

A596-1070 Revision K, October 2016
HC/HCN-S Systems
Installation and User Guide



Do not install near power lines. Power lines, telephone lines, and guy wires look the same. Assume any wire or line can electrocute you.



Do not install on a wet or windy day or when lightning or thunder is in the area. Do not use metal ladder.



Wear shoes with rubber soles and heels. Wear protective clothing including a long-sleeved shirt and rubber gloves.

REVISION STATUS

Rev	Changes	Date
A	Draft Release	1-Aug-2006
B	Removed obsolete section of 4.4, some changes to Appendix 3	4-Aug-2006
C	Added figure 4.5.1	21-Aug-2006
D	Removed bolt plate, updated figure 4.2.1	28-Aug-2006
E	Added Kits to Appendix	12-Oct-2006
F	Addition of Loctite note for M5x30 screws	10-Nov-2006
G	Addition of load plate for top stack HCX system, plus associated information. Added recognition sheet.	19-Mar-2007
H	Addition of limit to double stacking in Region C, plus some minor changes to notes.	1-Sep-2008
I	Update Argus Address	31-July-2009
J	Update the Argus installation guide by adding the CommScope logo and related edits.	03-Mar-2014
K	Changed drawing template to CommScope; Remove Argus brand name.	28-Oct-2016

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1 Introduction

1.1 Antenna Type

The HC/HCN-S System consists of a headframe to suit three single or multiband, high-gain panel antennas. This integrated headframe provides coverage of three cells with a minimum size system. Each panel antenna can be independently panned in azimuth. Electrical down tilt can be adjusted manually or remotely if required. The unit has been designed to produce minimum visual impact with pleasing architectural lines. Provision is made for stacking two antenna systems where greater capacity or flexibility is required.

1.2 Application

A single HCN-S antenna system, in multi-band configuration, is potentially capable of replacing a triangular headframe with up to eighteen high gain sector antennas in situations where such a headframe is not environmentally acceptable, or spatially allowed.

1.3 Antenna Types

Antenna types suitable for use with this HC/HCN-S systems can be found on the CommScope website at <http://www.CommScope.com>

2 Specifications

2.1 Electrical Specifications

The electrical specification of HC/HCN-S systems vary according to the antenna type(s) used and the electrical specifications of antennas are available from the CommScope website at <http://www.CommScope.com>

2.2 Mechanical Specifications

The mechanical specifications of the various panels used in HC/HCN-S systems also vary according to the antenna type(s) used and these specifications are also available from the CommScope website at <http://www.CommScope.com>

The mechanical specifications of the HC/HCN-S system headframe likewise can vary depending on the antenna type used and these specifications are set out in Appendix 1 of this Manual.

2.3 Mechanical Interface

The required mechanical interface to the headframe is shown in Figure 2.3.1 and is consistent across all HC/HCN-S, Tuft and Cluster Systems. A similar flange plate is fitted to the top of the headframe to allow stacking of frames (two only) with only 12 holes.

