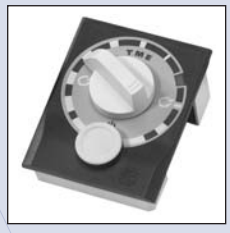
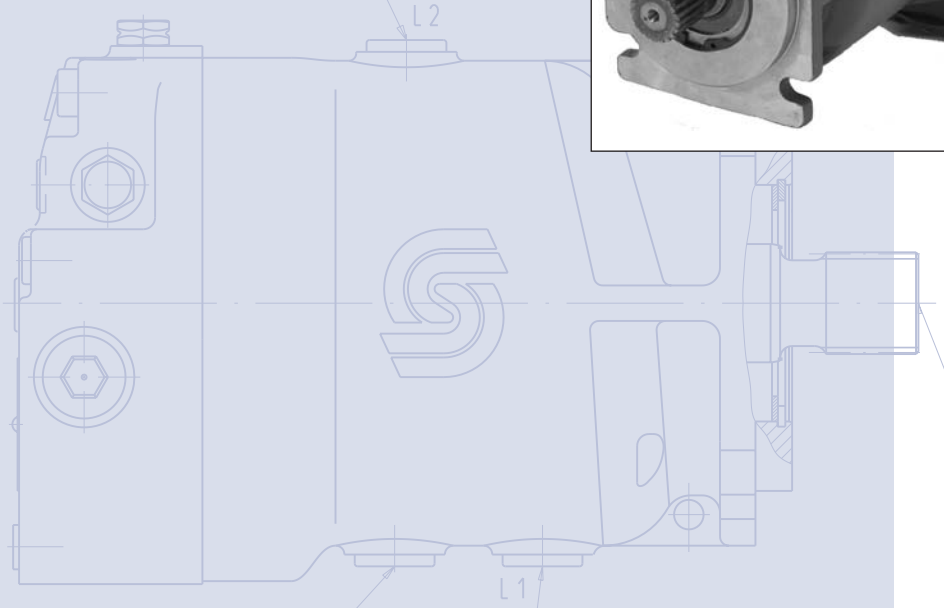
SAUER DANFOSS

Series TMM
Axial Piston Motor

Technical Information





SPLINE DATA

Pitch dia	: 33,338
Pressure angle	: 30°
Number of teeth	: 21
Pitch	: 16/32

ANSI B92.1-1970, Class 5
Fillet Root Side Fit

General Description

GENERAL DESCRIPTION

These motors are designed primarily to be combined with other products in closed circuit systems to transfer and control hydraulic power.
New generation with up to 27% shorter lenght and 25% lower weight.

- **Innovation with reliable technology**
- **Flange and shaft configuration like Series 20**
- **Proven rotating group**
- **Loop flushing device integrated**
- **High pressure relief valves integrated**
- **Hose connections in SAE**
- **High pressure ports 1- 6000 psi on one side**
- **Nearly equal hardware for size 070 and 089 cm³**
- **Significant reduction of the envelope size**

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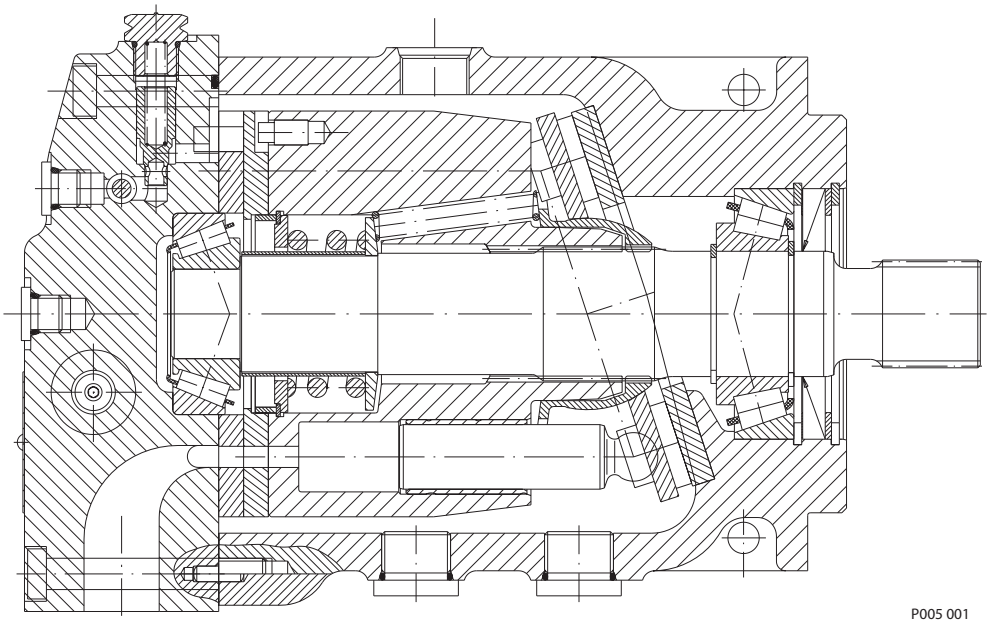

