80438-069-01A
February 1998
Seneca, SC, USA

Instruction Bulletin

ALTISTART™ 46

Soft Start Units for Motor Control Centers
Class 8998

SQUARE D

TABLE OF CONTENTS

SECTION 1 – INTRODUCTION

This instruction manual provides supplementary installation and maintenance information for ALTISTART 46 soft start controllers rated from 7.5 to 500 hp, 480 Vac and 3 to 200 hp, 208 or 240 Vac mounted in Square D Class 8998 Motor Control Centers (MCCs). Several features of the MCC ALTISTART 46 soft start controller units require the instructions contained in this document in addition to instructions for standard MCC units.

Reference documents shipped with ALTISTART 46 soft start controllers and Class 8998 MCCs include:

- Model 6 Motor Control Center Instruction Manual (8998IM9201_) or Model 5 Motor Control Center Installation and Maintenance Instruction Manual (8998IM9101_). These two manuals are referred to herein as “MCC instruction manual.”
- ALTISTART 46 Soft Start Controller User’s Manual (Instruction Manual VDOC32S301). This bulletin is referred to herein as “ALTISTART 46 User’s Manual.”
- Drawings specific to order.

To replace missing documents, contact your local Square D field sales office.

The information provided in this instruction manual should be read in addition to all other documents shipped with the MCC. Certain information contained in this instruction manual supersedes information provided in the ALTISTART 46 User’s Manual. Superseded information is specifically noted in this instruction manual.

NOTE: In this instruction manual, the MCC ALTISTART 46 soft start controller unit is referred to as the “MCC ALTISTART 46 unit.” The ALTISTART 46 soft start controller itself is referred to as the “soft start” or “ATS46.”

MCC ALTISTART 46 units provide a pre-engineered motor control center package with disconnect and an ATS46 for soft starting of standard three-phase asynchronous induction motors.

Each package contains current-limiting short circuit provisions to achieve the unit’s short circuit rating. Various control and power contactor options may be included in the package. Order-specific drawings will list all included options.

Refer to the ALTISTART 46 User’s Manual for applying and adjusting the soft start parameters for a particular installation.

SECTION 2 – SAFETY PRECAUTIONS

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- This equipment must be installed and serviced only by qualified electrical personnel.
- Turn OFF all power supplying this equipment before working on or inside this equipment.
- Always use a properly-rated voltage sensing device to confirm that all power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

NOTE: All personnel involved in handling, installation, testing, operation, and maintenance should be thoroughly familiar with the information in this instruction manual and the reference documents listed on page 1 of this manual before working on this equipment. Personnel must have a thorough understanding of electrical equipment in general, the specific operation of this particular equipment, and the degree of severity of potential injury.

SECTION 3 – RECEIVING, HANDLING, AND STORAGE

Refer to the appropriate MCC instruction manual (Model 5 or Model 6) for information about receiving, handling, and storage for MCC units and enclosures.

Before installing MCC control units, locate and tighten any connections loosened during shipment and handling. Refer to the procedures in the Maintenance section of the appropriate MCC instruction manual (Model 5 or Model 6).

SECTION 4 – INSTALLATION

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- This equipment must be installed and serviced only by qualified electrical personnel.
- Turn OFF all power supplying this equipment before working on or inside this equipment.
- Always use a properly-rated voltage sensing device to confirm that all power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.
- Do not install this equipment on a circuit capable of delivering more than 65,000 A of short circuit current at 480 Vac, 240 Vac, or 208 Vac.

Failure to follow these instructions will result in death or serious injury.

This bulletin contains details specific to installation of the MCC ALTISTART 46 units.

Unit Identification

The unit identification label (see Figure 1) is located on the left side wall inside the MCC ALTISTART 46 unit. The unit identification label contains, among other data, the factory order number (F.O. NO.), unit maximum amperage rating (AMPS), and voltage rating (VOLTS).

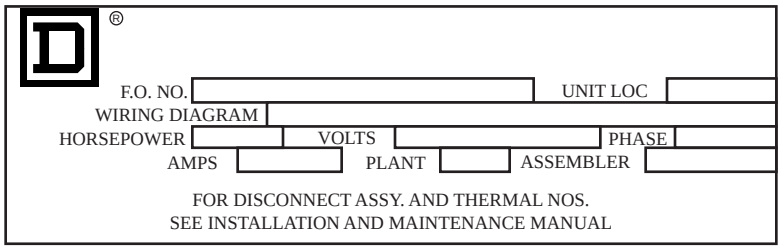

Figure 1: MCC Unit Identification Label

Information provided on the unit identification label should be referenced while reading this bulletin to determine which items are applicable to the installation. Also, the information on the label should be referenced in any communication with the factory or Field Services.

Standard Duty and Heavy Duty Ratings

Each MCC ALTISTART 46 unit is factory adjusted to the order information given to Square D at the time the order was placed. Information that accompanies the order determines the application setting for the soft start as standard duty or heavy duty. The unit identification label lists the application rating for the soft start in the AMPS field. To the right of the number in the AMPS field will be two letters, “SD,” meaning standard duty, or “HD,” meaning heavy duty. Refer to this rating when reading this manual.

Standard Duty: Typical examples of standard duty applications include most fans and centrifugal pumps. Other standard duty applications include machines such as screw conveyors or conveyors that are started with little or no load. For standard duty, the ATS46 is preset for Class 10 motor overload protection, a 300% current limit, and 10 second acceleration ramp. Standard duty operation is defined as 10 starts per hour, with a maximum start time of 23 seconds at 300% current limit or equivalent.

