

# JANUS MOTORS

MOTORS AXIAL  
PISTON

The  
**Water**  
**Hydraulics**  
Co. Ltd.



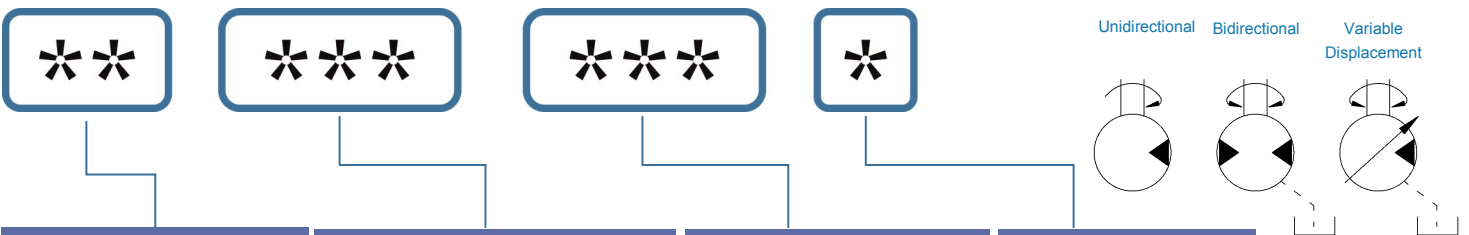
# JANUS MOTORS AXIAL PISTON

Our Janus axial piston motors are totally oil free, clean and completely safe to use. As a result of employing advanced materials, high velocity and loaded sliding surfaces, the range of motors can operate effectively with water as their only coolant/lubricant therefore, this removes the potential for cross contamination of the system fluid or lubricating oil. Each motor employs technology which minimises vibration and ensures a low noise yet high efficiency operation. The result is an exceptionally small, light-weight product.

Manufactured in 316 stainless steel as standard, the product offers excellent resistance to corrosive fluids. The materials utilised internally can be selected to suit the most appropriate combinations for not just tap water but also sea water and various other fluids.

Minimal pulsation is experienced with these units due to the multiple piston design and the high operational speeds. The physical size of the motor in comparison to the power generated offers one of the most compact drive solutions.

## MOTOR ORDERING CODE



UNIT TYPE		OPERATING PRESSURE (BAR)		DISPLACEMENTS (cc/rev)			FLUID	
*		*		*			*	
MA	Motor Anti-Clockwise	25	25.0	3.0	3.0	M3	W	Tap Water
MB	Motor Bi-Directional	Min	.....	4.6	4.6	M6	S	Sea Water
MC	Motor Clockwise	.....	.....	6.0	6.0		T	Technical Water
MV	Motor Variable **	160	160.0	12	12.0	M15	O	Other* (*Please Specify)
		Max		15	15.0			
				19	19.0			
				23	23.0	M30		
				30	30.0			
				35	35.0			
				51	51.0	M60		
				63	63.0			
				70	70.0			
				134	134.0	M180		
				180	180.0			
				225	225.0			



### Example

A motor operating at 160 bar. Shaft rotation clockwise (viewed on shaft end) with a displacement of 6cc

Ordering code: **MC160-6.0W**

# JANUS MOTORS

## FIXED DISPLACEMENT AXIAL PISTON

		SPECIFICATION					
Motors		M3	M6	M15	M30	M60	M180
Displacement (cc/rev)	Max:	3.0	6.0	18.6	34.6	70.3	225
	Min:	-	4.6	15.0	30.0	63.0	135.0
RPM	Max: *	4000	4000	4000	4000	4000	2000
	Min: **	500	500	500	500	500	300
Max. Power (kW) Cont.		2.7	5.4	17.5	31	67	120
Max. Input (l/min) Cont.		12	24	72	132	292	50
Max. Cont. Pressure (Bar)		160	160	160	160	160	160
Weight (kg)		1.5	2.2	6	10	19	82
Temperature (°C)	Max:	50	50	50	50	50	50
	Min: ***	2	2	2	2	2	2

\* Consult TWHC for higher operating speeds. \*\* See gearbox note. \*\*\* Consult TWHC for antifreeze option and lower temperature conditions.

### Geared Motor Assemblies

A standard range of epicyclic gearboxes are available for operation below the recommended minimum speed.

### Temperature

The units will generate full performance from 2°C to 50°C. For temperatures below freezing, an environmentally friendly antifreeze is available; ask for the Monopropylene Glycol datasheet. Operation above 50°C is possible however, the volumetric efficiency of the unit will be affected. Consult TWHC and specify the maximum operating temperature.

### Filters

All incoming water to the pumps must be pre-filtered to a nominal rating of 10µm (25µm absolute) with a filter element rating of β10 = 75 or better. Return line filtration is advisable on closed loop systems. High pressure filtration may also be considered but as these are manufactured in stainless steel, we consider this an expensive option.

### Shaft Loading

Radial and axial loads are not permitted on the motor output shaft; use a flexible gear coupling where possible.

### Start Torque

The smaller motors (M3 and M6) require a minimum pressure of 25 bar to rotate an unloaded shaft. The larger motors will all start above 12 bar. For applications that must start under full load, the motor must be sized based on their starting torque. A starting capacity of 60% of the dynamic torque shown in the graphs should be used for calculations

### Operation

It is advised the motors are operated on a monthly basis to ensure the maximum starting torque is maintained.

### Over Run

On applications where the motor shaft will continue to rotate once the control valve is closed; over run check valves must be incorporated. For further information on assemblies, please consult TWHC.

### ATEX

Atex approved to comply with regulations of Directive 94/9/EC (ATEX) for equipment or protection systems intended for use in potentially explosive atmospheres. Product group, category, zones: II 2GD ck T6 T85°C +1°C≤TA≤+40°C.

# JANUS MOTORS

## AXIAL PISTON

### Fluid

Drinking water quality conforming to the EEC-directive 98/83/EC should be used as standard. Consult TWHC if you are unsure of the water quality. The standard product will operate happily on technical water i.e. distilled, RO water or demineralised. Changes may need to be made to the seal material or construction depending on the operating environment. The motors also operate on non-flammable fluids such as Glycol 95/5 mixtures; internal clearances must be adjusted when functioning on such fluids. It is imperative the exact operating fluid is specified on all enquiries and orders. The standard construction will operate on sea water however, due to the increased corrosion potential of the fluid, a more noble material construction may be required for long term operation.

### Valve function

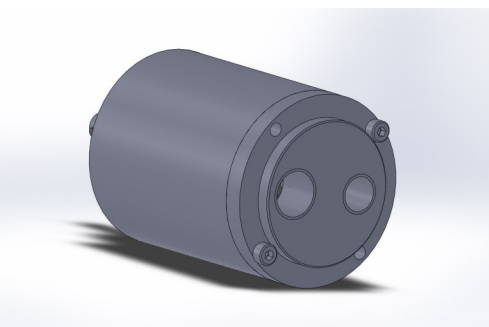
It is very important to design your circuit to ensure inertia forces and “Run on” conditions do not damage the motor. Dynamic conditions must be assessed, consult TWHC if application assistance is required.

### PORT CONFIGURATIONS

- All connections are BSPP
- Only use parallel threads with high pressure sealing washers
- Do not use taper fittings

### 2 Port Configuration

Motors are available in 2 port, unidirectional configuration. The P (pressure) inlet and T (tank return) line are clearly marked on the port end cover. Do not connect in reverse order or catastrophic failure will occur.

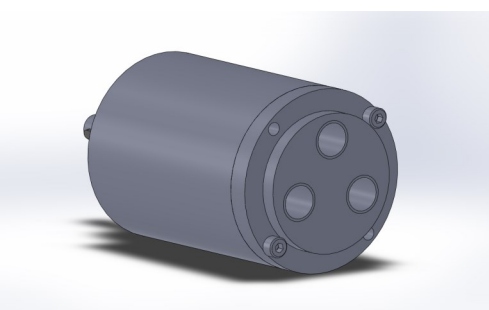


### Unidirectional Motor

Maximum Pressure in the motor return line is 2.5 bar.

