



QA Technology Company, Inc.

A p p l i c a t i o n s N o t e
**Instructions for Installing and Replacing
 X Series Terminations and Probes**

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The X Probe Terminations are installed in the Back plate of the fixture and are used to adjust the set height of the probe while providing the electrical connection from the probe to the fixture wiring. The X Probe Socketless Series is available in two Termination types: wired and wireless. The following chart gives recommended hole sizes and pin gauges for AT-7000, G-10/FR4 or similar materials:

Probe Series		Wired Termination	Wireless Termination
X39	Back Plate	.0315/.0325 [0.800/0.826]	.0315/.0325 [0.800/0.826]
	Pin Gage PN	PG-X39	PG-X39
X50	Back Plate	.038/.039 [0.97/0.99]	.038/.039 [0.97/0.99]
	Pin Gage PN	PG-X50-T	PG-X50-T
X75	Back Plate	.0515/.0525 [1.31/1.33]	.038/.039 [0.97/0.99]
	Pin Gage PN	PG-X75A-T	PG-X50-T

All dimensions are in inches [mm].

Termination Set Heights:

X39- The Wire Jack (X39-TJ-3G and 5G) Wired Terminations and X39-XTDS-10 Wireless Terminations can be set at set heights between -.040 [-1.02] and .100 [2.54] from the top of the Back Plate. The Wireless X39-XTDS-04 Termination is designed to be used between -.040 [-1.02] and .040 [1.02] set heights.

X50/X75- The Wire Wrap (X50-TW-3G, X50-TW-5G, X75-TWA-5G) Terminations, Wire Jack (X50-TJ-5G) and Wireless XTDS_-14 Terminations can be set between a .000 [0.00] and a .140 [3.56] set height from the top of the Back plate. The XTDS_-08 Wireless Termination can be set between .000 and .080 [2.03] set heights.

The distance from the top of the Probe plate to the probe tip is given in the following tables when building by the Suggested Fixture Layout drawings (C-X39-FIXTURE, C-X50- FIXTURE and C-X75-FIXTURE):

X39 Series	Distance from the top of the probe plate to the tip	
Termination Set Height	X39-PRP25 Series	IT Termination Installation Tool
-.040 [-1.02]	.410 [10.41]	IT-X39-SET -.040
.000 [0.00]	.450 [11.43]	IT-X39-FLUSH
.040 [1.02]	.490 [12.45]	IT-X39 SET .040
.100 [2.54]	.550 [13.97]	IT-X39 SET .100



X75 Series		Distance from the top of the probe plate to the tip	
Termination Set Height	X75-PRP25 Series	X75-PRP40 and X75-PRP40-D Series	IT Termination Installation Tool
.000 [0.00]	.410 [10.41]	.560 [14.22]	IT-X75A-FLUSH
.080 [2.03]	.490 [12.45]	.640 [16.26]	IT-X75A SET .080
.140 [3.56]	.550 [13.97]	.700 [17.78]	IT-X75A SET .140

X50 Series		Distance from the top of the probe plate to the tip	
Termination Set Height	X50-PRP25 Series	X50-PRP40 and X50-PRP40-D Series	IT Termination Installation Tool
.000 [0.00]	.410 [10.41]	.560 [14.22]	IT-X50-FLUSH
.080 [2.03]	.490 [12.45]	.640 [16.26]	IT-X50 SET .080
.140 [3.56]	.550 [13.97]	.700 [17.78]	IT-X50 SET .140

The X Probe set heights depend on the set height of the Termination and the stack-up height of the Probe and Optional Spacer plates versus the distance from the top of the Probe plate to the top of the socket as measured with standard test probes and sockets. By decreasing the thickness of the Probe and Optional Spacer plates and increasing the Termination set height; the distance from the tip of the probe to the top of the Probe plate is increased.

