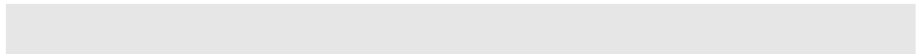





Form 1260

SHORT-STOP
Electronic Motor Brake –Type A
User's Manual

TB WOOD'S INCORPORATED
Chambersburg, Pennsylvania



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Section 1: Introduction

1.1 Product Overview

The SHORT-STOP Type A electronic motor brake permits rapid stopping of AC motors by DC injection, which creates a stationary magnetic field within the motor. Braking action is smooth, adjustable, and frictionless, and begins automatically when the motor is turned off. See Section 6.1 on page 25 for further information on how the SHORT-STOP brake works.

The torque applied during braking, and the length of time that the torque is applied, is adjustable. It also does not require mechanical connections and utilizes internal fuses. See Section 5 on page 23 for information on adjusting the SHORT-STOP brake.

Note that the SHORT-STOP brake does not affect normal machine performance, operation, or motor life.

1.2 Typical Applications

The SHORT-STOP Type A electronic motor brake works with all three-phase and single-phase AC induction motors; it will not work with DC or “universal” types of motors. Each SHORT-STOP model covers all motor sizes up to its rating for horsepower and amps. See page 3 for the Type A models that are currently available.

Standard units are completely satisfactory for most applications, particularly for wood- and metalworking machines such as saws, lathes, grinders, sanders, and so forth.

Another important application is to replace a worn-out mechanical brake with a SHORT-STOP electronic brake, which minimizes maintenance and provides for adjustable stopping rates. Note that retrofitting older machines is easy since a mechanical connection is not required.

Also note that for any application requiring frequent or severe braking (more than two stops per minute), a larger SHORT-STOP model may be required. In addition, applications involving exceptionally high inertia (such as flywheels and extractors) may also require a larger model, or extended braking time or higher torque. Consult TB Woods for further assistance with these types of applications.

Section 1: Introduction

1.3 Scope of This Manual

This manual contains specifications, receiving and installation instructions, configuration, description of operation, and troubleshooting procedures for the SHORT-STOP electronic motor brake.

1.4 Publication History

Date	Nature of Change
July 1998	First edition of Form 1260.

Section 2: Technical Characteristics

2.1 Type A Models Currently Available

Several models of the SHORT-STOP Type A electronic motor brake are currently available. The following table shows the models by motor horsepower and input voltage. For information on deciphering the SHORT-STOP model number, see the next page.

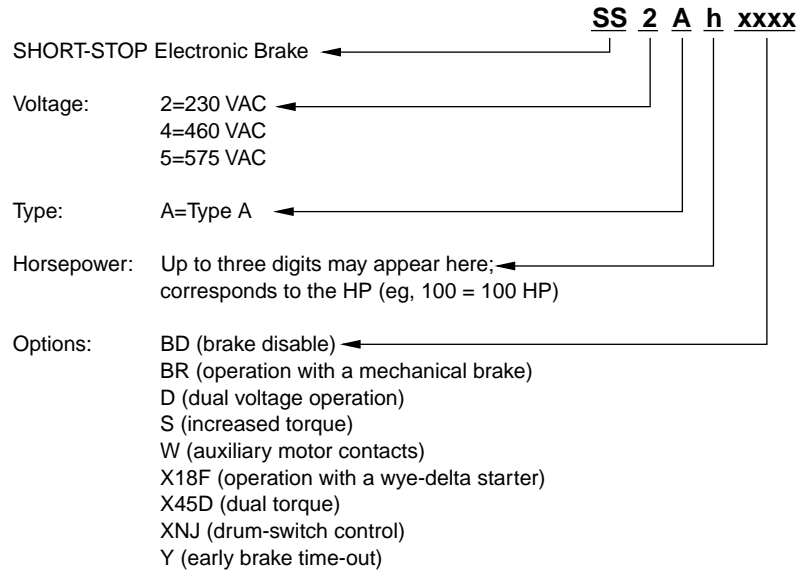
Motor Horsepower	Input Voltage		
	230 VAC	460 VAC	575 VAC
20	SS2A20	—	—
30	SS2A30	SS4A30	—
40	—	—	SS5A40
60	SS2A60	SS4A60	—
75	SS2A75	SS4A75	SS5A75
100	SS2A100	SS4A100	—
125	SS2A125	—	SS5A125
150	SS2A150	SS4A150	—
175	—	—	SS5A175
200	—	SS4A200	—
225	—	—	SS5A225
250	—	SS4A250	—
275	—	—	SS5A275
300	—	SS4A300	—
350	—	—	SS5A350
400	—	SS4A400	—
500	—	—	SS5A500
600	—	SS4A600	—
700	—	—	SS5A700

NOTE: The model numbers shown in the table above are “standard,” that is, without any options. If any options are added, the codes for the options will be appended to the right-side of the model number. See the next section for the codes for the Type A options.

Section 2: Technical Characteristics

2.2 Interpreting Model Numbers

The model number of the SHORT-STOP brake appears on the shipping carton label and on the technical data label affixed to the unit. The information provided by the model number is shown below:



2.3 General Specifications

Ambient Temperature	32 °F to 110°F (0 °C to 43 °C)
Heat Sink Maximum Temperature	158 °F (70 °C)
Voltage Tolerance	±10%
Frequency Tolerance	±3%
Installation Location	Indoor
Enclosure	NEMA 1

Section 3: Receiving and Installation

3.1 Preliminary Inspection

Before storing or installing the SHORT-STOP Type A electronic motor brake, thoroughly inspect it for possible shipping damage. Upon receipt, perform the following tasks:

1. Remove the SHORT-STOP model from its package and inspect exterior for shipping damage. If damage is apparent, notify the shipping agent and your sales representative.
2. Read the data label affixed to the SHORT-STOP model and ensure that the horsepower and input voltage are correct for the application. See page 4 for information on deciphering the codes that are found in the model number.
3. If you will store the SHORT-STOP model after receipt, place it in its original packaging and store it in a clean, dry place free from direct sunlight or corrosive fumes, and where the ambient temperature ranges between 0 and 43 °C (32 to 110 °F).