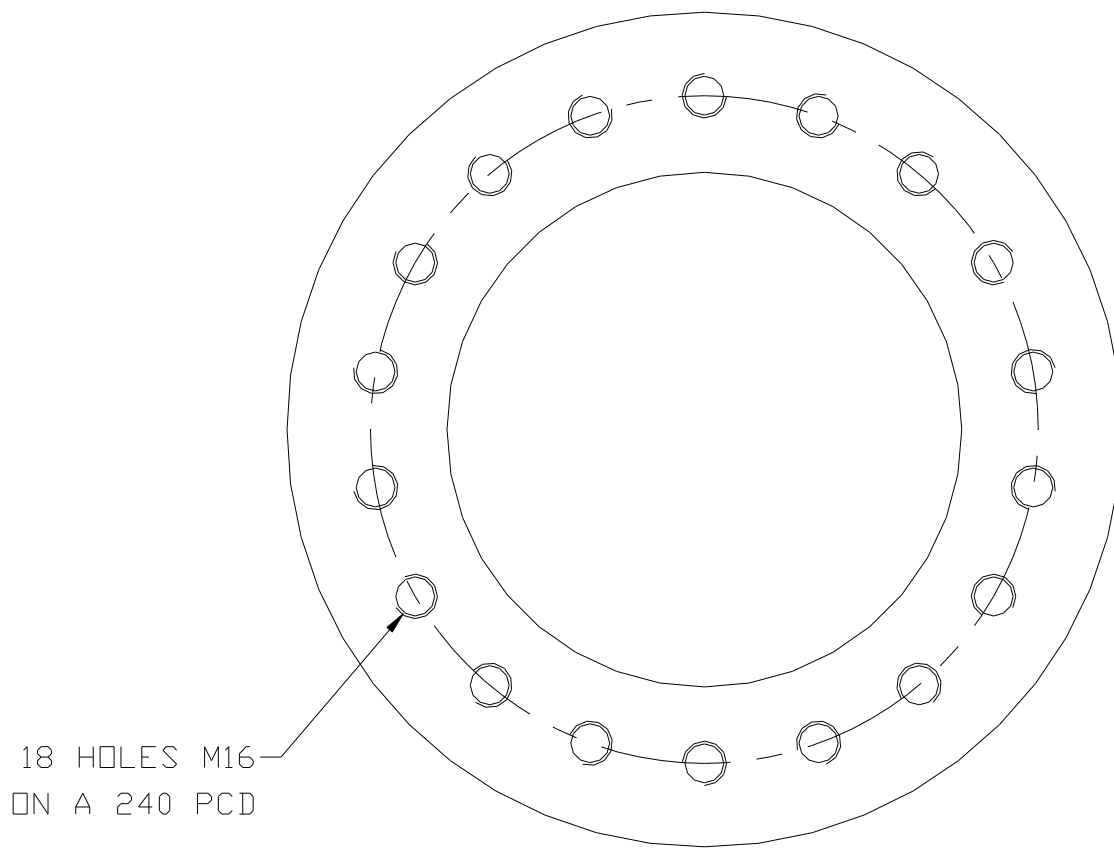


Figure 2.3.1 - Interface plate required for mounting the headframe.

2.4 Azimuth and Elevation Patterns

Azimuth and Elevation Patterns for the various HC/HCN-S systems are downloadable by antenna type from the CommScope website. <http://www.CommScope.com>

3 Components

The HC/HCN-S is a Headframe Kit only. Suitable antennas need to be ordered separately. The components comprising the kit and their purposes are listed in Appendix 2.

4 Installation

4.1 Mount brackets to antennas

- Remove the brackets from the rear of the antennas and dispose of the button head screws and wave washers.
 - For HC-S systems attach both brackets to rear of antennas using an M8 dome nut with spring washer and four new M8x16 button head screws (with DriLoc) and wave washers for each. For HCN-S systems attach both brackets to rear of the antenna using five new M8x16 button head screws (with DriLoc) and wave washers for each. The bottom bracket attaches to the lower end of the antenna so that the nuts sit adjacent to, but facing away from the connectors as shown in figure 4.1.1. The top bracket attaches to the top of the antenna so that the guide pin sits above the panel end cap, as shown in figure 4.1.2.
 - (Not Required for HC-06-S and HCN-06-S systems) Place the bracket strap on the face of the radome so that the thinnest part is towards the end cap as shown in figure 4.1.3. Ensure that the folded returns face away from the radome. Fix the strap to the rear bracket using 12 M5x30 socket head cap screws, with flat washers and spring washers. These screws should have Dry Lock already applied to the threads. Tighten until strap has moderate tension. Do not over tighten, as this will crush the radome and void the warranty. Repeat for the other end of the antenna.
 - Attach the 'U' bolt and clamp bracket to the guide pin using two M10 nuts with spring washers and flat washers. Ensure that the head of the guide pin sits in the cut out of the bracket as shown in figure 4.1.2. Loosen the nuts enough to allow the clamp to rotate freely.
 - Repeat for the other two antennas.
- Multiband antennas use an M8x16 button head screw in place of the dome nut used in slimline antennas.
- Once strap is bent into 'U' shape do not unbend it as this will lead to fatiguing of the metal.
- If twisting occurs as the strap is tensioned, a shifter can be used to hold the pin in place as the screw is tightened. See fig 4.1.4

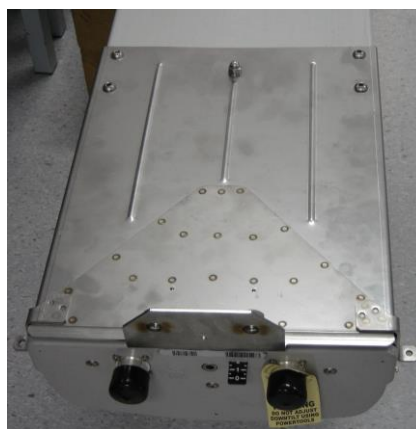


Figure 4.1.1: Mounted Bottom Bracket



Figure 4.1.2 : The head of the guide pin sits in the cut out of the 'U' Bolt bracket



Figure 4.1.3 : The thinnest section of the strap must sit closest to the end cap



Figure 4.1.4 : A shifter can be used to prevent twisting of the strap when tensioning

4.2 Mount infill brackets to headframe

- Fix the top infill support bracket to the top flange using two M6x20 screws with spring and flat washers. (see figure 4.2.1)
- Attach the lower infill support to the underside of the pan flange using the M6 cup head square neck screws and M6 nuts with spring and flat washers. The cup head screws may require a light tap to ensure they sit flush to the flange surface.