### 3 Port Configuration

All sizes of motor can be supplied for bi-directional rotation. The 3 port design includes an additional case drain port T. By alternating the pressure inlet and return ports, the motor shaft will reverse. Both pressure ports on the 3 port design can accept full system pressure. The motor performance can be adjusted by controlling the flow and pressure of the return flow.

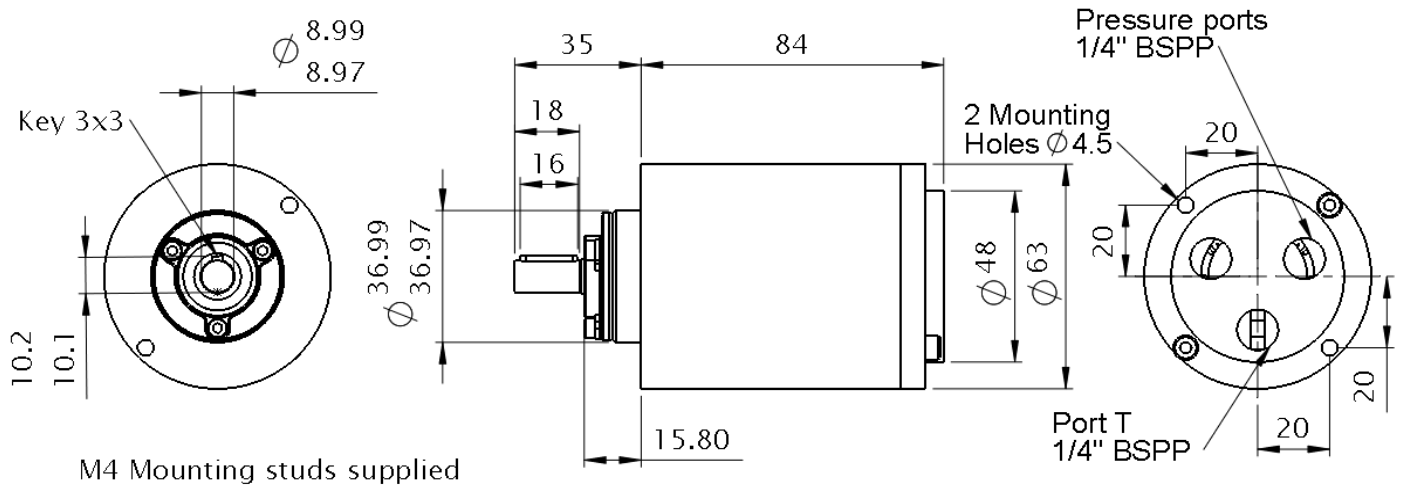


### Bi-Directional Motor

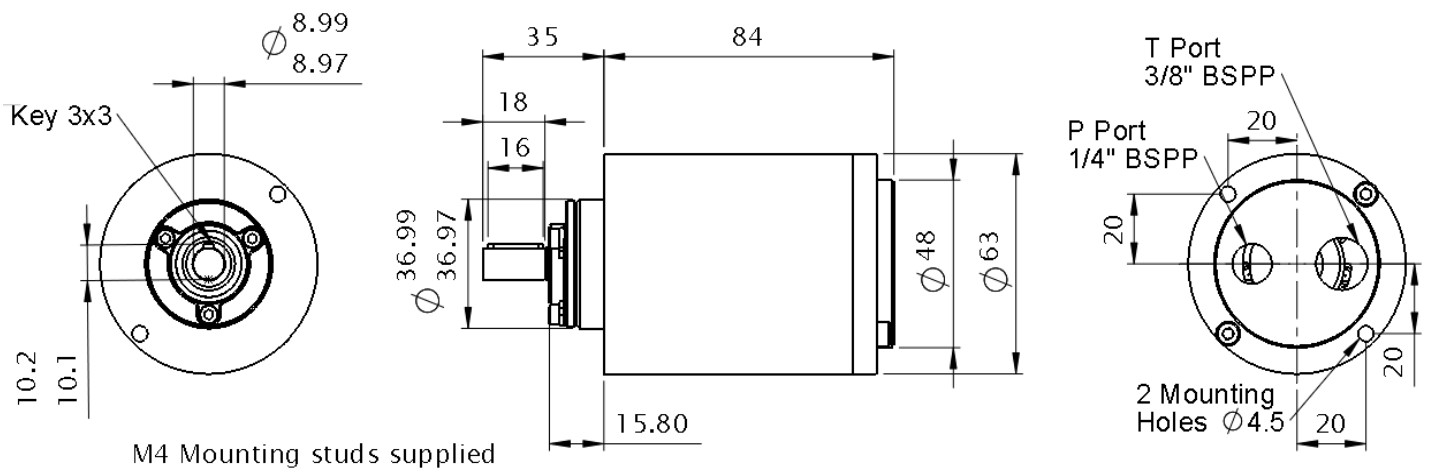
Pressure in the return line on a bi-directional motor must be greater than the pressure in the leakage port. The leakage port has a maximum pressure of 2.5 bar.

