

Micro90

DC Hydraulic Power Units



 **Related**
Fluid Power

Hydraulic Control & Power Unit Solutions

 relatedfluidpower.com

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Market leader in the design, development, manufacture and supply of hydraulic valves, manifold control systems and hydraulic micro & mini power units

Meeting your requirements

In present markets, AC & DC hydraulic power units are providing companies with the flexibility to produce simple as well as complex power and control systems with the greatest of ease.

Related Fluid Power are well equipped to provide these markets with this flexibility and at the same time meet and exceed customer requirements efficiently and effectively.

As a well established company with clear objectives; a) we are committed to our customers, b) continually invest in our company and our people and c) provide OEMs with high quality, cost effective hydraulic products which are designed and manufactured to their specific needs. Operating from our up-to-the-minute facility in Cuparmuir, Fife we have a dedicated and innovative team of designer engineers and technical sales people who have a wealth of experience in the hydraulic industry. We supply to a wide range of mobile and industrial markets varying from; marine, mining & construction, waste management, light industrial, leisure & entertainment, manufacturing and agricultural to name just a few.

Designed to function in wide and varied applications Related Fluid Power standard and custom Hydraulic Micro & Mini Power Units are up to the task. From simple motor pump units to multi-functional power unit assemblies,



we can provide solutions that fully meet our customers' expectations of performance, quality and cost. Continued investment in design and manufacturing technology, together with our wide application and engineering experience, has not only allowed us to develop our latest range of MPUs, but has enabled us to provide our OEM customers with standard or custom power unit systems to specifically meet requirements in terms of flexibility, power, control and size.

To ensure our customers' needs are completely fulfilled by our products we maintain rigorous testing, process controls, quality checking procedures and an efficient production. Our Management System is accredited with ISO 9001:2008; we take our customers' satisfaction seriously.



*Competitively priced products
with lead times that match
today's fast moving markets*

What We Can Offer

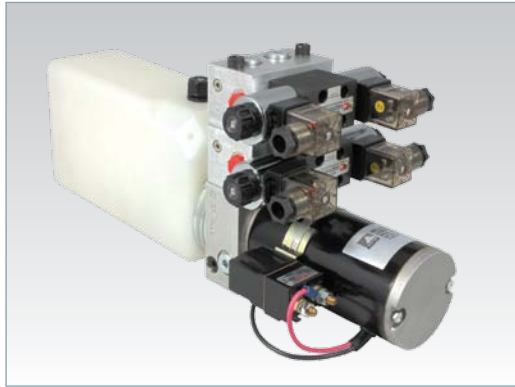
Our Micro90 series power units maximise on design and flexibility. Offering P & T as well as single and double acting hydraulic functions all within a very compact design. Our options range from 150W to 800W DC motors, gear pumps capable of up to 240bar, pressure line check and relief valves, a comprehensive range of integrated mechanical and solenoid operated control valves, optional compensated flow control and to complete your build a range of light weight plastic cylindrical or rectangular reservoirs.

Manufactured in the UK

Utilising our in-house state of the art CNC flexible manufacturing system we also have the ability to offer specialised manifold valve packages for all our power units. This enables Related Fluid Power Ltd to meet the market requirements for both large and small OEMs producing competitively priced products with lead times that match today's fast moving markets.



Solutions that fully meet our customers' expectations of performance, quality and cost



Key Points

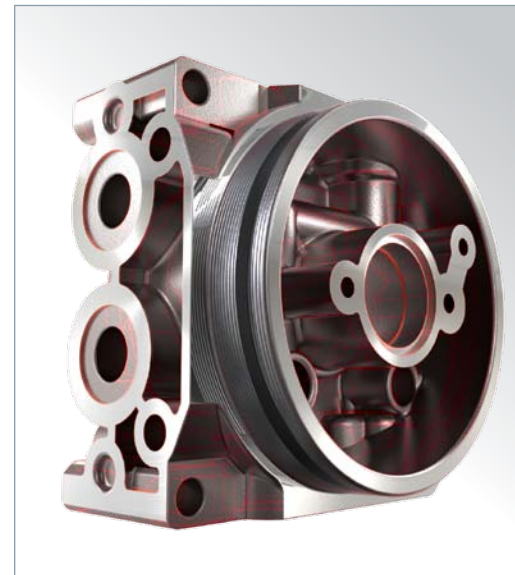
- > Compact, lightweight, versatile design.
- > High efficiency - low noise DC motors.
- > Reliable and proven design.
- > Lightweight pressure die cast drive plate with multiple circuit options.
- > Large range of pressure balanced gear pumps.
- > Steel check valve seat giving leak free control.
- > High performance direct acting relief valve with steel seat.

To Your Requirements

This brochure describes our Micro90 series power units and how they can be built as a self-contained motor, pump, valve, reservoir system.

Dimensional illustrations, performance curves and hydraulic schematics included in the pages accompanying this brochure depict some of the more standard power units, helping the customer to evaluate and understand the basis of our power unit system. Once selected, we review the power unit specification with you ensuring all requirements are covered and that the supplied product will meet all expectations.

The relationship that we have and build with our customers are one of the most important parts of what we do. Our understanding of many varied applications coupled with our excellent technical and sales support mean that our customers are able to quickly realise benefits and enhance their own products. Alongside this, our service and support is backed up by thorough process and quality controls with each power unit being 100% assembled and tested in the UK.



Our Power Unit Design

Our Micro90 Series power units can be fitted with 12 or 24 Volt high efficiency, low noise direct current electric motors ranging from 150W up to 800W, with or without respective starter solenoids.

A range of pressure balanced gear pumps as small as 0.26 cc/rev up to 1.0 cc/rev are adapted to the central drive plate that incorporates relief valve and check valve.

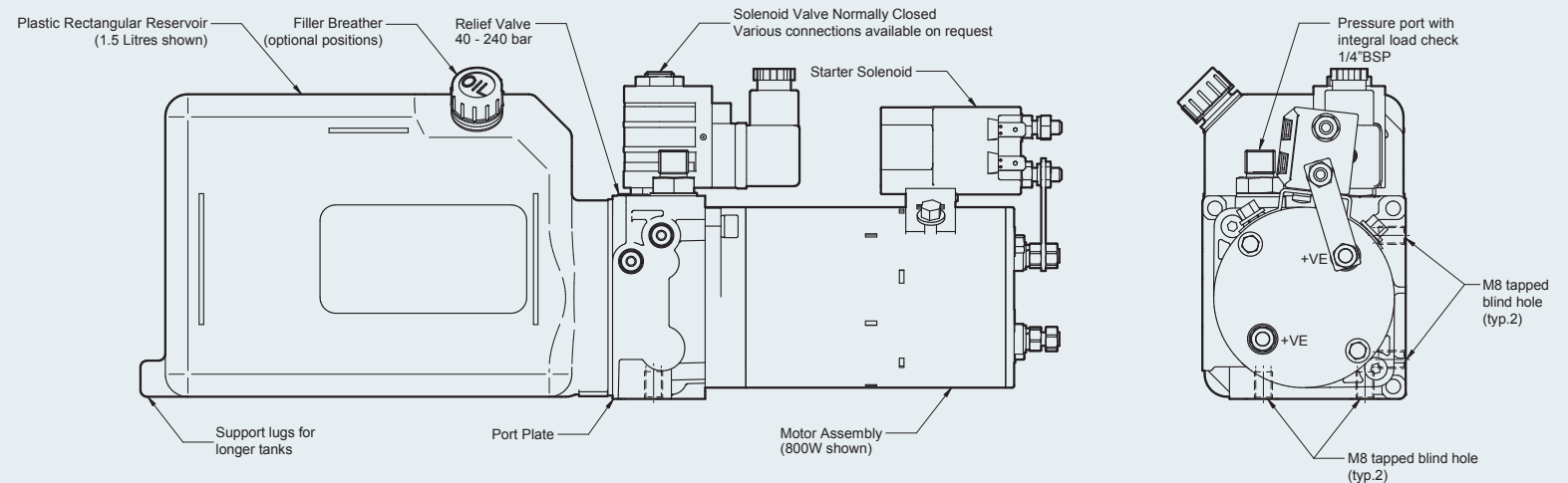
The versatile die cast aluminium drive plate offers either a simple pressure & tank port option or various mechanical & solenoid operated control valve options incorporated within. It also accepts various standard and custom flange on, manifold mounted hydraulic control options catering for the larger hydraulic circuit and all of which are available with various porting facilities.

