



SGM PTM&N

**Program Book/Guidelines for
Bosch Rexroth Hydraulic Products**

Document No.: SGMPT-CL-F-BOSCH REXROTH
Version 2.2

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Document Management Information

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Revision Date	Version No.	Document Name	Revision	Paragraph Affected	Revised By
2006-06-01	1.0	SGMPT-CL-BOSCH REXROTH	Released by SGM Engineering		Zhang Hao
2008-05-06	1.1	SGMPT-CL-BOSCH REXROTH	Power Unit Section	2.11	Zhang Hao
2008-06-25	1.2	SGMPT-CL-BOSCH REXROTH	Power Unit Section, revised drawing for reservoir covers & added note for 1500 RPM electric motors	2.11	Zhang Hao
2009-03-06	2.0	SGMPT-CL-BOSCH REXROTH	General update to the program book	All	Zhang Hao, Yang Chengwei
2009-12-08	2.1	SGMPT-CL-BOSCH REXROTH	Directional valve model codes and part numbers changed from K33L to the replacement K72L models.	2.1	Yang Chengwei
2010-02-27	2.2	SGMPT-CL-BOSCH REXROTH	Power unit section, changed the return filter and filter element part numbers.	2.2	Bosch Rexroth, Yang Chengwei



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1.0 INTRODUCTION

1.1 SCOPE OF DOCUMENT

The program book provides a list of Bosch Rexroth hydraulic products to be used for new SGM Powertrain programs. The use of components not listed in the program book requires a deviation from SGM Powertrain Engineering. For the complete hydraulic system requirements see General Motors Specification SP-F-Hydraulics.

1.2 COMPANY OVERVIEW

Bosch Rexroth AG, formed in 2001 through the merger of Bosch Automation Technology and Rexroth, is a 100 percent subsidiary of Robert Bosch GmbH with 35,300 employees worldwide. Bosch Rexroth has subsidiaries in 36 countries and a dealer network that spans 80 countries.

As a leading global hydraulics manufacturer Bosch Rexroth offers a portfolio of hydraulic solutions ranging from standard valves to state-of-the-art vertical low noise power units. Bosch Rexroth's diverse offering of Hydraulic and Electro-Hydraulic products and systems continue to be utilized as an integral part of the machine control.

Years of experience in the automotive industry combined with an expansive product range and support network enables Bosch Rexroth to provide the automotive industry with advanced Hydraulic Engineering, Product/System Application, Training, Program Management and Field Service Support.

Bosch Rexroth is committed to providing our automotive and machine tool customers with control solutions that afford reduced life cycle costs, maximum manufacturing efficiency, enhanced reliability and maintainability.

2.0 PRODUCT OVERVIEW

The Bosch Rexroth components which are recommended for new SGM Powertrain programs are listed on the following pages. For additional information on Bosch Rexroth Industrial Hydraulics components please see the Websites listed below.

<http://www.boschrexroth.com.cn>

<http://www.boschrexroth.co.jp>

<http://www.boschrexroth-us.com/>

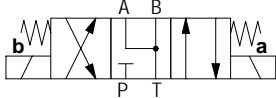
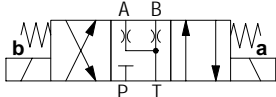
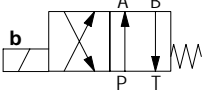
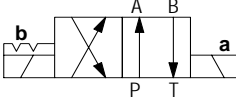
<http://www.boschrexroth.de/>

<http://www.boschrexroth.com.br>

2.1 DIRECTIONAL VALVES

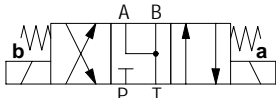
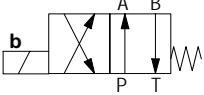
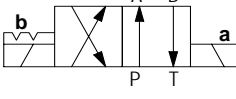
2.1.1 NG6 (D03) Four-Way Directional Control Valves

Subplate mounted, 24 V DC, P= 30 Watts, NBR seals, M12 connector on each solenoid, pin configuration: pin 4 24V, pin 3 0V, pins 2 & 1 bridged.

