STARLOG

Weather Station Tower Installation

Model 6700

User Manual Supplement
6205

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1.0 INTRODUCTION

This manual describes the installation and servicing of the STARLOG Weather Recording Station. This station consists of a weather instrument cluster and STARLOG Data Logger mounted on one of the following two models of Telescopic Instrument Tower.

- model 6700A - 10 metre tower
- model 6700B - 15 metre tower

1.1 Preparation

Check that all materials and tools are available before starting installation. Whenever possible, prepare the mast in a workshop rather than on-site.

NOTE: Ensure that the Mounting Bracket and Instrument metalwork is connected to a good ground (through the tower or via a grounding cable). Make certain that no other earth is introduced to the installation. (The system ground is at the top of the instrument mast, the best location for lightning protection).

1.2 List of Materials

The following list is for a 10 metre tower with the 15 metre tower quantities shown in [brackets].

a) 9.5 metre [15.5m] instrument cable with weatherproof connector fitted to one end and 25 Pin connector plug and cover for the other end (not fitted).

b) Appropriate STARLOG instrument cluster & mounting bracket (stainless steel)

c) Appropriate STARLOG Portable Data Logger.

d) Mast top instrument mounting bracket (galvanised) and two 35mm U- bolts, saddles. Mast top plastic cover.

e) STARLOG weatherproof enclosure with cable gland fitted, mounting base plate (galvanised), two U-bolts and saddles (one saddle must have a cable hole through it's centre. see later), 4 enclosure cover bolts & enclosure locking key and 4 self-tapping screws.

f) Collapsed, 3 [5] section mast with shipping pin through base and 2 [4] thrust rings/guy plates & 3 [5] locking rings installed on mast sections.

g) 3 [5] lock screws, 4 [8] retaining pins, 18 [30] wire thimbles, 18 [30] wire clamps, 9 [15] turnbuckles, 3 guy anchor stakes and 1[2] roll[s] of galvanised guy wire.

h) Mast base plate and U-bolt clamp.

i) 600mm square paving slab (if mast is to be installed on sandy soil).

1.3 List of Tools

- 3 metre ladder
- Spirit level
- Magnetic compass
- 200mm adjustable spanner
- 300mm heavy duty screwdriver
- 100mm instrument screwdriver
- Small wire cutters
- Heavy duty pliers (suitable for cutting/twisting guy wire)
- Tape measure
- Heavy hammer (for driving in the guy anchor stakes)
- Work gloves
- * Electric drill (battery operated), 7mm & 12mm bits
- * Soldering iron (battery operated), solder
- * 4m Pull-through wire
- * 5mm small round file
- * Insulating tape
- * Felt tipped marking pen
- * 100mm Cable Tie

* NOTE: These tools are not required if the mast has been prepared in a workshop prior to installation (see later).

2.0 ERECTION INSTRUCTIONS

The STARLOG Weather Recording Station has been designed for one man installation. Please follow these instructions EXACTLY in the specified sequence.

2.1 STEP 1. Mast Preparation

NOTE: This step may be performed in a workshop prior to installation, thereby reducing the work required to be performed in the field.

1. Lay mast flat. Using a felt pen, place a mark 1.1m from the base of the mast at right angles to the orientation of the shipping pin at the base of the mast. Also place a mark at the very top of the mast's inner section, in line with the first mark. Remove the Shipping pin from the bottom of the mast.
2. Slide the inner mast sections out of the outer mast section about 1.5m. Drill a 7mm hole right through the mast (both walls) 1.2m from the base, in line with the shipping pin hole at the base. Drill a 12mm hole through one wall of the mast, 1.1m from the base at right angles to the shipping pin (at the location already marked). File this hole smooth around the inside. Replace shipping pin through new hole about 1.2m from base. (This stops the inner sections from collapsing past the 1.1m point and shearing off the signal cable, when installed).

   NOTE: If the mast is being prepared for subsequent shipment to site, then place the shipping pin through the holes in the inner sections to lock them during transit.
3. Feed a cable pull-through wire into the signal cable hole (just drilled) and up the mast.
4. Feed the signal cable unterminated end through the mast top cover (drill a 7mm hole through cover) and bid this end with tape to the pull through wire.
5. Carefully pull the signal cable through the collapsed mast and out through the outlet hole, using the pull-through wire. Pull the excess signal cable through until 200mm of cable is left at the top of the mast. Place a cable tie around the signal

cable at the 200mm point to act as a strain relief against the mast top cover. Push the mast top cover onto the mast top (inner most section)

6. Mounting the enclosure base plate. Drill a 12mm hole through the centre of the U-bolt saddle so as to align with the signal cable hole in the mast. Feed the signal cable through the hole in the U-bolt saddle and through the centre hole of the lower mounting holes in the enclosure base plate. Insert U-bolts and tighten, ensuring that the signal cable mast hole, U-bolt saddle centre hole and the base plate cable hole are aligned and the signal cable will feed freely through the mast centre.

