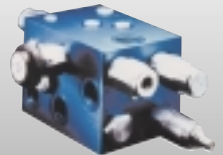
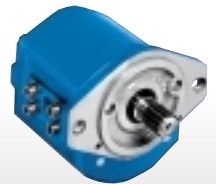
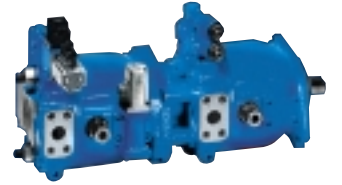




TOTAL SYSTEMS SOLUTIONS WORLDWIDE™



Product Overview





TOTAL SYSTEMS SOLUTIONS WORLDWIDE™



Markets Served

Agriculture

Truck Bodies & Trailers

Truck Mounted Equipment

Construction

Utility Construction

Forestry

Industrial Machinery

Fork Lift Trucks

Aerial Work Platforms

Material Transport Vehicles

Lift Equipment

Mining

Auto, Truck & Bus

Recreation & Marine

Refuse Equipment

Turf Maintenance



P300 Three Piece Cast Iron Pumps, Motors & Flow Dividers

Bushing type, external gear pumps and motors for heavy duty applications.

Model P = Pump M = Motor Options D = Stealth	Theoretical Displacement		Mineral Oil Maximum Pressure				
	in ³ /r - cm ³ /r		Continuous psi - bar		Intermittent psi - bar		
P315 M315	.620	10.2	3500	245	4000	275	
	.775	12.7	3500	245	4000	275	
	.930	15.2	3500	245	4000	275	
	1.09	17.8	3500	245	4000	275	
	1.24	20.3	3500	245	4000	275	
	1.40	22.9	3500	245	4000	275	
	1.55	25.9	3500	245	3850	265	
	1.71	27.9	3500	245	3700	255	
	1.86	30.5	3300	225	3500	245	
	2.02	33.0	3100	215	3350	230	
	2.17	35.6	2900	200	3100	215	
	2.33	38.1	2700	190	2950	205	
	2.48	40.6	2500	175	2750	190	
	P330 M330	.985	16.1	3500	245	4000	275
		1.47	24.2	3500	245	4000	275
1.97		32.3	3500	245	4000	275	
2.46		40.4	3500	245	4000	275	
2.95		48.4	3500	245	3850	265	
3.44		56.5	3250	225	3500	245	
3.94		64.6	3000	210	3300	225	
4.44		73.1	3500	245	4000	275	
4.94		81.2	3500	245	4000	275	
5.44		89.3	3500	245	4000	275	
P350 M350	1.28	20.9	3500	245	4000	275	
	1.91	31.3	3500	245	4000	275	
	2.55	41.8	3500	245	4000	275	
	3.19	52.2	3500	245	4000	275	
	3.82	62.7	3500	245	3850	265	
	4.46	73.1	3250	225	3500	245	
	5.10	83.6	3000	210	3300	225	
	5.73	94.0	2750	190	3000	210	
	6.38	104.5	2500	175	2750	190	
	7.02	115.0	2500	175	2750	190	
P365 M365	2.70	44.3	3500	245	4000	275	
	3.60	59.0	3500	245	4000	275	
	4.50	73.8	3500	245	4000	275	
	5.40	88.5	3500	245	4000	275	
	6.30	103.3	3500	245	4000	275	
	7.20	118.0	3500	245	3850	265	
	8.10	132.8	3250	225	3500	245	
	9.00	147.5	3000	210	3300	225	

Roller Bearing Units

Model	Displacement Range - cm ³ /r	Pressures up to:
P/M 30/31	16.1 - 64.6	207 bar
P/M 50/51	20.9 - 104.5	207 bar
P/M 75/76	50.0 - 201.6	207 bar



R Series Two Piece Cast Iron Pumps & Motors

Cast iron bodies for exceptional fatigue strength and high pressure capability providing excellent levels of overall efficiency.

Model 2PR = Pump 2TR = Motor	Theoretical Displacement		Mineral Oil Maximum Pressure				
	in ³ /r - cm ³ /r		Continuous psi - bar		Intermittent psi - bar		
Power-master 2PR Pumps	1.16	19.0	4000	275	4350	300	
	1.40	23.0	4000	275	4350	300	
	1.59	26.0	4000	275	4350	300	
	1.77	29.0	4000	275	4350	300	
	2.01	33.0	4000	275	4350	300	
	2.20	36.0	4000	275	4350	300	
	2.26	37.0	4000	275	4350	300	
	2.50	41.0	3600	250	4000	275	
	2.69	44.0	3350	230	3700	255	
	2.81	46.0	3200	220	3500	245	
	3.05	50.0	3000	210	3400	235	
	Torque-master 2TR Motors	1.16	19.0	4000	275	4350	300
		1.40	23.0	4000	275	4350	300
		1.59	26.0	4000	275	4350	300
		1.77	29.0	4000	275	4350	300
2.01		33.0	4000	275	4350	300	
2.20		36.0	3600	250	4000	300	
2.26		37.0	3600	250	4000	300	
2.50		41.0	3200	220	3600	250	
2.69		44.0	3000	210	3400	235	
2.81		46.0	3000	210	3400	235	

