MiTek®

SERVICE BULLETIN

Affected machinery:

***Cyber*® *A/T* and *Cyber*® saws**

Document:

SB235-1 rev. A

Title:

Installing a New Fuji® VFD

Applicable Frame Numbers:

All *Cyber A/T* and *Cyber* saws

Distribution:

Customers upon order

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Purpose and Scope

The *Cyber A/T* and *Cyber* saws use VFDs (variable frequency drives) to control movements of components. Several generations of these VFDs have become obsolete.

This document describes the process of removing and replacing any existing VFD with a Fuji VFD, the most recent type.

Overview

The parts included in this kit are shown below. Please make sure all parts are present before starting this procedure.

Table 1: Parts in SB235KIT-A

Quantity	Description	Part #
1	Service bulletin document	SB235-1
1	Programmed Fuji VFD (angle / centerline on *Cyber A/T*)	94001

Table 2: Parts in SB235KIT-B

Quantity	Description	Part #
1	Service bulletin document	SB235-1
1	Programmed Fuji VFD (carriage on *Cyber A/T*)	94002

Table 3: Parts in SB235KIT-C

Quantity	Description	Part #
1	Service bulletin document	SB235-1
1	Programmed Fuji VFD (infeed on *Cyber A/T*)	94003

Table 4: Parts in SB235KIT-D

Quantity	Description	Part #
1	Service bulletin document	SB235-1
1	Programmed Fuji VFD (angle on *Cyber*)	94026

Table 5: Parts in SB235KIT-E

Quantity	Description	Part #
1	Service bulletin document	SB235-1
1	Programmed Fuji VFD (carriage on *Cyber*)	94027

Table 6: Parts in SB235KIT-F

Quantity	Description	Part #
1	Service bulletin document	SB235-1
1	Programmed Fuji VFD (infeed on *Cyber*)	94028

Before beginning the procedure, gather the supplies listed here:

- Phillips screwdriver set
- Slotted screwdriver set
- Drill
- #29 tap drill and #8-32 tap
- Masking tape
- Permanent marker
- Multimeter

If you have any questions, call MiTek Machinery Division Customer Service at 1-800-523-3380.

Procedure

Electrical Lockout/Tagout Procedure

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

Working on a Machine Inside the Machine's Main Electrical Enclosure

Before opening the main electrical enclosure or attempting to repair or replace an electrical transmission line, 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. This is usually required to open the main electrical enclosure's door.
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 1.
4. Attach a lock and tag that meet OSHA requirements for lockout/tagout to the electrical service entry panel.
5. Open the door to the enclosure to which you need access. Using a multimeter, verify that the power is off.

Figure 1: Lockout/Tagout on the Power Source Panel

Removing the Old VFD

1. Open the doors to the electrical enclosure where the VFD is located.
2. Locate the old VFD in one of the drawers in the right-hand half of the enclosure.
   The old VFD may be one of four models depending on your saw's age. Note the manufacturer of the old VFD.
3. Remove the VFD by using the following steps.
   a) Check the wires in the VFD to make sure that all wire labels are present and legible. Pay special attention to the black three-phase output wires on the bottom right side of the VFD. Many of these are not labeled.
      - If the wire labels are present and legible, skip to step c.
      - If the wire labels are not legible, refer to the electrical schematics included with the manual to determine wire numbers. Use the permanent marker and masking tape to label the wires.

   b) Remove the wires from the old VFD.
   c) Loosen the screws fastening the old VFD to the rack.
   d) Remove the old VFD.