CAUTION

EQUIPMENT DAMAGE HAZARD

Do not operate or install the SHORT-STOP brake if it appears damaged.

Failure to follow this instruction can result in injury or equipment damage.

ATTENTION

RISQUE DE DOMMAGES MATÉRIELS

Ne faites pas fonctionner et n'installez pas tout onduleur qui semble être endommagé.

Si cette directive n'est pas respectée, cela peut entraîner des blessures corporelles ou des dommages matériels.

3.2 Installation and Usage Precautions

Improper installation of the SHORT-STOP electronic brake will greatly reduce its life. Be sure to observe the precautions shown on the following page when selecting a mounting location. ***Failure to observe these precautions may void the warranty!***

Section 3: Receiving and Installation

1. Ensure that the tool or blade attached to the machine braked by the SHORT-STOP brake is attached securely. Saws and grinders are often fastened with left-hand-threaded nuts, which tend to loosen when the machine is stopped too quickly. Use double nuts, or other positive locking methods, to prevent such loosening. Test for safe operation during braking and check locking often.
2. The SHORT-STOP brake uses AC line power to achieve its braking action. Thus, if the power fails or is disconnected (or if a fuse opens), the motor will coast to a stop without braking. Failure of the internal fuses may also disable the contactor interlock, which will prevent the motor from starting.
3. The SHORT-STOP brake cannot be used as a positive brake against overhauling loads after the motor stops. In such applications, a positive lock, a pin, or a separate mechanical brake must be used to provide for holding at rest. See page 19 for information on **Option BR**, which allows the use of a mechanical “fail-safe” brake as a holding brake.
4. Power factor capacitors must not be used across the Load controlled by the SHORT-STOP brake. Move any such capacitors to the Line side of the starting contactor (per NEC procedures).
5. If the torque control is set very high, the heat generated during braking can be considered equivalent to adding another start cycle. Therefore, high-cycle operations may require an external fan for cooling the motor. It is the user’s responsibility to ensure that the motor is protected from excessive heat rise, whether from extremes of running, starting, or braking.
6. Do not tamper with the wiring or components of the SHORT-STOP brake. Once the brake is installed and adjusted, the box cover of the SHORT-STOP brake should be closed securely.
7. Do not install the SHORT-STOP brake in a place subjected to high temperature, high humidity, or excessive vibration. Avoid exposure to airborne metallic particles.
8. Mount the SHORT-STOP brake vertically away from heat-radiating elements or direct sunlight.

Section 4: Connections

DANGER

HAZARDOUS VOLTAGE

Disconnect all power before servicing the electrical system.

Failure to observe this instruction will result in death or serious injury.

DANGER

TENSION DANGEREUSE

Coupez toute source d'alimentation avant d'entretenir le système électrique.

Si cette directive n'est pas respectée, cela entraînera la mort ou des blessures graves.

4.1 Wiring Considerations

4.1.1 General Wiring Practices

All wiring must conform with all national and local electrical codes. Refer to the motor nameplate affixed to the SHORT-STOP electronic motor brake for electrical data.

In particular, when making power and control connections, follow these precautions:

- Good wiring practice requires separation of control circuit wiring from all power wiring. Do not run control wires in the same conduit or raceway with power wiring.
- Cross conduits at right angles whenever power and control wiring cross.

4.1.2 Power Wiring

“Power wiring” refers to the Line connections made to Terminals 1 and 2 on the SHORT-STOP brake.

Select power wiring as follows:

- Use only UL recognized wire.
- Wire voltage rating must be a minimum of 300 V for 230 VAC systems, and 600 V for 460 VAC systems.
- Grounding must be in accordance with NEC and CEC.
- Wire must be shielded and of copper construction.

Section 4: Connections

- All wiring to the SHORT-STOP brake is to the terminals provided. In general, the wires connected to Terminals 1, 2, 5, and 6 must be able to carry the full motor running current. However, for those models supplied with **Option S** (see page 19), the wires to Terminals 1, 2, 5, and 6 must be able to carry up to **twice** the motor running current during braking, and should be sized accordingly.

4.1.3 Control Wiring

“Control wiring” refers to the wires connected to Terminals 3 and 4, and any additional terminals provided for optional features. Select control wiring as follows:

- Shielded wire is recommended to prevent electrical noise interference from causing improper operation or nuisance tripping.
- Use only UL recognized wire.
- Wire voltage rating must be a minimum of 300 V for 230 VAC systems, and 600 V for 460 VAC systems (Class 1 wire).
- Since wires connected to Terminals 3 and 4 (and to any terminals provided for optional features) will carry control current only, these may be of the same gauge as the control wires for the motor starting contactor.

CAUTION

EQUIPMENT DAMAGE HAZARD

Control wiring voltage must not exceed 240 VAC.

Never connect Terminals 3 and 4 of the SHORT-STOP brake across (in parallel with) the motor starter contactor coil or across the power line.

Do not manually operate the motor starter contactor when the SHORT-STOP brake is connected.

Failure to follow these instructions can result in injury or equipment damage.

⚠ ATTENTION**RISQUE DE DOMMAGES MATÉRIELS**

La tension du câblage de commande ne doit dépasser 240 VCA.

Ne jamais relier les bornes 3 et 4 du frein SHORT-STOP à travers (en parallèle avec) la bobine du contacteur du démarreur du moteur ou à travers le secteur.

Ne pas actionner manuellement le contacteur du démarreur du moteur lorsque le frein SHORT-STOP est branché.

Si cette directive n'est pas respectée, cela peut entraîner des blessures corporelles ou des dommages matériels.

4.2 Control Wiring

You must utilize the contactor interlock feature of the SHORT-STOP brake or the unit will not operate. The interlock should be connected and tested before connecting power wiring. Failure to correctly connect the contactor interlock feature will void the warranty because (if the feature is not connected correctly) both the starter contactor and SHORT-STOP brake may be energized at the same time, which will damage the SHORT-STOP brake.

