T tellabs
technical manual
76-819001
rev C

9001 and 9002 Relay Modules

contents

1. general description

1.01 The 9001 and 9002 Relay Modules (figure 1) each provide four independently operated relays for use in a variety of applications, including loudspeaker cutoff and data transfer. The relays each provide four sets of form C transfer (break before make) contacts.

1.02 This practice section is revised to provide current regional office telephone numbers in section 7.

1.03 Relays on the 9001 module operate from nominal 24Vdc supply, while relays on the 9002 module operate from nominal 48Vdc supply. Both modules' relays are rated at 1 ampere maximum current.

1.04 A diode across the coil of each relay suppresses transients that occur during release of the relay. This transient protection polarizes the relay-operate current.

1.05 The 9001 and 9002 modules mount in one position of a Tellabs Type 10 Mounting Shelf, versions of which are available for relay-rack or apparatus-case installation. In relay-rack applications, up to 12 modules can be mounted across a 19-inch rack, while up to 14 modules can be mounted across a 23-inch rack. In either case, 6 inches of vertical rack space is used.

2. application

2.01 The 9001 and 9002 Relay Modules can be used in a wide variety of circuits. The four relays on each module can be used independently or in combinations of two or more.

2.02 Typical applications of the 9001 and 9002 modules include control functions and alternate voice/data transmission transfer circuits. The relay-operate and relay-release times do not allow these relay modules to be used to follow dial pulses in normal dial-pulse applications.

2.03 Both modules contain transient-protection diodes connected in parallel with each relay coil to polarize the relay-operate current. Please refer to paragraphs 3.03 and 3.04 for installer connections.
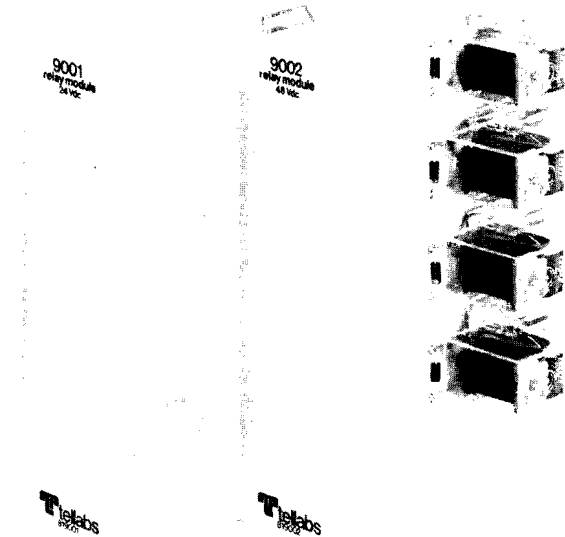

figure 1. 9001 and 9002 Relay Modules

3. installation

inspection

3.01 The 9001 and 9002 Relay Modules should be visually inspected upon arrival in order to find possible damage incurred during shipment. If damage is noted, a claim should immediately be filed with the carrier. If stored, the modules should be visually inspected again prior to installation.

mounting

3.02 The 9001 and 9002 modules each mount in one position of a Tellabs Type 10 Mounting Shelf, which is available in configurations for both relay-rack and apparatus-case installation. The module plugs physically and electrically into a 56-pin connector at the rear of the shelf.

installer connections

3.03 Before making any connections to the mounting shelf, make sure that power is **off** and modules are **removed**. Modules should be put into place only **after** they are properly optioned and **after** wiring is completed.

3.04 Table 1 lists external relay power connections to the 9001 and 9002 modules. All connections are made via wire-wrapping to the 56-pin connector at the rear of the modules' mounting shelf position. Pin numbers are found on the body of the connector. Please refer to the *functional schematic*, section 5 of this Practice, for additional wiring information.

options and alignment

3.05 The 9001 and 9002 modules require no alignment or optioning.

connect:	to pin:
K1 RELAY COIL, POSITIVE GROUND	56
K1 RELAY COIL, NEGATIVE BATTERY	55
K2 RELAY COIL, POSITIVE GROUND	42
K2 RELAY COIL, NEGATIVE BATTERY	41
K3 RELAY COIL, POSITIVE GROUND	28
K3 RELAY COIL, NEGATIVE BATTERY	27
K4 RELAY COIL, POSITIVE GROUND	14
K4 RELAY COIL, NEGATIVE BATTERY	13

