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Components, Systems and Service for Municipal Machines.

Note

The information in this brochure relates to the operating conditions and applications described. For applications or operating conditions not described, please contact the relevant technical department. All technical details are subject to change.
Your professional partner

HYDAC has been one of the leading suppliers of fluid technology, hydraulics, electronics and cooling equipment for more than 50 years and has over 8,000 members of staff worldwide.

The breadth and depth of our product range, combined with our recognised expertise in development, manufacturing and service, allow us to provide solutions worldwide for the wide range of requirements in the municipal machine industry.

For use in municipal machines, HYDAC offers a wide range of sector-specific components and systems from the areas of hydraulics, cooling, electronics and control technology.

In addition to its standard products, intelligent product combinations also create innovative and technologically advanced subsystems and complete systems for the increased requirements of specialist machinery.

Customer benefits:

- Cost optimisation achieved by customised system solutions which use standard components.
- Reduction in number of models through standardisation and modular design.
- On hand everywhere: more than 45 foreign companies and more than 500 Sales and Service Partners.
- Fluid engineering and service: support in technical design for commissioning, maintenance, training and in the event of claims.
- Customised solutions: designs can be tailored to individual customer requirements, made-to-order solutions for your machines.
- Advice on and implementation of the safety requirements in accordance with DIN EN ISO 13849.

Your partner for expertise in system solutions for municipal machines.

Solutions for different machine types

We offer you different solutions for the various primary and auxiliary functions of your municipal machine and are your partner for complete drive and control technology.

We have the correct solution for your machine in our product range.

**Power sweepers**

Compact and truck-mounted power sweepers

- **Work hydraulics for control and supply:** hydraulic transmission drive, various cylinder position functions, rotary drives for brush & blower, all-wheel-actuated brakes, low-pressure actuators
- **Filter systems:** return line filters, tank-filter solutions, pressure filters, supply circuit filtration
- **Suspension and levelling systems:** complete of electronics, sensors and hydraulics
- **Cooling systems:** oil coolers and combined coolers, with electric or hydraulic fan drive
- **Low-pressure actuator:** to activate the differential lock, PTO clutch

- **Sensors:** pressure, temperature, distance & position, contamination, etc.
- **Accumulators:** diaphragm accumulators, piston accumulators
- **Accessories:** to complete the system

**Gradient Mowers**

- **Work hydraulics:** to control the boom with integrated lowering brakes, ground contour equipment including sensors and memory, rotary drives for mowers, mulchers, various cutting devices, etc.
- **Filter systems:** return line filters, tank-filter solutions, pressure filters
- **Cooling systems:** oil coolers and combined coolers, with electrical or hydraulic fan drive
- **Sensors:** for pressure, temperature, distance & position, contamination, etc.
- **Accumulators:** diaphragm accumulators, piston accumulators
- **Accessories:** to complete the system

**Electronic control systems:** (individual, subsystem or whole vehicle/ device controls)

**Snow ploughs & gritters**

- **Working hydraulics:** for pressure, temperature and distance & position, contamination, etc.
- **Filter systems:** pressure filters
- **Accumulators:** diaphragm accumulators, piston accumulators
- **Sensors:** pressure, temperature, distance & position, contamination, etc.
- **Accessories:** to complete the system

**Electronic control systems:** (individual, subsystem or whole vehicle/ device controls)

**Snow Groomers**

- **Working hydraulics:** to drive the spinning plate, the mixing unit and the additional pump
- **Filter systems:** pressure filters
- **Sensors:** pressure, temperature and contamination, standard and customised system electronics
- **Accessories:** to complete the system

**Electronic control systems:** (individual, subsystem or whole vehicle/ device controls)

**Waste Collection Vehicles**

Rear, side and front loaders

- **Working hydraulics:** to control the side and slide cylinders, ejection plate and tailgate cylinders, lifting cylinders, axes cylinders on front and side loaders
- **Filter systems:** return line filters, tank-filter solutions, pressure filters
- **Sensors:** for pressure, temperature, distance & position, contamination, etc.
- **Accessories:** to complete the system