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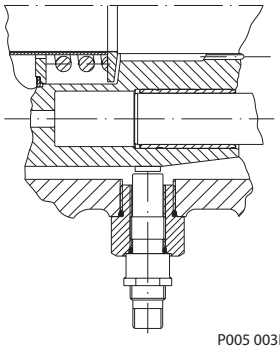

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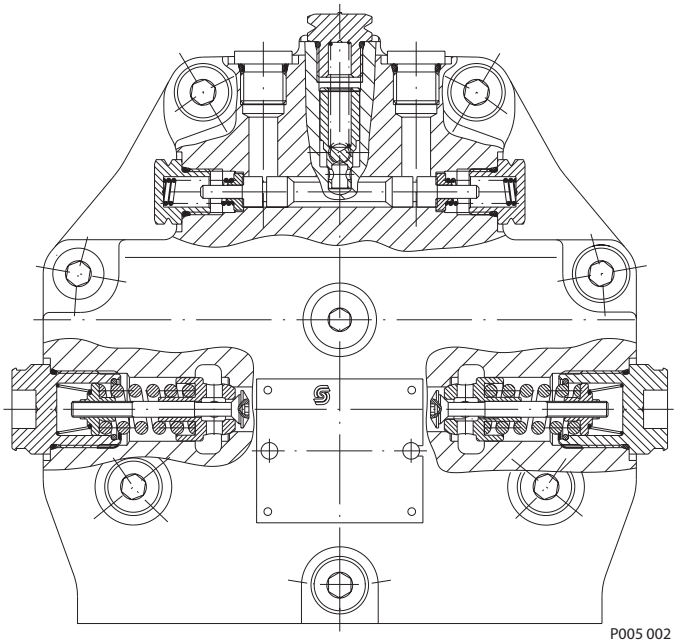

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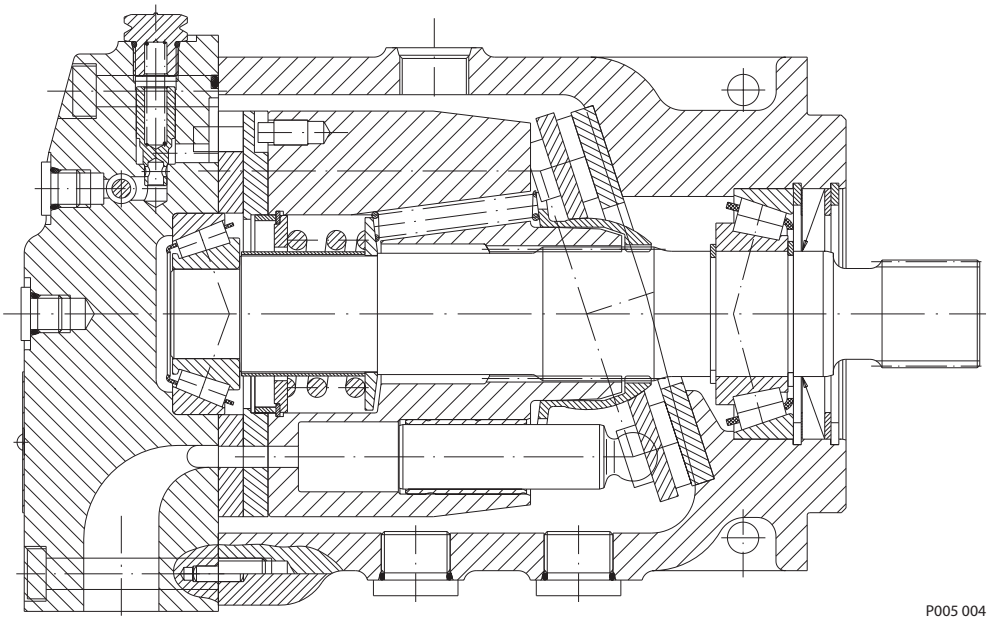
Sectional View

