

Compact Hydraulics highlights

1. Motion Control Valves / Parts in Body:
 - Green Valves: gravitational lowering for energy saving

Green Valves

Bosch Rexroth Oil Control presents the new concept in load-holding and lowering valves to make mobile equipment more energy efficient and easier to control: Green Valves.

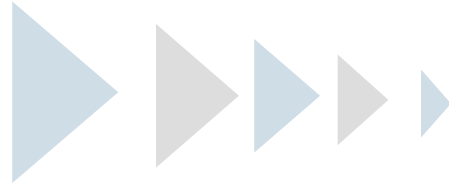
The new GENERATION of valves takes advantage of the force of gravity to lower a boom and its load instead of using the machine's valuable supply of energy.



Motion Control Valves / Parts in Body - Green Valves

To save Energy and Costs

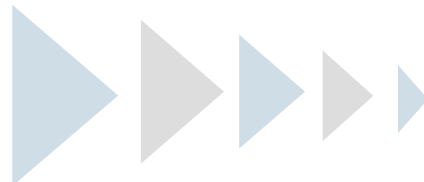
Gravity lowering enables to **reach significant energy savings and increase boom function performances** on different types of mobile machines.



New valve architecture in order to **optimize flow availability and reduce machine cycles time.**



Minimize energy dissipation helps engines to meet new emissions regulation.



PATENT PROTECTED

VBC-R



A-VBCN-R



How it works

In order to meet safety requirements and to ensure smooth motion, it is necessary to push down the boom against a counterbalance valve.

This requires more engine power to build up the pressure needed to open the valve. It's common to reach 55 kW of engine power in machines such as telehandlers, excavators, backhoe loaders, or cranes.

This can result in high power requirements, depending on parameters like cylinder position, the desired speed of movement or the pilot ratio of the counterbalance valve. With a pilot ratio of 4:1, today's counterbalance valves from Rexroth already reduce these energy requirements (up to 36 kW) without sacrificing stability or control precision.

Rexroth's new **Green Valves** go one step further and reduce the energy dissipation due to high pressure and high oil flow (less than 1 kw).

Engineered to replace traditional load holding valves, the patent-pending design takes advantage of gravity for boom lowering, both loaded or unloaded, while providing increased stability and control.



Motion Control Valves / Parts in Body - Green Valves

The result is quicker boom movement without cavitation and also smoother starting and stopping action. In addition, the Green Valves barely require any oil flow to lower the boom so more oil flow is available for faster operation of other simultaneous movements. Further, this can shorten machine cycle times for better performance.

By drastically reducing the energy required from the diesel engine to lower the boom, the new load-holding valves can provide significant fuel savings and also help in meeting emission standards. Higher fuel savings result in a more sustainable use of resources, which led to the product name, **Green Valves**.



Rexroth
Bosch Group

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The new **Green Valves** are made with well tested components to ensure reliability. The high level of stability and controllability integrated into the valves eliminates the need for damping devices such as orifices, thereby saving costs and also valuable installation space.

Suitable for any type of hydraulic circuit, Rexroth's Green Valves are compact, easy to install, and interchangeable with current Rexroth load holding valves.



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Example: Telescopic Handler



With traditional counterbalance valve:

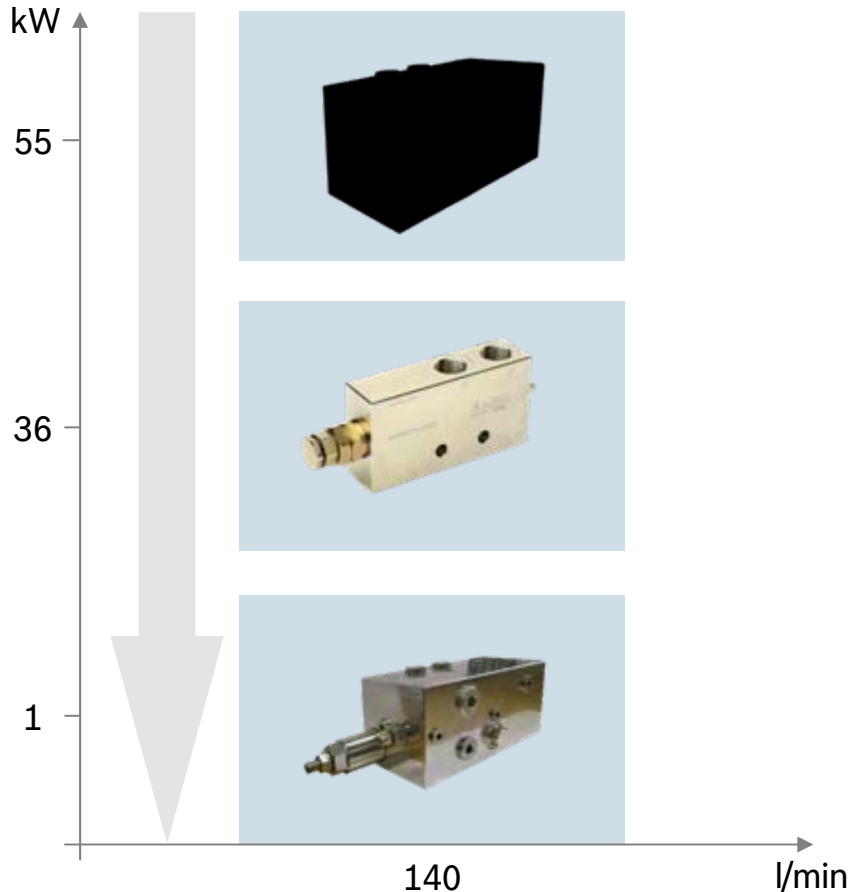
Wasting energy while lowering the boom since engine power is required.

Use of gravity forces to lower the boom:

- Need only low engine power.
- Higher speed with same pump flow.
- Same speed with lower pump flow.
- Lowering with no pump flow.



Field Test Results: Lowering with no Load



Competitor product:
Counterbalance, R = 2 : 1
Pump supplies 140 l/min @ 240 bar
approx. **55 kW**

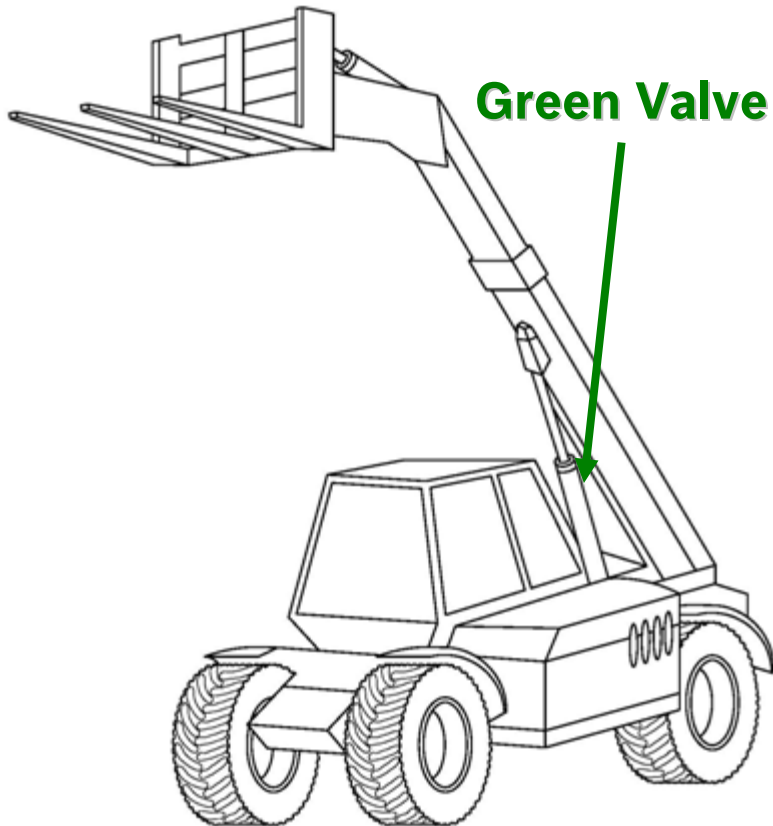
Rexroth traditional system:
Counterbalance, R = 4 : 1
Pump supplies 140 l/min @ 160 bar
approx. **36 kW**

Rexroth Green Valve
Less than **1 kW** to lower!



