



NorrDigi® MCC – Energy Saving Digital Hydraulics

www.norrhydro.com





Customer benefits

- Increased productivity by precise control
- Automated motion control ensures safe movements
- Downsizing of components
- Automatic energy recovery and re-use
- Remote monitoring, data collection & analytics
- Better fuel efficiency

Value proposition

OWNER / OPERATOR – INCOME STATEMENT

	CURRENT	NORRDIGI ®
Net income	167.250 €	187.320 €
COGS (Labor)	50.000 €	50.000 €
GM	117.250 €	137.320 €
Operating expenses		
Fuel	55.250 €	33.150 €
SG&A	8.000 €	8.000 €
EBITDA		
Interest	4.000 €	4.000 €
Depreciation	40.000 €	40.000 €
EARNINGS	10.000 €	52.170 €

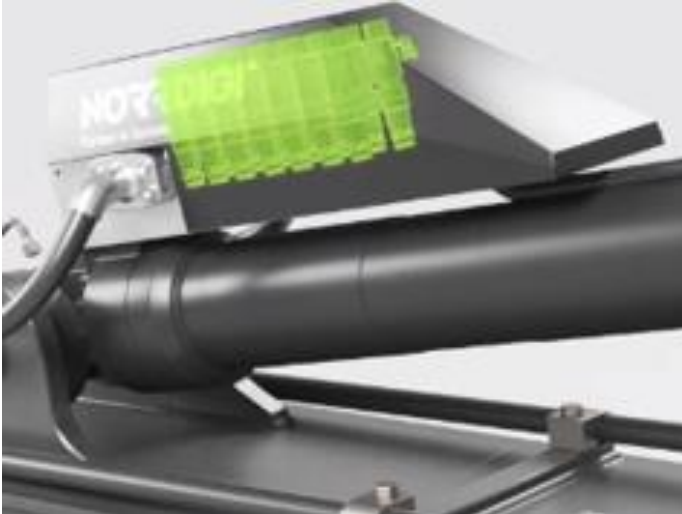




How Does NorrDigi MCC Work?

