2-Speed
Track Drive Motor

JMV Axial Piston Motor
Peak Pressure: 430 bar
Displacement 16~274 cc/r

EATON
Powering Business Worldwide

Table of Contents

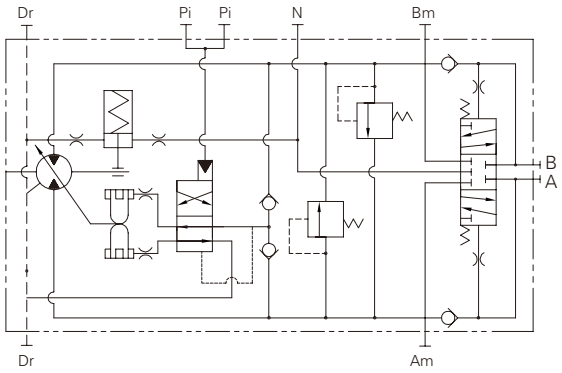
General Introduction

Features & Benefits

- Integrated gearbox with 2-speed Axial Piston Motor
- Rated pressure up to 365 bar
- Displacement: 16cc ~ 274cc
- Suitable for 1.5 ton ~ 50 ton mobile applications
- Integrated Relief and Counterbalance valves
- Integrated fail-safe mechanical Parking Brake
- Higher mechanical and volumetric efficiency helps reduce power loss
- Improved design for higher start up torque and overall efficiency
- Optimum design ensures smooth start/accelerate and decelerate/stop
- Compact design with high power density
- Auto-shift from high-speed low torque to low-speed high torque at high travelling resistance
- High performance and reliability, high market acceptance with over half million units in the field
- Compatible fit for most popular installation requirements in the market

Typical Applications

- Excavator and mini excavator
- Crawler crane
- Winch
- Aerial working platform
- Grasper
- Rotary drilling
- Horizontal directional drilling
- Crusher
- Asphalt milling
- Special crawler vehicle



Circuit diagram

Model Code

JMV	185	R	R	06	06	02	00	70	00	A	00	A
1,2,3	4,5,6	7	8	9,10	11,12	13,14	15,16	17,18	19,20	21	22,23	24

• Available option ▲Need consult

016[1]	016[2]	016[3]	018	021	023	041	044	047	053	067	076[1]	076[2]	118	147	155	168	173	185	274
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1,2,3	Track drive motor	
4,5,6	Maximum / Minimum displacement	
	016[1]	16 cc (Fixed)
	016[2]	16 cc / 10.4 cc
	016[3]	16 cc / 11.4 cc
	018	18 cc / 10.1 cc
	021	21 cc / 11.2cc
	023	23 cc / 14.7 cc
	041	41.1 cc / 26.1 cc
	044	44 cc/ 22.7 cc
	047	47 cc / 27.5 cc
	053	53 cc / 31.4 cc
	067	67 cc / 41.2 cc
	076[1]	76 cc / 44.8 cc
	076[2]	76 cc / 37.9 cc
	118	118 cc / 67 cc
	147	147 cc / 95.0 cc
	155	155 cc / 88.5 cc
	168	168 cc / 102.5cc
	173	173 cc / 101 cc
	185	185 cc / 114.1 cc
	274	274 cc / 171.6 cc
7	Mounting flange of motor	
	R	Integrated gear box
	P	Motor only
8	Output shaft of motor	
	R	Gear box
	S	Spline (See details in shaft table)
9,10	Main port size	
	01	JIS PF 3/8
	02	JIS PF 1/2
	03	SAE 1-1/16-12 UNF-2B
	04	JIS PF 3/4
	05	JIS PF 1
	06	JIS Flange TypeII ϕ25, 8-M12X1.75 bolts
	07	JIS Flange TypeII ϕ32, 8-M14X2 bolts
	08	JIS Flange TypeII ϕ25, 8-M10X1.5 bolts
11,12	Relief valve setting	
	00	None
	01	220 bar
	02	240 bar
	03	280 bar
	04	300 bar
	05	330 bar
	06	350 bar
	07	360 bar
	08	365 bar

The following 24-digit coding system has been developed to identify standard configuration options for the JMV Two Speed Track Drive Motor. Use this model code to specify a motor with the desired features. All 24 digits of the code must be present to release a new product number for ordering.

