MiTek®
Machinery Division

Service Bulletin

Machinery Affected:	RoofTracker II™ press
Document:	SB229 rev. A
Title:	Installing an ACS880 Variable-Frequency Drive
Distribution:	Customers Upon Order

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Purpose and Scope

The ACS800 variable-frequency drive (VFD) in the RoofTracker II press is obsolete. This Service Bulletin explains how to replace it with an ACS880 VFD.

The parts included in all kits are shown in Table 1. Your specific VFD is shown in one of the following tables. Please ensure all parts are present before starting this procedure.

Table 1: Parts in all SB229KIT

Qty.	Part Description	Part #
1	Service Bulletin	SB229
1	Encoder interface module	509305
1	Digital IO extension module	509296
4	#10-32X3/4" screws	341106

Table 2: Parts in SB229KIT-A

Qty.	Part Description	Part #
1	ACS880 VFD 208V (programmed)	92294-501

Table 3: Parts in SB229KIT-B

Qty.	Part Description	Part #
1	ACS880 VFD 230V (programmed)	92294-502

Table 4: Parts in SB229KIT-C

Qty.	Part Description	Part #
1	ACS880 VFD 415V (programmed)	92295-501

Table 5: Parts in SB229KIT-D

Qty.	Part Description	Part #
1	ACS880 VFD 460V (programmed)	92295-502

Before beginning the procedure, gather the supplies listed here:

- Phillips screwdriver set
- Slotted screwdriver set
- Torx screwdriver set
- Ruler (preferably metal)
- Thin permanent marker
- Multimeter

If you have a VFD running 415V or 460V power, gather the supplies listed here as well:

- Drill
- #21 drill bit
- #10-32 tap
- Vacuum

If you have any questions, call MiTek Machinery Division Customer Service at 800-523-3380.

Procedure

Electrical Lockout/Tagout Procedures

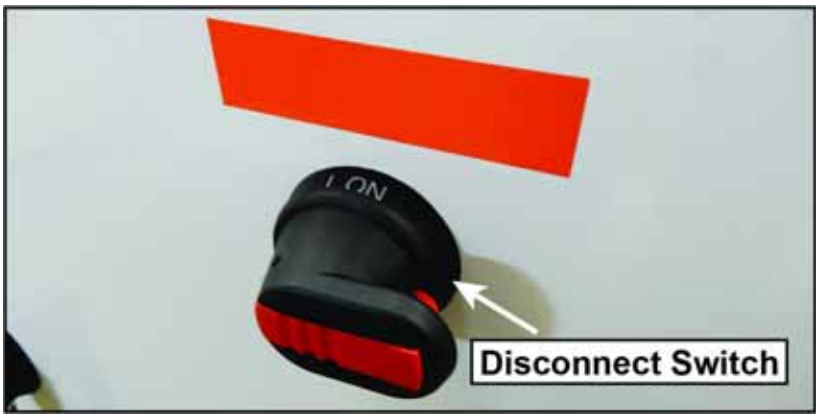
	**⚠ WARNING** **ELECTROCUTION HAZARD!** **Verify that all power to the machine has been turned off and follow approved lockout/tagout safety procedures before performing any maintenance.** **All electrical work must performed by a qualified electrician.** **If it is absolutely necessary to troubleshoot an energized machine, follow NFPA 70E for proper procedures and personal protective equipment.**

When Working on a Machine Inside the Machine's Main Electrical Enclosure or in the Electrical Transmission Line to the Machine

Before opening the main electrical enclosure, or attempting to repair or replace an electrical transmission line to the machine, lockout/tagout the machine properly. Follow your company's approved lockout/tagout procedures which should include, but are not limited to, the steps here.

1. Engage an E-stop on the machine.
2. Turn the machine's disconnect switch to the Off position as shown in Figure 1. This is usually required to open the main electrical enclosure's door.

Figure 1: Disconnect Switch on Main Electrical Enclosure



3. Shut the power to the machine off at the machine's power source, which is usually an electrical service entry panel on the facility wall. One example of a locked-out power source panel is shown in Figure 2.