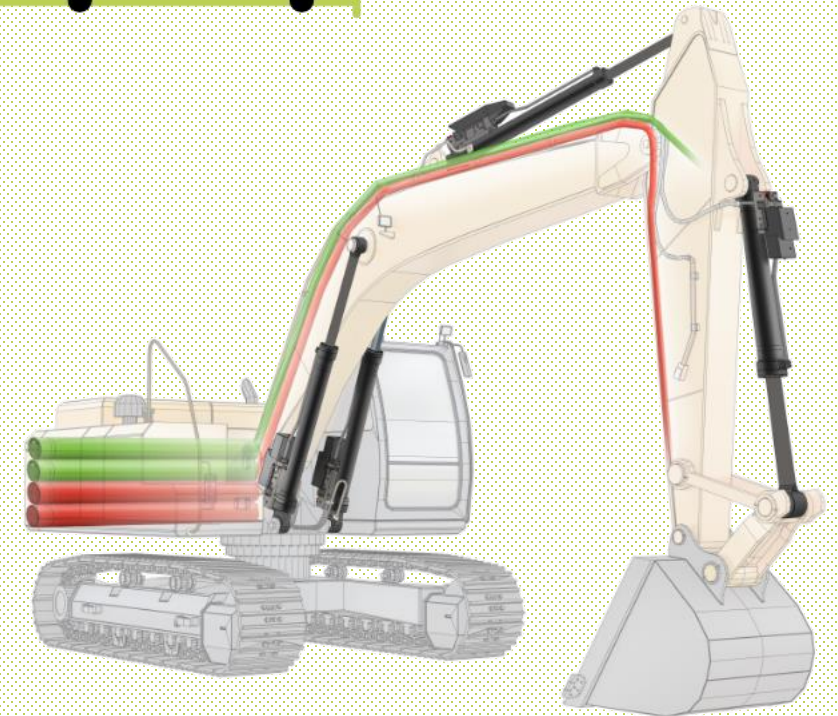
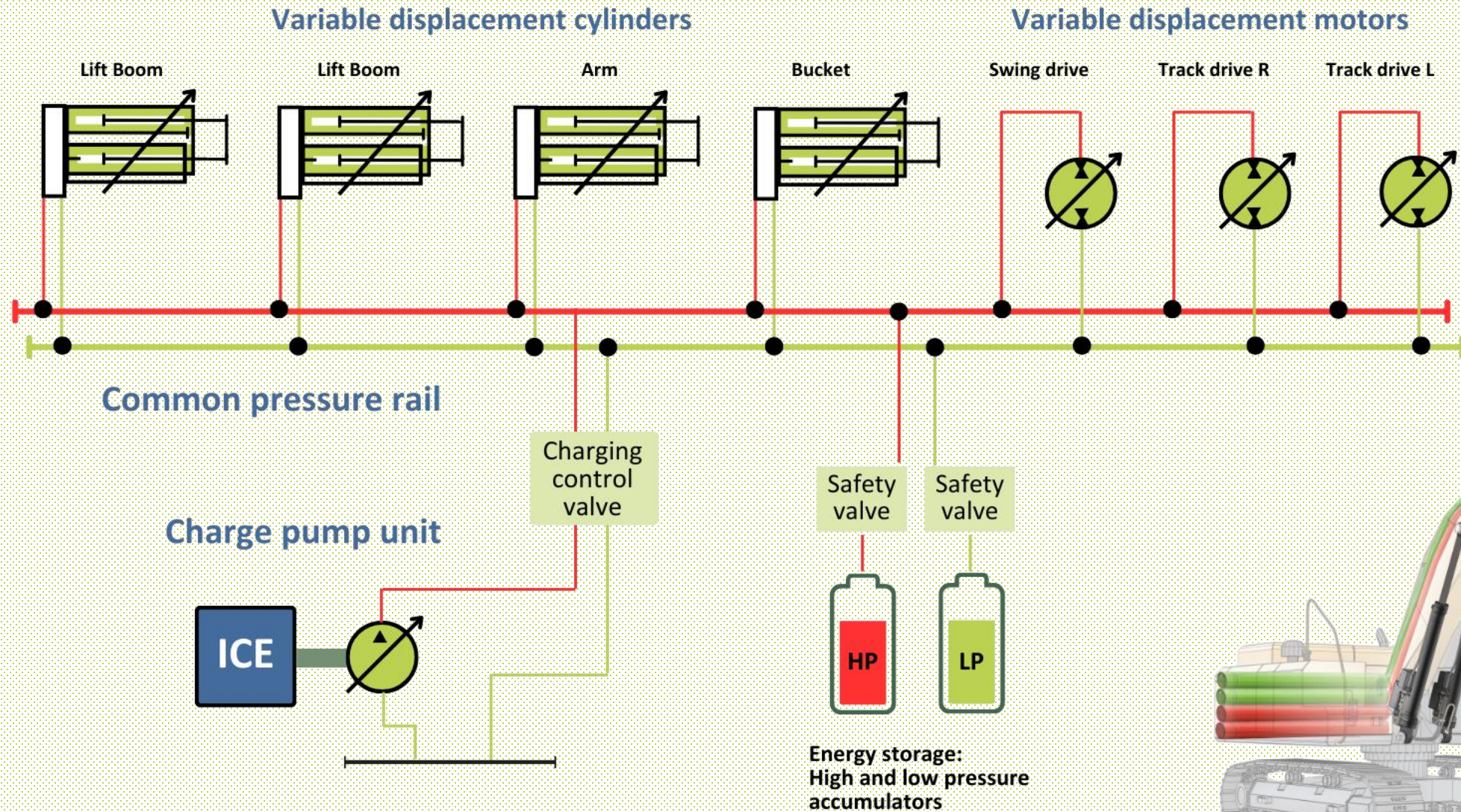
Key elements

