

UNAVCO Polar GPS System Component List TOOL KITS
Version 1.0, December 7 2012

PROJECT
STATION NAME
PREPARED BY
DATE SHIPPED

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| COMPONENT | QTY | NOTES |
|-----------|-----|-------|
|-----------|-----|-------|

HAND TOOLS



Note: Tools shown are for illustration only and do not match exactly the list below.

HAND TOOLS

Green = specific to rock sites only

Red = specific to snow sites only

| | | |
|--|---|---|
| tool bucket | 1 | home depot |
| fabric tool caddy | 1 | Husky 53378 |
| field notebook and pencil | 1 | |
| wind turbine shorting plugs | 2 | |
| 25 ft tape measure | 1 | |
| allen wrench, 5/64" T-handle | 1 | for SIM cards on certain Iridium modems |
| allen wrench, 3/32" T-handle | 2 | for met station screw, mil bulkhead fittings |
| allen wrench, 3/16" T-handle | 2 | for aluminum pipe fitting set screws |
| allen wrench, 1/4" T-handle | 2 | for set screws on snow frame pipe couplers |
| allen wrench, 5/16" T-handle | 2 | for cast iron pipe fitting set screws |
| allen driver 3/16" w/ 5/16" hex drive | 2 | for aluminum pipe fitting set screws with drill |
| allen driver 1/4" w/ 5/16" hex drive | | for set screws on snow frame pipe couplers |
| allen driver 5/16" w/ 5/16" hex drive | 2 | for cast iron pipe fitting set screws with drill |
| ratchet handle, 3/8" square | 2 | |
| adapter 5/16" hex to 3/8" square | 4 | to use sockets with drill |
| deep socket 3/4", 3/8" square drive, w/3" extension | 2 | black tape, for rock anchor bolt nuts |
| deep socket 11/16", 3/8" square drive, w/3" exten. | 2 | orange tape, for old aluminum hinge fittings |
| deep socket 5/8", 3/8" square drive, w/3" extension | 2 | blue tape, for old aluminum hinge fittings |
| deep socket 9/16", 3/8" square drive, w/3" exten. | 2 | red tape, for new iron hinge fittings, battery nuts |
| deep socket 1/2", 3/8" square drive, w/3" extension | 2 | yellow tape, for fitting through bolts |
| ratcheting wrench, box / open ends, 3/4" | 2 | black tape, for rock anchor bolt nuts |
| ratcheting wrench, box / open ends, 11/16" | 2 | orange tape, for old aluminum hinge fittings |
| ratcheting wrench, box / open ends, 5/8" | 2 | blue tape, for old aluminum hinge fittings |
| ratcheting wrench, box / open ends, 9/16" | 2 | red tape, for new iron hinge fittings, battery nuts |
| ratcheting wrench, box / open ends, 1/2" | 2 | yellow tape, for fitting through bolts |
| wrench, 5/16" | 1 | for TNC-SMA Iridium connector |
| crescent wrench, large | 2 | |
| crescent wrench, small | 1 | |
| needle nose pliers, large | 1 | |
| needle nose pliers, small | 1 | |
| adjustable pliers, large | 1 | for mil power connectors |
| vise grips | 1 | |
| side cut dykes, large | 1 | |
| side cut dykes, small | 1 | |
| drill bit, standard point, 1/8" | 3 | |
| drill bit, standard point, 1/4" | 2 | |
| drill bit, standard point, 5/16" | 2 | |
| drill bit, standard point, 3/8" | 4 | |
| drill bit, standard point, 7/16" | 2 | |
| step "unibit" drill bit, 1/4" to 1-3/8", 3/8" shank size | 1 | drill 1.25" bulkhead thru holes, Greenlee 36414 |
| wire strip tool, automatic | 1 | Ideal Stripmaster |