Heavy Duty: Typical heavy duty applications include high inertia loads or other loads requiring long acceleration times. Some examples of heavy duty applications include grinders, crushers and presses as well as high inertia fans and saws. For heavy duty, the ATS46 is preset for Class 20 motor overload protection, a 350% current limit, and 15 second acceleration ramp. Heavy duty is defined as 5 starts per hour, with a maximum start time of 46 seconds at 350% current limit or equivalent.

If it is determined that you require a heavy duty application rating for your soft start unit and “SD” (standard duty) is listed on the unit identification label, a larger soft start unit will be required. Contact your Square D representative to obtain upgrade information.

Cabling

Refer to the torque label located adjacent to the load terminals for load terminal wire and torque requirements. For MCC applications, the torque labels provided in the MCC ALTISTART 46 units supersede cabling information listed in Table 4 of the ALTISTART 46 User’s Manual.

Adaptation to Line Input

This paragraph replaces the information under “Adaptation To Line Input” explained in the ALTISTART 46 User’s Manual. Each MCC ALTISTART 46 unit has been factory configured for a particular line voltage as specified with the equipment order. The available ratings are 208 Vac, 240 Vac and 480 Vac at 60 Hz. The factory-configured voltage rating is listed on the Unit Identification label. Consult the factory if the equipment requires modification from this voltage rating.

SECTION 5 – CONTROL SEQUENCE OF OPERATION

Circuit Diagrams

The MCC ALTISTART 46 unit is an integrated package that may have different control diagrams and components from those listed in the ALTISTART 46 User's Manual. The sections "Control Circuit Diagrams" and "Recommended Components List" provided in the ALTISTART 46 User's Manual are superseded by the MCC documents provided with the MCC ALTISTART 46 units. Circuit diagrams specific to MCC ALTISTART 46 units are shipped with each unit. For component information specific to MCC ALTISTART 46 units, consult the replacement parts list beginning on page 16 of this document, or contact the factory.

The MCC ALTISTART 46 unit follows logic descriptions listed in the ALTISTART 46 User's Manual. Additional control options provided exclusively in the MCC version are explained below. Refer to wiring diagrams and data sheets supplied with the equipment, and form numbers provided on the soft start, for further details.

Shorting Contactor (Form U506)

The shorting contactor is used to reduce the heat dissipated by the soft start when the motor is operating at full speed and voltage.

Units Containing ATS46D47N and Larger

A shorting contactor is a standard feature on MCC ALTISTART 46 units containing ATS46D47N and larger). The ATS46 provides proper sequencing of this contactor (see the ALTISTART 46 User's Manual for a description of the logic).

Units Containing ATS46D38N and Smaller

On MCC ALTISTART 46 units containing ATS46D17N to D38N, the shorting contactor function is not required for heat dissipation purposes but may be added as an option. The shorting contactor description of logic as explained in the ALTISTART 46 User's Manual does not apply to MCC ALTISTART 46 units containing ATS46D38N and smaller. Instead, the shorting contactor is closed by the "end start up" relay when starting is complete. The ATS46 does not monitor motor current while the shorting contactor is closed. Motor current is monitored by a separate additional overload relay. Upon a stop command, the shorting contactor will open and the motor will freewheel stop (coast to stop). A controlled deceleration of the motor is not available when the shorting contactor is provided on the MCC ALTISTART 46 units containing ATS46D38N and smaller.

Integrated Bypass (Form U503)

As a standard feature, each MCC ALTISTART 46 unit includes a full-voltage bypass capability that provides the ability to bypass the soft start and run the motor using an across-the-line full-voltage starting method. This mode of operation can be used for conditions where the soft start is out of service due to a protective fault and the process must run until a convenient shutdown is possible. The electrical and mechanical systems should be reviewed for compatibility with a full-voltage starting method before using the bypass mode. The circuit includes a Bypass/Normal selector switch (mounted on the unit door), control logic, and a separate overload relay.

The shorting contactor provided as standard on units ATS46D47N and larger is used as the bypass mode motor contactor. On units smaller than D47N, a power contactor is added to the unit to function as the bypass mode motor contactor but does not function as a shorting contactor as a standard feature. If the shorting contactor function is required on units below D47N, as an additional option, Form U506 (Shorting Contactor) is included along with Form U503 (Bypass).

The bypass contactor is controlled by the Bypass/Normal selector switch. In the "Normal" mode, the soft start controls the motor. On ATS46D47N units and larger, the bypass contactor also functions as a shorting contactor and will close when the soft starting cycle is complete, and open when a stop command is given. The motor overload protection is provided via the solid state overload built into the ATS46.

In the "Bypass" mode, the isolation contactor and bypass contactor will be directly opened and closed via the customer start-stop logic. The soft start does not control the motor in bypass mode. A separate ambient temperature-compensated overload relay is used to provide motor overload protection.

On some units, the separate overload relay is electrically connected ahead of the soft start, and on other units, the overload is electrically connected on the load side of the soft start. This practice allows for more convenient connections to the user load.

Pilot relays are used for the bypass and input contactors when the contactor coil power requirements exceed the soft start relay contact ratings.

