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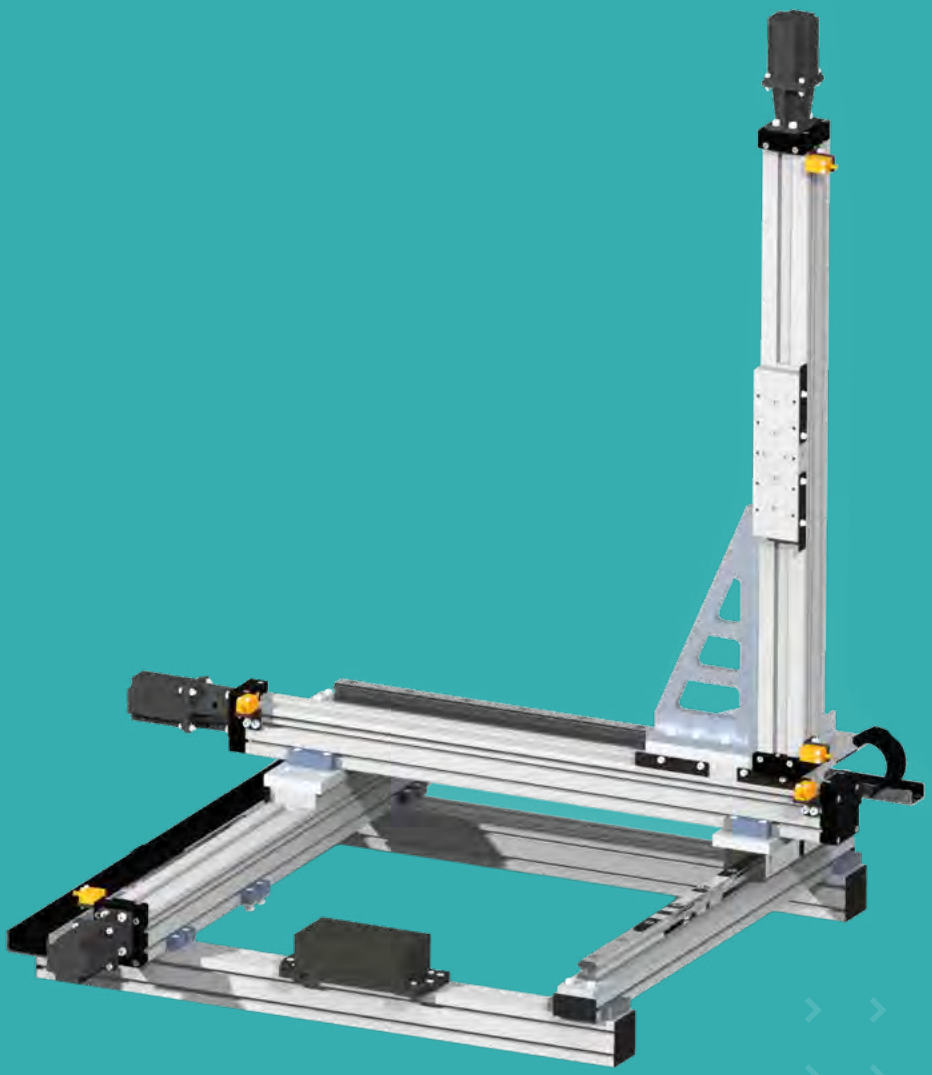
TRAVERSE MECHANISMS AND PROBE MANIPULATORS



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WTTECH.CZ
SPECIALISTS IN THE DEVELOPMENT, DESIGN, AND SUPPLY OF TEST EQUIPMENT

WTtech.CZ specializes **in the development, design, and construction of wind tunnels, including all necessary equipment**—the WTtech.CZ team consists of committed designers, engineers, constructors, and aerodynamics specialists. Thanks to our expert know-how and many years of experience, we can offer solutions for **any specialized project completed under difficult circumstances.**

WTtech.CZ wind tunnels (WT) can be used in many different areas from aviation research to the automotive industry to skydiving and university teaching. Our services are not limited to tunnels; we offer testing and measuring equipment, software, data processing, consultancy, project management, and research project preparation.