Example: if you currently use a .250 [6.35] socket set height and want to use the X Probe system, we first need to calculate the distance from the probe plate to the tip of the probe on the standard fixture. This is found by adding the socket set height to the distance from the top of the socket to the tip of the probe = $.250 [6.35] + .330 [8.38] (100-25 \text{ Series}) = .580 [14.73]$. This number is then subtracted from the overall length of the X Probe = $1.410 [28.96] (X75-25 \text{ Series}) - .580 [14.73] = .830 [21.08]$. This number is the distance from the top of the Termination to the top of the Probe plate. If the Termination is set flush (.000), this is also the distance from the top surface of the Back plate to the top surface of the Probe plate. If the Probe plate is .375 [9.53] thick, the Optional Spacer plate will have to be $.830 [21.08] - .375 [9.53] = .455 [11.56]$ when the Termination is set to .000 (See Applications Note- How to Calculate X Probe Termination Set Heights).

X39 Note: The probe tube on the X39 is .040 [1.02] longer than the probe tubes on the X50 and X75, which requires that the X39 termination to be set .040 [1.02] lower than a corresponding X50 or X75A termination. If X50 and X75A terminations are set flush, the X39 termination will have to be set at a -.040 [-1.02] set height with the appropriate IT tool (IT-X39-SET -.040) in order for the tips of all X Series to be on the same plane.

TERMINATION INSTALLATION STEPS:

The IT-X39, IT-X50 and IT-X75A set tools are designed to install Terminations into the Back plate at a specified set height. Installation is performed with the Back plate and Optional Spacer plates removed. These tools can be ordered preset at your specified set height or unset. Instructions are included with unset tools that allow the user to set the tool at a desired set height.



Following these instructions will ensure that the Terminations are installed correctly:

1. Insert the Termination into the correctly gauged mounting hole, tail end first. The bottom retention bead should be sitting on top of the Back plate. **When installing TC Terminations (Crimped with pre-attached wire), thread the wire through the mounting hole and gently pull on the wire until the first retention bead contacts the back plate. Do not try to pull the retention beads thru the plate by the attached wire; the crimp tube body can pull apart from the Termination retention bead portion of the assembly causing damaged parts.**
2. Place the nose of the IT tool over the Termination's .195 [.495] (X39) or .025 [0.64] (X50 and X75A) diameter interconnect pin.
3. Tap lightly on the IT tool with a 4-6 ounce hammer until the tool's stop has contacted the mounting material.

Please Note- The IT-X39 tool is delicate in nature and should be handled with care.

TERMINATION EXTRACTION:

Terminations can be removed with or without the Probe and Optional Spacer plates installed.

These Extraction tools are to be used to remove termination's with the Probe Plate and optional Spacer Plate removed. Two tools are recommended a Flush Insertion tool and an Extraction tool.

Series	Extraction Tool Kit	Flush-Insertion Tool	Extraction Tool
X39	ET-X39-KIT	IT-X39-FLUSH	ET-X39
X50	ET-X50-KIT	IT-X50-FLUSH	ET-X50
X75	ET-X75A-KIT	IT-X75A-FLUSH	ET-X75A

1. Removing Terminations and Probes with the Probe and Optional Spacer Plates REMOVED:

In locations where access is available, QA's standard PE100 tool will remove headed X75 probes. For all headless X Probes needle nose pliers or tweezers will be required.

The Termination removal requires use of the Termination Extraction tools (ET Tools). These tools are used when a Termination has been damaged and must be replaced. For removal of the Termination use of our ET-X39, ET-X50 and ET-X75A tools are required. These tools are designed to remove the Terminations from the Back plate once the Probe and Optional Spacer plates have been removed.

Following these instructions will ensure that the Back plate will not be damaged:

1. Remove all of the X probes.
2. Remove the Probe plate and Optional Spacer plate.
3. The ET tool is placed onto the .195 [.495] (X39) or .025 [0.64] (X50 and X75A) diameter interconnect pin of the Termination and driven out by tapping lightly on the tools "striker" with a 4- 6 ounce [113-170 gram] hammer.



