GANTRY CRANE SPECIFICATION

1. TECHNICAL SPECIFICATION

6.2t (2x3.2t) CXTS Single girder goliath crane @ 23 m span

2. Technical data of the crane

Manufacturer ................................................... Kone Cranes
Quantity ........................................................ 1
Capacity ......................................................... 3 200 kg
Type ............................................................ CXTS Single girder crane
Girder type ..................................................... Welded box
Number of rail wheels ....................................... 4 pcs
Wire rope hoist type ........................................ 2 x CXT40410032P2
Trolley type ..................................................... Low headroom
Reeving type .................................................. True lift
Crane weight with hoist ...................................... 16 670 kg

Wheel loads ........ Static wheel load ...................... 65 kN

Dimensions ........ Span ....................................... 23 m
Lifting height .............................................. 11 m (Max. 15 m)
Free space under crane ........ 11 364 mm
Max deflection (100% SWL) ...... 23.5 mm
Runway rail type ........... A55

Duty groups ........ Steel structure ......................... FEM A5
Hoist .......................... FEM M5 (2m)
Cross traverse ................ FEM M5 (2m)
Crane travel .................. FEM M5 (2m)

Speeds ........... Hoist speed ...................... 5/0.83m/min 2 - speed
Trolley traverse speed .......... 20m/min stepless
Bridge travel speed ........... 32m/min stepless

Motors .................. Hoist motor power ............ 3.6/0.5 kW 60% ED
Trolley traverse motor power ... 1 x 0.30 kW 40% ED
Bridge travel motor power ....... 4 x 2.20 kW 40% ED

Crane control ......... Radio remote control and Pendant control

Crane power ............ Needed power .................. 16.6 kW
Main voltage ................. 3Ph / 415 V / 50 Hz
Control voltage .............. 48 V

Operation ........ Location ......................... Outdoor
Ambient temperature ........... -10 - 40 °C

Surface treatment .......... Crane structure .................. Preparation: SA2,5
................................ E 220 µm, RAL1028
Machinery .................. E 120 µm - 5 mil, black/gray
Electric panels ............... E 120 µm - 5 mil, black/gray
Limit switches  Hoist ........................................ Hoist and lower - 4 adjustable points

IP protection .......... Electrical cubicles ............... IP54
                      Motors .................................. IP55

Scope of supply ..... Crane main girder(s), hoist, trolley, drives and electrification.

Other standard features (Included in supply)
- Overload limiting device
- Disk brake in all motors
- Thermal protection on hoisting motor
- All initial lubricants
- All crane and component warning signs
- DynADrive stepless speed control for trolley traverse motion
- DynAMove stepless speed control for bridge travel motion
- Remox-Remoc radio crane remote control
- ControlPro Perform
- ControlPro Lifetime
- ControlPro Multicare
- Standby heating for hoisting motor
- Standby heating for trolley traversing motor
- Standby heating for bridge traveling motor
- Standby heating for hoist control panel
- Standby heating for bridge control panel
- Standby heating for pendant station
- IP66 hoist motor protection
- IP66 trolley motor protection
- IP66 bridge motor protection
- Rain cover for hoist
- Rain cover for trolley traveling motor
- Rain cover for bridge traveling motor
- Warning indication for traveling movement
- 2-step limit switch, bridge traveling (slow+stop)
- 2-step limit switch, trolley traveling (slow+stop)
- Anti collision devices for bridge
- Load display for two hoists on bridge
- Horn
- Emergency stop on each leg
- ‘Cowcatchers’
- Master radio for hoist 1, separate radio for hoist 2
- 4 no Floodlights mounted on the crane legs

3. STANDARD FEATURES OF KONECRANES- CRANES
   Overhead travelling cranes combine lightweight construction with heavyweight strength, power and durability. Their superb handling characteristics together a with wide range of standard and optional features make them an automatic first choice for application requiring optimal lifting equipment with long term reliability.

4. Standards
   Design, dimensioning and calculations of Konecranes cranes are based on BS and FEM standard (Section IX). Manufacturing of steel construction is based on AWS D14.1 Code for welding, DIN 18800, Blatt 7 Constructions for quality of welding, DIN
15018, Blatt 2 for Crane Design and Constructions and DIN 8563, Blatt 3 for welding classes standards. The manufacturing of hooks is based on DIN 15401 for Single Hooks, DIN 15402 for Double Hooks and DIN 15404 for Certification of Hooks. The electrical equipment of the crane follows: IEC 60204-32, VDE 0113, VDE 0100 and CEE standards. Electric motors are manufactured according to IEC Recommendations 24-1, 34-5 and 72-1. Motor selection is based on the Swedish Crane Norm IKH 6.30.01. All motors are approved by the CSA (Canadian Standard Association). Gear design is based ISO/DIS 6336/II-6336/V (DIN 51150) standards. All component manufacturing of Konecranes comply with ISO 9001 standards. In defining the final design criteria and parameters, Konecranes meets all local requirements and safety regulations so that they can be met by using the above norms.