TMM WITHOUT HIGH PRESSURE RELIEF VALVES



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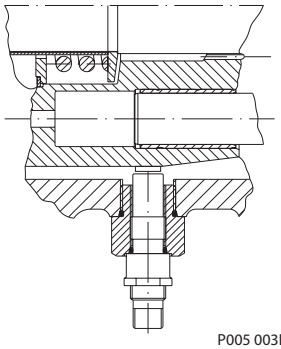

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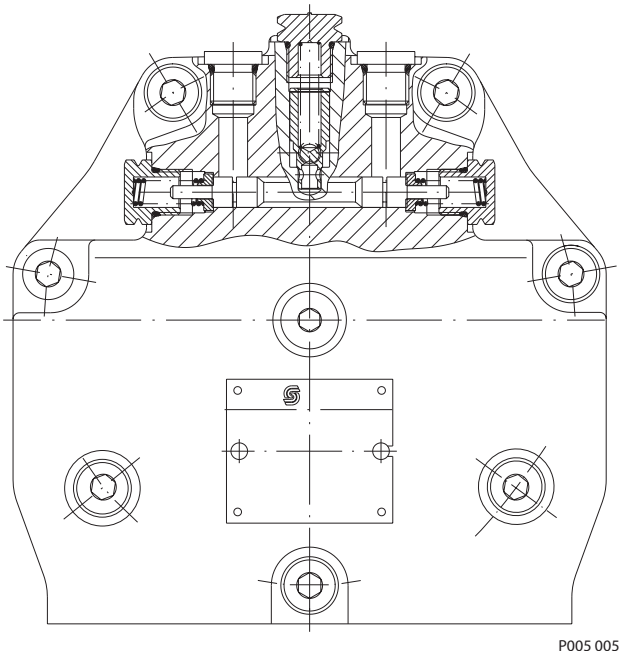

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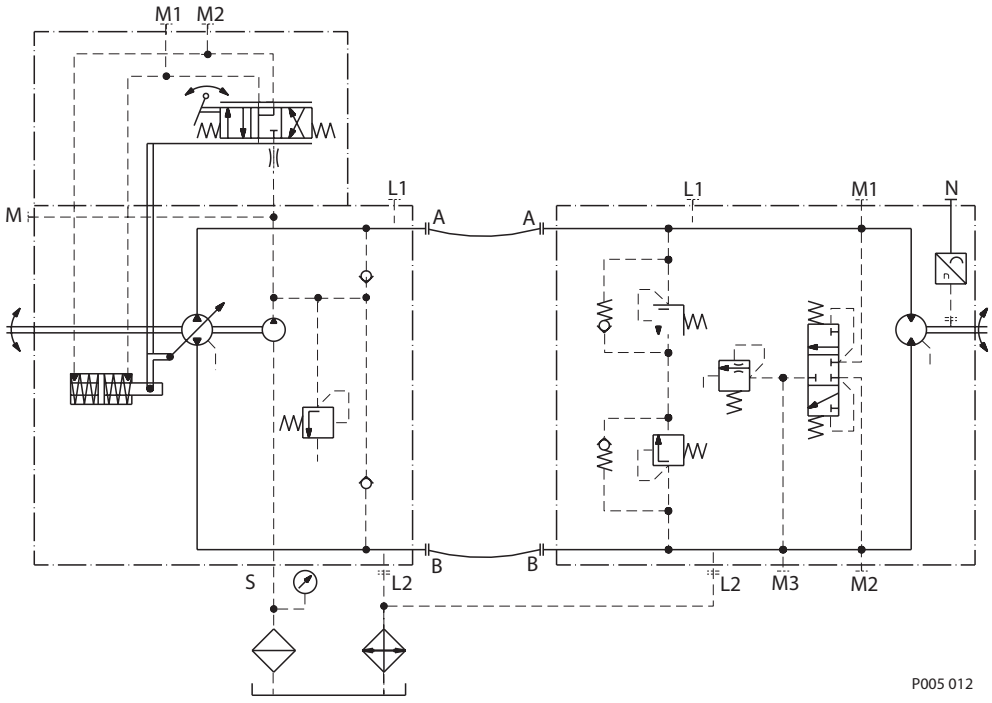
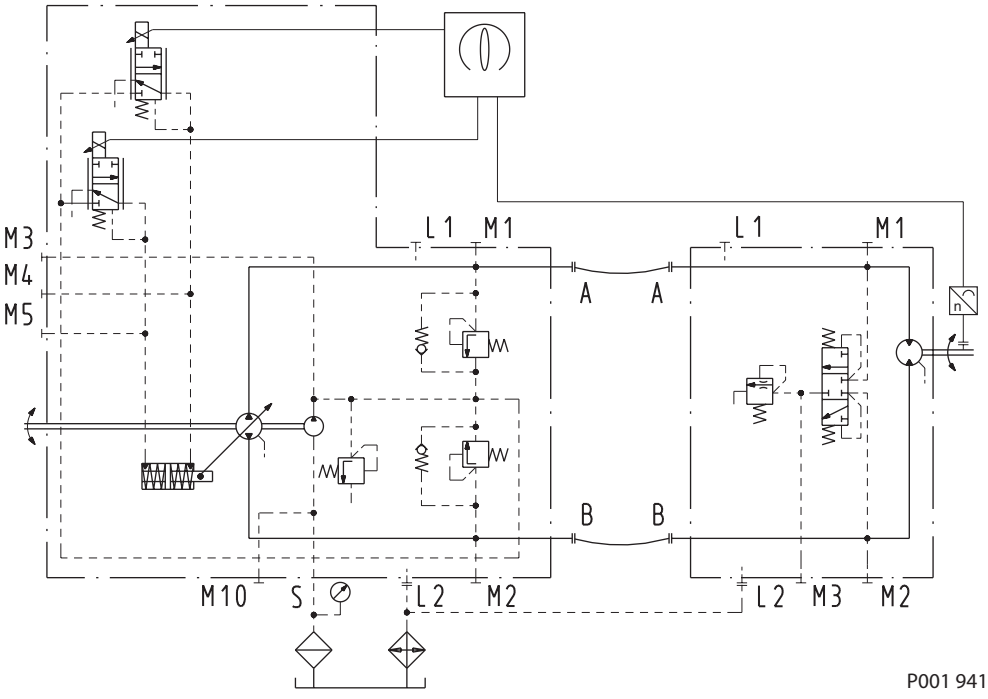
Notes