• Available option ▲ For consult

016[1]	016[2]	016[3]	018	021	023	041	044	047	053	067	076[1]	076[2]	118	147	155	168	173	185	274
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* Fixed displacement

13,14	Parking brake (Release pressure)	
	00	None
	01	6.6 bar
	02	9 bar
	03	11 bar
	04	15 bar
	05	17 bar
15,16	Automatic 2-speed	
	00	None
	01	260 bar
	02	270 bar
	03	290 bar
	04	120 bar
	05	243 bar
	06	335 bar
	07	180 bar
17,18	Gear ratio	
	00	None
	31	31
	43	43
	45	45
	46	46
	47	47
	51	50.5
	53	53.7
	54	54
	63	63
	70	70.2
	73	73
	##	Special Ratio
19,20	Special requirements	
	00	None
	##	Special specification required
21	Painting	
	A	Primer
	B	Eaton blue
22,23	Identification number	
	00	Eaton standard
24	Design number	
	A	First design

Performance

Model	Max. output torque (Reducer)		Motor displace-ment		Gear ratio	Max. speed (Motor)		Max. flow	Normal pressure**	Peak pressure	Mechanical brake torque		Automatic shift pressure	Relief valve	Mass	Typical vehicle application
	Low speed	High speed	Low speed	High speed		Low speed	High speed				Reducer	Motor				
	N.m		cc/r			rpm		l / min	bar	bar	N.m		bar		kg	Ton
016[1]	1666	x	16.1	x	31	1056	x	23	214	255	547	18	x	x	25	1.5
016[2]	3018	1915	16.4	10.4	53.7	2134	3365	35	220	260	2631	49	x	x	38	3.5
016[3]	2785	1936	16.4	11.4	42.7	2134	3070	35	250	280	1591	37	180	x	30	2~3
018	3317	1864	18	10.1	53.7	1944	3465	35	220	260	2631	49	x	x	38	3.5
021	3696	1969	21	11.2	53.7	1667	3125	35	220	260	2637	49	x	▲	38	3.5
023	4724	2955	23.5	14.7	53.7	1489	2381	35	240	285	2631	49	x	▲	38	3.5
041	10336	6560	41.1	26.1	53.7	1800	2835	74	300	355	8041	150	243	●	87	7.5
044	6831	3528	43.7	22.7	45.5	1259	2423	55	220	260	3746	82	x	●	79.5	5
	8056	4185	43.7	22.7	53.7	1259	2423	55	280	300	4421	82	x	●	79.5	5~6
047	11711	6909	46.6	27.5	53.7	1622	2744	76	300	360	3869	82	x	●	87	7
053	11720	6909	53.2	31.4	47	1597	2710	85	300	360	3869	82	x	●	89	7~8
067	18707	11452	67.3	41.2	54	1664	2718	112	330	395	10584	196	290	●	140	11
076[1]	23549	13775	76.62	44.8	54	1612	2757	124	365	430	10425	193	290	●	135	14
076[2]	23549	11671	76.62	37.9	54	1631	3294	125	365	430	10425	193	290	●	135	14
118	32535	19852	118	72	50.5	1864	3056	220	350	420	21648	480	260	●	300	16
147	41548	26940	146.5	95	50.5	1707	2632	250	360	430	24250	480	260	●	300	20~22
155	61671	35257	154.8	88.5	73	1718	3005	275	350	420	28607	392	270	●	404	29~32
168	46433	28263	168.4	102.5	50.5	1469	2413	248	350	420	24250	480	260	●	310	25
173	65010	37976	173	101	73	1561	2673	270	330	395	28607	392	270	●	404	33
185	72892	44972	185	114.1	70.2	1557	2523	288	360	430	30537	435	x	●	425	36~38
274	94438	59016	274.6	171.6	63	1383	2214	380	350	420	63592	1009	x	●	610	45~50

● - Standard ▲ - Option x - Not available

* Fixed displacement

** Nominal pressure is the max. relief valve setting pressure

Technical Data

1	Operation temperature rating	-20°C - +95°C	
2	Oil viscosity recommendation		
		Gear oil: 80W-90	Hydraulic oil: VG-46
	Viscosity at 40°C	143 mm²/s	46mm²/s
	Viscosity at 100°C	16mm²/s	7mm²/s
3	Oil cleanliness minimum requirements	NAS 9, or ISO 4406 (20/18/15)	
4	Case pressure	2 bar max.	