# JANUS MOTORS M3 MOTOR DIMENSIONS

## MB160-3.0W



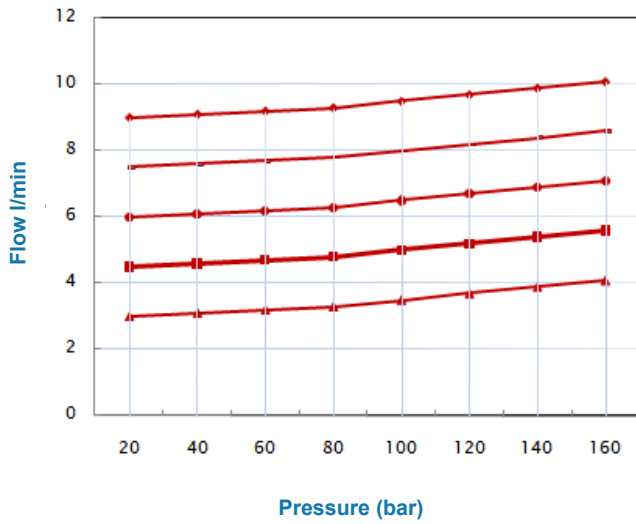
## MA160-3.0W & MC160-3.0W



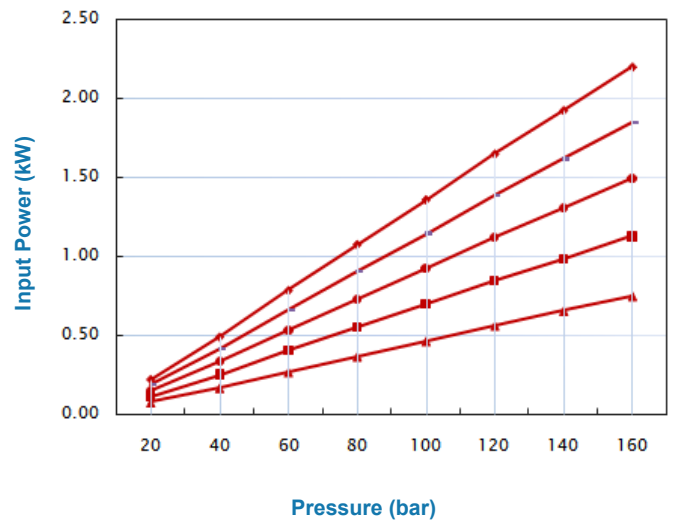
# JANUS MOTORS

## M3 MOTOR PERFORMANCE DATA

**Input Flow**

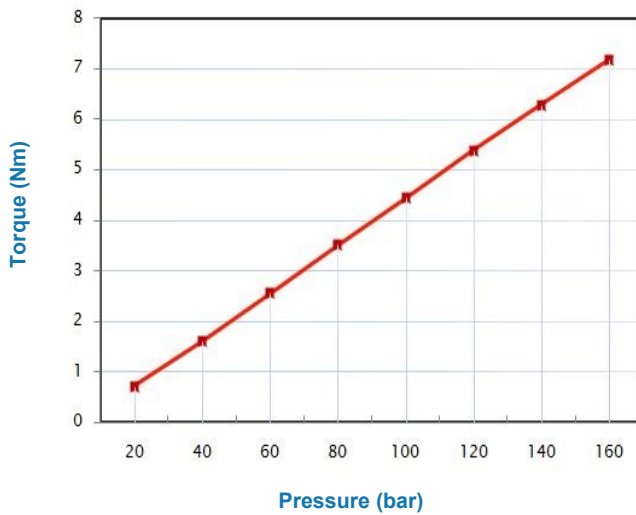


**Output Power kW**



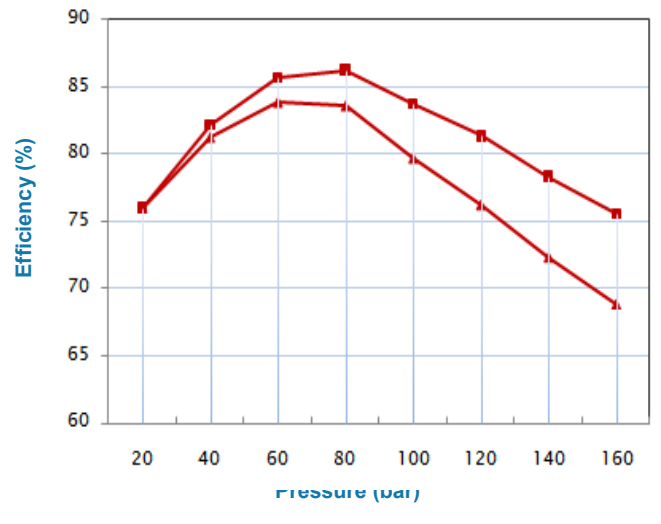
▲ 3cc 1000rpm ■ 3cc 1500rpm ● 3cc 2000rpm ◆ 3cc 2500rpm ◆ 3cc 3000rpm

