1334-MOD-C2

Frequency Output Card

Description

The Frequency Output Card is a module consisting of (2) boards — one mounted on top of the other. Together, these boards provide a means to generate output frequency signals to remote speed meters. The boards also provide a 4-20mA output signal proportional to Drive output frequency for customer use.

The module is supplied from the factory scaled to produce full output at a Drive output speed of 60 Hz, with the capability of being recalibrated for other operating ranges. The **1334-Mod-C2** may be installed in any Bulletin 1334 or 1335 Drive and includes a board mounted terminal block for customer connections. When installed as directed, the module will not affect the Drive enclosure rating.

Output signals from the module include:

- Meter driver outputs for connection to the Remote Analog Speed Meter, **1334-MOD-C**, or the Remote Programmable Speed Meter, **1334-MOD-E2** — only one of these MODs may be connected to the Frequency Output Card at a time.
- An analog output signal of 4-20mA capable of operating into a customer load of 500Ω or less. This signal is available for customer use and is independent of either meter driver signal. The module can supply both the 4-20mA signal and one meter driver signal simultaneously. The 4-20mA signal uses isolated Drive supplied power — no other power source is required.

Installation

WARNING

Only personnel familiar with the Drive and its associated machinery should plan or implement the installation, startup, and adjustment of MOD kits. Failure to comply may result in personal injury and/or equipment damage.

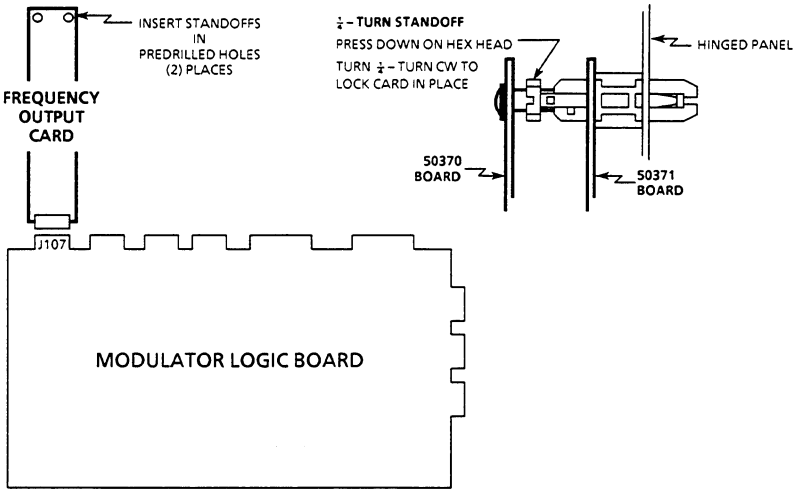
To guard against personal injury, always remove & lock-out power to the Drive at the main supply disconnect and all other power source disconnects. Ensure that DS1 is not lit when boards or wires are being installed or connected. Refer to the instruction manual for your Drive for LED location.

Each 1334-MOD-C2 Option Kit Includes:

- (1) Frequency Output Card Module, P/N 50371
- (2) $\frac{1}{4}$ Inch, $\frac{1}{4}$ – Turn Standoffs, P/N 201104

As shown in the installation drawing on the following page, two predrilled holes have been provided above Modulator Logic Board connector **J107**. Installation requires removing power to the Drive and installing (2) $\frac{1}{4}$ – turn standoffs into the predrilled holes. The module is then plugged onto the edge connector while pressing the top of the module onto the (2) installed standoffs. To secure the module in place, press down on the hex head and turn $\frac{1}{4}$ – turn CW.

Installation (continued)



Module Installation

Adjustments

WARNING

To avoid hazard of electrical shock, remove power when instructed and wait for the bus to completely discharge. Exercise extreme care when performing adjustments with power applied to the Drive.

The module is precalibrated at the factory to produce the correct output when the maximum Drive frequency is 60Hz. **If other frequency ranges are used or recalibration is required, use the following procedures prior to making any interconnections to the module.** For best accuracy an oscilloscope should be used. If a 4-20mA signal is required, both an oscilloscope and an ammeter capable of reading 4-20mA will be required.

The following is a list of all module adjustments. Some of the adjustments affect only specific outputs. If these outputs are not used, recalibration may not be required.