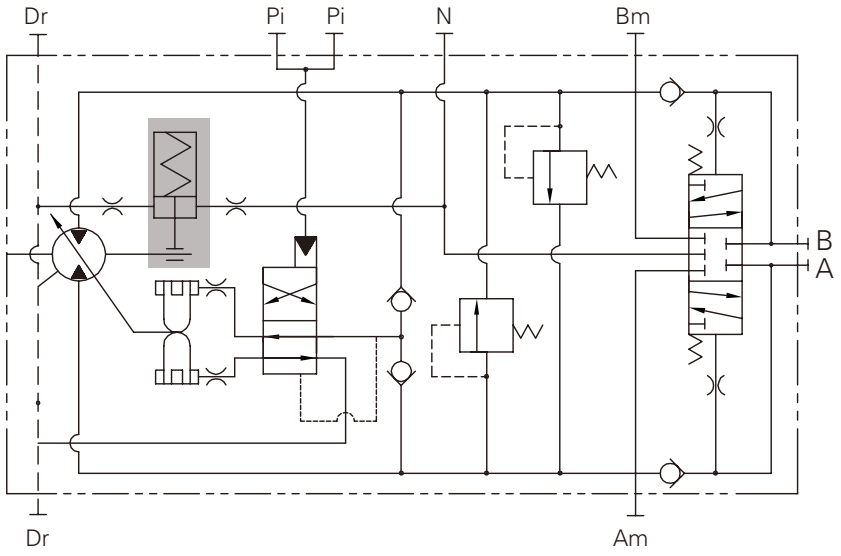
Parking Brake

The Parking Brake Valve is incorporated into the system to provide controlled operation and reduction of wear to the Track Drive Motor.

The Traction Parking Brake consists of multiple wet friction plates. The brake is applied via a spring force and removed by the motor's operating pressure.

- Parking Brake - OFF [disengaged]
  When the operator selects the travel function, oil flow and system working pressure enters the work port of the motor (A) or (B), simultaneously oil flows via the spool chamber through an orifice, pressurizing the brake chamber piston, compressing the brake springs and releasing the brake.

- Parking Brake - ON [engaged]
  When the operator places the travel function in neutral, working pressure at the A or B port falls to zero, simultaneously the oil path to the brake chamber piston is blocked. As a result pressure on the brake chamber piston decays, via a timing orifice resulting in the mechanical engagement of the brake. Concurrently, the counter balance valve spool returns to neutral.

