



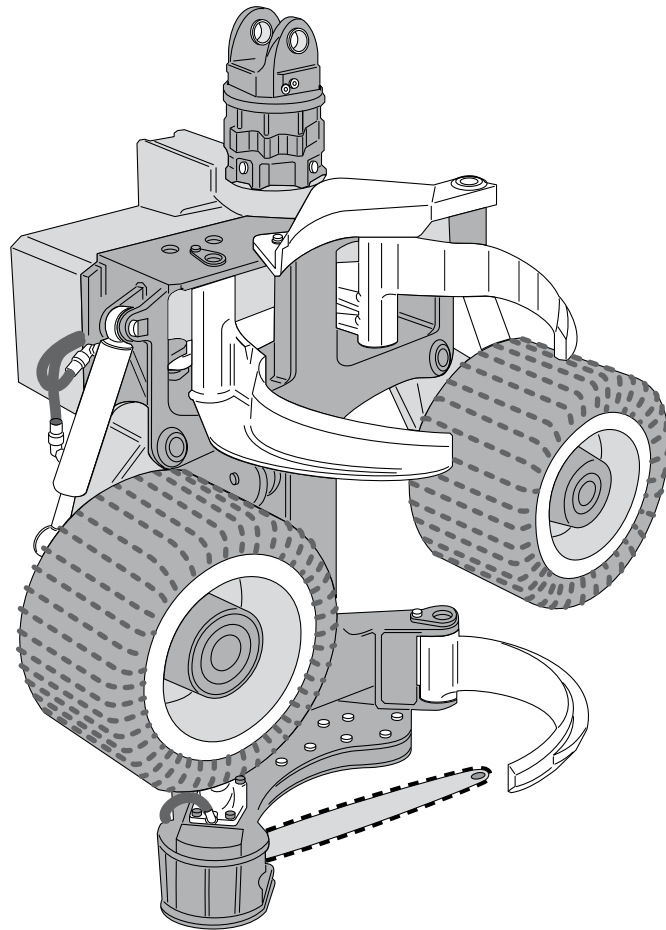
Bulletin HY30-8251/UK

# Application Guide Saw Motor Series F11iP

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**Conversion factors**

1 kg.....	2.20 lb
1 N.....	0.225 lbf
1 Nm.....	0.738 lbf ft
1 bar .....	14.5 psi
1 l.....	0.264 US gallon
1 cm <sup>3</sup> .....	0.061 cu in
1 mm.....	0.039 in
$\frac{9}{5} \text{ }^\circ\text{C} + 32$ .....	$^\circ\text{F}$

**DECLARATION BY THE MANUFACTURER**

(Directive 98/37/EG, Art. 4.2 and Annex II, sub B)

**PROHIBITION TO PUT INTO SERVICE**

Parker Hannifin AB Trollhättan declare with this declaration that our products:

- Are intended to be incorporated into machinery or to be assembled with other machinery to constitute machinery covered by Directive 98/37/EG.
- Are in accordance with technical specification stated in our product catalogue.
- And furthermore declares that it is not allowed to put the machinery into service until the machinery into which it is to be incorporated or of which it is to be a component has been found and declared to be in conformity with the provisions of Directive 98/37/EG and with national implementing legislation, i.e. as a whole, including the machinery referred to in this declaration.

Parker Hannifin AB  
Trollhättan



Lars Eliasson  
Lean and Quality Manager.



**WARNING - USER RESPONSIBILITY**

**FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

## Introduction

Parker Hannifin offers an extensive range of components suitable for forestry machines and will assist with an optimal technical solution to obtain the most cost-efficient system.

Based on many years of experience from forestry applications, product development at Parker Hannifin has always been focused on helping manufacturers obtain the best possible performance from their machines.

Many of our products are developed in direct and close co-operation with our customers.

## The optimal saw motor

Series F11 motors have proven extremely reliable in demanding applications such as chain saw drives. Primarily due to the 40 degree bent-axis design, spherical pistons (with laminated piston rings) and gear timing, extremely high speeds can be permitted, and the reliability is not affected even at low-temperature start-ups.

Based on the well proven F11 design, the saw bar can be mounted directly on the motor housing, and the chain sprocket can be installed on the motor shaft without the need for additional bearings

The saw motor unit has integrated functions for start/stop and speed control, which means long motor life.