| | | |
|--|----|---|
| wire strip tool, manual | 1 | |
| wire crimp tool | 1 | for 14ga wire, Garnder-Bender GS-88 |
| screwdriver, Torx 25 security head | 1 | for radome screws, Wiha 362-TR |
| screwdriver, multi bit, phillips/flat, small/large | 1 | |
| screwdriver, small flat blade, 1/8" max width | 3 | for terminal blocks, Wiha 260 |
| screwdriver, large flat blade | 1 | for breakers |
| screwdriver, large phillips | 1 | for breakers |
| screwdriver, small phillips | 1 | |
| screwdriver, very small phillips | 1 | for SIM cards on certain Iridium modems |
| file, metal, 8" | 2 | |
| file, metal, 4" | 2 | |
| wire brush, small | 1 | |
| inclinometer | 1 | for frame leveling |
| bubble level, 6-8" | 2 | for monument / frame leveling |
| hacksaw | 1 | |
| hacksaw blades, suitable for stainless | 3 | |
| claw hammer | 1 | |
| sledge hammer, 6-8 lb, unbreakable handle | 1 | for rock or snow anchor stakes |
| anchor stake drive cap | 1 | for rock anchor stakes. UNAVCO PPS-RG-002 |
| digital multimeter | 1 | Fluke 115 |
| spare batteries for multimeter | 2 | Fluke 115 uses 9V alkaline |
| spare fuses for multimeter | 2 | Fluke 115 uses #803293, 11A 1000V fast-blow |
| hand-held GPS unit | 1 | for orienting GPS antenna north, etc. |
| spare batteries for hand-held GPS | 2 | |
| Brunton compass | 1 | for orienting GPS antenna north |
| roll of electrical tape | 1 | |
| roll of self-vulcanizing rubber tape | 1 | to seal external RF connectors |
| utility knife / leatherman | 1 | |
| nut driver, 7/32" or 5.5mm | 1 | for locking screws on Gripple wire rope tensioner |
| Gripple release tool | 3 | mark with bright tape |
| wire rope cutter (must cut 3/16" wire rope) | 1 | US Rigging Supply P20-C9, for snow site guy wires |
| wire rope swage tool | 1 | US Rigging Supply P-21-005, for snow guy wires |
| cable tie-down strap, 12" | 25 | spares |
| roll of brass or copper wire | 1 | backup for cable tie-down etc. |
| plastic zip ties | 25 | for misc. use, not cable tie down |
| strong magnet | 1 | to reset Flexcharge LVD circuit |
| spare seal rings for mil connectors | 5 | |
| LMR400 cable strip tool | 1 | Ripley ST-400-EZ (Hutton) |
| LMR400 cable deburr tool | 1 | Times Microwave DBT-01 (Hutton) |
| LMR400 cable hand crimp tool | 1 | Daniels HX4 (Hutton) |
| LMR400 cable crimp tool die set | 1 | Daniels Y1719 (Hutton) |
| LMR400 cable cutters | 1 | HKP |
| LMR400 crimp on plug, type N | 2 | Times Microwave EZ-400-NMH-D (Hutton) |
| LMR400 crimp on plug, type N 30 | 2 | Times Microwave EZ-400-NMH-RA (Hutton) |
| LMR400 crimp on plug, type TNC | 2 | Times Microwave EZ-400-TM (Hutton) |

CORDLESS DRILL KIT



| | | |
|--|---|--------|
| cordless drill, 36V, with 3/8" keyless chuck | 1 | Dewalt |
| 36V battery for drill | 3 | Dewalt |
| AC battery charger | 1 | Dewalt |

SEE HAND TOOLS SECTION FOR DRILL BITS

ROCK HAMMER DRILL KIT



NOTE: if possible, bringing two complete Hilti kits for GPS station installation is recommended

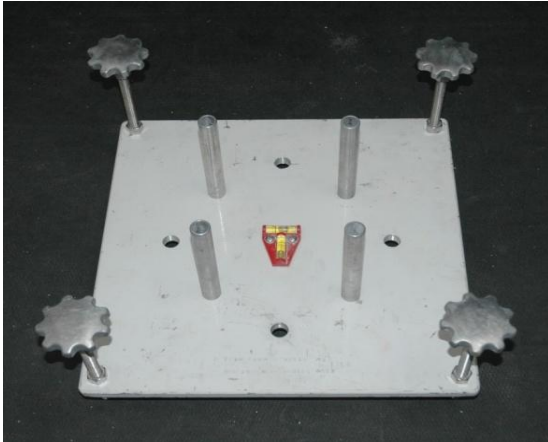
NOTE: lithium batteries may be difficult to ship air freight