4.2.1 Connecting the Contactor Interlock Feature

During normal running operation, the contactor interlock is closed and conduction takes place between Terminals 3 and 4. During braking, the interlock circuit opens, which locks out the motor starter contactor.

To correctly connect the contactor interlock feature, Terminals 3 and 4 of the SHORT-STOP brake must be connected **in series** with the motor starter contactor coil(s). This may be accomplished by placing Terminals 3 and 4 in series with the motor overload protection contacts or in series with the control system STOP button. Figures 1 through 3 on the following pages show typical applications with a correctly connected interlock feature. Also see Figure 10 on page 18 for connections of Terminals 3 and 4 in a jogging application.

Section 4: Connections

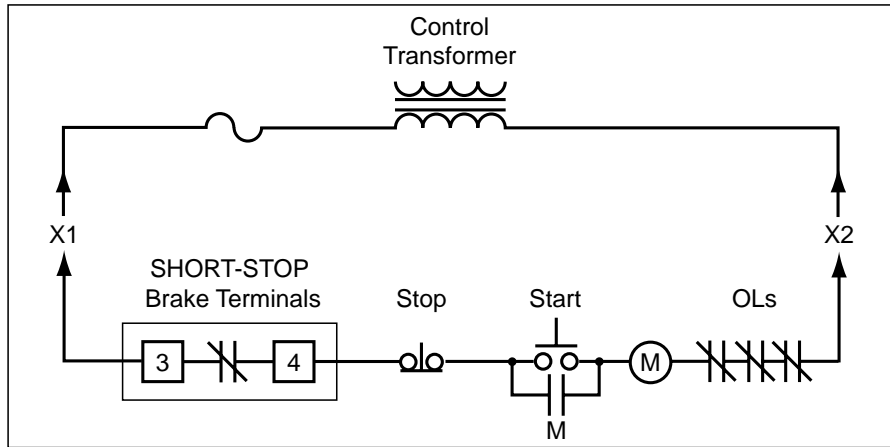


Figure 1: Contactor Interlock – Single Direction with a Control Transformer

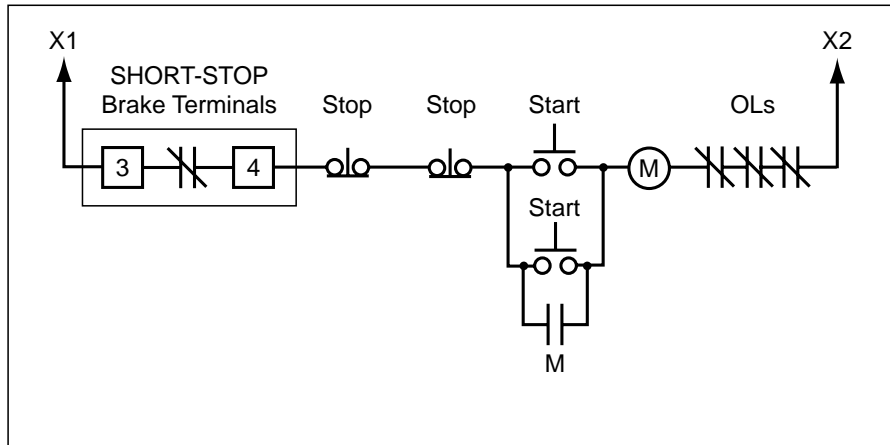


Figure 2: Contactor Interlock – Multiple Station Control

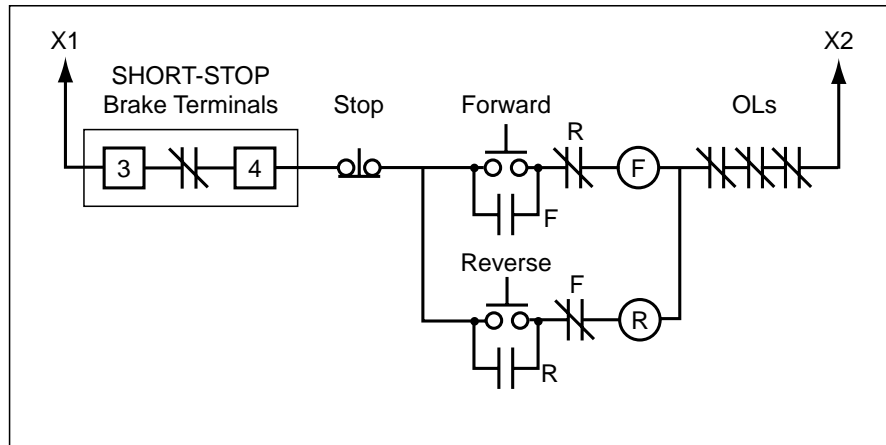


Figure 3: Contactor Interlock – Forward/Reverse System

4.2.2 Testing the Contactor Interlock Feature

After making the connection to Terminals 3 and 4 of the SHORT-STOP brake (as described on page 9), perform the following test to ensure that the wiring is indeed correct:

1. Ensure that the main power is off.
2. Ensure that Terminals 1, 2, 5, and 6 are not connected.
3. Remove the wire from Terminal 4 and insulate it.
4. Turn main power on.
5. Attempt to start the motor by every means possible. No matter which START switch is employed, or from where a start signal is generated, **the motor must not start.**

If the motor **does** start, the interlock feature **is not correctly connected**. To remedy this condition, turn the main power off. Then review the information in Section 4.2.1 on page 9 on connecting the interlock feature and correct the wiring fault. After attempting to correct the wiring, **perform this test again** to ensure that the interlock feature performs correctly.

If the motor **does not** start, **the test is successful**. Turn the main power off and re-connect the wire to Terminal 4. Then proceed with the remaining control and power wiring required.

Section 4: Connections

4.3 Power Wiring for Three-Phase Motors

Before connecting power wiring, you should first connect and test the contactor interlock feature of the SHORT-STOP brake. This feature prevents both the motor starter contactor coil(s) and the SHORT-STOP brake from being energized at the same time. See Section 4.2 on page 9 for further information on connecting and testing this feature.