A range of cylindrical and rectangular plastic (polyethylene) reservoirs. Manufactured in natural colour creating a semi-translucent reservoir allowing for visual oil check, all with various filler breather options.

The majority of the above elements can be rotated in various 90° increments and mounted either vertically, horizontally or universally all of which to suit any installation for maximum flexibility.

> Example Pack

Lift, hold and lower circuit with 800w motor and 1.5 litre reservoir, horizontal mount, circuit type "A**".



Key Build Features

- > Motors: compact, high efficiency, low noise.
- > Gear pumps: high mechanical & volumetric efficiency, low noise, pressure balanced.
- > Central port plate: lightweight, versatile.
- > Control valves: mechanical, solenoid operated, flange mounted manifold, large range of voltages and electrical terminations.
- > Reservoirs: polyethylene, colour natural semi-translucent.



Standard Applications

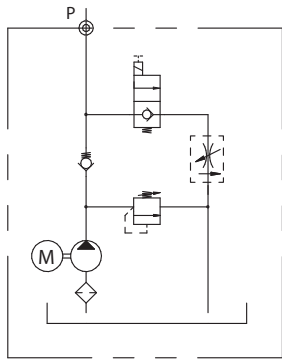
Standard and Custom Circuits

Detailed below are some of the more standard DC applications supplied by Related Fluid Power.

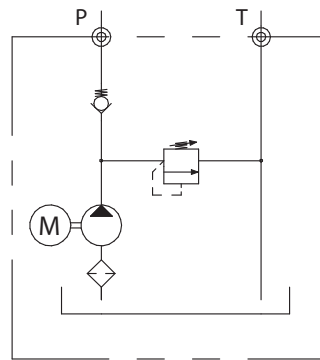
In addition to these circuits we also provide the flexibility to produce larger, more complex circuits to our customers' requirements. Such systems may incorporate any combination of cartridge, cetop, mobile type or customer's specified valve(s).

Quantity requirements for custom controls should not be a concern. Our in-house manufacturing capability means that we are able to meet the demands of our OEM customer no matter the quantity requirements, be it 1, 10, 100, 1000 or more.

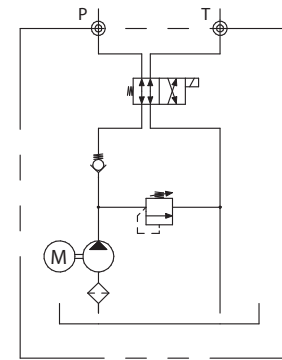
See ordering code section on page 14 for further options.



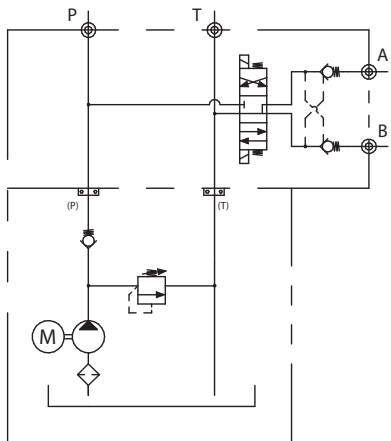
- > Lift, Hold & Lower with optional override and optional P.C.F.C.
- > Control Option "A**"



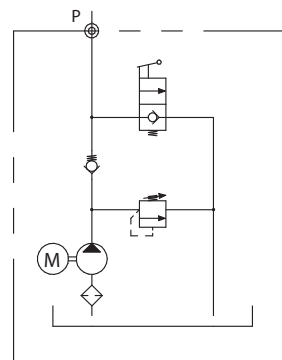
- > Pressure and Tank (P+T)
- > Control Option "XX"



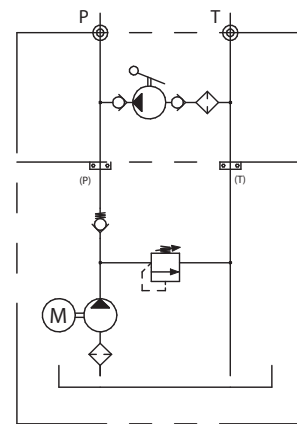
- > Integral 4 way 2 position
- > Control Option "SA"



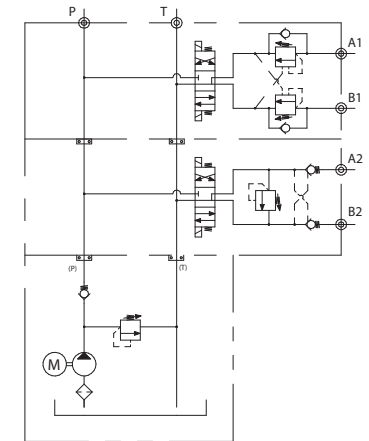
- > Cetop single station, figure 4 with P.O. check
- > Control Option "P**"



- > Lift, Hold & Lower with manual lower
- > Control Option "MO"

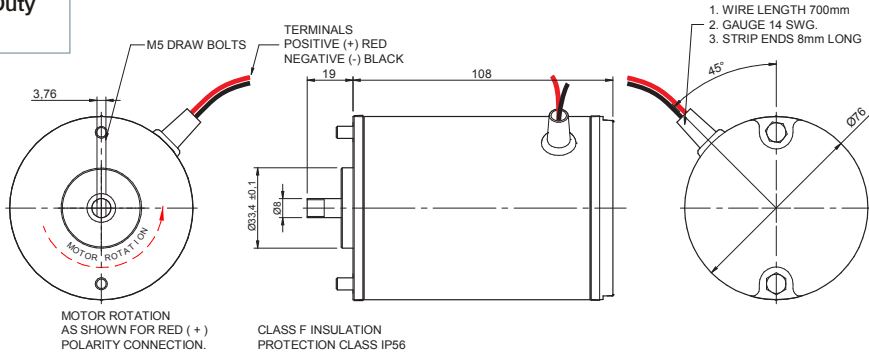


- > Hand Pump with P+T
- > Control Option "P*"

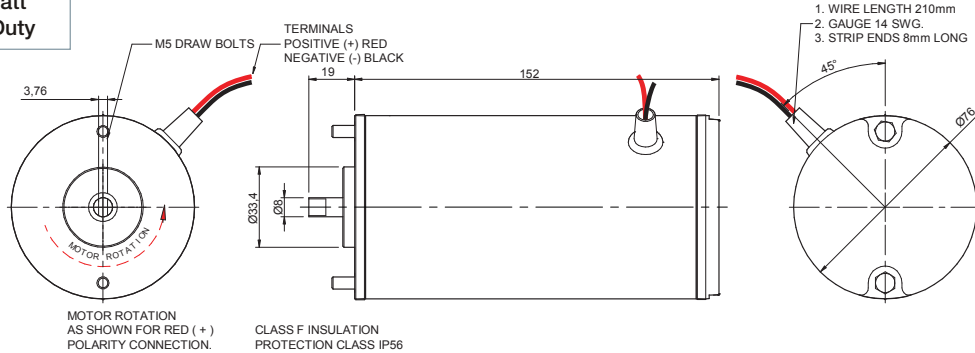


- > P+T with multiple manifold mount
- > Control Option "P*"

