HASK™

HITEC ANTENNA SERVO KIT

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LUXEMBOURG

THE HITEC ANTENNA SERVO KIT (HASK™) IS A RELIABLE, SCALABLE, PLUG-AND-PLAY SERVO SYSTEM FOR GROUND STATION ANTENNAS

For almost 20 years, HITEC Luxembourg has been developing and building high-precision ground station antennas. In the last few years, there has been an increasing demand to refurbish antenna control systems of 3rd-party ground station antennas, in particular of limited motion antennas, for which HASK™ is the most convenient solution.

To address these needs, HITEC Luxembourg has developed a reliable, precise and modular servo kit based on COTS (commercial off-the-shelf) parts which combines generic and application-specific modules to match customer needs.

Every HASK™ includes one of three different models of the HITEC Antenna Control Unit (HACU®), which can be interfaced with a wide range of compatible tracking receivers, and the HITEC Antenna Drive Unit (HADU™) comprising a HITEC Servo Control Unit (HSCU™), the drive system, a power supply system, a safety loop supervision, a portable maintenance unit and a customer interface.

For application-specific needs, HITEC Luxembourg supplies a series of options including a wide range of motor configurations, encoders with different levels of precision, polarization axis control, a tilt sensor, an advanced portable maintenance control unit, RF switch control, different cable lengths and indoor or outdoor cabinets.

KEY FEATURES

High performance
- High quality and reliability
- Mostly maintenance free

Modular design
- For 3rd-party antennas and refurbishments
- Adaptable to different antenna sizes
- Based on COTS hardware platform
- Compatible to wide range of tracking receivers

Maximum control
- Program track, step track and monopulse
- Advanced maintenance unit with display

Out of the box
- Easy to install and to set up

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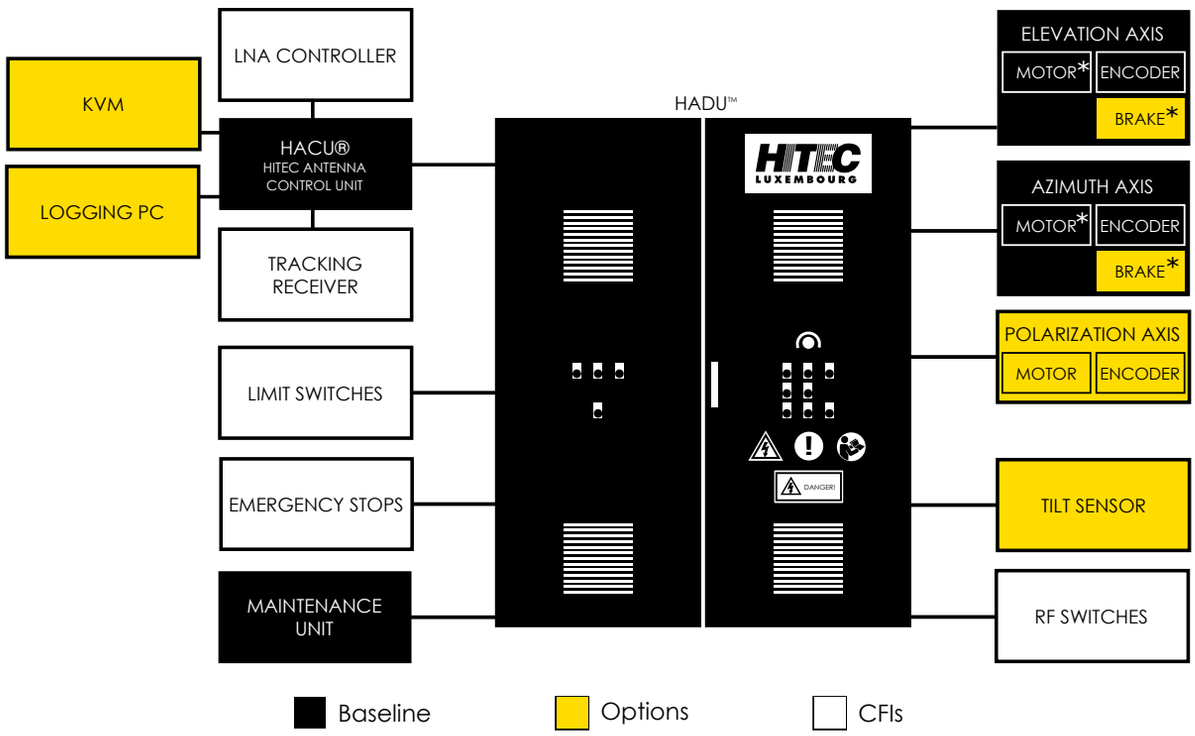
HITEC ANTENNA SERVO KIT (HASK™)
SYSTEM



ADDITIONAL OPTIONS: Extended cable lengths and temperature ranges, redundant 24 V power supply, surge protection, second motors (*), brakes (*), outdoor cabinet, advanced maintenance unit

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DRIVE CABINET: In the baseline configuration, the HITEC Luxembourg antenna drive unit (HADU™) is composed of an indoor cabinet which is ventilated and must be placed in a shelter and which comprises the HITEC Servo Control Unit (HSCU™), the servo drive subsystem, a breaking resistor, line filters, power supplies, a user interface (e.g. ON/OFF button) and fuses. It interfaces with the antenna mount components such as the motors and the encoders on the one side and with the HACU® on the other side. As an option a climate controlled outdoor cabinet is available which has the advantage that the cable lengths for encoders, motors and limit switches can be kept short to ensure maximum performance.

MOTORS: The system is compatible with temperature supervised high-precision permanent-magnet servo motors in the range from 4.7 to 15.5 Nm. For axes based on screw jacks, only one motor is used whereas for normal axes, a second motor is available for backlash control. If the antenna has a polarization axis, a polarization stepper motor is added.