4. Attach a lock and tag that meets OSHA requirements for lockout/tagout to the electrical service entry panel.

5. Open the door to the enclosure in which you need access, and using a multimeter, verify that the power is off.

Figure 2: Lockout/tagout on the Power Source Panel

Removing an ACS800 VFD

	⚠ WARNING
	**Wait five minutes after turning the disconnect switch to the Off position to start work on the VFD. Starting work without waiting five minutes may cause electric shock.**

1. Locate the ACS800 VFD in the main electrical enclosure. See Figure 3.

Figure 3: Location of the ACS800 VFD

2. Expose the wiring on the VFD by using the following steps.

   a) Insert a slotted screwdriver into the hole near the bottom of the VFD cover as shown in Figure 4.

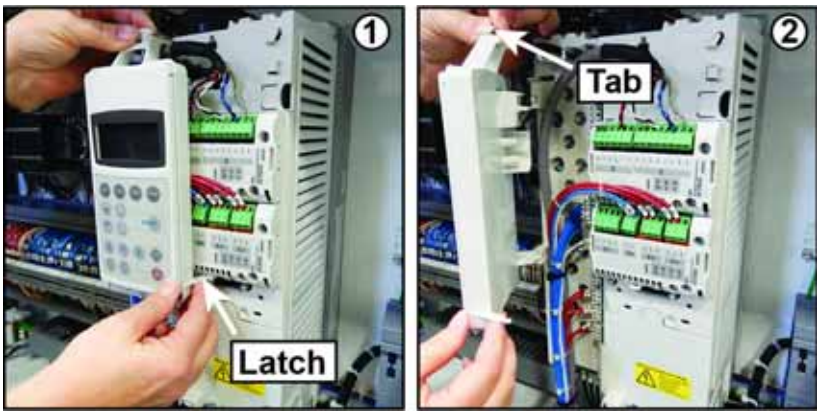
Figure 4: Inserting Screwdriver into VFD Cover

   b) Press down on the screwdriver to unhook the latch that holds the cover in place.

   c) Pull the cover forward and slightly upward to remove it.

d) Push up on the latch on the bottom right of the keypad. Pull the keypad forward by the tab on top. The keypad swings to the left. See Figure 5.

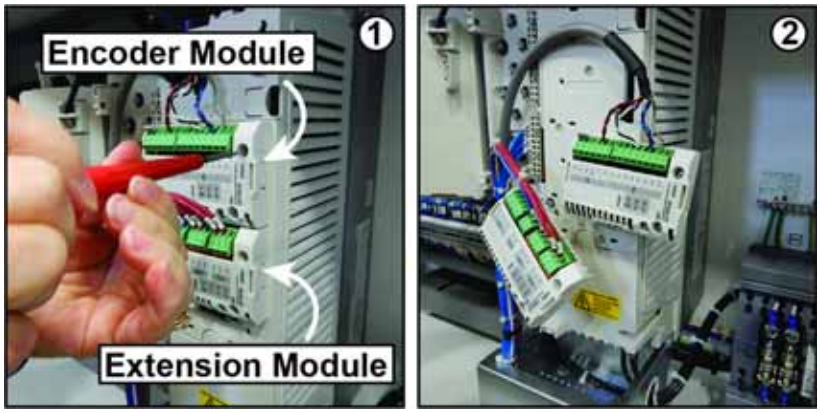
Figure 5: Moving Keypad



3. Remove the wiring from the front of the VFD by using the following steps.

a) Unscrew the four screws holding the encoder module (labeled the Pulse Encoder Interface) and the extension module (labeled the Digital I/O Extension) in place using a Phillips screwdriver. See Figure 6.