NOTE: The ATS46 soft start will trip on the "Phase Fault" whenever the MCC ALTISTART 46 Unit is switched to the Bypass mode. When switching back to the Normal Mode, it will be necessary to cycle the input power by turning the disconnect off and back on to reset the fault. The fault occurs because the ATS46 SCR protection circuit incorrectly diagnoses the equal voltage present on the line and load terminals in the Bypass Mode as a shorted SCR.

Factory Settings

The ATS46 is factory set so that for many applications it can be operated without adjustment. The factory settings are based on information provided with the equipment order. The setting of Standard Duty or Heavy Duty affects the ATS46 parameters shown in Table 1.

Table 1: Standard Duty/Heavy Duty Settings

Parameter Name	Parameter Code	Standard Duty Factory Setting	Heavy Duty Factory Setting
Acceleration ramp	ACC	10 seconds	15 seconds
Current limit	ILt	300%	350%
Overload protection	tHP	Class 10	Class 20

The setting of Standard Duty or Heavy Duty of the MCC ALTISTART 46 unit is identified as explained in "Installation" on page 4.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- This equipment must be installed and serviced only by qualified electrical personnel.
- Turn OFF all power supplying this equipment before working on or inside this equipment.
- Always use a properly-rated voltage sensing device to confirm that all power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

Adjustment Procedure

Several parameters in the three menu levels of the soft start can be set to customize the soft start for the application. In addition, a separate adjustable motor overload relay is included on each MCC ALTISTART 46 unit.

The following key items should be checked and adjusted if necessary before motor operation:

- Nominal Motor Current parameter (adjustable via the keypad)
- Motor overload relay (adjustable via the dial on the relay or via thermal unit selection)

The Nominal Motor Current parameter can be adjusted via the keypad along with all programmable ATS46 parameters. Two switches on the back of the keypad provide three levels of access to the parameters. Each can be set to prevent adjustment of the parameters (as is the case when shipped from the factory. The parameters are locked at the factory to avoid accidental modification). To adjust parameters, the keypad must first be removed from the front of the unit door, and then the dip switch settings must be changed.

To remove the keypad:

1. Remove the hardware holding the door-mounted trim ring around the keypad.
2. Remove the clear plastic keypad cover.
3. Loosen the holding screw on the keypad.

4. The keypad can be removed and the dip switches set. Refer to “Using The Keypad” in the ALTISTART 46 User’s Manual for information about how to set the dip switches.

NOTE: The keypad may be removed while the soft start is running. The keypad is not required to be in place to operate the soft start.

Remember to set the dip switches to the desired lockout position after adjusting the programmable parameters. Tighten the keypad holding screw and install the plastic cover and trim ring when returning the keypad to the unit door.

NOTE: The lockout position can help prevent unauthorized adjustment of the soft start parameters.

Nominal Motor Current (In)

The factory settings for Nominal Motor Current (In) for Standard Duty and Heavy Duty applications are shown in Table 2. If the motor full load current rating is **not** within 95 to 105% of the value shown in the table, or if the motor has a 1.0 service factor, the soft start should be adjusted for optimal motor protection and performance (explained below).

Solid state thermal overload protection is a standard function provided by the ATS46. The trip current rating is 1.10 times the motor full load amp setting. For continuous-rated motors having service factors of 1.15 to 1.25, set Nominal Motor Current to 100% of the full-load current shown on the motor nameplate. For continuous-rated motors having service factors of 1.0, set Nominal Motor Current to 96% of the full-load current shown on the motor nameplate.

Table 2: Nominal Motor Current Factory Settings

ATS46 Catalog Number	Nominal Motor Current (In) Factory Setting	
	Standard Duty Applications	Heavy Duty Applications
ATS46D17N	15	12
ATS46D22N	21	17
ATS46D32N	28	22
ATS46D38N	34	32
ATS46D47N	42	38
ATS46D62N	54	47
ATS46D75N	68	62
ATS46C11N	98	88
ATS46C14N	128	110
ATS46C17N	160	145
ATS46C21N	190	176
ATS46C25N	236	210
ATS46C32N	290	257
ATS46C41N	367	320
ATS46C48N	430	410
ATS46C59N	547	480
ATS46C66N	610	590

Tables 13 and 14 in the ATISTART 46 User’s Manual show the factory settings for other available parameters.

Motor Overload Relay

Units without Form U504 (NEMA Contactors)

A supplemental overload relay is used in conjunction with the soft start. This relay is an ambient temperature-compensated overload relay. The factory setting is the minimum trip setting. Check the setting to verify that the factory setting matches the full load motor current found on the motor nameplate. Table 3 lists the overload relay provided with each MCC ALTISTART 46 unit when Form U504 (NEMA Contactors) is not provided with the unit.

Table 3: Overload Relays For Units Without Form U504

Full Load Current (Amps)	Overload Relay Catalog Number①
3.5 to 4.0	LR2D1•08
4.1 to 6.0	LR2D1•10
6.1 to 8.0	LR2D1•12
8.1 to 10.0	LR2D1•14
10.1 to 13.0	LR2D1•16
13.1 to 18.0	LR2D1•21
18.1 to 24.0	LR2D1•22
24.1 to 28.0	LR2D2•53
28.1 to 32.0	LR2D3•53
32.1 to 40.0	LR2D3•55
40.1 to 50.0	LR2D3•57
50.1 to 65.0	LR2D3•59
65.1 to 72.0	LR2D3•63
72.1 to 100.0	LR9F5•67
101.0 to 135.0	LR9F5•69
136.0 to 200.0	LR9F5•71
201.0 to 314.0	LR9F7•75
315.0 to 415.0	LR9F7•79
416.0 to 590.0	LR9F7•81

① If ATS46 is set for standard duty, insert “3” in place of “•”. If set for heavy duty, insert “5” in place of “•”.

