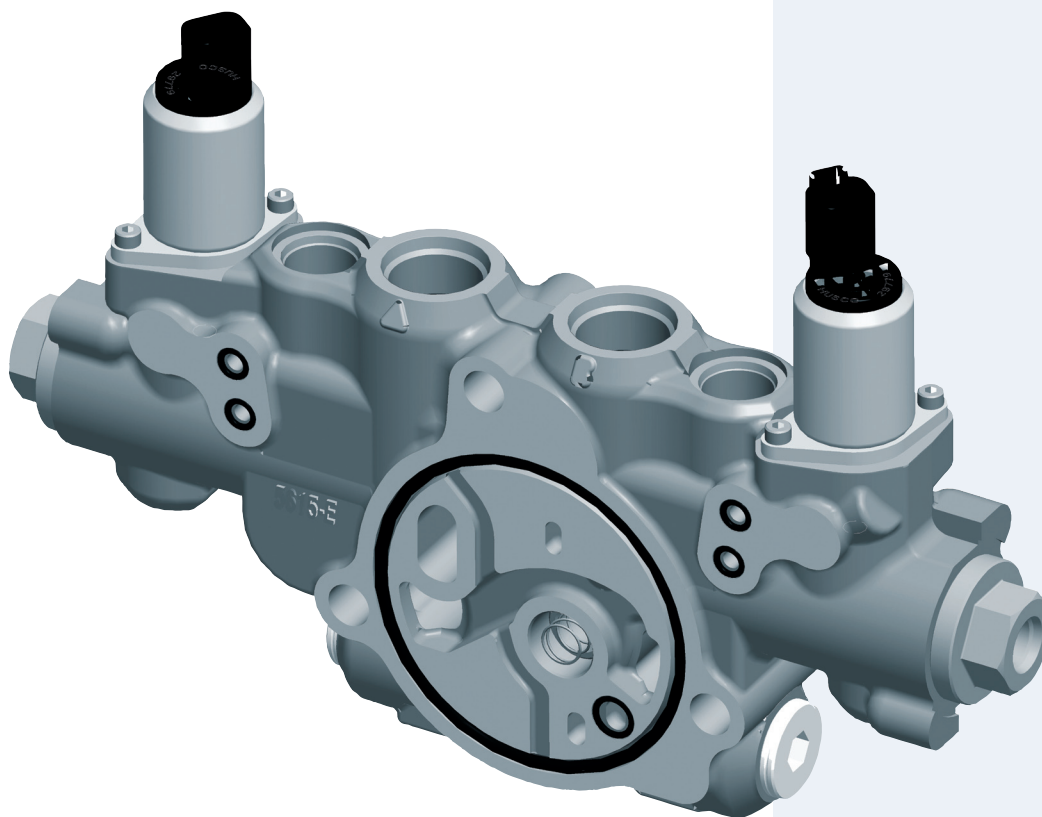


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APPENDICES

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SCX-180 SPECIFICATIONS

SPOOL CONTROL OPTIONS:

Manual Control

Hydraulically Pilot Operated Control

Electrohydraulic Control

Pneumatically Pilot Operated Control

SIZE:

Section Width	48.00 mm	1.89 in
---------------	----------	---------

SEALS:

BUNA-N (standard)	VITON (optional)
-------------------	------------------

STANDARD PORT SIZES (MAXIMUM):

Inlet (P)	1-5/16-2 (SAE 16) Standard	G1
Work Ports (A) and (B)	1-1/16-12 (SAE 12) Standard 7/8-14 (SAE 10) Optional	G3/4 G1/2
High Pressure Carry Over (HPCO)	1-5/16-12 (SAE 16)	G1
Outlet (T)	1-5/16-12 (SAE 16) Standard 1-5/8-12 (SAE 20) Optional	G1 G1-1/4

STANDARD INTERNAL LEAKAGE RATES:

Rated Work Port Leakage (A or B→T) tested with 70 bar (1,015 psi) ΔP at 43 ± 4 C (110° ± 10° F) and 28 – 35 mm²/sec (135 – 165 SSU) kinematic viscosity	Separate Section Assemblies	
	25 cm³/min	1.5 in³/min
	Finished Valve Assemblies	
	16 cm³/min	1.0 in³/min

STANDARD OPERATING FLOWS:

Rated Inlet Flow	230 lpm	60 gpm
Rated Section Flow (Work Port Flow)	180 lpm with 15 bar P-LS differential pressure	48 gpm with 215 psi P-LS differential pressure

STANDARD OPERATING PRESSURES:

	ISO Rating*		NFPA Rating*	
Rated Inlet Pressure	345 bar	5,000 psi	280 bar	4,000 psi
Rated Work Port Pressure	345 bar	5,000 psi	280 bar	4,000 psi
Rated Outlet Pressure	64 bar	925 psi	52 bar	750 psi

STANDARD OPERATING CONDITIONS:

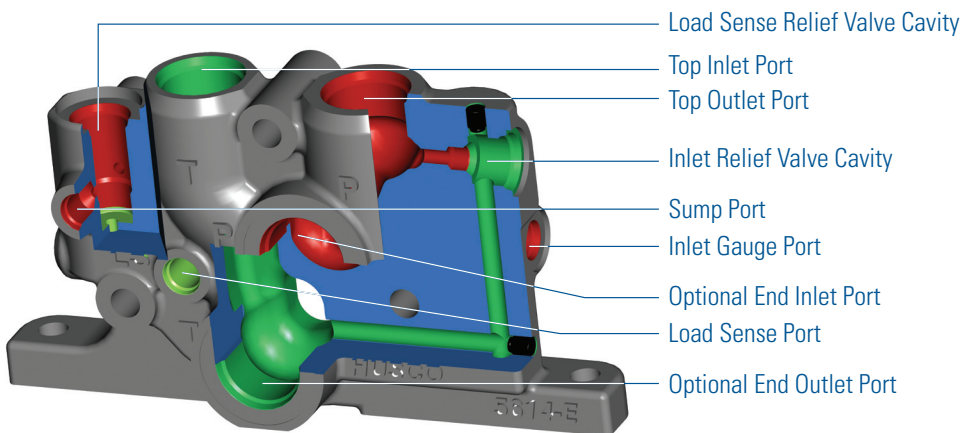
Fluid	Mineral based oil (SAE 10W or equivalent)		
Fluid Temperature Range	-29 to +104 C		-20° F to +220° F
Maximum Fluid Contamination Level	ISO 20/17/14		

* ISO rating is defined as 6 samples cycle tested at rated pressure for 1,000,000 cycles without failure. NFPA rating is defined as 6 samples cycle tested at 1.23 x rated pressure for 1,000,000 cycles without failure. Consult HUSCO Sales department for further detail on pressure rating specifications.

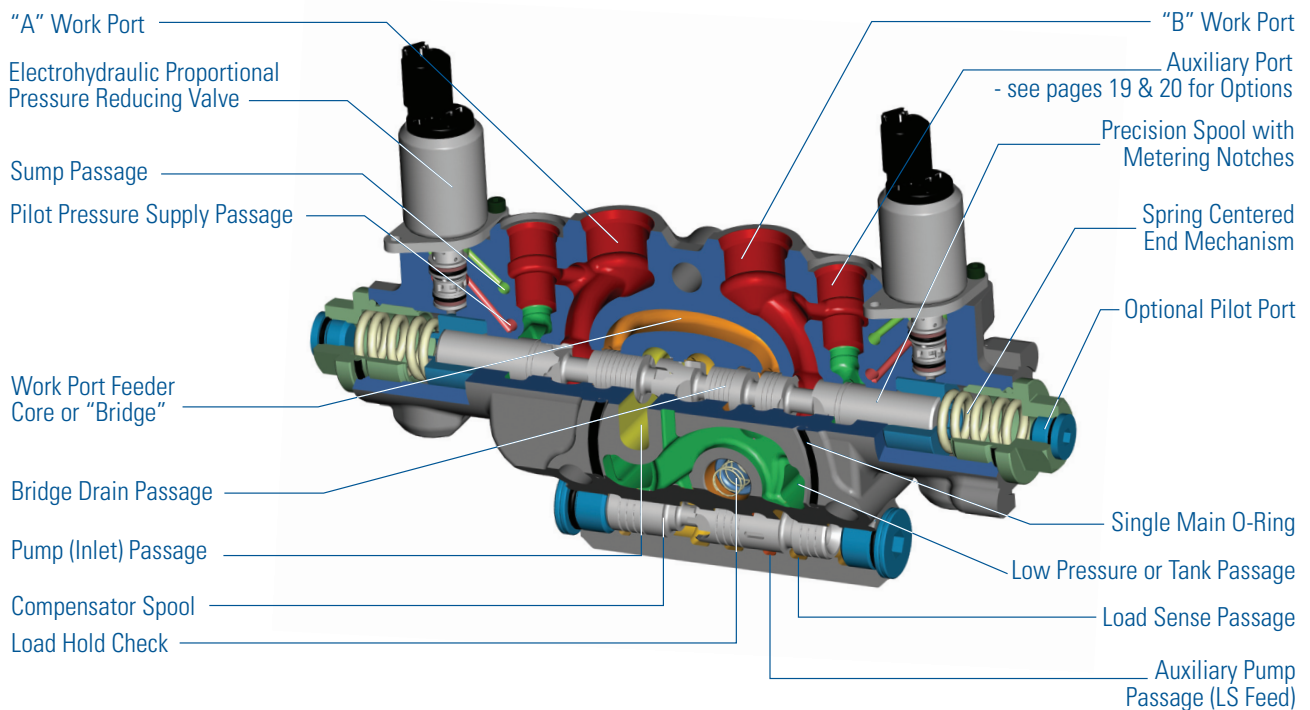
Consult HUSCO Sales department for other options

SCX-180 CUTAWAYS

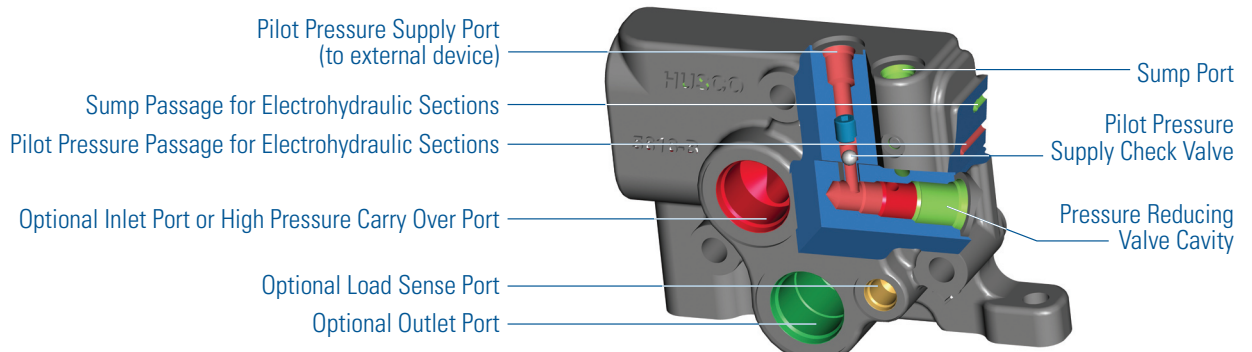
INLET SECTION CUTAWAY



ELECTROHYDRAULIC SPOOL SECTION CUTAWAY



OUTLET SECTION CUTAWAY



SCX-180 TECHNICAL DESCRIPTION

The SCX-180 is a closed-center, load-sensing, sectional control valve with post-pressure compensation that offers a wide range of control options and flexibility. The SCX-180 can be used with fixed displacement pumps or with pressure-compensated, load-sensing variable displacement pumps and can be configured with one to ten working sections.

The load sense (LS) pressure in an SCX-180 valve is generated by the compensator spool using the HUSCO patented IsoComp™ method to copy the LS signal using oil supplied by the pump instead of stealing oil from the function. Using pump oil to generate the LS signal prevents function droop at the start of metering when a function is selected.

When multiple functions are selected, the SCX-180 will automatically resolve the highest function load pressure, which is then transmitted to the pump or inlet unloader (bypass compensator). This design eliminates the need for shuttles between sections, simplifying the assembly of the valve and offers excellent flow sharing capability (the valve will maintain the ratio of flows to each function, even when flow demand exceeds flow supply).

Each SCX-180 valve comes with a load sense relief valve (LSRV) with an integrated pressure compensated drain function. The LS drain ensures that LS pressure drains to tank once all spools are returned to the neutral position.

Each section assembly has a built-in pilot pressure supply rail and a sump rail on each side of the valve for use with electrohydraulic (EH) proportional pressure reducing valves (PPRVs). It is recommended that the sump port be plumbed directly to tank to minimize any back pressure that may affect electrohydraulic solenoid valves (a maximum sump pressure of 7 bar (100 psi) is recommended).

Work port pressure limiting is accomplished by using the optional auxiliary relief valves. Each working section comes standard with auxiliary relief valve cavities machined for both work ports.

See appendix page 1 for a comparison of closed center to open center valve systems.