4.3.1 Single Direction, Single Speed Application

Figure 4 shows the power wiring connections when the application calls for a single direction at a single speed.

4.3.2 Application Requiring Forward and Reverse

In an application requiring forward and reverse directions, the wiring is largely the same as that for a single direction, single speed application. Braking will occur when stopping from either direction. See Figure 5 on page 13 for the power connections for this type of application.

4.3.3 Application with Wound-Rotor Motors

The SHORT-STOP brake may be used with wound-rotor (slip-ring) motors since they are induction motors. The minimum or lowest rotor resistance should be used for braking. A magnetic starter must also be employed so the contactor interlock feature of the SHORT-STOP brake may be correctly utilized.

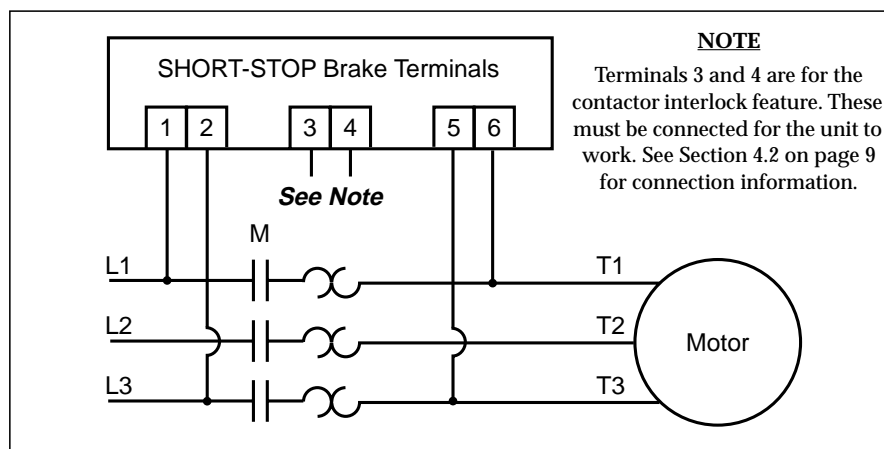


Figure 4: Power Connections in a One Direction, One Speed Application

4.3.4 Multiple Speed Application

For an application requiring multiple speeds, **Option W** is required; see page 20 for information on this option. Do not attempt to install a SHORT-STOP brake with a multi-speed motor unless the SHORT-STOP brake is equipped with **Option W**.

The power connections for this type of application are shown in Figure 6 on page 14. Note that the high-speed winding must be used for braking.

4.3.5 Application with an Electronic Drive

When the SHORT-STOP brake is used with electronic drives (such as motor accelerators, solid-state starters, and inverters), an isolating contactor must be installed between the motor and the electronic drive. Figure 7 on page 15 shows the power connections, including the required isolating contactor, for this type of application.

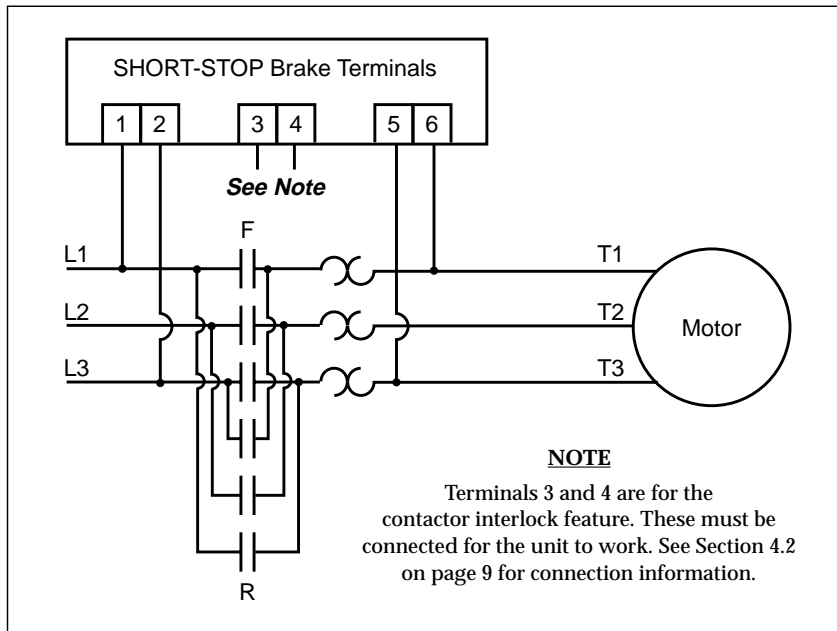
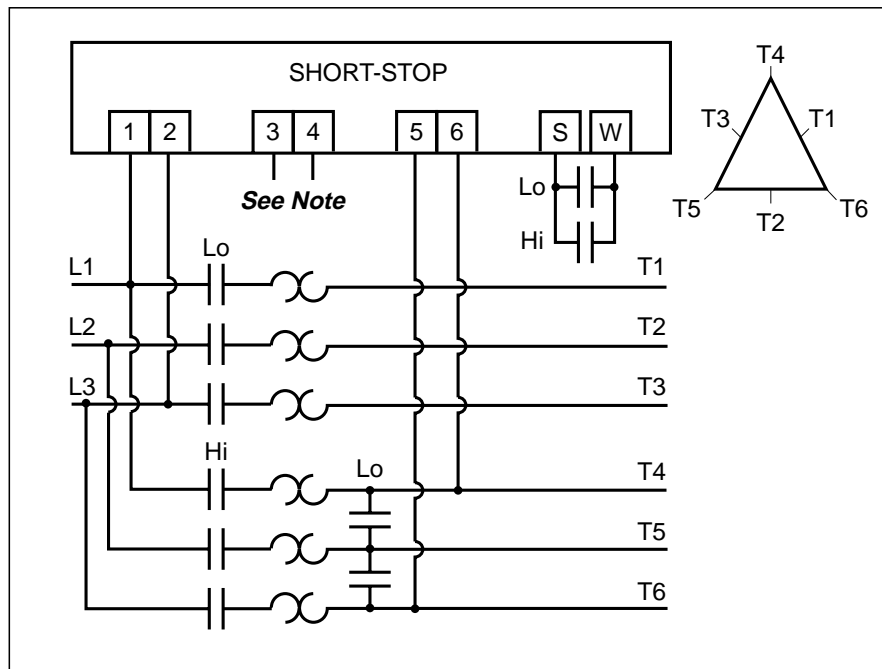


