

Planetarium Systems



**SKYMASTER® ZKP 4 LED –
The Small Size Planetarium for the Digital Age**



We make it visible.

Stars that Inspire.

The projection of the starry sky is what a planetarium is all about. Whether the artificial stars can fascinate and inspire hinges on the quality of imaging. ZEISS has set the standards for realistic and brilliant stars on the planetarium dome since 1923. In the age of digital video projection, more than ever before, it's true that bright and point-shaped stars on a black, velvety background can only be produced with optical projection.

In the new SKYMASTER ZKP 4 LED, ZEISS combines two leading-edge technologies to deliver extremely bright, tiny and pin-sharp light dots: ZEISS fiber optics and LED lighting. Never before has an artificial sky been as close to the natural one.

Thanks to LEDs, the stars are not only three times as bright as before, but also pure white compared to a slightly reddish hue of halogen-lit stars. Introducing LED illumination, ZEISS sticks to its concept of a realistic simulation of the night sky. The number of stars of the northern and southern skies projected remains approximately 7 000 – the quantity which a human eye can perceive under premium conditions, and which will not overload the view of the heavens in a planetarium of small or

medium dome size. The brightest stars shine with their natural colors; faint objects are represented as far as the naked eye could see their natural counterparts, and the Milky Way is realistically simulated by optical projection.

Expending only 35 watts, the LEDs even reduce power consumption by 66%. In addition, their long service life cuts down maintenance costs. An LED lamp needs to be changed only after 60 000 operating hours, i.e., after practically 20 years.



Each single star receives light from the high-power LED via a single optical fiber. Sixteen fiber-optic blocks, each for the northern and southern hemisphere are used to cover the entire star field.



Sun, Moon and Planets – Always Correctly Positioned.



Sun, Moon and the planets keep puzzling every new generation. How do lunar phases come about? Why does Sun rise vary with season and place? Why do planets move along loops? Only the planetarium can make the time run backwards or at extra speed, have the Moon run through its phases, make the Sun describe different paths in summer and winter, and orbit the planets in time-lapse fashion.

Each of the eight planet projectors in SKYMASTER ZKP 4 LED receives its astronomical coordinates via a digital drive. Within seconds, Jupiter and Saturn are

positioned as they were at the time of the star of Bethlehem in year -7. Every date 10 000 years in the past or future can be set instantly.

SKYMASTER ZKP 4 LED does more than simply show the planets visible to the naked eye – even Uranus, Neptune, dwarf planets and the Earth join in the cosmic dance around the sun. The gear chains of the past inevitably led to periodic deviations in the positions of the planets. SKYMASTER ZKP 4 LED always positions Sun, Moon and the planets correctly; even from a topocentric point of view. Define your vantage

point on the Earth, and SKYMASTER ZKP 4 LED moves the Sun, Moon and planets to their exact locations. Nothing could be better for explaining eclipses, occultations and planet conjunctions. Combined movements such as the progression of the analemma are as easy as pressing a button with SKYMASTER ZKP 4 LED. By the way, seven of the eight “planet” projectors can be used for other purposes. Simply enter the orbit of a planetoid, a comet or a satellite, and voilà, the object is positioned in the sky at the right time and right place.

Expanded Range of Functions With More Convenient Operation.

SKYMASTER ZKP 4 LED is a modular system. It is up to you to decide which didactic functions you want to be included. The projector supplied with powerdome® systems is designed for easy control of the ZEISS digital full-dome projection in synchronism with the optical-mechanical projector.

A convenient control panel with clearly arranged buttons and knobs, and the SKYPOST control program simplify working with the system despite the considerably expanded range of functions. SKYMASTER ZKP 4 permits manual and fully automatic operation, as well as switching between live presentations and program-guided playback. The control system is so easy to use that you can even have students operating and programming the system.



Projectors for zodiacal constellation figures, equator and ecliptic.



Projectors for hour angle scale with celestial pole and azimuth scale with zenith mark (covered).



SKYMASTER ZKP 4 control panel.

