	855	**ATS48M10●**	**ATS48M12●**	***NS1000L Micrologic 5.0 LR Off***	1000	**LC1BM33**
630	1045	**ATS48M12●**	–	***NS1250*** *(3)* ***Micrologic 5.0 LR Off***	1250	**LC1BP33**

(1) Replace ● with Q or Y according to the starter's voltage range.
(2) Replace ● with F, N, H, S, L or LB according to the breaking capacity (see the breaking capacity table below).
(3) Type 2 coordination is only possible if the fast-acting fuses remain in the motor supply circuit and are not bypassed at the end of starting.

Maximum starter prospective short-circuit current according to standard IEC 60947-4-2

Starter	Iq (kA)
ATS48D17●	**50**
ATS48D22● to ATS48D47●	**40**
ATS48D62● to ATS48C79●	**50**
ATS48M10● and ATS48M12●	**85**

Fast-acting fuse (essential for type 2 coordination) and starter combinations

Starter	Fast-acting fuses with microswitch			
Reference	Unit reference *(4)*	Size	Rating	I²t
			A	kA².s
A1	Q3			
ATS48D17●	**DF3ER50**	14 x 51	50	2.3
ATS48D22● and ATS48D32●	**DF3FR80**	22 x 58	80	5.6
ATS48D38● and ATS48D47●	**DF3FR100**	22 x 58	100	12
ATS48D62● and ATS48D75●	**DF400125**	00	125	45
ATS48D88● and ATS48C11●	**DF400160**	00	160	82
ATS48C14● and ATS48C17●	**DF430400**	30	400	120
ATS48C21● to ATS48C32●	**DF431700**	31	700	490
ATS48D75●	**DF433800**	33	800	490
ATS48C48● and ATS48C59●	**DF4331000**	33	1000	900
ATS48C66●	**DF42331400**	2 x 33	1400	1200
ATS48C79●	**DF4441600**	44	1600	1600
ATS48M10● and ATS48M12●	**DF4442200**	44	2200	4100

(4) DF3ER, DF3FR: sold in lots of 10.
DF4: sold singly.

Breaking capacity of circuit-breakers according to standard IEC 60947-4-2

380 V, 400 V, 415 V	Icu (kA)
GV2L20, GV2L22, GV2L32, GV3L40, GV3L50, GV3L65	50

380 V, 400 V, 415 V	Icu (kA)					
	F	N	H	S	L	LB
NS80HMA	–	–	70	–	–	–
NSX100/160/250	36	50	70	100	150	–
NSX400/630	36	50	70	100	150	–
NS630b/800L/LB	–	–	–	–	150	200
NS1000L	–	–	–	–	150	–
NS1250	–	50	70	–	–	–

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Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

440 V power supply
Type 1 coordination

Compatible components according to standards IEC 60947-4-1 and IEC 60947-4-2

Use either a circuit-breaker (light green columns), contactor, starter combination or a switch/fuse (dark green columns), contactor, starter combination

Motor		Starter		Circuit-breaker		Type of contactor	Type of switch or switch disconnector (bare unit)	aM fuses			
		Class 10 Standard applications	Class 20 Severe applications	Reference	Rating			Unit reference (2)		Size	Rating
								Without striker	With striker		
kW	A				A						A
M1		A1		Q1		KM1, KM2, KM3					
5.5	10.4	–	ATS48D17Y	NSX100●MA (1)	12.5	LC1D12	LS1D32	DF2CA16	–	10 x 38	16
				NS80HMA	12.5	LC1D12	LS1D32	DF2CA16	–	10 x 38	16
7.5	13.7	ATS48D17Y	ATS48D22Y	NSX100●MA (1)	25	LC1D18	LS1D32	DF2CA16	–	10 x 38	16
				NS80HMA	25	LC1D18	LS1D32	DF2CA16	–	10 x 38	16
11	20.1	ATS48D22Y	ATS48D32Y	NSX100●MA (1)	25	LC1D25	GK1EK	DF2EA25	DF3EA25	14 x 51	25
				NS80HMA	25	LC1D25	GK1EK	DF2EA25	DF3EA25	14 x 51	25
15	26.5	ATS48D32Y	ATS48D38Y	NSX100●MA (1)	50	LC1D32	GK1EK	DF2EA32	DF3EA32	14 x 51	32
				NS80HMA	50	LC1D32	GK1EK	DF2EA32	DF3EA32	14 x 51	32
18.5	32.8	ATS48D38Y	ATS48D47Y	NSX100●MA (1)	50	LC1D40A	GK1EK	DF2EA40	DF3EA40	14 x 51	40
				NS80HMA	50	LC1D40A	GK1EK	DF2EA40	DF3EA40	14 x 51	40
22	39	ATS48D47Y	ATS48D62Y	NSX100●MA (1)	50	LC1D40A	GS1K	DF2FA50	DF3FA50	22 x 58	50
				NS80HMA	50	LC1D40A	GS1K	DF2FA50	DF3FA50	22 x 58	50
30	52	ATS48D62Y	ATS48D75Y	NSX100●MA (1)	100	LC1D65A	GS1K	DF2FA80	DF3FA80	22 x 58	80
				NS80HMA	80	LC1D65A	GS1K	DF2FA80	DF3FA80	22 x 58	80
37	64	ATS48D75Y	ATS48D88Y	NSX100●MA (1)	100	LC1D65A	GS1K	DF2FA80	DF3FA80	22 x 58	80
				NS80HMA	80	LC1D65A	GS1K	DF2FA80	DF3FA80	22 x 58	80
45	76	ATS48D88Y	ATS48C11Y	NSX100●MA (1)	100	LC1D115	GS1K	DF2FA100	DF3FA100	22 x 58	100
55	90	ATS48C11Y	ATS48C14Y	NSX100●MA (1)	100	LC1D115	GS1L	DF2GA1121	DF4GA1121	0	125
75	125	ATS48C14Y	ATS48C17Y	NSX160●MA (1)	150	LC1D150	GS1L	DF2GA1161	DF4GA1161	1	160
90	150	ATS48C17Y	ATS48C21Y	NSX250●MA (1)	220	LC1F185	GS1N	DF2HA1201	DF4HA1201	1	200
110	178	ATS48C21Y	ATS48C25Y	NSX250●MA (1)	220	LC1F225	GS1N	DF2HA1251	DF4HA1251	1	250
132	215	ATS48C25Y	ATS48C32Y	NSX250●MA (1)	220	LC1F265	GS1QQ	DF2JA1311	DF4JA1311	2	315
160	256	ATS48C32Y	ATS48C41Y	NSX400● (1) Micrologic 1.3M	320	LC1F265	GS1QQ	DF2JA1401	DF4JA1401	2	315
220	353	ATS48C41Y	ATS48C48Y	NSX630● (1) Micrologic 1.3M	500	LC1F400	GS1S	DF2KA1501	DF4KA1501	3	500
250	401	ATS48C48Y	ATS48C59Y	NSX630● (1) Micrologic 1.3M	500	LC1F400	GS1S	DF2KA1501	DF4KA1501	3	500
355	549	ATS48C59Y	ATS48C66Y	NS630b● (1) Micrologic 5.0 LR Off	630	LC1F630	GS1V	DF2LA1801	DF4LA1801	4	800
400	611	ATS48C66Y	ATS48C79Y	NS630b● (1) Micrologic 5.0 LR Off	630	LC1F630	GS1V	DF2LA1801	DF4LA1801	4	800
500	780	ATS48C79Y	ATS48M10Y	NS800● (1) Micrologic 5.0 LR Off	800	LC1F780	GS1V	DF2LA1801	DF4LA1801	4	800
630	965	ATS48M10Y	ATS48M12Y	NS1000● (1) Micrologic 5.0 LR Off	1000	LC1BP33	GS1V	DF2LA1101	DF4LA1101	4	1000
710	1075	ATS48M12Y	–	NS1250● (1) Micrologic 5.0 LR Off	1250	LC1BP33	–	DF2LA1251	–	4	1250