Motion Control Valves / Parts in Body - Green Valves

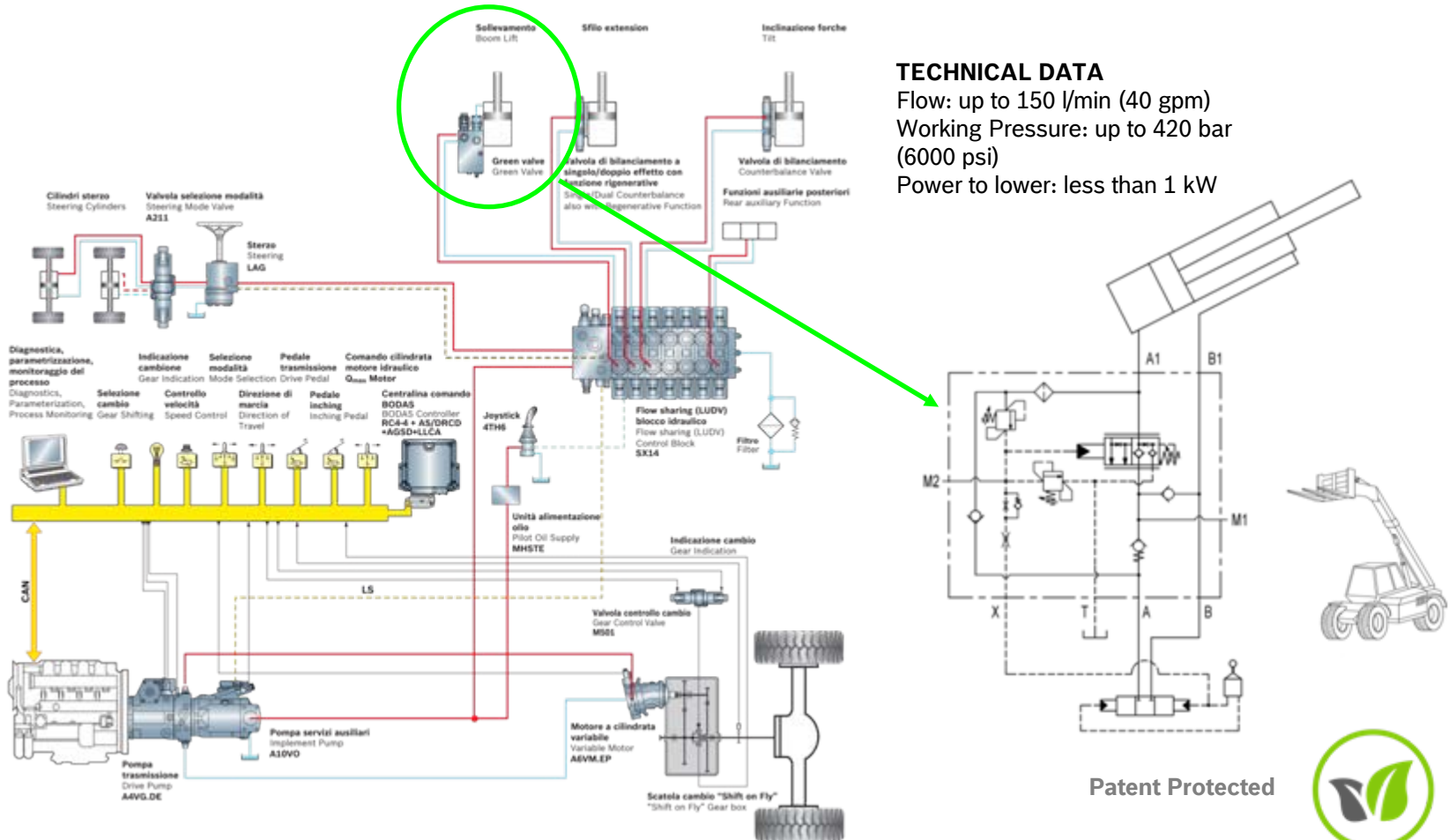
In short



- Low pressure needed to lower the load.
- No delay or minimized delay in fast starting of a movement.
- Oil recovery mode reduces cavitation and allows energy saving and more flow available for other functions during gravity lowering.
- No damping orifices or other dedicated devices needed to stabilize the movement.
- Smoother starting and stopping of the movement.