Figure 5: Power Connections in a Forward/Reverse Application

Section 4: Connections

4.3.6 Application with a Drum-Switch Controller

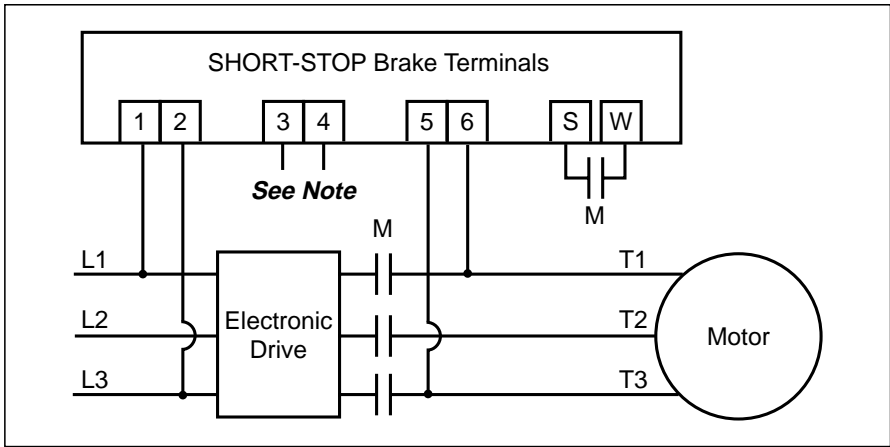
If the motor that is braked by the SHORT-STOP Type A brake is **solely** controlled by a drum switch, **Option XNJ** is required. See page 21 for a description of this option. Figure 8 on page 15 shows the power connections for an application that uses a drum-switch controller.



NOTE

Terminals 3 and 4 are for the contactor interlock feature. These must be connected for the unit to work. See Section 4.2 on page 9 for connection information.

Figure 6: Power Connections in a Multiple-Speed Application



NOTE

Terminals 3 and 4 are for the contactor interlock feature. These must be connected for the unit to work. See Section 4.2 on page 9 for connection information.

Figure 7: Power Connections in an Application with an Electronic Drive

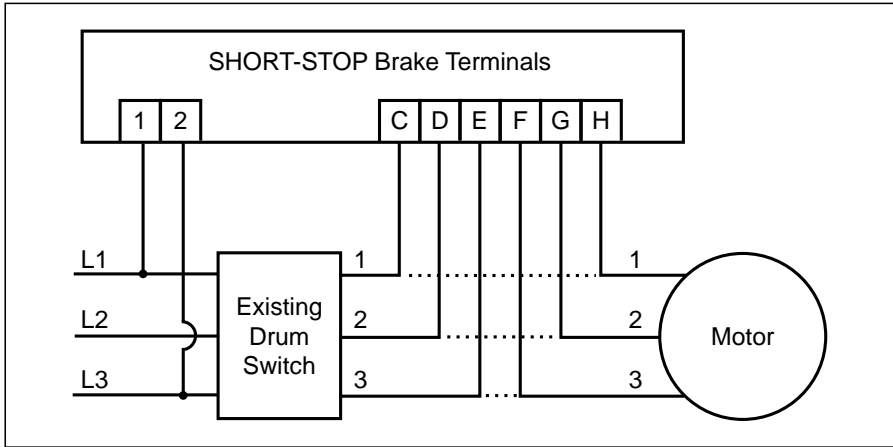


Figure 8: Power Connections in an Application with a Drum Switch

Section 4: Connections

4.3.7 Application with a Wye-Delta Starter

As shown in Figure 9 on page 17, both ends of each motor winding in the wye-delta starter are utilized for connections (six leads in all). This type of starter operates as follows:

- In the wye configuration, one end of each winding is connected to the power line, with the remaining leads shorted together by means of an S contactor.
- In the delta configuration, each winding is connected across a pair of power line phases.
- In the Off mode, all windings are disconnected.

For the SHORT-STOP brake to be used with a wye-delta starter, **Option X18F** is required (see page 21 for information on this option).

4.4 Power Wiring for Single-Phase Motors

Power wiring for single-phase motors is the same as that for three-phase motors. Power input is connected to Terminals 1 and 2, and the motor load is connected to Terminals 5 and 6. See Section 4.3 starting on page 12 for typical power connections.

A magnetic starter must be used so the contactor interlock feature of the SHORT-STOP brake may be utilized (see Section 4.2 on page 9 for information on this feature).