(1) Replace ● with F, N, H, S, L or LB according to the breaking capacity (see the breaking capacity table below).
(2) DF2CA, DF●EA, DF●FA: sold in lots of 20.
DF●GA, DF●KA: sold in lots of 3.
DF●LA: sold singly.

Maximum starter prospective short-circuit current according to standard IEC 60947-4-2

Starter	Iq (kA)
ATS48D17Y to ATS48C32Y	50
ATS48C41Y to ATS48M12Y	70

Breaking capacity of circuit-breakers according to standard IEC 60947-4-2

440 V	Icu (kA)
GV2L20, GV2L22, GV2L32	20
GV3L40, GV3L65	50
GK3EF80	25

440 V	Icu (kA)					
	F	N	H	S	L	LB
NS80HMA	–	–	65	–	–	–
NSX100/160/250	35	50	65	90	130	–
NSX400/630	30	42	65	90	130	–
NS630b/800	–	50	65	–	130	200
NS1000	–	50	65	–	130	–
NS1250	–	50	65	–	–	–

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Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

440 V power supply
Type 2 coordination

Compatible components according to standards IEC 60947-4-1 and IEC 60947-4-2: circuit-breakers, contactors, fast-acting fuses, starters

Combination: circuit-breaker, contactor, starter

Motor		Starter		Circuit-breaker		Type of contactor
		Class 10	Class 20	Reference	Rating	
kW	A	Standard applications	Severe applications		A	
M1		A1		Q1		KM1, KM2, KM3
5.5	10.4	–	**ATS48D17Y**	***NS80HMA***	12.5	**LC1D40**
				NSX100●MA *(1)*	12.5	**LC1D80**
7.5	13.7	**ATS48D17Y**	**ATS48D22Y**	***NS80HMA***	25	**LC1D40**
				NSX100●MA *(1)*	25	**LC1D80**
11	20.1	**ATS48D22Y**	**ATS48D32Y**	***NS80HMA***	25	**LC1D40**
				NSX100●MA *(1)*	25	**LC1D80**
15	26.5	**ATS48D32Y**	**ATS48D38Y**	***NSX100●MA*** *(1)*	50	**LC1D80**
				NS80HMA	50	**LC1D80**
18.5	32.8	**ATS48D38Y**	**ATS48D47Y**	***NSX100●MA*** *(1)*	50	**LC1D80**
				NS80HMA	50	**LC1D80**
22	39	**ATS48D47Y**	**ATS48D62Y**	***NSX100●MA*** *(1)*	50	**LC1D80**
				NS80HMA	50	**LC1D80**
30	52	**ATS48D62Y**	**ATS48D75Y**	***NSX100●MA*** *(1)*	100	**LC1D80**
				NS80HMA	80	**LC1D80**
37	64	**ATS48D75Y**	**ATS48D88Y**	***NSX100●MA*** *(1)*	100	**LC1D80**
				NS80HMA	80	**LC1D80**
45	76	**ATS48D88Y**	**ATS48C11Y**	***NSX100●MA*** *(1)*	100	**LC1D115**
55	90	**ATS48C11Y**	**ATS48C14Y**	***NSX100●MA*** *(1)*	100	**LC1D115**
75	125	**ATS48C14Y**	**ATS48C17Y**	***NSX160●MA*** *(1)*	150	**LC1D150**
90	150	**ATS48C17Y**	**ATS48C21Y**	***NSX160●MA*** *(1)*	150	**LC1D150**
110	178	**ATS48C21Y**	**ATS48C25Y**	***NSX250●MA*** *(1)*	220	**LC1F185**
132	215	**ATS48C25Y**	**ATS48C32Y**	***NSX400●*** *(1)* ***Micrologic 1.3M***	320	**LC1F265**
160	256	**ATS48C32Y**	**ATS48C41Y**	***NSX400●*** *(1)* ***Micrologic 1.3M***	320	**LC1F265**
220	353	**ATS48C41Y**	**ATS48C48Y**	***NSX630●*** *(1)* ***Micrologic 1.3M***	500	**LC1F400**
250	401	**ATS48C48Y**	**ATS48C59Y**	***NSX630●*** *(1)* ***Micrologic 1.3M***	500	**LC1F500**
355	549	**ATS48C59Y**	**ATS48C66Y**	***NS630bL/LB Micrologic 5.0 LR Off***	630	**LC1F630**
400	611	**ATS48C66Y**	**ATS48C79Y**	***NS800L/LB Micrologic 5.0 LR Off***	800	**LC1F800**
500	780	**ATS48C79Y**	**ATS48M10Y**	***NS800L/LB Micrologic 5.0 LR Off***	800	**LC1F780**
630	965	**ATS48M10Y**	**ATS48M12Y**	***NS1000L Micrologic 5.0 LR Off***	1000	**LC1BP33**
710	1075	**ATS48M12Y**	–	***NS1250●*** *(1)(2)* ***Micrologic 5.0 LR Off***	1250	**LC1BP33**

(1) Replace ● with F, N, H, S, L or LB according to the breaking capacity (see the breaking capacity table on page 18).
(2) Type 2 coordination is only possible if the fast-acting fuses remain in the motor supply circuit and are not bypassed at the end of starting.