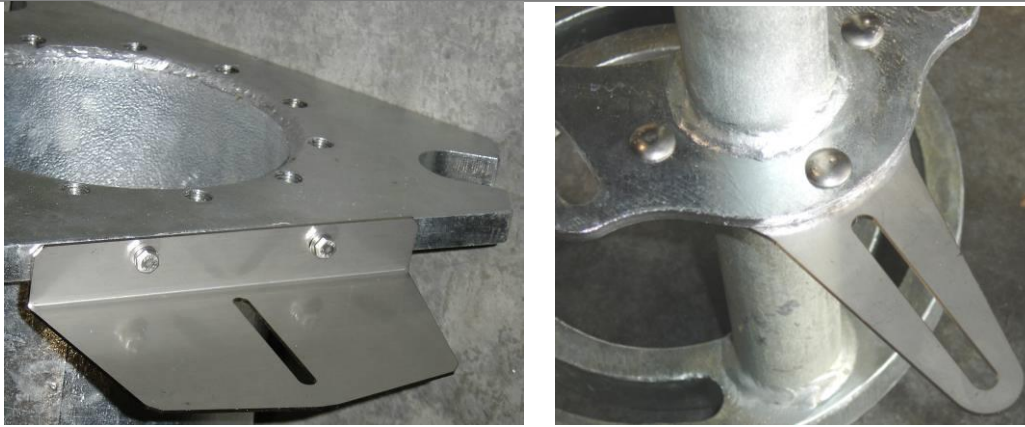


Figure 4.2.1 : Top Infill Support (left), Lower Infill Support (right)

4.3 Mount Antennas to headframe

- Remove the cover plate from the top of the headframe and fit two rated collared M16 eye-bolts to the top of the headframe (eye-bolts not supplied).
- Raise the headframe using a crane and slings attached to the eye-bolts at the top of the headframe. Stand the headframe on its base on level, flat ground keeping the slings taut so that the headframe cannot fall.
- Place the first antenna on the pan flange with the 'U' bolt assembly at the top. Bolt the 'U' bolt clamp securely in place using two M8x16 screws with flat and spring washers. Fix the rear bracket bottom to the pan flange using two M12x25 screws with spring and flat washers. Rotate the antennas to the approximate pan angle. Tighten the 'U' bolt M10 nuts and M12 bolts.
- Repeat for the other two panels.
- Ensure all fasteners are tight before lifting the headframe.

4.4 Fit headframe to pole

- Lift the headframe into position.
- Rotate the headframe to align it in approximately the required direction.
- With the lifting slings still in place, fit the nine M16 high tensile bolts (grade 10.9) flat washers, coronet washers & load plates loosely. The coronet washer must be placed between the load plate and the flat washer with the load indicator ridges touching the flat washer as shown in figure 4.4.1 and figure 4.5.1. Note that the grade is embossed in the bolt head.
- Attach the earth strap/cable. This cable is for grounding of the headframe in case of a lightning strike. The cable should be securely fastened to the headframe and should be of adequate thickness to provide a path of least resistance for the lightning to pass directly to ground. The earth cable is not included with the headframe.

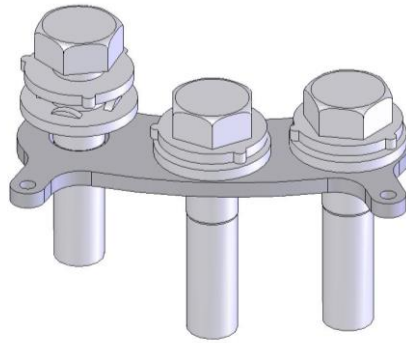


Figure 4.4.1 Coronet washer must be placed between flat washer and load plate

4.5 Alignment and Panning

- Nip all M16 bolts lightly
- Check the verticality of the headframe with an engineering spirit level on the vertical face of the antenna and fit any shims that are required between the headframe and pole to obtain verticality. (The three shims are in the accessory package). Shims are fitted by loosening bolts and inserting shims between the mating surfaces.
- Tighten all the M16 x 70 Grade 10.9 bolts to 100kN. This is achieved by tightening the bolts until the coronet washer load indicator gap is 0.25mm. That is, the gap between the flat washer and the flat of the coronet washer is 0.25mm. A feeler gauge must be used to confirm the correct gap size as shown in figure 4.5.1. When the gap is not uniform, the average gap distance should be used. Note: Once a coronet washer has been fully compressed it can *not* be re-used. It must be disposed of and replaced.
- The securing sling may now be removed from the eye bolts.
- Using the scales on the pan flange, loosen the 'U' bolt M10 nuts and M12 bolts. Rotate each antenna to the desired angle. Tighten all M12 bolts to 61.0Nm
- Tighten all screws and bolts.

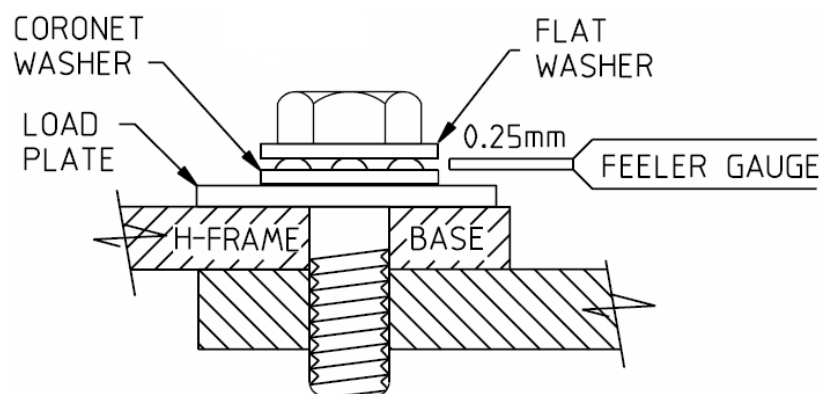


Figure 4.5.1 A feeler gauge must be used to confirm the correct gap size of 0.25mm.