**Output Torque**



■ 3cc 1500rpm

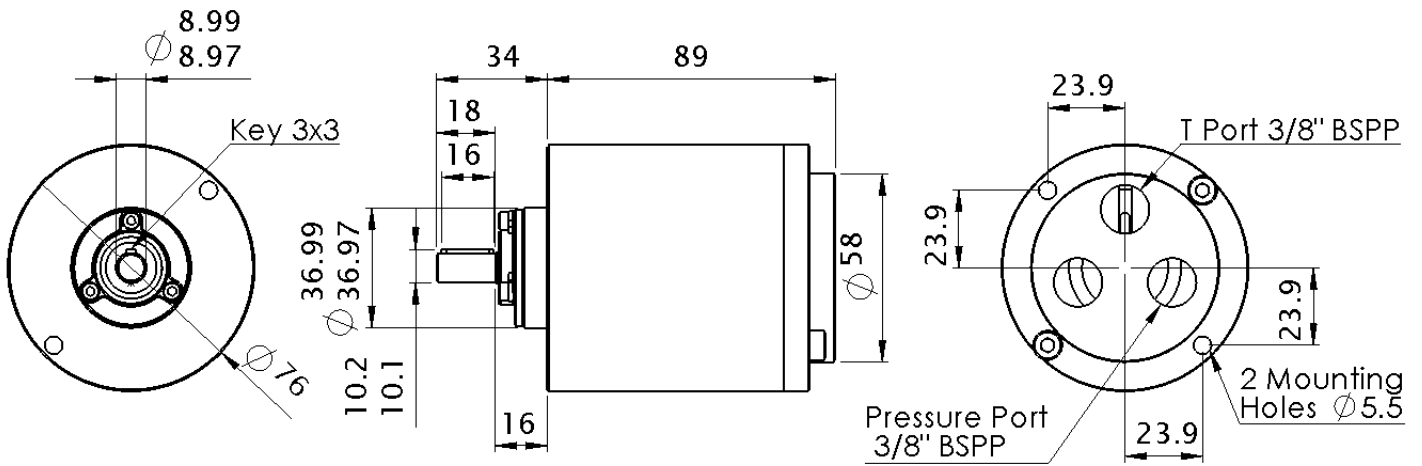
**Overall Efficiency**



▲ 3cc 1000rpm ■ 3cc 1500rpm

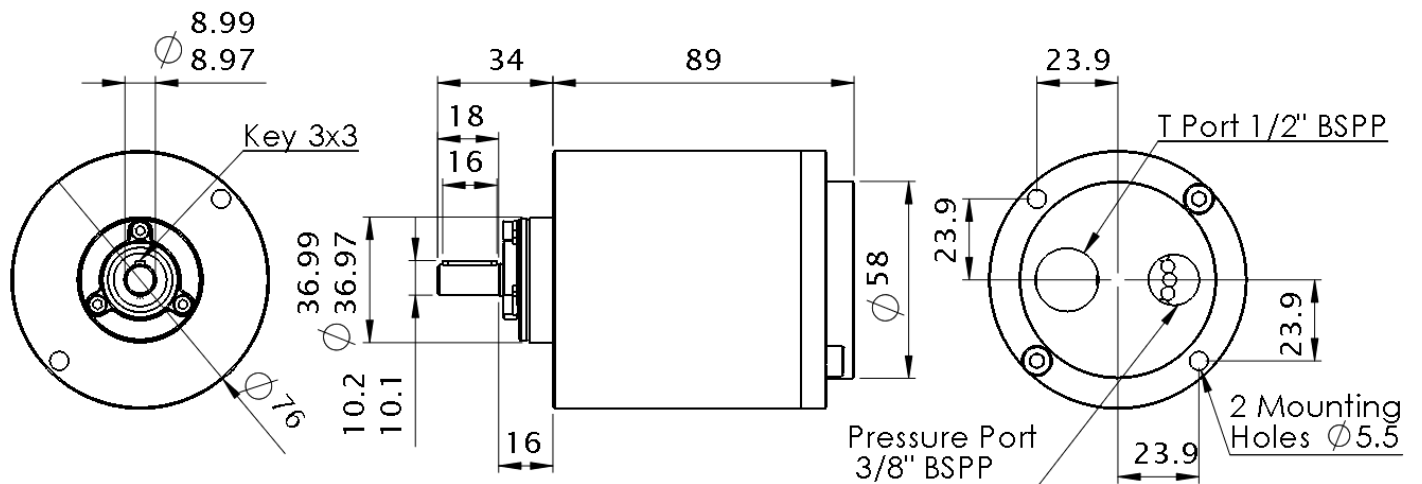
# JANUS MOTORS M6 MOTOR DIMENSIONS

## MB160-6.0W & MB160-4.6W



## MC160-6.0W & MA160-6.0W

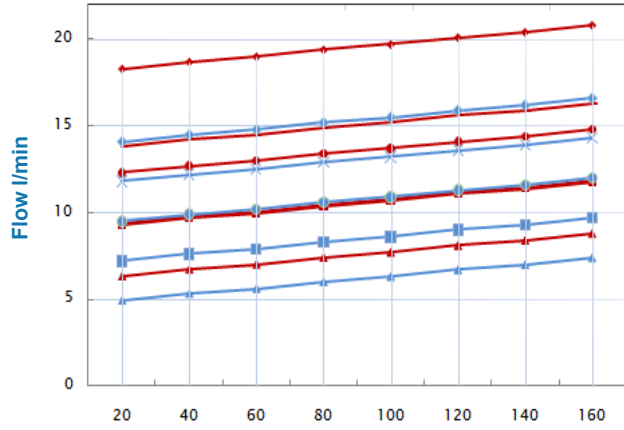
## MC160-4.6W & MA160-4.6W



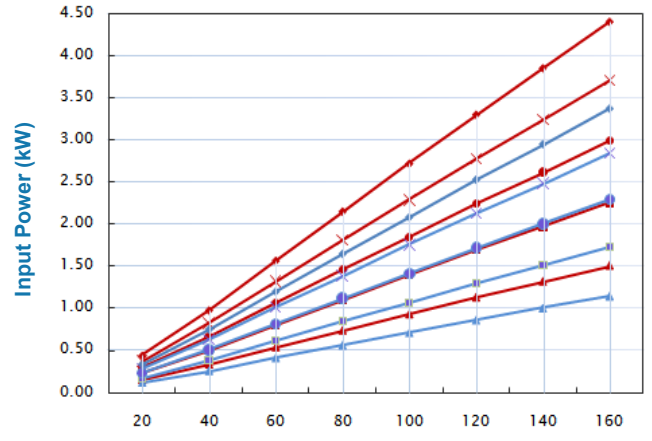
# JANUS MOTORS

## M6 MOTOR PERFORMANCE DATA

**Input Flow**



**Output Power kW**

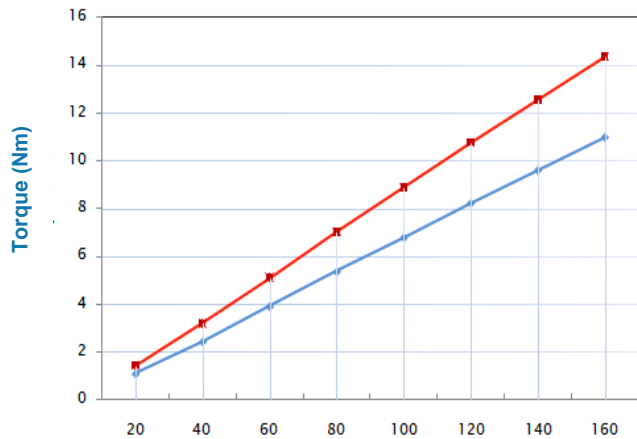


**Pressure (bar)**

**Pressure (bar)**

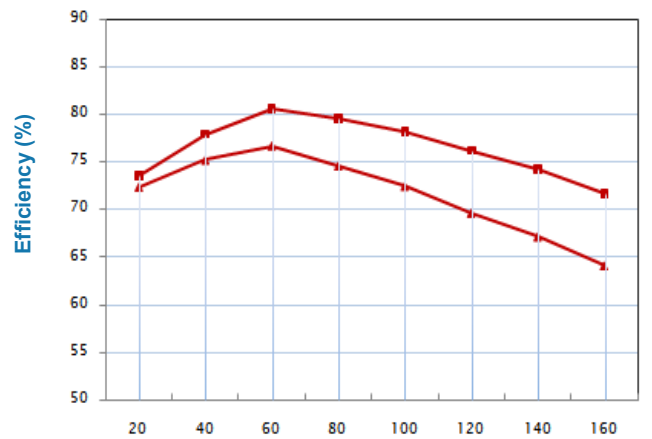
—◆— 6cc 1000rpm    —■— 6cc 1500rpm    —●— 6cc 2000rpm    —▲— 6cc 2500rpm    —◇— 6cc 3000rpm  
 —▲— 4.6cc 1000rpm    —■— 4.6cc 1500rpm    —●— 4.6cc 2000rpm    —◆— 4.6cc 2500rpm    —◇— 4.6cc 3000rpm