Maximum starter prospective short-circuit current according to standard IEC 60947-4-2

Starter	Iq (kA)
ATS48D17Y	**50**
ATS48D22Y to ATS48D47Y	**20**
ATS48D62Y and ATS48D75Y	**50**
ATS48D88Y and ATS48C41Y	**40**
ATS48C11Y to ATS48C32Y	**50**
ATS48C48Y to ATS48C79Y	**50**
ATS48M10Y and ATS48M12Y	**85**

Fast-acting fuse (essential for type 2 coordination) and starter combinations

Starter	Fast-acting fuses with microswitch			
Reference	Unit reference *(3)*	Size	Rating	I^2t
			A	$kA^2.s$
A1	Q3			
ATS48D17Y	**DF3ER50**	14 x 51	50	2.3
ATS48D22Y and ATS48D32Y	**DF3FR80**	22 x 58	80	5.6
ATS48D38Y and ATS48D47Y	**DF3FR100**	22 x 58	100	12
ATS48D62Y and ATS48D75Y	**DF400125**	00	125	45
ATS48D88Y and ATS48C11Y	**DF400160**	00	160	82
ATS48C14Y and ATS48C17Y	**DF430400**	30	400	120
ATS48C21Y to ATS48C32Y	**DF431700**	31	700	490
ATS48C41Y	**DF433800**	33	800	490
ATS48C48Y and ATS48C59Y	**DF4331000**	33	1000	900
ATS48C66Y	**DF42331400**	2 x 33	1400	1200
ATS48C79Y	**DF4441600**	44	1600	1600
ATS48M10Y and ATS48M12Y	**DF4442200**	44	2200	4100

(3) DF3ER, DF3FR: sold in lots of 10.
DF4: sold singly.

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Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

500 V power supply
Type 1 coordination

Compatible components according to standards IEC 60947-4-1 and IEC 60947-4-2

Use either a circuit-breaker (light green columns), contactor, starter combination or a switch/fuse (dark green columns), contactor, starter combination

Motor		Starter		Circuit-breaker		Type of contactor	Type of switch or switch disconnector (bare unit)	aM fuses			
		Class 10 Standard applications	Class 20 Severe applications	Reference	Rating			Unit reference (2)		Size	Rating
								Without striker	With striker		
kW	A				A						A
M1		A1		Q1		KM1, KM2, KM3					
7.5	12	–	ATS48D17Y	*GV2L16 + LA9LB920*	–	LC1D18	LS1D32	DF2CA16	–	10 x 38	16
				NS80HMA	12.5	LC1D32	–	–	–	–	–
				NSX100●MA (1)	12.5	LC1D40A	–	–	–	–	–
9	14	ATS48D17Y	ATS48D22Y	*GV2L20 + LA9LB920*	–	LC1D25	LS1D32	DF2CA16	–	10 x 38	16
				NS80HMA	25	LC1D32	–	–	–	–	–
				NSX100●MA (1)	25	LC1D40A	–	–	–	–	–
11	18.4	ATS48D22Y	ATS48D32Y	*GV2L22 + LA9LB920*	–	LC1D25	GK1EK	DF2EA25	DF3EA25	14 x 51	25
				NS80HMA	25	LC1D32	–	–	–	–	–
				NSX100●MA (1)	25	LC1D40A	–	–	–	–	–
18.5	28.5	ATS48D32Y	ATS48D38Y	*GV2L32 + LA9LB920*	–	LC1D32	GK1EK	DF2EA32	DF3EA32	14 x 51	32
				NS80HMA	50	LC1D40A	–	–	–	–	–
				NSX100●MA (1)	50	LC1D40A	–	–	–	–	–
22	33	ATS48D38Y	ATS48D47Y	*NS80HMA*	50	LC1D50A	GK1EK	DF2EA40	DF3EA40	14 x 51	40
				NSX100●MA (1)	50	LC1D50A	–	–	–	–	–
30	45	ATS48D47Y	ATS48D62Y	*NS80HMA*	50	LC1D50A	GS1K	DF2FA50	DF3FA50	22 x 58	50
				NSX100●MA (1)	50	LC1D50A	–	–	–	–	–
37	55	ATS48D62Y	ATS48D75Y	*NSX100●MA (1)*	100	LC1D65A	GS1K	DF2FA80	DF3FA80	22 x 58	80
45	65	ATS48D75Y	ATS48D88Y	*NSX100●MA (1)*	100	LC1D80	GS1K	DF2FA80	DF3FA80	22 x 58	80
55	80	ATS48D88Y	ATS48C11Y	*NSX100●MA (1)*	100	LC1D80	GS1K	DF2FA100	DF3FA100	22 x 58	100
75	105	ATS48C11Y	ATS48C14Y	*NSX160●MA (1)*	150	LC1D150/F115	GS1L	DF2GA1121	DF4GA1121	0	125
90	130	ATS48C14Y	ATS48C17Y	*NSX160●MA (1)*	150	LC1D150/F115	GS1L	DF2GA1161	DF4GA1161	0	160
110	156	ATS48C17Y	ATS48C21Y	*NSX250●MA (1)*	220	LC1F185	GS1N	DF2HA1201	DF4HA1201	1	200
132	207	ATS48C21Y	ATS48C25Y	*NSX250●MA (1)*	220	LC1F225	GS1N	DF2HA1251	DF4HA1251	1	250
160	257	ATS48C25Y	ATS48C32Y	*NSX400● (1) Micrologic 1.3M*	320	LC1F265	GS1QQ	DF2JA1311	DF4JA1311	2	315
220	310	ATS48C32Y	ATS48C41Y	*NSX630● (1) Micrologic 1.3M*	500	LC1F400	GS1QQ	DF2JA1401	DF4JA1401	2	400
250	360	ATS48C41Y	ATS48C48Y	*NSX630● (1) Micrologic 1.3M*	500	LC1F400	GS1S	DF2KA1501	DF4KA1501	3	500
315	460	ATS48C48Y	ATS48C59Y	*NSX630● (1) Micrologic 1.3M*	500	LC1F500	GS1S	DF2KA1631	DF4KA1631	3	630
400	540	ATS48C59Y	ATS48C66Y	*NS630b● (1) Micrologic 5.0 LR Off*	630	LC1F630	GS1V	DF2LA1801	DF4LA1801	4	800
450	630	ATS48C66Y	ATS48C79Y	*NS630b● (1) Micrologic 5.0 LR Off*	630	LC1F780	GS1V	DF2LA1801	DF4LA1801	4	800
500	680	ATS48C79Y	ATS48M10Y	*NS800● (1) Micrologic 5.0 LR Off*	800	LC1BL33	GS1V	DF2LA1801	DF4LA1801	4	800
630	850	ATS48M10Y	ATS48M12Y	*NS1000● (1) Micrologic 5.0 LR Off*	1000	LC1BP33	GS1V	DF2LA1101	DF4LA1101	4	1000
800	1100	ATS48M12Y	–	*NS1250● (1) Micrologic 5.0 LR Off*	1250	LC1BP33	–	DF2LA1251	–	4	1250