- The MCC system is based on our proven multi-chamber hydraulic cylinders and patented control system
- Multi-chamber cylinders: 16 area combinations
- Intelligent motion control: smooth and optimized shifting
- Advanced accumulators: excess energy stored and recycled
- Latest enabling technologies: software, sensors, micro processors, directional control valves



[NorrDigi animation](#)

NORRDIGI® MCC SYSTEM FOR CRAWLER EXCAVATOR



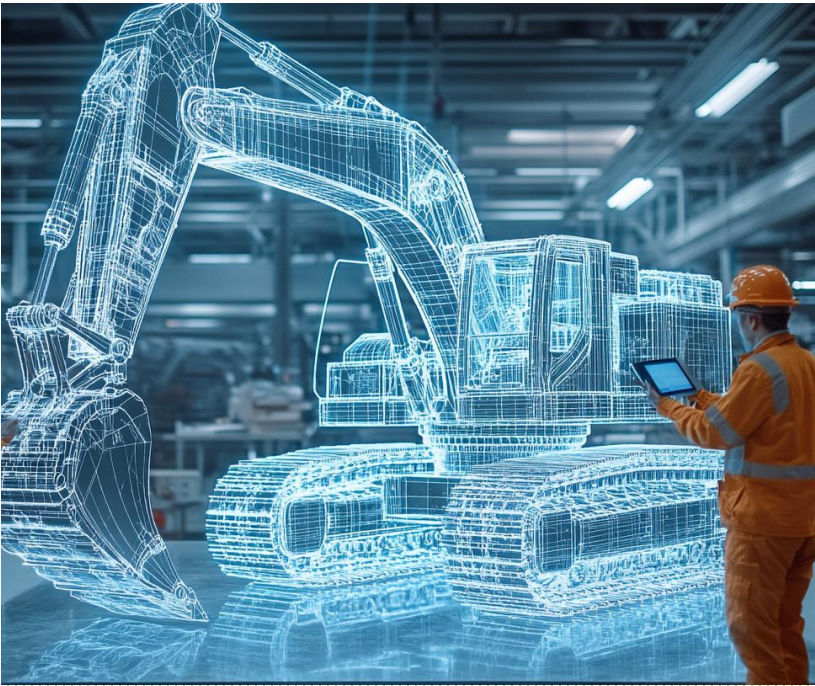
Designed According to the Application

Optimal applications:

- Earthmoving machines
- Forklifts
- Material handlers
- Reach stackers
- Mining machines

Benefits:

- Efficiency: 80%
- Energy recovery: 70%
- Increased productivity: 15-60%
- Improved fuel efficiency: 45-60%



PRODUCTIVITY GAINS, FUEL CONSUMPTION AND CO2 EMISSION REDUCTION



INDUSTRY

Construction equipment, off road mobile machinery.

CHALLENGE / OBJECTIVE

Volvo CE is committed to its position as a driver of change in the construction industry. Strict targets set to reach net zero value chain greenhouse gas emissions by 2040 – with a 30% reduction in CO₂ emissions across product use as by 2030.

SOLUTION

The NorrDigi Multi-Chamber Cylinders and control software replaced the excavator's conventional hydraulics in EC300E model. Main control valve removed – along with excessive pump capacity, piping and hoses. In addition, the system enabled downsizing of engine without impacting machine performance. High and low pressure lines installed with accumulators supplying power boost and storing excessive energy for reuse.

RESULTS

Significant fuel efficiency improvement by -50% compared to same size conventional machine and excellent maneuverability. Potential CO₂ emission reduction 300-350 tons CO₂ during machine lifetime (12.000h).

KEY PRODUCT

NorrDigi MCC cylinders, accumulators, control units and software logic.

VOLVO CE

Volvo Construction Equipment - Volvo CE is a major international company which develops, manufactures, and markets equipment for construction and related industries. It is a subsidiary and business of the Volvo Group.