4.6 Fit infill panels to headframe

- After the antennas have been fixed in place, measure the distance between the outer radii of two adjacent antennas. Figure 4.6.1 shows a measurement of approximately 205mm.
- Loosen (but do not remove) the six M8 button head screws along the length of the infill panel (6 element systems will have only four screws).
- Spread the panels to match the distance measured between the antennas. Tighten the M8 button head screws. Fit PVC tube to mid support screw at rear of panel HCN-xx-S systems only.
- Fit the infill panels loosely in place first engaging the M8 centre support screw to bracket at the midpoint of the headframe and then the M8 screws with flat and spring washers to the top and bottom infill support brackets. Note that the top of the panel has been marked.
- **Note:** Do not use an electric driver to adjust the centre M8 screw as this may cause the screw to jam. This screw should be adjusted by hand only.
- Slide the infill panel towards the centre of the headframe and adjust the M8 centre support screw.
- Push the top and bottom of the infill panels in until the panel compresses slightly. Tighten the M8 screws at the top and bottom of the infill panel.
- Tighten the M8 rod until the compression in the middle of the panel matches the compression at the top and bottom of the panel. This rod will engage the locking device on the glenlock nut. Turn the rod at least 2 full turns after the locking device has engaged (this will be felt as an increased resistance to tightening). Do not over tighten.
- Repeat for each infill panel.
- Remove eye-bolts from top of headframe and fit the cover plate, using three M16x35 bolts and washers supplied. Tighten grade 4.6 M16 bolts to 95.0Nm.

Note: In the case where there is maximum difference in angle between two neighbouring panels (ie. $+15^\circ$, $+15^\circ$), a small gap may appear between the infill panel and the radome. This can be remedied by shifting the top and bottom infill support brackets left or right to a small degree.



Figure 4.6.1 Measure the distance between outer radii of adjacent antennas

4.7 Connecting Cables

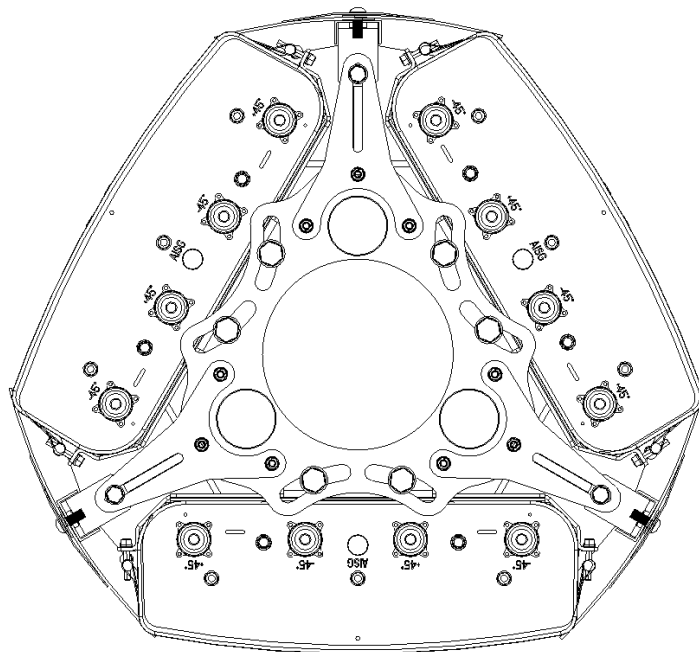
- Connect the tails to the feed cables and seal the connections with appropriate sealing method.
- Pass the cable through the hole in the base flange and form a double bend to bring the cable connector into line with the antenna connector as shown in figure 4.7.1.
- Tails may also be routed on the outside of the base flange and pole as required. For top systems in a stacked configuration cables should be routed through the centre hole only.
- Connect the tails to the antenna connectors and seal with appropriate sealing method.
- Fit Remote Downtilt Control Cables and seal with appropriate sealing method
- Recommended cable for tails: ½” super flexible corrugated coaxial cable with suitable 7-16 connectors.