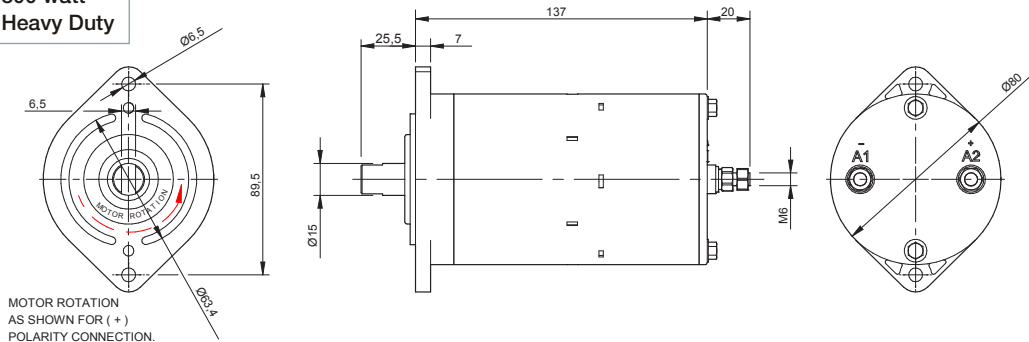
150 watt Low Duty



350 watt 500 watt Low Duty



500 watt 800 watt Heavy Duty



Our Motors

Our Micro90 series direct current (DC) permanent magnet electric motors are designed specifically for hydraulic power unit applications and can be supplied in 12 or 24 Volt with power options of 150, 350, 500 and 800 Watt.

They are designed for intermittent periodic operation at a declared load, resistant against short time overloading and overheating, Class F insulation (Max ambient 40°C), non-ventilated IP54 protection, optional thermal protection and can be supplied with or without respective starter solenoids.

Key features:

- > Compact construction.
- > High efficiency.
- > High ambient resistance.
- > Long brush life.
- > Low noise.
- > Low duty = improved low noise characteristics.

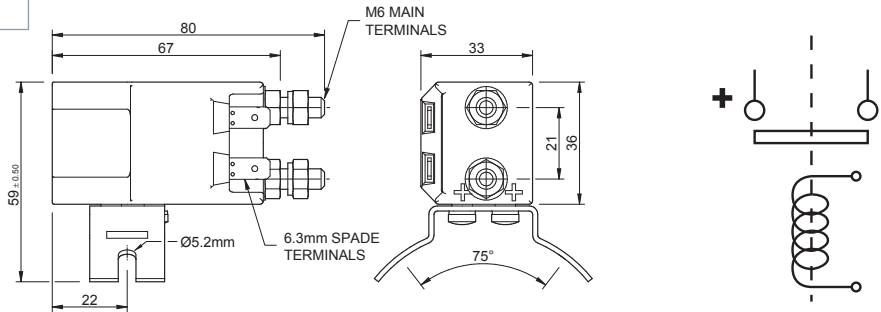
Our Starter Solenoid

We use only the highest quality starter solenoids that offer excellent standards in manufacture, reliability and performance.

Key features:

- > Ultra reliable (mechanical life >3 x 10⁶ cycles).
- > Single pole double breaking main contacts (SP ST NO).
- > Silver alloy, weld resistant contacts.
- > Low power consumption coil (10-14 watts, intermittently rated).
- > M6 stud main terminals and 6.3mm spade coil connections.

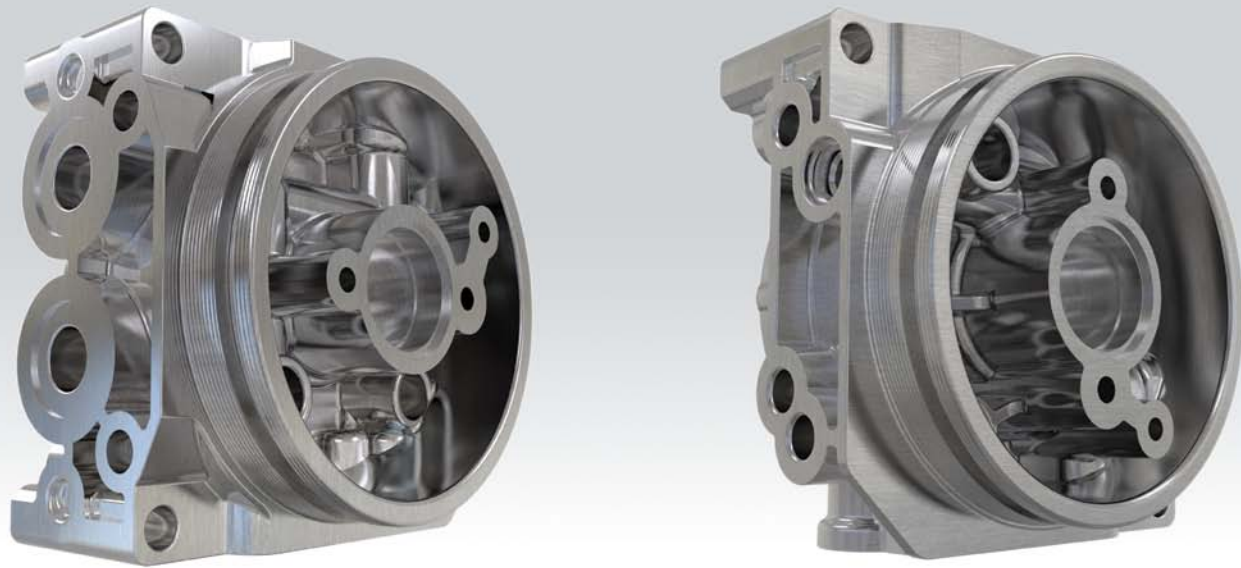
Starter Solenoid Switch



Our Drive Plates

Our Micro90 series drive plate is a precision engineered die cast aluminium construction, specifically designed to be compact, lightweight and versatile.

It caters for multiple options of integral mechanical or solenoid operated control valves as well as providing an interface for custom designed control valve manifold assemblies. It also incorporates steel seated inserts for both pressure line check and relief valve. Furthermore, the drive plate has an option for pressure compensated flow control valves (in lift, hold and lower configuration) as well as various porting facilities and mounting options. The drive plate also accommodates our comprehensive range of Group 0 gear pumps and DC electric motors allowing for the best balance of power, output and efficiency.



Our Pumps

Our Micro90 series range of Group 0 gear pumps cover several different displacements varying from 0.26 cc/rev up to 1.0 cc/rev.

Key features include:

- > compact design
- > high mechanical and volumetric efficiency
- > low noise

Nominal working pressures are 180 bar to 210 bar with maximum peak pressures ranging from 180 bar to 240 bar. All pumps are clockwise (CW) rotation and are protected by an integrated high efficiency suction filter element within the power unit build.

See ordering code section on page 14 for available displacements.



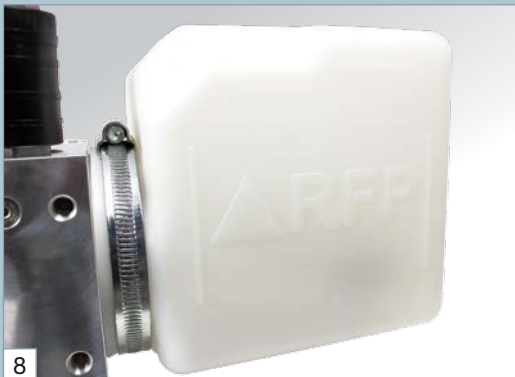
Our Reservoirs

Our Micro90 series reservoirs offer a variety of volumes in both cylindrical and rectangular form. All our reservoirs are manufactured from high density polyethylene (HDPE) producing a lightweight, corrosion resistant reservoir. Additional benefits are seen in terms of cleanliness when compared to steel fabricated reservoirs.