Symbol	Model Number & Description	Part Number
	4WE6J73-6X/EG24N9K72L/A12=AN Double Solenoid, 3-Position, A&B to Tank, Pressure Blocked	R901235372
	4WE6W73-6X/EG24N9K72L/A12=AN Double Solenoid, 3-Position, A&B Bleed to Tank, Pressure Blocked	R901257361
	4WE6D73-6X/EG24N9K72L/A12=AN Single Solenoid, Spring Return	R901235373
	4WE6D73-6X/OFEG24N9K72L/A12=AN Double Solenoid, 2-Position, Detented Note: To be used for clamping applications only. Other applications require written approval from SGM PT Controls Eng.	R901235371

2.1.2 NG10 (D05) Four-Way Directional Control Valves

Subplate mounted, 24 V DC, P= 35 Watts, NBR seals, M12 connector on each solenoid, pin configuration: pin 4 24V, pin 3 0V, pins 2 & 1 bridged

Symbol	Model Number & Description	Part Number
	4WE10J73-3X/CG24N9K72L/A12=AN Double Solenoid, 3-Position, A&B to Tank, Pressure Blocked	R901235534
	4WE10D73-3X/CG24N9K72L/A12=AN Single Solenoid, Spring Return	R901257365
	4WE10D73-3X/OFEG24N9K72L/A12=AN Double Solenoid, 2-Position, Detented Note: To be used for clamping applications only. Other applications require written approval from SGM PT Controls Eng.	R901257366



2.1.3 NG16 (D07) Four-Way Directional Control Valves

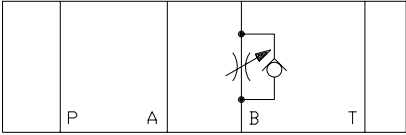
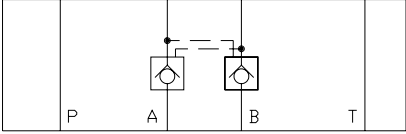
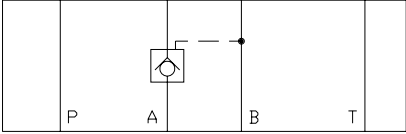
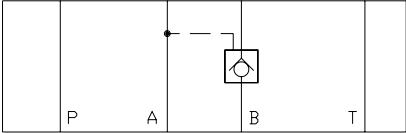
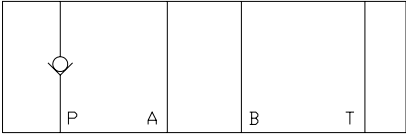
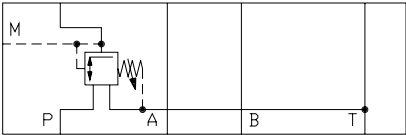
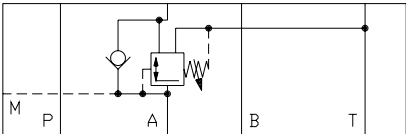
Subplate mounted, 24 V DC, P= 30 Watts, NBR seals, M12 connector on each solenoid, pin configuration: pin 4 24V, pin 3 0V, pins 2 & 1 bridged, internally piloted and internally drained.

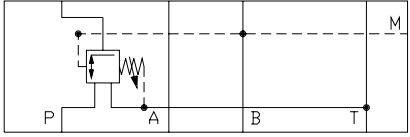
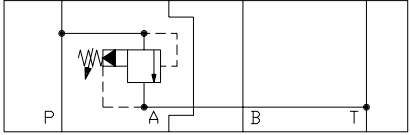
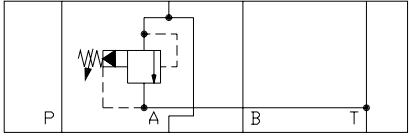
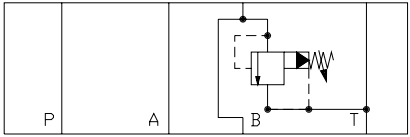
Symbol	Model Number & Description	Part Number
	<p>4WEH16J7X/6EG24N9ETK72LB10=AN</p> <p>Double Solenoid, 3-Position, A&B to Tank, Pressure Blocked</p>	R901257378
	<p>4WEH16W7X/6EG24N9ETK72LB10=AN</p> <p>Double Solenoid, 3-Position, A&B Bleed to Tank, Pressure Blocked</p>	R901257388
	<p>4WEH16D7X/6EG24N9ETK72LB10=AN</p> <p>Single Solenoid, Spring Return</p>	R901257392

2.2 MODULAR STACK VALVES

2.2.1 NG6 (D03) Sandwich Modules

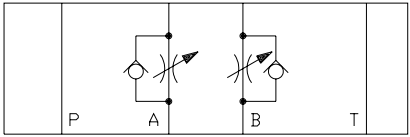
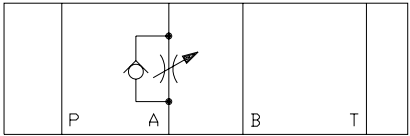
Symbol	Model Number & Description	Part Number
	<p>Dual Flow Control Module</p> <p>Meter in or meter out throttling Z2FS6-2-4X/2Q</p>	R900481622
	<p>A Port Flow Control Module</p> <p>Meter in or meter out throttling Z2FS6A2-4X/2Q</p>	R900427254