Units with Form U504 (NEMA Contactors)

If the full load current is 21.0 amps or less, a thermal unit must be used. Thermal units are not supplied by the factory and must be ordered separately and installed by the user before operating the motor. Table 4 on page 10 shows the thermal unit catalog number for MCC ALTISTART 46 units with full load current up to 21.0 amps.

For units with full load current of 21.1 amps or greater, a supplemental overload relay supplied with the unit is used in conjunction with the soft start. This relay is an ambient temperature-compensated overload relay. The factory setting is the minimum trip setting. Check the setting to verify that the factory setting matches the full load motor current found on the motor nameplate. Table 5 on page 10 shows the overload relay catalog number for MCC ALTISTART 46 units with full load current of 21.1 amps or greater.

Table 4: Thermal Units for MCC Units with Form U504

Full Load Current (Amps)	Thermal Unit Catalog Number①
3.50 to 3.81	AR5.8
3.82 to 4.20	AR6.4
4.21 to 4.65	AR7.0
4.66 to 5.29	AR7.7
5.30 to 5.84	AR8.5
5.85 to 6.27	AR9.3
6.28 to 6.97	AR10.2
6.98 to 7.59	AR11.2
7.60 to 7.89	AR12.4
7.90 to 8.95	AR13.6
8.96 to 10.3	AR15.4
10.4 to 11.7	AR17.6
11.8 to 13.3	AR20.5
13.4 to 14.0	AR23
14.1 to 14.4	AR27
14.5 to 16.4	AR30
16.5 to 18.9	AR35
19.0 to 21.0	AR40

① User must supply and install thermal units.

Table 5: Overload Relays for Units with Form U504

Full Load Current (Amps)	Overload Relay Catalog Number①
21.1 to 24.0	LR2D1•22
24.1 to 28.0	LR2D2•53
28.1 to 32.0	LR2D3•53
32.1 to 40.0	LR2D3•55
40.1 to 50.0	LR2D3•57
50.1 to 65.0	LR2D3•59
65.1 to 72.0	LR2D3•63
72.1 to 100.0	LR9F5•67
101.0 to 135.0	LR9F5•69
136.0 to 200.0	LR9F5•71
201.0 to 314.0	LR9F7•75
315.0 to 415.0	LR9F7•79
416.0 to 480.0	LR9F7•81

① If ATS46 is set for standard duty, insert “3” in place of “•”. If set for heavy duty, insert “5” in place of “•”.

SECTION 6 – POWER FUSE RECOMMENDATION

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION

- Never operate the switch with the door open.
- Turn OFF the switch before removing or installing fuses or making load side connections.
- Always use a properly-rated voltage sensing device at all line and load side fuse clips to confirm that the switch is OFF.
- Turn OFF all power supplying the switch before doing any other work on or inside the switch.
- Use only Class J or Class L fuses that are listed in Tables 6–9 to provide correct short circuit protection.

Failure to follow these instructions will result in death or serious injury.

The MCC ALTISTART 46 units are provided with either a thermal magnetic circuit breaker or a fusible switch disconnect. Current-limiting short circuit protection provisions are also supplied with each unit. Units supplied with thermal magnetic circuit breaker disconnects have a factory-installed current-limiting module (CLM) or factory-installed current-limiting fuses to achieve the short circuit withstand rating. The factory-installed current limiters are shown in Tables 6 (Standard Duty applications) and 7 (Heavy Duty applications) on pages 12 and 13. Units supplied with fusible switch disconnects require the user to supply and install the power fuses. The fuses necessary for the user to supply and install are shown in Tables 8 (Standard Duty applications) and 9 (Heavy Duty applications) on pages 14 to 16. All of the provisions for mounting fuses in the MCC ALTISTART 46 units accept UL Class J or L fuses, depending on the full load current rating.

NOTE: Tables 6 –9 on pages 12 and 13 supersede fuse recommendations and references to fuse type and size listed in Table 8 and Table 19 of the ALTISTART 46 User's Manual.

Table 6: Current Limiter Selection for Standard Duty MCC ALTISTART 46 Units with Circuit Breaker Disconnect