Note: *Please refer to the* **functional schematic,** *section 5 of this Practice, for all additional wiring information.*
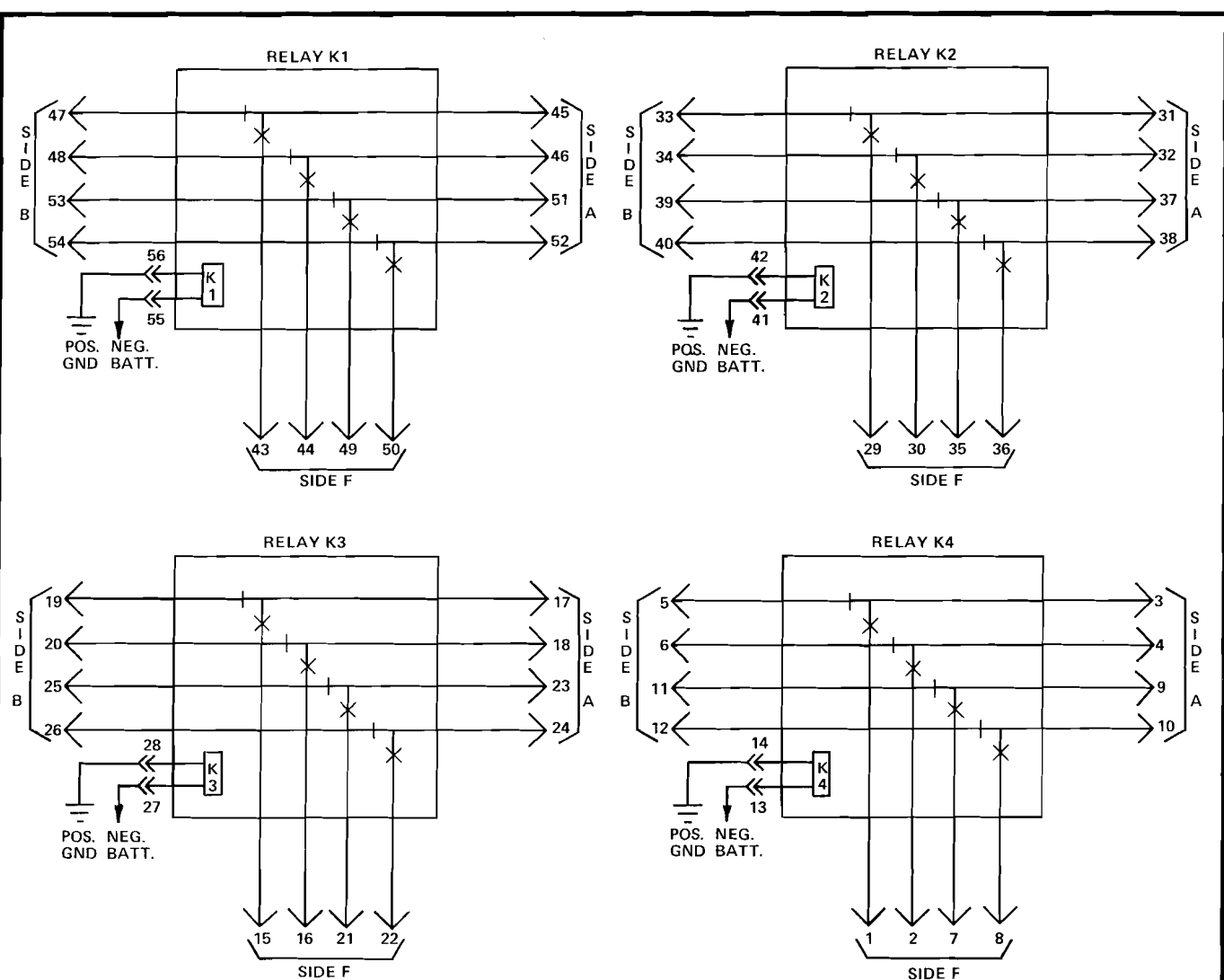
table 1. External relay-power connections to 9001 and 9002 modules

4. circuit description

4.01 This circuit description is intended to familiarize you with the 9001 and 9002 Relay Modules for application and engineering purposes only. Attempts to troubleshoot the 9001 and 9002 internally are not recommended and may void your warranty. Procedures for recommended testing and troubleshooting in the field are limited to those prescribed in section 7 of this Practice. Please refer to the 9001/9002 functional schematic, section 5 of this Practice, as an aid in following this circuit description.

4.02 The 9001 and 9002 modules each provide four independent relays. Each relay has four sets of form C (break before make) contacts. The application of voltage (24Vdc for 9001, 48Vdc for 9002) to the coil causes the four contact sets of the relay to operate (transfer). A diode across the coil suppresses the transient voltage that occurs during release of the relay.

Circuit notes:
Side A is normally toward customer.
Side B is normally toward equipment.
Side F is switched side.