	<p align="center">B Port Flow Control Module</p> <p align="center">Meter in or meter out throttling</p> <p align="center">Z2FS6B2-4X/2Q</p>	<p align="center">R900423224</p>
	<p align="center">Dual P.O. Check Module</p> <p align="center">Z2S6-1-6X/</p>	<p align="center">R900347495</p>
	<p align="center">A Port P.O. Check Module</p> <p align="center">Z2S6A1-6X/</p>	<p align="center">R900347498</p>
	<p align="center">B Port P.O. Check Module</p> <p align="center">Z2S6B1-6X/</p>	<p align="center">R900347501</p>
	<p align="center">P Port Check Module</p> <p align="center">Z1S6P05-4X/M</p>	<p align="center">R901152381</p>
	<p align="center">P Port Pressure Reducing Module</p>	
	<p>ZDR6DP2-4X/25YM Adjustable to 25 Bar</p>	<p align="center">R900483785</p>
	<p>ZDR6DP2-4X/75YM Adjustable to 75 Bar</p>	<p align="center">R900483786</p>
<p>ZDR6DP2-4X/150YM Adjustable to 150 Bar</p>	<p align="center">R900483787</p>	
	<p align="center">A Port Pressure Reducing Module</p>	
	<p>ZDR6DA2-4X/25Y Adjustable to 25 Bar</p>	<p align="center">R900410808</p>
	<p>ZDR6DA2-4X/75Y Adjustable to 75 Bar</p>	<p align="center">R900410813</p>
<p>ZDR6DA2-4X/150Y Adjustable to 150 Bar</p>	<p align="center">R900410849</p>	

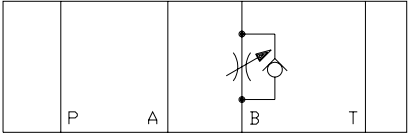
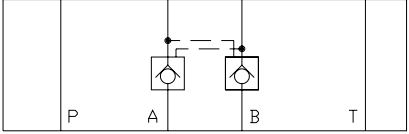
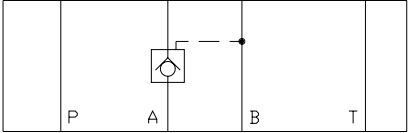
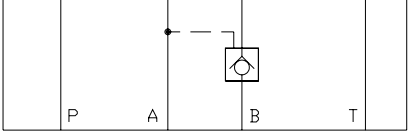
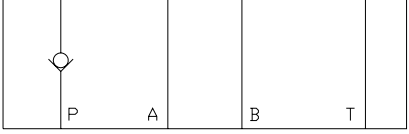
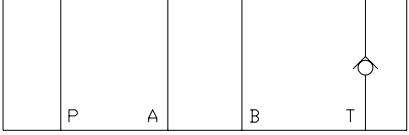
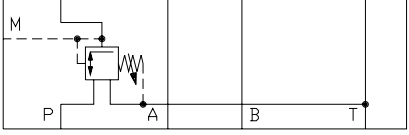
	B Port Pressure Reducing Module		
	ZDR6DB2-4X/25YM	Adjustable to 25 Bar	R900449839
	ZDR6DB2-4X/75YM	Adjustable to 75 Bar	R900431771
	ZDR6DB2-4X/150YM	Adjustable to 150 Bar	R900431172
	P To T Pressure Relief Module		
	ZDB6VP2-4X/50	Adjustable to 50 Bar	R900432804
	ZDB6VP2-4X/100	Adjustable to 100 Bar	R900423274
	ZDB6VP2-4X/200	Adjustable to 200 Bar	R900428339
	A To T Pressure Relief Module		
	ZDB6VA2-4X/50	Adjustable to 50 Bar	R900431678
	ZDB6VA2-4X/100	Adjustable to 100 Bar	R900437441
	ZDB6VA2-4X/200	Adjustable to 200 Bar	R900426329
	B To T Pressure Relief Module		
	ZDB6VB2-4X/50	Adjustable to 50 Bar	R900430645
	ZDB6VB2-4X/100	Adjustable to 100 Bar	R900431401
	ZDB6VB2-4X/200	Adjustable to 200 Bar	R900429509

Note: All NG6 modules are 40 MM high.