ADJUSTMENT	LOCATION	DESCRIPTION	CONNECTIONS AFFECTED
LO/HI Jumper	Bottom Board	Scales the Output Based On Drive Output Frequency	**ALL**
Potentiometer R12	Bottom Board	Range	**Term. 5, 6, 7, & 8** (MOD-C or MOD-C2)
Potentiometer R24	Top Board	Gain	**Term. 3 & 4** (4-20MA OUTPUT)
Potentiometer R28	Top Board	Offset	**Term. 3 & 4** (4-20MA OUTPUT)
Potentiometer R40	Top Board	Range	**Term. 3 & 4** (4-20MA OUTPUT)

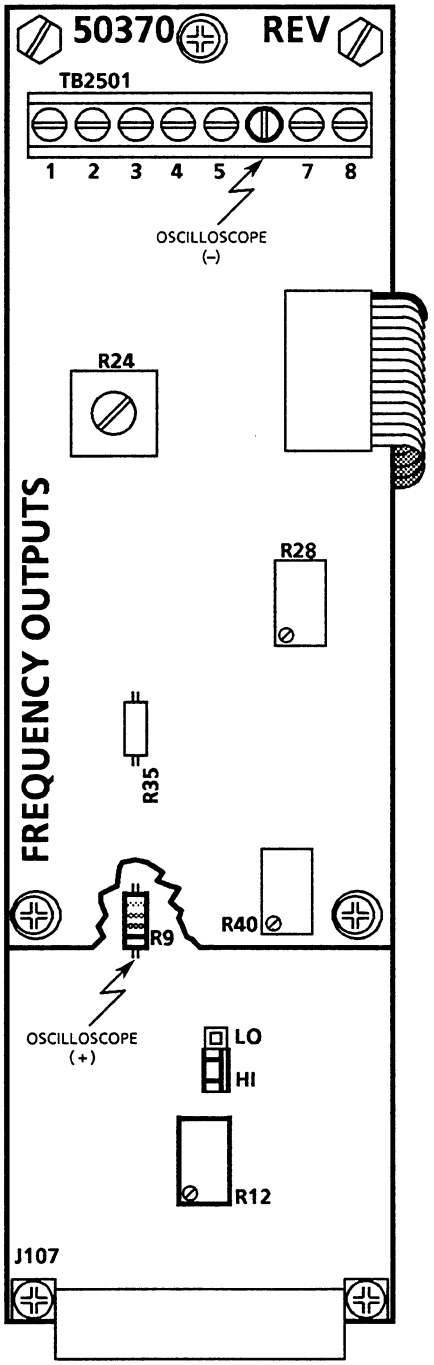
— HI/LO Jumper Adjustment —

With input power removed from the Drive, determine the maximum Drive output frequency and set the **HI/LO** jumper accordingly.

Maximum Frequency	Jumper Position
119 HZ OR LESS	LO
120 TO 200 HZ	HI

If an oscilloscope is available, use it to complete the adjustment procedures. If an oscilloscope is not available, use the alternate voltmeter adjustment procedure.

Adjustments
(continued)

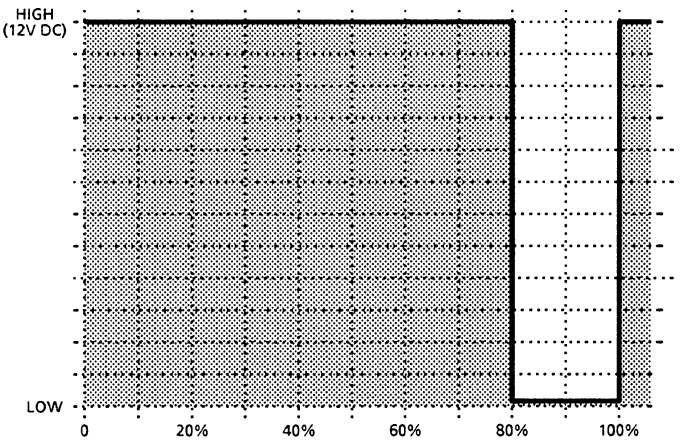


— 1334-MOD-C & 1334-MOD-E2 Adjustment Procedures —

Oscilloscope Adjustment

WARNING
If an oscilloscope is used during troubleshooting, it must be properly grounded. The oscilloscope chassis may be at potentially fatal voltage if not properly grounded. Always connect the oscilloscope chassis to earth ground.