KEY FIGURES

50 % Fuel saving

30 % Reduction in CO₂
emissions

55-60% Increase in
productivity

NORR DIGI[®]MCC CUSTOMER CASE – Oil & Gas Industry

RADICALLY INCREASED PRODUCTIVITY,
ENHANCED SAFETY



“

"This is a great improvement to both control and safety, as movements can easily be programmed by using NorrDigi software,"

Chris Martin, Aberdeen

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INDUSTRY

Oil & Gas exploration, drilling equipment.

CHALLENGE / OBJECTIVE

Customer looking to upgrade existing on shore drill rigs by enhancing productivity and safety in pipe lifting application. Slow manual operation, frequent oscillation and dangerous working conditions for operators needed to be eliminated.

SOLUTION

Replacing conventional hydraulic cylinder with NorrDigi MCC system to increase overall performance. Power boost installed utilizing high pressure chamber, allowing to speed up work cycle significantly. Installed control logics with safety features like soft end cushioning and precise controls to reduce oscillation.

RESULTS

Radical productivity gains achieved; cycle times cut by -60% in pipe lifting work cycle. The results are beyond anything available in the market, enhancing precision, durability and safety – thus helping rig operators to decrease turn around time and shift drill rigs to new work sites at increased pace.

KEY PRODUCT

NorrDigi MCC cylinder, pressure vessel and control logic.

ABERDEEN

Aberdeen Dynamics is a leading distributor of hydraulic, pneumatic, and electro-mechanical components and systems based in Tulsa, OK with 50 years of industry and engineering design and commissioning experience.



KEY FIGURES

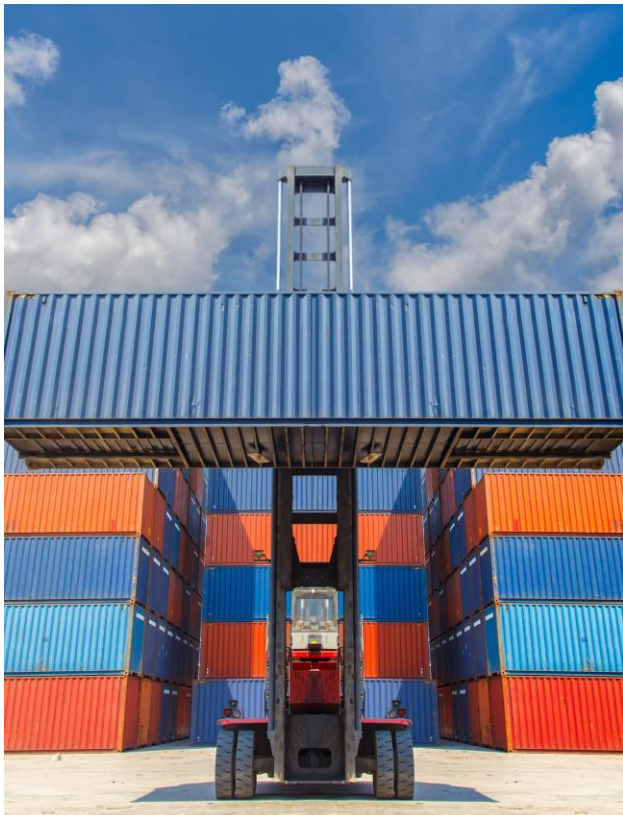
70 % Less Horsepower
required

50 % Reduction in CO₂
emissions

55-60% Increase in
productivity

CUSTOMER CASE – Container Forklift (Electrical)

CONTAINER FORKLIFT WITH CAPACITY TO LIFT 16TN



INDUSTRY

Transportation, vehicles, forklift, container lifts.

CHALLENGE / OBJECTIVE

Maximising operational up-time for heavy electric forklift for each battery charge. Target to reach full work shift capacity in single charge by energy storage and reuse. Cost saving by reducing battery packages. Increase productivity by longer working time.