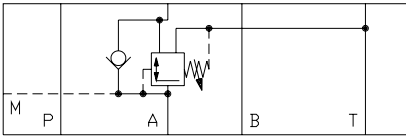
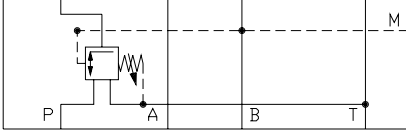
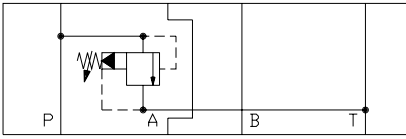
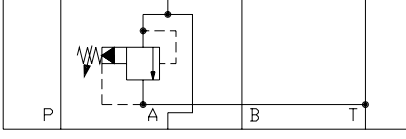
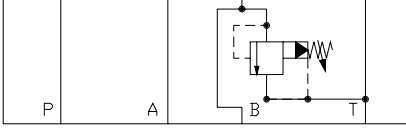
2.2.2 NG10 (D05) Sandwich Modules

Symbol	Model Number & Description	Part Number
	<p style="text-align: center;">Dual Flow Control Module</p> <p style="text-align: center;">Meter in or meter out throttling</p> <p style="text-align: center;">Z2FS10-5-3X/</p>	R900989095
	<p style="text-align: center;">A Port Flow Control Module</p> <p style="text-align: center;">meter out throttling</p> <p style="text-align: center;">Z2FS10A5-3X/S2</p>	R900571890



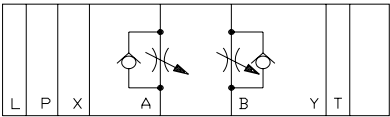
	<p>B Port Flow Control Module</p> <p>meter out throttling</p> <p>Z2FS10B5-3X/S2</p>	<p>R900989106</p>
	<p>Dual P.O. Check Module</p> <p>Z2S10-1-3X/</p>	<p>R900407394</p>
	<p>A Port P.O. Check Module</p> <p>Z2S10A1-3X/</p>	<p>R900407424</p>
	<p>B Port P.O. Check Module</p> <p>Z2S10B1-3X/</p>	<p>R900407434</p>
	<p>P Port Check Module</p> <p>Z1S10P1-3X/</p>	<p>R900989088</p>
	<p>T Port Check Module</p> <p>Z1S10T1-3X/</p>	<p>R900989091</p>
	<p>P Port Pressure Reducing Module</p>	
	<p>ZDR10DP2-5X/25YM Adjustable to 25 Bar</p>	<p>R900410899</p>
	<p>ZDR10DP2-5X/75YM Adjustable to 75 Bar</p>	<p>R900410875</p>
	<p>ZDR10DP2-5X/150YM Adjustable to 150 Bar</p>	<p>R900410880</p>



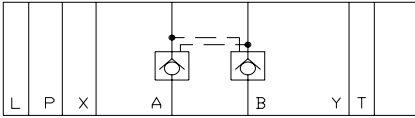
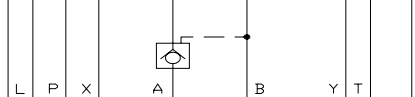
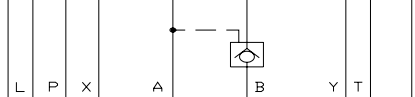
	A Port Pressure Reducing Module	
	ZDR10DA2-5X/25Y Adjustable to 25 Bar	R900407334
	ZDR10DA2-5X/75Y Adjustable to 75 Bar	R900438008
	ZDR10DA2-5X/150Y Adjustable to 150 Bar	R900410884
	B Port Pressure Reducing Module	
	ZDR10DB2-5X/25YM Adjustable to 25 Bar	R900426202
	ZDR10DB2-5X/75YM Adjustable to 75 Bar	R900431509
	ZDR10DB2-5X/150YM Adjustable to 150 Bar	R900408340
	P To T Pressure Relief Module	
	ZDB10VP2-4X/50 Adjustable to 50 Bar	R900440098
	ZDB10VP2-4X/100 Adjustable to 100 Bar	R900431065
	ZDB10VP2-4X/200 Adjustable to 200 Bar	R900428468
	A To T Pressure Relief Module	
	ZDB10VA2-4X/50 Adjustable to 50 Bar	R900432106
	ZDB10VA2-4X/100 Adjustable to 100 Bar	R900427434
	ZDB10VA2-4X/200 Adjustable to 200 Bar	R900421265
	B To T Pressure Relief Module	
	ZDB10VB2-4X/50 Adjustable to 50 Bar	R900967525
	ZDB10VB2-4X/100 Adjustable to 100 Bar	R900422073
	ZDB10VB2-4X/200 Adjustable to 200 Bar	R900422261

Note: All NG10 Modules are 50 MM high.