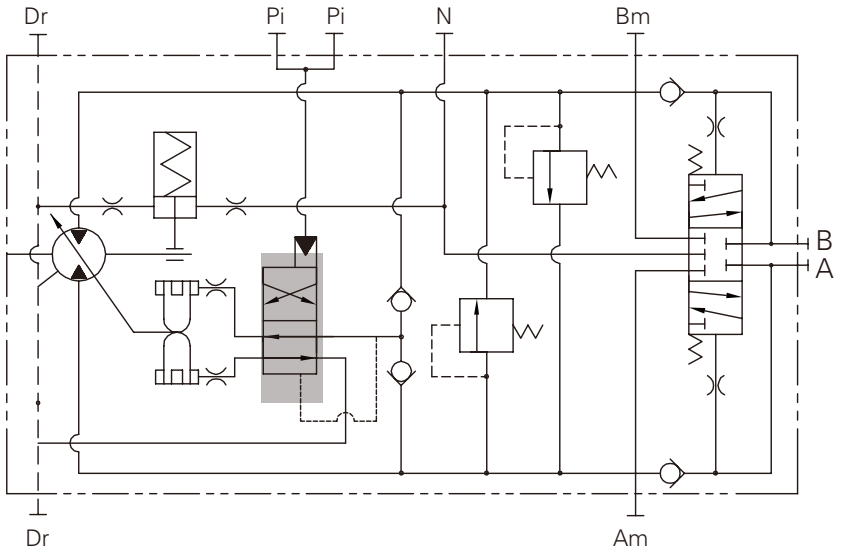


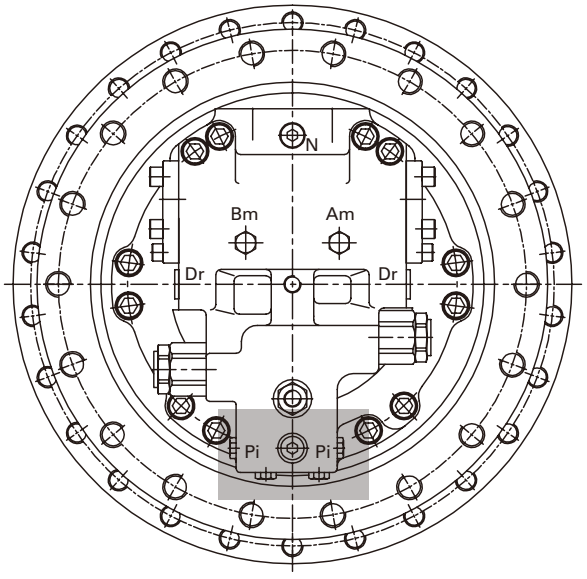
2-Speed Switch

Rotation speed of the track motor is dependent on the angle of the motor swash plate.
When the swash plate is at its maximum angle, the motor rotates at low speed.
When the swash plate is at its minimum angle, the motor rotates at high speed.
Motor speed selection is achieved through remote pilot pressure.

- Low speed option
  When the pilot pressure at Pi is disconnected, the integrated Two-Speed Valve shifts to the low-speed position via spring force. At this point, the swash plate moves to its maximum displacement and the motor rotates at low speed.

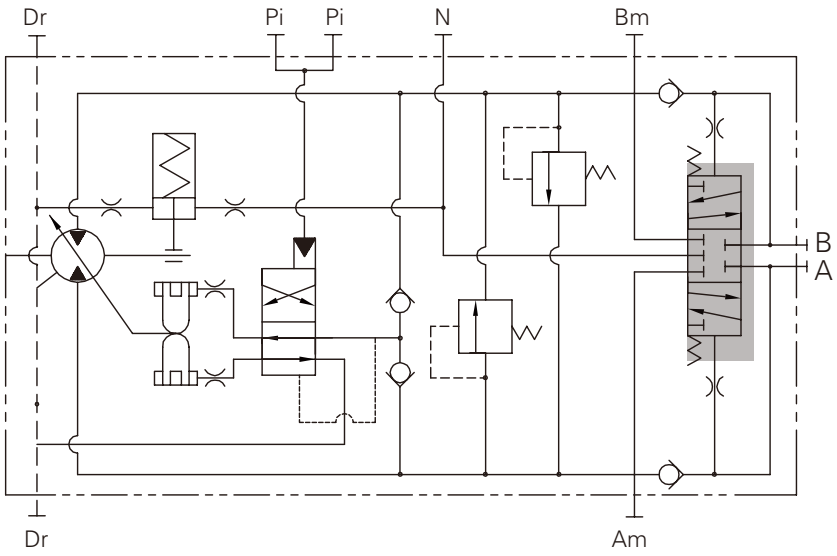
- High speed
  When the pilot pressure at Pi is connected, the pilot pressure moves the integrated Two-Speed Valve to the high speed position. At this point, the swash plate moves to its minimum angle and the motor rotates at high speed.