(1) Replace ● with N, H, S, L, R, HB1 or HB2 according to the breaking capacity (see the breaking capacity table below).
(2) DF2CA, DF●EA, DF●FA: sold in lots of 20. DF●GA, DF●KA: sold in lots of 3. DF●LA: sold singly.

Breaking capacity of circuit-breakers according to standard IEC 60947-4-2

500 V	Icu (kA)
GV2 + LA9LB920	100

500 V	Icu (kA)						
	N	H	S	L	R	HB1	HB2
NS80HMA	–	25	–	–	–	–	–
NSX100	36	50	65	70	80	85	100
NSX160	36	50	65	70	–	–	–
NSX250/400/630	36	50	65	70	80	85	100
NS630b/800/1000L	–	–	–	100	–	–	–
NS1250	40	50	–	–	–	–	–

Maximum starter prospective short-circuit current according to standard IEC 60947-4-2

Starter	Iq (kA)
ATS48D17Y to ATS48C32Y	50
ATS48C41Y to ATS48M12Y	70

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

500 V power supply
Type 2 coordination

Compatible components according to standards IEC 60947-4-1 and IEC 60947-4-2: circuit-breakers, contactors, fast-acting fuses, starters

Combination: circuit-breaker, contactor, starter

Motor		Starter		Circuit-breaker		Type of contactor
		Class 10	Class 20	Reference	Rating	
kW	A	Standard applications	Severe applications		A	
M1		A1		Q1		KM1, KM2, KM3
7.5	12	–	ATS48D17Y	*GV2L16 + LA9LB920*	–	LC1D25
				NS80HMA	12.5	LC1D40
				NSX100●MA (1)	12.5	LC1D80
9	14	ATS48D17Y	ATS48D22Y	*GV2L20 + LA9LB920*	–	LC1D25
				NS80HMA	25	LC1D40
				NSX100●MA (1)	25	LC1D80
11	18.4	ATS48D22Y	ATS48D32Y	*GV2L22 + LA9LB920*	–	LC1D25
				NS80HMA	25	LC1D40
				NSX100●MA (1)	25	LC1D80
18.5	28.5	ATS48D32Y	ATS48D38Y	*GV2L32 + LA9LB920*	–	LC1D25
				NS80HMA	50	LC1D40
				NSX100●MA (1)	50	LC1D80
22	33	ATS48D38Y	ATS48D47Y	*NS80HMA*	50	LC1D80
				NSX100●MA (1)	50	LC1D80
30	45	ATS48D47Y	ATS48D62Y	*NS80HMA*	50	LC1D80
				NSX100●MA (1)	50	LC1D80
37	55	ATS48D62Y	ATS48D75Y	*NSX100●MA (1)*	100	LC1D150/F115
45	65	ATS48D75Y	ATS48D88Y	*NSX100●MA (1)*	100	LC1D150/F115
55	80	ATS48D88Y	ATS48C11Y	*NSX100●MA (1)*	100	LC1D150/F115
75	105	ATS48C11Y	ATS48C14Y	*NSX160●MA (1)*	150	LC1F150
90	130	ATS48C14Y	ATS48C17Y	*NSX160●MA (1)*	150	LC1F185
110	156	ATS48C17Y	ATS48C21Y	*NSX250●MA (1)*	220	LC1F225
132	207	ATS48C21Y	ATS48C25Y	*NSX250●MA (1)*	220	LC1F330
160	257	ATS48C25Y	ATS48C32Y	*NSX400● (1) Micrologic 1.3M*	320	LC1F400
220	310	ATS48C32Y	ATS48C41Y	*NSX400● (1) Micrologic 1.3M*	320	LC1F400
250	360	ATS48C41Y	ATS48C48Y	*NSX630● (1) Micrologic 1.3M*	500	LC1F500
315	460	ATS48C48Y	ATS48C59Y	*NSX630● (1) Micrologic 1.3M*	500	LC1F500
400	540	ATS48C59Y	ATS48C66Y	*NS630bL Micrologic 5.0 LR Off*	630	LC1F630
450	630	ATS48C66Y	ATS48C79Y	*NS630bL Micrologic 5.0 LR Off*	630	LC1F800
500	680	ATS48C79Y	ATS48M10Y	*NS800L Micrologic 5.0 LR Off*	800	LC1BL33
630	850	ATS48M10Y	ATS48M12Y	*NS1000L Micrologic 5.0 LR Off*	1000	LC1BP33
800	1100	ATS48M12Y	–	*NS1250● (1) (2) Micrologic 5.0 LR Off*	1250	LC1BP33

(1) Replace ● with N, H, S, L, R, HB1 or HB2 according to the breaking capacity (see the breaking capacity table below).
(2) Type 2 coordination is only possible if the fast-acting fuses remain in the motor supply circuit and are not bypassed at the end of starting.