2.2.3 NG 16 (D07) Sandwich Modules

Symbol	Model Number & Description	Part Number
	<p style="text-align: center;">Dual Flow Control Module</p> <p style="text-align: center;">meter out throttling</p> <p style="text-align: center;">Z2FS16-8-3X/S2</p>	R900457256



	<p align="center">Dual P.O. Check Module Z2S16-1-5X/</p>	<p align="center">R900328797</p>
	<p align="center">A Port P.O. Check Module Z2S16A1-5X/</p>	<p align="center">R900328798</p>
	<p align="center">B Port P.O. Check Module Z2S16B1-5X/</p>	<p align="center">R900328799</p>

2.3 INLINE CHECK VALVES



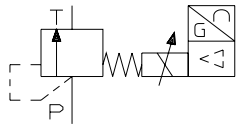
Port Size	Model Code	Part Number
G 1/4	S6A1.0/	R900422881
G 3/8	S8A1.0/	R900422886
G 1/2	S10A1.0/	R900420531
G 3/4	S15A1.0/	R900420537
G 1	S20A1.0/	R900420525
G 1 1/4	S25A1.0/	R900420511
G 1 1/2	S30A1.0/	R900420519



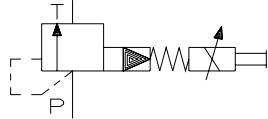
2.4 PROPORTIONAL VALVES

2.4.1 Proportional Pressure Controls

Direct Operated, Max. Flow 1.5 L/min, with on-board electronics

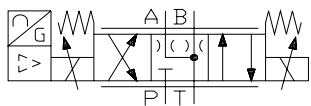
Size	Description	Model Number	Part Number
NG6 	Adj. to 80 bar	DBETBEX-1X/80G24K31A1M	0811402072
	Adj. to 180 bar	DBETBEX-1X/180G24K31A1M	0811402071
	Adj. to 250 bar	DBETBEX-1X/250G24K31A1M	0811402073
	Electrical Connector		1834482026

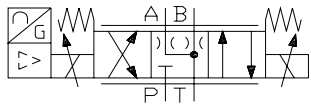
Pilot Operated, Max Flow 40 L/min

Size	Description	Model Number	Part Number
NG6 	Adj. to 80 bar	DBE6X-1X/80G24-8NZ4M	0811402045
	Adj. to 180 bar	DBE6X-1X/180G24-8NZ4M	0811402044
	Adj. to 315 bar	DBE6X-1X/315G24-8NZ4M	0811402043
	Amplifier VT-VSPA1-508-10/V0/RTP		0811405081

2.4.2 Proportional Directional Valves

Direct Operated with Integrated Electronics

Size	Description	Model Number	Part Number
NG6 	18L/min	4WRPE6W18SJ-2X/G24K0/A1M	0811404142
	32L/min	4WRPE6W32SJ-2X/G24K0/A1M	0811404143
	Electrical Connector		1834482026

Size	Description	Model Number	Part Number
NG10 	50L/min	4WRPE10W50SJ-2X/G24K0/A1M	0811404772
	80L/min	4WRPE10W80SJ-2X/G24K0/A1M	0811404773
	Electrical Connector		1834482026

2.5 ACCUMULATORS 1 – 35 Liters (¼ - 10 Gallons)

Diaphragm - Type

Volume (Liters)	Pressure Rating (bar)	Thread	Model Code
1.0 L	200	G 1/2	HAD1.0-200-1X/50G04C-1N111-BA

Bottom Repairable Bladder Accumulators

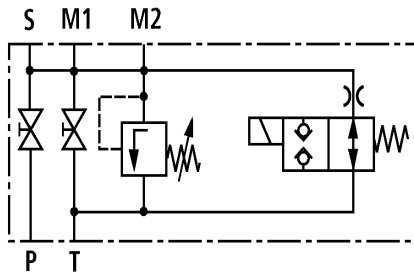
Volume (Liters)	Pressure Rating (bar)	Thread	Model Code
4 L	350	G 1 1/4	HAB4-350-4X/2G07G-2N111 - **
6 L	350	G 1 1/4	HAB6-350-4X/2G07G-2N111 - **
10 L	330	G 2	HAB10-330-4X/2G09G-2N111 - **
20 L	330	G 2	HAB20-330-4X/2G09G-2N111 - **
35 L	330	G 2	HAB35-330-4X/2G09G-2N111 - **

Accessories	Volume	QTY	Part Number
Clamp	1.0 Liter	1	1 531 316 019
Clamp	4...6 Liter	2	1 531 316 022
Clamp	10 Liter	1	1 531 316 026
Clamp	20...35 Liter	2	1 531 316 026
Support Bracket	10...35 Liter	1	1 531 334 008
Rubber Support Ring	10...35 Liter	1	1 530 221 042
Charging Kit			0 538 103 014

** Note: The bladder accumulator model codes require a suffix code dependant upon the country where the accumulator is being shipped to. For China the suffix code is SELO.