The saw motor also controls the saw bar feed function, which provides optimal chain speed and saw performance during the entire cutting process.

To further enhance the saw function and, at the same time, reduce weight, cost and installation dimensions, Parker Hannifin has thus developed a motor unit which is specifically dedicated to chain saws.

## Benefits

- Simple installation means lower cost
- Low overall weight
- Compact installation
- Reduced motor shaft loading
- Improved performance
- Controlled cutting process.



## WARNING

The saw motor must not, under any circumstances, operate without load for more than 5 seconds; there is otherwise a risk of motor break-down!

Parker Hannifin holds a leading position when it comes to product and application knowledge, dedicated to serve the forestry machine market.

We offer hydraulic components such as pumps, cylinders, motors, directional control valves and remote controls, as well as electronic equipment, suitable for most

forestry machines.

## Saw motor requirements and recommendations

In order to obtain the most satisfactory function of the saw motor, the hydraulic system of the machine must be able to maintain a system pressure through the whole cut of at least 220 bar at the motor; higher pressure levels (up to max allowed for the motor) will, of course, increase the performance even further.

Through the whole cut the corresponding flow into the unit should, at least, be:

- 180 l/min @ 8 500 rpm and 14-tooth chain sprocket
- 195 l/min @ 9 200 rpm and 13-tooth chain sprocket
- 210 l/min @ 9 900 rpm and 12-tooth chain sprocket.

As a consequence, the pump must be able to deliver at least a 5% higher flow than what is shown above to properly secure the saw function.

In order to utilize the full potential of the saw motor, it is most important to minimize pressure losses in the hydraulic system as much as possible. Avoid using so called 'banjo' couplings and make sure there are no sharp bends in the utilized hydraulic hoses, couplings and hydraulic piping.

The saw motor unit has a motor flushing function which is integrated with the sword feed function. By connecting the drain port "D" directly to tank, additional flushing will usually not be required.

As the saw bar feed function is of a re-regenerative type (refer to the saw function on page 5) a 40/30 or 40/25 mm feed cylinder is recommended; this will ensure the best cutting performance of the saw.

If another cylinder configuration is being considered, please contact Parker Hannifin.

The electric signal to the 'start/stop' solenoid which starts the cutting cycle must be of the 'no ramp' type, so that the saw motor can start immediately without delay; otherwise, there may be a risk of motor break-down.