5. **Steel structure**

Crane girders are manufactured from hot rolled wide flange profile sections or welded from certified steel plates to form a BOX type girder. The vertical deflection due to maximum load (SWL) is guaranteed to be better than stated by national standards and/or customer requirement unless specified otherwise in this crane offer. Before welding, all material is carefully inspected and cleaned. Welding (mostly MIG and submerged) is done with automatic or semi-automatic welding machines. The cranes are assembled in special assembly jigs, which ensure the proper alignment of the crane. For double girder cranes an optional full-length service platform along the crane bridge can be supplied, where it is equipped with protective hand railing and toe strips according to applicable laws and standards. This allows safe access to the hoist and trolley, crane travelling machinery and electric panels for ease of maintenance.

6. **CXT – Hoist & trolley**

**Hoisting machinery**

Hoisting motor, gearbox and drum form a revolutionary compact and sturdy package and it offers efficient use of floor space under the crane and increased lifting heights. Machinery has smooth and silent operation that extends the lifetime of the hoist. Hoisting motor is located inside the oversized drum to minimize the hoists outside dimensions and to increase the cooling effect of the hoisting motor. An enclosed hoist housing protects the rope drum, rope guide and limit switch equipment from dirt and climatic conditions. The hoist and trolley frame is painted with epoxy paint for maximum resistance against climatic conditions, extending the hoist’s working life.

**Gearing**

Konecranes manufactures all gearboxes and gears. Sealed gearbox housings are made of aluminum. Gears (hoist and travel gearboxes) run in totally enclosed semi-fluid or oil bath lubrication, designed for the lifetime of the crane. There are NO open gears to lubricate. The hoist gearing is helical type and all gearwheels are hardened and ground.

**Motors**

Hoisting motors are 2-speed pole changing (or frequency converter motors for stepless speed control) squirrel cage motors that are specially designed and manufactured by Konecranes for hoist duty. All motors incorporate a cylindrical rotor, class F insulation and are rated for minimum 60% ED duty. Motors are totally enclosed to IP55 degree of protection as standard. The stator frame is made of extruded aluminum to maximize the dissipation of heat together with the fan mounted on the back of the motor. All hoisting motors are equipped with imbedded bi-metallic thermal switch (or thermistors) in the windings to protect against overheating.

Trolley motors are 2-speed pole changing squirrel cage motors that are specially designed and manufactured by Konecranes.
**Brakes**
All hoisting motors are equipped with DC magnetic disk brakes. The hoist motion brakes are adjustment free. The hoist motor and brake are designed and manufactured to work together so that the load will not slip at any point of starting or stopping of the hoist or lower motions. In event of a power failure the brake will fall safe ON. The brake torque is at least 1.8 times higher than the nominal torque of the motor. Brake linings are asbestos-free and the brakes are fully covered and dust proof. Travel motors are equipped with DC magnetic disk brakes.

**Rope drum, rope guide and pulleys**
Large diameter rope drum and rope pulleys extend the rope’s lifetime. With large diameter rope drum the hook’s horizontal movement and rope’s fleet angle is minimized. This True Lift feature ensures accurate load positioning.

Rope drum is turned from high quality steel tubing and has precision machined grooves for rope, preventing rope overlap. The rope drum is supported at both ends on bearings and the rope is fixed to the drum with rope clamps. The drum has a minimum of two dead turns of rope with the hook in the lowest position. Ropes are manufactured from high tensile steel and galvanized as standard. Rope guide is wear resistant, heavy-duty, made of spheroidal graphite cast iron, maintaining the rope into the grooves. A spring operated guide roll in the rope guide prevents slack in rope. The rope pulleys are made from spheroidal cast iron and the construction of large diameter pulleys ensures that the rope is retained in the pulley.

**Limit switches & buffers**
CXT Hoists are equipped with 2-step limit switch to prevent over travel of hook. The up direction limit switch has 3 steps. First step switches the speed from fast to slow and the second step from slow to stop. The third step cuts the hoisting movement in case of phase mismatch.

Energy-absorbing rubber buffers are provided for cross and long travel motions and together with the fixed end stops on the runway (by others) and girder, limit the trolley and crane travel. As an option both cross and long travel motions can be equipped with electrical limit switches.

**Overload protection**
Each hoist is equipped with overload protector, which will prevent the lifting of loads beyond the capacity of each hoist on the crane. The overload protector is self resetting and the hoist motion is stopped if overloading occurs, but lowering is permitted, making the crane safe.

**ControlPro safety and performance control unit**
ControlPro is the new generation of Konecranes’ system for hoist and crane safety and performance control. Industry leading electronics and software design of ControlPro device make the load handling more safe and easy. The model range of ControlPro Perform, Life Time, Optic, Multicare and Interface offer versatile solutions for a wide variety of applications; from light duty monorail hoists to heavy duty process cranes with several hoists and from regular to preventive maintenance programs.

ControlPro solutions offer benefits for crane operators, production managers and maintenance personnel in form of worker safety and increased productivity and optimal maintenance planning. For crane and hoists owner system means an increased return of investment.