2.6 ACCUMULATOR SAFETY BLOCKS



The Accumulator Safety Blocks are used for safety, isolation and unloading of hydraulic accumulators. SGM Powertrain specifications require a safety block to be provided for each accumulator application. Each safety block is equipped with a manual isolation valve with locking handle, manual unloading valve, pressure relief valve and a 24 V solenoid unloading valve.

Accum. Size	Port	Size	Model Code
1.0 L	G 1/2	DN 10	ABZSS 10 E 3X / 210E / S30 G24 K4 V 104
4 - 6 L	G 1 1/4	DN 10	ABZSS 10 E 3X / 210E / S12 G24 K4 V 104
10 - 20 L	G 2	DN 20	ABZSS 20 E 3X / 210E / S13 G24 K4 V 104
35 L	G 2	DN 30	ABZSS 30 E 3X / 210E / S309 G24 K4 V 104

Accessories

Din Connector Plug

Equipped with Z diode and indicator light
(DIN to M12 adapter to be added)

Part Number

R901017026

2.7 SUBPLATES

Steel or Ductile Iron Subplates with metric threads for valve bolt down

Size	Ports	Description	Model Code
NG6 (D03)	G 1/4	Bottom Ported	G341/01
	G 3/8	Bottom Ported	G342/01
	G 1/2	Bottom Ported	G502/01
NG10 (D05)	G 1/2	Bottom Ported	G67/01
	G 3/4	Bottom Ported	G534/01
NG16 (D07)	G 3/4	Bottom Ported with X & Y Ports	G172/01
	G 1	Bottom Ported with X & Y Ports	G174/01

2.8 MANIFOLDS

Ductile Iron Manifolds with Bottom Cylinder Ports and Side Gauge Ports

Size	Ports	Nbr. of Stations	Model Code	
NG6 (D03)	P & T: G 3/4 A & B: G 1/2 A B Test Points G1/4	2	2HSR06-3X/01DS08	
		3	3HSR06-3X/01DS08	
		4	4HSR06-3X/01DS08	
		5	5HSR06-3X/01DS08	
		6	6HSR06-3X/01DS08	
		P & T: Both ends A & B: Bottom Face Test Points: one on each side.	7	7HSR06-3X/01DS08
			Alternate manifolds as listed below.	
	P & T: G 1 A & B: G 1/2 A B Test Points G1/4	2	ABM6PN-1X/02D2-01GM	
		3	ABM6PN-1X/03D2-01GM	
		4	ABM6PN-1X/04D2-01GM	
		5	ABM6PN-1X/05D2-01GM	
		6	ABM6PN-1X/06D2-01GM	
		P & T: Both ends A & B: Bottom Face Test Points: one on each side.	7	ABM6PN-1X/07D2-01GM



Size	Ports	Nbr. of Stations	Model Code
NG10 (D05)	P & T: G 1 A & B: G 3/4 A B Test Points G1/4	2	2HSR10-3X/01DS08
		3	3HSR10-3X/01DS08
		4	4HSR10-3X/01DS08
		5	5HSR10-3X/01DS08
		6	6HSR10-3X/01DS08
	Alternate manifolds as listed below.		
	P & T: G 1 A & B: G 3/4 A B Test Points G1/4	2	ABM10PN-1X/02D3-01GM
		3	ABM10PN-1X/03D3-01GM
		4	ABM10PN-1X/04D3-01GM
		5	ABM10PN-1X/05D3-01GM
		6	ABM10PN-1X/06D3-01GM
P & T: Both ends A & B: Bottom Face Test Points: one on each side.			

2.8.1 Cover Plates

Size	Description	Model Code	Part Number
NG6 (D03)	Cover Plate with Metric Bolts	HSA06A001-3X/M00	R900316232
		Alternate cover plate as listed below.	
		CP6NN-1X/D01	R978839953
NG10 (D05)	Cover Plate with Metric Bolts	HSA10B001-3X/M00	R900302150
		Alternate cover plate as listed below.	
		CP10NN-1X/D01P	R978839951