Stealth Low Noise Pumps

High performance pumps designed for low flow ripple and reduced noise.

Model	Displacement Range in ³ /r - cm ³ /r		Max. Cont. Pressure psi - bar
1SX (S)	.370 - 1.65	6 - 27	3625 250
2SR (S)	1.16 - 2.81	19 - 46	3625 250
P315 SD (D)	.485 - 2.48	10.2 - 40.6	3500 245
P330 SD (D)	.985 - 3.94	16.1 - 64.6	3500 245

Pressure ratings decrease in large displacements.



PX Series Pumps, Motors & Flow Dividers

Aluminium bodied external gear pumps and motors for light weight and high performance requirements.

Model P = Pump M = Motor Options S = Stealth	Theoretical Displacement		Mineral Oil Maximum Pressure				
	in ³ /r - cm ³ /r		Continuous psi - bar		Intermittent psi - bar		
P3X M3X	.05	0.8	4000	275	4350	300	
	.07	1.2	4000	275	4350	300	
	.10	1.6	4000	275	4350	300	
	.12	2.1	4000	275	4350	300	
	.15	2.5	4000	275	4350	300	
	.20	3.3	4000	275	4350	300	
	.22	3.6	3600	250	4000	280	
	.26	4.3	3000	210	3350	230	
	.29	4.8	2350	160	2600	180	
	.35	5.8	2350	160	2600	180	
	.38	6.2	2175	150	2450	170	
	.48	7.9	1750	120	2000	140	
	P5X M5X	.18	3.0	4000	275	4350	300
		.24	4.0	4000	275	4350	300
		.31	5.0	4000	275	4350	300
.37		6.0	4000	275	4350	300	
.43		7.0	4000	275	4350	300	
.49		8.0	4000	275	4350	300	
.61		10.0	3600	250	4000	275	
.67		11.0	3400	235	3600	250	
.73		12.0	3400	235	3600	250	
.37		6.0	4000	275	4350	300	
P11X M11X	.49	8.0	4000	275	4350	300	
	.61	10.0	4000	275	4350	300	
	.67	11.0	4000	275	4350	300	
	.85	14.0	4000	275	4350	300	
	.98	16.0	4000	275	4350	300	
	1.16	19.0	4000	275	4350	300	
	1.40	23.0	3400	235	3700	255	
	1.65	27.0	2900	200	3200	220	
	1.89	31.0	2850	195	3100	215	
	2.01	33.0	2700	185	3000	210	
P17X M17X	.85	14.0	3625	250	4000	275	
	.98	16.0	3625	250	4000	275	
	1.16	19.0	3625	250	4000	275	
	1.40	23.0	3625	250	4000	275	
	1.53	25.0	3625	250	4000	275	
	1.71	28.0	3625	250	4000	275	
	2.02	33.0	3625	250	4000	275	
	2.32	38.0	3625	250	4000	275	
	2.67	44.0	3200	220	3500	245	
	3.17	52.0	2900	200	3200	220	

Flow Dividers/Intensifiers (FD)

Commercial's standard gear units can be configured as flow dividers/intensifiers that are more accurate and more efficient than conventional spool flow dividers.



101/102 Series Combination Pump/Valves

Rugged cast iron pump/valve packages for truck applications.

Model	Rated Flow @1800 rpm gpm - lpm		Mineral Oil Continuous psi - bar	
	gpm	lpm	psi	bar
G101/102	9.5	36	2500	172
	21	79	2500	172
	29	110	2500	172
G104/105	9.5	36	2500	172
	21	79	2500	172
	29	110	2500	172
C101/102	39	148	2500	172
	48	182	2500	172

Integrated Valve Options

Commercial Hydraulics pumps and motors are available with a variety of integrated valve options including load sensing priority valves, accumulator charging circuits, L/S unloader valves and relief valves.

Motors are also available with relief and unloading capabilities as well as support bearings for side load and mower blade applications.