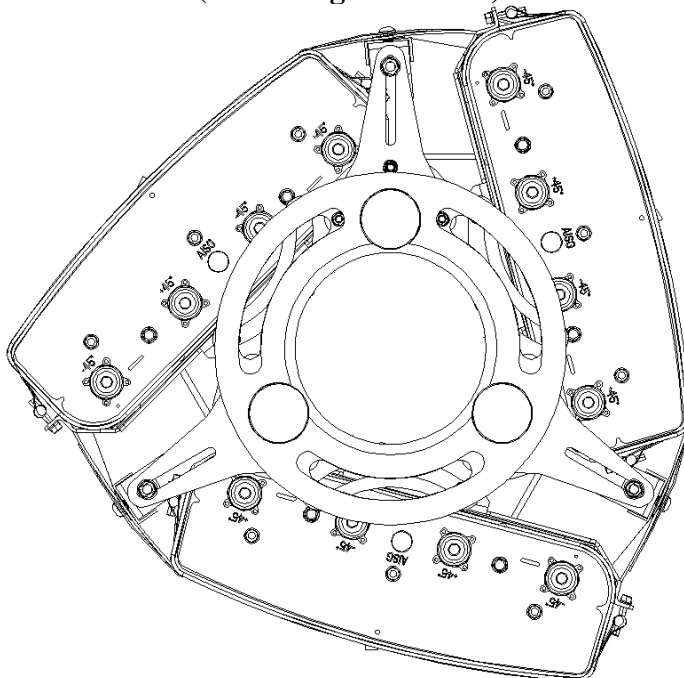
Figure 4.7.1 Cabling of one sector showing four signal cables and one AISG cable

4.8 Adjusting downtilt

- Adjust the downtilt settings of each antenna by turning the adjusting screw on the base of the antenna so that the required downtilt angle is indicated by the scale at the base of the antenna panel.
- HC/HCN-S systems fitted with remote antennas can be tilted using the appropriate AISG Remote Control unit. Information on remote control units, remote accessories and tower top equipment enclosures is available on request.



**Figure 4.8.1 – Bottom view of three multiband panel antennas mounted on headframe showing the panning mechanism and Infill panels (Zero Pan)
(base flange is hidden)**



**Figure 4.8.2 – Bottom view of three multiband panel antennas mounted on headframe showing the panning mechanism and Infill panels (15 ° Pan)
(base flange is shown)**

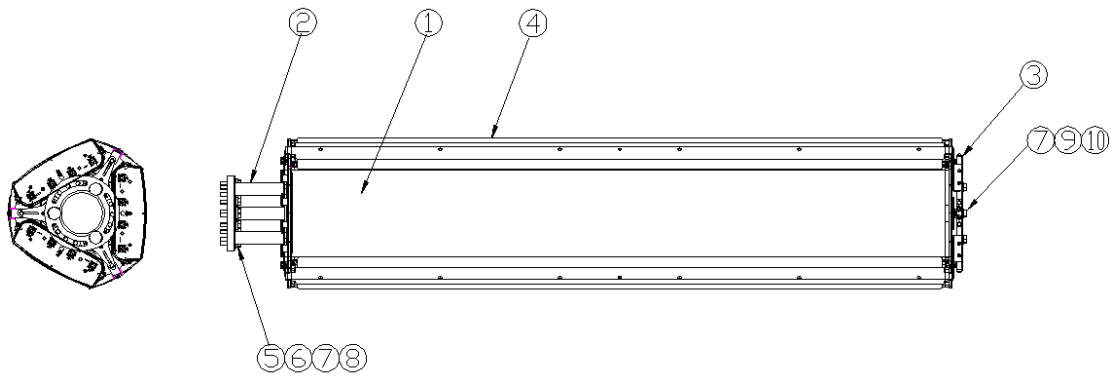


Figure 4.8.3 - Details of assembly of antenna panels to headframe.

(Note that all nine M16 x 70 bolts should be used in conjunction with the load plates (ITEM 10) in all cases except where the headframe is bolted on top of another Tuft headframe. In this case only six bolts need be used with two structural washers under each bolt head in place of the load plate)

ITEM	QTY	DESCRIPTION
1	3	PANEL ANTENNA (ORDERED SEPERATELY)
2	1	HEADFRAME
3	1	COVER PLATE
4	3	INFILL PANEL
5	3	LOAD PLATE
6	9	CORONET LOAD INDICATOR WASHER
7	12	WASHER FLAT M16 STRUCTURAL GAL
8	9	BOLT M16 X 70 HEX HD HIGH TENSILE GRADE 10.9 GAL
9	3	WASHER LOCK SPRING M16 GAL
10	3	BOLT M16 X 35 HEX HD GRADE 4.6 GAL

Figure 4.8.3 (contd) - Parts list for Figure 4.3.

5 Removing and Replacing Panels

- Remove the infill panels on each side of the antenna to be removed by removing the fixing bolts at the top and bottom of the panel and loosening the M8 rod at the centre.
- Undo the cable tails at the connectors and AISG cable if fitted.
- Secure antenna so it cannot fall. A triangular lifting plate is provided which can be attached to the outside of the 'U' bolt bracket at the top of the antenna.
- Remove the M12 bolts from the bottom bracket, followed by the M8 bolts in the 'U' bolt clamp bracket.
- Replace the panel by reversing these steps.

6 Stacking In Region A and B (ultimate gust speed 65m/s)

6.1 Installation of Top HC/HCN-S System

A maximum of **only two** HC/HCN-S antenna systems may be stacked because of wind loading on the interface flange. The top of the HC/HCN-S headframe is similar to the interface plate required. To stack two antenna systems, the lower system is installed as described in Section 4. The cover plate (supplied attached to the top of the headframe) and M16 x 35 gal bolts should be removed from the top of the lower headframe. The steps in the installation of the upper unit follow Section 4 except that six M16 grade 10.9 bolts and three 2 hole load plates are used in place of the nine M16 grade 10.9 bolts and three 3 hole load. See figures 6.1.1-2 for bolting configurations. The upper headframe should have a cover-plate fitted.