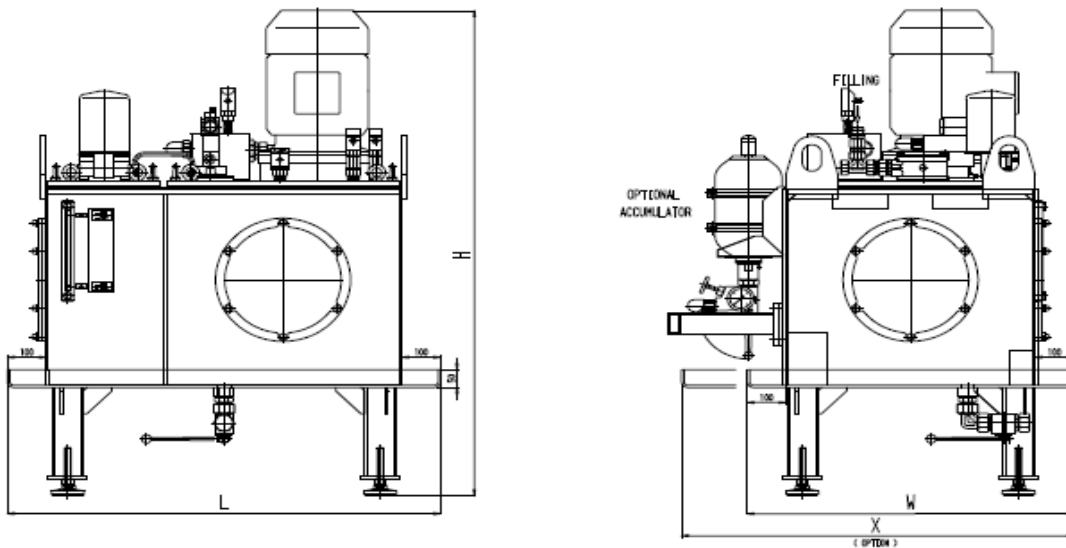
2.9 HYDRAULIC POWER UNITS

Vertical power units for SGM are available in four standard sizes, 100, 250, 400 & 800 L reservoirs. Power units for SGM Powertrain must not exceed a maximum sound level of 75 dB(A). The pumping element consists of a PV7 variable volume pressure compensated vane pump for the main system and either a gear or a vane pump for the re-circulation / filtration loop. SGM Powertrain encourages the design of energy efficient hydraulic systems, which do not require heat exchangers. If a specific application requires that a heat exchanger be added, then a plate style oil to water heat exchanger will be installed in the re-circulation line. The use of oil to air type heat exchangers is not permitted.

For maintenance purposes, the case drain line from the main variable volume pump will be tubed to the return side of the reservoir. Access to the reservoir is through the tank top or two reservoir cover doors. The clean out covers shall have a minimum of six studs to prevent cover leakage. Included with the power units are isolation / leveler pads. Should an accumulator be required for an application it will be added to the power unit along with an accumulator isolation block. The accumulator isolation block includes an isolation valve with a locking handle feature.

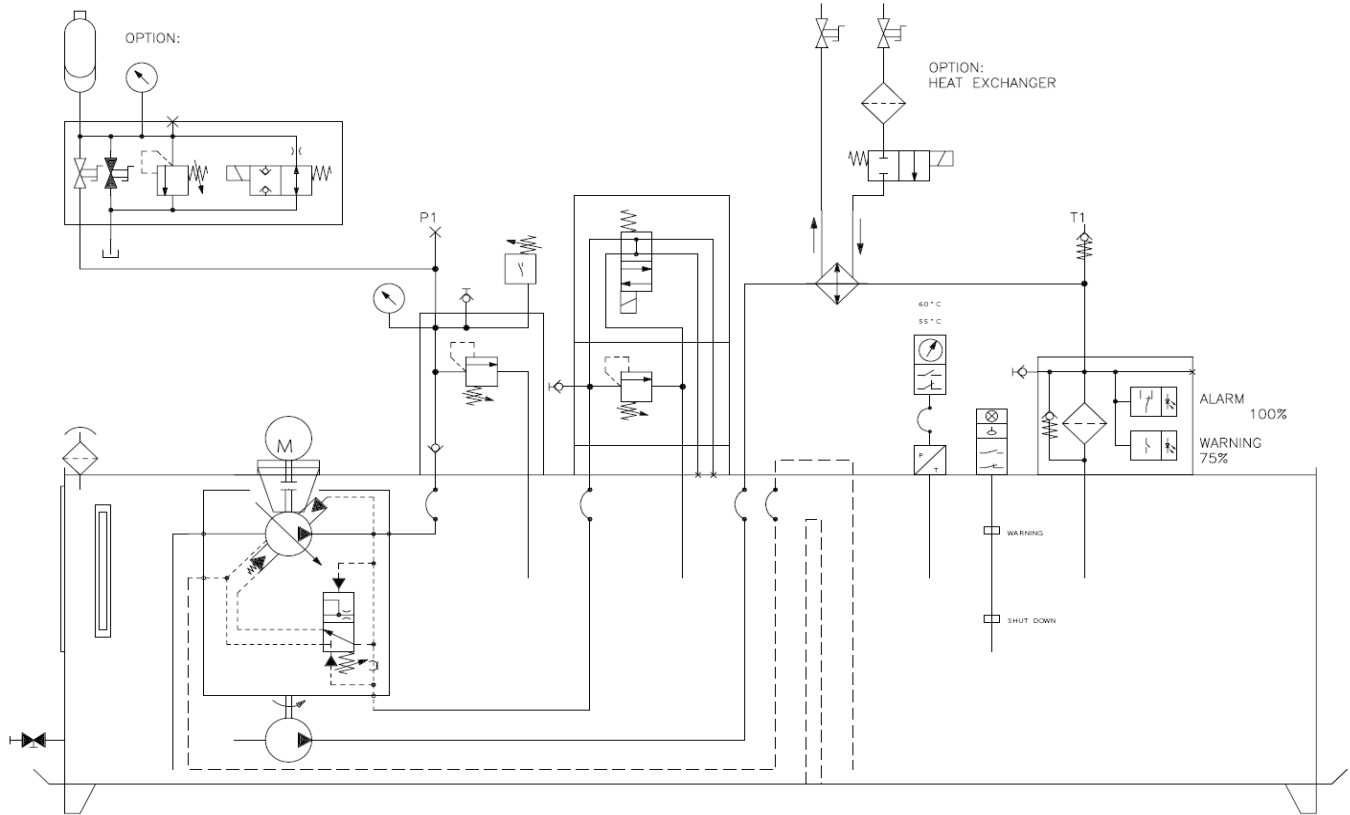
Power units for special machine applications, (such as for long clamping cycles) should be equipped with a heat exchanger located in the re-circulation line.

