
CKAS W15R 7DOF Motion System (1500kg / 3300lb Payload) 6DOF + Infinite Turntable



Introduction

The CKAS W15R 7DOF Motion System is specifically directed at **medium-heavy weight professional motion simulator applications requiring excellent ground handling capabilities or disorientation training abilities**, such as commercial and industrial simulators, bus simulators, truck simulators or custom built flight simulators which require the **absolute highest level of fidelity** available.

Target Applications

- **Medium-Large Scale Professional Fidelity Flight Training Simulators for up to 5 people with UPRT and Disorientation Training abilities**
- **Medium-Large Scale Military Training Simulators for up to 5 people with superior ground handling or Disorientation Training**
- **Medium-Large Scale Professional Fidelity Commercial Vehicle and Truck Driver Training Simulators with proper ground handling**
- **Antenna and Radome Research Platforms**
- **Medium-Large Scale Professional Fidelity Research Platforms**

General Description and Capabilities

The CKAS W15R 7DOF Motion System is Ideal for OEM manufacturers of existing simulator products who are looking for a cost effective method to add the highest level of professional motion to an existing or new design. This unique 7DOF unit (6DOF + Infinite Turntable) is built to CKAS standards, and is USB (or Ethernet) plug and play straight out of the box. The only assembly required is to bolt on whatever goes on top of the motion system.

The CKAS W15R 7DOF Motion System is a full motion unit with additional infinite rotation turntable capability, features a heavy plate frame structure, can carry 1500kg, can swing 18° in any axis, make an excursion of 150mm in any direction, can rotate indefinitely in the Yaw axis with enough speed to simulate a turning vehicle, and a high enough architecture to take a 3.0m size payload.

The W15R has a connection to power which the user can supply up to 80 amps into. Some of this power (up to 35 Amps) is utilised by the motion system and the remainder is available for the user for items such as computers and visuals. The W15R can carry up to 4 x 4U rack computers on the turntable itself in a 2 x 8U Full Depth Rack.

The expected life of the W15R is extremely high, and the maintenance requirements are minimal, especially important in commercial or military based applications. The technology used on this professional 7DOF system is “best in class”, incorporating industry leading electronics, encoders and actuators

The CKAS W15R 7DOF motion system comes with the following key features:

- Fully Electric Actuation
- USB 2.0 plug and play
- Ethernet 100BaseT interface for custom OS/Platform independent applications (optional extra)
- On board Washout filters and acceleration onset cueing algorithms for many supported titles constantly growing (see website for all current supported games and simulator programs)
- Generic custom user program or other systems with full washout cueing, inverse kinematics, forward kinematics and full diagnostics on board the motion system
- Configurable to be connected directly to X-Sim to support over 50 other popular games such as Dirt/Dirt2/Dirt3 F1 2010/2011/2012/2013/2014 and many more
- Basic Serial over USB or optionally UDP (over Ethernet or Local) interface for immediate connection to custom software
- Very high speed update 100Hz motion controller for extremely smooth high fidelity response

Specific “On-board” Functionalities

This motion system features the CKAS Generation III controller which has some very high level functionality available to the user, without the need for any CKAS software to be running on a host PC. The client software can directly interface to the motion system at a very high level, and is even platform independent with the optional Ethernet Module installed.

The CKAS Generation III controller features the following specific capabilities on board:

- **Full Inverse Kinematics** allowing the user to drive the machine in Cartesian co-ordinates from any custom application, over either USB serial (Windows/Linux only) or completely platform independent through an optional Ethernet Interface.
- **Full Forward Kinematics** allowing the user to read the actual current position of the motion system in real-time, allowing for a wide range of applications, including when the visual system is not mounted on the motion system and needs to be synchronised in the graphics (client software required to perform the graphical synchronisation).
- **Washout Cueing Filters** allowing the client to send high level kinematics data to the motion system in order to recreate the vehicle motion through the washout filters, all completely independent of any other software, and even completely platform independent on the optional Ethernet Interface.