**NOTE:** The chain saw function is covered on page 5.

**Specifications**

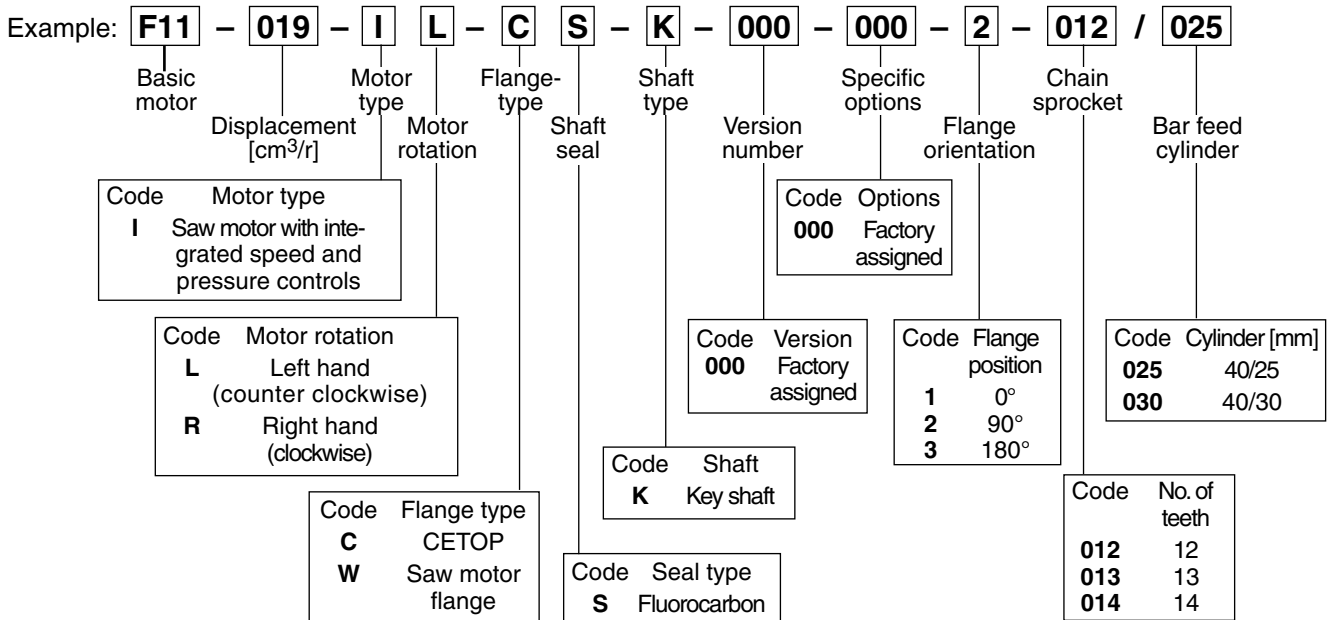
<b>Basic motor frame size</b>	F11-19	<b>Shaft torque (theor.)</b> at 100 bar [Nm]	30.2
<b>Displacement</b> [cm <sup>3</sup> /r]	19.0	<b>Mass moment of inertia</b> (x10 <sup>-3</sup> ) [kg m <sup>2</sup> ]	0.88x10 <sup>-3</sup>
<b>Pressure (at the motor)</b> [bar]		<b>Weight</b> [kg]	17
max intermittent <sup>1)</sup>	300	<b>Solenoid valve</b>	
max operating	280	Voltage [VDC]	24
min operating	220	Current [A]	0.6
min stand-by	20	Power [W]	14
<b>Case pressure</b> <sup>2)</sup> [bar]		Connector	Deutsch DT04-2P
max	6		
min	3		
<b>Max shaft speed</b> [rpm]	10 000		
<b>Min flow</b> [l/min]	210 <sup>3)</sup>		

**Please note:**

- Parker Hannifin will assign a specific model number to a saw motor based on customer application data (sprocket number of teeth, cylinder configuration, etc.).
- When the unit is delivered from the factory, all valve settings are sealed.
- Please refer to the ordering information below.

- 1) Max 6 seconds in any one minute  
 2) Should be measured at drain port D  
 3) Min flow with a 12-tooth chain sprocket (min 195 l/min with a 13-tooth sprocket and min 180 l/min with a 14-tooth sprocket)

**Ordering information**



**Standard model numbers**

Model number	Ordering number	Number of chain sprocket teeth	Sword feed cylinder [mm]
F11-019-IL-CS-K-000-000-2-012/025	378 6315	12	40/25
F11-019-IL-WS-K-000-000-1-012/030	378 6316	12	40/30
F11-019-IR-WS-K-000-000-1-014/025	378 6317	14	40/25
F11-019-IR-WS-K-000-000-3-012/030	378 6318	12	40/30

**Hydraulic fluids**

The saw motor data shown in the specification above are valid when operating on a high quality, mineral based fluid with a minimum of contamination. Hydraulic fluids type HLP (DIN 51524), ATF (automatic transmission fluid), and API type CD engine oils are suitable.

**Operating temperature**

The fluid temperature in the main hydraulic system must not exceed 70 °C; the drain fluid must not exceed 115 °C. **NOTE:** Fluid temperature should be measured at the utilized motor drain port.

