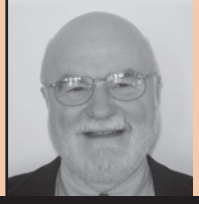
ProductReview



By Al Pepling, LS

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Sokkia SRX3

Sokkia's fully robotic, reflectorless total station is a versatile, capable tool that comes in 1", 2", 3", and 5" models. The angle accuracy is per ISO17123-3 and uses an absolute encoder scanning device with diametrical detection on both circles. Sokkia calls it the "Enhanced Encoder with IACS Technology". Robotically it turns tighter horizon closures than my own eyes can, and a lot faster, too. It has dual axis compensation using a "liquid" tilt sensor that has a working range of +/- 4 minutes.

For distances it uses a "modulated laser, phase comparison method with red laser diode". You can use it prismless, with auto-tracking prisms, reflective sheet targets, or plain old vanilla prisms. Pay strict attention to your prism offsets if you mix and match, though! It will shoot prismless from 0.3 to 500 meters to a 90% reflective surface. Accuracy is 3mm+2ppm up to 200M, 5mm+10ppm from 200M up to 350M, and 10mm+10ppm from 350M up to 500M. With reflective sheet targets your range is 1.3 to 500M. Range with the ATP1 prism 1.3 to 1,000M and an accuracy of 2mm+2ppm in the fine mode. Range with one AP prism (**Figure 1**) is 1.3 to 5,000M and 2mm+2ppm accuracy. Under good conditions the AP

The SRX3 tracks and reacquires a prism beautifully, and the servos are fast and quiet.

Figure 1

Figure 2

Figure 3

prism will return measurements out to 6,000M. What about those times when you need to measure movement of a particular target or structure, similar to a deformation study for instance? Sokkia still supplies the reflective target sheets, too. When it comes to targeting, Sokkia supplies you with a versatile, capable, and adaptable measuring system.

I was impressed with how quiet the gun was in operation, both manually or in full robotic mode. Even more impressive was how quickly the EDM worked. When aimed close to an old prism scavenged from our crew room, the SRX3 searched, then locked on it and shot the distance. Wow! When I looked through the scope to see where it was aimed it was dead center on the cross hairs of that old prism! No old top mounted or non-coaxial, parallax issues here. Sokkia calls this a "Single Optimized Beam"; I call it just what I am used to.

The optical quality of this gun is outstanding. The clarity and sharpness of the scope in bright sunlight or at dusk was comparable to the finer older optical "trig" instruments I've had the pleasure to operate. Light or dark targeting, and smooth or rough surfaces were easily seen and sighted upon. It has a very efficient lens design, considering the splitters that divert incoming light to other uses in the modern coaxial instruments. Being able to just grab the standards of this gun, rough aim it, and then use the coarse/fine mode servo knobs for pointing to target is notable improvement over the run of the mill robotics. The outstanding thing about these servos is that they are very quiet with just the right amount of resistance. They are as close as you can come to the older dual motion "clamps" without any of the maintenance issues associated with them. Between the two servos is a blue "trigger" button that initiates a measurement when pressed. You do not have to look up from the scope or "feel with your finger" over the exterior of the instrument, perhaps hitting a wrong key with undesired consequences.

The SRX series uses standard BDC58 camcorder Li-ion batteries, and two are supplied with it (**Figure 2**). That should get you through a long day's use. If you

frequently have deadline pressure you just might want to purchase another charger, power inverter and a couple more batteries to be on the safe side. For longer running times, just hook it up to an external power supply via the multi-port.

It supports multiple data interfaces. Present is a 1GB type II CF card slot and a 1GB, FAT32 USB port. An environmentally rated, IP64, waterproof multi-port that will handle data transmission and external power through the same connection is also present. Even Sokkia's SFX long-range, instantaneous, data transfer via the Internet is provided (**Figure 3**).

The onboard software is Windows CE-based, meaning you can operate this gun with the touch screen or the buttons on the face of the control panel. Notice on the left the three buttons to get you into the settings programs, and the target. The four "F" or function keys will also take you to various parts of the menu system. To the right are the numeric keypad and the four direction keys to move around the menus.