TMM WITH HIGH PRESSURE RELIEF VALVES



P005 012

TMM WITHOUT HIGH PRESSURE RELIEF VALVES



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GENERAL SPECIFICATION

Most specifications for axial piston motor with fixed displacement swashplate axial piston design are listed on these pages. For definitions of the various specifications, *see the related pages in this publication.*

General Specifications	
Motor type	Axial piston motor with fixed displacement swashplate axial piston design
Direction of rotation	Clockwise and counter-clockwise (bi-directional)
Installation position	Discretionary, the housing must always be filled with hydraulic fluid
Other system requirements	Circuit overpressure protection, suitable reservoir

T005 009E

SPECIFIC DATA

Specific Data				
		Dimension	Frame Size	
			070	**089**
Displacement	Vg	cm^3 [in^3]	70 [4.27]	89 [5.43]
Maximum flow	Q_{max}	l/min [US gal/min]	203 [54]	258 [68]
Maximum corner power	p corner$_{max}$	kW [hp]	142 [190]	180 [242]
Weight	m	kg [lb]	35 [77]	35 [77]
Mass moment of inertia of the internal rotating parts	J	kg m^2 [lbf•ft^2]	0.01777 [0.42]	0.01777 [0.42]
Type of mounting	Four (4) bolt flange, SAE flange configuration			
Pipe connections	Main pressure ports: SAE flange Remaining ports: SAE straight thread O-ring boss			
Shaft configuration	Splined ANSI			

T005 010E

TECHNICAL DATA

Case Pressure	
	bar [psi]
Rated pressure	**3** [44.0]
Maximum pressure (cold start)	**5** [73.0]
Minimum pressure	**1** [14.5]

T000 003E

Theoretical Torque			
		Frame size	
		070	**089**
At maximum displacement	Nm/bar [lbf•in/1000 psi]	1.11 [680]	1.42 [864]

T005 011E

Speed Limits			
		Frame size	
		070	**089**
Rated speed	min^{-1} (rpm)	2500	
Maximum speed	min^{-1} (rpm)	2900	

T005 012E

System pressure range, Input		
	bar	[psi]
Maximum delta pressure	420	[6000]

T005 013E

FLUID SPECIFICATIONS

Temperature Range [1]		
	°C [°F]	
Minimum	**-40** [-40]	intermittent, cold start
Rated	**104** [220]	
Maximum	**115** [240]	intermittent
		T002 006E

[1] At the hottest point, normally the case drain port.