**Output Torque**



**Pressure (bar)**

**Overall Efficiency**



**Pressure (bar)**

—■— 6cc 1500rpm

—▲— 4.6cc 1500rpm

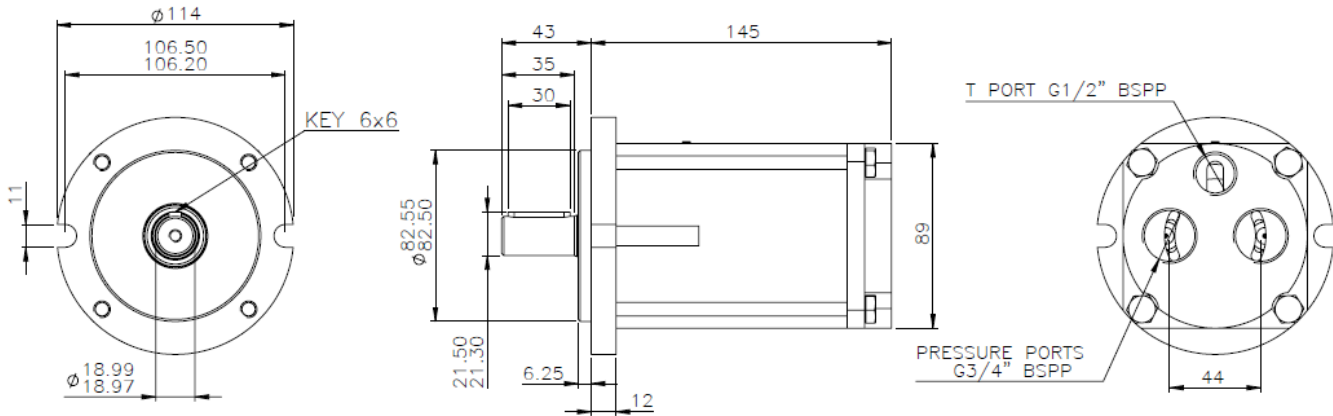
—◆— 6cc 1000rpm

—■— 6cc 1500rpm



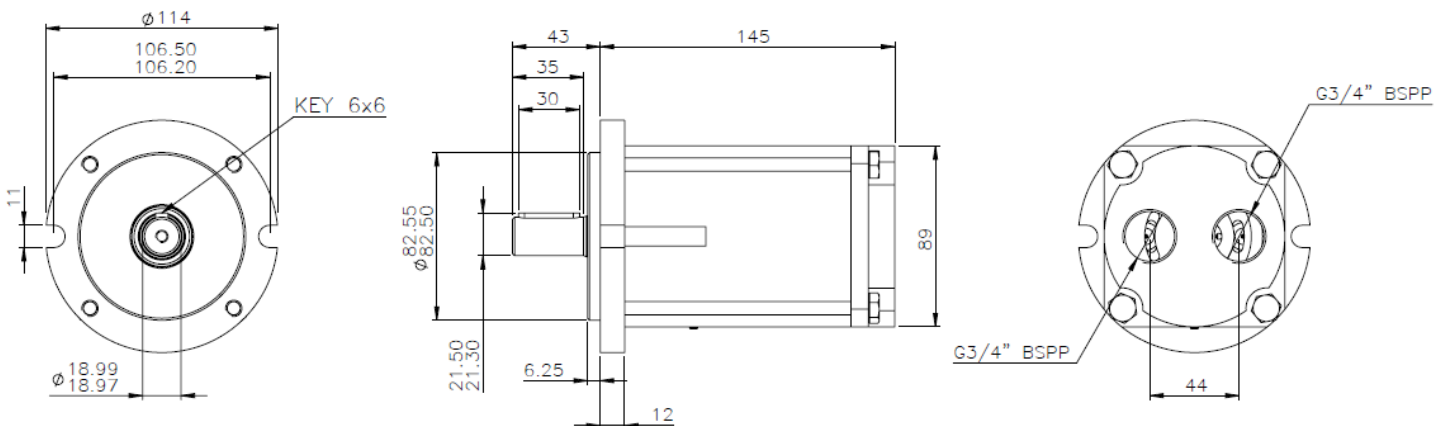
# JANUS MOTORS MI5 MOTOR DIMENSIONS

## MB160-15W & MB160-19W



## MC160-15W & MA160-19W

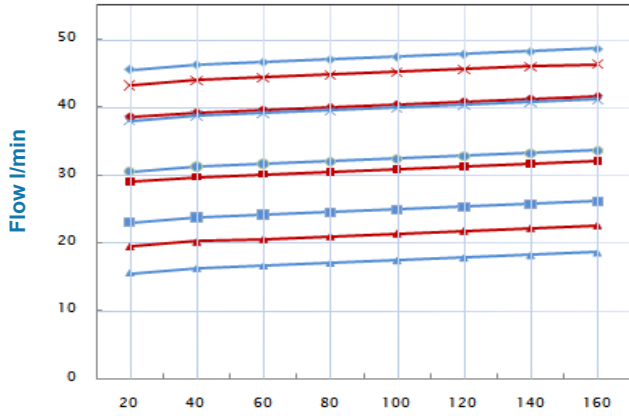
## MC160-15W & MA160-19W



# JANUS MOTORS

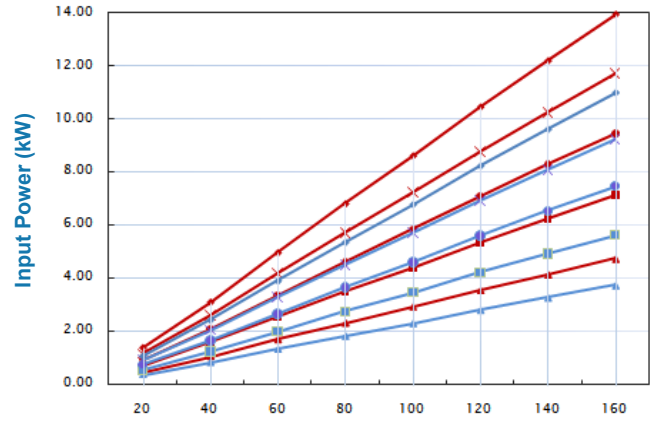
MI5 MOTOR PERFORMANCE DATA

Input Flow



Pressure (bar)

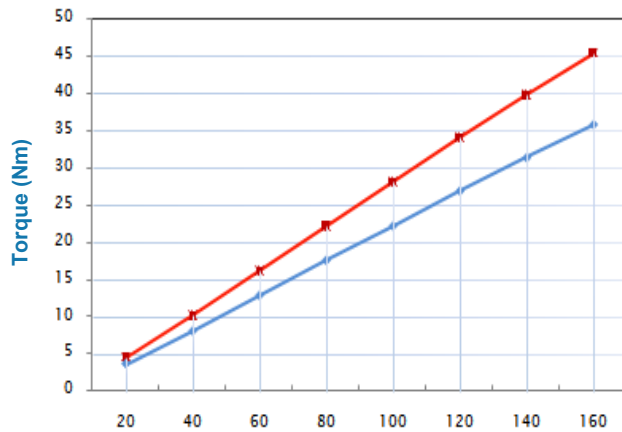
Output Power kW



Pressure (bar)

—■— 19cc 1000rpm  
 —■— 19cc 1500rpm  
 —●— 19cc 2000rpm  
 —×— 19cc 2500rpm  
 —■— 19cc 3000rpm  
—■— 15cc 1000rpm  
 —■— 15cc 1500rpm  
 —●— 15cc 2000rpm  
 —×— 15cc 2500rpm  
 —■— 15cc 3000rpm

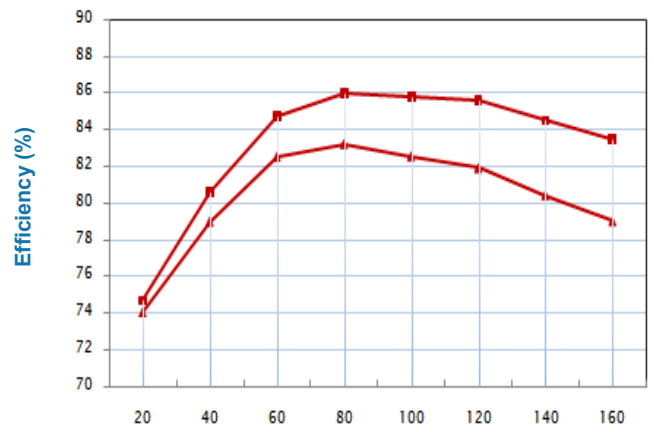
Output Torque



Pressure (bar)

—■— 19cc 1500rpm  
 —■— 15cc 1500rpm

Overall Efficiency



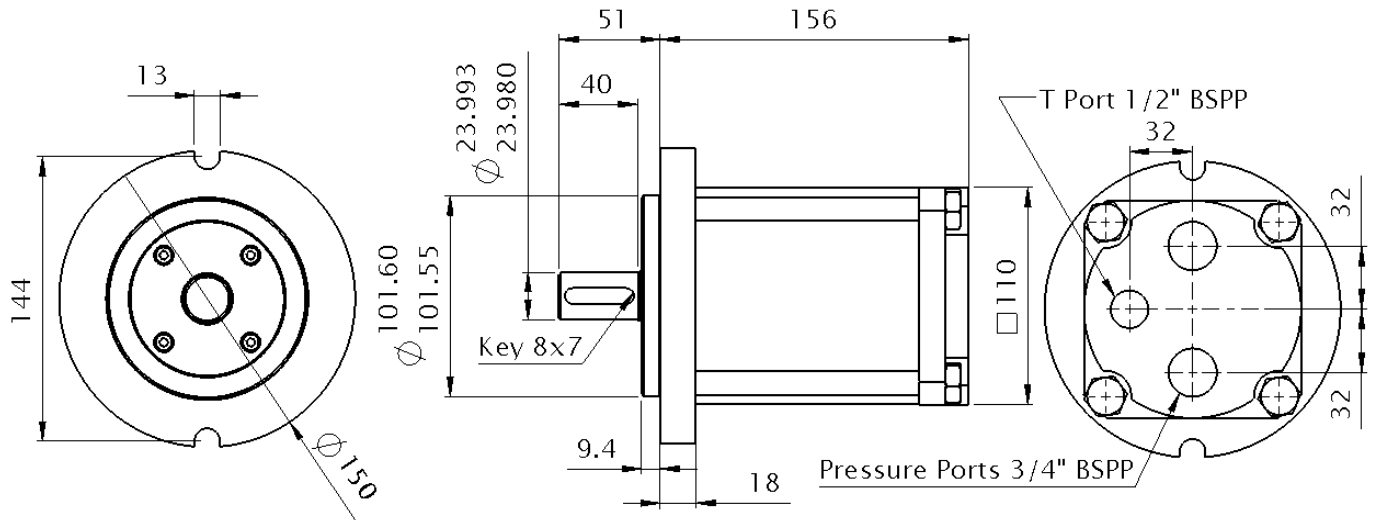
Pressure (bar)