Notice the useful keys to the left of the numeric keypad (**Figure 4**). If you use numeric coding, perhaps they will not be used that much. Most practitioners and departments of transportation use alpha coding and these key will get constant use without the necessity of roaming through a menu. The keys have good tactile feedback and are spaced far enough apart for most users.

The display is large and easy to read. Figure 4 was taken on a bright sunlit day, although the gun was set up in the shade. There is a battery "gauge" in the upper right hand corner that exhibits how much battery power is remaining. The four function keys will execute the functions directly above them on the lower bar of the screen. The tabs at the top are for the different pages. What you see pictured is what I found most useful in my practice. With all the other instruments I have used over the years, I could only get three or four of the five. Here are all five at once and very easy to read.

The remaining icons to the right, after the battery display, are target display, auto pointing/auto tracking status, laser pointer/guide light status, tilt angle compensation selection, Bluetooth/ RS232C connection, character input status, and input panel. This combination of information allows you to see what settings are in place without having to browse through menus.

Now for the gravy. The eight page, liberally illustrated "Series SRX Quick Start Guide" can be downloaded from Sokkia's website, and will get you up and operating quickly. When using the RC-PR3 fully robotic with your data collector on the rod, make sure the instrument's receiver section door is open. It is located on the right side of the instrument handle and the radio antenna is on the left on the handle when at the rod facing the instrument. Forget to open the door and the communications will still work, but the instrument will not "see" the RC-PR3.

Communications between the instrument and the RC-PR3 rod in the full robotic mode is handled by "Bluetooth" radio transmission. The PC-PR3 is the transmitter at the rod (**Figure 5**). It is also powered by a standard camcorder battery. The ATP1 360° prism also fits onto the top of the PC-PR3 unit. The blue/gray color combination of the

Figure 4

Figure 5

gun and the PC-PR3 makes it easy to distinguish, and the rubber bumper at the base of the PC-PR3functions quite well as a rod rest. Its square design prevents it from rolling and functions as a shock absorber. The 360° prism is also shock absorbent. I would not be careless with it, but it is nice to know it will survive some rough handling.

So, how does it perform? I chose to use hand note-keeping for these since I was at the instrument. The first thing I tried was a manual horizon closure as is my practice with any instrument. Due to my age, my ability to turn tight angles has diminished, and my average with my own personal 3" gun is now up to 5"-6".

Over the same short sights my closure, with the SRX3 which is also a 3" gun, was 2.5" direct and also 2.5" in the reverse (twice as good as the gun I am used to). The distances were shot to standard prisms and were identical at each sighting.

Next, I tried some reflectorless distances to some wires above the alley behind my house (**Figure 6**), and to some different colored and textured surfaces (**Figure 7**). The horizontal distance to the lowest and thickest wire was 69.56', to the next higher wire was 69.41', to the thinnest wire was 69.18' and to the highest wire was 68.66'. There was a gentle wind at the time of the observations. When I turned the vertical servo off the wire and aimed at the sky the instrument responded with a "signal off" message.

Next I tried some wires to the street behind my house. On the pole they appeared in a vertical plane as the alley wires. Imagine my surprise when I recorded the distances. The bottom was at 264.62', the middle was at 260.18', and the top was at 262.24'. In disbelief, I walked up to the wires and discovered at the preceding pole the wires were on a horizontal arm and then transformed into a vertical plane. At the point where I had shot them they were in transition. If only I had also recorded the vertical distance, I would have seen it right away.

To test the reflectorless ability to differentiate between targets, I shot the lattice on my garage and the textured block behind it. It was 45.99' to the lattice and 46.24' to the block. The vertical distance to the lattice was 3.33' and to the block was 3.35'. Then I shot the corner of a church steeple and just off the corner of the steeple. The corner was 410.97' away, and just off the corner

Figure 6

Figure 7

was 410.94' away. The aluminum cross on the steeple was 343.93' distant. The black strap hinges on the church door were 338.79' away and the white door behind them was 338.80' away. The hinge thickness measured with a six-foot folding rule was 0.015' thick. I continued on with other buildings and surfaces achieving similar, quite accurate results.

This gun, in a one-second model would be ideal for bridge work and deformation monitoring, and equally at home for boundary or construction stakeout.

This instrument is quite a confidence builder, and for the area where I live and practice an ideal choice. I found the Sokkia SRX3/ RC-PR3 combination to be capable and comfortable.