HDPE is known for its large strength-to-density ratio. This material can withstand high temperatures; 120°C/248°F for short periods, 110°C/230°F continuously. Key characteristics include high level UV resistance, good chemical resistance as well as environmental stress cracking resistance and is 100% fully recyclable material. All reservoirs are manufactured in their natural, off-white colour producing a semi translucent view of the oil within allowing for a visual oil level check.

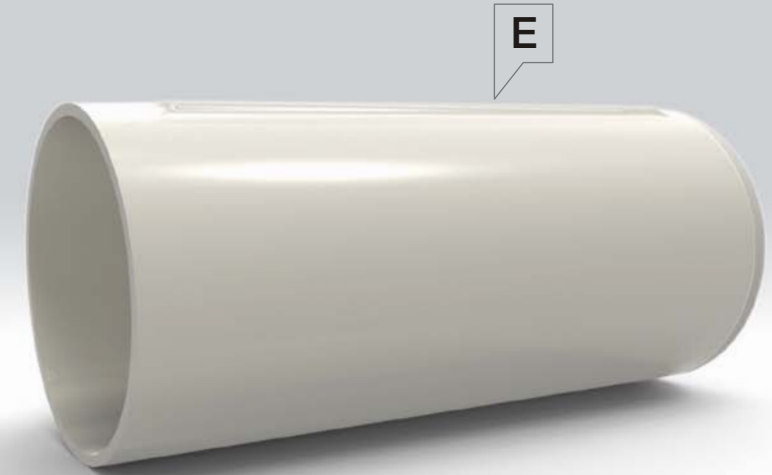
The filler breather port can be position on a variety of faces allowing for almost any orientation of the reservoir and/or installation for maximum flexibility.

Unless otherwise requested all reservoirs come with a standard 3/8" BSP filler breather fitted. A pressurised filler breather is also available - please request further information.



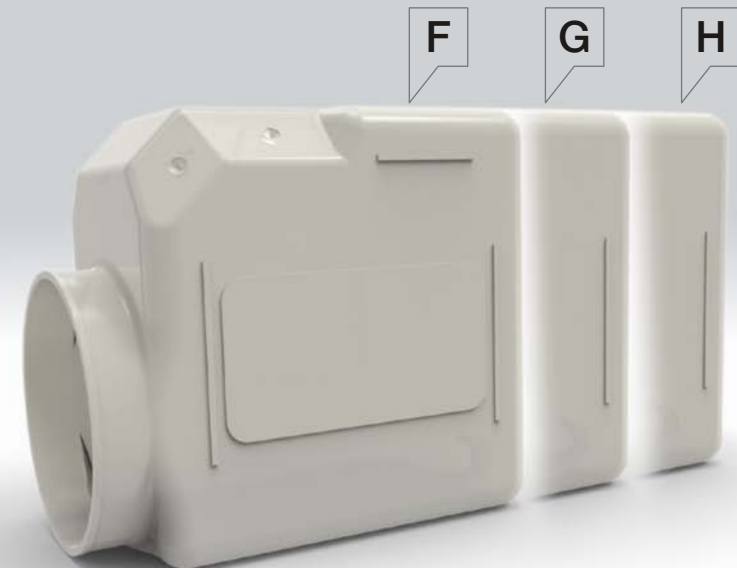
> Cylindrical

	Reference Capacity (Litres)	Usable Horiz. (Litres)	Usable Vert. (Litres)	Length (L) (mm)	Diameter (mm)
E	1.0	0.6	0.5	196	88



> Rectangular

	Reference Capacity (Litres)	Usable Horiz. (Litres)	Usable Vert. (Litres)	Length (L) (mm)	Width (mm)	Height (mm)
F	1.0	0.7	0.6	161	88	134
G	1.5	1.0	1.0	209	88	134
H	2.0	1.3	1.5	259	88	134



Installation

Our Micro90 series power unit range offers the customer total flexibility to produce a power unit that can meet their needs, whether it be a standard single acting or double acting circuit or creating a more complex larger hydraulic circuit to meet specific applications.

Detailed alongside and on the accompanying page are examples with brief descriptions of typical 'P + T' and single acting hydraulic circuits (lift, hold and lower).

All power units are 100% fully tested with the relief valve set to customer requirements (up to a maximum available pressure) ensuring all our Micro90 hydraulic power unit systems meet the satisfaction of the customer.

Pack 1: Pressure & Return Circuit

Part No: ZN2G1XX26HXXXA0EH

Control Option: "XX"

- > 150 Watt 24Vdc electric motor – less solenoid
- > 0.26 cc/rev gear pump
- > Pressure line relief valve
- > Pressure line check valve
- > 1/4" bsp 'P + T' service ports
- > 1.0 Litre cylindrical plastic reservoir with filler breather
- > Horizontally mounted

Pack 2: Pressure & Return Circuit

Part No: ZN1G3LX35HXXXA0FH

Control Option: "XX"

- > 350 Watt 12Vdc electric motor with starter solenoid (not wired to motor)
- > 0.35 cc/rev gear pump
- > Pressure line relief valve
- > Pressure line check valve
- > 1/4" bsp 'P & T' service ports
- > 1.0 Litre rectangular plastic reservoir with filler breather
- > Horizontally mounted

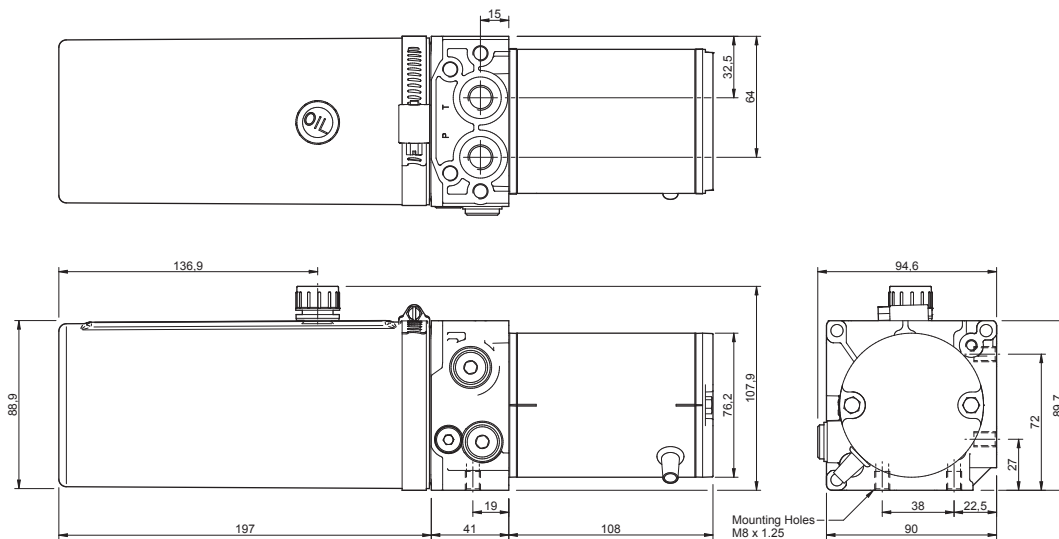
Pack 3: Lift, Hold & Lower Circuit

Part No: ZN1A8LX75HA01A0GH

Control Option: "AO"