Motion Control Valves / Parts in Body - Green Valves

Green Valve VBC-R example THL - Hydraulic Circuit



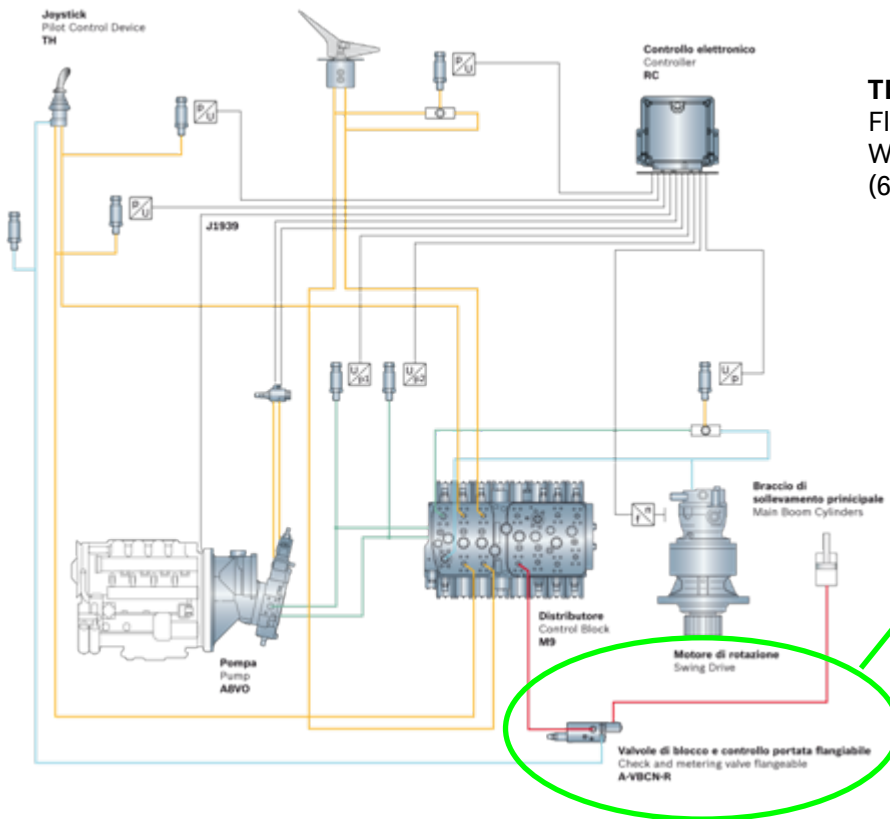
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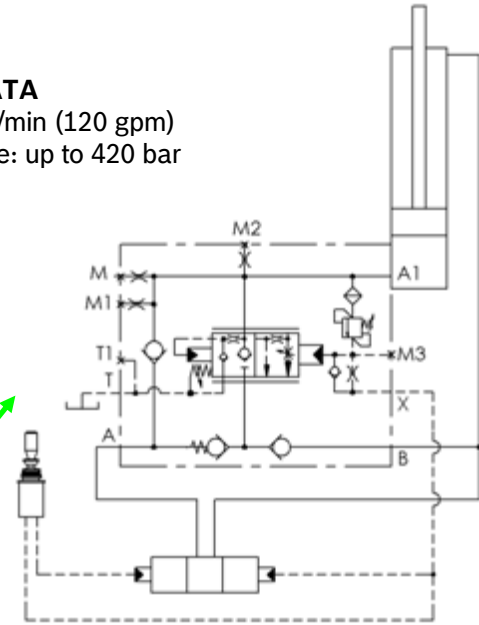
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Green Valve A-VBCN-R example EXC - Hydraulic Circuit



TECHNICAL DATA

Flow: up to 450 l/min (120 gpm)
Working pressure: up to 420 bar (6000 psi)



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Motion Control Valves / Parts in Body - Green Valves

Main applications

The diagram illustrates the main applications of Rexroth motion control valves. It is divided into two main sections by a vertical line. On the left, two valve models are shown: VBC-R and A-VBCN-R. Below them are illustrations of Excavators, Telehandlers, and Aerial Work Platforms. On the right, there are illustrations of Truck Cranes and Backhoe loaders. The labels for the applications are placed near their respective illustrations.

VBC-R

A-VBCN-R

Truck Cranes

Excavators

Backhoe loader

Aerial Work Platforms

Telehandlers



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