—■— 19cc 1000rpm  
 —■— 19cc 1500rpm

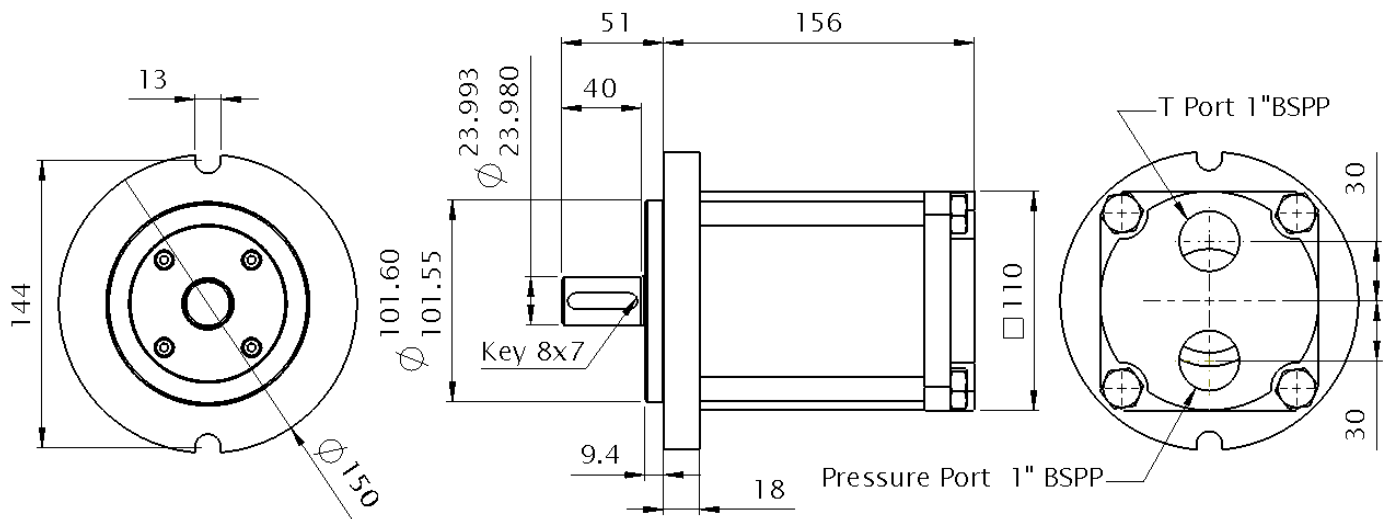
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## M30 MOTOR DIMENSIONS

### MB160-30W & MB160-35W



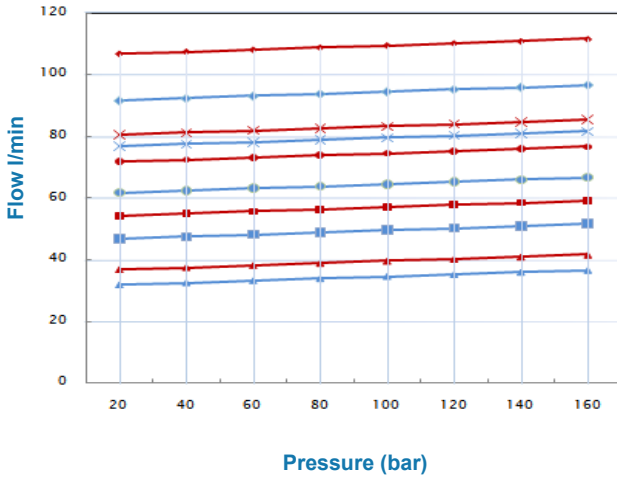
### MC160-30W & MA160-35W



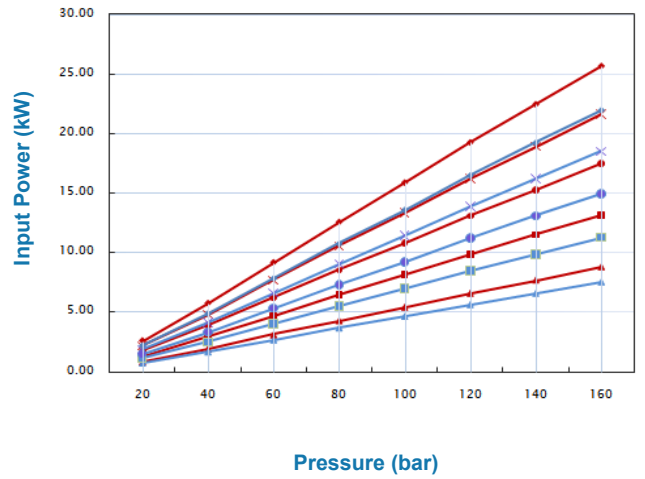
# JANUS MOTORS

## M30 MOTOR PERFORMANCE DATA

**Input Flow**

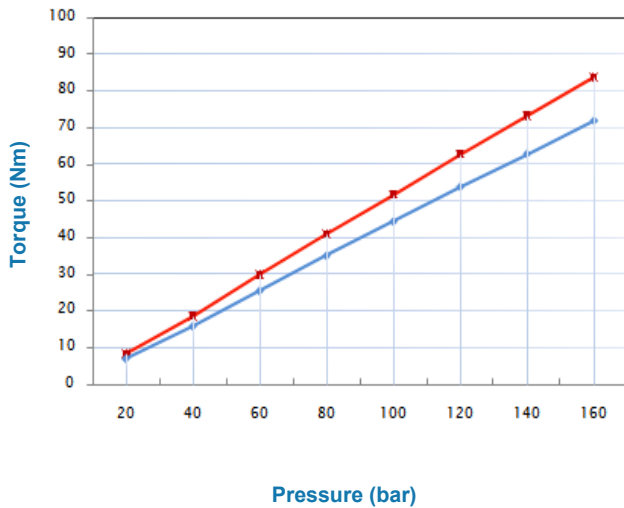


**Output Power kW**

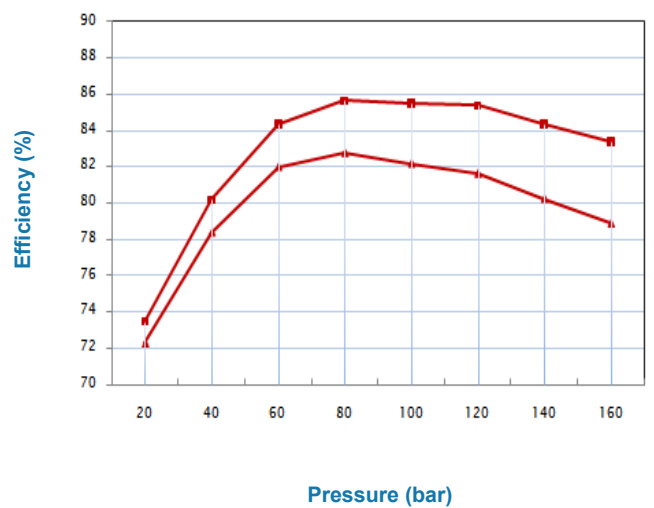


- 35cc 1000rpm
- 35cc 1500rpm
- 35cc 2000rpm
- ×— 35cc 2500rpm
- 35cc 3000rpm
- ▲— 30cc 1000rpm
- 30cc 1500rpm
- 30cc 2000rpm
- ×— 30cc 2500rpm
- ▲— 30cc 3000rpm