Maximum starter prospective short-circuit current according to standard IEC 60947-4-2

Starter	Iq (kA)
ATS48D17Y	50
ATS48D22Y to ATS48D47Y	20
ATS48D62Y and ATS48D75Y	50
ATS48D88Y	40
ATS48C11Y to ATS48C32Y	50
ATS48C41Y	40
ATS48C48Y to ATS48C79Y	50
ATS48M10Y and ATS48M12Y	85

Fast-acting fuse (essential for type 2 coordination) and starter combinations

Starter	Fast-acting fuses with microswitch			
Reference	Unit reference*(3)*	Size	Rating	I²t
			A	kA².s
A1	Q3			
ATS48D17Y	DF3ER50	14 x 51	50	2.3
ATS48D22Y and ATS48D32Y	DF3FR80	22 x 58	80	5.6
ATS48D38Y and ATS48D47Y	DF3FR100	22 x 58	100	12
ATS48D62Y and ATS48D75Y	DF400125	00	125	45
ATS48D88Y and ATS48C11Y	DF400160	00	160	82
ATS48C14Y and ATS48C17Y	DF430400	30	400	120
ATS48C21Y to ATS48C32Y	DF431700	31	700	490
ATS48C41Y	DF433800	33	800	490
ATS48C48Y and ATS48C59Y	DF4331000	33	1000	900
ATS48C66Y	DF42331400	2 x 33	1400	1200
ATS48C79Y	DF4441600	44	1600	1600
ATS48M10Y and ATS48M12Y	DF4442200	44	2200	4100

Breaking capacity of circuit-breakers according to standard IEC 60947-4-2

500 V	Icu (kA)
GV2 + LA9LB920	100

500 V	Icu (kA)						
	N	H	S	L	R	HB1	HB2
NS80HMA	–	25	–	–	–	–	–
NSX100	36	50	65	70	80	85	100
NSX160	36	50	65	70	–	–	–
NSX250/400/630	36	50	65	70	80	85	100
NS630b/800/1000L	–	–	–	100	–	–	–
NS1250	40	50	–	–	–	–	–

(3) DF3ER, DF3FR: sold in lots of 10. DF4: sold singly.

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units
690 V power supply
Type 1 coordination

Compatible components according to standards IEC 60947-4-1 and IEC 60947-4-2

Use either a circuit-breaker (light green columns), contactor, starter combination or a switch/fuse (dark green columns), contactor, starter combination

Motor		Starter		Circuit-breaker		Type of contactor	Type of switch or switch disconnector (bare unit)	aM fuses			
		Class 10 Standard applications	Class 20 Severe applications	Reference	Rating			Unit reference (2)		Size	Rating
								Without striker	With striker		
kW	A				A						A
M1		A1		Q1		KM1, KM2, KM3					
11	12.1	–	ATS48D17Y	*GV2L16 + LA9LB920*	–	LC1D18	GS1K	DF2FA16	DF3FA16	22 x 58	16
15	16.5	ATS48D17Y	ATS48D22Y	*GV2L20 + LA9LB920*	–	LC1D25	GS1K	DF2FA20	DF3FA20	22 x 58	20
				NSX100●MA (1)	25	LC1D25	–	–	–	–	–
18.5	20.2	ATS48D22Y	ATS48D32Y	*GV2L22 + LA9LB920*	–	LC1D32	GS1K	DF2FA25	DF3FA25	22 x 58	25
				NSX100●MA (1)	50	LC1D32	–	–	–	–	–
22	24.2	ATS48D32Y	ATS48D38Y	*GV2L32 + LA9LB920*	–	LC1D32	GS1K	DF2FA32	DF3FA32	22 x 58	32
				NSX100●MA (1)	50	LC1D40A	–	–	–	–	–
30	33	ATS48D38Y	ATS48D47Y	*NSX100●MA (1)*	50	LC1D40A	GS1K	DF2FA40	DF3FA40	22 x 58	40
37	40	ATS48D47Y	ATS48D62Y	*NSX100●MA (1)*	50	LC1D65A	GS1K	DF2FA50	DF3FA50	22 x 58	50
45	49	ATS48D62Y	ATS48D75Y	*NSX100●MA (1)*	100	LC1D80	–	–	–	–	–
55	58	ATS48D75Y	ATS48D88Y	*NSX100●MA (1)*	100	LC1D-115	–	–	–	–	–
75	75.5	ATS48D88Y	ATS48C11Y	*NSX100●MA (1)*	100	LC1D-115	–	–	–	–	–
90	94	ATS48C11Y	ATS48C14Y	*NSX160●MA (1)*	150	LC1D-150	–	–	–	–	–
110	113	ATS48C14Y	ATS48C17Y	*NSX160L●MA (1)*	150	LC1D-150	–	–	–	–	–
160	165	ATS48C17Y	ATS48C21Y	*NSX250●MA (1)*	220	LC1F-265	–	–	–	–	–
200	203	ATS48C21Y	ATS48C25Y	*NSX400L● (1) Micrologic 1.3M*	320	LC1F-330	–	–	–	–	–
250	253	ATS48C25Y	ATS48C32Y	*NSX400● (1) Micrologic 1.3M*	320	LC1F-400	–	–	–	–	–
315	321	ATS48C32Y	ATS48C41Y	*NSX630● (1) Micrologic 1.3M*	500	LC1F-500	–	–	–	–	–
400	390	ATS48C41Y	ATS48C48Y	*NSX630LB Micrologic 1.3M*	500	LC1F630	–	–	–	–	–
500	490	ATS48C48Y	ATS48C59Y	*NS630bLB Micrologic 5.0 LR Off*	630	LC1BL33	–	–	–	–	–
560	549	ATS48C59Y	ATS48C66Y	*NS630bLB Micrologic 5.0 LR Off*	630	LC1BL33	–	–	–	–	–
630	605	ATS48C66Y	ATS48C79Y	*NS800LB Micrologic 5.0 LR Off*	800	LC1BP33	–	–	–	–	–
710	694	ATS48C79Y	ATS48M10Y	*NS800LB Micrologic 5.0 LR Off*	800	LC1BP33	–	–	–	–	–
900	880	ATS48M10Y	ATS48M12Y	*NS1000● (1) Micrologic 5.0 LR Off*	1000	LC1BR33	–	–	–	–	–
950	1000	ATS48M12Y	–	*NS1250● (1) Micrologic 5.0 LR Off*	1250	LC1BR33	–	–	–	–	–

(1) Replace ● with N, H, S, L, R, HB1, HB2 or LB according to the breaking capacity (see the breaking capacity table below).
(2) DF●FA: sold in lots of 10.