MCC ALTISTART 46 Unit Rating (Amps)		Nominal Horsepower @			ALTISTART 46 Catalog Number	Square D Replacement	
Min	Max	200 V	230 V	460 V		Limiter Type	Limiter Part Number
8.5	10.0	-	3	-	ATS46D17N	CLM2	30450-039-50
10.1	12.0	3	-	7.5	ATS46D17N	CLM2	30450-039-50
12.1	13.0	-	-	-	ATS46D22N	CLM2	30450-039-50
13.1	14.0	-	-	10	ATS46D22N	CLM2	30450-039-50
14.1	16.0	-	5	-	ATS46D22N	CLM3	30450-040-50
16.1	18.0	5	-	-	ATS46D32N	CLM3	30450-040-50
18.1	20.0	-	-	-	ATS46D32N	CLM3	30450-040-50
20.1	21.0	-	-	15	ATS46D32N	CLM3	30450-040-50
21.1	24.0	-	7.5	-	ATS46D38N	CLM3	30450-040-50
24.1	28.0	7.5	10	20	ATS46D38N	CLM3	30450-040-50
28.1	32.0	10	-	-	ATS46D47N	LPJ-100SP	25423-31000
32.1	36.0	-	-	25	ATS46D47N	LPJ-100SP	25423-31000
36.1	40.0	-	-	30	ATS46D47N	LPJ-100SP	25423-31000
40.1	44.0	-	-	-	ATS46D47N	LPJ-100SP	25423-31000
44.1	50.0	15	-	-	ATS46D62N	LPJ-200SP	25423-32000
50.1	62.0	20	20	40	ATS46D62N	LPJ-200SP	25423-32000
62.1	65.0	-	-	50	ATS46D75N	LPJ-200SP	25423-32000
65.1	69.0	-	25	-	ATS46D75N	LPJ-200SP	25423-32000
69.1	72.0	-	-	-	ATS46D75N	LPJ-200SP	25423-32000
72.1	80.0	25	30	60	ATS46C11N	LPJ-200SP	25423-32000
80.1	90.0	30	-	-	ATS46C11N	LPJ-200SP	25423-32000
90.1	100.0	-	-	75	ATS46C11N	LPJ-200SP	25423-32000
101.0	105.0	-	40	-	ATS46C11N	LPJ-200SP	25423-32000
106.0	115.0	40	-	-	ATS46C14N	LPJ-400SP	25423-34000
116.0	135.0	-	50	100	ATS46C14N	LPJ-400SP	25423-34000
136.0	160.0	50	60	125	ATS46C17N	LPJ-400SP	25423-34000
161.0	172.0	60	-	-	ATS46C17N	LPJ-400SP	25423-34000
173.0	176.0	-	-	-	ATS46C17N	LPJ-400SP	25423-34000
177.0	200.0	-	75	150	ATS46C21N	LPJ-400SP	25423-34000
201.0	250.0	75	100	200	ATS46C25N	LPJ-400SP	25423-34000
251.0	257.0	-	-	-	ATS46C25N	LPJ-400SP	25423-34000
258.0	285.0	100	-	-	ATS46C32N	LPJ-600SP	25423-36000
286.0	302.0	-	-	250	ATS46C32N	LPJ-600SP	25423-36000
303.0	314.0	-	125	-	ATS46C41N	LPJ-600SP	25423-36000
315.0	410.0	125/150	150	300	ATS46C41N	LPJ-600SP	25423-36000
411.0	415.0	-	-	350	ATS46C48N	KRP-C-1000①	25432-11000
416.0	439.0	-	-	-	ATS46C48N	KRP-C-1000①	25432-11000
440.0	480.0	-	200	400	ATS46C48N	KRP-C-1000①	25432-11000
481	528	200	-	450	ATS46C59N	KRP-C-1000①	25432-11000
529	590	-	-	500	ATS46C59N	KRP-C-1000①	25432-11000

① Bussman only.

Table 7: Current Limiter Selection for Heavy Duty MCC ALTISTART 46 Units with Circuit Breaker Disconnect

MCC ALTISTART 46 Unit Rating (Amps)		Nominal Horsepower @			ALTISTART 46 Catalog Number	Square D Replacement	
Min	Max	200 V	230 V	460 V		Limiter Type	Limiter Part Number
8.5	10.0	-	3	-	ATS46D22N	CLM2	30450-039-50
10.1	12.0	3	-	7.5	ATS46D22N	CLM2	30450-039-50
12.1	13.0	-	-	-	ATS46D32N	CLM2	30450-039-50
13.1	14.0	-	-	10	ATS46D32N	CLM3	30450-040-50
14.1	16.0	-	5	-	ATS46D32N	CLM3	30450-040-50
16.1	18.0	5	-	-	ATS46D38N	CLM3	30450-040-50
18.1	21.0	-	-	15	ATS46D38N	CLM3	30450-040-50
21.1	24.0	-	7.5	-	ATS46D47N	LPJ-100SP	25423-31000
24.1	28.0	7.5	10	20	ATS46D47N	LPJ-100SP	25423-31000
28.1	32.0	10	-	-	ATS46D62N	LPJ-100SP	25423-31000
32.1	36.0	-	-	25	ATS46D62N	LPJ-100SP	25423-31000
36.1	40.0	-	-	30	ATS46D62N	LPJ-100SP	25423-31000
40.1	44.0	-	15	-	ATS46D62N	LPJ-100SP	25423-31000
44.1	50.0	15	-	-	ATS46D75N	LPJ-200SP	25423-32000
50.1	62.0	20	20	40	ATS46D75N	LPJ-200SP	25423-32000
62.1	65.0	-	-	50	ATS46C11N	LPJ-200SP	25423-32000
65.1	72.0	-	25	-	ATS46C11N	LPJ-200SP	25423-32000
72.1	100.0	25/30	30	60/75	ATS46C14N	LPJ-200SP	25423-32000
101.0	105.0	-	40	-	ATS46C14N	LPJ-200SP	25423-32000
106.0	122.0	40	-	-	ATS46C17N	LPJ-400SP	25423-34000
123.0	135.0	-	50	100	ATS46C17N	LPJ-400SP	25423-34000
136.0	160.0	50	60	125	ATS46C21N	LPJ-400SP	25423-34000
161.0	176.0	60	-	-	ATS46C21N	LPJ-400SP	25423-34000
177.0	200.0	-	75	150	ATS46C25N	LPJ-400SP	25423-34000
201.0	257.0	75	100	200	ATS46C32N	LPJ-400SP	25423-34000
258.0	302.0	100	-	250	ATS46C41N	LPJ-600SP	25423-36000
303.0	314.0	-	125	-	ATS46C48N	LPJ-600SP	25423-36000
315.0	410.0	125/150	150	300	ATS46C48N	LPJ-600SP	25423-36000
411.0	415.0	-	-	350	ATS46C59N	KRP-C-1000①	25432-11000
416.0	439.0	-	-	-	ATS46C59N	KRP-C-1000①	25432-11000
440.0	480.0	-	200	400	ATS46C59N	KRP-C-1000①	25432-11000
481	590	200	-	450/500	ATS46C66N	KRP-C-1000①	25432-11000