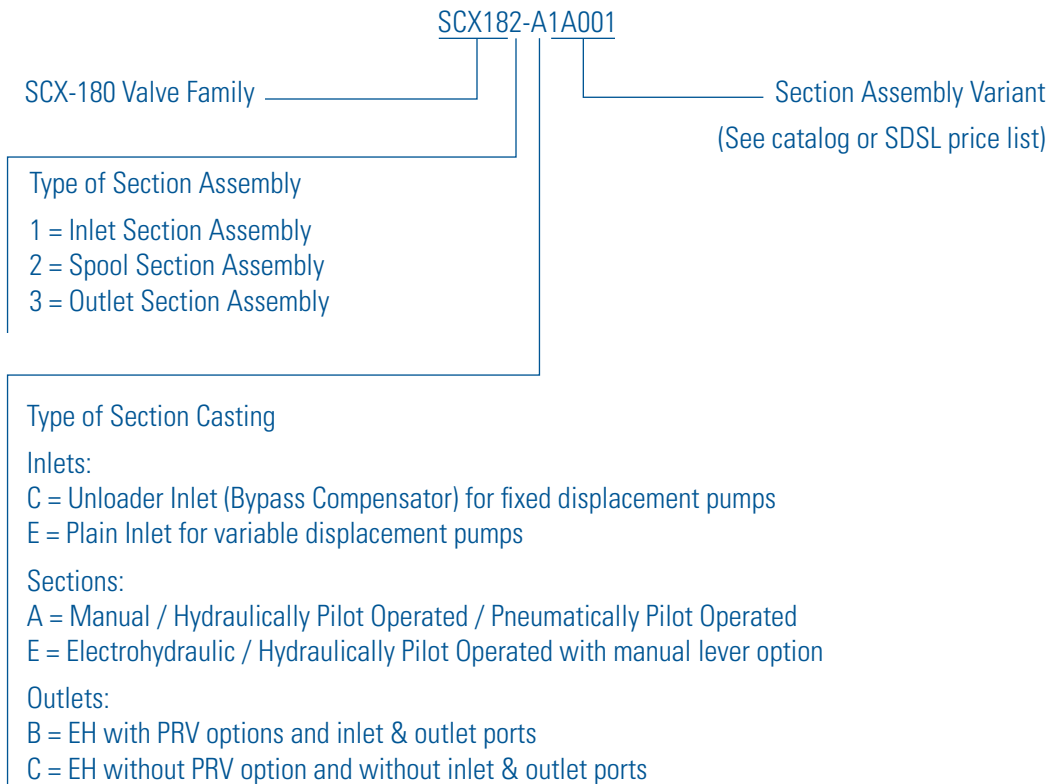
See appendix page 2 for a comparison of post-compensated to pre-compensated valve systems.

SCX-180 PRODUCT BENEFITS & FEATURES

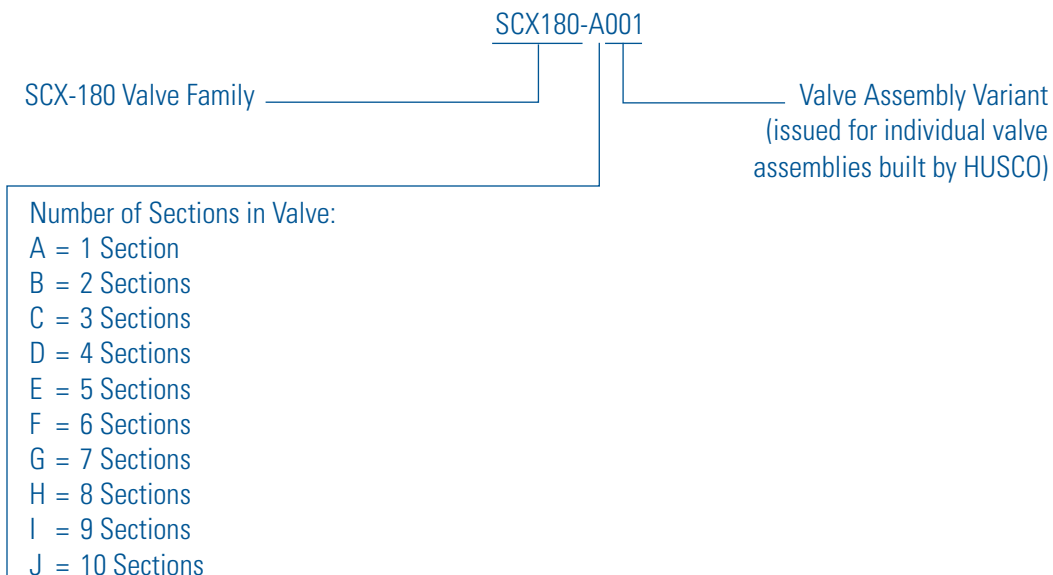
- Excellent multi-function flow sharing with post-pressure compensation
- High flow, low pressure drop capability
- Compact size
- Dedicated electrohydraulic (EH) section
 - Sections can be ordered “electrically prepared,” allowing conversion from pilot operated to EH operated in the field
- Lever option for EH and pilot operated sections
- Universal spools can be used in manual, pilot operated or EH sections
- Single low pressure main o-ring between sections for high pressure passages
 - Offers better intersectional leakage control compared to high pressure seals
- Adjustable flow control option
- Stroke limiter option
 - Allows for reduced flow from a given spool
- Manual override adjustment screw option
 - Allows a spool to be shifted in a dead-engine situation

SCX-180 MODEL CODE

The SCX-180 valve line uses the following model code system for section assemblies:



The SCX-180 valve line uses the following model code system for complete valve assemblies:





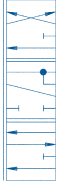
STANDARD SCX-180 SPOOLS

(INTERCHANGEABLE BETWEEN MANUAL, PILOT OPERATED AND ELECTROHYDRAULICALLY OPERATED SECTION ASSEMBLIES)

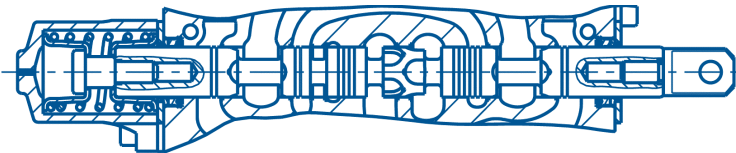
The SCX-180 3-position spool is interchangeable between manual, pilot operated and electrohydraulically operated section assemblies. Each spool has a threaded hole on both ends, allowing any spool to be a left-handed or right-handed spool.

STANDARD SCX-180 3-POSITION SPOOLS

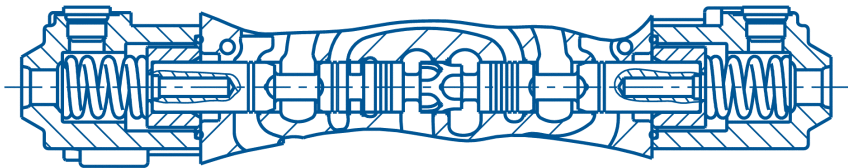
Flow rates are based on a 15 bar (215 psi) pump to LS differential pressure.
Each spool is designed for the same flow rates for both work ports.

Spool Flow Rate	Cylinder Spool Part Number		Restricted Motor Spool Part Number		Full Motor Spool Part Number	
19 lpm (5 gpm)	SCX18-S0001		SCX18-S0007		SCX18-S0013	
38 lpm (10 gpm)	SCX18-S0002		SCX18-S0008		SCX18-S0014	
76 lpm (20 gpm)	SCX18-S0003		SCX18-S0009		SCX18-S0015	
114 lpm (30 gpm)	SCX18-S0004		SCX18-S0010		SCX18-S0016	
151 lpm (40 gpm)	SCX18-S0005		SCX18-S0011		SCX18-S0017	
Full Flow	SCX18-S0006		SCX18-S0012		SCX18-S0018	

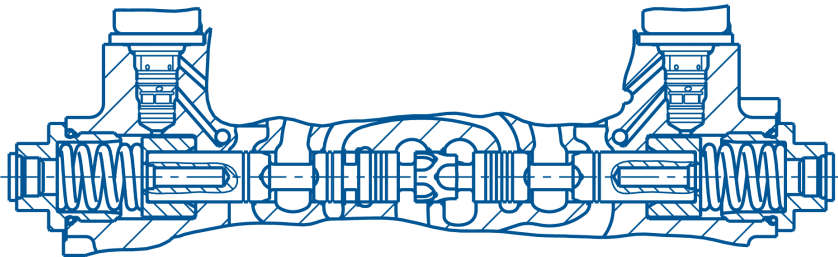
MANUALLY OPERATED



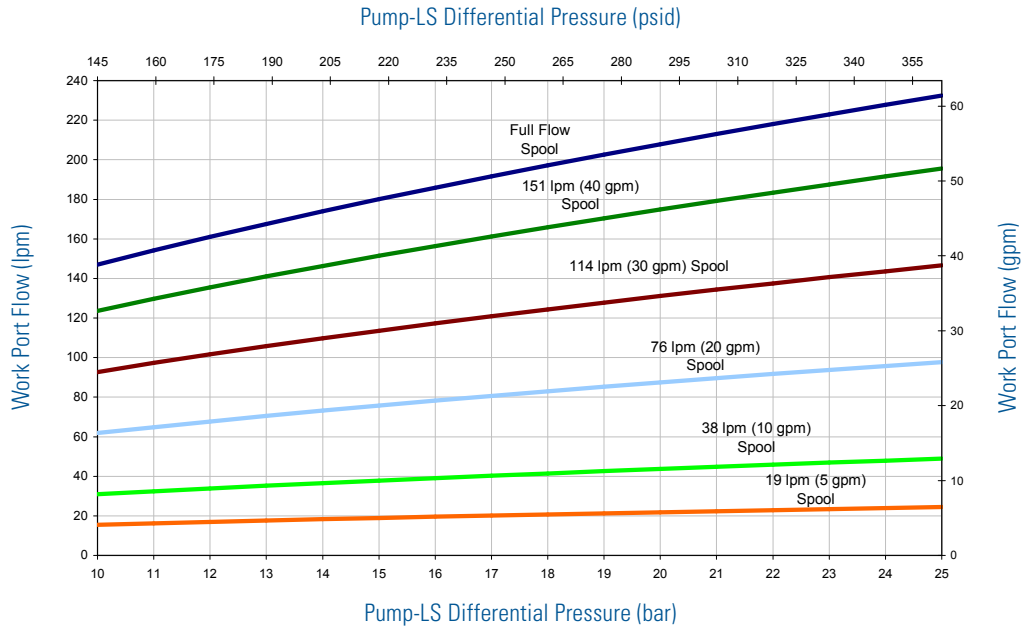
HYDRAULICALLY PILOT OPERATED



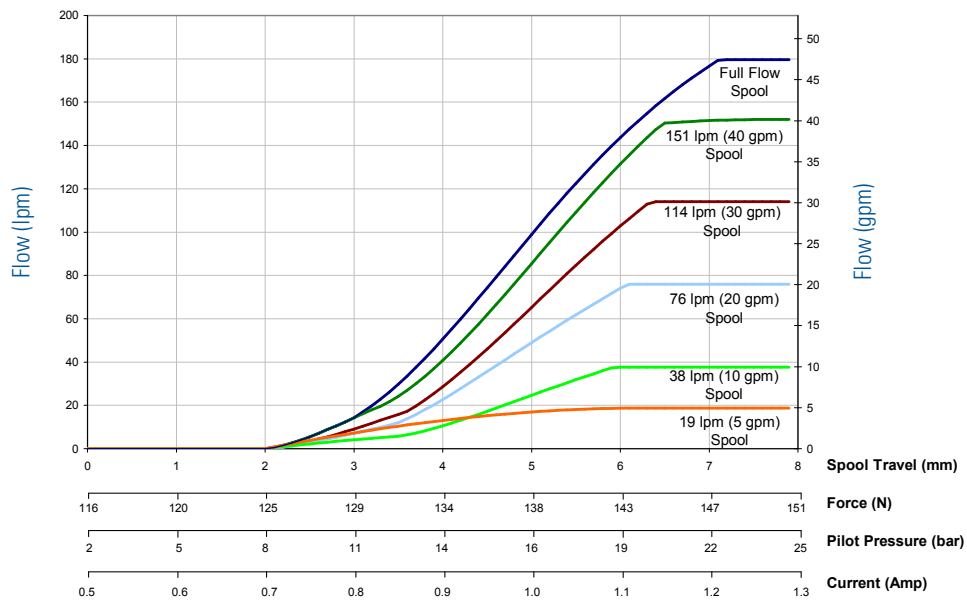
ELECTROHYDRAULICALLY OPERATED



SCX-180 STANDARD SPOOLS SPOOL FLOW VERSUS PUMP-LS DIFFERENTIAL PRESSURE



SCX-180 STANDARD SPOOLS WORK PORT FLOWS VERSUS TRAVEL

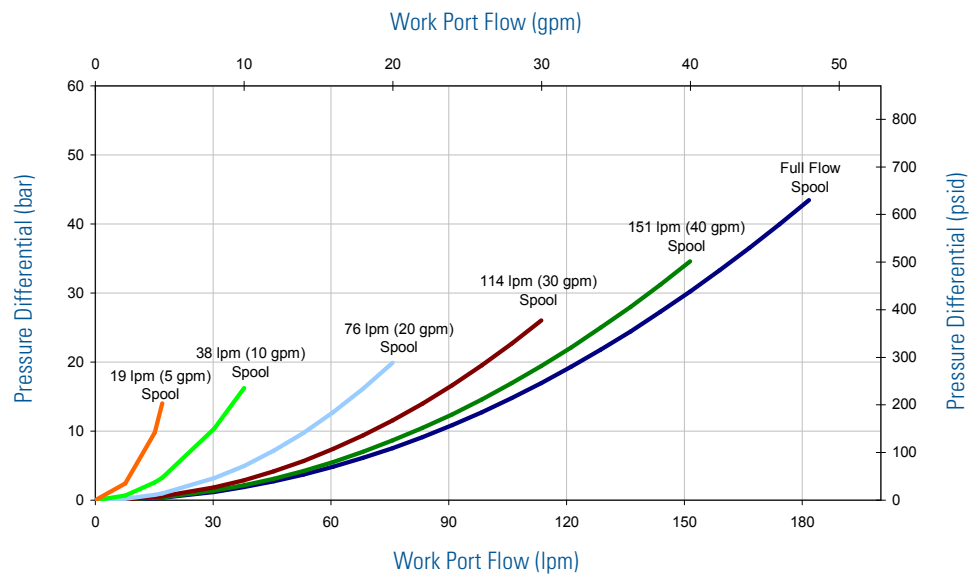


Notes:

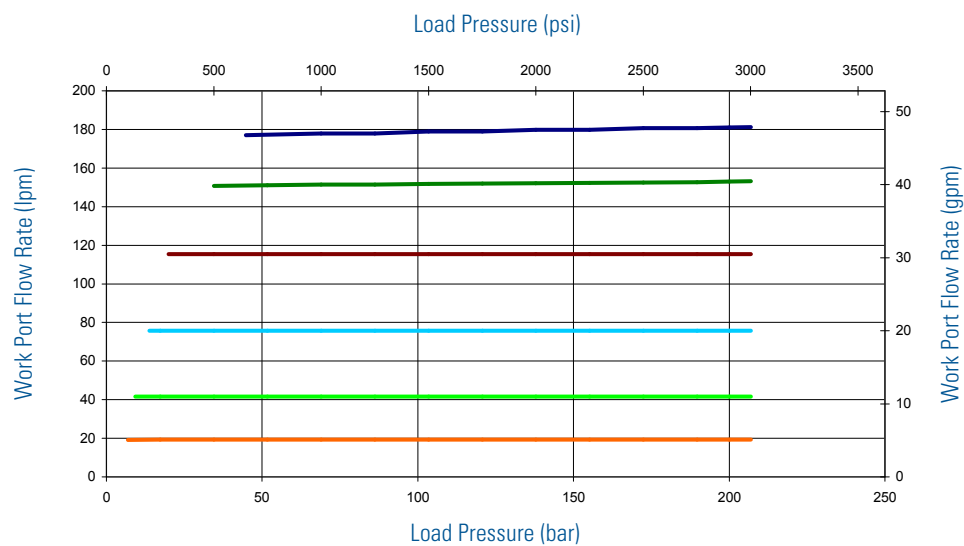
- Force values are based on standard 3-position manual spring end mechanism 61501
- Pilot pressure values are based on 61499 series of pilot operated end mechanisms
- Current values are based on the 12 VDC, 20 bar proportional pressure reducing valve

STANDARD SPOOL PRESSURE DROPS (INLET TO WORK PORT)
AND COMPENSATOR PERFORMANCE

SCX-180 STANDARD SPOOLS
INLET TO WORK PORT PRESSURE DROP

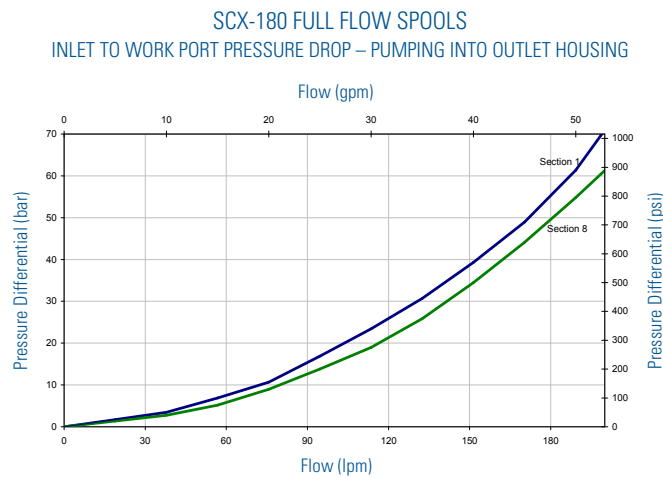
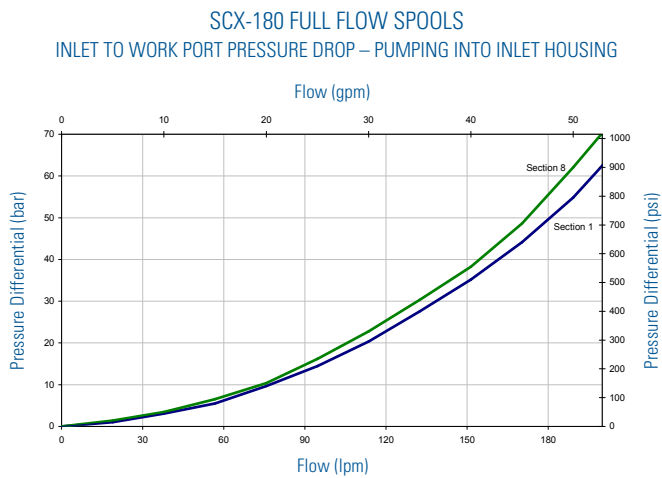


SCX-180 STANDARD SPOOLS
COMPENSATOR PERFORMANCE – WORK PORT FLOW VERSUS LOAD PRESSURE

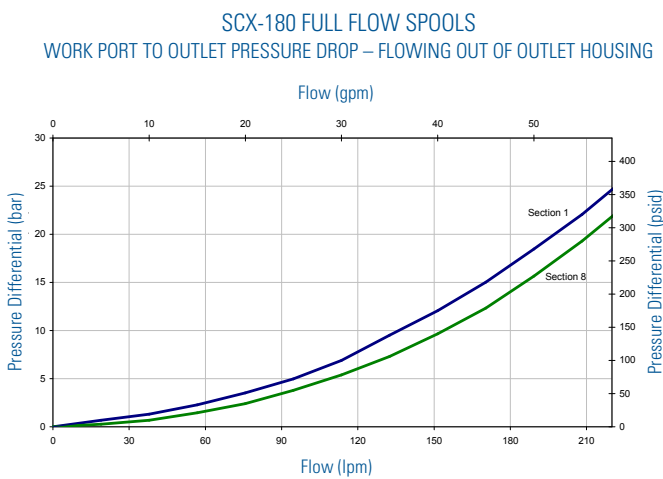
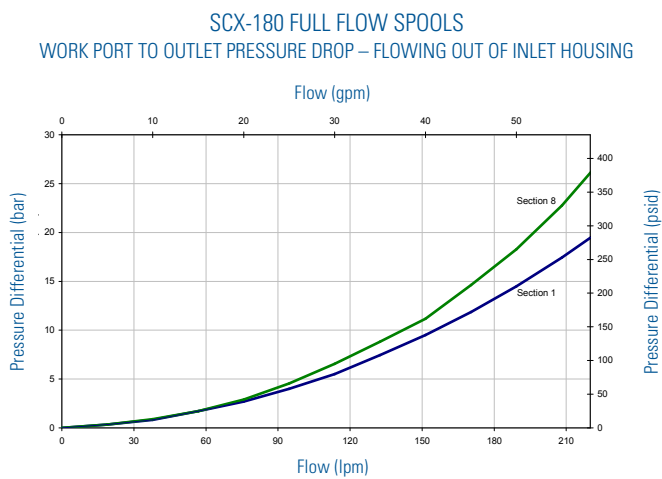


STANDARD SPOOL PRESSURE DROPS (WORK PORT TO OUTLET)

INLET TO WORK PORT PRESSURE DROPS



WORK PORT TO OUTLET PRESSURE DROPS

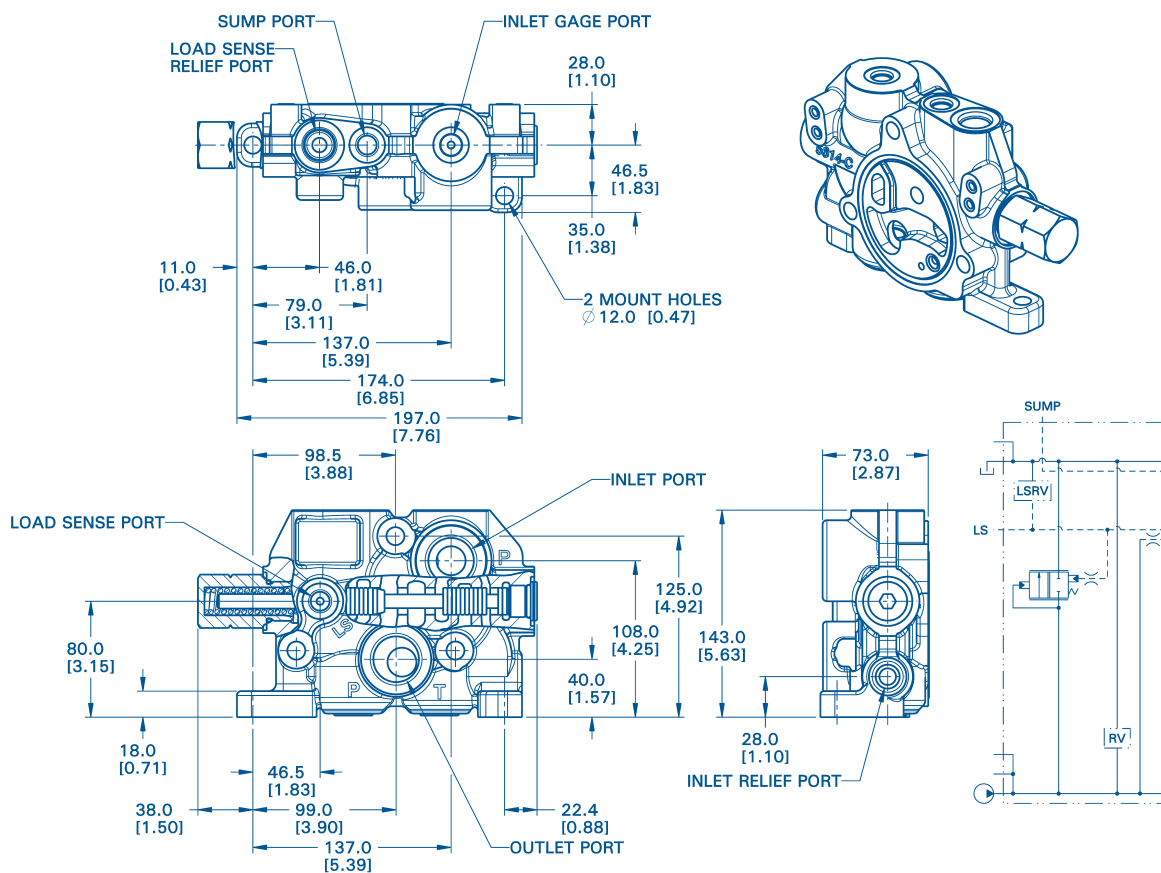
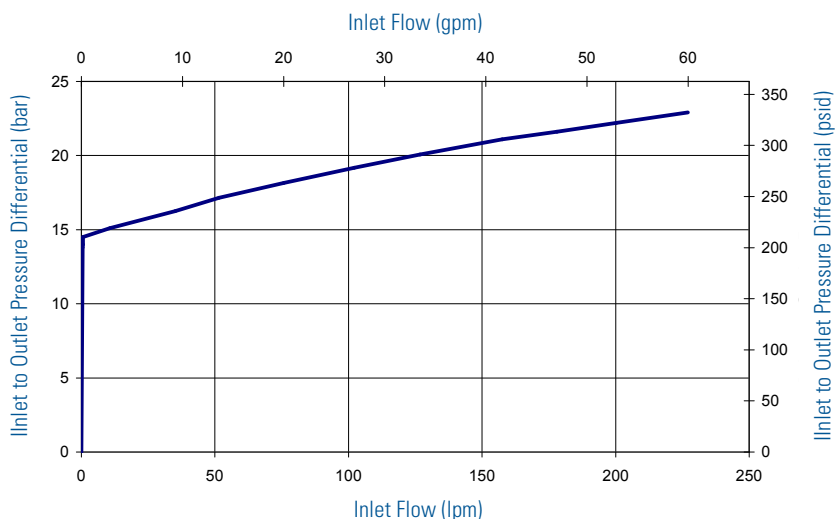