1. Check for a variable duty 12V square wave. **With input power removed from the Drive**, connect oscilloscope (+) to the bottom of **R9** — connect oscilloscope common (–) to terminal **6** of **TB2501**.
2. Apply input power and start the Drive at low frequency. Maintain a stable trace on the oscilloscope with the positive portion of one cycle filling approximately half of the screen. Increase the Drive frequency to the desired maximum frequency.
3. With the Drive at the desired maximum frequency, adjust **R12** for a waveform that is high (ON) for 80% of the wave, and low (OFF) for 20% of the wave.

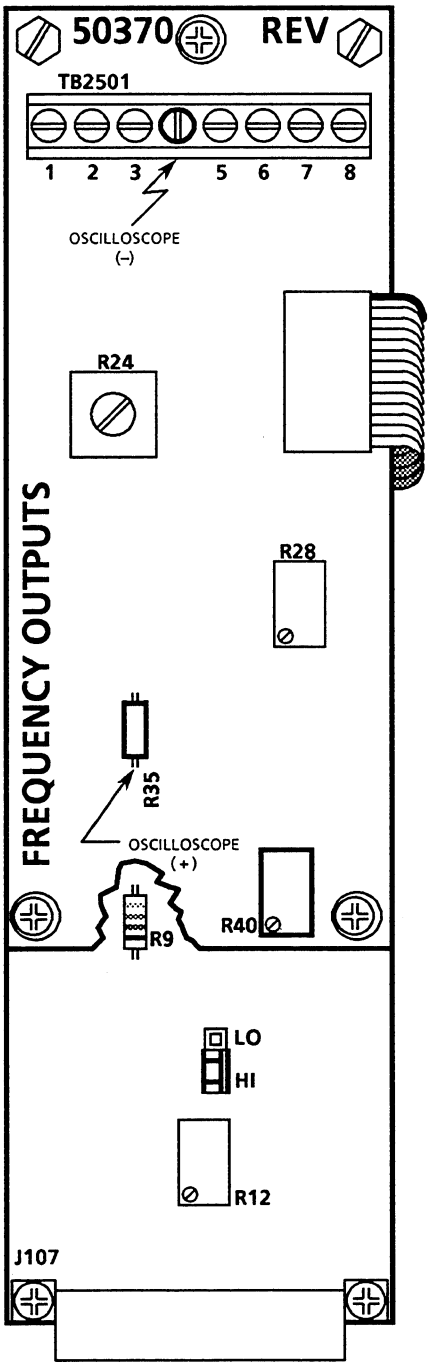


4. Refer to the **1334-MOD-C** or **1334-MOD-E2** meter instructions to complete any additional calibration or scaling adjustments required.

Voltmeter Adjustment

1. Use a voltmeter with a range of approximately 12-20V DC. **With input power removed from the Drive**, connect the (+) lead to the bottom of **R9** — connect (–) lead to terminal **6** of **TB2501**.
2. Apply input power and start the Drive at low frequency. Increase the Drive frequency to the desired maximum frequency.
3. With the Drive at the desired maximum frequency, adjust **R12** for a voltmeter reading of 9.5V DC.
4. Refer to the **1334-MOD-C** or **1334-MOD-E2** meter instructions to complete any additional calibration or scaling adjustments required.

Adjustments
(continued)



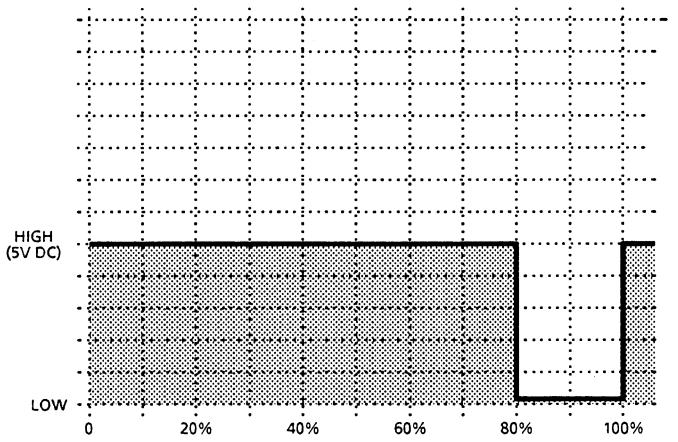
— 4-20mA Output Signal Adjustment Procedures —

Oscilloscope Adjustment

WARNING

If an oscilloscope is used during troubleshooting, it must be properly grounded. The oscilloscope chassis may be at potentially fatal voltage if not properly grounded. Always connect the oscilloscope chassis to earth ground.