Cartridge Valves and Integrated Circuits

Commercial Hydraulics manufactures integrated hydraulic circuits and screw-in cartridge valves to industry common cavity sizes from -7 to -20 with flow ratings up to 80 gpm/300 lpm.

Pressure Controls

Pressure control cartridges are available in relief, pressure reducing and sequencing designs. Both pilot operated and direct acting valves as well as both spool and poppet configurations are available.

Flow Controls

Flow control cartridges are manufactured for needle valve, rotary control, pressure compensated and priority flow applications. Check valve, shuttle, flow fuse and flow divider cartridges are also available.

Directional Controls

Commercial Hydraulics manufactures both poppet and spool type directional cartridge valves in a wide range of styles including solenoid, manual and pilot operated configurations.

Proportional Electric Controls

Proportional flow controls and pressure controls are available for applications requiring electronic speed or force modulation.

Sensing and Logic Elements

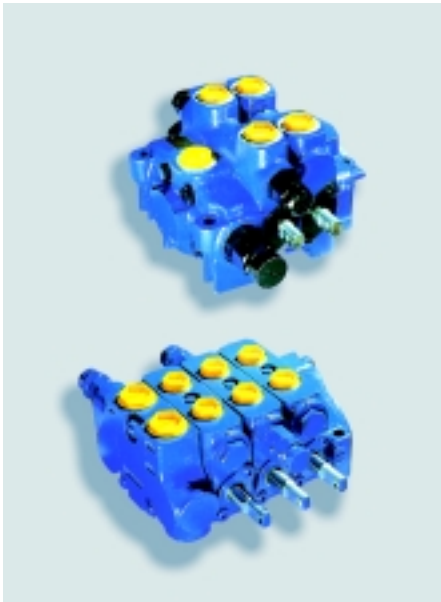
Sensing valves include pilot-controlled logic elements, compensator spools, unloading valves and accumulator charge valves.

Integrated Circuits

Commercial Hydraulics is a full service manufacturer and designer of integrated hydraulic circuits and special application controls. Commercial Hydraulics provides circuit design assistance and applications support as well as high quality manufacturing capabilities for both cartridge valves and manifold systems.

Cartridge Sizes / Ratings

Cavity Size	Thread Size	Nominal Flow Ratings	
		GPM	LPM
C7	5/8 - 18	2	7
C8	3/4 - 16	6	23
C10	7/8 - 14	12	45
C12	1 1/16 - 12	20	76
C16	1 5/16 - 12	30	114
C20	1 5/8 - 12	80	303



Directional Control / Sectional Valves

Model LS = load sensing	Flow Max. gpm - lpm	Port Dia.	Pressure Max. Relief psi - bar
KA10	15 60	1/2"	4650 320
KA18	15 90	1/2"	4650 320
KLS18	24 90	1/2"	4650 320
VG20	40 150	3/4"	3500 240
VG21	40 150	3/4"	4000 280
VG21 (LS)	40 150	3/4"	4000 280
VG35	66 250	1"	3500 240
VG36	66 250	1"	4000 280
VG36 (LS)	66 250	1"	4000 280
VG80	120 450	1-1/4"	3625 250

- Sectional construction for open or closed center, parallel, series, tandem and mixed circuits up to 10 sections.
- Integral full-flow cartridges for main and port relief-valves, anticav, and combination of both; built-in transition checks.
- Mid-inlet sections for split or combined flows, or selection of either. Tank return, pressure beyond, unloader or regenerative outlets.
- Load sensing, and other options and accessories are also available.
- Electrical controls for all control valve models (except for the VG80 and VG80 LS) are available with proportional solenoids.

PC Valve

PC valves utilize Commercial's patented Over-demand Management Technology, providing proportional compensation in the event of pump demand saturation. In addition, PC valves feature a dual load sensing structure which provides superior response speeds and accurate load control capabilities.

Model	Flow Max. gpm - lpm	Port Dia.	Pressure Max. Relief psi - bar
PC Valves: Incorporating Overdemand Management Technology.			
PC15	28 105	1/2"	4500 310
PC25	40 150	3/4"	4000 280
PC55	75 285	1"	4000 280



Monobloc Valves

Model LS = load sensing	Flow Max. gpm - lpm	Port Dia.	Pressure Max. Relief psi - bar
KM301 (LS)	105 400	25 mm	3250 225
KM85/86 (LS)	21 80	1/2"	3625 250
KM83/84	24 90	1/2"	4650 320
MH20/MHP20	24 90	1/2"	3625 250

KM301 - KM301 (LS)

This three spool monobloc valve incorporates all the features required for the mobile "loader" application.