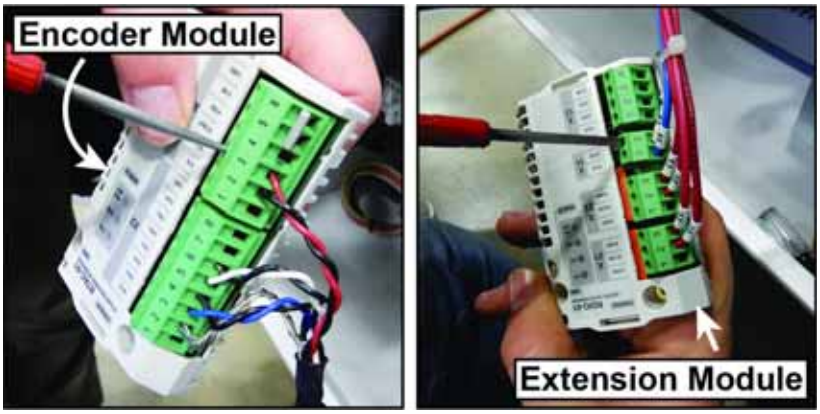
Figure 6: Removing Modules



b) Loosen the screws on the green terminals on the encoder module with a slotted screwdriver. Remove the wires from those terminals. Do not untwist any of the twisted wires. See Figure 7.

c) Loosen the screws on the green terminals of the extension module with a slotted screwdriver. Remove the wires from these terminals. See Figure 7.

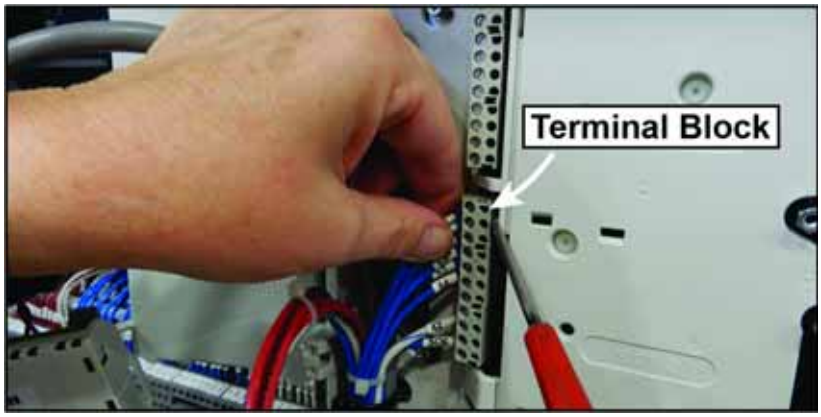
Figure 7: Removing Wires from Modules



d) Pull the gray terminal blocks on the front of the VFD forward to remove them. Leave the wires in the terminal blocks to make rewiring easier. See Figure 8.

Use a flathead screwdriver to pry gently on the right sides of the terminal blocks if necessary.

Figure 8: Removing Terminal Blocks from VFD

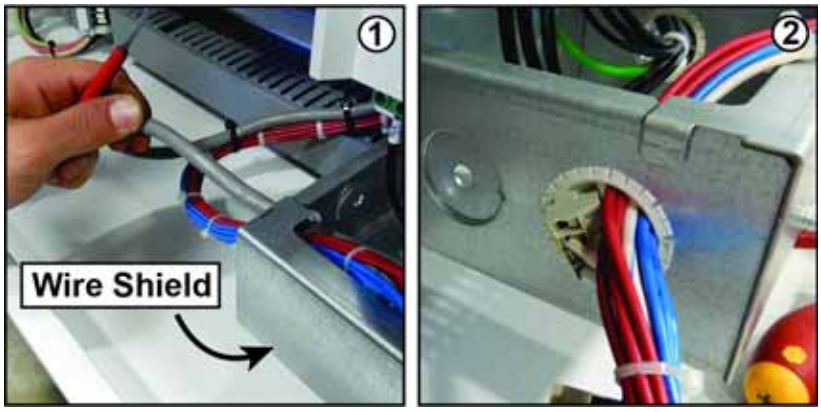


e) Cut the zip ties that bundle the gray cable with the blue wires, red wires, and white and blue wire.