① Bussman only.

Table 8: Fuse Selection for Standard Duty MCC ALTISTART 46 Units with Fusible Switch Disconnect

MCC ALTISTART 46 Unit Rating (Amps)		Nominal Horsepower @			ALTISTART 46 Catalog No.	Square D Replacement	
Min	Max	200 V	230 V	460 V		Fuse Type	Fuse Part No.
8.5	10.0	-	3	-	ATS46D17N	LPJ-15SP	25423-30150
10.1	12.0	3	-	7.5	ATS46D17N	LPJ-17.5SP	25423-30175
12.1	13.0	-	-	-	ATS46D22N	LPJ-20SP	25423-30200
13.1	15.0	-	-	10	ATS46D22N	LPJ-20SP	25423-30200
15.1	16.0	-	5	-	ATS46D22N	LPJ-25SP	25423-30250
16.1	18.0	5	-	-	ATS46D32N	LPJ-25SP	25423-30250
18.1	20.0	-	-	-	ATS46D32N	LPJ-30SP	25423-30300
20.1	21.0	-	-	15	ATS46D32N	LPJ-35SP	25423-30350
21.1	23.0	-	7.5	-	ATS46D38N	LPJ-35SP	25423-30350
23.1	24.0	-	-	-	ATS46D38N	LPJ-40SP	25423-30400
24.1	26.0	7.5	-	-	ATS46D38N	LPJ-40SP	25423-30400
26.1	28.0	-	10	20	ATS46D38N	LPJ-45SP	25423-30450
28.1	29.0	-	-	-	ATS46D47N	LPJ-45SP	25423-30450
29.1	32.0	10	-	-	ATS46D47N	LPJ-50SP	25423-30500
32.1	35.0	-	-	25	ATS46D47N	LPJ-50SP	25423-30500
35.1	40.0	-	-	30	ATS46D47N	LPJ-60SP	25423-30600
40.1	44.0	-	15	-	ATS46D47N	LPJ-70SP	25423-30700
44.1	46.0	-	-	-	ATS46D62N	LPJ-70SP	25423-30700
46.1	50.0	15	-	-	ATS46D62N	LPJ-80SP	25423-30800
50.1	52.0	-	-	40	ATS46D62N	LPJ-80SP	25423-30800
52.1	58.0	-	20	-	ATS46D62N	LPJ-90SP	25423-30900
58.1	62.0	20	-	-	ATS46D62N	LPJ-100SP	25423-31000
62.1	63.0	-	-	-	ATS46D75N	LPJ-100SP	25423-31000
63.1	65.0	-	-	50	ATS46D75N	LPJ-110SP	25423-31100
65.1	72.0	-	25	-	ATS46D75N	LPJ-110SP	25423-31100
72.1	86.0	25	30	60	ATS46C11N	LPJ-125SP	25423-31250
86.1	100.0	30	-	75	ATS46C11N	LPJ-150SP	25423-31500
101.0	105.0	-	40	-	ATS46C11N	LPJ-175SP	25423-31750
106.0	115.0	40	-	-	ATS46C14N	LPJ-175SP	25423-31750
116.0	129.0	-	-	100	ATS46C14N	LPJ-200SP	25423-32000
130.0	135.0	-	50	-	ATS46C14N	LPJ-225SP	25423-32250
136.0	143.0	50	-	-	ATS46C17N	LPJ-225SP	25423-32250
144.0	172.0	60	60	125	ATS46C17N	LPJ-250SP	25423-32500
173.0	176.0	-	-	-	ATS46C17N	LPJ-300SP	25423-33000
177.0	200.0	-	75	150	ATS46C21N	LPJ-300SP	25423-33000
201.0	229.0	75	-	-	ATS46C25N	LPJ-350SP	25423-33500
230.0	250.0	-	100	200	ATS46C25N	LPJ-400SP	25423-34000
251.0	257.0	-	-	-	ATS46C25N	LPJ-400SP	25423-34000
258.0	258.0	-	-	-	ATS46C32N	LPJ-400SP	25423-34000
259.0	286.0	100	-	-	ATS46C32N	LPJ-450SP	25423-34500
287.0	302.0	-	-	250	ATS46C32N	LPJ-500SP	25423-35000
303.0	314.0	-	125	-	ATS46C41N	LPJ-500SP	25423-35000
315.0	343.0	125	-	-	ATS46C41N	LPJ-500SP	25423-35000
344.0	410.0	150	150	300	ATS46C41N	LPJ-600SP	25423-36000
411.0	415.0	-	-	350	ATS46C48N	KRP-C-700①	25432-10700
416.0	458.0	-	-	-	ATS46C48N	KRP-C-700①	25432-10700
459.0	480.0	-	200	400	ATS46C48N	KRP-C-800①	25432-10800
481	572	200	-	450	ATS46C59N	KRP-C-800①	25432-10800
573	590	-	-	500	ATS46C59N	KRP-C-1000①	25432-11000

① Bussman only.