- > 800 Watt 12Vdc electric motor with starter solenoid
- > 0.75 cc/rev gear pump
- > Pressure line relief valve
- > Pressure line check valve
- > Solenoid operated Normally Closed control valve – 12Vdc
- > 1/4" bsp pressure port (male)
- > 1.5 Litre rectangular plastic reservoir with filler breather
- > Horizontally mounted

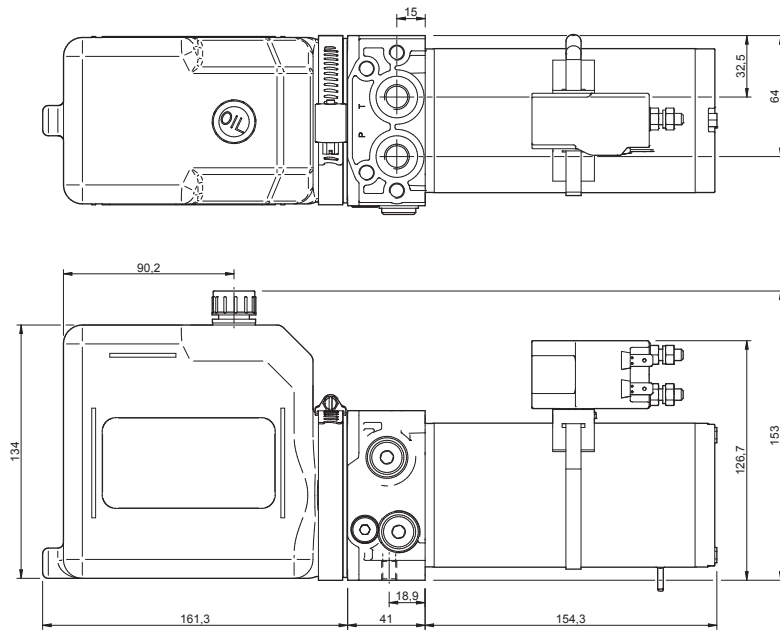
1



Control Option: "XX"



2



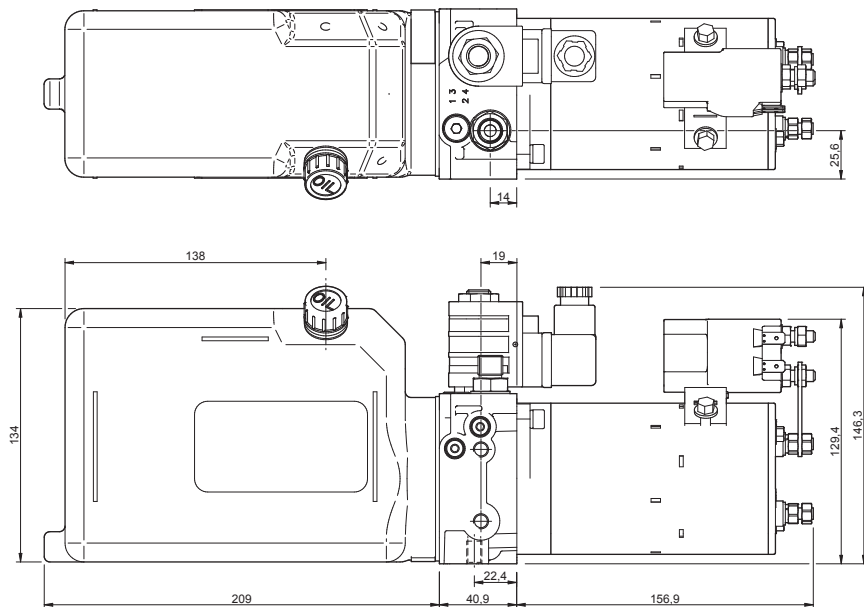
Mounting Holes
M8 x 1.25 (X4)

2.5mm² PVC insulated leads (+/-)
Length 400mm

Control Option: "XX"



3



Mounting Holes
M8 x 1.25

Control Option: "AO"



Our Motor Performance

Nominal performance of motor/pump combinations are given based on constant voltage and nominal a 20 - 25°C with ISO VG22 oil.

> Pump Code

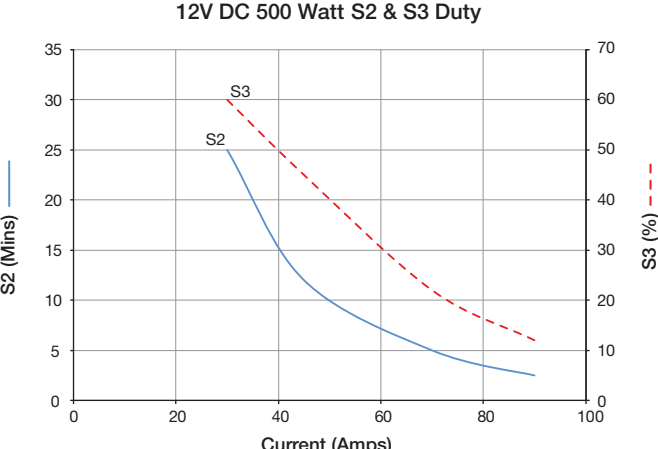
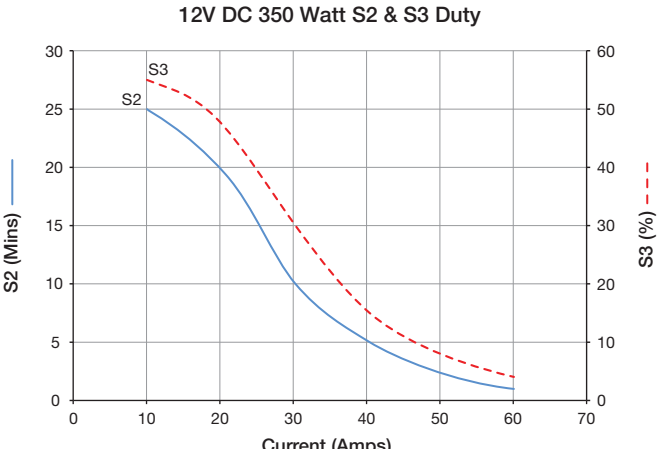
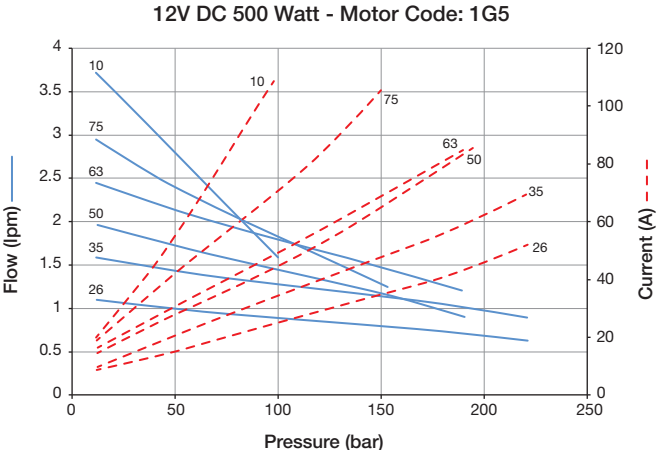
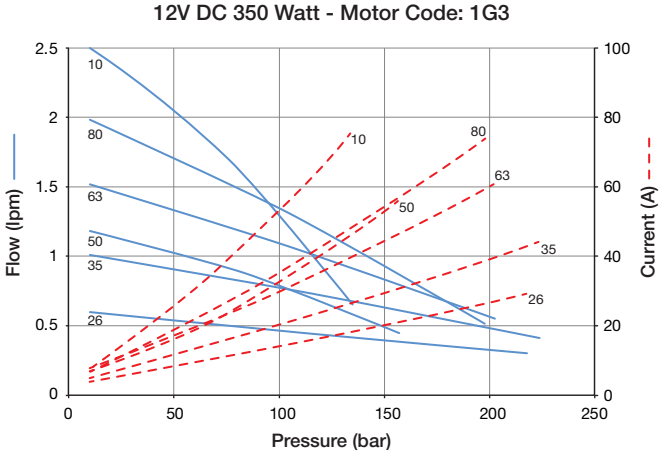
- 26** = 0.26 cc/rev
- 35** = 0.35 cc/rev
- 50** = 0.50 cc/rev
- 63** = 0.63 cc/rev
- 75** = 0.75 cc/rev
- 10** = 1.00 cc/rev