4. Pull the gray cable through the hole on the left-hand side of the wire shield. Then pull the red wires, blue wires, and white and blue wire through as well. See Figure 9.

   The gray terminal blocks fit through the hole.

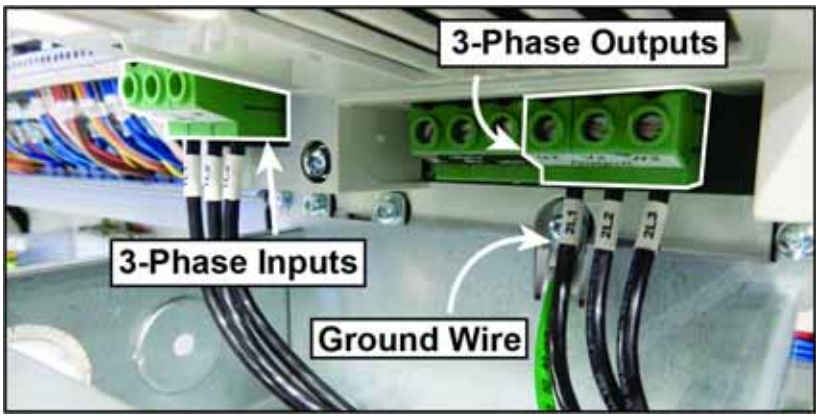
Figure 9: Removing Cable and Wires through the Wire Shield



5. Remove the 3-phase wires and ground wire by using the following steps.

   a) Locate the green 3-phase input and output terminals on the bottom of the VFD. See Figure 10.

Figure 10: Location of 3-Phase Input and Output Terminals



   b) Remove the black 3-phase wires from the input and output terminals on the bottom of the VFD using a slotted screwdriver.

   c) Remove the green ground wire underneath the 3-phase output terminals using a Torx screwdriver.

d) Pull the 3-phase wires and the ground wire through the hole on the right-hand side of the wire shield.

6. Check the wire labels on all of the wires to make sure they are clearly visible. Use a thin permanent marker to trace any faded letters on the wire labels.

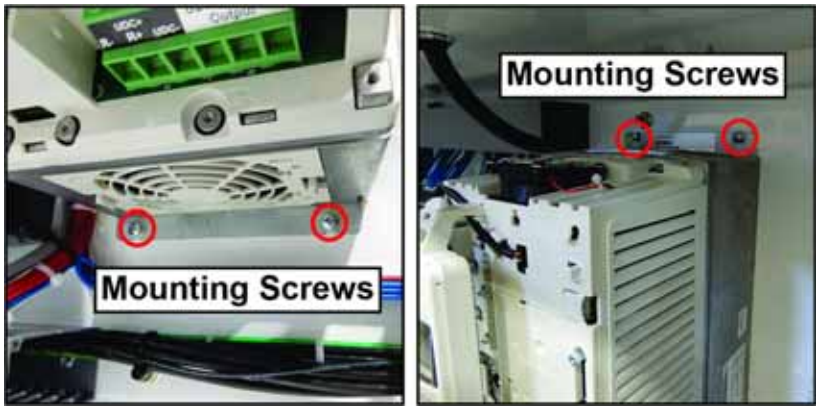
Removing the Old VFD

1. Remove the four screws bolting the wire shield to the VFD. Remove the wire shield. See Figure 11 for the location of the screws.
   Removing the wire shield gives you easy access to the mounting screws.

Figure 11: Wire Shield Screw Locations

2. Loosen the two mounting screws on the bottom of the VFD. Do not remove these screws yet. Remove the two mounting screws from the top of the VFD. See Figure 12.

Figure 12: Mounting Screw Locations



3. Tilt the VFD slightly forward. Lift it up and remove it.

Installing the ACS880 VFD

NOTICE	
If you have an ACS880 VFD using 415V or 460V power, your VFD is physically smaller than the old one. You need to drill. Continue to step 1 below this notice.	If you have an ACS880 VFD using 208V or 230 V power, your VFD is the same size as the old one. Remove the old mounting screws. Mount the new VFD using the new mounting screws and old washers. Then skip to step 1 on page 12.