| | | |
|---|---|--|
| Hilti TE-7A CPC Professional Hammer Drill Kit, 36V | 1 | Hilti 03476269, includes following 6 lines |
| w/ lithium batteries | 2 | UN number 3480 "Lithium ion batteries" |
| w/ AC battery charge | 1 | |
| w/ dust removal tool | 1 | |
| w/ side handle | 1 | |
| w/ carrying case | 1 | |
| w/ grease tube | 1 | place dab on top of drill bit shank |
| quick-release keyless chuck assembly | 1 | Hilti 00070639. Use hammer drill w/normal bits |
| wire brush extender HIT-RBH | 1 | Hilti 00229138 |
| ½" Round steel brush HIT-RB 1/2" | 2 | Hilti 00273204 |
| epoxy dispenser HDM-500-CB | 1 | Hilti 02029270 |
| epoxy tube with mixing tip, HIT-RE-500 | 3 | Hilti 00340225 |
| carbide rock drill bit, SDS shank, 1/2" x 24" | 6 | McMaster 8948A78. 1-m mast + frame anchors |
| carbide rock drill bit, SDS shank, 1/4" x 4-3/8" | 6 | McMaster 8948A62. For GPS cable anchors |
| carbide rock drill bit, SDS shank, 5/8" x 24" | 6 | McMaster 8948A81. 2-meter monument |
| **carbide rock drill bit, SDS shank, 3/4" or 1" x 24" | 6 | optional for 2-meter monument |

****Note: 2-meter monument may require 3/4" or 1" rock bolts depending hardness and integrity of rock surface.**

Drill 1/2" pilot holes using drill jig, then remove drill jig and enlarge to final diameter with larger drills.

GPS MONUMENT DRILL JIG KIT



FOR 1-METER MAST INSTALLATION

| | | |
|--|----|--|
| fabric drill jig case | 1 | UNAVCO |
| drill jig plate | 1 | Tech2000 |
| leveling screws with knurled knob | 4 | Tech2000 |
| leveling screw locking nuts | 4 | Tech2000 |
| drill guide, 1/2" x 6" | 4 | Tech2000 |
| T-levels, one on plate and one spare | 2 | Tech2000 |
| bubble level, 6-8" | 1 | |
| ruler, 12" | 1 | |
| tape measure, 100 ft | 1 | |
| hammer, copper or brass, 2-3 lb | 1 | |
| connecting nut, 1/2" x 2", with short bolt | 4 | caps for pounding in 1/2" anchor bolts |
| wrench, 7/8", open / box end | 2 | for 1/2" nuts |
| crescent wrench, large | 1 | for 1/2" nuts |
| small wisk brush | 1 | |
| flexible plastic tubing, 3/8" OD x 6' length | 1 | |
| center punch | 1 | |
| hacksaw | 1 | |
| spare blades for hacksaw, suitable for stainless | 3 | |
| tap handle | 1 | to repair damaged threads in the field |
| plug tap, 3/4-16, 4-flute, HSS | 1 | to repair damaged threads in the field |
| cable tie down straps, 18" | 10 | secure cable to monument |

ADDITIONS FOR 2-METER MAST INSTALLATION

| | | |
|--|---|--|
| connecting nut, 5/8" x 2", with short bolt | 4 | caps for pounding in 1/2" anchor bolts |
| drill guide, 5/8" x 6" | 4 | Tech2000 |
| wrench, 1-1/16", open / box end | 2 | for 5/8" nuts |

**Note: 2-meter monument may require 3/4" or 1" rock bolts depending hardness and integrity of rock surface.

Drill 1/2" pilot holes using drill jig, then remove drill jig and enlarge to final diameter with larger drills.

FIELD COMMUNICATIONS KIT

| | | |
|--|---|--|
| laptop computer | 1 | to connect to GPS and place Iridium test calls |
| w/ serial port or USB-serial adapter | | |
| w/ spare battery | | |
| serial cable, DB9F-DB9M | 2 | |
| ethernet cable | 2 | |
| crossover ethernet cable | 2 | may need if computer is old (no autosensing) |
| Trimble NetRS dongle | 2 | |
| Iridium handset | 1 | Motorola 9505 or 9575 Extreme (no 9555) |
| w/ SIM card | | DOD SIM card only |
| w/ "data kit" serial adapter for handset | | |
| w/ handset cradle | | |
| w/ external antenna and cable | | |
| w/ phone adapter for external antenna | | |
| w/ spare battery | | |

STAGING AREA EQUIPMENT

| | | |
|--|---|------------------------|
| AC charger for 12V lead-acid batteries | 1 | Deltran Battery Tender |
| battery tester for 12V lead-acid batteries | 1 | Midtronics SCP 6/12 |