INLET SECTION ASSEMBLY OPTIONS

SCX181-C1 INLET SECTION ASSEMBLY (UNLOADER / BYPASS COMPENSATOR INLET)

- Designed for fixed displacement pumps
- Unloader has a 15 bar (215 psi) bias spring to create pump-to-LS differential pressure
- Inlet comes standard with a load sense relief valve cavity machined for the 56903 load sense relief valve
- Inlet comes standard with an inlet pressure relief valve cavity machined for the 60360 relief valve
- Inlet comes standard with 1-5/16-12 (SAE 16) inlet (P) and outlet (T) ports
- Additional standard ports:
 - 9/16-18 (SAE 6) Load Sense port
 - 9/16-18 (SAE 6) Sump port
 - 9/16-18 (SAE 6) Inlet pressure gauge port

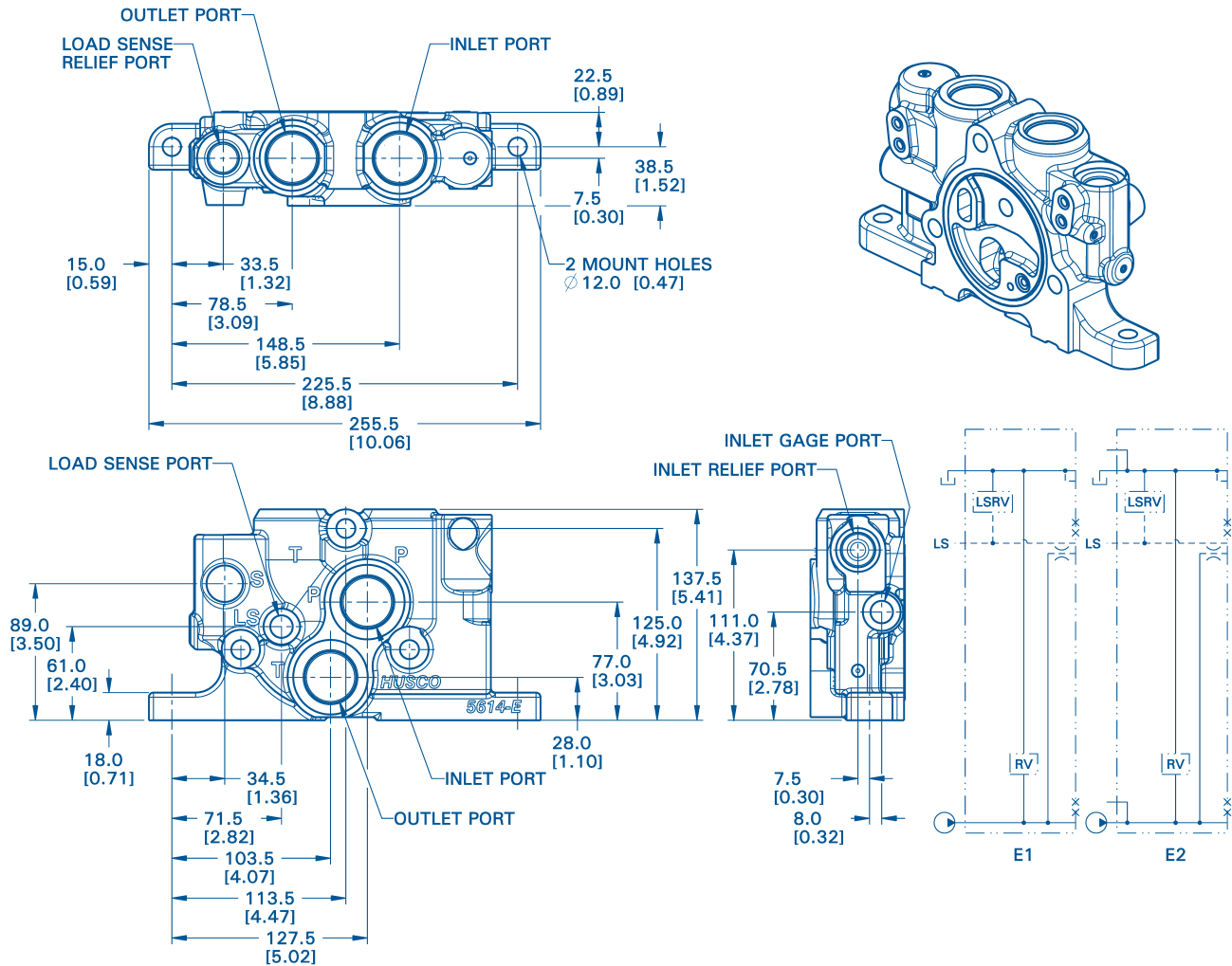
UNLOADER INLET (BYPASS COMPENSATOR) PERFORMANCE



INLET SECTION ASSEMBLY OPTIONS

SCX181-E1 & SCX181-E2 INLET SECTION ASSEMBLIES

- Designed for variable displacement, pressure-compensated load-sensing pumps
- Inlets come standard with a load sense relief valve cavity machined for the 56903 load sense relief valve
- Inlets come standard with an inlet pressure relief valve cavity machined for 5060-P and 51650-2 relief valves
- See table below for inlet & outlet port options
- Additional standard ports:
 - 9/16-18 (SAE 6) Load Sense port
 - 9/16-18 (SAE 6) Inlet pressure gauge port



INLET SECTION ASSEMBLY	TOP INLET PORT	TOP OUTLET PORT	END INLET PORT	END OUTLET PORT
SCX181-E1	1-5/16-12 (SAE 16)	1-5/16-12 (SAE 16)	1-5/16-12 (SAE 16)	1-5/16-12 (SAE 16)
SCX181-E2	1-5/16-12 (SAE 16)	1-5/16-12 (SAE 16)	NONE	NONE

SPOOL SECTION ASSEMBLY OPTIONS

All SCX-180 catalog spool section assemblies come with the following standard features:

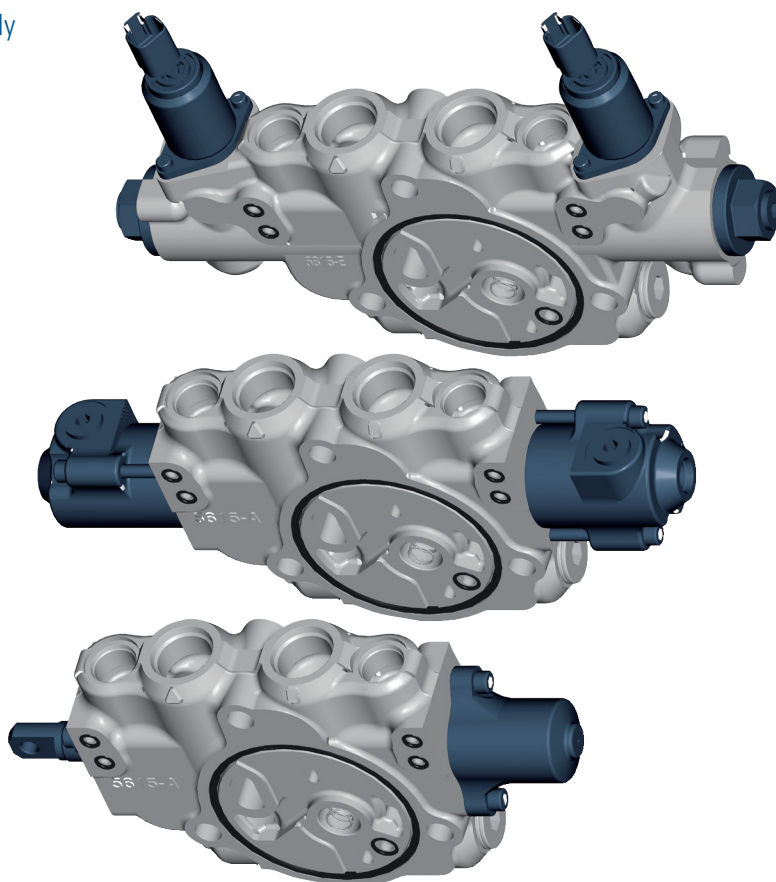
- 1-1/16-12 (SAE 12) Work Ports
- Work port circuit relief valve cavities machined for both “A” port and “B” port
- Independent load hold check
- Independent compensator spool

3-position spool section assemblies are available with the following control options:

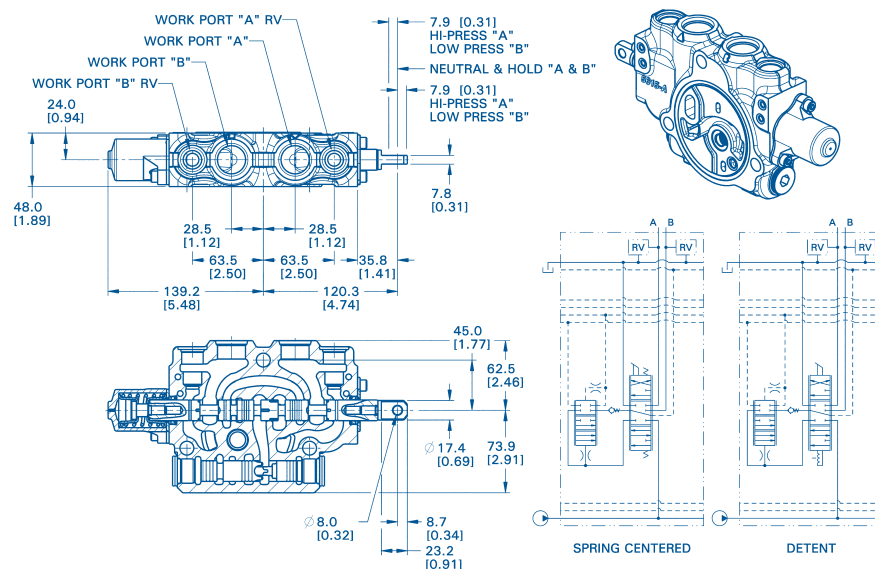
- Manual, spring-centered
- Manual, 3-position detent
- Hydraulically pilot operated
- Pneumatically pilot operated
- Proportional or on/off electrohydraulically operated
- Hydraulically pilot operated, electrically prepared

The following options are available for 3-position section assemblies:




- Auxiliary relief valve assemblies
- Spool stroke limiter assembly
- Spool manual override & stroke limiter assembly
- Adjustable flow control assembly
- Electrohydraulic shut-off plug assembly kit



3-POSITION, MANUAL, RIGHT-HANDED SECTION ASSEMBLIES



The following table contains standard part numbers for 3-position, manually actuated, right handed section assemblies:

Spool Type	Spool Flow Rate lpm (gpm)	Spring Centered Section Assembly with Standard Compensator	Detent Section Assembly with Standard Compensator
 Cylinder Spool	19 lpm (5 gpm)	SCX182-A1A001	SCX182-A1B001
	38 lpm (10 gpm)	SCX182-A1A002	SCX182-A1B002
	76 lpm (20 gpm)	SCX182-A1A003	SCX182-A1B003
	114 lpm (30 gpm)	SCX182-A1A004	SCX182-A1B004
	151 lpm (40 gpm)	SCX182-A1A005	SCX182-A1B005
	Full Flow	SCX182-A1A006	SCX182-A1B006
 Restricted Motor	19 lpm (5 gpm)	SCX182-A1A007	SCX182-A1B007
	38 lpm (10 gpm)	SCX182-A1A008	SCX182-A1B008
	76 lpm (20 gpm)	SCX182-A1A009	SCX182-A1B009
	114 lpm (30 gpm)	SCX182-A1A010	SCX182-A1B010
	151 lpm (40 gpm)	SCX182-A1A011	SCX182-A1B011
	Full Flow	SCX182-A1A012	SCX182-A1B012
 Full Motor	19 lpm (5 gpm)	SCX182-A1A013	SCX182-A1B013
	38 lpm (10 gpm)	SCX182-A1A014	SCX182-A1B014
	76 lpm (20 gpm)	SCX182-A1A015	SCX182-A1B015
	114 lpm (30 gpm)	SCX182-A1A016	SCX182-A1B016
	151 lpm (40 gpm)	SCX182-A1A017	SCX182-A1B017
	Full Flow	SCX182-A1A018	SCX182-A1B018



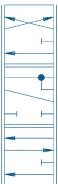
Consult HUSCO Sales department for non-standard flow spool options.