1. Prepare the main electrical enclosure for the ACS880 VFD by using the following steps.

   a) Place a metal ruler on the two mounting screws from the bottom of the old VFD. Rest the bottom of the VFD on the ruler as shown in Figure 13.

   Figure 13: Placing VFD on a Ruler

   b) Use a thin permanent marker to mark the locations where the new mounting screws will hold the new VFD in place. Remove the VFD from the enclosure.

   c) Remove the old mounting screws. Discard the four old mounting screws. Keep the washers.

   d) Drill in the four places indicated by your marks on the rear wall of the enclosure using a #21 bit. Tap the holes using the #10-32 tap.

Have another person hold the VFD in place while you mark the spots for the new mounting screws.

	NOTICE
	**Never use compressed air inside the electrical enclosures! It may force contaminates into the electrical connections.** **Use a vacuum to remove dust from electrical enclosures. Canned air is acceptable after vacuuming.**

2. Vacuum the inside of the enclosure to remove any metal debris created by the drilling and tapping.

3. Install the ACS880 VFD in the main electrical enclosure by using the following steps.

    a) Insert two new mounting screws with the old washers in the bottom holes. Start the screws but do not tighten them.

    b) Place the VFD in the enclosure. It should rest on the two new mounting screws.

    c) Insert and tighten two new mounting screws with the old washers through the holes on the top of the VFD mount using a slotted screwdriver. Then tighten the bottom two mounting screws. See Figure 14.

Figure 14: Tightening Mounting Screws

Wiring the ACS880 VFD

1. Wire the 3-phase wires and ground wire by using the following steps.
   For each wire on the VFD, make sure that the terminal screw is not tightened. Insert the wire into the terminal. Use a slotted screwdriver to tighten the screw on the terminal. Tug the wire gently after tightening to make sure the wire is secure in the terminal. (The ground wire uses a different type of terminal. It also uses a Torx screwdriver.)

   a) Place the black 3-phase wires into the three green input terminals on the left-hand side of the bottom of the VFD. See Figure 15.

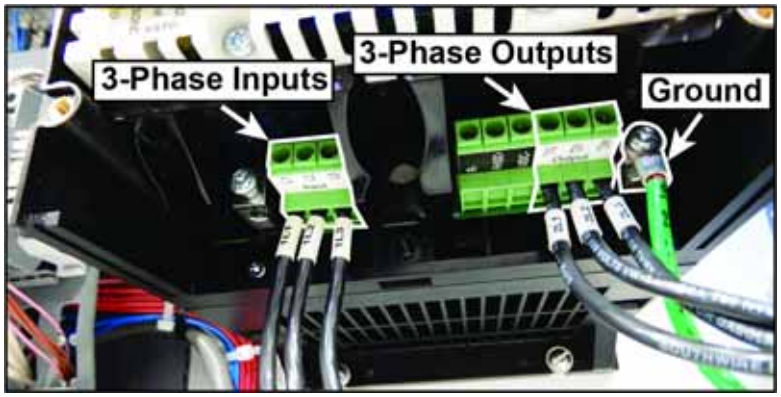
Terminal	L1	L2	L3
Wire	1L1	1L2	1L3
	Input		

   b) Place the black 3-phase wires into the three green output terminals on the right-hand side of the bottom of the VFD. See Figure 15.

Terminal	T1/U	T2/V	T3/W
Wire	2L1	2L2	2L3
	Output		

   c) Connect the ground wire to the ground wire terminal using a Torx screwdriver. See Figure 15.
      The ground wire may connect to either ground terminal on the VFD. The right-hand ground terminal to the right of the 3-phase output terminals is easiest to reach.

Figure 15: Wired 3-Phase Inputs, Outputs, and Ground



2. Wire the modules by using the following steps.
   At this point, some wires are still in the gray terminal blocks from the old VFD. Remove them as necessary to place them into their new terminals.

   a) Locate the encoder module (labeled HTL Encoder Interface) by pulling the tab on the bottom of the keypad forward to flip the keypad up.

   b) Locate the blue X82 terminal block on the encoder module. Run wires from the gray cable as follows. See Figure 16.

