

1. Which principal components make up a hydrostatic travel drive?

> Diesel engine, travel drive pump, hydraulic motor or ICVD®, axles.

2. What is the ICVD®?

> ICVD® = Integrated Continuously Variable Drive

A continuously variable, hydrostatic travel drive for self-propelled agricultural and construction machinery, as well as other mobile machines.

3. Functional principle of a hydrostatic travel drive with ICVD®

> The travel drive pump and the hydraulic motor of the ICVD® each have an adjustable piston displacement. Adjusting the piston displacement of the hydraulic motor and the travel drive pump results in continuously variable speed and torque conversion.

The mechanical energy of the diesel engine is converted into hydraulic energy by means of the travel drive pump. The travel drive pump is connected to the ICVD® via high-pressure hoses.

The axial piston motor of the ICVD® converts the hydraulic energy back into mechanical energy and transmits it to the axles.

4. What are the principal components of the ICVD®?

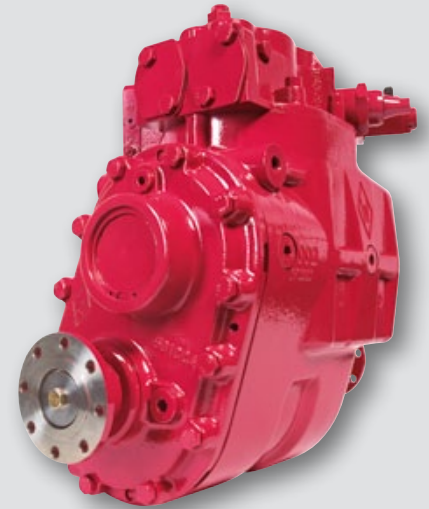
> Hydraulic motor (axial piston motor of bent-axis design featuring 45° wide-angle technology), swivel bracket, control unit cover, housing, one gear stage, output shaft.

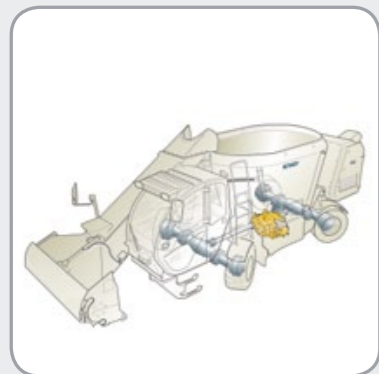
5. Function of the control unit cover

> The valves and control elements are integrated in the control unit cover and interconnected by oil ducts. The valves are used to set the driving characteristics and adjust the output, as well for cooling and selection of the direction of travel.

6. What kinds of control are possible?

> Hydraulic or electric control.





7. Function of the hydraulic motor

> Converts the hydraulic energy into mechanical energy.

8. Function of the swivel bracket

> Bears the hydraulic motor and performs the swivelling movement for varying the piston displacement.

9. Conversion range / Spread / Travelling speed

> The ICVD® is capable of realising a large spread, i.e. high transmission ratios can be achieved for high tractive forces, and low transmission ratios for high travelling speeds.

10. How is the speed adjusted?

> When setting off, the travel drive pump increases the delivery volume up to the maximum, after which the hydraulic motor swivels from the maximum displacement volume to the minimum and the maximum speed is reached.

11. Why are there two oil circuits?

> The hydraulic circuit is used for power transmission, while the gear oil circuit serves to lubricate and cool the gears and bearings.

12. How does the hydraulic circuit have to be structured?

> The ICVD® operates in a closed circuit (wheeled loaders, telescopic loaders, ...) or in an open circuit (excavators).

13. What is a closed hydraulic circuit?

> The travel drive pump and the ICVD® are directly connected with each other.

14. What is an open hydraulic circuit?

> What is an open hydraulic circuit?

15. What is the maximum system pressure?

> 500 bar.

16. What are the advantages of the wide-angle technology?

> Approximately 20% higher efficiency compared to conventional 32° designs, large conversion range.