SOLUTION

Using MCC cylinders and 3 accumulators to reuse energy from lowering containers, reaching 73% energy saving with heavy loads.

RESULTS

In concept phase.

KEY PRODUCT

NorrDigi MCC cylinders, accumulators, ECU and control logic with parameter setting.

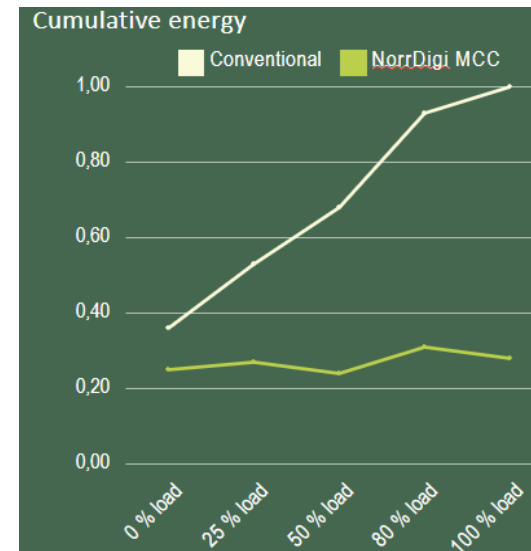
KEY FIGURES

70% Energy saving

30% Increase in productivity

Customer (confidential)

Customer is a global provider of wide range of industrial forklifts designed to meet various industrial applications, with lifting capacities ranging from 5 - 85 tons. Forklifts serve a wide array of industries, such as logistics, warehousing, steel, wood, metal, concrete, and wind turbine lifting and wind farm construction.



HOOKLOADER FOR MOUNTING AND DEMOUNTING BODIES & TIPPING LOADS



INDUSTRY

Transportation, vehicles, trucks, container lift.s

CHALLENGE / OBJECTIVE

- Increased motion for faster operation.
- Movement booster to initiate lifting heavy loads
- Remote controls for safer and faster operations.
- Optimizing space utilization.

SOLUTION

Using MCC cylinder for peak force and increase operational speed. Motion control logic for automated remote operations.

RESULTS

In concept phase.

KEY PRODUCT

NorrDigi MCC cylinders, accumulator, ECU and control logic with parameter setting.

Customer (confidential)

Customer is the world's leading provider of on-road load handling equipment, intelligent services, smart and connected solutions. Hooklifts and skiploaders can handle a wide variety of applications with equipment that is tailored to capacity and operational needs that have a low lifetime cost and give maximum uptime each day.

KEY FIGURES

50 % Energy saving

30% Increase in productivity

CUSTOMER CASE – Automated Feeding Unit of Geothermal Pipes

PIPE FEEDER FOR MOBILE DRILLING UNIT



INDUSTRY

Transportation, mobile machines, drilling unit.

CHALLENGE / OBJECTIVE

Several hundred steel pipes per jobsite to be lifted to upper drill deck and turned vertical, aligning with drillhole in a continuous (automated) movement and at a pace directed by operator.

SOLUTION

NorrDigi MCC cylinder, ECU and accumulator (optional).

RESULTS

In concept phase.

KEY PRODUCT

NorrDigi MCC cylinders, motors, ECU and control logic with parameter setting.

Customer (confidential)

Customers' geotechnical drill rigs are designed to operate in difficult soil and challenging terrain conditions. Due to their versatility, they are suitable for a wide variety of geotechnical and geological drilling.

KEY FIGURES

70 % Less energy required

50 % Reduction in CO² emissions

55-60% Increase in productivity

Customers

– Diversified customer base spanning multiple industries



FORESTRY



MATERIAL
HANDLING



CONSTRUCTION
EQUIPMENT



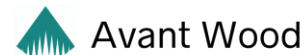
MINING



MARINE &
OFF-SHORE



RECYCLING &
LIFTING





Partner in Success

Thank you!

More information:

www.norrhydro.com

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