Viscosity		
	mm²/s [SUS]	
Minimum	**7** [47]	intermittent
Recommended operating range	**12-60** [70-278]	
Maximum	**1600** [7500]	intermittent, cold start
		T002 010E

Cleanliness Level and β_x-Ratio	
Required Fluid Cleanliness Level	ISO 4406 Class 18/13
Recommended β_x-Ratio for Suction Filtration	$\beta_{35-45} = 75$ $(\beta_{10} \geq 2)$
Recommended β_x-Ratio for Charge Pressure Filtration	$\beta_{15-20} = 75$ $(\beta_{10} \geq 10)$
Recommended Inlet Screen Size for Charge Pressure Filtration	100 µm-125 µm
	T002 007E

DETERMINATION OF NOMINAL MOTOR SIZES

Metric System/Inch System

Input flow: $Q_e = \frac{Vg \cdot n}{1\,000 \cdot \eta_v}$ l/min $\quad Q_e = \frac{Vg \cdot n}{231 \cdot \eta_v}$ [US gal/min]

Output torque: $M_e = \frac{Vg \cdot \Delta p \cdot \eta_{mh}}{20 \cdot \pi}$ Nm $\quad M_e = \frac{Vg \cdot \Delta p \cdot \eta_{mh}}{2 \cdot \pi}$ [lbf•in]

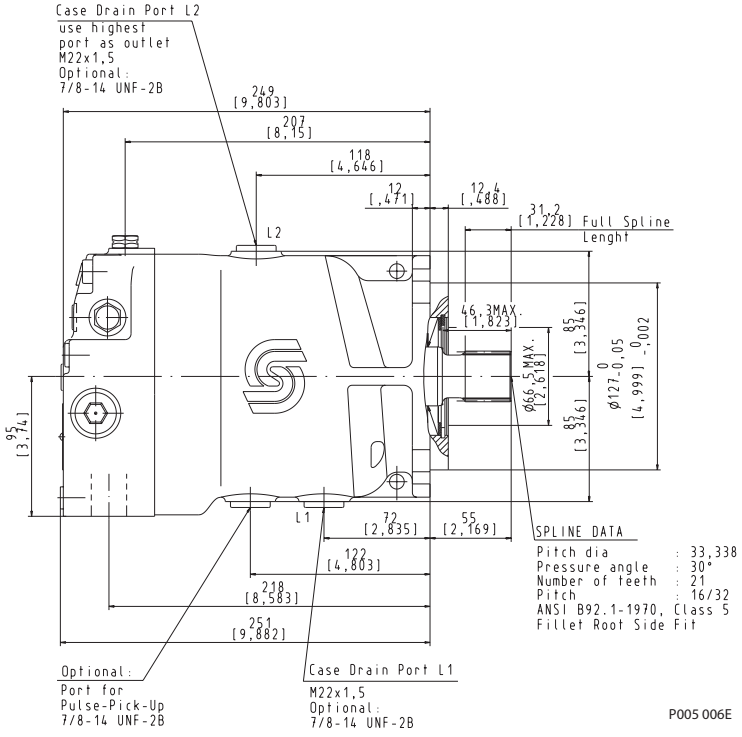
Output power: $P_e = \frac{M_e \cdot n}{9\,550} = \frac{Q_e \cdot \Delta p \cdot \eta_t}{600}$ kW $\quad Pe = \frac{Vg \cdot n \cdot \Delta p \cdot \eta_t}{396\,000}$ [hp]

Speed: $n = \frac{Q_e \cdot 1\,000 \cdot \eta_v}{Vg}$ min^{-1} $\quad n = \frac{Q_e \cdot 231 \cdot \eta_v}{Vg}$ (rpm)

Where:

Vg	=	Motor displacement per rev.	cm^3	[in^3]
Δp	=	$p_{HD} - p_{ND}$	bar	[psid]
η_v	=	Motor volumetric efficiency		
η_{mh}	=	Motor mechanical-hydraulic (Torque) efficiency)		
η_t	=	Motor overall efficiency		
p_{HD}	=	High pressure	bar	[psid]
p_{ND}	=	Low pressure	bar	[psid]