17. Advantages of continuously variable drives for the driver

> Greater comfort and convenience => No gear-shifting, no interruption of the tractive force, relief of the burden on the driver – he can focus on the task in hand.

18. What advantages does the ICVD® offer end users?

> Greater energy efficiency (15% less fuel consumption according to customer measurements), improved operating convenience, increased productivity.

19. What advantages does the ICVD® offer machinery manufacturers?

> Cost efficiency due to modular system design and standard components, good capacity for integration due to compact design and flexible arrangement, high compatibility with other components. Owing to its higher efficiency, the ICVD® has the potential for down sizing with unchanged machine performance.

20. Advantages of continuously variable drives as regards energy efficiency

> The diesel engine can work at the optimum operating point (the rpm speed of the diesel engine is independent of the load and travelling speed). The diesel engine speed can be reduced.

21. What additional functions does the ICVD® offer?

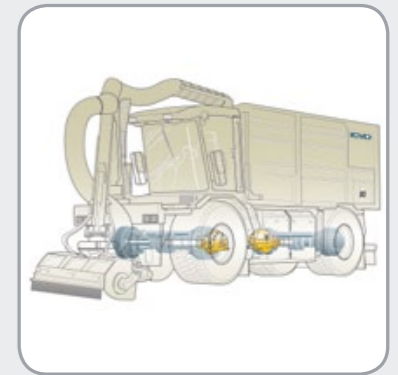
> Reversal of direction and torque, brake boost.

22. Which ICVD® types for which applications?

> Based on the required tractive force, the appropriate ICVD® is selected from the modular system and adapted in accordance with the customer-specific parameters (maximum travelling speed and driving characteristics).

23. What is the motor (MO) used for?

> The motor (MO) has no integrated gear stage. It can be installed directly on the axles or used as a single-wheel drive.



INTEGRATED
 CONTINUOUSLY
 VARIABLE
 DRIVE

24. What are the typical target applications?

- > Telescopic loaders, wheeled loaders, forestry and municipal vehicles, special tractors, mixer-feeders.

25. Which parameters are needed for an initial design?

- > Engine output and rpm speed, axle ratio, tyre diameter, vehicle weight, maximum vehicle speed and necessary tractive force.

26. What output classes and sizes are available?

- > Five sizes from 1,600 Nm to 7,000 Nm output torque at the ICVD® output shaft.

27. What are the advantages of the axle disconnection?

- > This new “automatic axle disconnection” function of the transmission permits switching from four-wheel drive to two-wheel drive for travelling on the road, thereby substantially increasing the system efficiency and reducing tyre wear.

28. Is product training available?

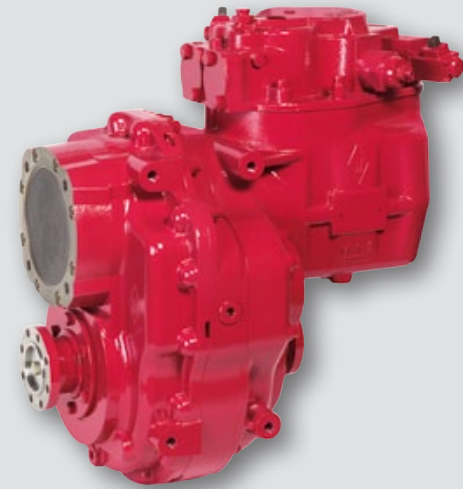
- > GKN Walterscheid offers ICVD® product training at its locations in Sohland and Lohmar on request.

29. Spare parts supplies / Service

- > Service work may only be performed by trained service staff. Removal of the protection caps invalidates the guarantee. Service is provided by GKN itself or through partners.

30. Customer references

- > Customers for production machines include CLAAS, Kramer, JCB, DIECI, SENNEBOGEN, Liebherr, Knüsel and Paus. There are currently more than 8,000 ICVD® units in the marketplace.



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