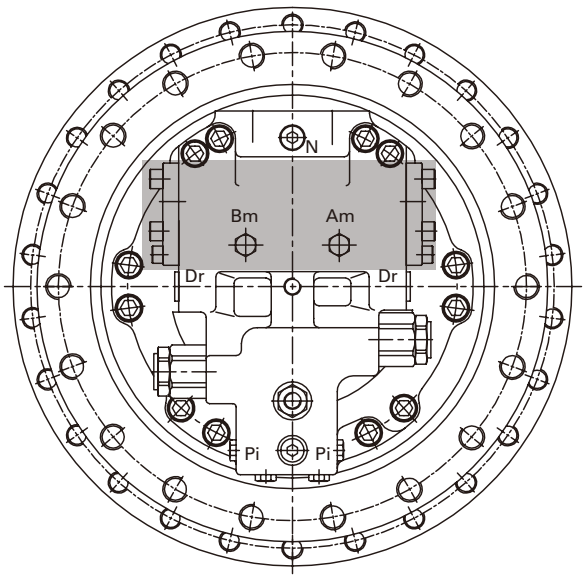




Counter Balance Valve Sequence

- Parking Brake is Off [disengaged] during operation of the machine.
- When machine descends on a slope, provides traveling velocity control.
- After the machine stops on the slope, provides slip prevention.
- When the motor stops rotation, supplementary flow can be provided through the Counter Balance when in its neutral position.

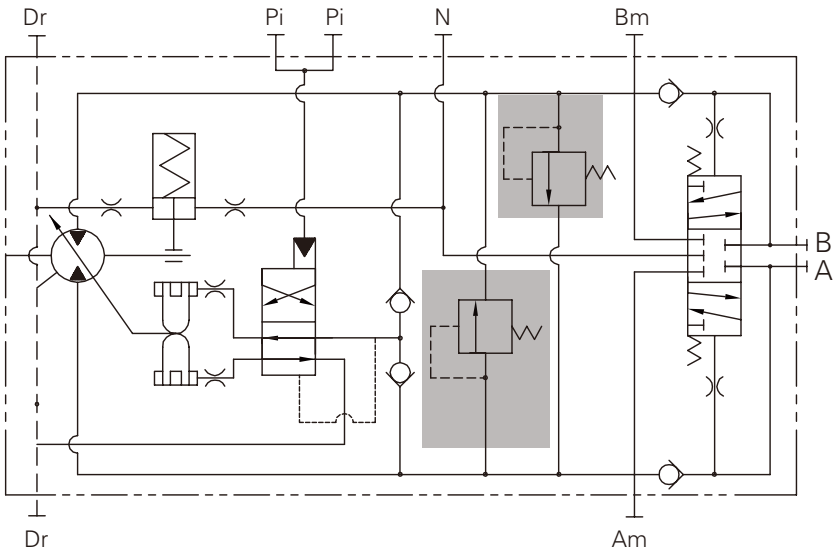


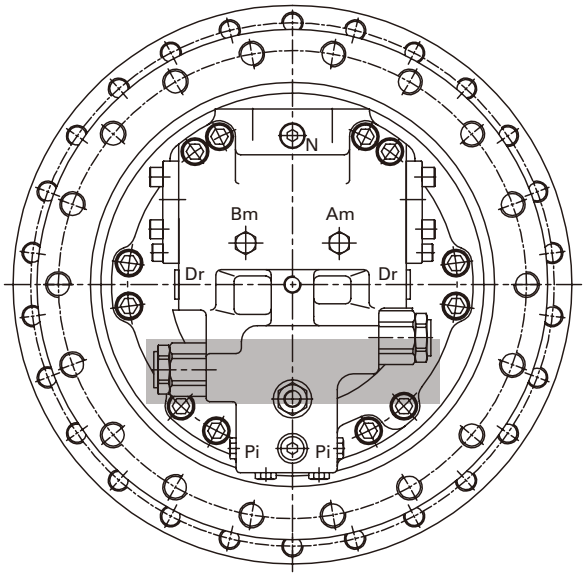


Relief Valve

Relief Valves are incorporated into the system to prevent internal damage of the Track Drive Motor.