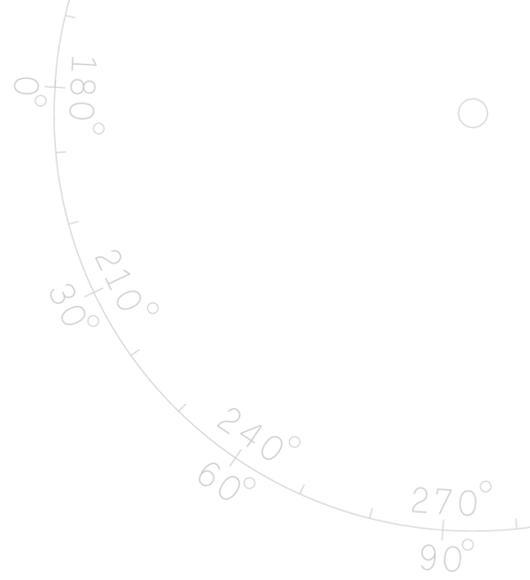
Didactic Functions*

- Celestial equator
- Ecliptic
- Meridian
- White and blue dome and effect illumination
- Constellation figures
- Hour circle / hour angle scale with celestial pole
- Vertical circle and azimuth scale with zenith mark
- Nautical triangle
- Cardinal points, switchable
- Precession scale
- Rotating Earth map
- East and west horizon light, white/red

Additional Features*

- Integrated lift, lifting height: 530 mm
- Azimuth rotation, unlimited and positionable
- Alphanumeric display (on dome edge)

* selectable features



The user interface provides clarity and flexibility. A new feature allows you to open several show programs at once. You can work with the timeline and list view at the same time, edit different positions in the show program and group control commands. The instrument status can be shown in digital and analog form for fast orientation during live presentations. All functions can be activated separately, i. e. independently of each other. SKYMASTER ZKP 4 LED also lets you link functions with each other in sensible combinations, for example to control a sunset.



*SKYMASTER VELVET in the Laupheim Planetarium.
(Photos courtesy of Laupheim Planetarium).*

SKYMASTER VELVET

ZEISS Hybrid Planetarium

SKYMASTER ZKP 4 LED is designed for joint use with full-dome video systems from ZEISS. The digital planetarium of powerdome® systems is coupled to the SKYMASTER movements. The digital planetarium follows the motion of the opto-mechanical projector without fail. As an example, while SKYMASTER projects the night sky, powerdome permits synchronous overlay projections of individual constellation figures of any selected color.