Ratings

S2 is a short time operation rating and is the time in minutes for the motor brush temperature to reach 150°C. For example: a 12Vdc 800 Watt motor with a 0.75cc/rev pump delivers 3.5lpm at 100 bar and draws a current of 100 amps. It could be operated from cold (25°C) for 4 minutes under those conditions before the motor reaches its maximum permissible temperature. The motor must then be allowed to cool to ambient temperature before repeating the cycle. (Ambient temperature range -20°C to +40°C).

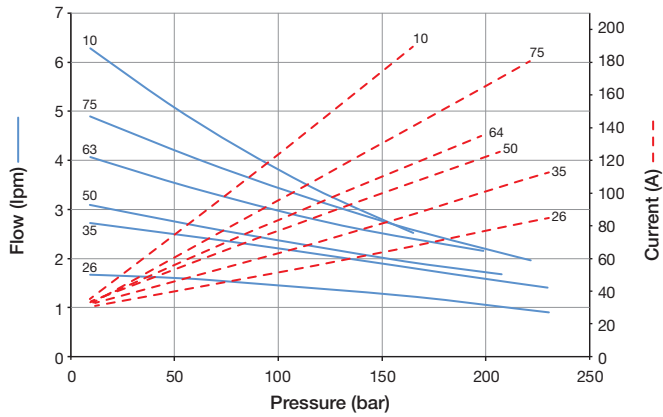
S3 is the duty rating expressed as the percentage 'ON' time in a 10 minute cycle. For example: a 10% S3 rating is '1 minute' ON followed by '9 minutes' OFF.

This data is provided for guidance and should be verified by the user on the specific application. The duty of the pack will be influenced by ambient temperature, ventilation and locality to other heat sources affecting the rate of cooling.