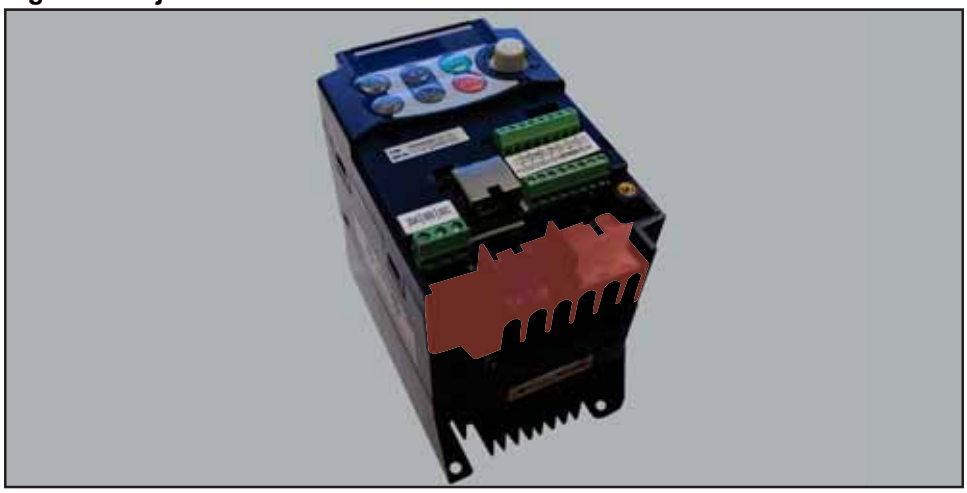
Installing the New VFD

1. Install the Fuji VFD in the space where the old VFD was installed.
   Depending on the model of VFD that you removed, you may have to drill and tap new holes for the Fuji VFD.
2. Remove the screw holding the control circuit terminal block cover on the Fuji VFD. Remove the cover from the VFD. The cover is highlighted in red in Figure 2.

Figure 2: Fuji VFD Control Circuit Terminal Block Cover

3. Remove the main circuit terminal block cover that covers the high-voltage terminals so that all terminals are accessible. The cover is highlighted in red in Figure 3.

Figure 3: Fuji VFD Main Circuit Terminal Block Cover

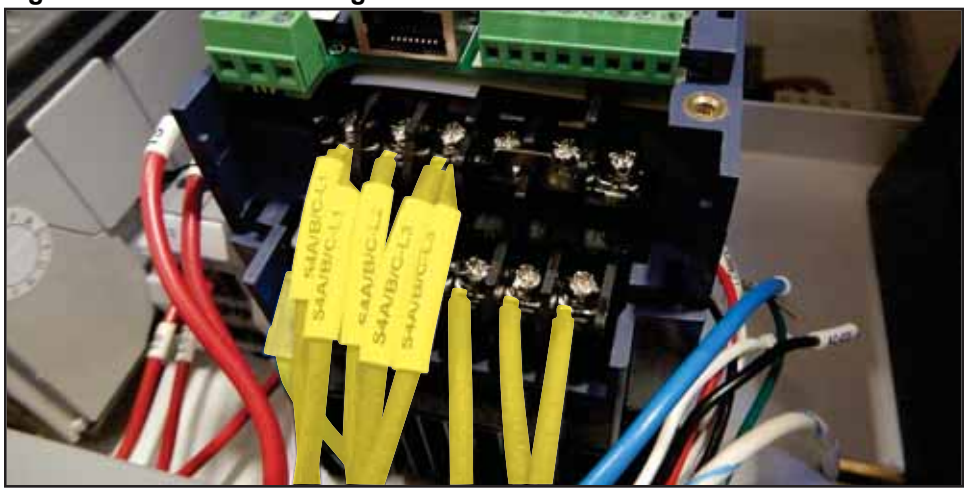


4. Wire the terminals for the main circuit on the Fuji VFD according to Table 7. The wires that compose the main circuit are highlighted in yellow in Figure 4.

Table 7: Main Circuit Wiring

	Bottom Terminal Block				Top Terminal Block		
Terminal	**G**	**R**	**S**	**T**	**U**	**V**	**W**
Wire	Ground	L1 / L1	L2	L3 / L3	T1	T2	T3

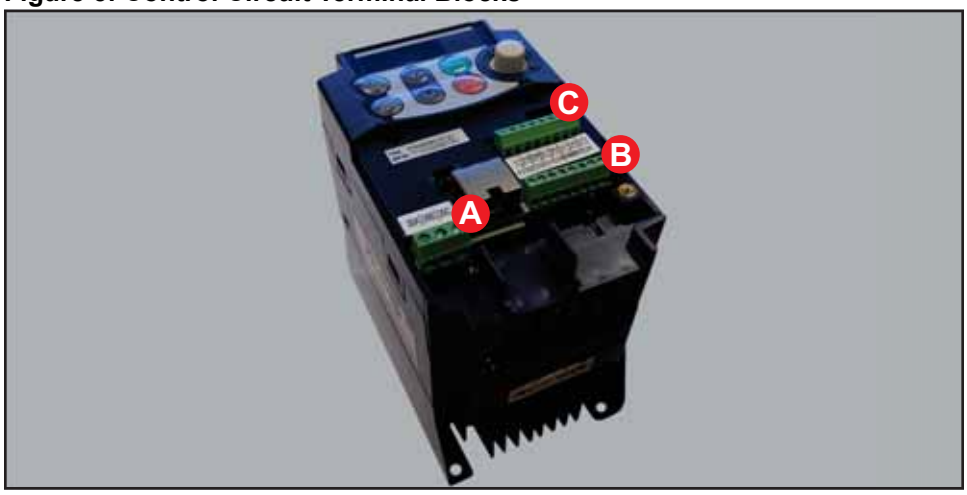
Figure 4: Main Circuit Wiring



5. Replace the main circuit terminal block cover, shown in Figure 3.

6. Wire the terminals for the control circuit. The three terminal blocks are labeled for reference in Figure 5.

Figure 5: Control Circuit Terminal Blocks



Use the following to wire a VFD on a *Cyber A/T* saw.