- **NOTE:** The TUFT102 Tower Top Equipment Enclosure is limited to an HC/HCN-08-S stacked on an HC/HCN-10-S in Region B only. It cannot be used in Region C.

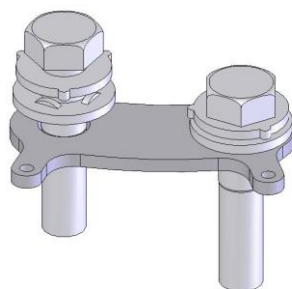


Figure 6.1.1: Load Plate, Bottom Stack M16 G10.9 Bolts

7 Stacking In Region C (ultimate gust speed 80 m/s)

Double stacking in Region C is limited to one HC/HCN-08-S system stacked on one HC/HCN-10-S system. When double stacking in this region the Region C mounting kit (RCK-1) must be used as much higher wind loading is applied to the system. This mounting kit consists of nine M16x70 Grade 12.9 socket head cap screws to replace the nine Grade 10.9 hex head bolts in the mounting procedure in section 4. The bolting configuration would then be as shown in Figure 7.1.

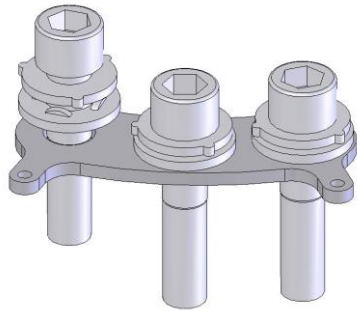


Figure 7.1

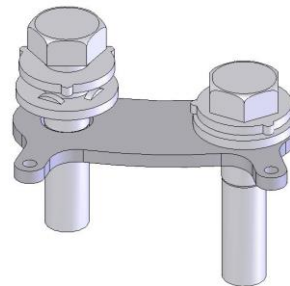


Figure 7.2

Figure 7.1: Load Plate, Bottom Stack M16 G12.9 Bolts (Region C Configuration)

Figure 7.2: Load Plate, Top Stack M16 G10.9 Bolts

Appendix 1 - Antenna System Dimensions and Headframe Specifications

HCN-10-S Mechanical Specifications

Diameter	585 mm
Weight (Excluding antennas)	152 kg
Total Length (including cover plate bolt heads)	2936mm
Stacking	2 units may be stacked (for +65m/s see section 7)
Wind	Ultimate design wind speed 80 m/s
Lateral Thrust	1.45 kN for $V_z = 44$ m/s*
Lightning	Direct ground of all metal parts

HCN-08-S Mechanical Specifications

Diameter	585 mm
Weight (Excluding antennas)	132 kg
Total Length (including cover plate bolt heads)	2416mm
Stacking	2 units may be stacked (for +65m/s see section 7)
Wind	Ultimate design wind speed 80 m/s
Lateral Thrust	1.19 kN for $V_z = 44$ m/s*
Lightning	Direct ground of all metal parts

HCN-06-S Mechanical Specifications

Diameter	585 mm
Weight (Excluding antennas)	108 kg
Total Length (including cover plate bolt heads)	1896mm
Stacking	2 units may be stacked (for +65m/s see section 7)
Wind	Ultimate design wind speed 80 m/s
Lateral Thrust	0.93 kN for $V_z = 44$ m/s*
Lightning	Direct ground of all metal parts

HC-10-S Mechanical Specifications

Diameter	552 mm
Weight (Excluding antennas)	152 kg
Total Length (including cover plate bolt heads)	2936mm
Stacking	2 units may be stacked (for +65m/s see section 7)
Wind	Ultimate design wind speed 80 m/s
Lateral Thrust	1.38 kN for $V_z = 44$ m/s*
Lightning	Direct ground of all metal parts

HC-08-S Mechanical Specifications

Diameter	552 mm
Weight (Excluding antennas)	132 kg
Total Length (including cover plate bolt heads)	2416mm
Stacking	2 units may be stacked (for +65m/s see section 7)
Wind	Ultimate design wind speed 80 m/s
Lateral Thrust	1.12 kN for $V_z = 44$ m/s*
Lightning	Direct ground of all metal parts

HC-06-S Mechanical Specifications

Diameter	552 mm
Weight (Excluding antennas)	108 kg
Total Length (including cover plate bolt heads)	1896mm
Stacking	2 units may be stacked (for +65m/s see section 7)
Wind	Ultimate design wind speed 80 m/s
Lateral Thrust	0.89 kN for Vz = 44 m/s*
Lightning	Direct ground of all metal parts

*Lateral thrust forces are for HC/HCN-S systems with antennas set to a zero degree pan angle.