ENCODERS: For azimuth and elevation, the customer can choose between high resolution 18-bit or very high resolution 25-bit encoders. A 16-bit polarization encoder can optionally be added to the HASK™.

TILT SENSOR: For very demanding applications, an optional 2-axis tilt sensor is available for measuring the deflection of the antenna pedestal. Its tilt angles are forwarded to the HACU® to apply an error correction to the axis set points.

MAINTENANCE UNIT: In the baseline, a standard portable maintenance control unit (PMCU) connected either to the drive cabinet or at the level of the yoke platform is provided. The PMCU features AZ/EL/POL jog buttons, a start and a stop button, an emergency stop button, a limit override button, speed switch buttons and a dead-man switch. As an option, an advanced maintenance unit comprising a touch panel display can be supplied which in addition to the standard PMCU also indicates the status and position of the axes and the beacon level.

RF SWITCHES CONTROL & MONITORING: Optionally, the RF-switches can be controlled and monitored via the ACU.

CABLE LENGTHS: Depending on the desired position of the different HASK™ components, different cable lengths between the antenna and the HADU™ and between the drive cabinet and the HACU® can be provided.

EXISTING COMPONENTS: The HASK™ can be interfaced with pre-existing components such as limit switches, brakes, emergency stop buttons, hand crank interlocks, stow pins and alarms.

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HITEC ANTENNA SERVO KIT (HASK™) SYSTEM

DRIVE CABINET			
Type	Indoor Cabinet		
Dimensions (WxDxH)	1.2 x 0.4 x 1.8 m		
Weight	290 kg		
Protection class	IP54		
Temperature range	+10°C to + 50°C		
Power supply	400 VAC / 50-60 Hz / nominal current depending on selected configuration		
MOTORS (AZ/EL)			
Rated Torque	**4.7 Nm**	**10.5 Nm**	**15.5 Nm**
Peak torque	6.3 Nm	13.1 Nm	24.0 Nm
Rated current	3.7 A	7.2 A	11.6 A
Rated speed	3000 rpm	3000 rpm	3000 rpm
Protection class	IP65	IP65	IP65
Baseline temperature range	-25°C to +40°C	-25°C to +40°C	-25°C to +40°C
ENCODERS (AZ/EL)			
Type	**High resolution**	**Very high resolution**	
Resolution	18-bit	25-bit	
Protection class	IP65	IP64	
Accuracy	± 10 mdeg	± 2.78 mdeg	
Temperature range	-25°C to +85°C	-25°C to +70°C	
POLARIZATION AXIS			
MOTOR		**ENCODER**	
Holding torque	1.7 Nm	**Resolution**	16-bit
Rated current	0.9 A	**Protection class**	IP65
Step size / microstepping	1.8 deg / 0.036 deg	**Accuracy**	100 mdeg
Temperature range	-25°C to 60°C	**Temperature range**	-40°C to 80°C
2-AXIS TILT SENSOR			
Resolution	1 µradian		
Repeatability	4 µradians (static)		
Temperature range	-25°C to + 70°C		
RF-SWITCHES			
Max. number of supported switches	6		
Standard electrical interface per switch	24 VDC - 1 A		
LNA MONITORING			
Monitoring of the telemetry LNA via an LNA controller			
Monitoring of a tracking LNA via a dry contact			

CABLE LENGTHS BETWEEN MODULES		
	Baseline	**Extended range**
HACU® - HADU™	< 100 m	< 230 m
HADU™ - antenna	< 50 m	< 150 m
Standard maintenance unit - HADU™	< 150 m	-
Advanced maintenance unit - HADU™	< 50 m	< 150 m

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HITEC ANTENNA CONTROL UNIT (HACU®)
OVERVIEW

The HACU® software is running on an industrial PC which requires 2 rack units and must be placed in a server rack in a shelter. The HACU® core software can be operated and configured both locally and remotely via a user-friendly client software. Depending on the required tracking modes of the antenna, HITEC Luxembourg can supply the HACU® with three different software versions: HACU® 1000, 2000 and 3000. Please use the table below to select the software version best suited for your application.

For very critical applications, HITEC Luxembourg can equip the HACU® with redundant power supplies and/or redundant hard disks. As time reference the ACU can use NTP or can be equipped with an IRIG-B compatible time reference card. Furthermore, LNA monitoring is available on the HACU® 2000 and HACU® 3000 models.

Optionally, a 1U rack-mountable KVM can be provided. The HACU® can be complemented by a logging PC, which performs logging of all relevant ACU and antenna parameters over long durations and at sampling rates of up to 20 samples/s.

	HACU® 1000	HACU® 2000	HACU® 3000
Standby mode	x	x	x
Pointing mode	x	x	x
Slew mode	x	x	x
Program track mode	x	x	x
Scan mode		x	x
Step track mode		x	x
Monopulse mode			x
Monopulse calibration mode			x
Adaptive track mode		x	x
Autotrack mode		x	x
Stow/unstow mode (optionally stow pin control)	x	x	x
Manual mode (PMCU)	x	x	x
Mechanical error correction (e.g. from tilt sensor)	x	x	x
Atmospheric refraction error correction	x	x	x
LNA monitoring		x	x
RF switches monitoring and control	x	x	x
Polarization axis control	x	x	x

HACU®			
Power supply	100/240 VAC (autorange) 50/60 Hz	**Temperature range**	5°C to 50°C
Rack Space	2U	**Protection class**	IP20 (rear) / IP41 (front)
Depth	444 mm	**Net weight**	17 kg

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CERTIFIED COMPANY ISO 9001:2015

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