- See Table 8 on page 10 to wire an angle VFD.
- See Table 9 on page 11 to wire a centerline VFD.
- See Table 10 on page 12 to wire any other VFD.

Use the following to wire a VFD on a *Cyber* saw.

- See Table 11 on page 13 to wire an angle VFD.
- See Table 12 on page 14 to wire an any other VFD.

7. Replace the control circuit terminal block cover and the screw that holds it in place.

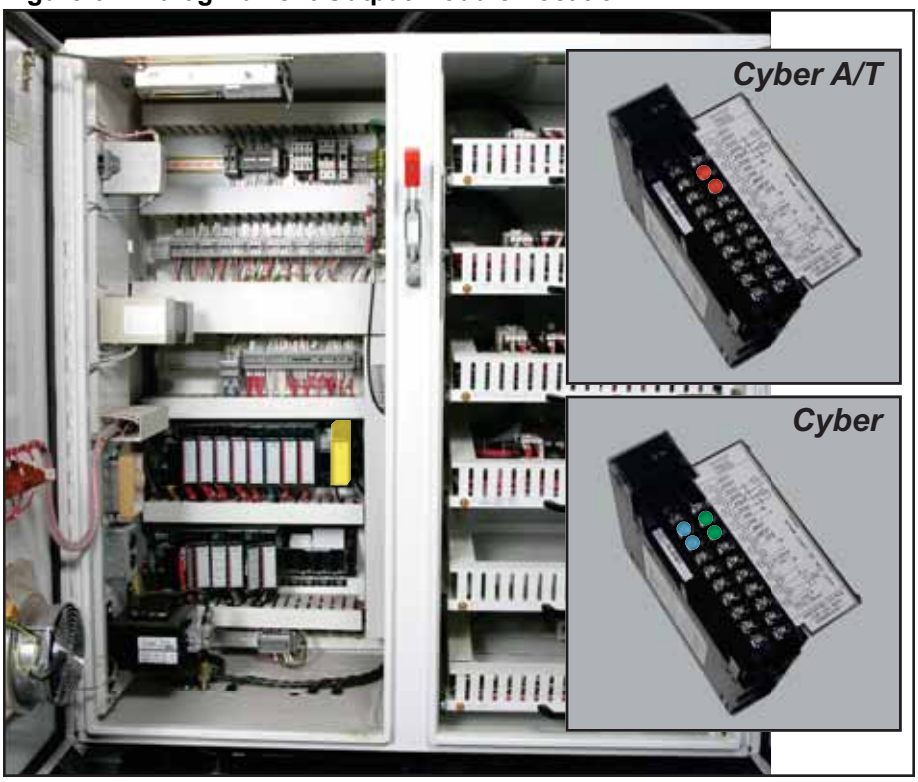
Completing Installation of the New VFD

- If you removed a Mitsubishi VFD from the carriage drive of a *Cyber A/T* or from the carriage or infeed drive of a *Cyber*, proceed to step 1.
- If you removed any other VFD, skip to step 2.

1. If applicable to your machine, remove the resistor by using the following steps.

   a) Locate the analog current output module in the carriage end electrical enclosure. The analog current output module, highlighted in yellow in Figure 6, is mounted on the top PLC rack in slot 10.

Figure 6: Analog Current Output Module Location



Cyber A/T encloure shown above.

   b) Open the cover of the analog current output module.

   c) Remove a resistor based on the VFD that you replaced.

Machine	VFD Replaced	Resistor Location (Color in Figure 6)
Cyber A/T	Carriage drive	Between terminals 4 and 6 (red)
Cyber	Infeed drive	Between terminals 3 and 5 (blue)
Cyber	Carriage drive	Between terminals 4 and 6 (green)

   d) Close the cover of the analog current output module.

2. Close the doors to the electrical enclosure in which you were working.
3. Remove the lock and tag from the electrical service entry panel.
4. Restore power to the saw.

