

Introduction

This guide contains information on S46T relay installation and system configuration that is necessary after installing new relays. To install a relay, refer to [“Relay kits” on page 1](#) for a description of the kits and then follow the applicable installation instructions.

WARNING: The information in this section is only intended for qualified service personnel. Do not attempt to replace parts or otherwise service the equipment unless you are qualified to do so.

Relay kits

[Table 1](#) summarizes available relay kits and part numbers.

WARNING: Use only the parts specified in [Table 1](#) of this guide when servicing the equipment. Use of improper parts may expose the operator to hazardous voltages that could result in personal injury or death.

Table 1
S46T relay kits

| Relay kit model number | Description | Relay location | Kit parts summary (Quantity) | Keithley part number | Installation reference |
|------------------------|--------------|----------------|---|---|---|
| S46T-SPDT-KIT | 18GHz SPDT | 1 to 8 | SPDT un-terminated relay (1) SPDT spacer (1) Connecting cable (1) | S40-0154 S40-SE05-307 SYS46-311C | “SPDT relay 1–8 installation” on page 3 |
| S46T-SP4T-KIT | 18GHz SP4T | A to D | 4-40 ×1/4 PPHSEM screws (2) 4-40 ×3/8 PFH screws (4) SP4T relay (1) Ribbon cable (1) Mounting plate (1) | 4-40X1/4PPHSEM 4-40x3/8PFH RL-282-2 CA-286-1 S40-N410-312 | “Relay A–D installation” on page 5 |
| S46T-SP6T-KIT | 18GHz SP6T | A to D | 4-40 ×1/4 PPHSEM screws (2) 4-40 ×3/8 PFH screws (4) SP6T un-terminated relay (1) Ribbon cable (1) Mounting plate (1) | 4-40X1/4PPHSEM 4-40x3/8PFH RL-282-1 CA-286-1 S40-N410-312 | “Relay A–D installation” on page 5 |
| S46T-SPDT-KIT-26 | 26.5GHz SPDT | 1 to 8 | SPDT un-terminated relay (1) SPDT spacer (1) Connecting cable (1) | RL-308 S40-SE05-307 SYS46-311C | “SPDT relay 1–8 installation” on page 3 |
| S46T-SP4T-KIT-26 | 26.5GHz SP4T | A to D | 4-40 ×3/8 PFH screws (4) SP4T un-terminated relay (1) Mounting plate (1) Ribbon cable (1) | 4-40x3/8PFH RL-312 S40-N410-312 S46-U100-350A | “Relay A–D installation” on page 5 |