Table 9: Fuse Selection for Heavy Duty MCC ALTISTART 46 Units with Fusible Switch Disconnect

MCC ALTISTART 46 Unit Rating (Amps)		Nominal Horsepower @			ALTISTART 46 Catalog No.	Square D Replacement	
Min	Max	200 V	230 V	460 V		Fuse Type	Fuse Part No.
8.5	10.0	-	3	-	ATS46D22N	LPJ-15SP	25423-30150
10.1	12.0	3	-	7.5	ATS46D22N	LPJ-17.5SP	25423-30175
12.1	13.0	-	-	-	ATS46D32N	LPJ-20SP	25423-30200
13.1	15.0	-	-	10	ATS46D32N	LPJ-20SP	25423-30200
15.1	16.0	-	5	-	ATS46D32N	LPJ-25SP	25423-30250
16.1	18.0	5	-	-	ATS46D38N	LPJ-25SP	25423-30250
18.1	20.0	-	-	-	ATS46D38N	LPJ-30SP	25423-30300
20.1	21.0	-	-	15	ATS46D38N	LPJ-35SP	25423-30350
21.1	23.0	-	7.5	-	ATS46D47N	LPJ-35SP	25423-30350
23.1	24.0	-	-	-	ATS46D47N	LPJ-40SP	25423-30400
24.1	26.0	7.5	-	-	ATS46D47N	LPJ-40SP	25423-30400
26.1	28.0	-	10	20	ATS46D47N	LPJ-45SP	25423-30450
28.1	29.0	-	-	-	ATS46D62N	LPJ-45SP	25423-30450
29.1	32.0	10	-	-	ATS46D62N	LPJ-50SP	25423-30500
32.1	35.0	-	-	25	ATS46D62N	LPJ-50SP	25423-30500
35.1	40.0	-	-	30	ATS46D62N	LPJ-60SP	25423-30600
40.1	44.0	-	15	-	ATS46D62N	LPJ-70SP	25423-30700
44.1	46.0	-	-	-	ATS46D75N	LPJ-70SP	25423-30700
46.1	50.0	15	-	-	ATS46D75N	LPJ-80SP	25423-30800
50.1	52.0	-	-	40	ATS46D75N	LPJ-80SP	25423-30800
52.1	58.0	-	20	-	ATS46D75N	LPJ-90SP	25423-30900
58.1	62.0	20	-	-	ATS46D75N	LPJ-100SP	25423-31000
62.1	63.0	-	-	-	ATS46C11N	LPJ-100SP	25423-31000
63.1	65.0	-	-	50	ATS46C11N	LPJ-110SP	25423-31100
65.1	72.0	-	25	-	ATS46C11N	LPJ-110SP	25423-31100
72.1	86.0	25	30	60	ATS46C14N	LPJ-125SP	25423-31250
86.1	100.0	30	-	75	ATS46C14N	LPJ-150SP	25423-31500
101.0	105.0	-	40	-	ATS46C14N	LPJ-175SP	25423-31750
106.0	115.0	40	-	-	ATS46C17N	LPJ-175SP	25423-31750
116.0	129.0	-	-	100	ATS46C17N	LPJ-200SP	25423-32000
130.0	135.0	-	50	-	ATS46C17N	LPJ-225SP	25423-32250
136.0	143.0	50	-	-	ATS46C21N	LPJ-225SP	25423-32250
144.0	172.0	60	60	125	ATS46C21N	LPJ-250SP	25423-32500
173.0	176.0	-	-	-	ATS46C21N	LPJ-300SP	25423-33000
177.0	200.0	-	75	150	ATS46C25N	LPJ-300SP	25423-33000
201.0	229.0	75	-	-	ATS46C32N	LPJ-350SP	25423-33500
230.0	250.0	-	100	200	ATS46C32N	LPJ-400SP	25423-34000
251.0	257.0	-	-	-	ATS46C32N	LPJ-400SP	25423-34000
258.0	258.0	-	-	-	ATS46C41N	LPJ-400SP	25423-34000
259.0	286.0	100	-	-	ATS46C41N	LPJ-450SP	25423-34500
287.0	302.0	-	-	250	ATS46C41N	LPJ-500SP	25423-35000
303.0	314.0	-	125	-	ATS46C48N	LPJ-500SP	25423-35000
315.0	343.0	125	-	-	ATS46C48N	LPJ-500SP	25423-35000
344.0	410.0	150	150	300	ATS46C48N	LPJ-600SP	25423-36000
411.0	415.0	-	-	350	ATS46C59N	KRP-C-700①	25432-10700
416.0	458.0	-	-	-	ATS46C59N	KRP-C-700①	25432-10700
459.0	480.0	-	200	400	ATS46C59N	KRP-C-800①	25432-10800
481	572	200	-	450	ATS46C66N	KRP-C-800①	25432-10800
573	590	-	-	500	ATS46C66N	KRP-C-1000①	25432-11000

① Bussman only.