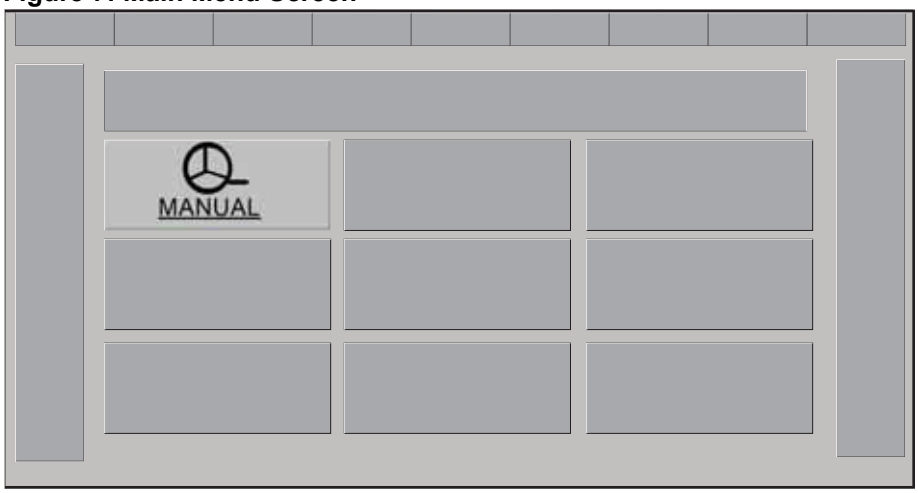
Testing the Replacement VFD

1. Test the replacement VFD using the following steps.

   a) Start the saw PC and software.

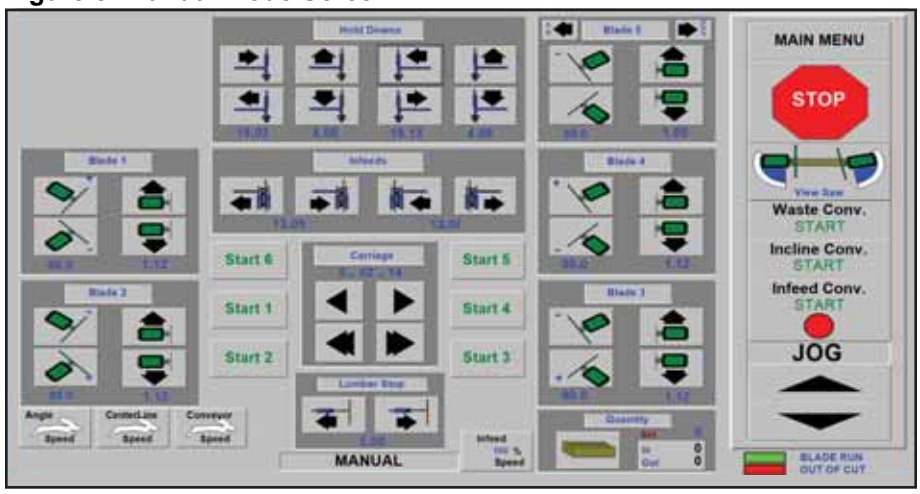
   b) Select **Manual** from the main menu. See Figure 7.

Figure 7: Main Menu Screen



   c) Locate the controls for the part of the saw affected by the VFD replacement. See Figure 8.

Figure 8: Manual Mode Screen



Cyber A/T manual mode screen shown above.

   d) Use the controls to actuate the part of the saw associated with the VFD that you replaced.

   - If the part of the saw actuates, continue to step 2.
   - If the saw does not actuate, first lockout/tagout the saw. Check to make sure all wires are landed in their correct terminals. If they are, call Machinery Division Customer Service.

2. Resume operation.

Machinery Division Customer Service is available at 800-523-3380 Monday through Friday.

Cyber A/T Wiring Charts

Table 8: Control Circuit Wiring for Angle VFDs on the Cyber A/T Saw

		Terminal Block A		Terminal Block B					Terminal Block C		
		30B	30C	11	12	CM	FWD	REV	Y1	Y1E	X3
VFD	Angle 1	I-018	1S	Common*	AQ-004	Common**	Q-229	Q-230	S2B-BRK	-24 VDC	Q-231
	Angle 2	I-008	1S	Common*	AQ-003	Common**	Q-225	Q-226	S1B-BRK	-24 VDC	Q-227
	Angle 3	I-104	1T	Common*	AQ-007	Common**	Q-241	Q-242	T1B-BRK	-24 VDC	Q-243
	Angle 4	I-114	1T	Common*	AQ-008	Common**	Q-245	Q-246	T2B-BRK	-24 VDC	Q-247
	Angle 5	I-124	1T	Common*	AQ-009	Common**	Q-249	Q-250	T3B-BRK	-24 VDC	Q-251
	Angle 6	I-028	1S	Common*	AQ-005	Common**	Q-233	Q-234	S3B-BRK	-24 VDC	Q-235