SGM Powertrain Vertical Hydraulic Power Units



SIZE	L	W	H
100 LITER	1003 mm	936 mm	1100 mm
250 LITER	1122 mm	846 mm	1385 mm
400 LITER	1420 mm	951 mm	1700 mm
800 LITER	1745 mm	1181 mm	1900 mm





Sound Spec: Less than 75 dB(A) Ports: ISO 1179-1 (G thread) Options: Accumulator circuit, heat exchanger circuit
 Fill point: H6-63 BSPP Labels: Per GM Spec. Tubing & Fittings: Trivalent Chrome metric tubing & metric flareless fittings per spec.

Electric Motor Drive Speed: The electric motor drive speed shall be 1500 RPM. The exception is when a slower drive speed is required to achieve the power unit sound level of 75 dB (A). For these applications **only**, 1000 RPM electric motors will be approved by SGM PT Controls Engineering.

	100 L	250 L	400L	800 L
Main Pump, Variable Displacement	PV7-1X/16-20RE01MD0	PV7-1X/25-30RE01MD0	PV7-1X/63-71RE07MD0	PV7-1X/100-118RE07MD0
Flow @ 1000 RPM	20 LPM	29.9 LPM	70.9 LPM	118 LPM
Flow @ 1500 RPM	29.9 LPM	44.9 LPM	106 LPM	N.A.
Aux Pump for Filtering/Cooling Loop	PGF2-2X/011RJ01VU2	PGF2-2X/019RJ20VU2	PVV1-1X/027RJ15UMB	PVV1-1X/027RJ15UMB
Return Filter	10TEN0063-H10XLA00-V2.2-M-R4 c/w ABZFV-E2SP-M12X1-1X/DIN Dual Elec. Indicator.	10FREN0160H10XL-A00-07V2.2-00M00 c/w ABZFV- E2SP-M12X1-1X/DIN Dual Elec. Indicator.	10FREN0250H10XL-A00-07V2.2-00M00 c/w ABZFV- E2SP-M12X1-1X/DIN Dual Elec. Indicator.	10FREN0630H10XL-A00-07V2.2-00M00 c/w ABZFV-E2SP-M12X1-1X/DIN Dual Elec. Indicator.
Filter Element	1.0063H10XL-A00-0-M	1.0160H10XL-A00-0-M	1.0250H10XL-A00-0-M	1.0630H10XL-A00-0-M
Temperature Switch	IFM TR7430	IFM TR7430	IFM TR7430	IFM TR7430
Level Switch	IFM LK7023	IFM LK7023	IFM LK7023	IFM LK7023
Pressure Switch	IFM PN7001	IFM PN7001	IFM PN7001	IFM PN7001

3.0 PROJECT CONTACT INFORMATION

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