With care, the tool will also remove the Terminations with broken interconnect pins. The tool is designed to remove Terminations in mounting plates up to .625 [15.88] in thickness. To help prevent the tool from being damaged it is recommended that the Termination first be set to .000 with an IT-X39/X50/X75A –FLUSH tool (on Terminations set below .000 this step is not required).

2. Removing Terminations and Probes with the Probe and Optional Spacer Plates INSTALLED:

The ET-X39-EXT, ET-X50-EXT and ET-X75A-EXT tools are designed to remove and install Terminations from the Back plate with the Probe and Optional Spacer plates in place. These tools would typically be used for field repairs where it is not practical to remove all of the probes and disassemble the Probe and Optional Spacer plates from the fixture.

The tool is designed to remove and install Terminations in Back plates up to .625 [15.88] in thickness when the fixture is designed around QA's Suggested Fixture Layout Drawings. Note: the Probe and Optional Spacer plates must be in place in order to prevent the tool from being damaged. If these plates are removed, use the standard ET-X39, ET-X50 and ET-X75A tools for Termination removal and the IT-X39, IT-X50 and IT-X75A tools for installation.

1. Remove the probe from the Probe plate with QA's PE tools, tweezers, or needle nose pliers. Identify the Termination from the bottom side of the Back plate for removal and move adjacent wires and components to prepare the Termination to be removed. This will help prevent damage to nearby contacts while the Termination is being driven out.
2. Guide the nose of the tool into the mounting hole in the Probe plate until the nose of the tool contacts the .195 [.495] (X39) or .025 [0.64] (X50 and X75A) diameter interconnect pin on the Termination. Make a small mark on the shank of the tool located at the top of the Probe plate with a pencil or fine line marker. This mark will be used to gage the set height when installing the replacement Termination.
3. The Terminations are removed by tapping lightly on the tools "striker" with a 4-6 ounce [113-170 gram] hammer.

Note: The wireless XTDS_-08 and -14 Terminations are used with both the X50 and X75 Probes. In cases where an X75 Probe is connected with an XTDS Termination, the ET-X50-EXT tool would be use, not the ET-X75A-EXT tool.

REINSTALLING THE TERMINATION:

1. **If installing the termination with the Spacer plates removed see Termination Installation steps on page 2 and 3.**
2. Check the mounting hole to make sure nothing is obstructing it. The appropriate ET-EXT tool can be inserted into the hole to check this.
3. Drop the replacement Termination into the hole, tail first. If the Termination hangs up in the hole, the ET-EXT tool can be used to push it to its starting position on the top of the Back plate. If the Termination requires more than a light tap of the hammer to seat on the Back plate, the mounting holes in the Probe and Optional Spacer plates will have to be enlarged to the sizes listed in the QA- X Probe Drill Size Applications note.
4. The Terminations are installed by tapping lightly on the tools "striker" with a 4-6 ounce [113-170 gram] hammer. Only install the Termination to the point where the mark (made previously) on



the tool shank aligns with the top of the Probe plate. This ensures that the Termination is at the same set height as the previously removed Terminations.

5. Reinstall the proper X Probe with appropriate PT tool or other plastic pusher.
6. Reconnect fixture wiring to the tail of the Termination.

Terminations can also be installed from the bottom side of the Back Plate. Once the old Termination is removed, a new Termination can be installed from the bottom side of the Back Plate. This would make it possible to install a Termination without having to remove the probes and the Probe and Optional Spacer plates. A custom tool would have to be fabricated by the user that would support the Termination during installation and provide positioning so that the Termination could be set at the proper set height. On high-density fixtures, the congested wiring on the bottom side of the Back Plate could make this method very challenging.

PROBE INSTALLATION:

The X Probe is inserted into the mounting hole in the Probe and Optional Spacer plates during installation. (For the recommended X probe hole sizes please refer to QA Applications Note #D10050 *X Probe Drill Sizes*). X Probe installation is accomplished by using the standard PT50/39, PT100/75 tools for the X39, X50 and X75 respectively. (Use of the PT installation tools will seat even the sharpest point styles without damaging the tips). Select the proper PT tool for the actual center spacing of the probes.