General Specifications

(Subject to change without notification)

Product Name	CKAS W15R 7DOF Motion System
Product Code	W15RMP
Product Number	60.0002.11
Product Description	Medium-Large Scale 7DOF electric motion system with infinite turntable
Harmonization Code (HS)	854370 or 854380 or 8543.70.96.50 (depending on Harmonisation system)

Mechanical Specifications

Architecture	7 Degree of Freedom Modified Stewart Hybrid with infinite turntable
Actuation	Fully Electric
Nominal Width (Parked)	2900 mm (114.2") (additional 100mm (4") overhang for on board PC rack)
Nominal Length (Parked)	2900 mm (114.2") (additional 100mm (4") overhang for on board PC rack)
Nominal Height (Parked)	790 mm (31.1")
Approx unit weight	1600 kg (3500 lb)
Anchoring Specification	8 places 22mm holes on 2850 PCD to be anchored with 12-16mm fasteners

Performance Specifications

Payload Mass Limit	1500 kg (3300 lb)
Payload Moment of Inertia	1500 kg.m ² (35,600 lb.ft ²)
Payload CG horizontal offset	Less than 100mm from Centroid of Flying Platform
Payload CG Vertical offset	Less than 800mm high from top of Flying Platform
Payload Max Floor Size	Diameter 3000mm (118")
Indep. Surge (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Sway (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Heave (disp. / vel. / accel.)	±150mm , ±300mm/s , 0.5G
Indep. Yaw (disp. / vel. / accel.)	±18° , ±30°/s , ±300°/s ²
Indep. Pitch (disp. / vel. / accel.)	±18° , ±30°/s , ±300°/s ²
Indep. Roll (disp. / vel. / accel.)	±18° , ±30°/s , ±300°/s ²
Turntable (disp. / vel. / accel.)	±∞° , ±25°/s , ±150°/s ²
Max Motion Excitation Frequency	50 Hz

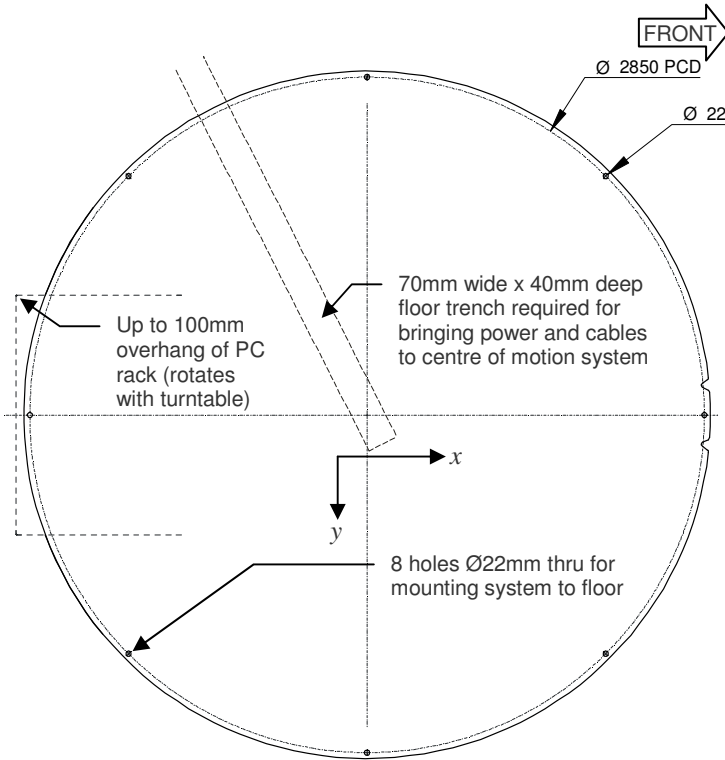
Electrical Specifications

Power Supply Requirements	200 – 250V AC Single Phase @ 35 Amps hard wired (no RCD) for Motion
Power Available to Onboard	Up to 200 – 250V AC Single Phase @ 45 Amps (if 80 Amps supply used)
Safety Interlocks	External User Park and Current Position Freeze on Power Fail
Connection Interface	1 x Single Phase Power up to 80 Amps, 1 x Ethernet, 4 x General I/O Lines
PC Connectivity	USB 2.0 (Ethernet Optional)
PC Space on Turntable	2 x 8U full depth rack for on board computing
Controller Update Frequency	100 Hz