**Hook blocks**
Easy to handle hook blocks are closed and rotate freely 360 degrees. Hooks are supported on anti-friction lifetime lubricated bearings and are made from quenched and tempered 34CrMoV steel. Each Hook is fitted with spring loaded sturdy safety
latch, ensuring that slings cannot accidentally release from the hook. Hook forging is ergonomically designed and most hooks have a "grip point" for easy handling.

7. DynA Vector family products
DynA product family is a trademark of Konecranes motor control system that controls the motor rotating speed by changing the supply voltage frequency of a sturdy squirrel cage motor. The DynA family includes DynADrive and DynAMove for standard and DynAC Vector for more demanding traveling applications and DynALift Vector for standard and DynAHoist Vector for more demanding hoisting applications. Their robust construction ensures excellent tolerance to poor ambient conditions.

Stepless speed control ensures an easy, safe, precise and consequently a more effective crane operation. Due to very low creeping speed and high main speed, an accurate load positioning and fast cycle time can be achieved simultaneously. Smooth starts and stops protect the load from damage and reduce wear and mechanical stress for components and structures. Electrical braking is provided in all circumstances and the mechanical brake is used only as a holding and emergency brake.

DynA family cannot be compared to any general-purpose inverter. DynA family products are made and designed specially for crane use. The benefit from choosing a DynA inverter is to receive a tested and widely proven solution, that forms an integral part with the other crane components. In Konecranes DynA family everything is included, even the smallest detail is taken care of.

8. REMOX-REMOC – Radio crane remote control
Konecranes' REMOX-REMOC is radio control system specially designed for the remote control of large variety of crane applications. REMOX-REMOC improves the efficiency and safety of crane operation. REMOX-REMOC is available with 2 different transmitter models: push button or joystick. As a standard REMOX consists of a transmitter, a charger and a receiver. The transmitter is lightweight and sturdy and it includes all standard crane operation signals as well as an emergency mushroom switch and key lock. Each REMOX-REMOC system controls only one crane and vice versa. Many REMOX-REMOC systems can be used in same operational area simultaneously.

Main benefits of crane remote control compared to conventional wired pendant are as follows:
- To allow operator more fully concentrate on his job.
- To help the crane operator position a load faster and more accurately.
- To enable operator maintain control of his crane from any position and at any time without restrictions normally associated with wired control systems.
- To enable the crane operator to find the safest operating position from where to control his crane or hoist.
- To enable the crane operator to help prepare a load (slinging), this saving additional manpower.

9. End carriages
End carriages are manufactured from rectangular hollow sections (RHS) or welded from high tensile steel plates. After welding, the wheel housings are machined with NC-machines to exact tolerances. Each end carriage is equipped with double flanged wheels, cellular buffers, and derailment protectors keeping the crane on the track in case of wheel or axle damage. Crane wheels are turned and they run on anti-friction bearings.
10. Electrification and outfitting

Power for the crane is taken through a down-shop power supply line where the current is fed through the manual Main Disconnect switch (located at the bridge control panel). With this, the entire crane can conveniently de-energized for maintenance/service or longer periods. After the Main Switch, current is taken through main fuses to a main contactor, which is controlled from an emergency stop push button on the pendant. After the main contactor the current goes through a protection switch (short circuit protection with automatic trip or fuses), and further to overload switches and thermal protection system for the hoisting motor.

The power supply system is equipped with a phase control guard that opens the main contactor in case of phase failure. The control voltage is taken to the control circuitry through isolating transformer. All hoist and crane movements are independent and can be run simultaneously. Contactors are magnetic type and designed for crane applications, rated for severe vibration. Mechanical interlocking is used in contactors that control movements in opposite directions, preventing accidental, simultaneous contacting. The electrical equipment of the crane is located in the bridge and hoist control panels. The control panels are manufactured of steel plates and finished to withstand corrosion. The components are positioned in a maintenance friendly way, and the whole layout provides good protection against accidental contact.

The multi-wire type fixed cables with plastic insulation are intended for crane usage. Cables are coded either with numbers, colours or tags for easy identification. The cables used for festoons are PVC insulated flexible flat cables rated for 450/750V, specially designed for cranes, hoists and monorail systems. Festoon cables are suspended on cable saddles, fixed to cable trolleys, running in a galvanised C-track, which is connected to the main girder with bolted or welded support brackets.

11. Factory tests and quality control

The standard in-house inspection and test plan meets most requirements, including the following:

Steel Construction
- All load-bearing material, such as girder plates are supplied with quality certificates.
- All welders and weld procedures are qualified.
- The welds are inspected.

Machinery
- Hooks forgings are certified, including magnetic particle test.
- Ropes have manufacturer’s certificates.
- Gears have no-load running test including hardness and backlash measurements.
- Motor testing includes resistance, insulation resistance, high voltage and short circuit measurements and a no-load running test.

Assembly
- Ready assembled crane is measured to verify correct span and alignment.
- Measuring devices secure wheel alignment.
- Crane will be completely assembled at our workshop and run without load to check the function of the crane and to verify the dimensions.

General
- In addition, the inspectors carry out inspections after each phase of work during the manufacture. No reports about these inspections and measurement controls are normally written. Any special inspection will to be defined before delivery.