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5. functional schematic

6. specifications

9001 relays
relay coil: 1150 ohms ±10%
must-operate voltage: 19Vdc
must-release voltage: 2Vdc
normal voltage: 24Vdc

9002 relays
relay coil: 3000 ohms ±10%
must-operate voltage: 33Vdc
must-release voltage: 4Vdc
normal voltage: 48Vdc

relay contacts, 9001 and 9002
maximum current: 1 ampere
maximum apparent power: 10VA
maximum voltage: 100Vdc
typical operate time: 20ms
typical release time: 60ms

operating environment
0° to 122°F (−18° to 50°C), humidity to 95%
(no condensation)

weight
9.5 ounces (270 grams)

dimensions
5.58 inches (14.17cm) high
1.42 inches (3.61cm) wide
5.96 inches (15.14cm) deep

mounting
relay rack or apparatus case via one position of Tellabs
Type 10 Mounting Shelf

7. testing and troubleshooting

7.01   The *testing guide checklist* in this section may be used to assist in the installation, testing or troubleshooting of the 9001 and 9002 Relay Modules. The checklist is intended as an aid in the localization of trouble to a specific module. If a module is suspected of being defective, a new one should be substituted and the test conducted again. If the substitute module operates correctly, the original module should be considered defective and returned to Tellabs for repair or replacement as directed below. We strongly recommend that no internal (component-level) testing or repairs be attempted on the 9001 or 9002 module. Unauthorized testing or repairs may void the module's warranty. Also, if the module is part of a registered system, unauthorized repairs will result in noncompliance with Part 68 of the FCC Rules and Regulations.

Note: *Warranty service does not include removal of permanent customer markings on the front panels of Tellabs modules, although an attempt will be made to do so. If a module must be marked* **defective,** *we recommend that it be done on a piece of tape or on a removable stick-on label.*

7.02   If a situation arises that is not covered in the checklist, contact Tellabs Customer Service as follows (telephone numbers are given below):

USA customers: Contact Tellabs Customer Service at your Tellabs Regional office.

Canadian customers: Contact Tellabs Customer Service at our Canadian headquarters in Mississauga, Ontario.

International customers: Contact your Tellabs distributor.

US atlantic region: (203) 798-0506
US capital region: (703) 478-0468
US central region: (312) 357-7400
US southeast region: (305) 834-8311
US southwest region: (214) 869-4114
US western region: (714) 850-1300
Canada: (416) 624-0052

7.03   If a 9001 or 9002 is diagnosed as defective, follow the *replacement* procedure in paragraph 7.04 when a critical service outage exists (e.g., when a system or a critical circuit is down and no spares are available). If the situation is not critical, follow the *repair and return* procedure in paragraph 7.05.

replacement
7.04   To obtain a replacement 9001 or 9002 module, notify Tellabs via letter or telephone (see addresses and numbers below), or via TWX (910-694-3530 in the USA, 610-492-4387 in Canada). Be sure to provide all relevant information, including the 8X9001 or 8X9002 part number that indicates the issue of the module in question. Upon notification, we shall ship a replacement module to you. If the module in question is in warranty, the replacement will be shipped at no charge. Pack the defective module in the replacement module's carton, sign the packing slip included with the replacement, and enclose it with the defective module (this is your return authorization). Affix the preaddressed label provided with the replacement module to the carton being returned, and ship the carton prepaid to Tellabs.

repair and return
7.05   Return the defective 9001 or 9002 module, shipment prepaid, to Tellabs (attn: repair and return).

in the USA:
Tellabs, Inc.
4951 Indiana Avenue
Lisle, Illinois 60532
telephone (312) 969-8800

in Canada:
Tellabs Communications Canada, Ltd.
1200 Aerowood Drive, Unit 39
Mississauga, Ontario, Canada L4W 2S7
telephone (416) 624-0052

Enclose an explanation of the module's malfunction. Follow your company's standard procedure with regard to administrative paperwork. Tellabs will repair the module and ship it back to you. If the module is in warranty, no invoice will be issued.

testing guide checklist appears on page 4

testing guide checklist

test	test procedure	normal result	if normal conditions are not met, verify:
input voltage	Use VOM (set to 250Vdc scale) to measure dc voltages between each *NEG. BATT.* input (pins 55, 41, 27, and 13) and its corresponding *POS. GND* input (pins 56, 42, 28, and 14, respectively).	VOM indicates approximate negative input battery voltage across each indicated pair of pins □.	Wiring □. Power on □. Replace 9001 or 9002 and retest □.
overall circuit operation	Test operation of all relays by causing actual circuit operation.	Relays operate and provide proper circuit operation □.	Same as above □.