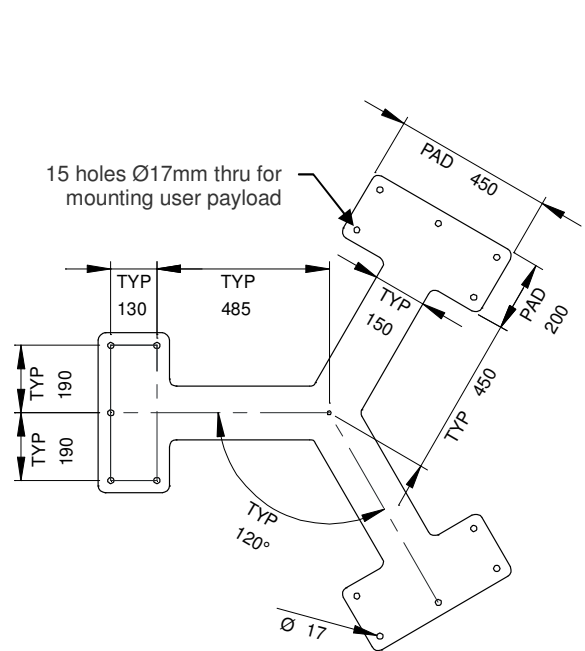
Software Specifications

Interface Protocols	Serial over USB (Windows/Linux) / Optional Ethernet (OS independent)
Washout Algorithm Drive	Washout System with 6DOF optimisations for: <ul style="list-style-type: none"> • Many supported games and simulator programs (see website for complete details) • Generic User Applications (any platform with Ethernet)
Direct Drive	Extended command set over Serial or (optional) Ethernet

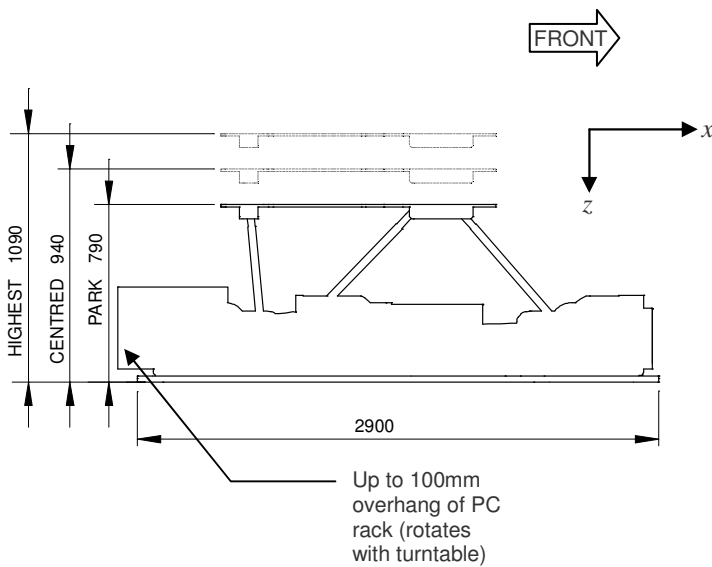
View of Base Mounting Holes from TOP



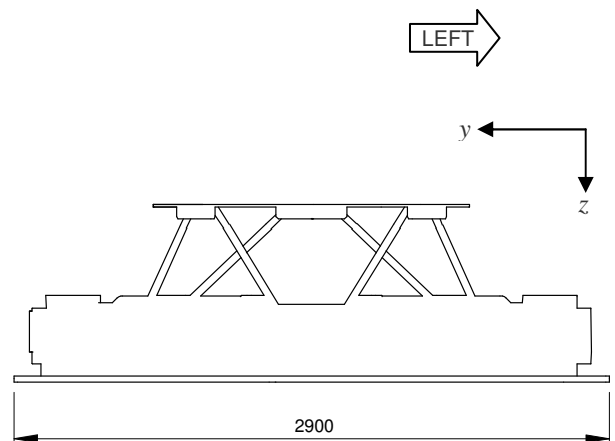
View of Flying Platform from TOP



View of Motion System from RIGHT



View of Motion System from FRONT



CKAS W25R 7DOF Motion System (2500kg / 5500lb Payload) 6DOF + Infinite Turntable



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The W25R has a connection to power which the user can supply up to 80 amps into. Some of this power (up to 55 Amps) is utilised by the motion system and the remainder is available for the user for items such as computers and visuals. The W25R can carry up to 4 x 4U rack computers on the turntable itself in a 2 x 8U Full Depth Rack.

