RELIANCE ELECTRIC

INSTRUCTION SHEET D-3939

PROCESS LINE KIT
Model 14C278

For use with
FlexPak Plus (S2C) and
Regenerative FlexPak Plus (S2R)
D-C V+S Drives

This instruction sheet is general information only. Refer to the Sales Order Wiring Diagrams for complete Process Line Kit application data.

WARNING
THE PROCESS LINE KIT IS SPECIALLY CONFIGURED FOR EACH CUSTOMER ORDER. WHEN REPLACING AN EXISTING UNIT, IT IS IMPERATIVE THAT ALL JUMPERS, CLIPPED/ADDED COMPONENTS AND WIRING BE DUPLICATED EXACTLY AS ON THE UNIT BEING REPLACED.

WARNING
INSTALLATION OF THIS MODIFICATION KIT SHOULD BE PERFORMED ONLY BY QUALIFIED ELECTRICAL MAINTENANCE PERSONNEL FAMILIAR WITH THE DESIGN AND OPERATION OF THIS EQUIPMENT. DAMAGE COULD RESULT IF THIS IS NOT HEEDED.

Complete details for the installation of the Process Line Kit are given in Paragraph 5.1 in the FlexPak Plus (S2C) Instruction Manual D-3935 and in the Regenerative FlexPak Plus (S2R) Instruction Manual D-3936.

DANGER
INSTALLATION IS TO BE DONE ONLY AFTER A-C LINE VOLTAGE IS DISCONNECTED AND LOCKED OUT AT THE MAIN DISCONNECT SWITCH. DO NOT INSTALL KIT WHEN POWER IS APPLIED TO THE CONTROLLER. SERIOUS PERSONAL INJURY AND EQUIPMENT DAMAGE COULD RESULT.

Process Line Kit— The Process Line Kit (Figure 5.2) allows the FlexPak Plus (S2C) and the Regenerative FlexPak Plus (S2R) to be used in most process line applications without the need for additional hardware in separate racks. The Process Line Kit includes circuitry for remote operator interfacing, tachometer feedback and standby operation. Applications include web process lines where a drive would have multiple sources of feedback signals controlling the process.

This Kit contains the Process Line Module and three mounting screws. The Module has been designed to include standard values for interfacing but also provides for modifications via wire wrap pins in many areas. The operational limits of the Process Line Module are

- Line speed 50 to 1.
- Draw speed range of 0 to 130% (not to exceed motor base speed).
- Current compounding 0 to 20%.
- Operating temperature 0° C to 70° C.

The Module circuitry is divided into seven major functions. Refer to Figure 5.2A (Figure 6.6 in Instruction Manual D-3935 or Figure 6.5 in Instruction Manual D-3936).

1. A summing amplifier type **active feedback** is used around a speed loop summing amplifier.
   - If the application **does** require active feedback, the standard feedback circuitry on the Regulator Module must be disabled by clipping and removing J13.
   - If the application **does not** require active feedback, remove resistor 1R (18.2K) on the Process Line Module.
2. A **D-C tachometer feedback divider** circuit is set up to accept a 50 V/1000 rpm tachometer on a 1750 rpm motor. Other tachometers can be accommodated. (Refer in Instruction Manual D-3935 or D-3936 to Table 3.6 for the proper voltage scaling and to Paragraph 3.4 for the proper installation procedure for other tachometers.) If a 2 microfarad capacitor is required across the tachometer output, connect the capacitor at terminals 119 and 57 or directly to the tachometer terminals. The circuit impedance is approximately 80K at the tachometer input. For some tachometers, greater loading will be necessary for stability.
3. An **LVTU buffering and reference** input circuitry allows the Regulator Module to follow the internal LVTU or an external reference.

- The standard (10K) Speed potentiometer is connected to terminals 25, 426 and 57.
- The external reference terminal 467 of 8 volts is 100% output of the Regulator.
- The buffer output (terminals 767 and 57) is for the Draw potentiometers (maximum of two 10K potentiometers) if used.
- The LVTU timing may be extended from the standard 0.3 to 30 seconds to 0.6 to 60 seconds by adding capacitors (10µf maximum with less than 0.5 µA leakage over the operating temperature range of 0° C to 70° C) between terminals 367 and 377.

4. A **draw potentiometer and a draw summing amplifier** contains a summing amplifier, zero set signal, and a summed speed reference signal to the regulator major speed loop amplifier.
   - The Draw potentiometer (10K typical) is connected to terminals 767, 667 and 21. The minimum speed resistor (1K) between terminals 21 and 57 may be changed if required.
   - Extra terminals are provided on the input of the amplifier for additional signal inputs or for gain adjustment.
   - The summing amplifier output is available at terminals 667 and 57 for progressive draw applications. It can supply two 10K potentiometers.
   - If progressive draw is not used, the LVTU buffered output (terminal 767) may be jumpered to the input (terminal 667) of the summing amplifier.
   - A maximum speed potentiometer is provided on this Module to adjust the maximum drive speed reference.
5. **Current compounding/IR compensation** receives current related input(s) from the current scaling circuit on the Regulator Module.
   - The forward direction input (terminal 219) is a −1.0 V signal while the reverse direction input (terminal 220) is a +1.0 V signal.
   - The current signals are summed in the amplifier