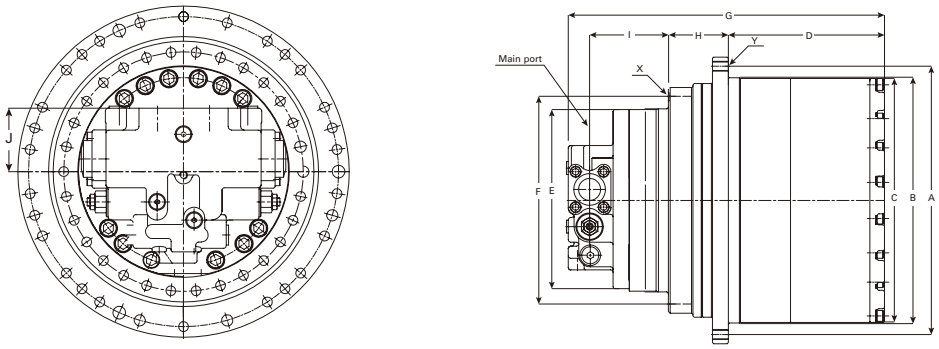
When the control valve ports A and B are blocked, there is no flow to the motor preventing any further traction movement. However, due to travel inertia of the excavator's upper body the motor will continue to rotate which induces excessive over pressure in the downstream port. The Relief Valves function is to discharge the rising port pressure from the high pressure port to the low pressure port of the motor.



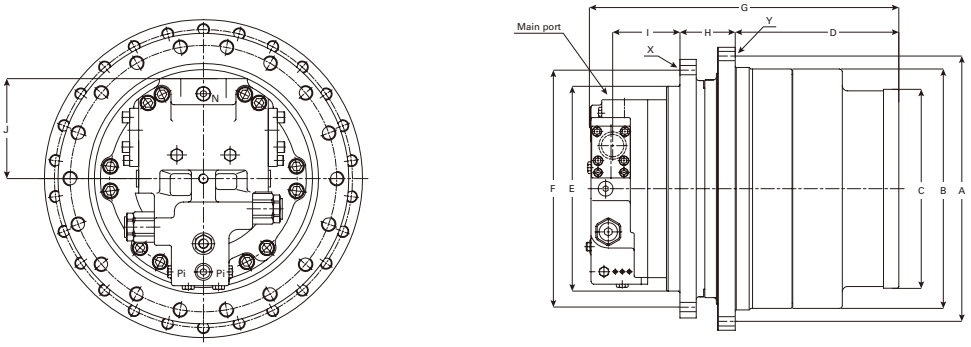


Installation Dimensions

JMV016 ~147, 168



JMV155, 173, 185, 274



Unit: mm

Model	øA	øB	øC	D	øE	øF	G	H	I	J	X	Y	Main Port
016[1]	180	160	154	99.5	150	170	214	40	58.5	39	8-M8	8-M10	2-G3/8 (2-PF3/8)
016[2]	215	190	188	132	165	192	257.3	50	47.5	51	7-M10	9-M12	2-G1/2(2-PF1/2)
016[3]	180	160	159	114.5	150	170	251.5	40	77	39	8-M8	8-M10*	2-G3/8(2-PF3/8)
018	215	190	188	132	165	192	257.3	50	47.5	51	7-M10	9-M12	2-G1/2(2-PF1/2)
021	232	204	196	132	165	192	257.5	50	55.5	51	9-M12	10-M12	2-G1/2 (2-PF1/2)
023	232	204	196	132	165	192	257.5	50	55.5	51	9-M12	10-M12	2-G1/2 (2-PF1/2)
041	300	265	248	150.5	210	250	347	80	74	76.5	12-M16	12-M14	2-G1/2 (2-PF1/2)
044	282	250	244	155	210	244	342	68	76	74	12-M14	12-M14	2-G1/2 (2-PF1/2)
047	300	265	244	148.5	210	250	351.5	80	74	74	12-M16	12-M14	2-G1/2 (2-PF1/2)
053	300	265	261	149	210	250	344	80	72	76	12-M16	12-M14	2-G1/2 (2-PF1/2)
067	364	324	320	204	225	320	400	83	88.5	74	16-M16	15-M16	2-1-1/16-12 UNF-2B
076	364	324	320	193	246	280	396.5	98.5	81	74	20-M16	21-M16	2-G3/4 (2-PF3/4)
118	440	402	400	250	300	340	515.5	98.5	123	90	30-M16	12-M12	ø25 Flange, 2-G1(2-PF1)
147	440	402	400	250	300	340	515.5	98.5	123	90	30-M16	30-M16	ø25 Flange, 2-G1(2-PF1)
168	440	402	400	250	300	340	515.5	98.5	123	90	30-M16	30-M16	ø25 Flange, 2-G (2-PF1)
155	492	450	369	305	380	440	572.5	102.5	103	165	18-M24	26-M20	ø25 Flange
173	492	450	369	305	380	440	572.5	102.5	103	165	18-M24	26-M20	2-G1 (2-PF1)
185	490	450	369	295.5	380	425	572.5	112	103	165	26-M20	24-M20	ø25 Flange
274	605	556	472	326.5	420	460	651.5	130	134	156.5	24-M20	24-M22	ø32 Flange