**Output Torque**



**Overall Efficiency**

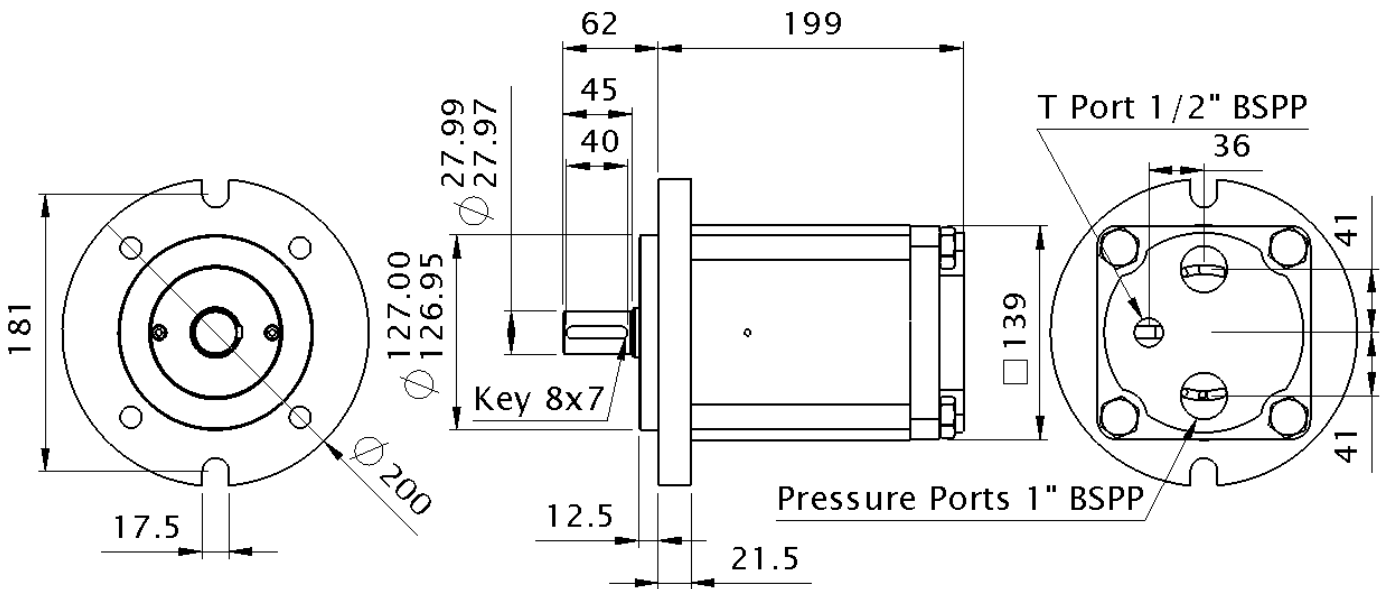


- 35cc 1000rpm
- 35cc 1500rpm

# JANUS MOTORS

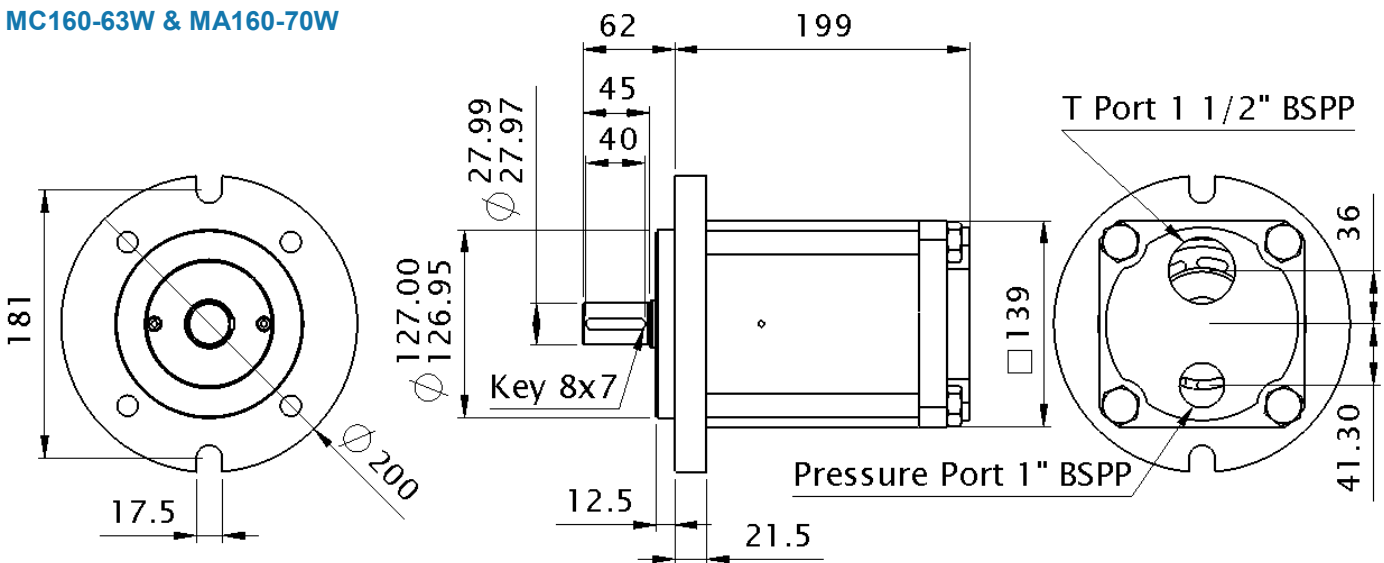
## M60 MOTORS DIMENSIONS

### MB160-63W & MB160-70W



### MC160-63W & MA160-70W

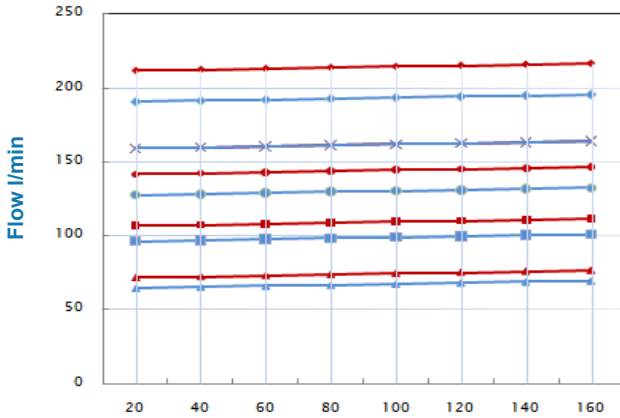
### MC160-63W & MA160-70W



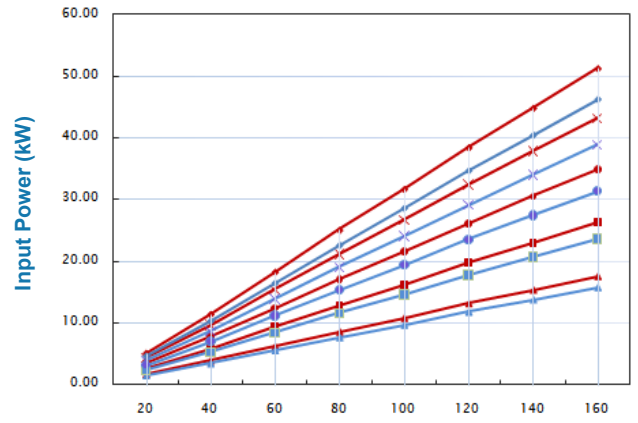
# JANUS MOTORS

## M60 MOTORS PERFORMANCE DATA

**Input Flow**



**Output Power kW**

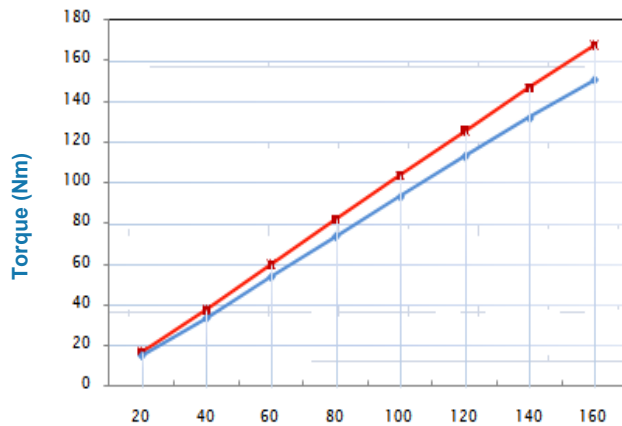


**Pressure (bar)**

**Pressure (bar)**

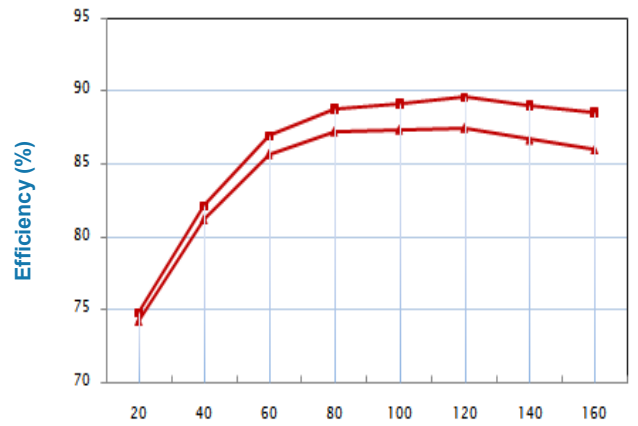
- 70cc 1000rpm
- 70cc 1500rpm
- 70cc 2000rpm
- 70cc 2500rpm
- 70cc 3000rpm
- 63cc 1000rpm
- 63cc 1500rpm
- 63cc 2000rpm
- 63cc 2500rpm
- 63cc 3000rpm