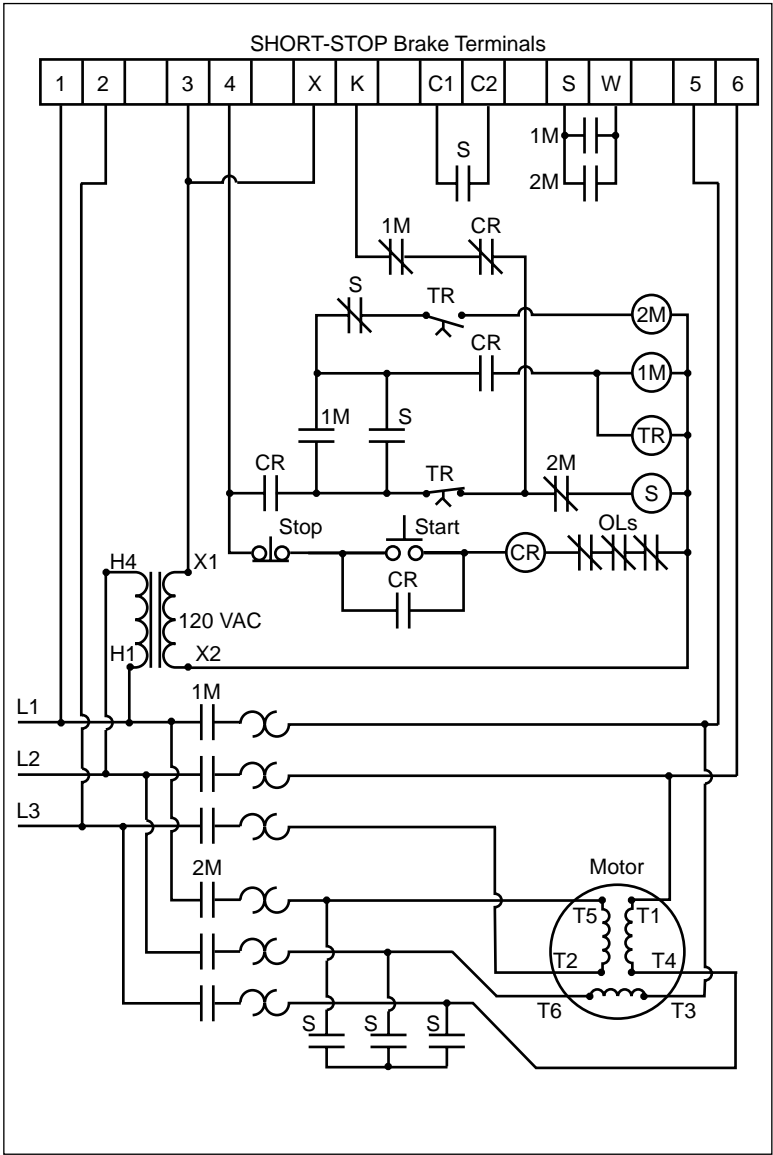


Figure 9: Power Connections in an Application with a Wye-Delta Starter

4.5 Wiring for Optional Features

The SHORT-STOP Type A electronic motor brake may be equipped with various options to better suit certain applications. See page 4 for the options that are available. The following pages describe the available options.

4.5.1 Option BD

Option BD permits the SHORT-STOP brake to be disabled for certain purposes, such as during jogging or setup. Note that when this option is used for safety, a key switch is recommended so that only authorized personnel may disable the SHORT-STOP brake.

For this option, two terminals (A and B) are added. Figure 10 shows how to connect this option for a jogging application. Opening Terminals A and B before a brake cycle starts disables the SHORT-STOP brake. However, when a brake cycle is active, opening the contact across Terminals A and B will not terminate the active brake cycle.

NOTE: Option BD overrides Option X45D. If terminals A and B are open, no brake cycle will occur regardless of whether terminals P and S (added by Option X45D) are open or closed.

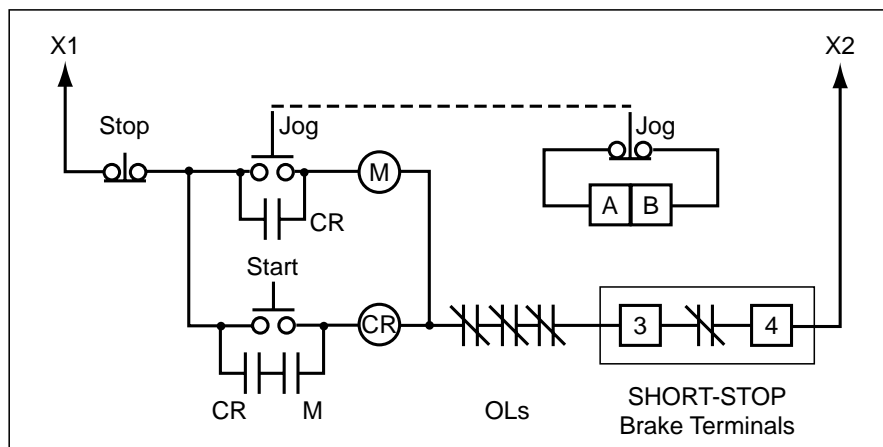


Figure 10: Control Wiring for Option BD in a Jogging Application

4.5.2 Option BR

Option BR adds two terminals (B and R) to the SHORT-STOP brake. The normally-open contact associated with these terminals is used to release a customer-supplied spring-actuated brake. This allows the use of a “fail-safe” mechanical brake as a holding brake that is applied after the SHORT-STOP braking cycle is finished and hence prevents overhauling loads. Note that if AC power is lost or the fuse blows (either of which will disable the SHORT-STOP brake), the mechanical brake will be applied immediately. Figure 11 shows how terminals B and R should be connected.

4.5.3 Option S

Option S adds a three-position selector switch to the SHORT-STOP brake, which is used to vary the intensity of the applied torque. No additional wiring is required. The selector switch is used to select one of three torque loads:

- Low – The same torque range as a standard SHORT-STOP brake, with the amount of torque set by the torque potentiometer.
- Medium – Maximum torque higher than standard maximum, and may be varied by turning the torque potentiometer.
- High – Maximum torque fixed at roughly twice the standard maximum; not adjustable with the torque potentiometer.

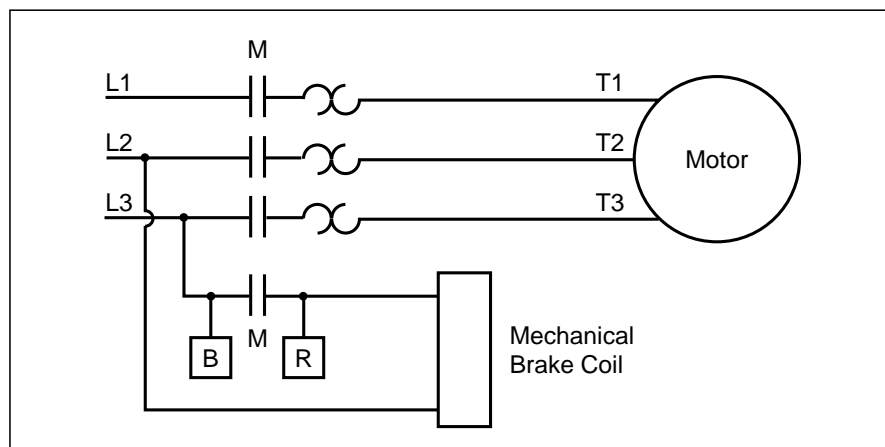


Figure 11: Power Wiring for Option BR

Section 4: Connections

4.5.4 Option D

Option D allows a 460 VAC SHORT-STOP brake model to be used on either a 230 VAC or a 460 VAC line. (The unit is shipped from the factory set for 460 VAC operation.) A selector switch for the desired voltage is added as part of this option. To convert from one voltage to the other, both the selector switch provided and the links on the control transformer must be set to the correct position for the voltage used.