- Open or closed center load sense
- Hydraulic remote control
- Through porting for ease of installation

KM85 / KM86 (LS)

This two spool monobloc has been designed to meet the requirements of the agricultural loader market. It is offered in both open and closed center (load sense).

- Porting in same axis as spools
- Manual or remote operation
- Uses all standard KA spools and accessories

KM83 / KM84

This single spool monobloc valve is designed to meet various application needs. The KM83 is an open or closed center valve, with pressure beyond as standard. The KM84 offers the addition of a main relief valve and a tank return outlet.

- Uses standard KA main and port relief valves
- Uses standard KA spools and operators
- Available for local or remote operation

MH20 / MHP20

The MH20 is a 3 spool, open center monobloc valve developed originally for the lift truck industry. Additional spool sections can be stack mounted. The MHP 20 includes an integral priority valve.

- Tandem - parallel circuitry
- Flows to 90 lpm / 24 gpm
- Pressures to 250 bar / 3625 psi
- Up to 5 spools per assembly



Remote Controls

General Description

Commercial offers a wide range of control options. These include manual handles, cable control, hydraulic, pneumatic remote, on-off electrical and electro proportional.

TCS Electronic Systems

Commercial Hydraulics offers an extensive range of CAN bus based electronic control capabilities.

Combining it's mobile vehicle expertise with extensive experience in electronic controls and electro-hydraulic products, Commercial is able to provide applications support for your electronic or electrohydraulic system integration projects.

Electro Hydraulics

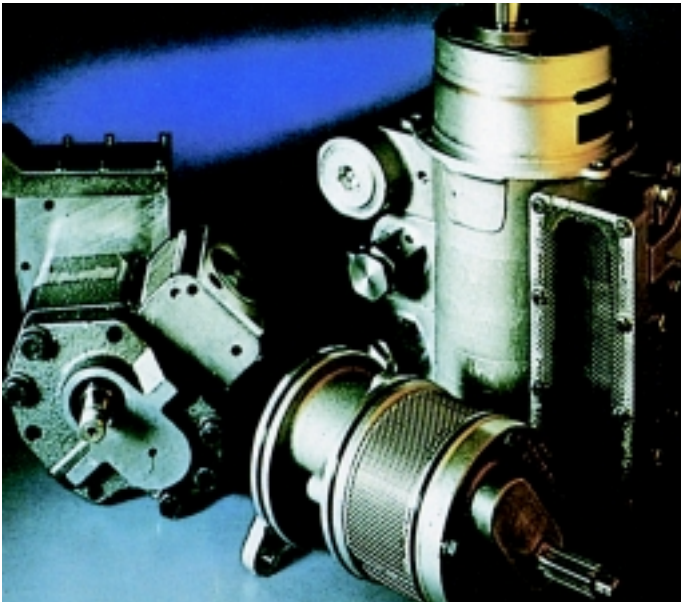
Digitrak® (stepper motor technology) All the larger VA/VG valves can be fitted with Commercial's new advanced motion control system Digitrak. Digitrak consists of three major components:

- 1) Stepper motor backcap
- 2) Stepper motor control/driver board
- 3) Control levers

The stepper motor backcap can position the mobile valve spool independent of mechanical load, flow forces or temperature variation. The maximum hysteresis being only 2% of command input.

KA / KM - Electrical Control

The KA10 can be supplied with direct acting solenoids for on-off control (up to 45 litres). Commercial now offers electro proportional control fitted to the KA18 valve (for flows up to 90 litres). Using an integral pilot generating system (within the inlet section), internal feeds supply proportional solenoid cartridges in the back caps.



Axial Piston Pumps and Motors

Mobile Range

Axial Piston Pump PVO Series
Pumps for open circuit applications

Characteristics

- Variable displacement axial piston pump
- SAE or ISO port connections
- Robust construction for heavy duty application
- Full power through drive for tandem assemblies
- High response rate control options
- High pressure continuous operation

Technical Data

Code		Displacement		Continuous Pressure		Maximum Pressure	
Model	Size	in ³ /r - cm ³ /r		psi - bar		psi - bar	
MD	5	.28	4.55	3625	250	4640	320
	28	1.70	28.0	3625	250	4640	320
	45	2.80	45	3625	250	4640	320
PVO	33	1.98	33	4000	275	5075	350
	51	3.13	51	4000	275	5075	350
	68	4.17	68	4000	275	5075	350
	87	5.32	87	4000	275	5075	350
	111	6.80	111	4000	275	5075	350
	140	8.59	140	4000	275	5075	350