Table 1 (Continued)
S46T relay kits

| Relay kit model number | Description | Relay location | Kit parts summary (Quantity) | Keithley part number | Installation reference |
|------------------------|--------------|----------------|--|--|---|
| S46T-SP6T-KIT-26 | 26.5GHz SP6T | A to D | 4-40 x3/8 PFH screws (4) SP6T un-terminated relay (1) Mounting plate (1) Ribbon cable (1) | 4-40x3/8PFH RL-309 S40-N410-312 S46-U100-350A | “Relay A–D installation” on page 5 |
| S46T-SPDT-KIT-T | 18GHz SPDT | 1 to 8 | SPDT terminated relay (1) Connecting cable (1) | S40-0172 SYS46-311C | “SPDT relay 1–8 installation” on page 3 |
| S46T-SPDT-KIT-26T | 26.5GHz SPDT | 1 to 8 | SPDT terminated relay (1) Connecting cable (1) | RL-292-1 SYS46-311C | “SPDT relay 1–8 installation” on page 3 |
| S46T-SP4T-KIT-T | 18GHz SP4T | A to D | 4-40 x3/16 PPHSEM screws (2) SP4T terminated relay (1) Ribbon cable (1) | 4-40X3/16PPHSEM RL-317 S40-SV11-350 | “Relay A–D installation” on page 5 |
| S46T-SP6T-KIT-T | 18GHz SP6T | A to D | 4-40 x3/16 PPHSEM screws (2) SP6T terminated relay (1) Ribbon cable (1) | 4-40X3/16PPHSEM RL-318 S40-SV11-350 | “Relay A–D installation” on page 5 |
| S46T-SP4T-KIT-26T | 26.5GHz SP4T | A to D | 4-40 x3/16 PPHSEM screws (2) SP4T terminated relay (1) Ribbon cable (1) | 4-40X3/16PPHSEM RL-310 S40-SV11-350 | “Relay A–D installation” on page 5 |
| S46T-SP6T-KIT-26T | 26.5GHz SP6T | A to D | 4-40 x3/16 PPHSEM screws (2) SP6T terminated relay (1) Ribbon cable (1) | 4-40X3/16PPHSEM RL-290-1 S40-SV11-350 | “Relay A–D installation” on page 5 |
| S46T-XFER-KIT | 18GHz XFER | A to D | M3X5PPH screws (4) XFER un-terminated relay (1) XFER mounting plate (1) Ribbon cable (1) | M3X5PPH RL-304 S40-N410-311 S46-U100-350A | “Relay A–D installation” on page 5 |
| S46T-XFER-KIT-26 | 26.5GHz XFER | A to D | M3X5PPH screws (4) XFER un-terminated relay (1) XFER mounting plate (1) Ribbon cable (1) | M3X5PPH RL-308 S40-N410-311 S46-U100-350A | “Relay A–D installation” on page 5 |
| S46T-MSPDT-KIT | 18GHz SPDT | A to D | 4-40x1-1/2PPH screws (2) SPDT un-terminated relay (2) Mounting plate (1) Relay spacer (1) Ribbon cable (1) | 4-40x1-1/2PPH S40-0154 S40-N410-309 S40-N410-313 S46-U100-350A | “Relay A–D installation” on page 5 |
| S46T-MSPDT-KIT-26 | 26.5GHz SPDT | A to D | 4-40x1-1/2PPH screws (2) SPDT un-terminated relay (2) Mounting plate (1) Relay spacer (1) Ribbon cable (1) | 4-40x1-1/2PPH RL-308 S40-N410-309 S40-N410-313 S46-U100-350A | “Relay A–D installation” on page 5 |

Installation

Before installing the relays, remove the screws that secure the S46T top cover, and then remove the cover.

WARNING: Disconnect the line cord and all cables from the S46T before removing the top cover.

To find the applicable installation procedure for your specific kit, refer to the Installation reference column contained in [Table 1](#), and then perform the referenced installation.

SPDT relay 1–8 installation

1. Remove the 6 screws that secure the SPDT relay mounting brackets to the S46T chassis (see [Figure 1](#)) and remove the SPDT assembly from front panel.
2. Remove the 2 screws holding relay spacers in the relay column containing the desired relay installation location (see [Figure 3](#)).
3. Loosen remaining 4 SPDT screws to facilitate second and third row installation.
4. For terminated relays: replace the spacer in the desired location with the relay (refer to the inset in [Figure 3](#) labeled Terminated SPDT relay installation).
For un-terminated relays: replace the spacer in the desired location with the relay and an S40-SE05-307 spacer (refer to the inset in [Figure 3](#) labeled Un-terminated SPDT relay installation).
5. Install the 2 screws removed in step 2 in the new relay column.
6. Thread the red and black wires (from the relay) through the PVC Tubing (PVC tubing, TX-52-7, is part of SYS46-311C)(not shown). The TX-52-7 may be cut to a length that will allow the relay assembly to be removed without removing the top cover.
7. Referring to [Figure 2](#), solder the two control wires to the terminals of the relay.
8. Install the relay mounting bracket using the screws removed in step 1.
9. Plug the wire connector into the appropriate circuit board connector (see [Figure 4](#)).
10. Install the top cover, and then configure the system as covered in [“System configuration” on page 6](#) of this guide.