**Electronic control systems:** (individual, subsystem or whole vehicle/ device controls)

**Sewage Vehicles**

Washing and suction vehicles

- **Working hydraulics:** to control the cylinder position functions, hydraulic motors
- **Filter systems:** suction and return line filters, tank-filter solutions, pressure filters, supply circuit filtration
- **Cooling systems:** oil coolers and combined coolers, with electrical or hydraulic fan drive
- **Sensors:** for pressure, temperature, distance & position, contamination, etc.
- **Accumulators:** diaphragm accumulators, piston accumulators
- **Accessories:** to complete the system

**Electronic control systems:** (individual, subsystem or whole vehicle/ device controls)
Hydraulic/motor control technology

From component to intelligent flow system.

HYDAC offers everything from hydraulic and electronic components to sub-systems to fully customised systems.

The demands of modern hydraulic/motor control systems are leading to ever-increasing complexity of control systems. Modern machines require a variety of assistance and control systems whenever simpler operating concepts and a better overview and controllability of the machine functions become necessary.

The development of systems technology is characterised by three key developments across various machine machineries: Ever more complex control systems gain more importance due to the enhanced productivity and efficiency of the machines. The questions are supported and the work processes are optimised in the context of modern electronic assistance and control systems of the individual machine functions.

The HYGATEWAY platform is the result of these key developments and is to be continuously optimised. The requirements are also fulfilled using HYDAC's expertise in the field of system technology and the development of solutions for the latest machines.

The focus of these developments is on the following key topics:

- Energy efficiency
- Safe operation
- Power consumption
- Cooling losses
- Reduced area and weight
- Environmental compatibility
- Increased productivity
- Customer-specific solutions
- Software development
- Degree of customer integration
- System development support

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"MATCH" development environment

**MATCH Mobile Application Tool Chain**

Development environment for mobile working machines

With the "MATCH" (Mobile Application Tool Chain) development environment, HYDAC offers a tool chain for system-level software development by the customer that is especially suited to the requirements of mobile machinery. "MATCH" supports development from defining the system at the vehicle level and creating the application software to initial start-up, testing, and documentation.

"MATCH" offers modules for:
- Defining the system at the vehicle level
- Starting up and servicing the machine
- Testing software
- Documentation

Furthermore, an "embedded mobile work" is offered which permits a hardware-independent programming of the application and which contains a multitude of basic functions. A comprehensive selection of library modules (e.g. for sensor and valve drives) is also available for an efficient programming of the application and which contains a multitude of basic functions. A comprehensive selection of library modules (e.g. for sensor and valve drives) is also available for an efficient programming of the application and which contains a multitude of basic functions.

### Functional safety

"MATCH" can also write application software with increased functional safety according to the following safety standards:
- "SIL 2" to IEC 61508
- "PL d" to EN ISO 13849

### Sensors

**Function**
The range of sensors includes products for measuring pressure, temperature, distance, position, level, flow rate, speed, inclination, and angle as well as contamination and oil condition. In addition to products for standard applications, the product portfolio also covers special applications such as potentially explosive atmospheres or applications with increased functional safety.

**Features**
- Max. load regulation
- Electro-hydraulic load sensing
- Working hydraulics
- Positioning
- Controls of special equipment
- Switch-off devices
- Safety systems

### Mobile controller

**HY-TTC 500**

**Function**
The HY-TTC 500 controller series is based on a 32-bit processor with a modern micro-controller platform.

**Features**
- "SIL 2" / "PL d"
- Up to three alternative PWM shut-off groups
- Up to 36 PWM power outputs with current measurement
- Numerous and highly flexible I/O groups
- Excellent computer performance
- High number of interfaces, communication and information interfaces
- CAN-bus interfaces
- Optional Ethernet interface for external fast software download and debugging

### I/O Expansion Module

**HY-TTC 30X / 30XS**

**Function**
The new HY-TTC 30X series of I/O expansion modules provides an outstanding power balance combined with extremely compact design.

**Features**
- "PL c" (HY-TTC 30XS)
- Freely configurable analogue and flexible digital inputs
- Up to three alternative PWM shut-off groups
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- Up to three alternative PWM shut-off groups
- The different I/O modules provide a large number of signal processing outputs and for diverse PWM outputs with internal current measurement as well as configurable analogue and flexible digital inputs.