1. Check for a variable duty 5V square wave. **With input power removed from the Drive**, connect oscilloscope (**+**) to the bottom of **R35** — connect oscilloscope common (–) to terminal **4** of **TB2501**.
2. Apply input power and start the Drive at low frequency. Maintain a stable trace on the oscilloscope with the positive portion of one cycle filling approximately half of the screen. Increase the Drive frequency to the desired maximum frequency.
3. With the Drive at the desired maximum frequency, adjust **R40** for a waveform that is high (ON) for 80% of the wave, and low (OFF) for 20% of the wave.

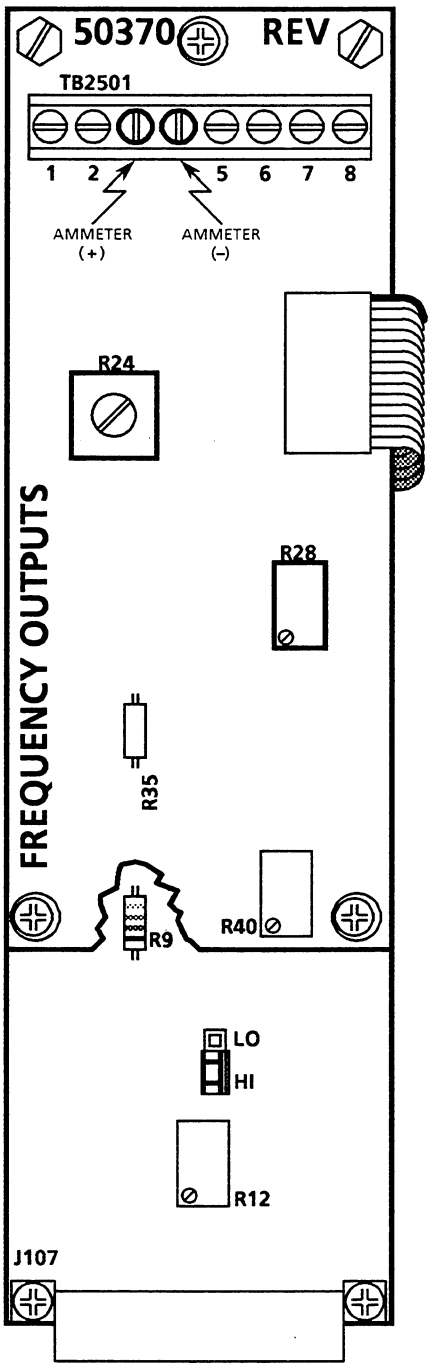


4. Complete calibration by completing the **Ammeter Adjustment** procedure on the following page.

Voltmeter Adjustment

1. Use a voltmeter with a range of approximately 6-10V DC. **With input power removed from the Drive**, connect the (**+**) lead to the bottom of **R35** — connect (–) lead to terminal **4** of **TB2501**.
2. Apply input power and start the Drive at a low frequency. Increase the Drive frequency to the desired maximum frequency.
3. With the Drive at the desired maximum frequency, adjust **R40** for a voltmeter reading of 4.0V DC.
4. Complete calibration by completing the **Ammeter Adjustment** procedure on the following page.

Adjustments
(continued)



— 4-20mA Output Signal Adjustment Procedures —

Ammeter Adjustment

1. Stop the Drive. **Remove input power from the Drive** and disconnect any test leads from the Drive.
2. Use an ammeter with a range of 4-20mA. With input power removed from the Drive, connect the (**+**) lead to terminal **3** of **TB2501** — connect the (**-**) lead to terminal **4**.
3. Apply input power and start the Drive at low frequency. Set the output frequency to zero — or the minimum desired operating frequency to correspond to a 4mA output — then turn **R28** until the meter reads 4mA.

IMPORTANT

R28 Minimum Frequency Adjustment Limits —

When the **HI/LO** jumper is set to **LO**, the highest Drive frequency corresponding to 4mA that can be set is 22Hz.

When the **HI/LO** jumper is set to **HI**, the highest Drive frequency corresponding to 4mA that can be set is 44Hz.