**Viscosity**

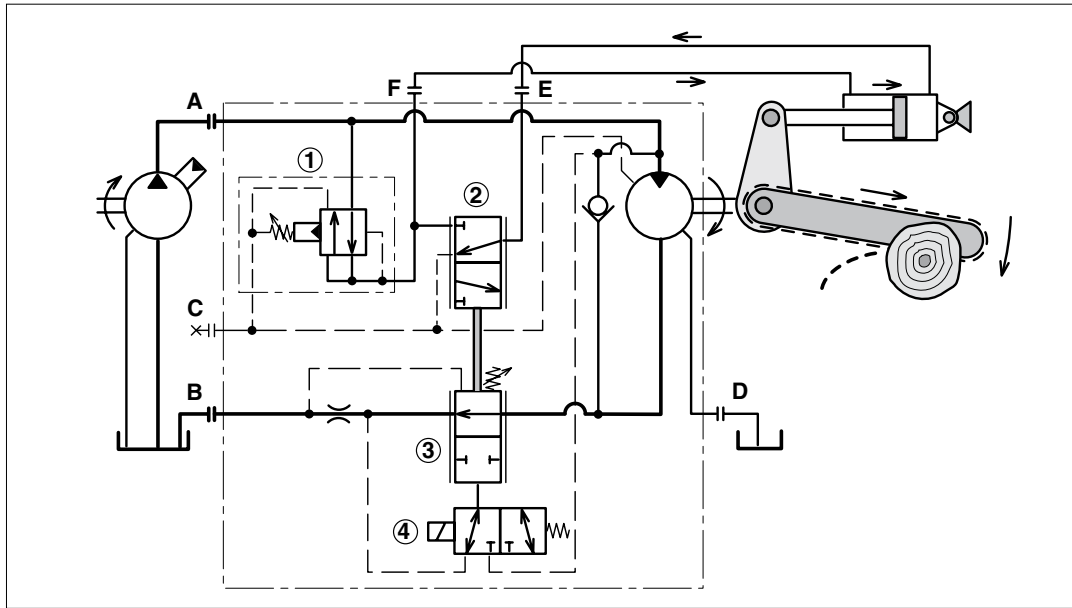
The ideal viscosity for the saw motor is 15–30 mm<sup>2</sup>/s (cSt). When the hydraulic system has reached full operating temperature, the drain fluid viscosity must not be lower than 8 mm<sup>2</sup>/s (measured at the utilized motor drain port). Max start-up viscosity: 1 000 mm<sup>2</sup>/s.

**Filtration**

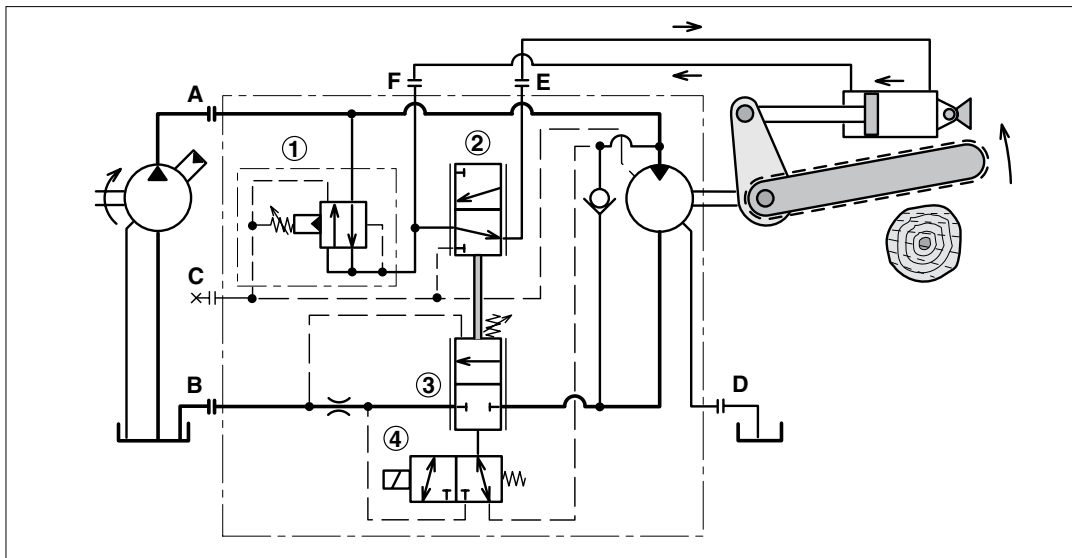
Long saw motor life can be expected if fluid cleanliness meets or exceeds 'ISO code 18/13' (according to ISO 4406). Under normal operating conditions a filtration level of 10 µm (absolute) is recommended.



**Chain saw function**



*Chain saw function - cutting mode.*



*Chain saw function - return mode.*

**Cutting mode** (refer to the top schematic)  
 The machine operator activates the start/stop function '4' which starts the saw motor. When the motor reaches operating speed, the cylinder piston side (port 'E') is drained and the cutting bar starts to move 'down'.  
 The drain flow (through port 'E' and valve '2'), provides cooling to the motor case.