General Dimensions – Frame Size 070 and 089



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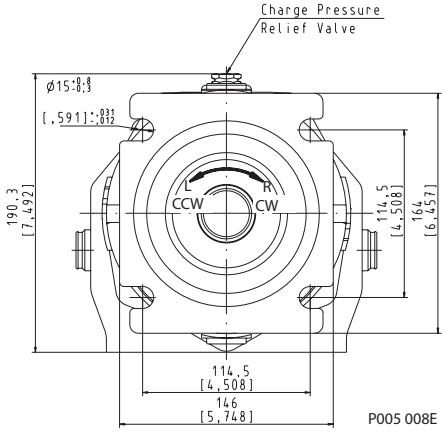

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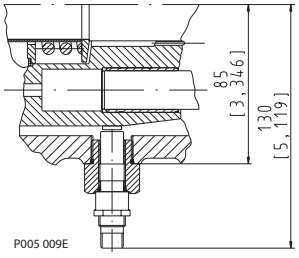
Optional



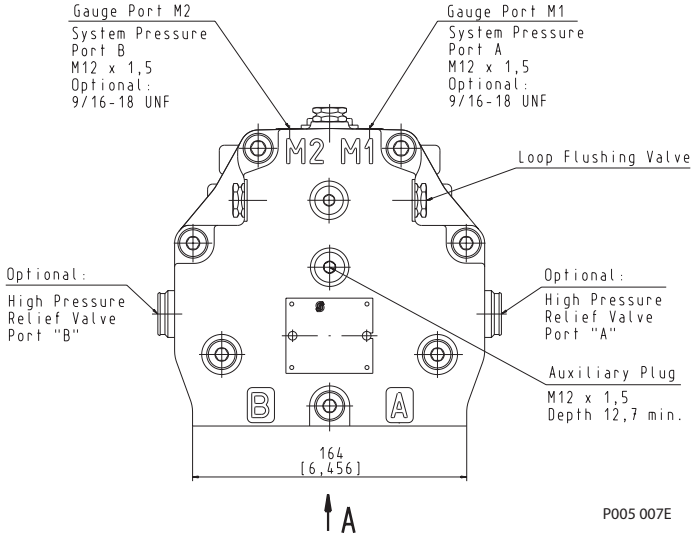
P005 009E

Direction of Rotation		
	Port "A"	Port "B"
Clockwise (CW)	Output	Input
Counterclock (CCW)	Input	Output

T005 024E

SAE - Building dimensions	A6 mm [in]	A7 mm [in]
SAE Flange Size 1, J512C Code 62 [6000 psi] 4 Threads 7/16-14 UNC 20 Depth	57,2 [2.252]	27,8 [1.063]
SAE Flange Size 1, J512C Code 62 [6000 psi] 4 Threads M12-6H 21 Depth		

T005 025E



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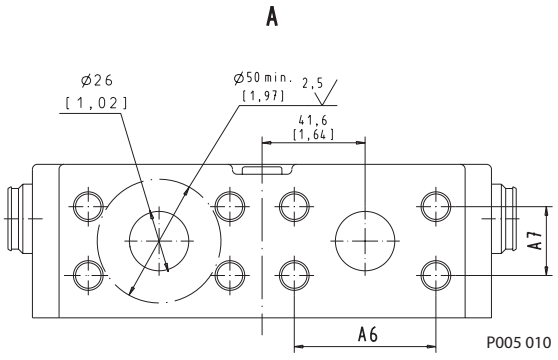