Maximum starter prospective short-circuit current according to standard IEC 60947-4-2

Starter	Iq (kA)
ATS48D17Y to ATS48C32Y	50
ATS48C41Y to ATS48M12Y	70

Breaking capacity of circuit-breakers according to standard IEC 60947-4-2

690 V	Icu (kA)
GV2 + LA9LB920	50

690 V	Icu (kA)							
	N	H	S	L	R	HB1	HB2	LB
NSX100	8	10	10	15	45	75	100	–
NSX160	8	10	10	15	–	–	–	–
NSX250	8	10	10	15	45	75	100	–
NSX400/630	10	10	20	25	45	75	100	–
NS630b/800LB	–	–	–	–	–	–	–	75
NS1250	30	42	–	–	–	–	–	–

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Schneider Electric

Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

690 V power supply
Type 2 coordination

Compatible components according to standards IEC 60947-4-1 and IEC 60947-4-2: circuit-breakers, contactors, fast-acting fuses, starters

Combination: circuit-breaker, contactor, starter

Motor		Starter		Circuit-breaker		Type of contactor
		Class 10	Class 20	Reference	Rating	
kW	A	Standard applications	Severe applications		A	
M1		A1		Q1		KM1, KM2, KM3
11	12.1	–	ATS48D17Y	***NSX100●MA*** *(1)*	25	LC1D80
15	16.5	ATS48D17Y	ATS48D22Y	***NSX100●MA*** *(1)*	25	LC1D80
18.5	20.2	ATS48D22Y	ATS48D32Y	***NSX100●MA*** *(1)*	25	LC1D80
22	24.2	ATS48D32Y	ATS48D38Y	***NSX100●MA*** *(1)*	25	LC1D80
30	33	ATS48D38Y	ATS48D47Y	***NSX100●MA*** *(1)*	50	LC1D150/F115
37	40	ATS48D47Y	ATS48D62Y	***NSX100●MA*** *(1)*	50	LC1D150/F115
45	49	ATS48D62Y	ATS48D75Y	***NSX100●MA*** *(1)*	100	LC1D150/F115
55	58	ATS48D75Y	ATS48D88Y	***NSX100●MA*** *(1)*	100	LC1D150/F115
75	75.5	ATS48D88Y	ATS48C11Y	***NSX100●MA*** *(1)*	100	LC1D150/F115
90	94	ATS48C11Y	ATS48C14Y	***NSX250●MA*** *(1)*	150	LC1F150
110	113	ATS48C14Y	ATS48C17Y	***NSX250●MA*** *(1)*	150	LC1F185
160	165	ATS48C17Y	ATS48C21Y	***NSX250●MA*** *(1)*	220	LC1F330
200	203	ATS48C21Y	ATS48C25Y	***NSX250●MA*** *(1)*	220	LC1F330
250	253	ATS48C25Y	ATS48C32Y	***NSX400●MA*** *(1)*	320	LC1F400
315	321	ATS48C32Y	ATS48C41Y	***NSX630●MA*** *(1)*	500	LC1F500
400	390	ATS48C41Y	ATS48C48Y	***NSX630●MA*** *(1)*	500	LC1F630
500	490	ATS48C48Y	ATS48C59Y	***NS630bLB Micrologic 5.0 LR Off***	630	LC1F630
560	549	ATS48C59Y	ATS48C66Y	***NS630bLB Micrologic 5.0 LR Off***	630	LC1F630
630	605	ATS48C66Y	ATS48C79Y	***NS800LB Micrologic 5.0 LR Off***	800	LC1F780
710	694	ATS48C79Y	ATS48M10Y	***NS800LB Micrologic 5.0 LR Off***	800	LC1F780
900	880	ATS48M10Y	ATS48M12Y	***NS1000*** *(2)* ***Micrologic 5.0 LR Off***	1000	LC1BR33
950	1000	ATS48M12Y	–	***NS1250*** *(2)* ***Micrologic 5.0 LR Off***	1250	LC1BR33

(1) Replace ● with HB1 or HB2 according to the breaking capacity (see the breaking capacity table below).
(2) Type 2 coordination is only possible if the fast-acting fuses remain in the motor supply circuit and are not bypassed at the end of starting.

Maximum starter prospective short-circuit current according to standard IEC 60947-4-2

Starter	Iq (kA)
ATS48D17Y	50
ATS48D22Y to ATS48D47Y	20
ATS48D62Y and ATS48D75Y	50
ATS48D88Y	40
ATS48C11Y to ATS48C32Y	50
ATS48C41Y	40
ATS48C48Y to ATS48C79Y	50
ATS48M10Y and ATS48M12Y	85
ATS48D17Y	50

Fast-acting fuse (essential for type 2 coordination) and starter combinations

Starter	Fast-acting fuses with microswitch			
Reference	Unit reference *(3)*	Size	Rating	I²t
			A	kA².s
A1	Q3			
ATS48D17Y	DF3ER50	14 x 51	50	2.3
ATS48D22Y and ATS48D32Y	DF3FR80	22 x 58	80	5.6
ATS48D38Y and ATS48D47Y	DF3FR100	22 x 58	100	12
ATS48D62Y and ATS48D75Y	DF400125	00	125	45
ATS48D88Y and ATS48C11Y	DF400160	00	160	82
ATS48C14Y and ATS48C17Y	DF430400	30	400	120
ATS48C21Y to ATS48C32Y	DF431700	31	700	490
ATS48C41Y	DF433800	33	800	490
ATS48C48Y and ATS48C59Y	DF4331000	33	1000	900
ATS48C66Y	DF42331400	2 x 33	1400	1200
ATS48C79Y	DF4441600	44	1600	1600
ATS48M10Y and ATS48M12Y	DF4442200	44	2200	4100

(3) DF3ER, DF3FR: sold in lots of 10.
DF4: sold singly.