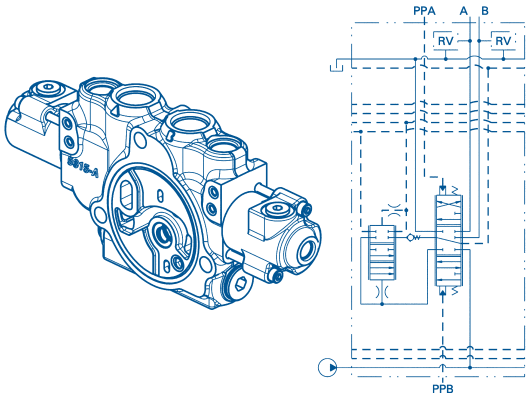
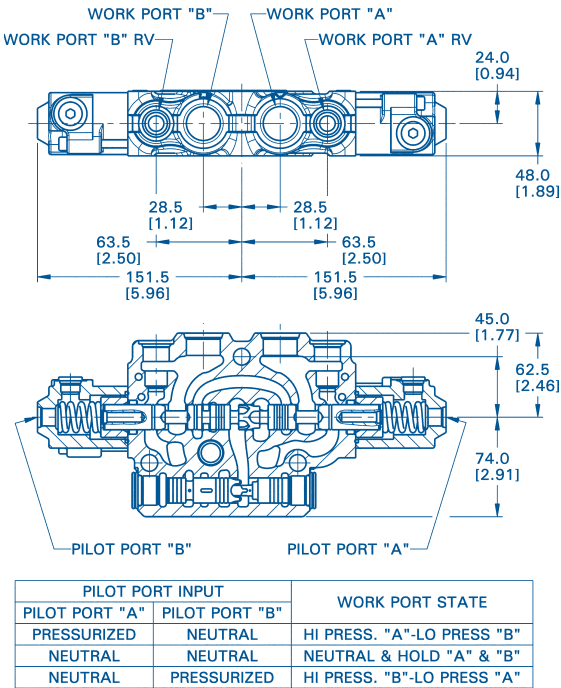
3-POSITION, HYDRAULICALLY OPERATED SECTION ASSEMBLIES

Section assemblies use 25 bar (360 psi) centering springs, for use with the standard HUSCO pilot pressure controller.

Section assemblies come with 9/16-18 (SAE 6) o-ring port plug assembly installed in top pilot port.

See page 23 for spool stroke limiter and manual override options.

Spool Type	Spool Flow Rate lpm (gpm)	Spring Centered Section Assembly with Standard Compensator
	19 lpm (5 gpm)	SCX182-A1C001
	38 lpm (10 gpm)	SCX182-A1C002
	76 lpm (20 gpm)	SCX182-A1C003
	114 lpm (30 gpm)	SCX182-A1C004
	151 lpm (40 gpm)	SCX182-A1C005
	Full Flow	SCX182-A1C006
	19 lpm (5 gpm)	SCX182-A1C007
	38 lpm (10 gpm)	SCX182-A1C008
	76 lpm (20 gpm)	SCX182-A1C009
	114 lpm (30 gpm)	SCX182-A1C010
	151 lpm (40 gpm)	SCX182-A1C011
	Full Flow	SCX182-A1C012
	19 lpm (5 gpm)	SCX182-A1C013
	38 lpm (10 gpm)	SCX182-A1C014
	76 lpm (20 gpm)	SCX182-A1C015
	114 lpm (30 gpm)	SCX182-A1C016
	151 lpm (40 gpm)	SCX182-A1C017
	Full Flow	SCX182-A1C018



Consult HUSCO Sales department for non-standard flow spool options.

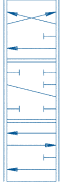

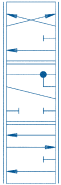
3-POSITION, ELECTROHYDRAULICALLY OPERATED SECTION ASSEMBLIES

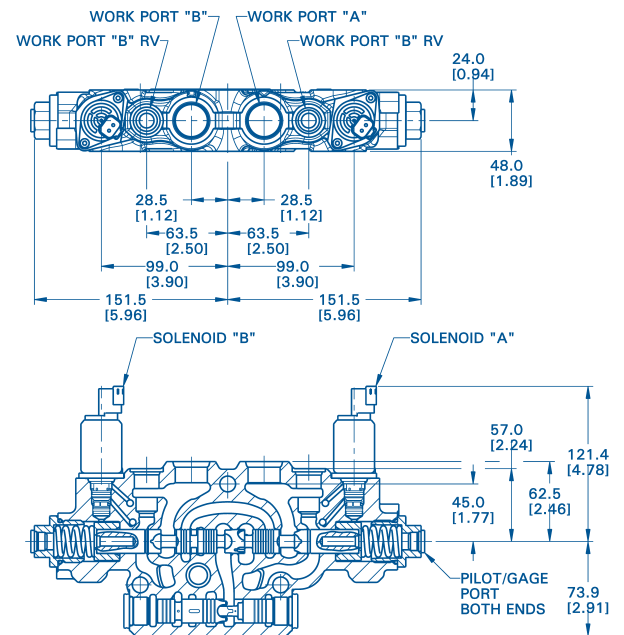
Electrohydraulic section assemblies use HUSCO manufactured proportional pressure reducing valves (PPRV). The standard section assemblies come with the PPRV-20-12-D-H installed, which has integrated Deutsch DT04-2P female connectors, 12 VDC coils and 20 bar control pressure.

PPRVs are also available with 24 VDC coils and Amp Junior Power Timer (male) connectors.

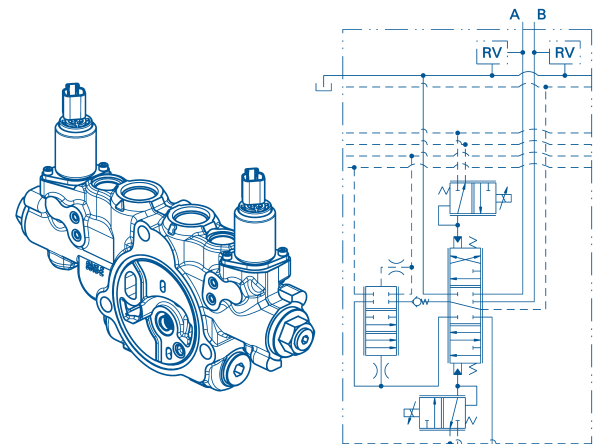
Section assemblies come with 9/16-18 (SAE 6) o-ring port plug assemblies installed in end pilot ports.

See page 23 for spool stroke limiter and manual override options.

Spool Type	Spool Flow Rate lpm (gpm)	Spring Centered Section Assembly with Standard Compensator
	19 lpm (5 gpm)	SCX182-E1A001
	38 lpm (10 gpm)	SCX182-E1A002
	76 lpm (20 gpm)	SCX182-E1A003
	114 lpm (30 gpm)	SCX182-E1A004
	151 lpm (40 gpm)	SCX182-E1A005
	Full Flow	SCX182-E1A006
	19 lpm (5 gpm)	SCX182-E1A007
	38 lpm (10 gpm)	SCX182-E1A008
	76 lpm (20 gpm)	SCX182-E1A009
	114 lpm (30 gpm)	SCX182-E1A010
	151 lpm (40 gpm)	SCX182-E1A011
	Full Flow	SCX182-E1A012
	19 lpm (5 gpm)	SCX182-E1A013
	38 lpm (10 gpm)	SCX182-E1A014
	76 lpm (20 gpm)	SCX182-E1A015
	114 lpm (30 gpm)	SCX182-E1A016
	151 lpm (40 gpm)	SCX182-E1A017
	Full Flow	SCX182-E1A018



PROPORTIONAL COIL		WORK PORT STATE
SOLENOID "A"	SOLENOID "B"	
ENERGIZED	OFF	HI PRESS. "A" - LO PRESS. "B"
OFF	OFF	NEUTRAL & HOLD "A" & "B"
OFF	ENERGIZED	HI PRESS. "B" - LO PRESS. "A"

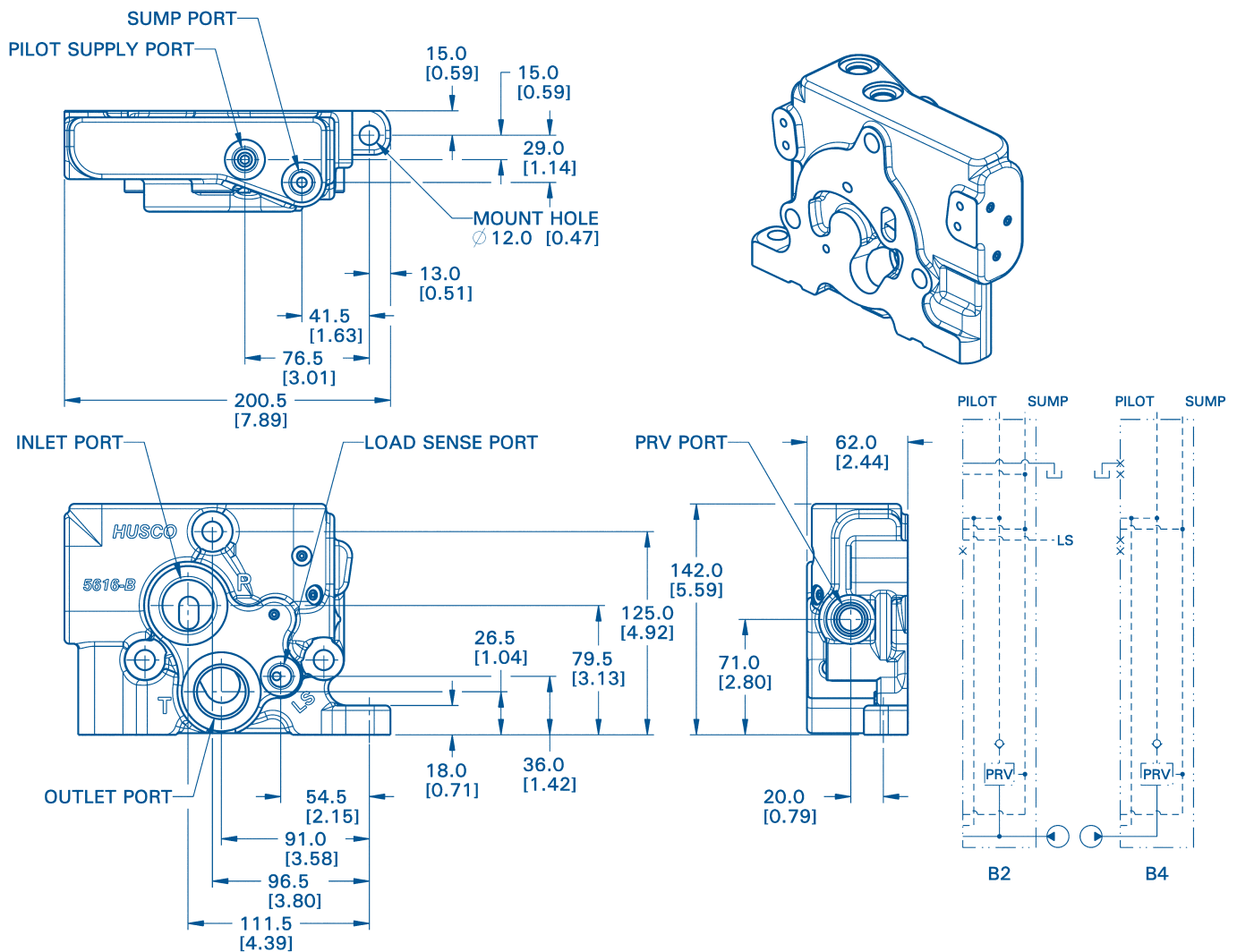


Consult HUSCO Sales department for non-standard flow spool options or other electrohydraulic PPRV options.