SECTION 7 – REPLACEMENT PARTS

Refer to the ALTISTART 46 User's Manual for replacement parts for the soft start. Table 10 below lists additional replacement parts used in MCC ALTISTART 46 units. Order all parts from your local Square D supplier.

Table 10: Replacement Parts for MCC ALTISTART 46 Units

Replacement Part	Circuit Diagram Notation	Used with ATS46••••	Part Number
Stirring fan	FAN1	D17N, D22N, D32N, D38N (Heavy Duty)	26016-31529
		D38N (Standard Duty), D47N, D62N, D75N	26016-31528
		C41N, C48N	26016-31528
	FAN2 (used only on units rated >480 A)	C59N, C66N	26016-31529
Contactors, overload relays, control relays, and control power transformers		All	See component label for replacement part number.
Power fuses		All	See Tables 6 through 9.
ALTISTART control fuses	F1	D17N, D22N, D32N, D38N, D47N, D62N @ 208/240 or 480 Vac	25430-20025 (1/4 A)
		D75N, D88N, C11N, C14N @ 208/240 Vac @ 480 Vac	25430-20500 (1/2 A) 25430-20025 (1/4 A)
		C17N, C21N, C25N, C32N @ 208/240 Vac @ 480 Vac	25430-20160 (1 6/10 A) 25430-20080 (8/10 A)
		C41N, C48N, C59N, C66N @ 208/240 Vac @ 480 Vac	25430-20200 (2 A) 25430-20100 (1 A)
Control power fuses	FU		Order fuses listed on MCC ALTISTART 46 unit labels.

For pricing of replacement parts, contact your local Square D distributor or field sales office.

Circuit Breaker and Fusible Switch Replacement Parts

Square D recommends replacing the entire disconnect assembly if listed below instead of replacing just the circuit breaker or switch. The disconnect assembly includes the operating mechanism and the appropriate circuit breaker or switch. Always use replacement devices of the same type and rating as the device being removed. Using a different type of disconnect or one with a different rating may alter the short circuit ratings of the motor control center.

Circuit Breaker Selection

Table 11 shows the disconnect assembly, which replaces a thermal magnetic circuit breaker, used on standard duty units only. For units with a soft start larger than ATS46D75N, order a replacement circuit breaker of the same type as the original device.

Table 11: Replacements for Thermal Magnetic Circuit Breakers

Thermal Magnetic Circuit Breaker To Be Replaced① (used on standard duty units only)	Disconnect Assembly To Order	
	Model 5 MCC	Model 6 MCC
FHP36020	M5DSATM020M Y532	M6DSATM020MY532
FHP36025	M5DSATM025M Y532	M6DSATM025MY532
FHP36030	M5DSATM030M Y532	M6DSATM030MY532
FHP36035	M5DSATM035MY532	M6DSATM035MY532
FHP36040	M5DSATM040M Y532	M6DSATM040MY532
FHP36045	M5DSATM045MY532	M6DSATM045MY532
FHP36050	M5DSATM050MY532	M6DSATM050MY532
FHP36060	M5DSATM060MY532	M6DSATM060MY532
FHP36070	M5DSATM070MY532	M6DSATM070MY532
FHP36080	M5DSATM080MY532	M6DSATM080MY532
FHP36090	M5DSATM090MY532	M6DSATM090MY532
KAP36090	M5DSATM110MU914	M6DSATM110MU914
KAP36100	M5DSATM110MU915	M6DSATM110MU915
KAP36110	M5DSATM110M	M6DSATM110M

① For units with a soft start controller larger than ATS46D75N, order a replacement circuit breaker of the same type as the original device.

Table 12 shows the disconnect assembly, which replaces a MAG-GARD™ circuit breaker, used on heavy duty units only. For units with a soft start larger than ATS46D75N, order a replacement circuit breaker of the same type as the original device.

Table 12: Replacements for MAG-GARD Circuit Breakers

MAG-GARD Circuit Breaker To Be Replaced① (used on heavy duty units only)	Disconnect Assembly To Order	
	Model 5 MCC	Model 6 MCC
FHP3601513M	M5DSAMG015M13Y532	M6DSAMG015M13Y532
FHP3603015M	M5DSAMG030M15Y532	M6DSAMG030M15Y532
FHP3605016M	M5DSAMG050M16Y532	M6DSAMG050M16Y532
FHP3610018M	M5DSAMG100M18Y532	M6DSAMG100M18Y532

① For units with a soft start controller larger than ATS46D75N, order a replacement circuit breaker of the same type as the original device.

Fusible Switch Selection

Table 13 shows the disconnect assembly, which replaces a fusible switch. For fusible type MCC ALTISTART 46 units rated greater than 21 amps (ATS46D38N and larger for standard duty; ATS46D47N and larger for heavy duty), order a replacement automatic molded case switch of the same type as the original device.

Table 13: Replacements for Fusible Switches

Fusible Switch To Be Replaced①	Disconnect Assembly To Order	
	Model 5 MCC	Model 6 MCC
30 A	M5DSAFS030M	M6DSAFS030M
60 A	M5DSAFS060M	M6DSAFS060M

① For fusible type MCC ALTISTART 46 soft start controller units rated greater than 21 amps, order a replacement automatic molded case switch of the same type as the original device.

Square D
1990 Sandifer Blvd.
Seneca, SC 29678 USA
(864) 882-2414