CAUTION

EQUIPMENT DAMAGE HAZARD

Do not set the selector switch to a line voltage other than that to which the SHORT-STOP brake is connected.

Failure to follow this instruction can result in injury or equipment damage, or may inhibit braking action.

ATTENTION

RISQUE DE DOMMAGES MATÉRIELS

Ne pas régler le sélecteur à une tension de secteur autre que celle à laquelle le frein SHORT-STOP est branché.

Si cette directive n'est pas respectée, cela peut entraîner des blessures corporelles ou des dommages matériels.

4.5.6 Option W

Option W adds two terminals (S and W) to the SHORT-STOP Type A brake. It permits braking to be controlled by a separate set of auxiliary contacts on the motor starter(s).

While this option may or may not be utilized for applications where desired braking occurs under restricted conditions (for example, only one speed or direction), or to reduce brake pickup time when the motor is turned off, it is **required** for the following:

- Applications in which multi-speed motors are used.
- Applications in which motors are operated from variable voltage sources, such as variable frequency or soft-start drives.
- Applications in which motors are operated from frequency sources other than 50 to 60 Hz.

Terminals S and W are connected to a dry, normally open (N.O.) auxiliary contact on **all** starter contactors.

4.5.7 Option X18F

Option X18F is required when the SHORT-STOP Type A brake is used with a wye-delta starter. This option adds four additional terminals (X, K, C1, and C2) to the SHORT-STOP brake. Figure 9 on page 17 shows how these additional terminals are connected.

This option operates by closing the internal contacts between terminals X and K only during braking. These two terminals are also used to operate the S contactor. A sensor is located between terminals C1 and C2 to confirm that the S contactor is closed before braking is activated.

4.5.8 Option X45D

Option X45D adds two terminals (P and S) to the SHORT-STOP brake. This option provides an adjustable low-level braking effect (using standard controls) as well as a fixed high-level braking effect (when Terminals P and S are closed).

Note that an additional set of contacts must be used to disengage the starter contactor **before** Terminals P and S are closed. Figure 12 shows a connection diagram for this option. In this wiring scheme, whenever Terminals P and S are closed, a brake cycle will begin (even if the motor is at rest).

NOTE: Option BD overrides Option X45D. If terminals A and B (added by **Option BD**) are open, no brake cycle will occur regardless of whether terminals P and S are open or closed.

4.5.9 Option XNJ

Option XNJ is used with drum-switch applications and causes power to the motor to be fully locked-out during a brake cycle. If the existing starter already includes a contactor with a similar function, then **Option W** (described on page 20) should be used instead of **Option XNJ**.

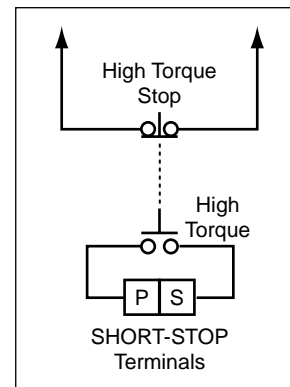


Figure 12: Control Wiring for Option X45D

Section 4: Connections

4.5.10 Option Y

Option Y adds two terminals (Y and Z) to the SHORT-STOP brake. A dry contact or switch is connected across these two terminals, and when the contact or switch is closed, the braking cycle will immediately terminate. This allows you the option of terminating the braking cycle before the internal timer times out.

This option is often used on high inertia loads in conjunction with a zero-speed switch to minimize motor heating.

Section 5: Adjusting the SHORT-STOP Brake

5.1 Description of Adjustments

The SHORT-STOP electronic motor brake provides adjustable torque and time controls. These controls allow you to optimize braking characteristics to best fit your particular application.

The adjustable torque control determines the amount of braking power (torque) applied to the motor. The adjustable time control determines how long this power is applied. The standard time is set to 15 seconds, but may be configured for up to 5 minutes.

The controls are single-turn potentiometers, which are set with an insulated screwdriver. The torque and time values are at a minimum when each potentiometer is turned fully counterclockwise. Use care when adjusting the potentiometers; **do not force a potentiometer beyond its end stops.**

Once the potentiometers are set for a particular application, they should not have to be re-adjusted.

CAUTION

EQUIPMENT DAMAGE HAZARD

Do not use excessively high torque settings that may result in tools being loosened due to the rapid deceleration of intense braking.

Failure to follow this instruction can result in injury or equipment damage.

ATTENTION

RISQUE DE DOMMAGES MATÉRIELS

Ne pas utiliser des réglages de couple de serrage excessivement hauts qui pourraient desserrer les outils à cause de la décélération rapide d'un freinage intense.

Si cette directive n'est pas respectée, cela peut entraîner des blessures corporelles ou des dommages matériels.

Section 5: Adjusting the SHORT-STOP Brake

5.2 Adjusting Torque and Time Values

Perform the following steps to set the torque and time potentiometers:

1. Ensure that main power is off.
2. Turn the time potentiometer so it is halfway between its minimum and maximum positions (fully clockwise and fully counterclockwise, respectively).
3. Turn the torque potentiometer to its minimum position (fully counterclockwise).
4. Turn the main power on.
5. Turn the motor on.
6. Once the motor reaches full speed, turn it off. As the motor decelerates, observe how quickly it comes to rest. The braking action of the SHORT-STOP brake is indicated by a slight hum from the motor.
7. If more braking power needs to be applied to achieve a safe braking rate, adjust the torque potentiometer 1/8 turn clockwise. Then repeat steps 5 and 6. Adjust the torque control further, if necessary, until a safe braking rate is achieved.
8. Once the desired braking rate is achieved, adjust the time potentiometer so that the hum from the motor ceases about 1 second after the motor comes to rest.