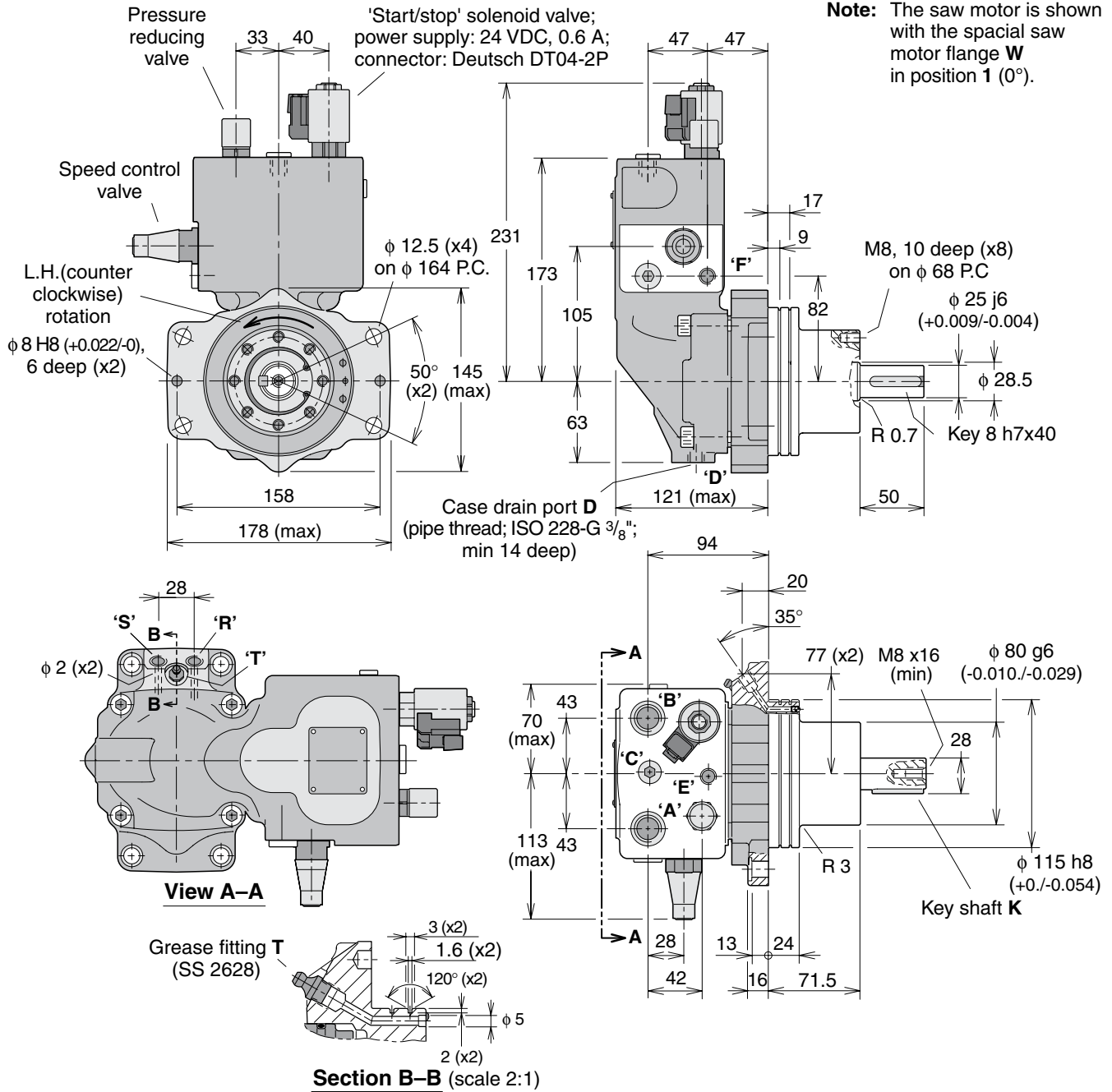
**Return mode** (refer to the bottom schematic)  
 When the tree or log has been cut through, the operator de-activates the start/stop solenoid valve '4'. Valve spools '2' and '3' move to the 'up' position and the motor stops turning.  
 At the same time both sides of the cylinder are pressurized and the cutting bar moves 'up' to the start position (because of the re-generative cylinder/valve hook-up).