In addition to WT, WTtech.CZ specializes in advanced aerodynamic calculations, structural work in the **Creo 3D CAD system, CFD and FEM simulations**, and development of accessories such as manipulators and aerodynamic scales. We also offers specific measurement and control software, data processing, and analysis to optimize design and efficiently solve aerodynamic challenges.

Founded in 2009, WTtech.CZ became an official National Instruments system integrator and the exclusive representative of Scanivalve Corp. for the Czech Republic, Slovakia, and Poland. This allowed us access to the latest technologies and cutting-edge research and measurement tools.

TRAVERSE MECHANISMS AND MANIPULATORS FOR WIND TUNNELS

Traverse Mechanisms and manipulators are key accessories for wind tunnels and experimental facilities used for various types of research, including fluid mechanics. They are **used for precise positioning and control of models or probes**, enabling flow field characteristic measurement in the wind tunnel‘s Test Section. Traverse Mechanisms move probes and sensors in different axes, which is essential to obtain detailed data on airflow and other aerodynamic properties in the area of interest.

They are designed and constructed for maximum position accuracy, minimum interference with the flowfield, and the ability to withstand extreme conditions such as high flow velocities and high temperatures.

TRAVERSE MECHANISMS TYPES ACCORDING TO ITS DRIVE

Manual – the simplest traverser type, where the movement is controlled manually, suitable for basic applications where high precision or automation is not required

Driven by stepper motor – these traversers offer high precision and reliability and are capable of performing fine steps; they are ideal for applications that require precise positioning

Driven by servomotor – provide higher performance and precision than stepper motor traversers and can be used to quickly and smoothly change position, are suitable for highly demanding applications requiring dynamics and precision

TRAVERSE MECHANISMS TYPES ACCORDING TO THE NUMBER OF AUTOMATICALLY CONTROLLED AXES

1D traversers – move on one axis, used for basic measurements requiring only linear displacement

2D traversers – move on two axes, allowing for more complex automatic measurement in a two-dimensional space

3D traversers – move on three axes and are essential for complex three-dimensional measurements and analyses

Multi-axis traversers – combine the above with additional probe adjustment options

WTtech.CZ offers a wide range of traversing devices designed to suit the customer's requirements and conditions, including the size of the area to be surveyed. The control software allows for scheduling of the measurement in predefined steps and intervals, while the traversing process is fully automated and can take from a few minutes to several hours depending on the type of measurement.

The traversers can be controlled both manually with buttons on control panel and solely via a software interface. The traverse mechanisms can move in predefined steps or continuously. In order to increase the safety of the measurement, the movement of the traversers is restricted by software and hardware limits.

The design of WTtech.CZ traversers minimizes the traverser's influence on the test airflow and is optimized using the finite element method (FEM). This ensures high structural stiffness, minimizes deformation during operation, and contributes to high measurement accuracy. **FEM optimization** also ensures that the traversers have optimal natural frequencies, reducing their susceptibility to vibrations caused by external forces. This increases the stability and reliability of measurements in challenging aerodynamic conditions.

SELECTED COMPLETED PROJECTS

2D TRAVERSE MECHANISM FOR A LOW-SPEED WIND TUNNEL WITH CLOSED TEST SECTION

Movement range: 300 x 200 mm

Maximum airspeed: 90 m/s

Purpose: measurement of the velocity flowfield characteristics inside the Test Section

Application: positioning of pitot-static probes, directional probes, and hot wire anemometer probes

Specifics: sealed system to minimize the influence on the flowfield inside the test section

3D TRAVERSE MECHANISM FOR A LOW-SPEED WIND TUNNEL WITH OPEN TEST SECTION

Movement range: 500 x 500 mm

Maximum airspeed: 90 m/s

Purpose: measurement of flow characteristics in the air stream

Application: placement of pitot-static probes, directional probes, and hot wire anemometer probes

Specifics: its rigidity, tonnage, and capacity allow the mounting of a laser head designed for LDA, or systems and cameras for PIV measurement