* 10-M10 or 14-M10 is available

Motor Output Shaft

Dimension, mm

16(cc/rev) 16/11.4(cc/rev)		
Involute Spline		
Number of teeth	12	
Module	1	
Pressure Angle	20°	
Pitch Diameter	Φ12	
Displacement	5.143	0.025
		-0.007
Over Pin(Φ3)	Φ10.067	0.07
		0

16/10.4(cc/rev) 18/10.1(cc/rev) 21/11.2(cc/rev) 23/14.7(cc/rev)		
Involute Spline		
Number of teeth	12	
Module	1.25	
Pressure Angle	20°	
Pitch Diameter	Φ15	
Displacement(2)	Φ6.258	0.025
		-0.008
Over Pin(Φ2.4)	Φ12.473	0.078
		0

41/26.1(cc/rev)		
Involute Spline		
Number of teeth	15	
Module	1.25	
Pressure Angle	20°	
Pitch Diameter	Φ18.75	
Displacement	10.172	0.025
		-0.008
Over Pin(Φ2.5)	Φ16.231	0.07
		0

44/22.7(cc/rev) 47/27.5(cc/rev)		
Involute Spline		
Number of teeth	14	
Module	1.5	
Pressure Angle	20°	
Pitch Diameter	Φ21	
Displacement(3)	12.185	0.03
		-0.008
Over Pin(Φ3)	Φ18.1	0.085
		0

53/31.4(cc/rev)		
Involute Spline		
Number of teeth	14	
Module	1.25	
Pressure Angle	20°	
Pitch Diameter	Φ17.5	
Displacement(3)	10.155	0.025
		-0.008
Over Pin(Φ2.5)	Φ15.084	0.071
		0

67/41.2(cc/rev) 76/44.8(cc/rev)		
Involute Spline		
Number of teeth	18	
Module	1.25	
Pressure Angle	20°	
Pitch Diameter	Φ22.5	
Displacement(3)	10.225	-0.052
		-0.1
Over Pin(Φ2.25)	Φ27.183	-0.113
		-0.189

118/67(cc/rev) 147/95(cc/rev) 168/102.5(ccc/rev)	
Involute Spline	
Number of teeth	21
Module	16/32
Pressure Angle	30°
Pitch Diameter	Φ33.3375
Major Diameter	Φ34.925
Minor Diameter	Φ30.83
Form Diameter	Φ31.65
Over Pin(Φ3.048)	Φ37.84

155/88.5(cc/rev) 185/114.1(cc/rev)		
Involute Spline		
Number of teeth	14	
Module	2.5	
Pressure Angle	20°	
Pitch Diameter	Φ35	
Displacement(3)	20.309	-0.061
		-0.118
Over Pin(Φ4.5)	Φ44.173	-0.172
		-0.228

274/171.6(cc/rev)		
Involute Spline		
Number of teeth	16	
Module	2.5	
Pressure Angle	20°	
Pitch Diameter	Φ40	
Displacement(3)	20.379	0.03
		-0.009
Over Pin(Φ2.25)	Φ35.168	0.085
		0

Application Description

Traction Function

- Starting the traction operation
  When the operator selects the travel function, oil flow and system working pressure enters the work port of the motor (A) or (B), simultaneously oil flows via spool chamber through an orifice, pressurizing the brake chamber piston, compressing the brake springs and releasing the brake. At this point, the Track Drive Motor will rotate and activate the propel work circuit.
- Stopping the traction operation
  When the operator places the travel function to neutral, working pressure at the A or B port falls to zero and the propel motion is discontinued. Simultaneously, the oil path to the brake chamber piston is blocked and as result the pressure on the brake chamber piston decays, engaging the brake and bringing the machine to a safe stop.