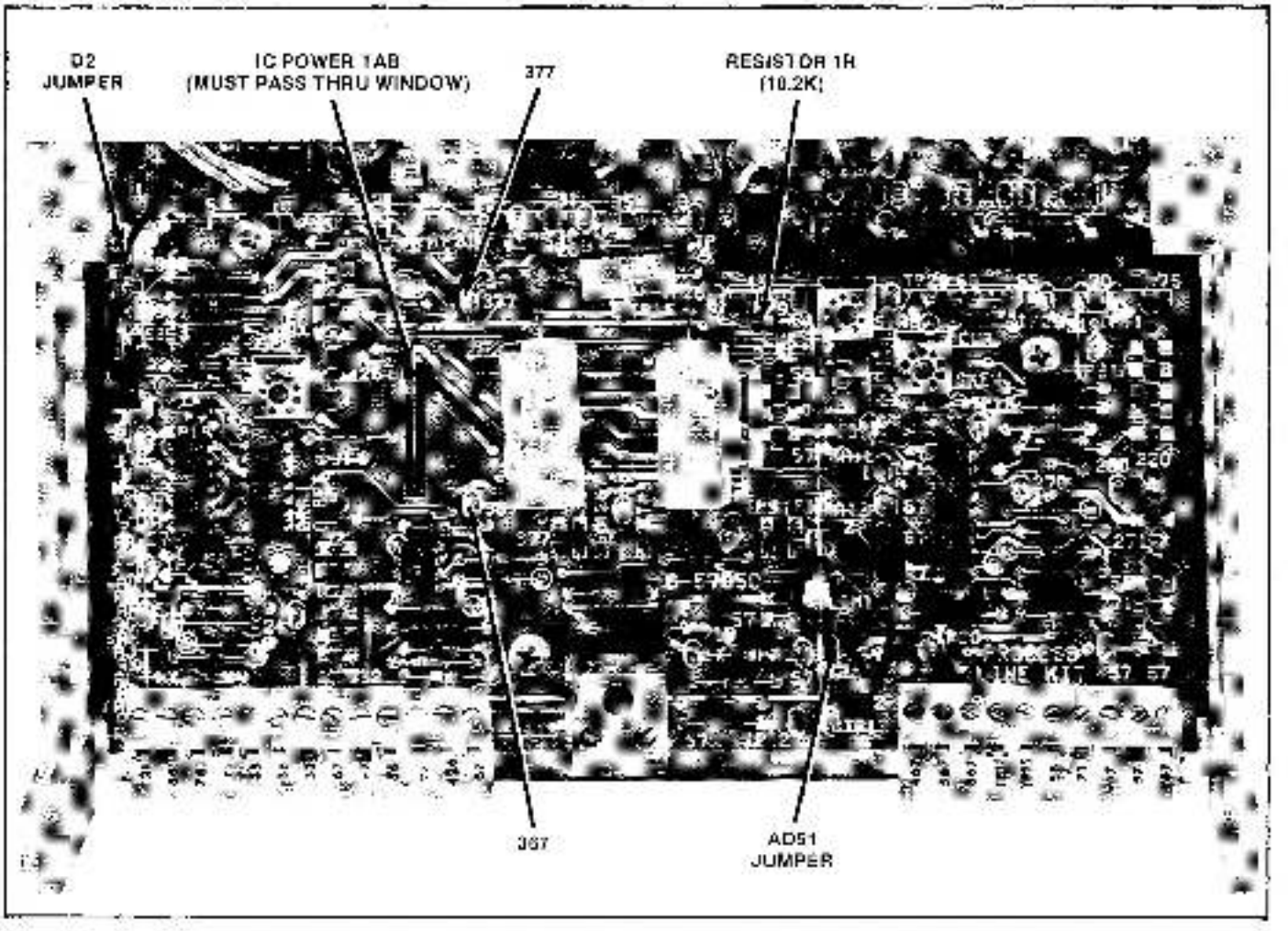

Figure 5.2. Process Line Kit installed on Regulator Module.