Breaking capacity of circuit-breakers according to standard IEC 60947-4-2

690 V	Icu (kA)
GV2 + LA9LB920	50

690 V	Icu (kA)				
	N	H	HB1	HB2	LB
NSX100/250	–	–	75	100	–
NSX400/630	–	–	75	100	–
NS630b/800LB	–	–	–	–	75
NS1000/1250	30	42	–	–	–

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Soft starters for asynchronous motors

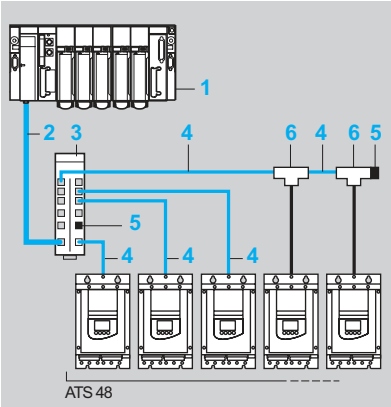
Altistart 48 soft start/soft stop units

Communication options

Modbus serial link

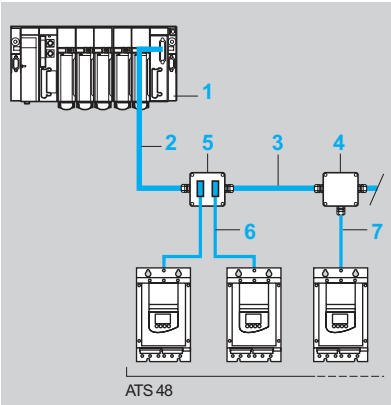
The Altistart 48 is connected directly to the Modbus bus via its RJ45 connector port.
This port supports the RS 485 (2-wire) standard and the Modbus RTU protocol.
The communication function provides access to the starter's configuration, adjustment, control and signaling functions.

Connections via splitter boxes and RJ45 connectors



1 PLC *(1)*.
2 Modbus cable depending on the controller or PLC type.
3 Modbus splitter box **LU9GC3**.
4 Modbus drop cables **VW3A8306R●●**.
5 Line terminators **VW3A8306RC**.
6 Modbus T-junction boxes **VW3A8306TF●●** (with cable).

Connections via tap junctions



1 PLC *(1)*.
2 Modbus cable depending on the controller or PLC type.
3 Modbus cable **TSXCSA●00**.
4 Junction box **TSXSCA50**.
5 Subscriber socket **TSXSCA62**.
6 Modbus drop cable **VW3A8306**.
7 Modbus drop cable **VW3A8306D30**.

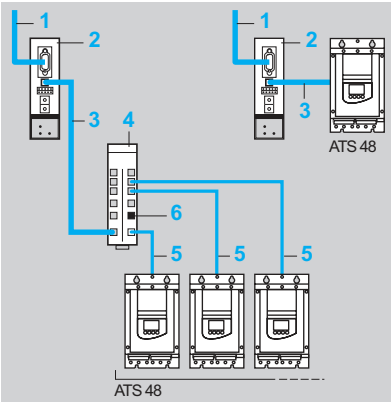
Connection via screw terminals

In this case, use a Modbus drop cable **VW3A8306D30** and line terminators **VW3A8306DRC**.

Other communication buses

The Altistart 48 can also be connected to Ethernet, Fipio, Profibus DP and DeviceNet networks via a module (bridge or gateway).
Communication on the network is used for:
- controlling,
- monitoring and,
- adjusting the connected Modbus devices.

Connection via modules



1 To network.
2 Communication modules.
3 Cables **VW3A8306R●●**, **VW3P07306R10** or **VW3A8306D30**.
4 Modbus splitter box **LU9GC3**.
5 Modbus drop cables **VW3A8306R●●**.
6 Line terminator **VW3A8306RC**.

(1) Please refer to our specialist "Modicon Premium automation platform" and "Modicon TSX Micro automation platform" catalogs.

References:
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Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

Communication options

109038

LU9GC3

Modbus serial link

Connection accessories

Description			Reference	Weight kg/ *lb*
Tap junction 3 screw terminals and RC line terminator To be connected using cable VW3A8306D30			**TSXSCA50**	0.520/ *1.156*
Subscriber socket 2 x 15-way female SUB-D connectors and 2 sets of screw terminals, RC line terminator To be connected using cable VW3A8306			**TSXSCA62**	0.570/ *1.257*
Modbus splitter box 8 RJ45 connectors and 1 set of screw terminals			**LU9GC3**	0.500/ *1.102*
Line terminators *(1)*	For RJ45 connector	R = 120 Ω, C = 1 nf	**VW3A8306RC**	0.200/ *0.441*
		R = 150 Ω	**VW3A8306R**	0.200/ *0.441*
	For screw terminals	R = 120 Ω, C = 1 nf	**VW3A8306DRC**	0.200/ *0.441*
		R = 150 Ω	**VW3A8306DR**	0.200/ *0.441*
Modbus T-junction boxes		With integrated cable 0.3 m/*0.98 ft*	**VW3A8306TF03**	–
		With integrated cable 1 m/*3.28 ft*	**VW3A8306TF10**	–

Connection cables

Description	Length m/ *ft*	Connectors	Reference	Weight kg/ *lb*
Cables for Modbus bus	3/ *9.84*	1 RJ45 connector and a stripped end	**VW3A8306D30**	0.150/ *0.331*
	3/ *9.84*	1 RJ45 connector and 1 x 15-way male SUB-D connector for TSXSCA62	**VW3A8306**	0.150/ *0.331*
	0.3/ *0.98*	2 RJ45 connectors	**VW3A8306R03**	0.050/ *0.110*
	1/ *3.28*	2 RJ45 connectors	**VW3A8306R10**	0.050/ *0.110*
	3/ *9.84*	2 RJ45 connectors	**VW3A8306R30**	0.150/ *0.331*
Cables for Profibus DP	1/ *3.28*	2 RJ45 connectors	**VW3P07306R10**	0.050/ *0.110*
RS 485 double shielded twisted pair cables	100/ *328.08*	Supplied without connector	**TSXCSA100**	–
	200/ *656.17*	Supplied without connector	**TSXCSA200**	–
	500/ *1640.42*	Supplied without connector	**TSXCSA500**	–