Troubleshooting

General Precautions

- If you experience abnormal operation of the Track Drive Motor, consider all elements within the work circuit that could potentially effect the Track Drive Motor's performance.
- If deemed necessary to disassemble the Track Drive Motor, it is critical to do so in a clean environment, in order to ensure no contamination is introduced during the reassembly process.
- In the event of disassembly, note that the internal hydraulic components of the Track Drive Motor are precision manufactured and as a result must be handled with care to avoid irreversible damage.

Diagnosis & Maintenance

- If the motor is making an unusual sound, unscrew the plug from the case drain and check whether the recommended level of oil is present. Top up the oil level if required and ensure to bleed the trapped air from the circuit. Check the quality of the oil, if impurities are found, replace the oil to optimize the life of the Track Drive Motor.
- If you still experience abnormal operation of the motor, measure the pressure throughout the work circuit to assess whether or not the motor is at fault.

Driving Precautions

- *Check the piping and flexible hose is correctly installed.*
- *Ensure correct direction of rotation of the motor is achieved.*
- *Check for leakage from all motor parts.*
- *Ensure the system is operating within the specified working temperature.*
- *Check the pressure is operating within specified range.*

Application Data Sheet

Contact: _____ Date: _____

Company/Location: _____ Model / Application: _____

Distributor/Eaton Contact: _____ Annual Usage: _____

Prototype / Production Date: _____

Machine Specifications:

Available Horsepower @ RPM: _____ hp @ _____ rpm

Operating / Overspeed rpm: _____ rpm/ _____ rpm

Vehicle Weight: _____ lbs / kg

Machine Life Goal: _____ hours

Machine Usage Environment: _____

Machine Temperature Range: _____ °F / °C

Type Hydraulic of Circuit: _____ Open/Closed

Drive Motor Qty: _____ per machine

Sprocket (Wheel) Pitch Diameter: _____ in / mm

Main Relief Set Pressure: _____ psi / bar

Main Relief Set Flow Rate: _____ gpm / lpm

Max Working Pressure: _____ psi / bar

Max Flow per Motor: _____ gpm / lpm

Hydraulic Oil Type: _____

Hydraulic Oil Temp Range: _____ °F / °C

Current Motor (mfg, model): _____

Hydraulic Schematic Available: _____ Y or N

Current Track Drive Motor Info: _____ in^3/ rev / cc / rev

Gear Ratio: _____ :1

Requested Specifications:

Max Drive Output Speed: _____ rpm

Drive Motor Lifetime: _____ hours

Max Vehicle Speed: _____ mph / kph

Parking Brake Required: _____ Y or N

Max Torque Required: _____ ft-lbs / Nm

Parking Brake Torque Required: _____ ft-lbs / Nm

Max Tractive Effort: _____ lbs / N

Displacement (Max/Min): _____ in^3/ rev / cc / rev

Additional Drawbar Pull: _____ lbs / N

Displacement Control Type: _____ Manual or Auto

Max Gradability: _____ %

Automatic Shift Point: _____ psi / bar

Distance - Hub C/L to Ground: _____ in / mm

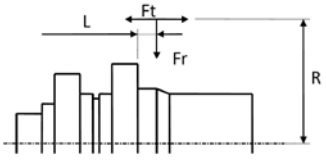
Max External Loads:

Radial Force (Fr): _____ lbs / N

Thrust Force (Ft): _____ lbs / N

Radial Force Location (L): _____ in / mm

Thrust Force Location (R): _____ in / mm



Motor Duty Cycle Information:

Pressure/Torque	Speed	Direction	% Duty

Gradability Information:

Grade	Speed	Surface Type or Rolling Resistance Coeff.	Weight	Drawbar Pull

Additional Information:

Roll Resistance Coefficient

Concrete/Asphalt	0.03-0.04
Smooth dirt/Gravel road	0.025-0.05
Unplowed earth	0.04-0.08
Loose earth	0.06-0.08
Loose sand or gravel/mud-soft base	0.10-0.12
Mud - firm base	0.05-0.09
Snow	0.02-0.035

Notes

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