Terminal	1	2	3	4	5	6	7
Wire	Blue	Black	White	Black			Metal
	Twisted wires		Twisted wires				

Figure 16: Encoder Module Wires

   c) Locate the black X81 terminal block on the encoder module. It is below the blue X82 terminal block. Run wires from the gray cable as follows. See Figure 16.

Terminal	1	2	3	4	5	6	7
Wire		Jumper	Jumper	Red	Black		
				Twisted wires			

   d) Flip the keypad down.

e) Locate the orange X65 terminal block and orange X66 terminal block on the front of the extension module (labeled Digital IO Extension). Run wires as follows. See Figure 17.

Terminal	1	2	3
Wire	12	15	

1	2	3
13	15	

Figure 17: Extension Module

f) Locate the blue X61 terminal block on the front of the extension module. Run wires as follows.

Terminal	1	2
Wire	55	42

1	2

1	2

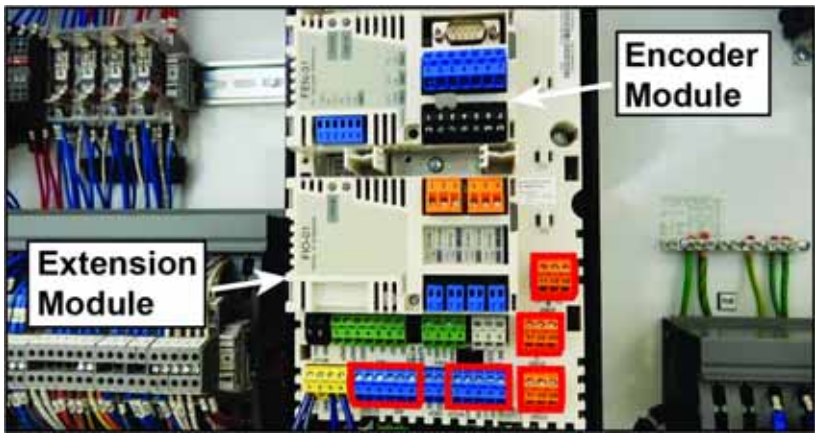
1	2

3. Wire the terminal blocks on the front of the VFD by using the following steps.

   a) Locate the terminal blocks labels outlined in red in Figure 18. Each terminal block has a label under it. Knowing the locations of these terminal blocks allows you to place wires correctly.

      The yellow XSTO terminal block has two jumpers. Do not remove the jumpers or the terminal block.

Figure 18: Locations of Terminal Blocks



Shown without modules wired

   b) Locate the orange XRO1 terminal block. Run wires as follows.

Terminal	11	12	13
Wire		9	1
	XRO1		

   c) Locate the orange XRO2 terminal block. Run wires as follows.

Terminal	21	22	23
Wire		15	11
	XRO2		

   d) Locate the orange XRO3 terminal block. Run wires as follows.

Terminal	31	32	33
Wire	10	1	
	XRO3		

e) Locate the blue XD24 terminal block. Remove the jumper from the terminal block, if a jumper is present. Run wires as follows.

Terminal	1	2	3	4	5
Wire	SO6				42
	XD24				

f) Locate the blue XDI terminal block. Run wires as follows.

Terminal	1	2	3	4	5	6
Wire	48	52	56	57	53	54
	XDI					

Figure 19: Wired VFD

4. Gather the wires toward the bottom of the VFD. This keeps them from interfering with the cover.

5. Place the front cover on the VFD. Tighten the two screws that hold the cover using a Torx screwdriver.

Preparing the Press

1. Close the doors on the main electrical enclosure.

2. Turn the black and red disconnect switch on the right-hand door of the electrical enclosure to the On position.

3. Remove the lock and tag, and restore power at the electrical service entry panel.

4. Resume operation of the press.