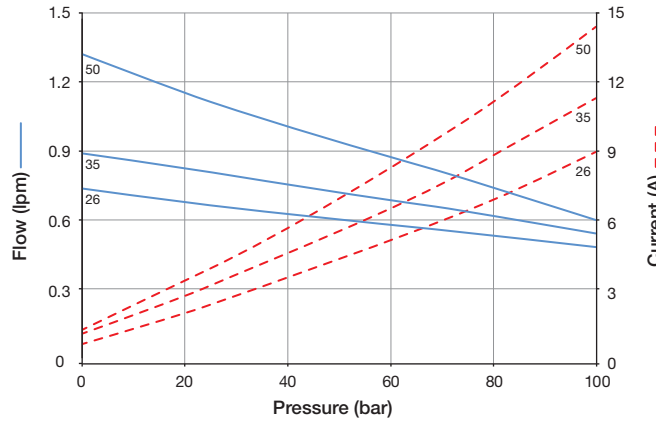


Motor Pump Data

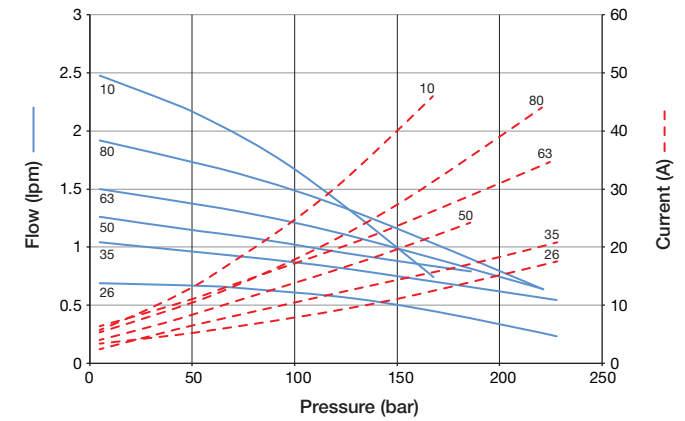
12V DC 800 Watt - Motor Code: 1A8/C8



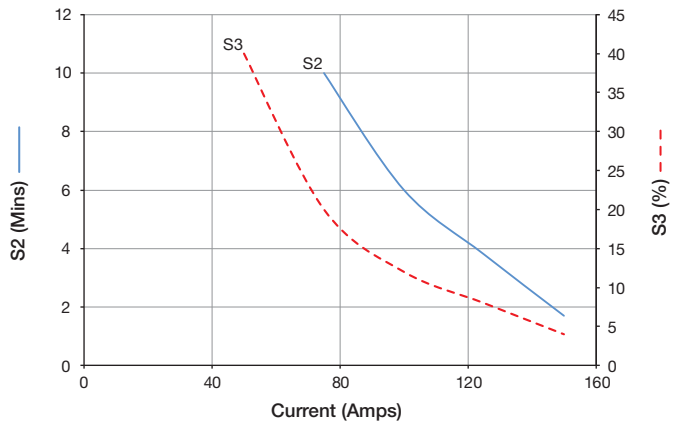
24V DC 150 Watt - Motor Code: 2G1



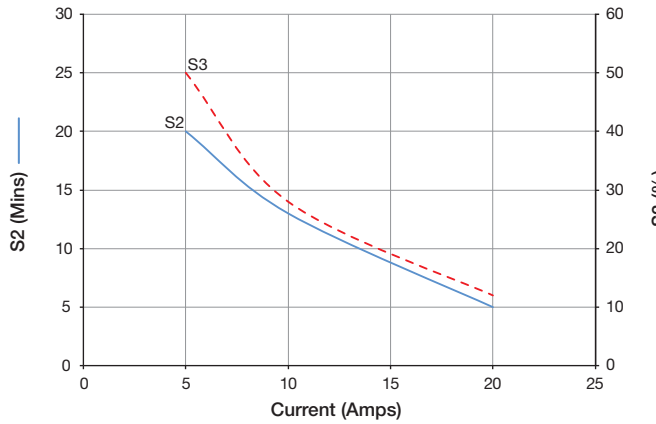
24V DC 350 Watt - Motor Code: 2G3



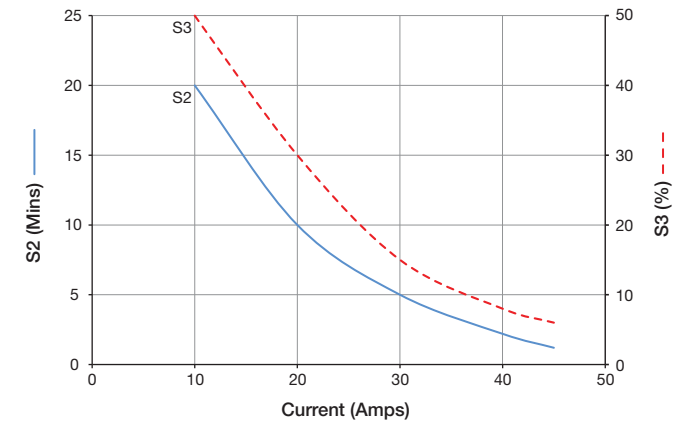
12V DC 800 Watt S2 & S3 Duty



24V DC 150 Watt S2 & S3 Duty

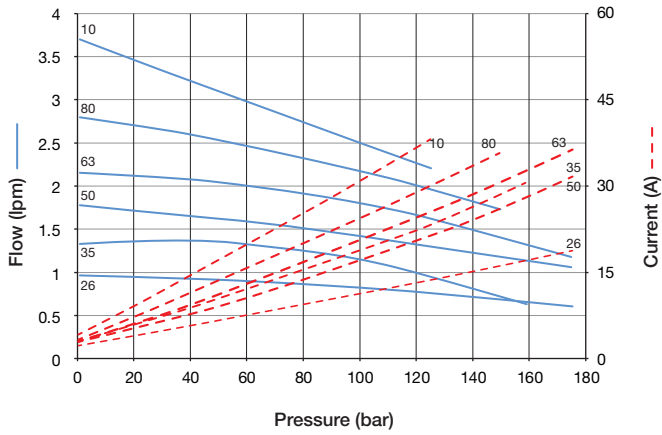


24V DC 350 Watt S2 & S3 Duty

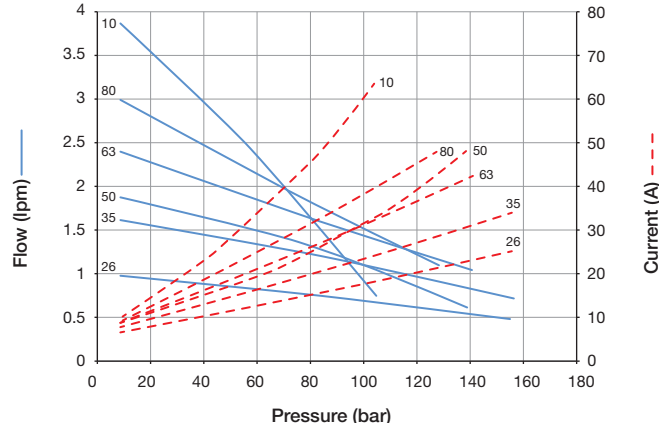


Motor Pump Data

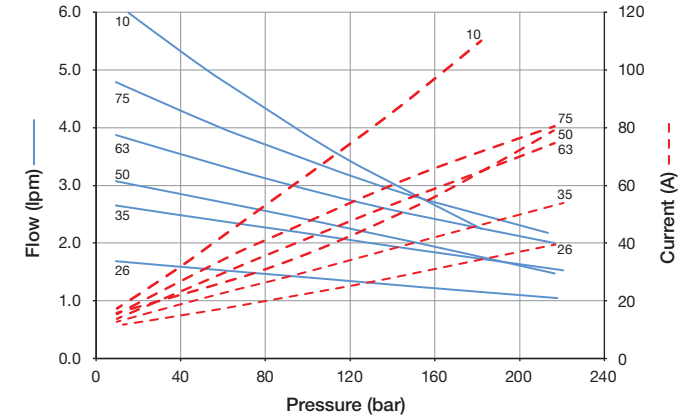
24V DC 500 Watt Low Duty - Motor Code: 2G5



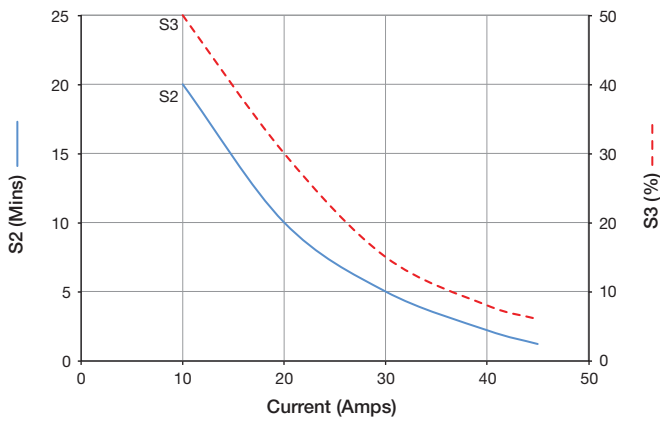
24V DC 500 Watt Heavy Duty - Motor Code: 2A5/C5



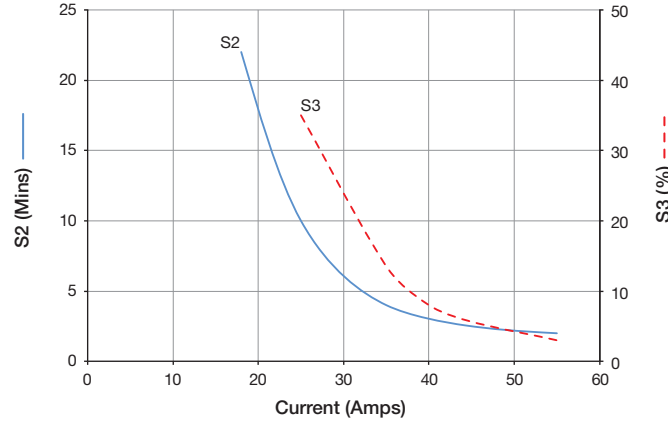
24V DC 800 Watt - Motor Code 2A8/C8



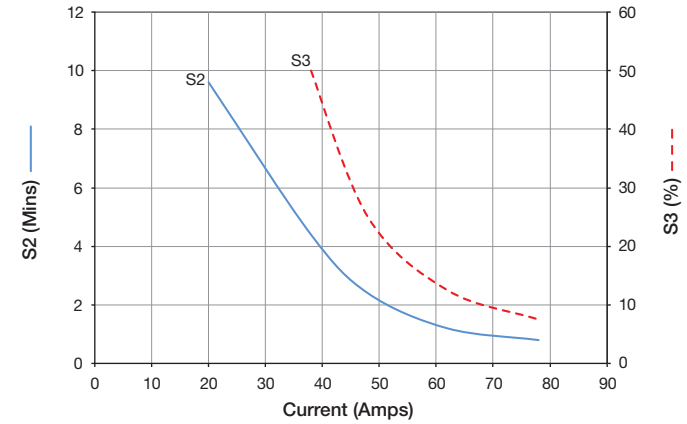
24V DC 350 Watt S2 & S3 Duty



24V DC 500 Watt S2 & S3 Duty



24V DC 800W S2 & S3 Duty



Ordering Code

Power Unit
Series Type

Motor
Voltage
DC Power
Category
Starter

Pump

Relief Valve
Pressure
Rating

Z N

2 G1 X

63

H

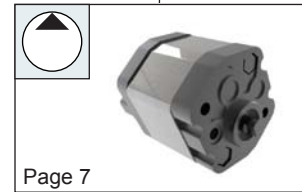
Power Unit Series	
ZN	Micro 90 Power Unit Series



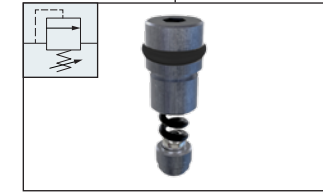
Motor Assembly		
Voltage		
1	12v	
2	24v	
Motor		
A8	800W Heavy Duty	
C8	800W Heavy Duty c/w Thermal Switch	
A5	500W Heavy Duty	
C5	500W Heavy Duty c/w Thermal Switch	
G1	150W Low Duty, High Efficiency	
G3	350W Low Duty, High Efficiency	
G5	500W Low Duty, High Efficiency	
Solenoid		
L	Starter Solenoid	
X	No Starter Solenoid	



Pump Displacement	
26	0.26 cc/rev
35	0.35 cc/rev
50	0.50 cc/rev
63	0.63 cc/rev
75	0.75 cc/rev
10	1.00 cc/rev



Relief Valve	
L	5 - 60 bar
H	40 - 240 bar
X	No Relief Valve



Whilst every endeavour has been made to ensure accuracy, this brochure cannot be considered to represent any part of a contract, whether expressed or implied. We reserve the right to amend specifications at our discretion. Errors and omissions excepted.