7. Screw the bottom left hand enclosure fixing screw part way into the base plate and swing the enclosure down, exposing the base plate.

8. Feed the signal cable through the cable gland into the enclosure about lm.

9. Feed the signal cable through the connector cover (the right way around) and solder the signal wires to the 25 Pin connector plug according to the connections listed in Section 3.0.

10. Screw cover over the connector, insert and lock the cable tension relief. (Ensure the cover feeds the cable towards the cable gland, when the connector is plugged into the Data Logger). Tighten cable gland, leaving about 200mm loose cable inside the enclosure.

NOTE: Perform the following step if the mast is being prepared in the workshop, prior to shipping to the field.

11. Place a plastic bag over the mast top & connector and tape it to the mast to protect the connector from the water and dirt. Coil the excess cable around inside the base plate and swing the enclosure over the base plate, securing with the 4 self tapping screws. Fasten enclosure lid (remember where the key is). Ensure that the mast shipping pin is through the inner sections at the 1.2m shipping hole. (NOTE: The mast must remain in this slightly extended state 4m long during transit to site). When the mast arrives on site, the shipping pin is removed and the inner sections slid out, then the shipping pin replaced to stop the mast from fully collapsing and shearing the cable.

2.2 STEP 2. Site Preparation

Protect your hands with work gloves when handling guy wires.

1. Select site, preferably a flat area of 12m [15m] diameter, Place mast base plate in the centre (on top of a concrete paving slab if the soil is very sandy).
2. Locate the 3 guy anchor stakes at 120 deg. intervals, 6m [7.5m] from the mast base. Hammer anchor stakes into the ground at 45 deg. Leave the top 3 [5] holes of the stake above ground level for securing guy wires.
3. Position mast midway between two guy anchor stakes, with the mast base towards the centre. Cut guy wires according to the following table and attach the 3 shortest lengths to the 1st section guy plate using 3 thimbles (to protect the wire) and 3 wire clamps (leaving about 25mm of guy wire through the wire clamps and position the wire clamp as close to the thimble as practical). Attach all remaining guy wires according to length to their associated guy plate. Tighten wire clamps firmly. Pit 3 [5] turnbuckles into each of the anchor stakes. Ensure that the turnbuckles are opened out with thread still visible on the inside of the turnbuckle.

Mast Guy Lengths

Mast Section	Guy Cut Length (metres)
#1 (bottom)	8.8[9.2]
#2	10.8[10.7]
#3	13.3[13.0]
#4	[15.1]
#5	[17.9]

4. Bend two of the shortest guy wires at 6.7 [7.9] metres from the guy plate and secure them exactly at that point (using a wire clamp) through the bottom turnbuckles in the anchor stakes adjacent to the mast. (Ensure the guy wires are free to be lifted and are connected to the correct corners of the guy plate).
5. Slide the top guy support and guy plate off the mast top section and replace them in the opposite order. Screw the 5/16"

lock screws into all lock rings, making sure that the lock screw just protrudes into the top hole in each mast section (don't tighten), except the top section which has it's lock ring firmly tightened 300mm below the mast top.

6. Fit instrument bracket to top of mast (innermost section) by feeding over signal connector & cable and securing with U-bolts. Leave 20mm clearance between the mast top cover and the inside top of the instrument bracket. Orient the instrument bracket so that the bracket points the same direction as the felt pen mark (see Step 1). (If you wish you may temporarily connect the Instrument Cluster and using a Data Logger & Field Test Unit, check to see that the instruments & cable are operating correctly. It is not recommended that the instruments be left on the mast during erection, in case they become damaged).

2.3 STEP 3. Erection

1. Lift up the top of the mast ensuring that the mast base end buries into the soil a fraction (to stop it sliding away as the mast is lifted). As the mast becomes vertical, the two guy wires (already anchored) should tighten and hold the mast from toppling.
2. Seize the third (free) short guy wire and gently pull it out to the free guy anchor and feed it through the tumbuckle in the bottom hole and secure temporarily. (leave 200mm slack in this guy wire to allow the mast to be lifted into place).
3. Lift the mast onto the mast base plate (and concrete slab if used) and centre the mast base/plate.
4. Carefully fit the cable thimbles to each bottom guy wire as they are tightened to correct length using a spirit level to ensure the mast is vertical. Lightly tension guys and tighten all wire clamps securely. (Don't cut off excess guy wire yet.)
5. Stand ladder against mast, attach instrument cluster to signal cable and bolt cluster to instrument mounting bracket using stainless steel wing nuts. (Ensure all free cable is within the instrument mounting bracket).
6. Ensure that the signal cable is hanging free and able to feed into the mast as it is extended. (swing the enclosure down on it's bottom LH mounting screws to facilitate cable entry).

7. USING GLOVES, extend the top section slowly until it reaches it's limit, tighten the lock screw to hold it there. (NOTE: the mast ends taper for safety so the sections cannot be extended right out). Insert the two retaining pins, then reIease the lock screw and allow the section to drop down onto the retaining pins. Turn the top section until it engages on the retaining pins. Tighten the lock screw firmly (by hand only).