### Mobile display

**HY-TTC eVision²**

**Function**
The new HY-TTC 30X series of I/O expansion modules provides an outstanding power balance combined with extremely compact design. The HY-TTC 30X series extension modules are integrated very easily.

**Features**
- User-friendly, self-explanatory and time-saving graphical design and operation interface
- Good portability via CoDeSys platform
- High image brilliance
- High refresh rate
- Fast boot-up times
- Highly expressive display options such as 3D, picture-in-picture, overlapping effects, etc.

### Software library

In order to make software development significantly easier for the customer, HYDAC offers software libraries with ready-made modules as part of its "MATCH" development environment. The library modules can be configured and parameterised as desired.

Examples of library modules include:
- Sensors
- Switches
- Proportional and switching valves
- Relays, LEDs
- Transfer functions/signal elements

Special error modules can also be used to detect system errors.
**Hydraulic systems**

The optimal working hydraulics for fast, accurate and efficient control.

### Open center primary control valves

HYDAC’s open center primary control valves offer you a modular system with which to design robust, energy efficient and cost-effective solutions for demands such as those for mechanical, pneumatic, hydraulic and electro-hydraulic control.

**Features:**
- Structural design as monoblock, multi-section and slice construction
- Key data: $Q_{\text{max}} \leq 180 \text{l/min}$; $p_{\text{max}} = 350/420 \text{bar}$
- Energy-saving Q-Help option
- Robust, high-quality and maximum controllability
- Low internal leakage
- Integral track switching for safe flow distribution
- Electrical pump volume current cut-off
- Electrical and/or hydraulic brake
- Simple integration of secondary safeguards
- Optional switch position monitoring of the main control spool
- Optionally also for the actuation of LS variable pumps

**Key data for open center primary control valves (see photos on right):**
- O4 primary control valve
  - $Q_{\text{max}} \leq 60 \text{l/min}$; $p_{\text{max}} = 250 \text{bar}$
- R22 primary control valve
  - $Q_{\text{max}} = 80 \text{l/min}$; $p_{\text{max}} = 350 \text{bar}$
- O4 primary control valve
  - $Q_{\text{max}} \leq 140 \text{l/min}$; $p_{\text{max}} = 350 \text{bar}$

### Load-sensing primary control valves

HYDAC’s load-sensing primary control valves offer you a modular system with which to design load-compensated, energy efficient load-sensing controls for mechanical, pneumatic, hydraulic and electro-hydraulic control.

**Features:**
- Structural design as monoblock, multi-section and section construction
- Key data: $Q_{\text{max}} \leq 120/250 \text{ppm}$ (trip); $p_{\text{max}} = 250 \text{bar}$
- Load-sensing primary control valve
  - $Q_{\text{max}} \leq 180 \text{l/min}$; $p_{\text{max}} = 350 \text{bar}$

**Key data for load-sensing primary control valves (see photos on right):**
- HH 1 load-sensing primary control valve
  - $Q_{\text{max}} = 120/250 \text{ppm}$ (trip); $p_{\text{max}} = 250 \text{bar}$
- LL 1 load-sensing primary control valve
  - $Q_{\text{max}} = 180 \text{l/min}$; $p_{\text{max}} = 350 \text{bar}$

See Brochures 5.254 - Mobile Valves + 5.256 HX-1
**Modular LS-system**

- **Advantages**
  - Modular system compared to competitor valves
  - Very compact system compared to competitor valves
  - Low installation and maintenance costs on site
  - Prioritisation of the various functions
  - Modular design compared to competitor valves
  - Cost-effective solution similar to competitor valves
  - Affordable large series technology for small producers

**Modular work hydraulics**

- **Straight-through valve design**
- Modularly integrated heat exchanger
- Option for supply mains control blocks

**Customised solutions for work hydraulics**

- **HX-1 Modular manifold system**

**Work hydraulics optimised for installation space for smaller flow rates**

- For small mobile vehicles with low flow rates, control blocks can be used to reduce the overall installation space.
- Suitable for compact installation conditions in smaller mobile applications.
- Functions are integrated into the manifold for optimal space utilisation.
- Reduced energy consumption.