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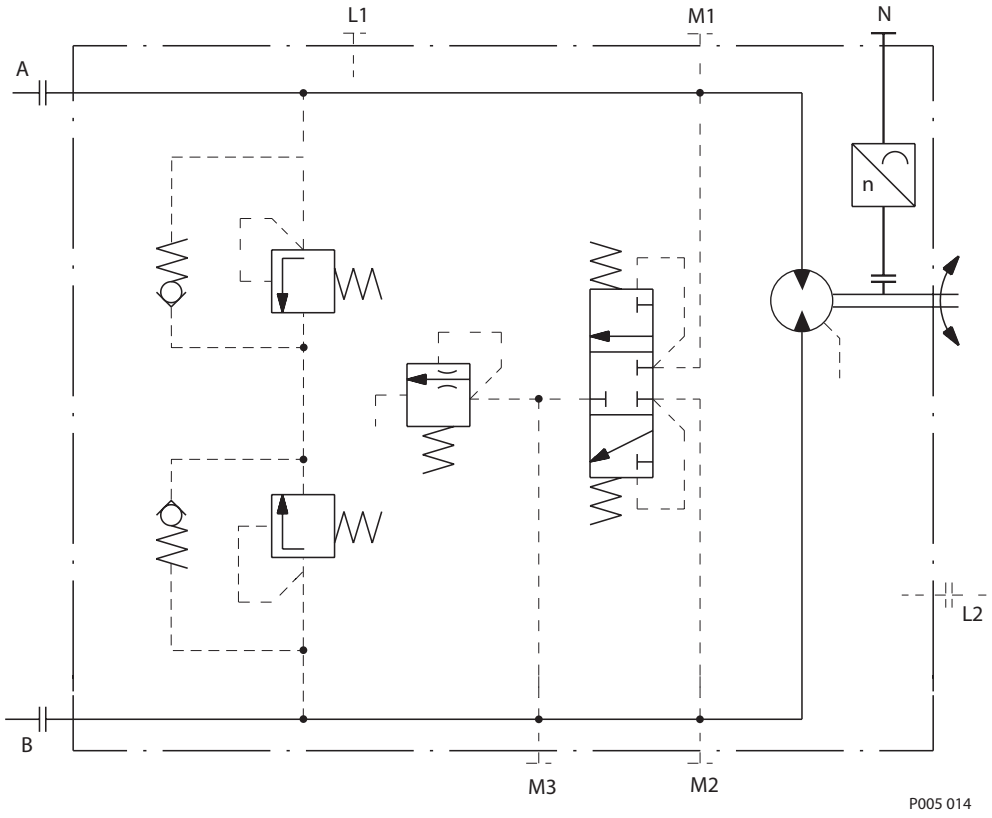
Circuit Diagrams

TMM WITH HIGH PRESSURE RELIEF VALVES



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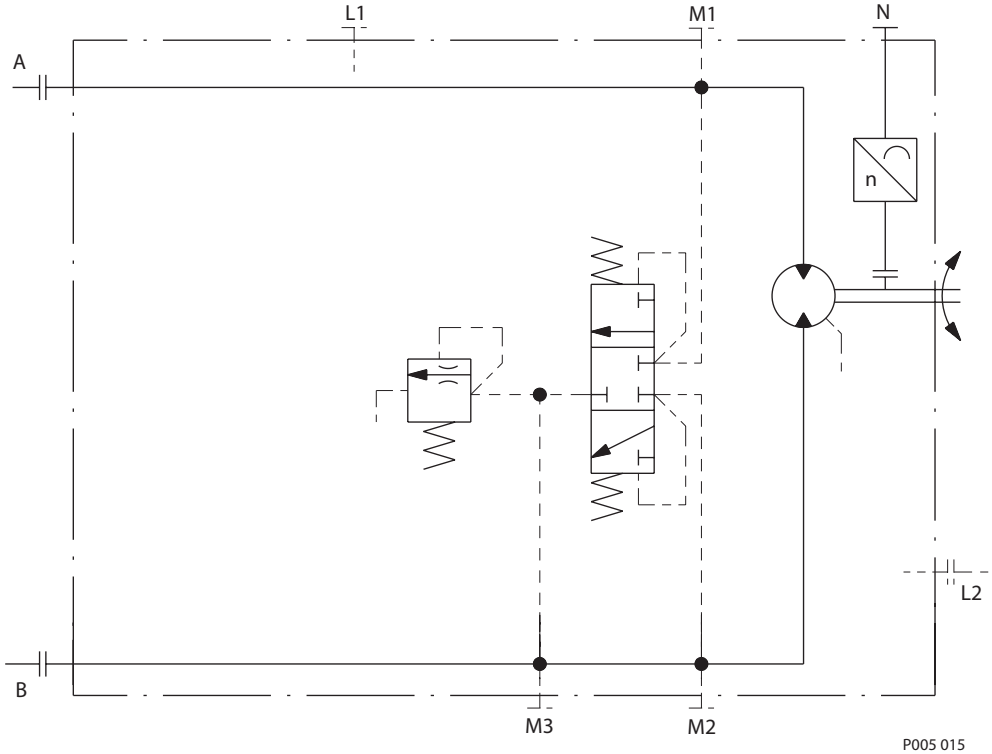

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