OUTLET SECTION ASSEMBLY OPTIONS

SCX183-B2 & SCX183-B4 OUTLET SECTION ASSEMBLY

- Outlets come standard with machining cavity for pressure reducing valve for the purpose of generating a low pressure pilot supply
- 1-5/16-12 (SAE 16) size inlet (P) end port, 1-5/16-12 (SAE 16) outlet (T) end port and 9/16-18 (SAE 6) load sense (LS) end port are optional
- Additional standard ports:
 - 9/16-18 (SAE 6) top sump port
 - 9/16-18 (SAE 6) top pilot pressure supply port



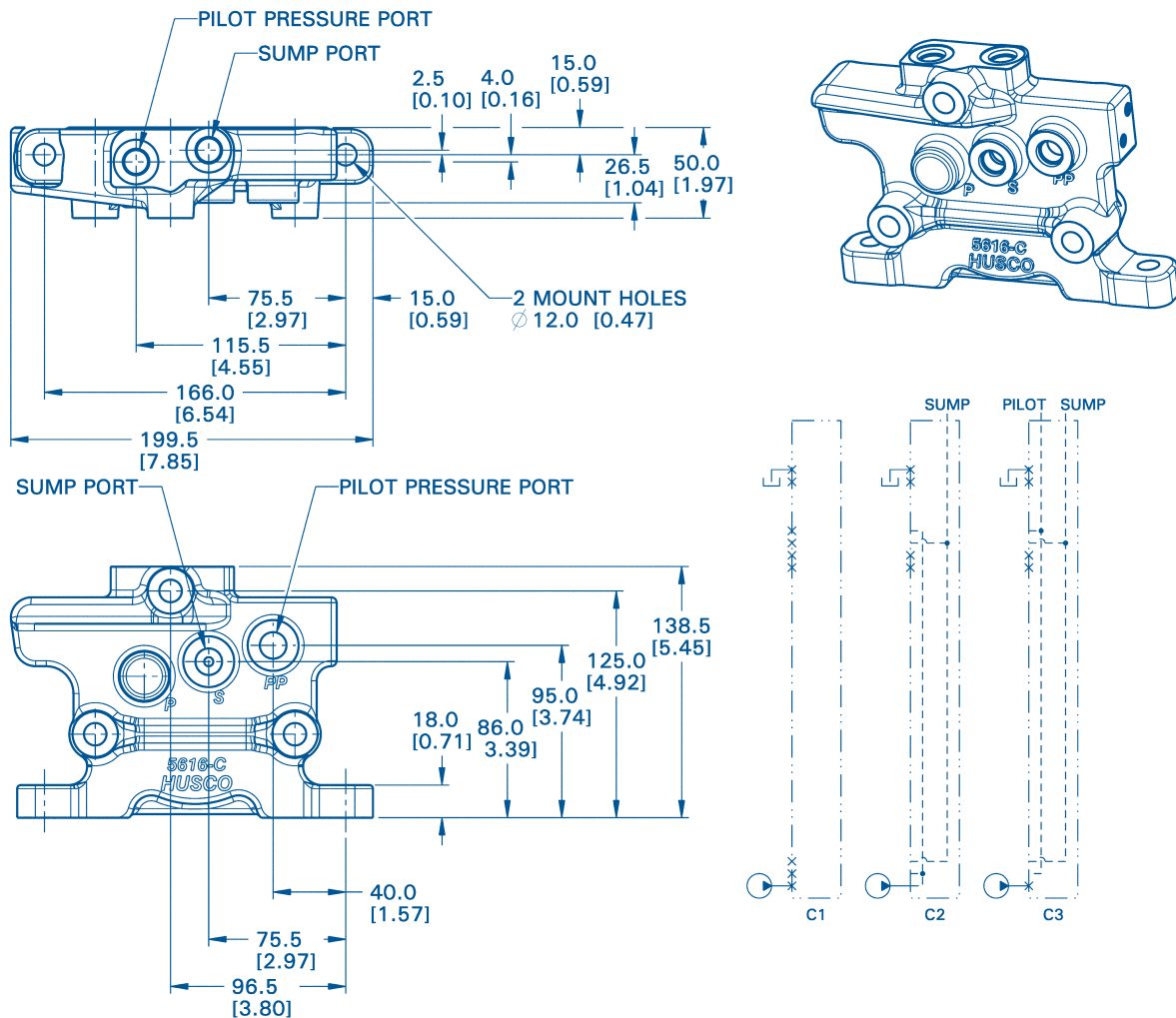
INLET SECTION ASSEMBLY	END INLET PORT	END OUTLET PORT	END LOAD SENSE PORT
SCX183-B2	1-5/16-12 (SAE 16)	1-5/16-12 (SAE 16)	9/16-18 (SAE 6)
SCX183-B4	NONE	NONE	NONE

Consult HUSCO Sales department for other outlet options.

OUTLET SECTION ASSEMBLY OPTIONS

SCX183-C1, SCX183-C2 & SCX183-C3 OUTLET SECTION ASSEMBLIES

- No inlet (P) or outlet (T) port options
- Outlets are available with the following options:
 - No EH machining (end cover only)
 - EH machining for pump pressure to feed EH pilot supply rails from internal pump rail
 - EH machining for external pilot pressure supply to be fed into SCX-180 valve to feed EH supply rails
- See table below for port options



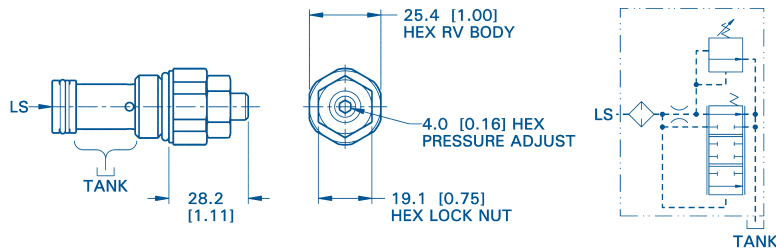
OUTLET SECTION ASSEMBLY	TOP SUMP (T) PORT	TOP PILOT SUPPLY (PP) PORT	END SUMP (T) PORT	END PILOT SUPPLY (PP) PORT	REQUIRES EXTERNAL SUPPLY OF PILOT PRESSURE	INTERNAL PUMP PRESSURE USED TO SUPPLY EH SOLENOIDS
SCX183-C1	NONE	NONE	NONE	NONE	N/A	N/A
SCX183-C2	9/16-18 (SAE 6)	NONE	NONE	NONE	NO	YES
SCX183-C3	9/16-18 (SAE 6)	9/16-18 (SAE 6)	NONE	NONE	YES	NO

Consult HUSCO Sales department for other outlet options.

LOAD SENSE RELIEF VALVE AND DRAIN REGULATOR ASSEMBLY

The 56903 is the standard load sense relief valve for the SCX-180 valve line. Installed into the inlet housing, it limits the maximum LS pressure, which therefore limits the maximum inlet (P) pressure. The 56903 also has an integrated pressure compensated LS drain, which drains off LS pressure when none of the spools are selected. The relief valve is protected against contamination by use of an integrated 100µ filter. The 56903 relief valve has a setting range of 62 - 300 bar (900 - 4,350 psi).

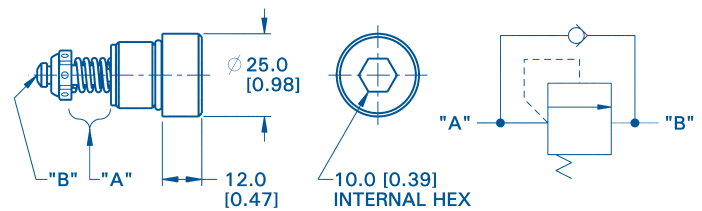
The standard catalog setting for the 56903 is 214 bar (3,100 psi) and can be readjusted to suit the requirements needed for each application.



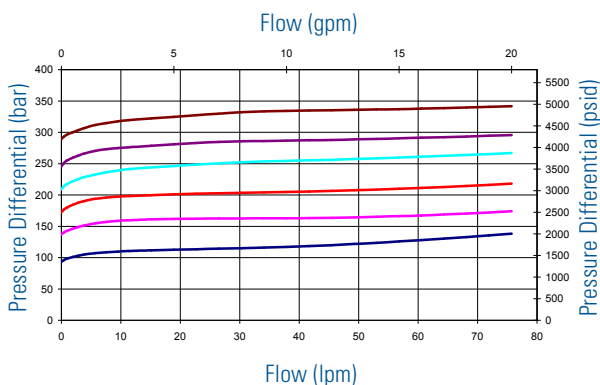
WORK PORT RELIEF VALVE ASSEMBLY

The 60360 Relief Valve Assembly is a direct acting relief valve with integrated anti-void (anti-cavitation) function and is the standard work port relief valve option (shock valve). The 60360 can also be used in some inlet housings to prevent fast inlet (P) pressure spikes from damaging the main control valve or the rest of the hydraulic system. Relief valves are set to 10 lpm (2.6 gpm) and have a recommended maximum flow rate of 75 lpm (19.8 gpm). The relief valve setting is stamped on the RV plug (for example: "200" = a setting of 200 bar (2,900 psi)).

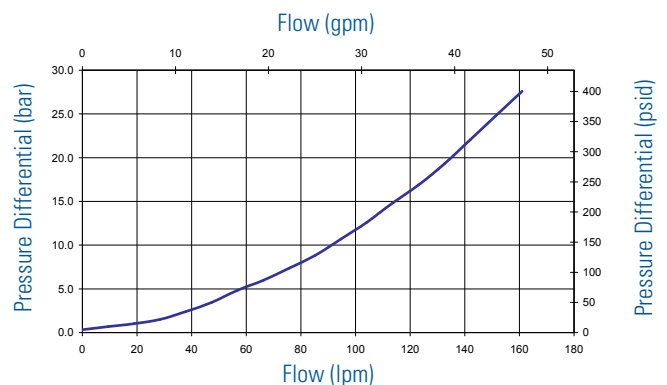
Part Number	Setting (bar)	Setting (psi)
60360-120	120	1,740
60360-160	160	2,320
60360-200	200	2,900
60360-240	240	3,480
60360-280	280	4,060
60360-320	320	4,640



RELIEF VALVE PERFORMANCE



ANTI-VOID (ANTI-CAVITATION) PERFORMANCE

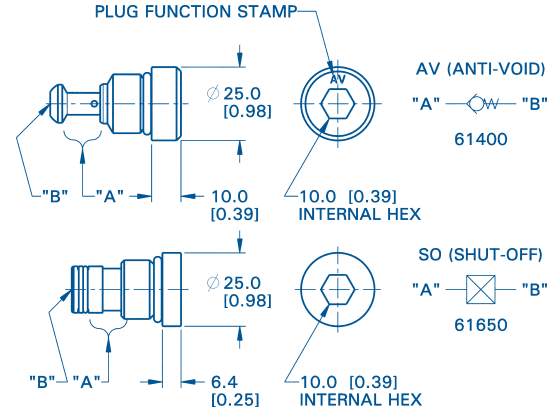


Consult HUSCO Sales department for non-standard RV settings.

WORK PORT ANTI-VOID (ANTI-CAVITATION) VALVE ASSEMBLY AND SHUT-OFF PLUG ASSEMBLY

The 61400 is the standard anti-void assembly, designed to prevent cavitation in the valve work port. The 61400 has "AV" stamped on the plug.

The 61650 is the standard shut-off plug assembly, designed to block off the work port RV cavity when no RV is required and the inlet (P) pressure RV cavity when no inlet RV is required.



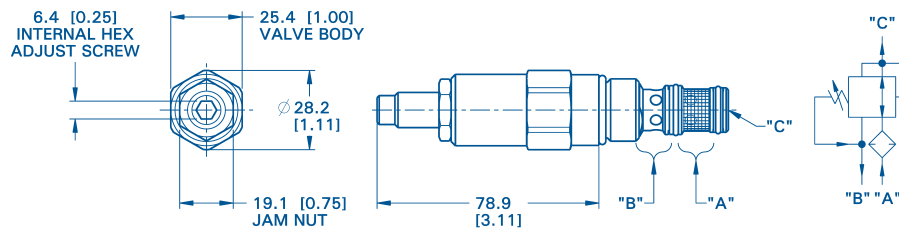
TIE ROD KITS

The 61522 series of Tie Rod Kits include the standard tie rod part numbers and nuts required to build SCX-180 valve assemblies. Tie rod kits for valve stacks of eight, nine or ten section assemblies come with compression washers (recommended for longer valve stacks).

Part Number	Valve Assembly Size	Part Number	Valve Assembly Size
61522-1	1 Section	61522-6	6 Sections
61522-2	2 Sections	61522-7	7 Sections
61522-3	3 Sections	61522-8	8 Sections
61522-4	4 Sections	61522-9	9 Sections
61522-5	5 Sections	61522-10	10 Sections

PRESSURE REDUCING VALVE ASSEMBLY FOR PILOT PRESSURE SUPPLY

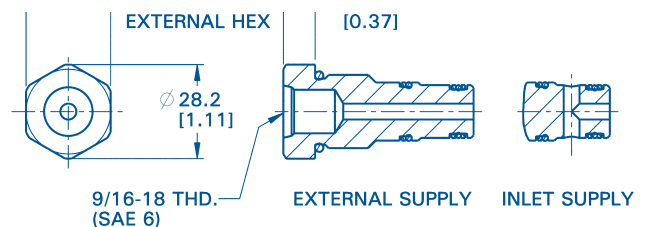
The 58108-7 Pressure Reducing Valve is a cartridge valve designed to reduce inlet (P) pressure down to 24 bar (350 psi) and, it is used in the SCX183-B2 Outlet Section Assembly for SCX-180 valve assemblies that require internal or external pilot pressure supply. The valve is protected against contamination by use of an integrated 100μ filter.



PRESSURE REDUCING VALVE SHUT-OFF PLUG ASSEMBLY

A series of shut-off plug assemblies are available to plug the cavity of the 58108-7 pressure reducing valve, in the SCX183-B2 Outlet Section Assembly, in case the pressure reducing valve is not required.

Part Number	Pilot Supply Source
400548	None
400554*	Inlet Supply
400555	External Supply



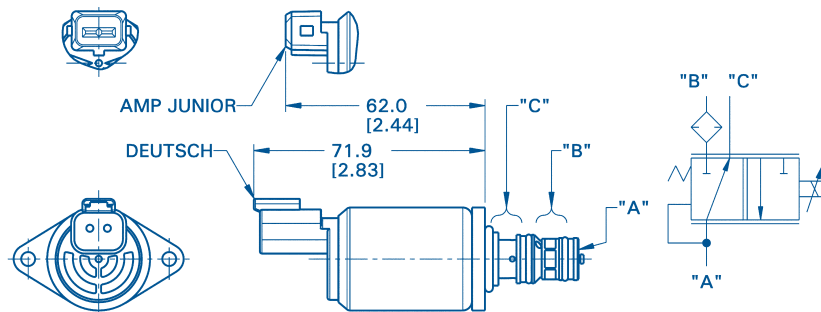
*Note: When using the 400554 Shut-Off Plug, inlet pressure must be limited to 250 bar (3,625 psi) maximum, to prevent exceeding the maximum supply pressure supplied to the PPRVs.