**Control blocks for transmission applications**

- Suitable for use in 2 and 3-speed lock modes.
- On request, compact control blocks for fluid power supply.
- Custom designed to suit the requirements of the customer’s vehicle.

**Compact control blocks for rotary transmission drives (gritters, sweepers, water pumps, etc.)**

- Compact control blocks for rotary transmission drives with common pressure supply.
- In-line metering valve.
- Pressure-optimised control blocks.

**Flow regulation using one cartridge valve with integrated pressure compensator**

- Cartridge valve is used to control flow rates of a rotary transmission drive with common pressure supply.
- Compact cartridge valve.
- Pressure-optimised control blocks.
- Suitable for use in 2 and 3-speed lock modes.
- On request, compact control blocks for fluid power supply.
- Custom designed to suit the requirements of the customer’s vehicle.

**Application examples**

- **HX-1 Modulair manifold system**

- Modular manifold system compared to competitor valves
- Pressure is available on site
- Prioritisation of the various functions
- Modularly integrated heat exchanger
- Option for supply mains control blocks

**Modular manifold system compared to competitor valves**

- Very compact system compared to competitor valves
- Low installation and maintenance costs on site
- Prioritisation of the various functions
- Modularly integrated heat exchanger
- Option for supply mains control blocks
Hydraulic supply
Optimal solutions from the HYDAC technology platform.

Hydraulic supply

Drive technology

HYDAC offers a wide range of pumps for working hydraulics in open or closed hydraulic circuits. The pump range includes fixed and variable displacement pumps of various designs from 0.25 l/min to 560 l/min and pressures up to 560 bar. HYDAC fixed displacement pumps for auxiliary circuits and control systems are available in different designs for low-, medium- and high-pressure ranges. The range includes external gear pumps (MG) in various sizes for pressures up to 400 bar, vane pumps (MV5M) from 1.5 l/min to 20 l/min, and axial piston pumps ( PPV100S) from 100 l/min to 560 l/min with pressure ranges of up to 400 bar. HYDAC offers a wide range of pumps for working hydraulics in open or closed hydraulic circuits. The pump range includes fixed and variable displacement pumps of various designs from 0.25 l/min to 560 l/min and pressures up to 560 bar. HYDAC fixed displacement pumps for auxiliary circuits and control systems are available in different designs for low-, medium- and high-pressure ranges. The range includes external gear pumps (MG) in various sizes for pressures up to 400 bar, vane pumps (MV5M) from 1.5 l/min to 20 l/min, and axial piston pumps ( PPV100S) from 100 l/min to 560 l/min with pressure ranges of up to 400 bar.

Accumulators

HYDAC offers an exceptionally wide product portfolio of accumulators and dampers for a very wide array of hydraulic applications involving municipal machines and their accessories. This enhances the working comfort and functionality of the machines and thus increases life cycles for both machines and accessories. Our comprehensive range of products and benefits results in many years of experience.

Customer benefits:
- Greater vertical acceleration of the cab.
- Reduced risk of pitching.
- Reduced vibration of the vehicle at high speed.
- Safety for passengers and drivers.
- Contribution to compliance with directives on health and safety at work.

Hydraulic control systems are modular and can be adapted to the specific requirements of each application. HYDAC’s comprehensive range of system components ensures that the best solution is always available, whether for simple or complex applications. This means that HYDAC’s hydraulic control systems can be used worldwide with country-specific acceptances.

Hydraulic systems

Optimal solutions from the HYDAC technology platform.

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Additional solutions
Perfectly tailored to the HYDAC Technology Platform.

Cabin air filter for very fine and nano dust: CabinAirCare

Municipal vehicles must not be used in contaminated areas unless the driver’s cab is equipped with filtration and/or compressed air systems to ensure an air supply of sufficient breathing quality. For tasks such as landfill sealing or encapsulation or land rehabilitation, a CabinAirCare module can be retrofitted to existing vehicles to provide optimum protection for the driver without having to make drastic changes to the existing air-conditioning system or the cab.