Other communication buses

Description	Cables to be connected	Reference	Weight kg/ *lb*
Ethernet/Modbus bridge with 1 Ethernet 10baseT port (RJ45 type)	VW3A8306D30	**174CEV30010** *(2)*	0.500/ *1.102*
Fipio/Modbus gateway	VW3A8306R●●	**LUFP1**	0.240/ *0.529*
DeviceNet/Modbus gateway	VW3A8306R●●	**LUFP9**	0.240/ *0.529*
Profibus DP/Modbus gateway Parameters set using standard Profibus DP configurator, Hilscher Sycon type	VW3P07306R10	**LA9P307**	0.240/ *0.529*
Profibus DP/Modbus gateway Parameters set using ABC Configurator software	VW3A8306R●●	**LUFP7**	0.240/ *0.529*

(1) Sold in lots of 2.
(2) Please refer to the "Modicon Premium and PL7 software automation platform" catalog.

108816

LUFP1

108817

LA9P307

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Soft starters for asynchronous motors

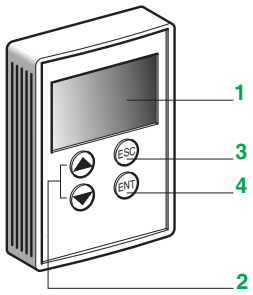
Altistart 48 soft start/soft stop units

Options: remote terminal, line chokes and DNV kits

Remote terminal

The terminal can be mounted on the door of a wall-fixing or floor-standing enclosure. It has the same signaling display and configuration buttons as the terminal integrated in the starter. A menu access locking switch is located on the rear of the terminal.

The option comprises:
- the remote terminal,
- a mounting kit containing a cover, screws and an IP 54 seal on the front panel,
- a connection cable 3 m/*9.84 ft* long, with a 9-way SUB-D connector at the terminal end and an RJ45 connector at the Altistart 48 end.



1 Information is displayed in the form of codes or values in three 7-segment displays.
2 Buttons for scrolling through the menus or modifying values.
3 “ESC”: Button for exiting the menus (no confirmation).
4 “ENT”: Confirm button for entering a menu or confirming the new value selected.

Line chokes

The use of line chokes is recommended in particular when installing several electronic starters on the same line supply. The inductance values are defined for a voltage drop between 3% and 5% of the nominal line voltage.
Install the line choke between the line contactor and the starter.

DNV kits

These kits enable ATS48D62●...48M12● starters to meet the requirements of the DNV certification body.
Each kit consists of the fixing pins and the parts necessary for mounting the starter (when mounting using the VW3G48107 kit a sling must be used, which is not included).

ATS48D17●...48D47● starters are DNV certified and it is not necessary to add an optional kit.

Protective covers for power terminals

To be used with eyelet connectors

ATS48C14● and ATS48C17● soft start/soft stop units have 9 unprotected power terminals. These terminals can be fitted with protective covers for compliance with IP 20 degree of protection.

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Soft starters for asynchronous motors

Altistart 48 soft start/soft stop units

Options: remote terminal, line chokes, DNV kits, protective covers and documentation

106770

VW3G48101

Remote terminal

Description	Reference	Weight kg/ *lb*
Remote terminal with a connection cable 3 m/*9.84 ft* long, with 9-way SUB-D connectors at the terminal end and RJ45 at the Altistart 48 end	**VW3G48101**	0.200/ *0.441*

Line chokes

For starters	Value of the choke mH	Nominal current A	Degree of protection	Reference	Weight kg/ *lb*
ATS48D17●	1.7	15	IP 20	**VZ1L015UM17T**	2.100/ *4.630*
ATS48D22●	0.8	30	IP 20	**VZ1L030U800T**	4.100/ *9.039*
ATS48D32● and 48D38●	0.6	40	IP 20	**VZ1L040U600T**	5.100/ *11.244*
ATS48D47● and 48D62●	0.35	70	IP 20	**VZ1L070U350T**	8.000/ *17.637*
ATS48D75●...48C14●	0.17	150	IP 00	**VZ1L150U170T**	14.900/ *32.849*
ATS48C17●...48C25●	0.1	250	IP 00	**VZ1L250U100T**	24.300/ *53.572*
ATS48C32●	0.075	325	IP 00	**VZ1L325U075T**	28.900/ *63.714*
ATS48C41● and 48C48●	0.045	530	IP 00	**VZ1L530U045T**	37.000/ *81.571*
ATS48C59●...48M10●	0.024	1025	IP 00	**VZ1LM10U024T**	66.000/ *145.505*
ATS48M12●	0.016	1435	IP 00	**VZ1LM14U016T**	80.000/ *176.370*

Note: *Line chokes with IP 00 degree of protection must be fitted with a protective bar to protect personnel from electrical contact.*

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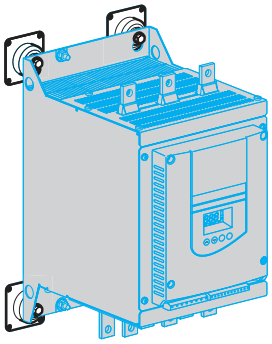

VW3G48106

DNV kits

For starters	Reference	Weight kg/ *lb*
ATS48D62●...48C17●	**VW3G48106**	0.600/ *1.323*
ATS48C21●...48C32●	**VW3G48107**	0.680/ *1.499*
ATS48C41●...48C66●	**VW3G48108**	3.400/ *7.496*
ATS48C79●...48M12●	**VW3G48109**	4.400/ *9.700*

PB111592

LA9F702

Protective covers for power terminals

To be used with eyelet connectors

For starters	Number of covers per set	Reference	Weight kg/ *lb*
ATS48C14● and ATS48C17●	6 *(1)*	**LA9F702**	0.250/ *0.551*

(1) The starters have 9 unprotected power terminals.

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