**NOTE:** - The pressure compensated pump is operating during the entire cutting cycle.  
 - The pressure reducing valve, '1', reduces the pressure to the saw bar cylinder.

- The connected spool valve functions, '2' and '3', control the speed of the motor as well as the saw bar speed.

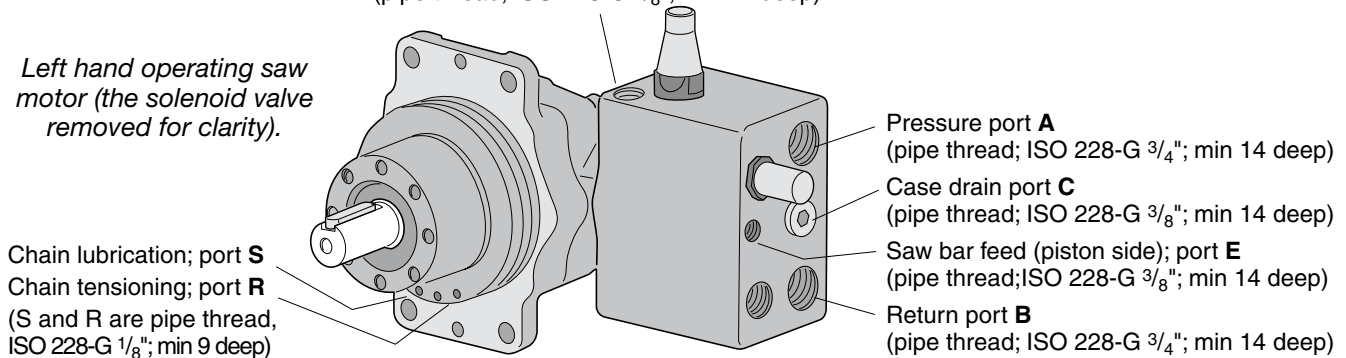
**Installation dimensions - left hand operating saw motor**