8. Extend the next section in the same manner. Rotate section until retaining pins are engaged, this time ensuring that the instrument bracket/cluster is pointing the same way as the enclosure at the base of the mast. Tighten lock screw.

   [Repeat for all sections, keeping the instrument bracket correctly aligned]

9. Connect guy wires with thimbles and wire clamps. Trim guy wires to bring each section of the mast vertical (from the bottom section up), don't tighten guys yet.

10. Rotate complete mast until instrument bracket and instruments point due south* (check with compass). NOTE: The equipment enclosure should also be pointing south*, away from the summer sun. Clamp mast to base plate with U-bolt to prevent the mast rotating.

* NOTE: North in the northern hemisphere

11. Tighten guy wire evenly (by hand only), then trim the loose guy wire to 500mm and feed it back through it's turnbuckle centre and on through it's anchor stake hole. (This stops the turnbuckle being undone by the guy wire untwisting under tension). Wrap remaining loose wire around turnbuckle/guy wire (or cut to size if mast is not going to be relocated).

2.4 STEP 4. Commissioning

1. Swing enclosure up onto mounting plate, ensuring excess signal cable is enclosed within base plate. Securely screw enclosure to base plate.

2. Insert STARLOG Data Logger and connect signal connector (remove dust cap and leave inside enclosure for when logger is collected).

3. If required, check site operation with the STARLOG Field Test Unit.

3.0 CONNECTIONS (Models 6504A/B/C/D/E)

Inst	Instrument Cluster connector pin numbers
Term	Model 6103B Termination Strip terminal numbers
Logger	Data Logger signal connector pin numbers
Addr	Address in memory of Data Logger

Description	Cable Color	Inst	Term	Logger	Channel	Addr
+5VDC	red	1	15	13	Power	
	orange		16			
wind speed	yellow	2	7	12	ClL	29
direction 180	grey	3	30	4	A3	19
direction 270	white	4	33	3	A2	18
temperature	pink	5	39	1	A0	16
solar radiation	blue	** 6	36	2	A1	17
ground 0V	green	7	4	23	Ground	
	lt blue (grn)		10			
	brown		32			
	purple		41			
humidity	black	** 8	18	*8*	A7	23
rainfall			9	11	C0L	25
LogFlag (link)			Link	19-23	Digital0	32
humidity	blue	** 6	18	8	A7	*23*

(see Note 2. ** Model 6505E only)

NOTES:

1. LOG-FLAG must be installed on connector to allow the logger program to detect the signal plug connection and begin recording the input signals.

   If using the Field Termination Strip (model 6103B), this link is already in place on the strip.

2. For Model 6504E WDTH Instrument Cluster, the HUMIDITY signal is connected to Pin 6 of the cluster in place of the SOLAR RADIATION signal.

4.0 MAST INSTRUMENT SERVICE

When the instruments on the tower require servicing, the tower must be telescoped (lowered).

4.1 STEP 1. Lowering Mast

1. Ensure that the shipping pin is in place behind the enclosure. (To stop the mast fully collapsing and shearing the signal cable).
2. Disconnect Data Logger from signal cable and remove logger from enclosure.
3. Loosen bottom LH enclosure mounting screw and remove other 3 screws. AlIow enclosure to rotate down (supported by 1 screw) and revealing spare instrument cable and cable hole in mast.
4. Remove turnbuckle locking wire and starting from the top, loosen turnbuckles au equal number of turns making sure the thread is still visible on inside of turnbuckle. (DON'T loosen bottom row of turnbuckles).
5. Stand ladder against mast base section. WITH GLOVES, release the lock screw of the bottom section, lift the top sections until the stop is reached, then retighten lock screw to hold the sections temporarily. (Remember the mast sections will not come out altogether so be sure to extend fully to the stop position). Remove retaining pins, then hold top sections and carefully loosen lock screw to allow the top sections to collapse SLOWLY. Whilst the sections are being collapsed, have a second person pull the excess signal cable through the cable hole in the mast to stop the cable bunching up inside the mast. (If only one person is undertaking this procedure, then make sure that the excess cable is pulled through twice each section by retightening the lock screw to hold the top sections half way down each section.)
6. Repeat until all top sections are collapsed. Remove Instrument Cluster retaining nuts and lift Instruments clear of mounting bracket to reveal the signal cable connector.

4.2 STEP 2. Raising Mast

This procedure is the reversal of the lowering procedure. Notice that the signal cable will feed into the mast by itself, provided the cable is carefully arranged so as not to tangle.

5.0 SPECIFICATIONS

Type:	Guyed, telescopic
Height:	10 metre (15 metre optn.)
Material:	Tubular steel, Hot dipped galvanised
Withstand:	45 m/s category 1 terrain (72 m/s optn.)
Enclosure:	Polycarbonate UV resistant, Grey
Protection:	IP66 weatherproof/marine duty