5.3 Additional Considerations for Adjustments

When the motor reaches its equilibrium temperature, the winding resistance will increase. This may require a longer application of braking current. Therefore, set the time control either with the motor hot or so as to “hang on” for about a second after stopping a cold motor.

The amount of torque applied will also vary with line voltage variations. These variations may require re-adjustment of the torque potentiometer to obtain better braking power.

When performing adjustments, bear in mind that applying the brake for a longer time than is absolutely necessary only serves to increase motor heating.

Section 6: Troubleshooting

DANGER

HAZARDOUS VOLTAGE

Disconnect all power before servicing the electrical system.

Failure to observe this instruction will result in death or serious injury.

DANGER

TENSION DANGEREUSE

Coupez toute source d'alimentation avant d'entretenir le système électrique.

Si cette directive n'est pas respectée, cela entraînera la mort ou des blessures graves.

Once installed and adjusted, the SHORT-STOP electronic motor brake should not require any additional maintenance or adjustment (other than for the conditions described in Section 5.3 on page 24).

This section describes the SHORT-STOP brake's theory of operation, how to remedy problems that may occur during initial set-up, and fuse replacement information.

6.1 Theory of Operation

6.1.1 Basic Concept

The principle used by the SHORT-STOP brake to achieve braking is the injection of a controlled amount of direct current (DC) into an AC motor. The direct current in the motor stator sets up a stationary magnetic field in which the rotor is turning. The interaction between the rotor and the magnetic field tries to align the rotor with the field. Thus, the SHORT-STOP brake actually drives the rotor to zero speed.

Retarding torque is proportional to the field strength, and hence to braking current. By varying the braking current, the braking strength (torque) can be set.

6.1.2 Operation

When any START button is pressed, the motor will instantly start (provided a brake cycle is not in progress). When the motor starts, the presence of alternating current (AC) on the motor is detected by the SHORT-STOP brake and the brake is primed.

Section 6: Troubleshooting

When the STOP button is pressed and the starter contactor released, alternating current is no longer detected at the motor. After a short delay, the SHORT-STOP brake activates and the braking cycle begins. The length of the braking cycle is determined by the time control; the amount of braking force is determined by the torque control.

If the SHORT-STOP brake includes **Option BD**, the additional terminals A and B are checked during the run-to-brake transition. If they are found to be open, the braking cycle will not begin. Instead, the motor will coast to a stop.

6.2 Verification of Operation

If a problem occurs on initial installation, or if the SHORT-STOP brake should fail to function properly, the following checks should be made:

- Check that the time and torque controls are set properly, and are not at a minimum. See Section 5 starting on page 23 for a description of these controls.
- Check that any options (such as **Option W** or **Option BD**) are correctly wired and are operated from the proper type of auxiliary contacts. See page 20 for information on **Option W** and page 18 for information on **Option BD**.
- Verify that the rated motor voltage for the SHORT-STOP brake is present at Terminals 5 and 6 **when the motor runs**. If no voltage is present when the motor runs, the brake is wired incorrectly.
- Verify that normal line voltage (SHORT-STOP brake rated voltage) across Terminals 1 and 2, and that 120 VAC is output from the control transformer if one is present. Lack of voltage at these places may indicate a blown line fuse. (If the line fuses blow at high torque settings, the SHORT-STOP brake should be removed from the motor line and operated instead from a separate fused disconnect.)
- Turn off power and then check for blown fuses in the supply line and in the SHORT-STOP brake. See the next section for information on what may cause fuses to blow.

6.3 Fuse Replacement

The fuses in the SHORT-STOP brake are designed to protect the internal components. They are of a special fast-acting semiconductor type. If a fuse needs to be replaced, it must be replaced with the same type of equal current rating.

If fuses continue to blow, you should check the following:

- Check that the contactor interlock feature is wired correctly; see Section 4.2 on page 9 for further information.
- Check for an open contactor interlock circuit (if it is open, the starter will not engage).
- Check for continuity between terminals 3 and 4. If there is no continuity, then the interlock circuit is at fault. The most likely reason is that power was put directly across Terminals 3 and 4 instead of in series with the starter coils.
- Check that the SHORT-STOP brake is not being overloaded. After replacing the fuses, attempt operation at a very low torque value. If the fuses remain intact, increase the torque value. If the fuses blow when the value is increased, the selected SHORT-STOP brake model is probably too small for the application.
- Check that any power factor capacitors are not connected across the Load; if used, they should be connected across the Line.

NOTES

Section 7: Warranty Information

7.1 Hassle-Free Warranty

The driving force at TB Wood's is customer service, including dealing with unforeseen problems without creating new ones! TB Wood's takes the extra step to ensure that ANY problem that occurs to its electronic products is dealt with swiftly and with no hassles to you. The Hassle-Free Warranty removes the "burden of guilt" and promises to quickly repair any failed product.

TB Wood's Incorporated warrants the SHORT-STOP Type A electronic motor brake to be free of defects in parts or workmanship for a period of one year from the date of manufacture. If a SHORT-STOP Type A brake fails for any reason, excluding physical abuse or repeated failure, within the warranty period, TB Wood's will promptly repair the brake. TB Wood's Incorporated shall not in any event be liable for any incidental or consequential damages, secondary charges, expenses for installing or disconnecting, or losses to persons or property resulting from any failure of the SHORT-STOP Type A brake.

7.2 Procedure for Repairs

If a SHORT-STOP Type A electronic motor brake needs to be returned for repair, you must obtain an RGA number before returning the unit. To obtain an RGA number, call 1-888-TBWOODS (829-6637).

After obtaining the RGA number, print the RGA number on the packing list that came with the unit and send the unit (along with the packing list) to the following address:

TB Wood's Incorporated
100 Bonita Drive
Greensboro, NC 27405

NOTES





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