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Nominal Height (Parked)	790 mm (31.1")
Approx unit weight	1800 kg (4000 lb)
Anchoring Specification	8 places 22mm holes on 2850 PCD to be anchored with 12-16mm fasteners

Performance Specifications

Payload Mass Limit	2500 kg (5500 lb)
Payload Moment of Inertia	3500 kg.m ² (83,000 lb.ft ²)
Payload CG horizontal offset	Less than 100mm from Centroid of Flying Platform
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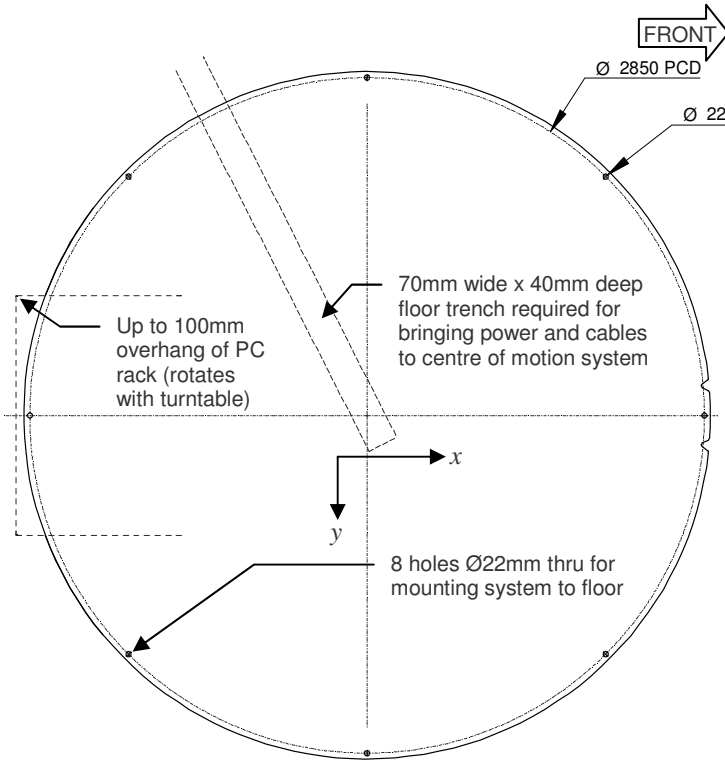
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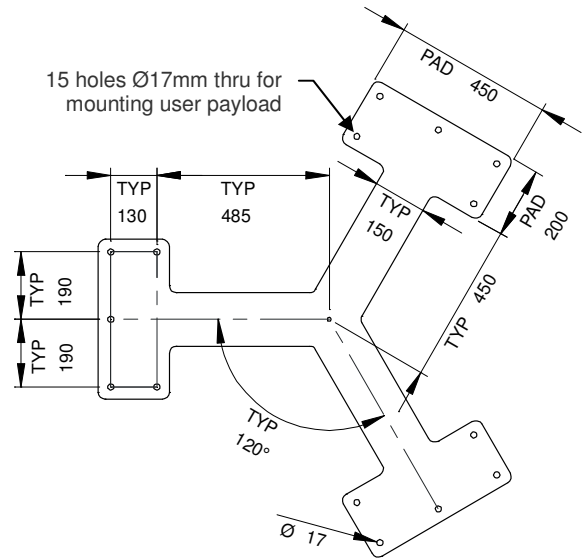
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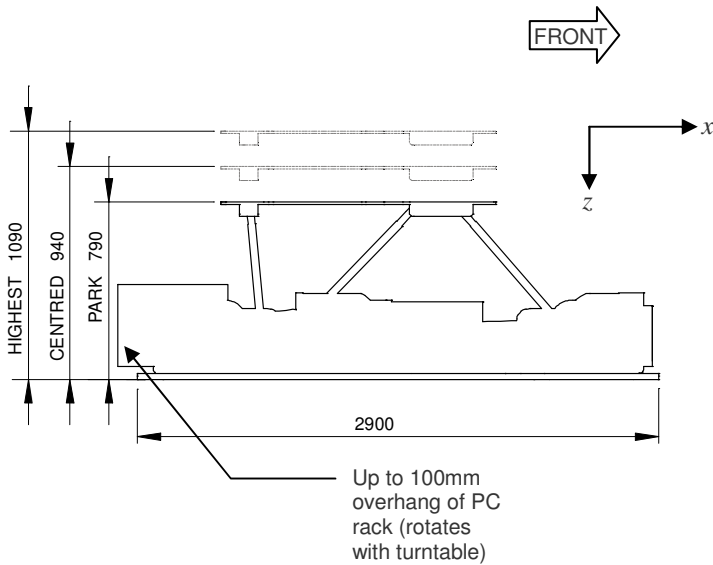
View of Base Mounting Holes from TOP



View of Flying Platform from TOP



View of Motion System from RIGHT



View of Motion System from FRONT