For a healthy environment that promotes performance, HYDAC Filter Technology already offers highly effective air filtration systems that can be equipped or retrofitted.

Customer benefits:
- Easy to install and expand (on existing AC or filter systems)
- Sufficient system reserve (fan power, media sizing) for common cabin sizes in construction and agriculture
- Robust and simple construction
- Filters airborne pollutants, including nano-particles and gases

See brochure 7.010.1 - CabinAirCare

Accessories for every sector

For the completion of hydraulic systems

- Standard fittings and ball valves (high pressure)
- Mounting clamps for hydraulic hoses and pipes, cylinders, electrical cables and accumulators
- Tamper-proof-inductive proximity switch (high pressure-resistant)
- Fluid level sensors
- Temperature switch TSE
- Standard clamp 3015 air/water reservoir
- Test point connections
- Quick-release couplings
- Special clamps for particle filters

See catalogue 61.000 - Accessories

Cylinder systems

Our cylinder systems are notable for their versatility and extreme compactness. We offer cylinder drive with integrated valve technology and guarantee optimal operation of your machine, even with increased operational loads.

- Piston diameters up to 600 mm
- Differential cylinders
- Double rod cylinders
- Plunger cylinders
- Telescopic cylinders

The cylinders can also be weight-optimised and they can be supplied with an integrated distance measurement system.

Customer benefits:
- Our own Service Center offers you a comprehensive customer service.
- We support you with the design, assembly, maintenance and initial startup of your system. We begin working closely with the customer right from the development stage.
- Because of our knowledge, we can achieve the best cylinder solution for your product, e.g. by using special surface coatings for the piston rod. FE simulations or fatigue strength calculations also come under our Engineering Standard.

See brochure HS-D 10.102 – Cylinders and Cylinder Systems for Mobile Hydraulics

Fluid conditioning systems

To provide flexible servicing on machines, there are convenient mobile units for removing solid particles:
- Portable filtration units
- Mobile filtration units
- Built-in filtration units (off-line)

Customer benefits:
- Clean filling and flushing
- Versatile design – can be used on a variety of systems
- Relief for the in-line filter
- Greater system availability
- Reduction in Life Cycle Cost

See catalogue 79.000 - Filter Systems

FluidCareCenter

We get involved in the process early on.

With our clean room in the FluidCareCenter, we promise you exceptional cleanliness from the component to the system: Technical Cleanliness is becoming ever more important in mobile hydraulics. Phrases such as “reduction and prevention of production-stage breakdowns” and the difficulty of longer warranty periods are driving up the demands for component cleanliness.

Customer benefits:
- By understanding the relevant cleanliness data of your components, you will be a step ahead of your competitors
- A laboratory approved and recommended by well-known automotive suppliers
- Many years’ experience in the area of technical cleanliness owing to active collaboration on VDA Volume 19 and ISO 16232
- Analysis with the help of extraction units developed at HYDAC
- High-quality analysis equipment
- Ongoing continual development of equipment and processes to meet the increasing requirements and needs of customers

See brochure 7.128 - FluidCareCenter

FluidCareCenter

Condition Monitoring and Service

Constantly growing demands for operational availability, reduction in downtime, detailed load and service management (economic viability, wear, service, warranty) require innovative and comprehensive monitoring, service and control concepts. A variety of sensors provides the ideal basis for the development of such integrated system solutions.

Oil condition, e.g. time deterioration or presence of contaminating fluids can be determined via the saturation level, temperature, change in electrical conductivity, change in dielectric constant (HYDACLAB®)

SATURATION LEVEL
TEMPERATURE
CHANGE IN ELECTRICAL
CONDUCTIVITY
CHANGE IN DIELECTRIC
CONSTANT

Saturation level (AS)
- Particle contamination (CS)
- Pressure (HDA)
- Flow rate (EVS)
- Fluid level (ENS, HNT)

In combination with portable measuring instruments (HM3 series), this data can be recorded and analysed to supplement the machine electronics (service).

See brochure 10.122 – Condition Monitoring for Efficient Life Cycle Cost Management
See brochure 18.000 – Measurement Equipment for Hydraulics and Pneumatics