ELECTROHYDRAULIC PROPORTIONAL PRESSURE REDUCING VALVES

HUSCO manufactured Proportional Pressure Reducing Valves (PPRV) are IP69 rated and come with an integrated 100µ filter on the pilot pressure supply ("B") gallery going into the PPRV. HUSCO PPRVs work with a maximum supply pressure of 250 bar (3,625 psi). The sump port on the valve should be connected to the system reservoir with a minimum amount of back pressure (a maximum back pressure of 7 bar (100 psi) is recommended).

The PPRV-20-12-D-H is the standard HUSCO PPRV solenoid valve and can be used for either proportional control or on-off ("bang-bang") control.

The PPRV-20-12-D-H requires a 12 VDC control signal, comes with an integrated Deutsch DT04-2P female connector, has a 20 bar (290 psi) maximum control pressure and typically requires a 100 Hz PWM command current of 0.5 – 1.5 amp.



The PPRV-20-12-A-H requires a 12 VDC control signal, comes with an integrated Amp Junior Power Timer male connector, has a 20 bar (290 psi) maximum control pressure and typically requires a 100 Hz PWM command current of 0.5 – 1.5 amp.

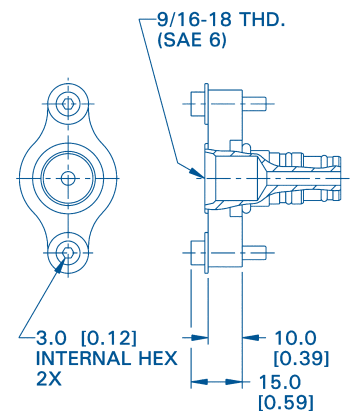
See HUSCO PPRV literature for more technical details.

Consult HUSCO Sales department for non-standard electrical connectors or coil voltage requirements.

ELECTROHYDRAULIC CONVERSION ASSEMBLY KIT

The 61482-1 Conversion Kit will plug the EH solenoid cavity on EH sections and provides a 9/16-18 (SAE 6) o-ring port for connecting pilot pressure to the spool spring chamber in order to shift the spool as a hydraulically pilot operated section.

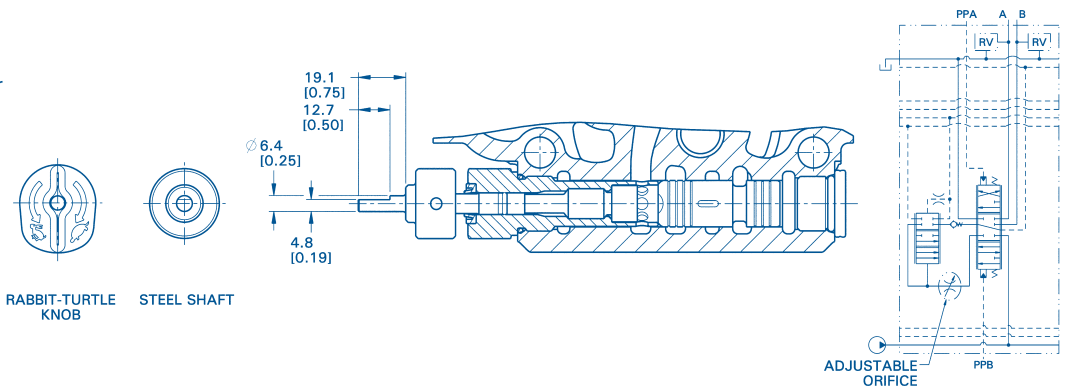
The kit allows a section assembly to be "electrically prepared" (machined for PPRV solenoid valves but built to be hydraulically pilot operated). When a customer wants to update from pilot operated control to EH control, the section can be easily upgraded to EH in the field without the need for a costly valve removal.



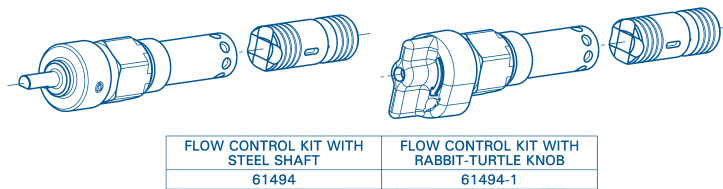
ADJUSTABLE FLOW CONTROL KIT

The SCX-180 adjustable flow control works by providing an adjustable orifice that can regulate the flow of a full flow spool from approximately 60 lpm (15 gpm) to 150 lpm (40 gpm). Due to the extra restriction that is added with the adjustable flow control assembly, the maximum flow rate of a given spool is reduced when the flow control is installed. The graph below shows the flow adjustment range with standard SCX-180 spools when using the adjustable flow control assembly. The flow control is most effective with full flow spools. When used with lower flow rate spools, the range of adjustment decreases.

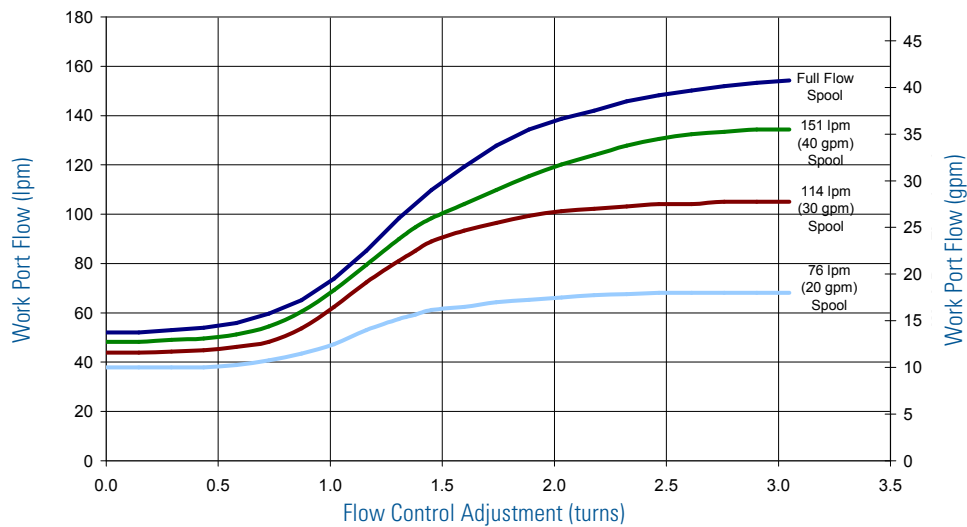
Assembled into the compensator bore in place of the standard compensator spool and plug assembly, the adjustable flow control assembly and compensator can be installed into an existing section assembly, making it ideal for vehicle upgrades or retro-fits in the field.



Flow Control Assemblies are available with a plastic “rabbit-turtle” knob, or with a steel shaft for connection to an adjustment shaft.

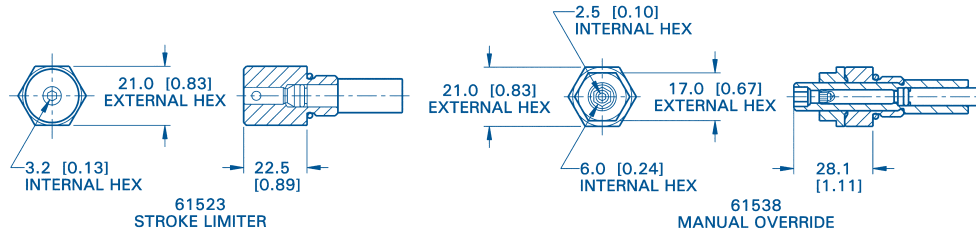


FLOW CONTROL ADJUSTMENT RANGE USING SCX-180 STANDARD SPOOLS



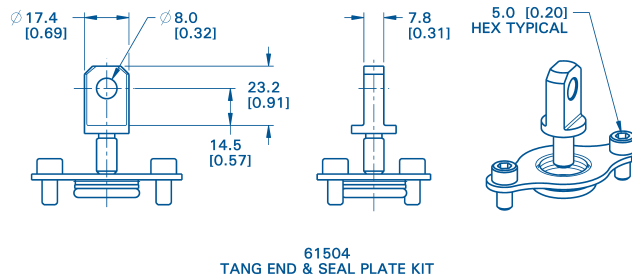
ADJUSTABLE STROKE LIMITER KIT AND MANUAL OVERRIDE KIT

The 61523 Adjustable Stroke Limiter provides a mechanical stop that can be adjusted to limit the travel of a spool. It can be used to limit the maximum flow of a given spool or as a fine tuning mechanism when trying to match the flow from sections or work ports exactly, and it is compatible with both hydraulically pilot operated electrohydraulically operated sections.



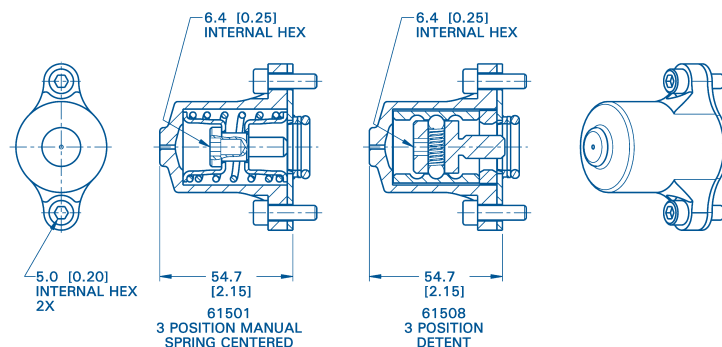
The 61538 Manual Override Kit provides a way to manually shift a spool far enough to lower a machine implement in case of a dead engine situation. It also provides the function of the adjustable stroke limiter and allows the manual override adjustment to be made independent of the stroke limiting adjustment.

TANG END & SEAL PLATE KITS FOR MANUAL SECTIONS



END MECHANISM KITS FOR 3-POSITION MANUAL SECTIONS

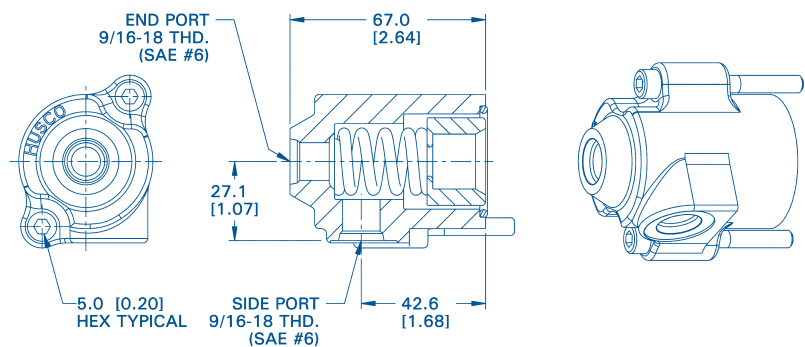
3-position, spring centered end mechanisms come with a standard 150 N (34 LBF) spring.



Consult HUSCO Sales department for non-standard centering spring forces.

END MECHANISM KITS FOR 3-POSITION HYDRAULICALLY PILOT OPERATED SECTIONS

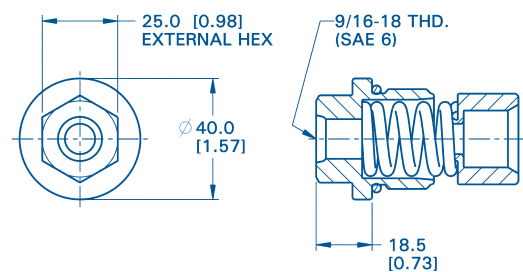
The SCX-180 end mechanisms for hydraulically pilot operated sections come standard with a 25 bar (360 psi) centering spring and 9/16-18 (SAE 6) o-ring ports for connecting to a hydraulic pilot joystick. Kits are available with three different porting options: end port only, side port only, or both end port and side port.