Figure 1
Remove SPDT 1–8 relay mounting brackets

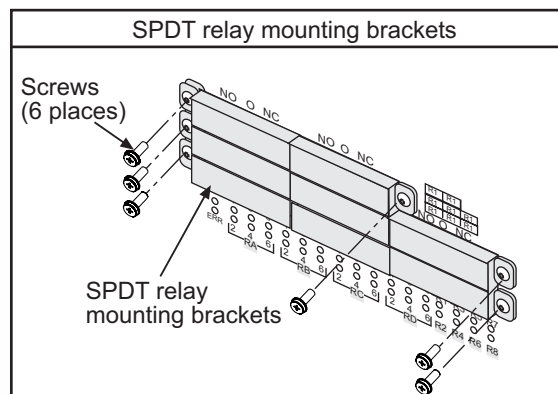


Figure 2
Connecting control wires to SPDT relay

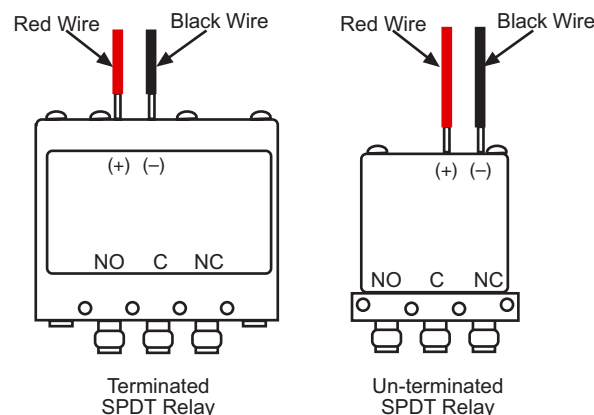


Figure 3
SPDT 1–8 relay installation

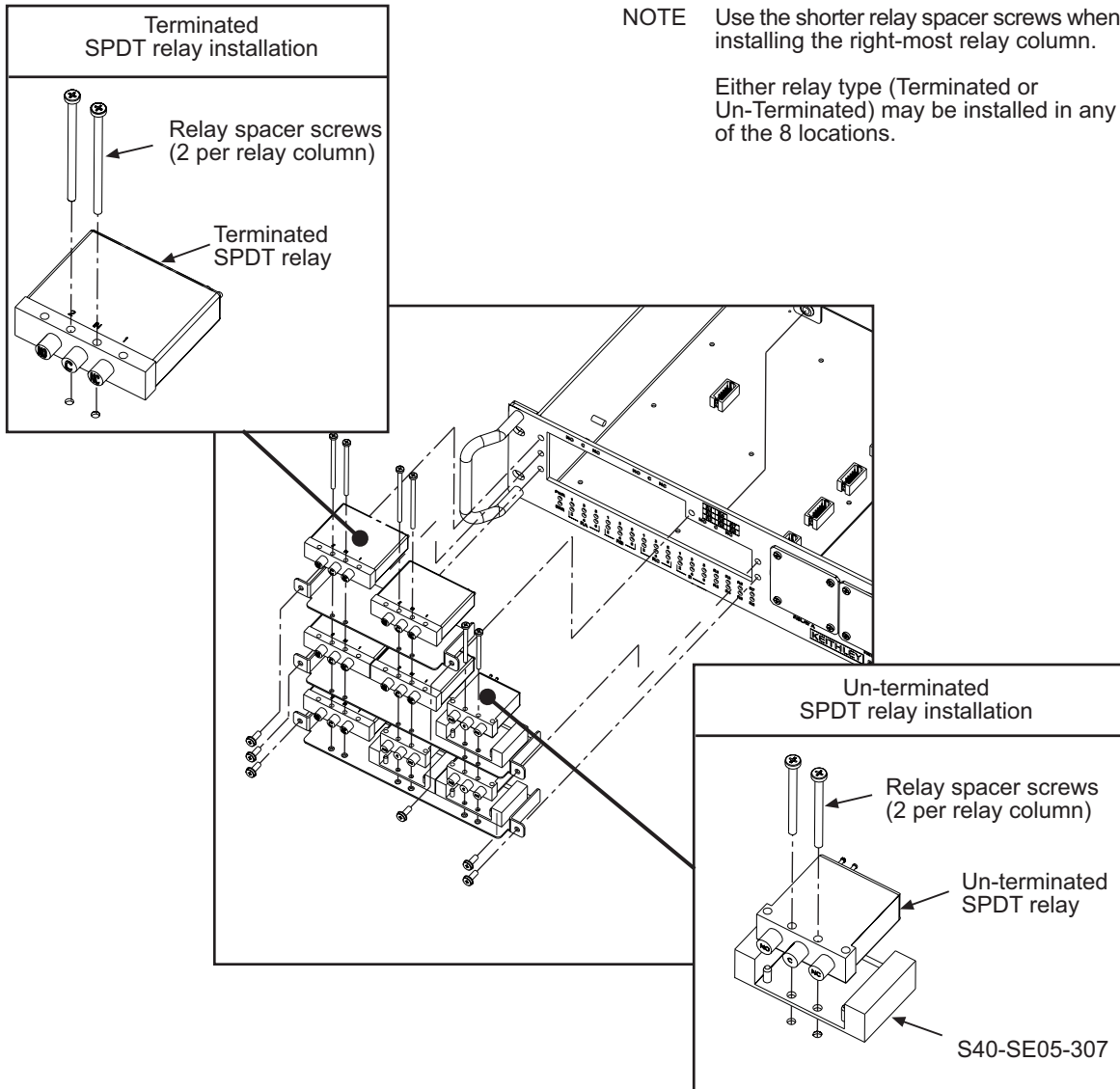
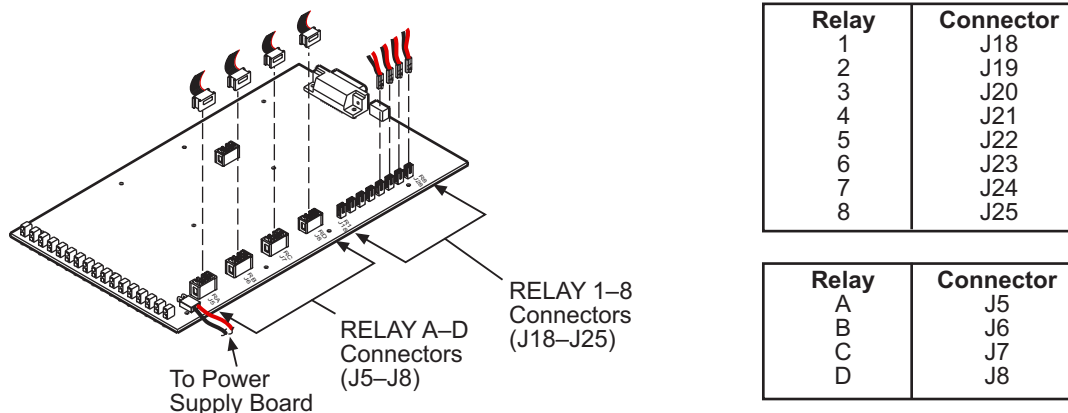


Figure 4
Relay connector locations



Relay A–D installation

1. Remove the four screws securing the cover plate over the mounting hole where the new relay is to be installed (see Cover plate inset in [Figure 6](#)).
2. Connect the supplied ribbon cable to the relay:
XFER relays (transfer relays), 26.5GHz un-terminated relays, and MSPDT relays—solder the ribbon cable to the relay use [Figure 5](#) as a guide.
All other A–D relays—secure the ribbon cable to the relay with the two supplied screws (use [Figure 5](#) as a guide).
3. Using the applicable inset in [Figure 5](#), install the relay in the mounting hole, and then secure it with the four screws removed in step 1.
4. Plug the ribbon connector into the appropriate circuit board connector (see [Figure 4](#)).
5. Install the top cover, and then configure the system as covered in *“System configuration”* on [page 6](#) of this guide.