Ordering Code

Valve Type
Valve Option
Solenoid Voltage
Flow Control
Reservoir
Mounting

A O 2 **B5** **G** **H**

Control Options		
Solenoid Operated		
A	O	Solenoid Operated - Normally Closed
A	M	Sol Op NC + Manual Override (Detent)
A	N	Sol Op NC + Manual Override (Non-Detent)
A	S	Sol Op NC + Screen
A	T	Sol Op NC + Man Over (Detent) & Screen
A	U	Sol Op NC + Man Over (No-Detent) & Scr.
B	O	Solenoid Operated - Normally Open
B	M	Sol Op NO + Manual Override (Screw)
B	S	Sol Op NO + Screen
B	T	Sol Op NO + Man Over & Screen
S	A	Sol Op 4 Way 2 Position
Manual		
M	O	Manual Pull NC (Detent)
M	S	Manual Pull NC (Detent) c/w Screen
V	O	Needle Valve
V	K	Needle Valve c/w Screen
P & T Ports Only		
X	X	P & T Ports Only
Special Flange on Manifold Assembly		
P	A	To circuit A
P	B	To circuit B
P	...	See 'Standard Applications' page for range
Control Voltage		
	1	12V DC
	2	24V DC
	5	24V AC
	6	110V AC
	9	110V AC
	X	No Voltage Required

Lowering Control	
A0	None
B0	1.0 lpm
B5	1.5 lpm
C0	2.0 lpm
C5	2.5 lpm
D0	3.0 lpm
E0	4.0 lpm
Further options available on request	

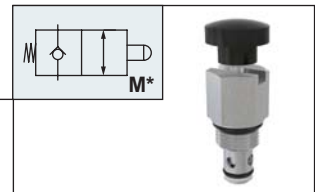
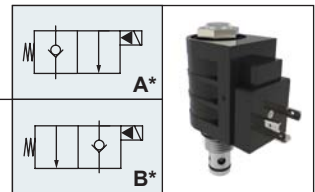


Reservoirs	
E	1L Cylindrical Plastic
F	1L Plastic
G	1.5L Plastic
H	2L Plastic
X	No Reservoir
Special filler breathers available	



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Mounting	
H	Horizontal
V	Vertical
U	Universal



P*

Priming a Power Unit

Under no circumstances should an un-primed power unit be run continuously as this may damage the pump and will invalidate the Warranty.

Before starting system, make a final check that all external pipe work connections have been tightened and that control valves are in the neutral position.

Power units are normally self-priming, but in the event of difficulty, first check that the motor is rotating in the correct direction (see Additional Information - Electrical Wiring section).

Single acting circuits:

Operate the solenoid lowering valve either electrically or with manual over-ride if fitted, and operate the motor briefly. In the event this does not allow the unit to prime:

Disconnect the pressure hose from the actuator and place end of hose into tank filler or separate container and briefly operate the motor until a continuous flow of oil is seen. The unit is now primed.

Double acting circuits:

Connect a suitable hose between the A & B ports, energise the directional control valve and briefly operate the motor.

Pressure and tank circuit:

Connect a suitable hose between the pressure port and tank filler breather or separate container and operate power unit as above

Caution:-

- Top up reservoir with clean oil after priming.
- Never use oil additives, Hydraulic brake fluid, or thin out with other fluids.
- Pumps are NOT suitable for many water

glycol fluids.

- Never add oil when cylinders are extended.
- Allow sufficient air space below the breather.
DO NOT OVERFILL

Recommended Hydraulic Fluid

Type: Mineral based hydraulic oil. Consult Sales Department if specialised oil is required for high or low temperature environments.

Viscosity: The correct grade of oil is dependent on application, duty cycle and ambient temperatures.

Examples	Ambient temp. degree C	ISO viscosity grade VG no.	Viscosity index
Standard grade oils	-5 to 25	32	98
	5 to 35	46	98
Premium grade oils with high viscosity index	-10 to 30	37	155
	-25 to 35	22/32	up to 400

Oil Cleanliness

Most hydraulic failures they are caused by contamination. It should also be understood that new oil from the barrel is not necessarily clean by hydraulic standards, so use filtered oil (ISO 4406 18/16/13) from known clean sources. Do not use unclean containers or funnels to decant oil.

Electrical Wiring

Only nominal specified voltage is to be used. All wiring should be in compliance with the relevant electrical regulations and should be carried out by competent persons. Consider cable length, section and consequent voltage drop, and ensure that wire size, connectors, generators, batteries and transformers are

rated to meet inrush current demands. Solenoid valves, pressure switches etc. are not normally supplied wired unless stated in the specification/quotation. See relevant sections in this catalogue for current draw data for motors and valves.

Pendant Controls

Push button pendant controls can be supplied on request.

Useful Formulae

Q = Flow rate (Lpm)

p = Pressure (bar)

P = Power (kw)

A = Cylinder area (cm²)

d = Cylinder bore (cm)

F = Cylinder Force (N)

L = Cylinder stroke (cm)

D = Displacement (L)

V = Speed (cm/s)

T = Time (sec)

$$\text{Power} \quad P = \frac{Q \times p}{600} \times 1.2$$

$$\text{Cylinder Area} \quad A = \frac{\pi d^2}{4}$$

$$\text{Cylinder Force} \quad F = (p \times A) \times 10$$

$$\text{Cylinder Speed} \quad V = \frac{Q}{A}$$

$$\text{Cylinder Displacement} \quad \text{Cyl. Disp. Litres} = \frac{A \times L}{1000}$$

$$\text{Cylinder Flow} \quad \text{Cyl. Flow Lpm} = \frac{60 \times D}{T}$$

Technical Information

The following information can be supplied on request:

Test Certificate

Certificate of Conformity

Declaration of Incorporation

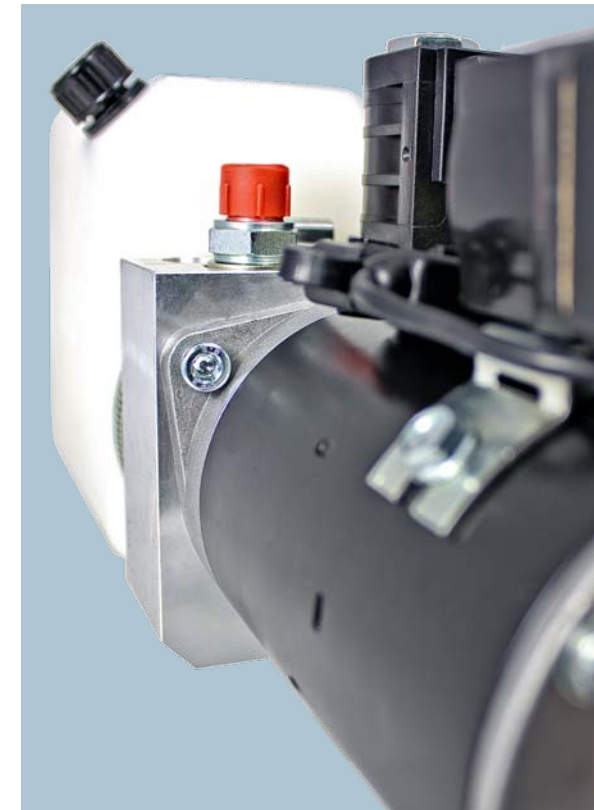
Maintenance and Installation

Hydraulic circuit

Electrical circuit

2 Dimensional layout drawings (*.pdf)

3 Dimensional model (*.step)





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