Industrial Range

HD2 Pumps and Motors

Model	Displacement	RPM	Maximum Pressure
	cm ³ /rev		- bar
900	68	4000	410
1400	106	3600	410
2200	166	2500	410
3000	227	2500	410
4000	303	2500	410
6600	500	2300	350

HD2 Control Options

- Fixed capacity
- Manually variable
- Servo valve
- Electrical remote
- Power override
- Temperature controlled
- Constant power motor
- Externally adjustable
- Rendering
- Hydraulic remote
- Constant flow
- Pressure override
- Load Sensing
- Pressure compensated fast response

High Flow – Low Pressure Custom Gear Pumps

- Single or multiple custom-designed pumps utilize special bearing arrangement to achieve extremely compact installation
- Patented inlet design permits excellent high-speed inlet characteristics, and special seals prevent air leaks from scavenge pumps into adjacent sections
- Flows up to 2080 l/min (550 gpm)
- Speeds up to 4000 rev/min
- Temperature range -50°C to +175°C
- Lubrication and charge pumps to 40 bar (580 psi)
- Scavenge pumps normally to 3.5 bar (50 psi)

Specialty Products

- Military hydrostatic steering systems
- Industrial gas expansion turbines
- Mobile electric power generation systems
- Hydraulic test and endurance systems
- Emergency isolation valves for the nuclear power industry

Brake Systems

Commercial Hydraulics provides a full range of system components for hydraulic powered braking circuits. This product range includes brake modulating, accumulator charge and priority valve functions which can be integrated into pump or valve combination packages, or mounted individually. Commercial Hydraulics has extensive experience in the application of brake components and systems for construction, material handling and agricultural machinery applications.

BMV (Brake Modulating Valve)

The BMV is used to precisely control brake actuation pressure on wet disc brake systems.

ACV (Accumulator Charge Valve)

The ACV provides priority flow to charge an accumulator for vehicle brakes or any application requiring stored energy.

STAC (Steering & Accumulator Charge Valve)

The STAC combines the ACV function with load sense priority flow control.

BMAC (Brake modulating & Accumulator Charge)

The BMAC controls the charging of the accumulator, provides a circuit load sense signal and modulates brake pressure.



Power Packs / Minihydraulics

Commercial manufactures a wide range of mini power packs for the marine/mobile and light industrial markets.

Power Units Series 108

Completely self-contained light power units with AC or DC motor, gear pump, reservoir, internal valves, load hold checks and relief valves.

- Intermittent service
- Flows to 2.5 l/min (0.75 gpm)
- Pressure to 245 bar (3500 psi)
- Reservoirs to 3.8 l (1 gal)
- 12.24 or 36 VDC - 115 to 415 VAC
- Vertical or horizontal mounting
- Uni-directional with or without check
- Bi-directional with or without checks and/or back pressure valve



Mini-Piston Pumps

- Fixed displacement axial piston pump
- Flows up to 2.51 lpm (0.7 gpm)
- Quick response time/quiet operation
- Operate on very thin fluids (1 cSt): brake fluid, kerosene, cleaning solvent, ATF, mineral oil.
- Wide temperature range from -40°C to +150°C
- Naturally aspirated to 4600 rev/min
- Available with or without DC drive motor

Model	Flow		Continuous Pressure	
	in ³ /r	cm ³ /r	psi	bar
300	.0062	.10	2000	140
450	.0095	.16	3500	240
600	.0126	.21	3500	240
900	.0158	.26	1000	69
1200	.0190	.31	1000	69
750	.0211	.35	3500	240
1000	.0255	.42	3500	240
1500	.0317	.52	3500	240
2000	.0422	.69	3250	225
2500	.0527	.86	3250	225

Industrial/Marine Power Packs



Commercial Hydraulics Industrial/Marine power packs are manufactured to customer requirements/specifications. They cover power ranges from 2.5 kw upwards and can be supplied with integral valves. Units with AC motors can be designed with the pump/motor immersed in the reservoir, giving low noise operation.

Installation and commissioning can also be undertaken by our trained workforce.

Hydraulic Cylinders

Commercial Hydraulics is a multinational manufacturer of hydraulic cylinders for mobile equipment applications. Manufacturing facilities are located in North America (Benton, AR; Minneapolis, MN; and Youngstown, OH) and Europe (Geringswalde, Germany).

Each location has an on sight engineering staff using the latest engineering tools such as solid modeling, finite element analysis, autocad and more.

The product line includes a full range of single and double acting telescopic and piston rod type cylinders. The standard product line includes bores from .5 to 20", strokes to 500" and operating pressures up to 6000 psi. Also, custom made cylinders are available with features such as external valve blocks, internal valving, cushions, internal position sensing electronics (smart cylinder) and more.



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