Figure 5
Connecting control wires to relays A-D

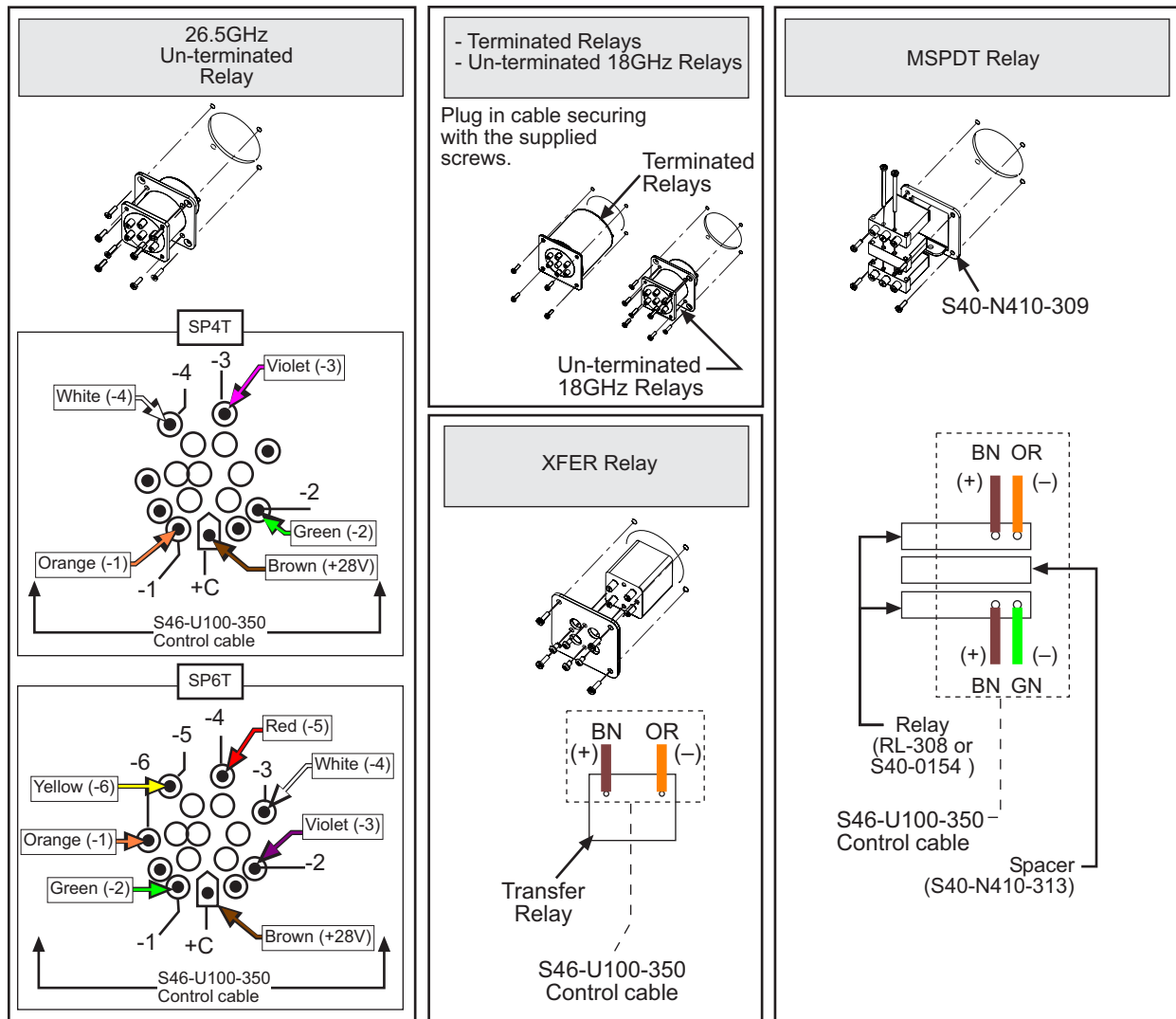
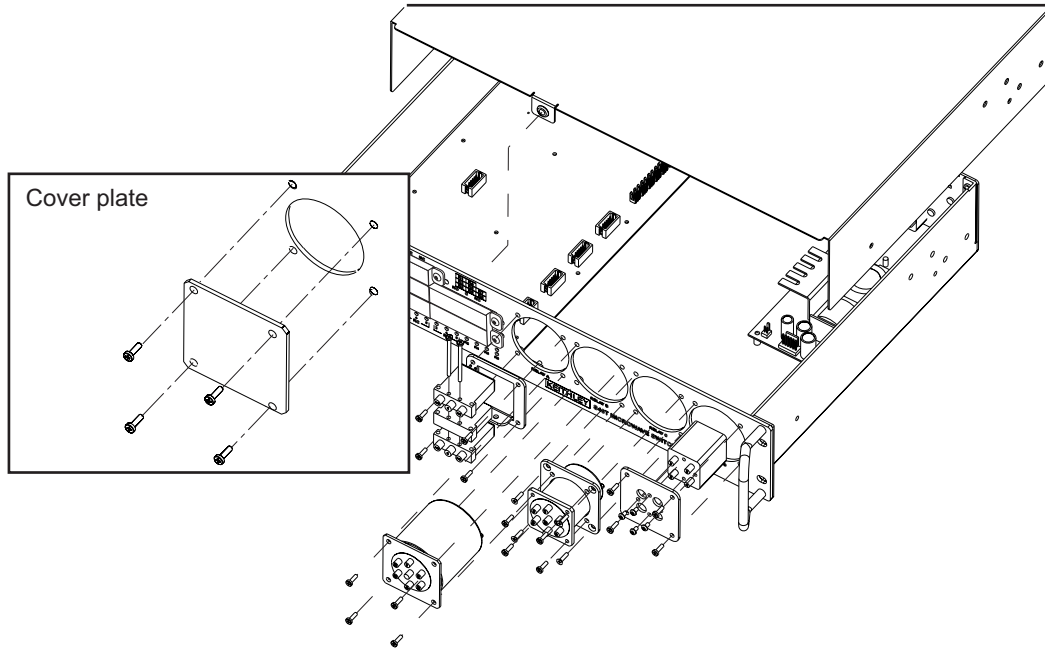