** White wire labeled COMMON bundled with wire in terminal 12*

*** White wire labeled COMMON bundled with wire in terminal FWD*

Table 9: Control Circuit Wiring for Centerline VFDs on the Cyber A/T Saw

		Terminal Block A		Terminal Block B					Terminal Block C		
		30B	30C	11	12	CM	FWD	REV	Y1	Y1E	X3
VFD	Center-line 1	I-060	1S	Common*	AQ-015	Common**	Q-293	Q-294	S2A-BRK	-24 VDC	Q-295
	Center-line 2	I-061	1S	Common*	AQ-014	Common**	Q-289	Q-290	S1A-BRK	-24 VDC	Q-291
	Center-line 3	I-148	1T	Common*	AQ-018	Common**	Q-305	Q-306	T1A-BRK	-24 VDC	Q-307
	Center-line 4	I-149	1T	Common*	AQ-019	Common**	Q-309	Q-310	T2A-BRK	-24 VDC	Q-311
	Center-line 5	I-130	1T	Common*	AQ-020	Common**	Q-313	Q-314	T3A-BRK	-24 VDC	Q-315
	Center-line 6	I-062	1S	Common*	AQ-016	Common**	Q-297	Q-298	S3A-BRK	-24 VDC	Q-299
		** White wire labeled COMMON bundled with wire in terminal 12*									
		*** White wire labeled COMMON bundled with wire in terminal FWD*									

Table 10: Control Circuit Wiring for Other VFDs on the Cyber A/T Saw

		Terminal Block A		Terminal Block B					Terminal Block C		
		30B	30C	11	12	CM	FWD	REV	Y1	Y1E	X3
VFD	St. Hold-Down	I-035	1S	Common*	AQ-023	Common**	Q-325	Q-326	S4B-BRK	-24 VDC	Q-327
	St. Infeed	I-031	1S	Common*	AQ-022	Common**	Q-321	Q-322	S4A-BRK	-24 VDC	Q-323
	Carr. Hold-Down	I-131	1T	Common*	AQ-021	Common**	Q-341	Q-342	T4B-BRK	-24 VDC	Q-343
	Carr. Infeed	I-127	1T	Common*	AQ-010	Common**	Q-337	Q-338	T4A-BRK	-24 VDC	Q-339
	Infeed Drive	I-071	1S	Common*	AQ-017	Common**	Q-301	Q-302	—	—	Q-303
	Carr. Drive	I-142	1T	Common*	***	Common**	Q-217	Q-218	—	—	Q-219

** White wire labeled COMMON bundled with wire in terminal 12*

*** White wire labeled COMMON bundled with wire in terminal FWD*

**** Connect wire AQ-002 to terminal C1 for the carriage drive VFD.*

Cyber Wiring Charts

Table 11: Control Circuit Wiring for Angle VFDs on the Cyber Saw

		Terminal Block A		Terminal Block B				
		30B	30C	11	12	CM	FWD	REV
VFD	Angle 1	1S	I-018	Common*	AQ-004	Common**	Q-229	Q-230
	Angle 2	1S	I-008	Common*	AQ-003	Common**	Q-225	Q-226
	Angle 3	1T	I-104	Common*	AQ-007	Common**	Q-241	Q-242
	Angle 4	1T	I-114	Common*	AQ-008	Common**	Q-245	Q-246
	Angle 5	1T	I-124	Common*	AQ-009	Common**	Q-249	Q-250
	Angle 6	1S	I-028	Common*	AQ-005	Common**	Q-233	Q-234
		** White wire labeled COMMON bundled with wire in terminal 12*						
		*** White wire labeled COMMON bundled with wire in terminal FWD*						

Table 12: Control Circuit Wiring for Other VFDs on the Cyber Saw

		Terminal Block A		Terminal Block B				Terminal Block C
		30B	30C	11	CM	FWD	REV	C1
VFD	Infeed	1T	I-147	Common*	Common**	Q-221	Q-222	AQ-001
	Carriage	1T	I-142	Common*	Common**	Q-217	Q-218	AQ-002
		** White wire labeled COMMON bundled with wire in terminal C1*						
		*** White wire labeled COMMON bundled with wire in terminal FWD*						