Appendix 2 - Items Supplied with Kits

Package	Item	Qty	Description/Purpose
Headframe kit	Headframe	1	Mounting pole and interface plates
	Cover plate (fitted to frame)	1	Fitted to frame
	M16 x 35 gal bolts (fitted to cover plate)	3	Fitting cover plate to frame
	M16 lock washer gal (fitted to cover plate)	3	Fitting cover plate to frame
	M16 x 70 hex head high tensile bolts, grade 10.9, gal (Grade 10.9 stamped on head)	9	Bolting headframe to pole
	M16 flat structural washer Gal	12	Bolting headframe to pole
	M16 Coronet Load indicator washer Gal	9	Bolting headframe to pole
	Load plates (3 hole - Bottom)	3	Under M16 x 70 bolts holding head frame to interface
	Load plates (2 hole - Top)	3	Under M16 x 70 bolts holding top head frame to lower head frame
	Shims	3	For vertical alignment
	Infill Support Top	3	To support infill panel
	Infill Support Bottom	3	To support infill panel
	'U'Bolt Clamp	3	To clamp 'U' bolt and Rear Bracket Top
	Rear Bracket Top	3	Attaches to rear of antennas
	Rear Bracket Bottom	3	Attaches to rear of antennas
	Bracket Strap (-08 & -10 only)	6	Straps antenna to rear bracket
	Plate Lifting	1	For crane lifting of antennas
	M10 'U' Bolt	3	To attach Rear Bracket top to 'U'Bolt Clamp
	Washer Lock Spring M12	6	Attaching Rear bracket to Pan Flange
	Screw Set Hex M12 X 25 SS	6	Attaching Rear bracket to Pan Flange
Washer Flat M12 SS	6	Attaching Rear bracket to Pan Flange	
Washer Spring M8 SS	12	Attaching infill panels and 'U' bolt Clamp	

Package	Item	Qty	Description/Purpose
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Instruction Sheet

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(continued)	Washer Flat M8 SS	12	Attaching infill panels and 'U' bolt Clamp
	Set Screw Hex H'd M8 X 16 SS	6	Attaching infill panels
	Washer Crinkle M8 SS	30	Mounting Rear Bracket to Antenna
	Screw Button Hd Skt M8 X 16 SS	30	Mounting Rear Bracket to Antenna
	Nut Hex M10 SS	6	Fitting 'U' Bolt
	Washer Flat M10 SS	6	Fitting 'U' Bolt
	Washer Spring M10 SS	6	Fitting 'U' Bolt
	Washer Flat M6 SS	15	Mounting top and bottom infill supports
	Washer Spring M6 SS	15	Mounting top and bottom infill supports
	Set Screw M6 x 12 SS	6	Mounting top infill supports
	Bolt M6 Cup Head Square Neck	9	Mounting bottom infill supports
	Infill Panels	3	Cover gaps between panel antennas
	Set Screw M8 x 20 SS	6	Fitting 'U' Bolt Clamp
	Screw Socket Head Cap M5x30	12	Attaching Bracket Strap
	Washer Flat M5 SS	12	Attaching Bracket Strap
	Washer Spring M5 SS	12	Attaching Bracket Strap
	Instruction Manual HC/HCN-S Systems	1	This manual
	PVC Tube 10mm diameter (HCN-xx-S systems only)	3	Protect antennas from infill panel mid support rod.