**Note:** The saw motor is shown with the special saw motor flange **W** in position **1** (0°).



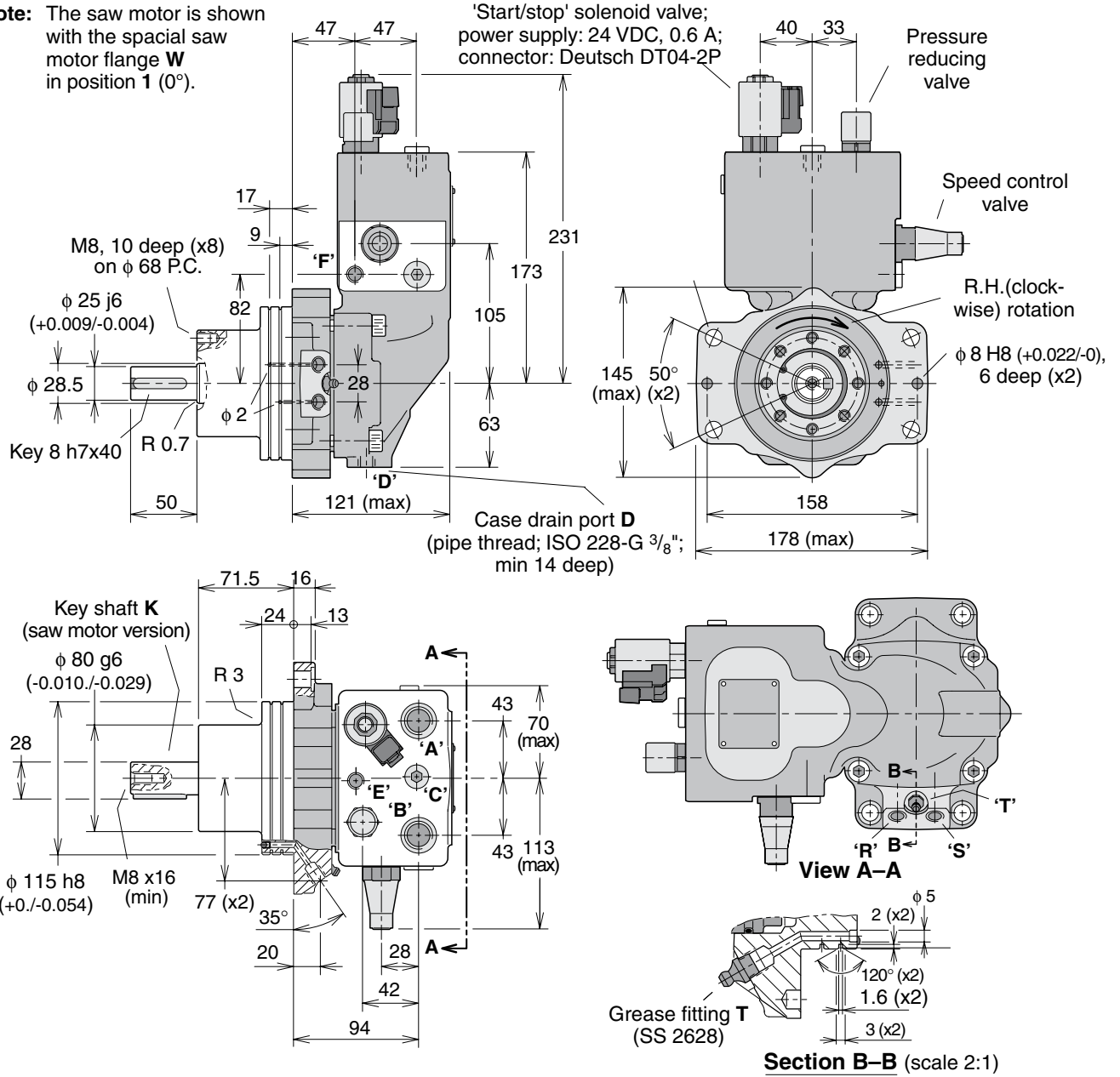
Saw bar feed (piston rod side); port **F**  
 (pipe thread; ISO 228-G  $\frac{3}{8}$ "; min 14 deep)

Left hand operating saw motor (the solenoid valve removed for clarity).

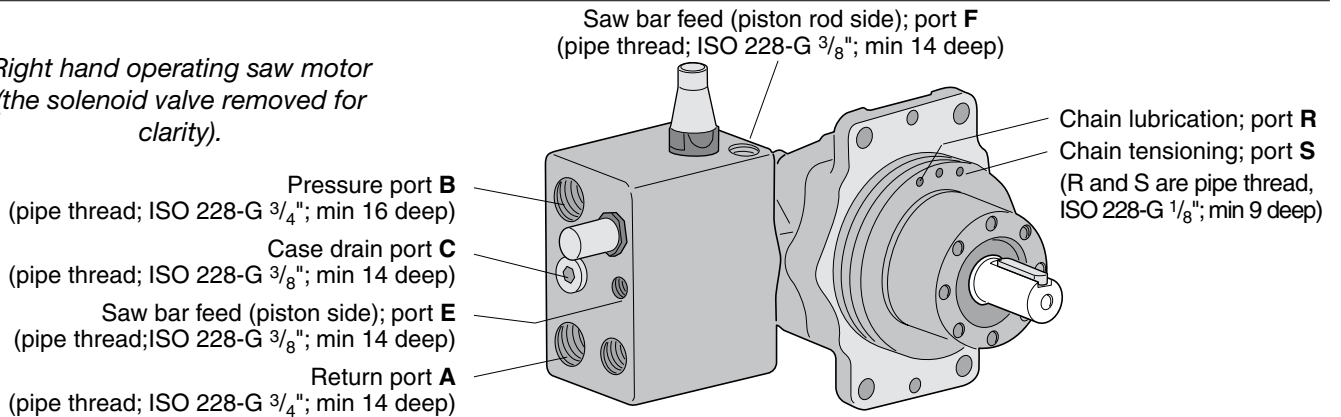


**Installation dimensions - right hand operating saw motor**

**Note:** The saw motor is shown with the spacial saw motor flange **W** in position **1** (0°).



*Right hand operating saw motor (the solenoid valve removed for clarity).*



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