3-POSITION HYDRAULIC OPERATED END MECHANISM KITS		
END PORT ONLY	SIDE PORT ONLY	END AND SIDE PORT
61499	61499-1	61499-2

END MECHANISM KITS FOR 3-POSITION ELECTROHYDRAULICALLY OPERATED SECTIONS

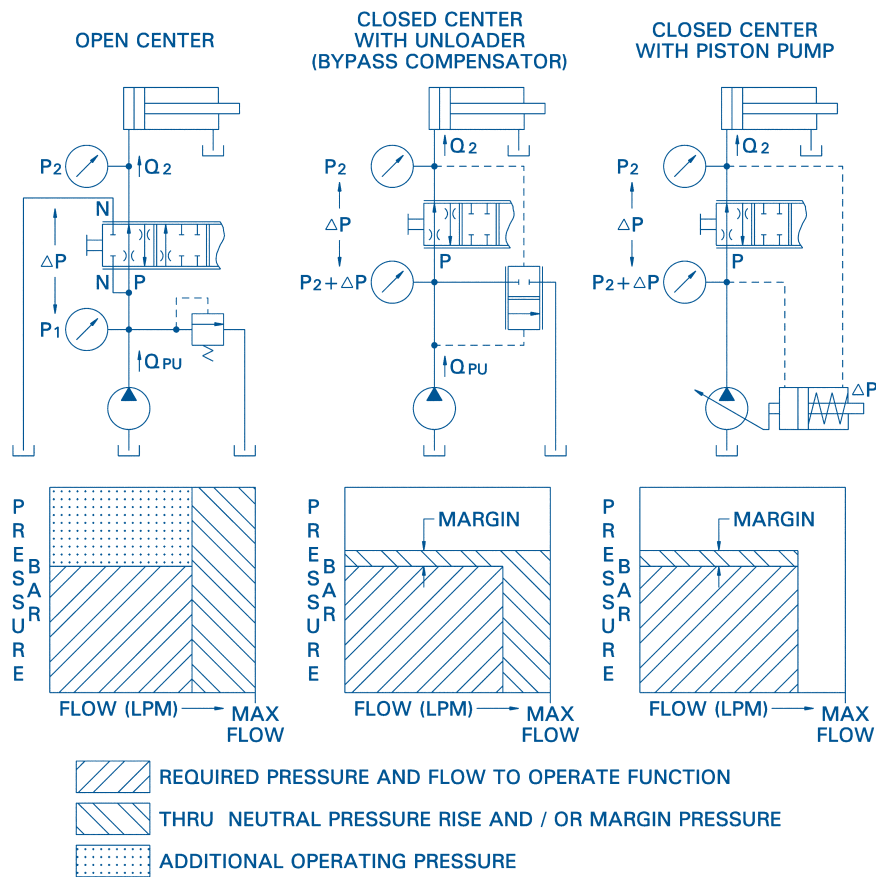
SCX-180 end mechanisms for electrohydraulically actuated sections come standard with a 20 bar (290 psi) centering spring, designed to work with the 20 bar HUSCO electrohydraulic PPRV. Kits are available with a 9/16-18 (SAE 6) o-ring port (for connecting to a hydraulic pilot joystick or using the stroke limiter assembly) or without a port.






3-POSITION ELECTROHYDRAULIC OPERATED END MECHANISM KITS	
WITHOUT PILOT PORT	WITH PILOT PORT
61500	61500-1

OPEN CENTER VERSUS CLOSED CENTER

The following hydraulic circuits & graphs represent efficiency gains going from an open center valve with fixed displacement pump to a closed center valve with inlet unloader (bypass compensator) with fixed displacement pump to a closed center valve with pressure-compensated load-sensing variable displacement pump.



The following table compares the system costs and efficiencies of an open center system, a closed center system with unloader (bypass compensator) and a closed center system with a pressure-compensated load-sensing variable displacement pump.

	System Cost	Efficiency
Open Center System <ul style="list-style-type: none">Fixed displacement pumpPressure differential across spool depends on flow	\$	
Unloader (Bypass Compensator) System <ul style="list-style-type: none">Fixed displacement pumpUnloader (bypass compensator) spool diverts excess flowConstant pressure differential maintained	\$\$	
Pressure Compensated Load Sense System (PCLS) <ul style="list-style-type: none">Variable displacement pumpLoad sensing valvePump flow varied to maintain constant pressure differential	\$\$\$	

POST-COMPENSATED VERSUS PRE-COMPENSATED

The following hydraulic circuits represent the basic design of post-pressure compensated and pre-pressure compensated closed center valve systems.

There are several differences in the two styles of valve design, which are determined by the basic valve geometry and design. The most noticeable difference however, is that post-compensated valves continue to offer excellent flow sharing when flow demand exceeds flow supply, while pre-compensated valves will only meet the flow demands of the lowest loaded functions (causing higher loaded functions to slow down or stop moving).

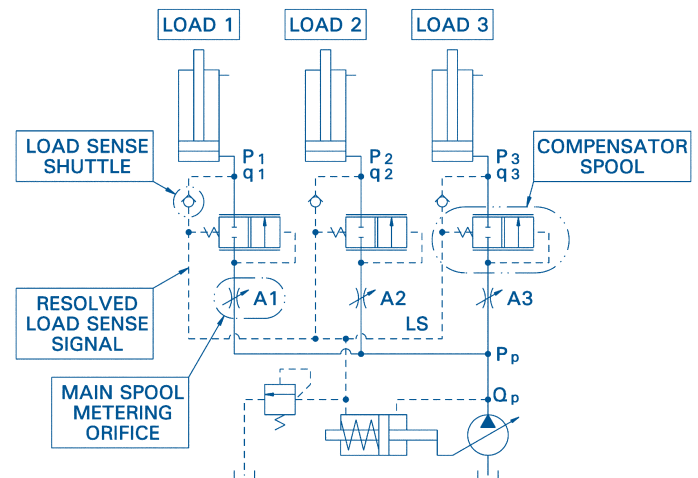
TRADITIONAL POST-PRESSURE COMPENSATED CIRCUIT

Key Features:

- Pressure differential acting on the compensator spool is picked downstream of the main spool metering orifice
- Load sense signal from each function is picked up before the load sense shuttle
- All compensator spools reference the same resolved load sense signal
 - Key feature for maintaining flow sharing
- Pump to load sense pressure differential is controlled by the pump or the inlet unloader (bypass compensator)

Resulting Characteristics:

- When flow demand exceeds flow supply, the compensators will split the pump flow to all functions proportional to the main spool metering orifice of each spool
 - Great flow sharing, even when exceeding flow supply.
- Maximum function pressure is limited using optional auxiliary relief valves
 - Load Sense pressure limiting on individual functions is not available



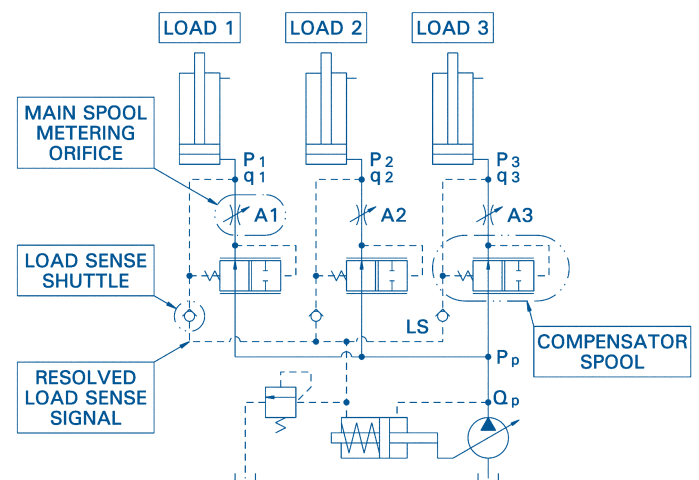
TRADITIONAL PRE-PRESSURE COMPENSATED CIRCUIT

Key Features:

- Pressure differential acting on the compensator spool is picked from either side of the main metering orifice
- Load sense signal from each function is picked up after the load sense shuttle
- Compensator spools reference a load sense signal picked up before the load sense shuttle
 - Allows load sense pressure limiting on individual functions
- Pump to load sense pressure differential is controlled by the compensator springs

Resulting Characteristics:

- When flow demand exceeds flow supply, the lowest loaded functions will take priority over the highest loaded function
 - Highest loaded functions may stop moving, depending on flow demand



ORDER SHEET

MODEL SCX-180 SECTIONAL VALVE ASSEMBLY SPECIFICATION SHEET

INLET

Inlet Section Assembly:	SCX181-
Load Sense Relief Valve Assembly:	56903/3100/2.5
Inlet Relief Valve or Shut-Off Plug:	

OUTLET

Outlet Section Assembly:	SCX183-
Pressure Reducing Valve or Shut-Off Plug Assembly:	

TIE ROD KIT

Tie Rod Kit:	61522-
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SPOOL SECTIONS

Spool Section 1: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 2: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 3: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 4: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 5: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 6: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 7: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 8: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 9: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 10: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =

ORDER SHEET

MODEL SCX-180 SECTIONAL VALVE ASSEMBLY SPECIFICATION SHEET

INLET

Inlet Section Assembly:	SCX181-
Load Sense Relief Valve Assembly:	56903/3100/2.5
Inlet Relief Valve or Shut-Off Plug:	

OUTLET

Outlet Section Assembly:	SCX183-
Pressure Reducing Valve or Shut-Off Plug Assembly:	

TIE ROD KIT

Tie Rod Kit:	61522-
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SPOOL SECTIONS

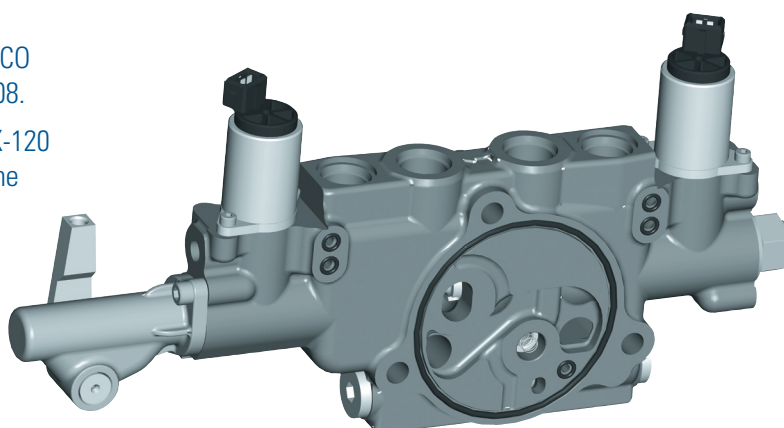
Spool Section 1: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 2: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 3: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 4: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 5: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 6: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 7: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 8: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 9: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =
Spool Section 10: Function = Section Assembly p/n = SCX182-	Port Relief Valve or Shut-Off Plug: "A" Port p/n = "B" Port p/n =	Stroke Limiter Kit: p/n = 61523 Quantity =	Manual Override Assembly Kit: p/n = 61538 Quantity =	Manual Lever Kit: p/n =	Adjustable Flow Control Kit: p/n =

SCX-120 PREVIEW

The SCX-120 valve line is currently being developed at HUSCO and is scheduled to start initial production by the end of 2008.

With a 120 lpm (32 gpm) nominal section flow rate, the SCX-120 will be a smaller version of the SCX-180, with all of the same basic features.

The SCX-120 uses many of the components currently used in other HUSCO valve lines, including the HUSCO manufactured PPRV solenoids.



PRELIMINARY SCX-120 SPECIFICATIONS

SPOOL CONTROL OPTIONS:

Manual Control

Hydraulically Pilot Operated Control

Electrohydraulic Control

Pneumatically Pilot Operated Control

SIZE:

Section Width	40.00 mm	1.57 in
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STANDARD PORT SIZES (MAXIMUM):

Inlet (P)	1-1/16-12 (SAE 12 Standard)	G3/4
Work Ports (A) and (B)	7/8-14 (SAE 10) Standard	G1/2
High Pressure Carry Over (HPCO)	1-1/16-12 (SAE 12) Standard	G3/4
Outlet (T)	1-1/16-12 (SAE 12) Standard 1-5/16-12 (SAE 16) Optional	G3/4 G1

STANDARD OPERATING FLOWS:

Rated Inlet Flow	190 lpm	50 gpm
Rated Section Flow (Work Port Flow)	120 lpm with 15 bar P-LS differential pressure	32 gpm with 215 psi P-LS differential pressure

STANDARD OPERATING PRESSURES:

	ISO Rating*		NFPA Rating*	
Rated Inlet Pressure	345 bar	5,000 psi	280 bar	4,000 psi
Rated Work Port Pressure	345 bar	5,000 psi	280 bar	4,000 psi
Rated Outlet Pressure	64 bar	925 psi	52 bar	750 psi

For over 60 years, HUSCO International has been designing and producing some of the most important custom hydraulic and electrohydraulic products in the construction, forestry and material handling industry. Today HUSCO control products can be found on a variety of leading off-highway equipment including: Caterpillar, CNH, Crown, Daewoo, Deere & Company, Hyundai, JCB, Jerr-Dan, JLG, Komatsu, Kubota, Liebherr, Manitowoc Crane Group, NACCO, Volvo and Terex, just to name a few.

Dedicated to meeting and exceeding the changing control needs of the off-highway market for today and well into the future, HUSCO employs an extensive engineering staff capable of designing customized, cost-effective solutions to maximize the efficiency, productivity, controllability and reliability of vehicles.

Using vehicle fit-up and testing capabilities, HUSCO is able to design, install and test valve configurations at HUSCO facilities, reducing production development time while optimizing vehicle performance through iterative testing.

With manufacturing facilities in North America, Europe, China and India, HUSCO continues to expand as we work with international partners in South America, China, Korea, Japan, India, South Africa and Australia to bring you any product you need, anywhere in the world.

Visit the HUSCO website at www.huscointl.com for a complete list of HUSCO Distributors.

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