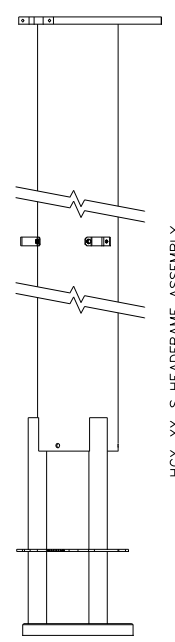
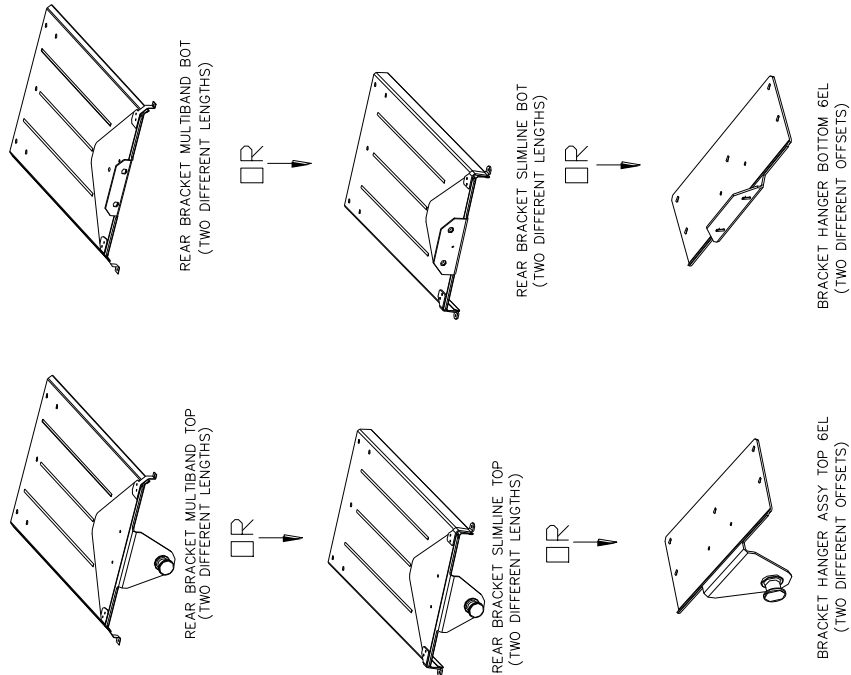
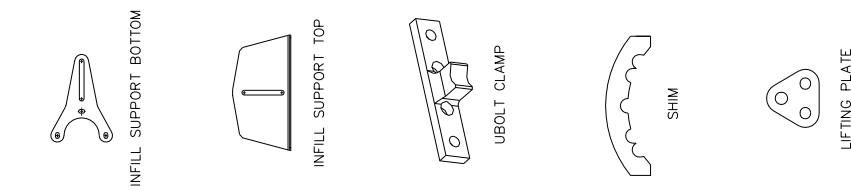
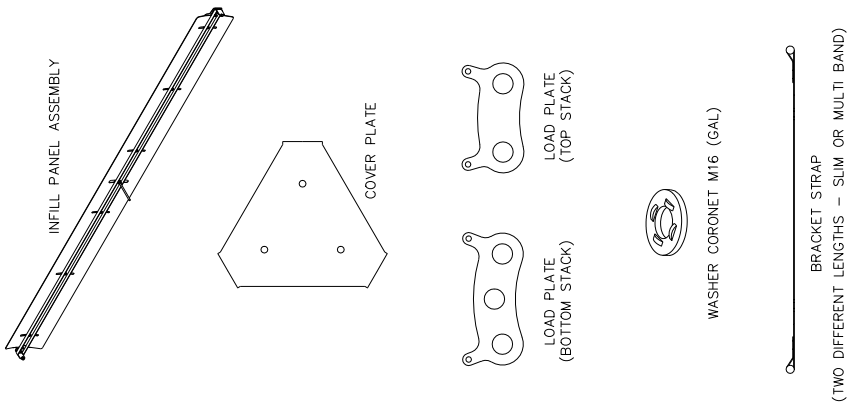
Package	Item	Qty	Description/Purpose
RCK-1 mounting kit (ordered separately)	Socket Head Cap Screws M16x70 High Tensile G12.9 (Galvanised)	9	Replace the 9 M16 x 70 hex head high tensile bolts, grade 10.9
	Washer Coronet Load Indicator M16 (Galvanised)	9	Replace the 9 Used Coronet Load Indicator Washers
	Washer Flat Structural M16 (Galvanised)	9	Replace the 9 Flat Structural Washers

Package	Item	Qty	Description/Purpose
Bracket Kits: KCN-10-S, KCN-08-S, KC-10-S, KC-08-S (ordered separately)	Rear Bracket Top	3	Attaches to rear of antennas
	Rear Bracket Bottom	3	Attaches to rear of antennas
	Bracket Strap	6	Straps antenna to rear bracket
	Washer Lock Spring M12 SS	6	Attaching Rear bracket to Pan Flange
	Washer Lock Spring M10 SS	6	Fitting 'U' Bolt
	Washer Lock Spring M8 SS	6	Fitting 'U' Bolt Clamp
	Washer Lock Spring M5 SS	12	Attaching Bracket Strap
	Washer Crinkle M8 SS	30	Mounting Rear Bracket to Antenna
	Washer Flat M12 SS	6	Attaching Rear bracket to Pan Flange
	Washer Flat M10 SS	6	Fitting 'U' Bolt
	Washer Flat M8 SS	6	Fitting 'U' Bolt Clamp
	Screw Button Head Skt M8x16	30	Mounting Rear Bracket to Antenna
	Screw Socket Head Cap M5x30	12	Attaching Bracket Strap

Package	Item	Qty	Description/Purpose
Bracket Kits: KCN-06-S, KC-06-S (ordered separately)	Rear Bracket Top	3	Attaches to rear of antennas
	Rear Bracket Bottom	3	Attaches to rear of antennas
	Washer Lock Spring M12 SS	6	Attaching Rear bracket to Pan Flange
	Washer Lock Spring M10 SS	6	Fitting 'U' Bolt
	Washer Lock Spring M8 SS	6	Fitting 'U' Bolt Clamp
	Washer Crinkle M8 SS	30	Mounting Rear Bracket to Antenna
	Washer Flat M12 SS	6	Attaching Rear bracket to Pan Flange
	Washer Flat M10 SS	6	Fitting 'U' Bolt
	Washer Flat M8 SS	6	Fitting 'U' Bolt Clamp
	Screw Button Head Skt M8x16	30	Mounting Rear Bracket to Antenna

REV	DESCRIPTION	DATE
1	NEW	19/03/07

THIS SHEET IS FOR PART RECOGNITION ONLY



DRAWN S.DAWSON		ARGUS TECHNOLOGIES	
		HEADFRAME ASSY PART RECOGNITION	
PATH IDENT:	DWG NO. SK-714	REV	1
SCALE: N.T.S.		SHEET	1 OF 1