**Output Torque**



**Pressure (bar)**

**Overall Efficiency**



**Pressure (bar)**

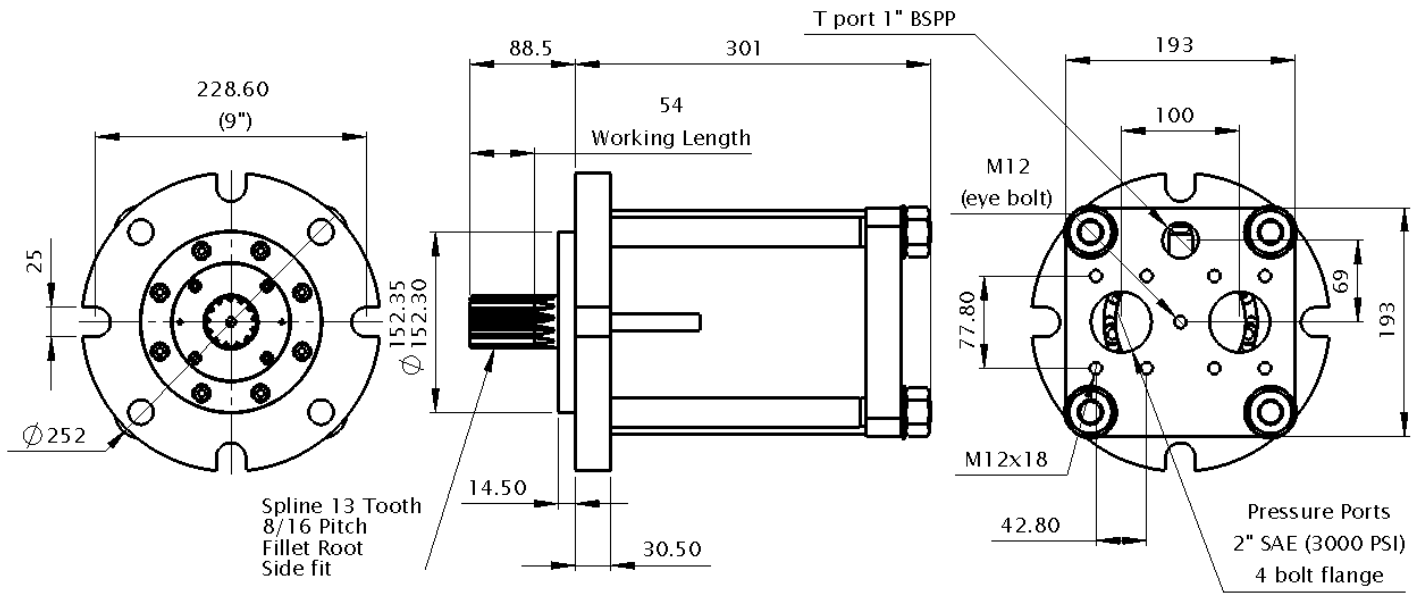
- 70cc 1500rpm
- 63cc 1500rpm

- 70cc 1000rpm
- 70cc 1500rpm

# JANUS MOTORS

MI80 MOTOR DIMENSIONS

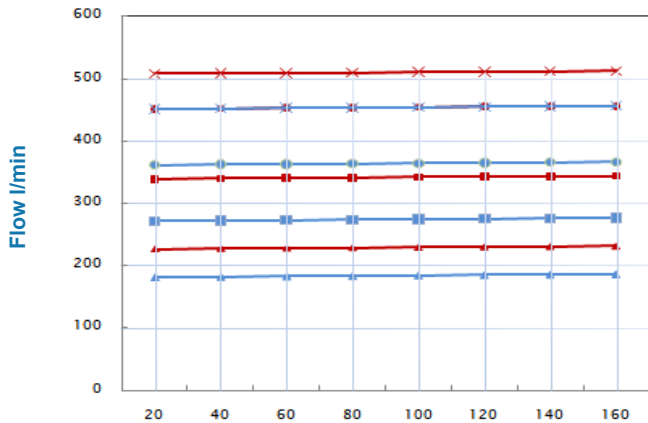
MB160-180W & MB160-225W



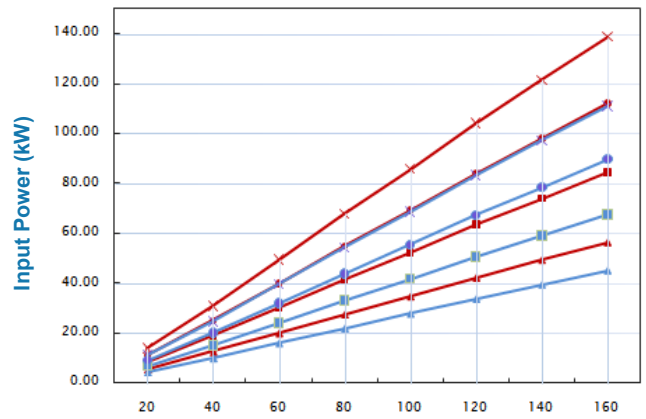
# JANUS MOTORS

## MI80 MOTOR PERFORMANCE DATA

**Input Flow**



**Output Power kW**

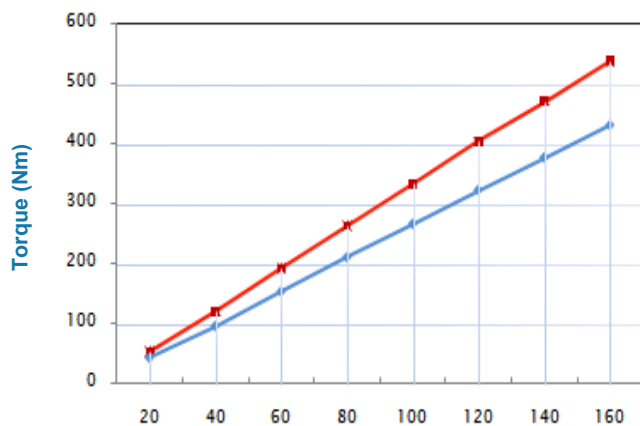


**Pressure (bar)**

**Pressure (bar)**

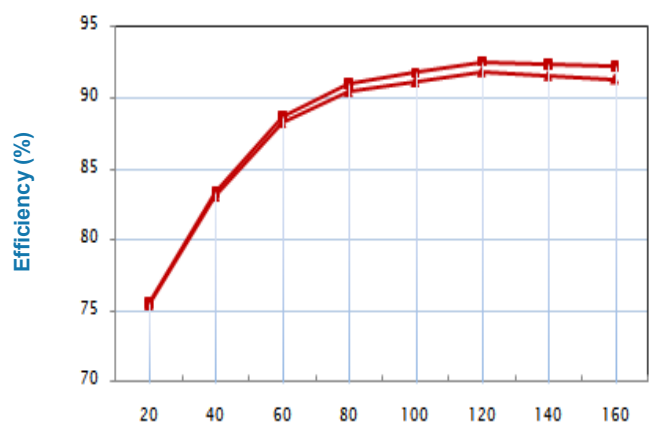
—■ 225cc 1000rpm   
 —■ 225cc 1500rpm   
 —■ 225cc 2000rpm   
 —x 225cc 2500rpm  
—■ 180cc 1000rpm   
 —■ 180cc 1500rpm   
 —■ 180cc 2000rpm   
 —x 180cc 2500rpm

**Output Torque**



**Pressure (bar)**

**Overall Efficiency**



**Pressure (bar)**

—■ 225cc 1500rpm   
 —■ 180cc 1500rpm

—■ 225cc 1000rpm   
 —■ 225cc 1500rpm