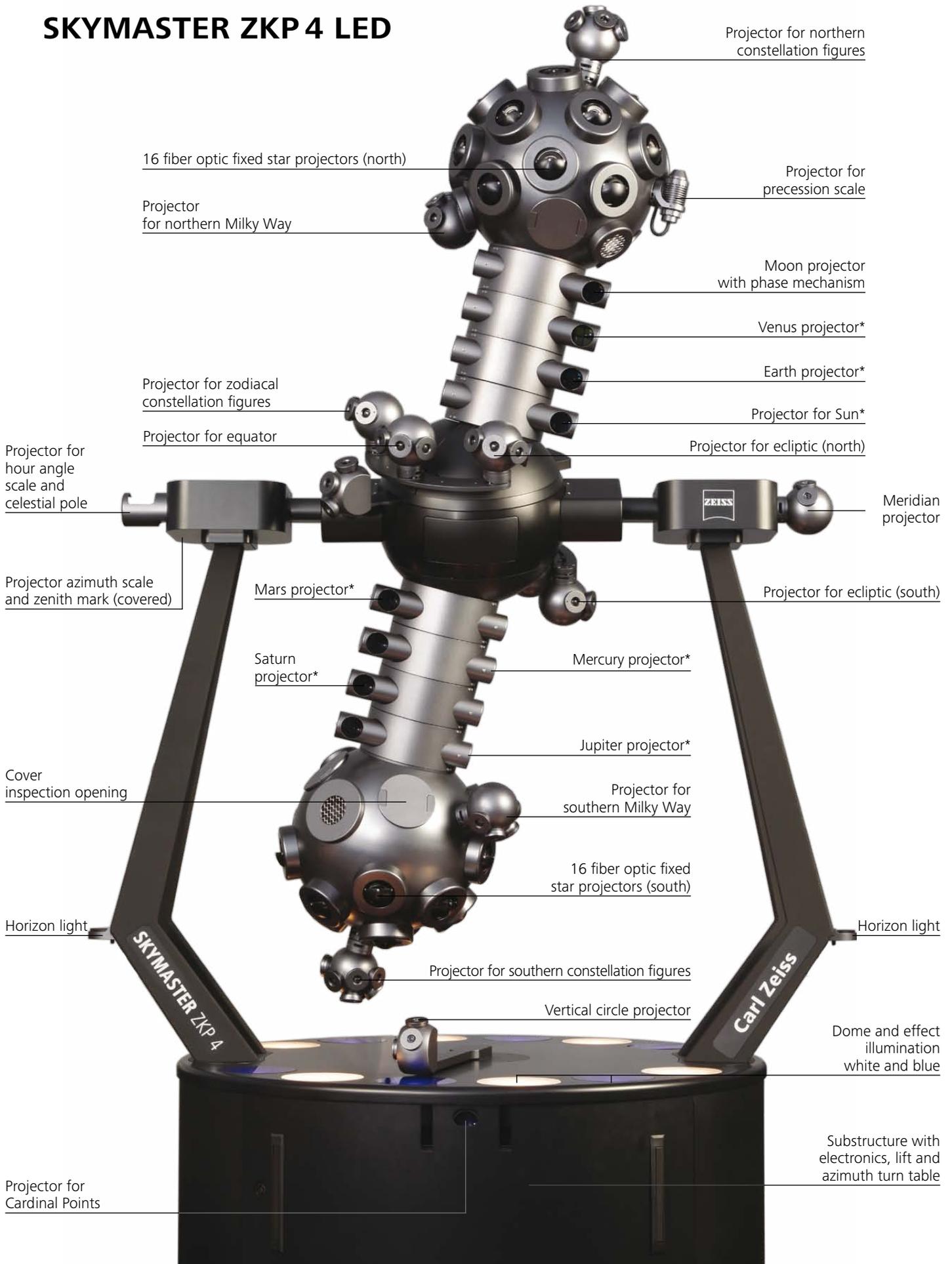
Powerdome®VELVET Duo, a two-channel digital projection system from ZEISS is the ideal complement to SKYMASTER ZKP 4 LED. The two VELVET projectors are arranged close to the ZKP 4 column providing full-dome imagery without any obstruction. SKYMASTER VELVET combines all the advantages of analog and digital planetarium projections: a true hybrid planetarium.

With powerdome®SPACEGATE Nova, ZEISS offers additional full-dome video systems based on commercial projectors.



SKYMASTER VELVET
(computer rendering).

SKYMASTER ZKP 4 LED



* Default projector function, other planets and objects by selection or input of orbital parameters in the SKYPOST 4 operating program.

Technical Data

Projection Dome

Dome diameters:	6 m to 15 m (20 to 50 ft)
Reflectivity:	40 % to 75 %
Horizon height:	2055 mm

Auditorium

Temperature:	+15°C to +30°C
Temperature changes:	max. 5°C/h
Rel. humidity:	max. 70 %

Projection Instrument

Color:	metallic anthracite / matt black
Height, max./min.:	2750 / 1725 mm
Diameter, substructure:	780 mm
Weight:	approx. 280 kg

Design Control Console*

Width:	1840 mm
Depth:	980 mm
Desk height:	1130 mm

Power Supply

Operating voltage:	240/220 V \pm 10 %, 50 Hz; 130/110 V \pm 10 %, 60 Hz
Power consumption:	3.0 kVA (max.); 1.8 kVA (typ.)

Control

Control computer:	Industrial PC
Control panel:	450 x 250 x 50 mm
Operating system:	MS Windows®
Operating software:	ZEISS SKYPOST 4

Installation/Training

ZEISS installs the projection system at the customer's location as agreed as soon as the assembly requirements meet the specifications of ZEISS. Following installation, the customer receives in-depth training on the operation and maintenance of the projection system.

* Additional Equipment

Carl Zeiss AG

Planetarium Division
07740 JENA, GERMANY

Phone: +49 3641 642406
Fax: +49 3641 643023

Email: planetarium@zeiss.com
www.zeiss.com/planetariums