WIND TUNNEL TRAVERSE SYSTEM FOR CLOSED-LOOP WIND TUNNEL / CALORIMETRIC RIG

2x 2D TRAVERSE MECHANISM FOR MEASUREMENT IN FRONT OF AND BEHIND THE TEST OBJECT

Configuration: 2x 2D traverser

Movement range: 700 x 500 mm

Maximum airspeed: 70 m/s

Purpose: measurement of flow characteristics in the flow stream (velocity vector, pressure, turbulence, temperature) in front of and behind tested Heat Exchanger

Application: placement of pitot-static probes, directional probes, and hot wire anemometer probes

Specifics: fully automated synchronized movement

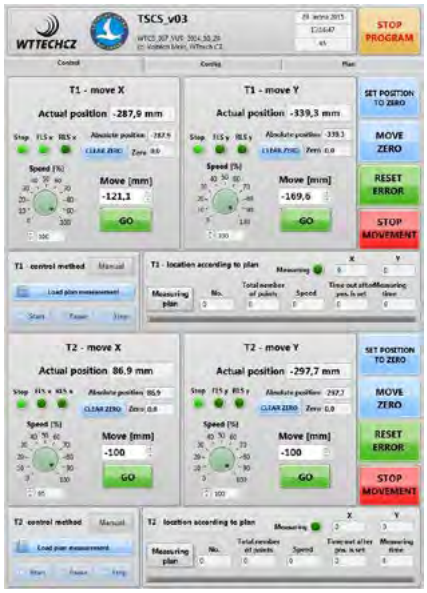
1D TRAVERSING SYSTEM FOR AN INDUSTRIAL WIND TUNNEL

Movement range: 1600 mm

Maximum speed: 110 m/s

Purpose: measurement in a closed-circuit industrial WT

Application: positioning of pitot-static probes, directional probes, and hot wire anemometer probes



TYPICAL CONTROL SOFTWARE OF TWO 2D TRAVERSER MECHANISMS

WTtech.CZ software allows for example:

Setting the movement according to predefined steps

Speed control

Display of the current position

Fully automated movement according to a measurement plan

Software limitation of the motion range

Integrated solution for emergencies

3D (6D) TRAVERSING SYSTEM FOR AN INDUSTRIAL WIND TUNNEL

Movement range: 3100 x 2100 x 2000 mm

Maximum speed: 110 m/s

Purpose: measurement in a closed-circuit industrial WT

Application: positioning of pitot-static probes, directional probes, and hot wire anemometer probes

Specifics: the 3D traverser is designed as a manipulator with 6 degrees of latitude