4. Increase Drive frequency to the desired frequency, then adjust **R24** until the meter reads 20mA.

IMPORTANT

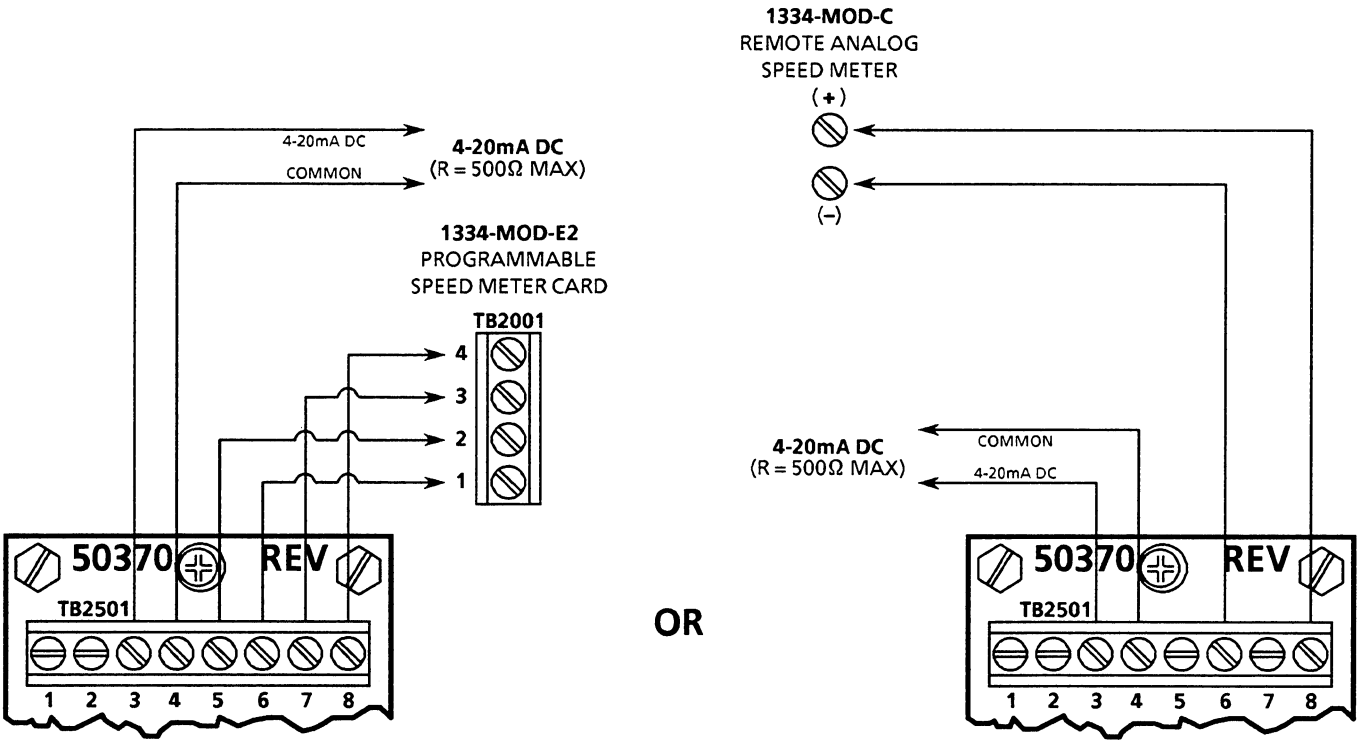
R24 Maximum Frequency Adjustment Limits —

When the **HI/LO** jumper is set to **LO**, there must be a minimum difference of 48Hz between the MIN and MAX frequencies to obtain a 4-20mA range.

When the **HI/LO** jumper is set to **LO**, there must be a minimum difference of 96Hz between the MIN and MAX frequencies to obtain a 4-20mA range.

5. Repeat steps **3** & **4** until the desired readings are present.

Wiring Interconnection wiring to the module is not provided with the kit. All interconnection wiring to the module is made to terminal block **TB2501** located on the top board.



— 1334-MOD-C & 1334-MOD-E2 Wiring —

Refer to the option kit instructions if either the Remote Analog Speed Meter (**1334-MOD-C**), or the Remote Programmable Speed Meter (**1334-MOD-E2**), is installed.

— 4-20mA Output Signal Wiring —

For best results, interconnection wiring for the 4-20mA analog output signal should be twisted pair, unshielded wire, with a maximum distance of 200 feet. The maximum wire size **TB2501** will accept is 18 AWG stranded copper wire. Connect the (+) or 4-20mA source to terminal **3** of **TB2501** — the (–) or common to terminal **4** of **TB2501**.

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