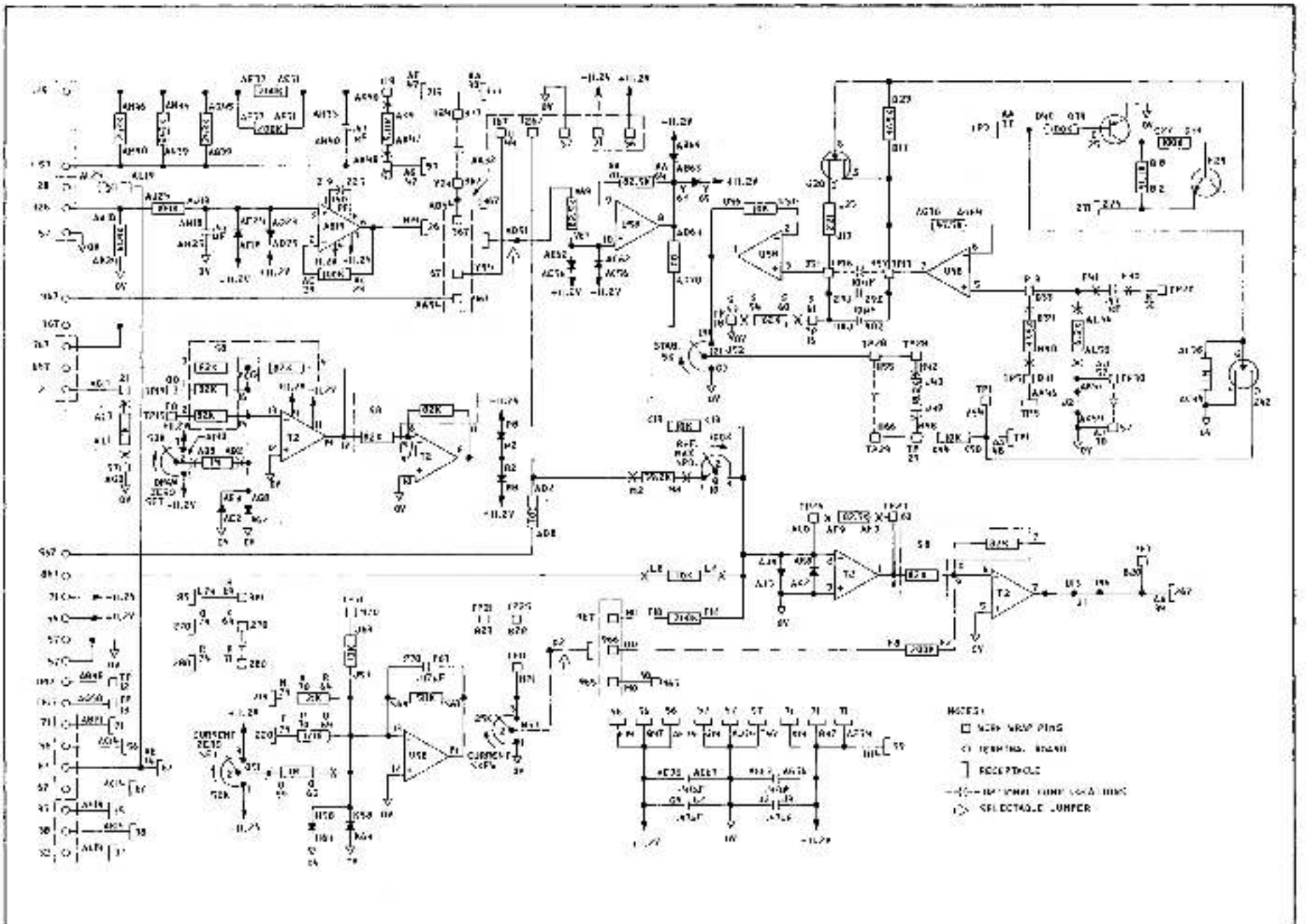

Figure 5.2A. Process Line schematic.

to give a maximum 0 to 20% input into the major loop amplifier.

- The output of the summing amplifier can be used for IR compensation, speed increase with motor current increase; or current compounding, speed decrease with motor current increase. IR compensation is used with voltage regulators not speed regulators. Current compounding can be used with voltage or speed regulators which tends to "soften" or increase motor speed regulation.

6. **Remote operator interfacing** accepts Operator Control wiring (maximum of #14 AWG). Operator Control wiring cannot be connected directly to the controller.
7. **Standby circuitry.**

To install the Kit, follow these procedures.

Step 1 — Clip and remove jumper J10 on the Regulator Module.

Step 2 — Refer to Figure 6.4 in Instruction Manual D-3935 or Figure 6.9 in Instruction Manual D-3936 and note that the shaded area on the Regulator Module is where the Process Line Module is to be mounted. Orient the Process Line Module over this area so the pin guides on the Module are aligned over the two sets of pins labeled GRN 28 and RED 32. **Check that the IC with the power tab is in an upright position and that all pins are aligned.**

NOTE: *The pins on all new Regulator Modules have been lubricated. Older Regulator Modules must have the contact pins cleaned and re-lubricated (Amp Lubricant 561232-1 or equivalent) before installing this Module.*

Lower the Process Line Module making sure all pins pass thru the corresponding pin guides and the mounting spacer seats in the mounting hole. Secure the Module with the three mounting screws.

Step 3 — Connect the black pig-tail jumper at location AD51 to pin 367 if the Position Loop Kit is not to be used, to pin 167 if the Position Loop Kit is to be used or to pin 467 for auxiliary reference inputs for specific applications.

Step 4 — Connect the black pig-tail jumper at location D2 to pin 965 if IR compensation or current compounding are **not** desired, to pin 966 for IR compensation, or to 967 for current compounding.

Step 5 — It is important that all modifications and interconnections made to the Process Line Module be duplicated onto any replacement Process Line Module used on the drive system. This includes jumpers, added/clipped components and external wiring. This will ensure maintaining the same performance and operating characteristics of the drive system.