TURBINE TEST RIG TRAVERSING SYSTEM

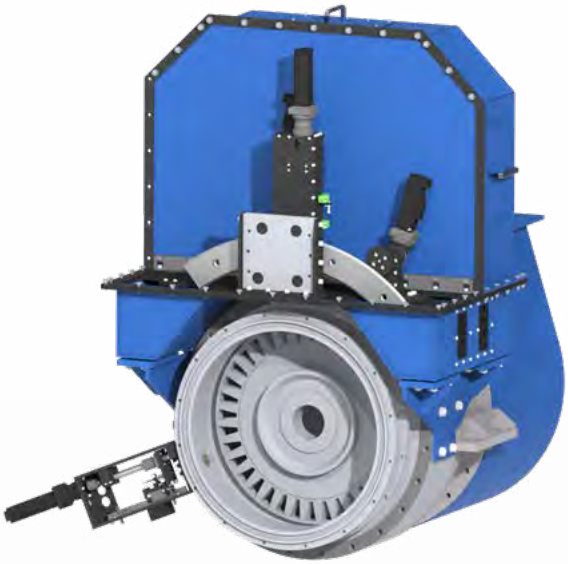
Configuration: 2x 3D traverser

Maximum airspeed: 100 m/s

Purpose: internal aerodynamics measurement

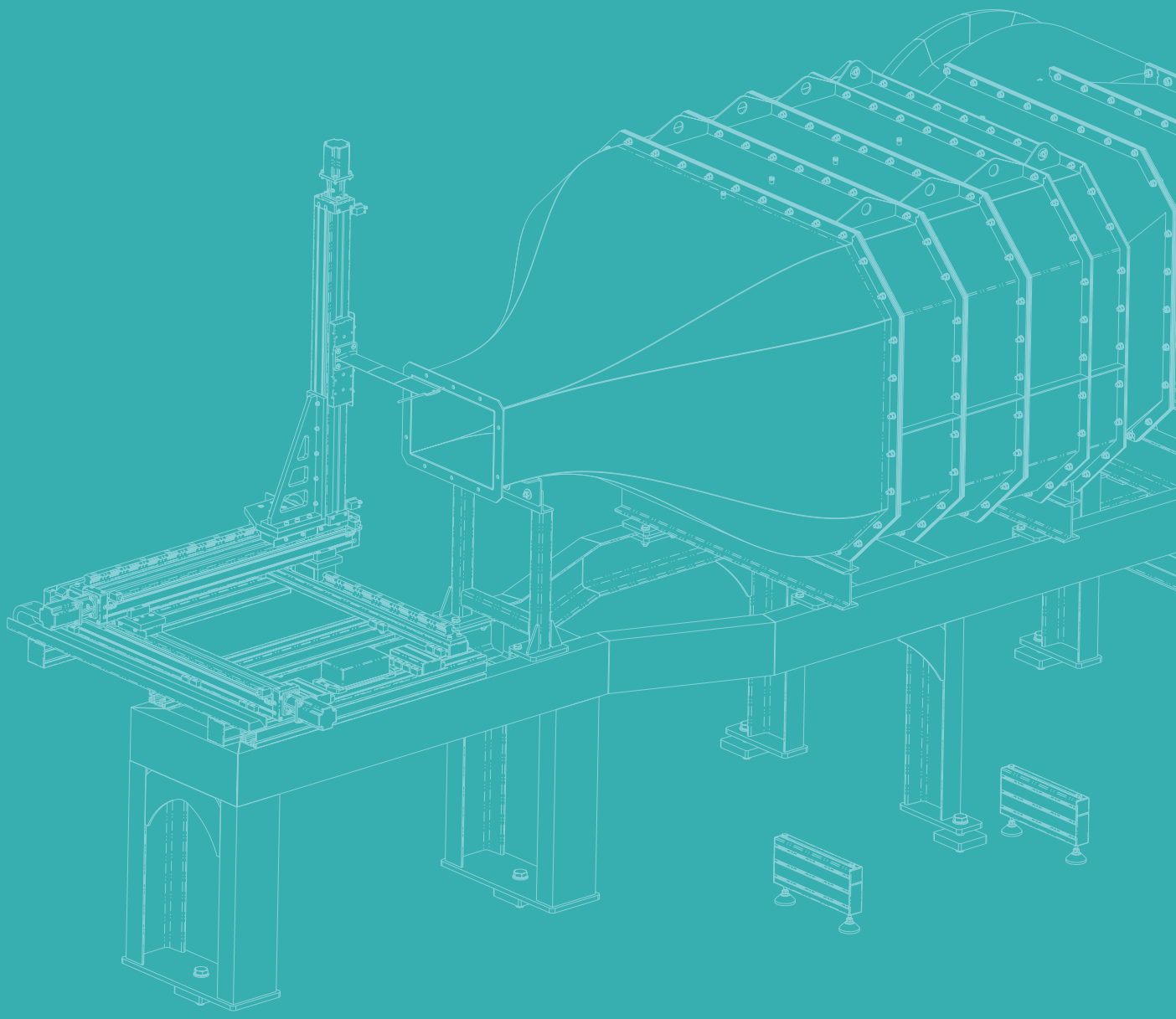
Application: measurements with directional and fast pneumatic probe, traversing in front of and behind the turbine stage

Probe movement options:
1. circumferential displacement
2. radial displacement
3. probe rotation around its axis



WTTECHCZ

DESIGN, CONSTRUCTION, AND DELIVERY OF TEST EQUIPMENT FOR YOU: TAILORED TO YOUR SPECIFIC REQUIREMENTS AND CONDITIONS!



For more products and our range of services, please visit **www.wttech.cz**