Figure 6
A-D relay installation



System configuration

After installing the new relays, you must program the S46T for the new relay configuration with the following command:

```
:ROUT:CONF:CPOL <clist>
```

<clist> is defined as follows:

```
clist = (@0 | 3-6, 0 | 3-6, 0 | 3-6, 0 | 3-6, 0 | 1, ... 0 | 1)
Relay:  A      B      C      D      1 ... 8
```

NOTE: All switch locations must be included in the <clist> whether or not all locations are populated. The numeric value (1 or 3-6) indicates the number of throws, while a value of 0 indicates that a location is not populated.

For example, if RELAY A and RELAY B are SP6T, RELAY 1 and RELAY 2 are SPDTs, and all other locations are not populated, the command syntax would be:

```
:ROUT:CONF:CPOL (@6,6,0,0,1,1,0,0,0,0,0,0)
```

S46T-MSPDT-KIT and S46T-XFER-KIT are programmed with a value of 3 (not the number of throws as other relays). The MSPDT top relay uses the first channel assignment for relay's A-D, the second channel controls the lower relay. The XFER relay uses the first channel assignment for relay's A-D.

Terminated SP4T relays are programmed with a value of 6. Ports 2, 3, 5 and 6 control channels are used.

See Section 3 of the S46T Instruction Manual for detailed programming information.