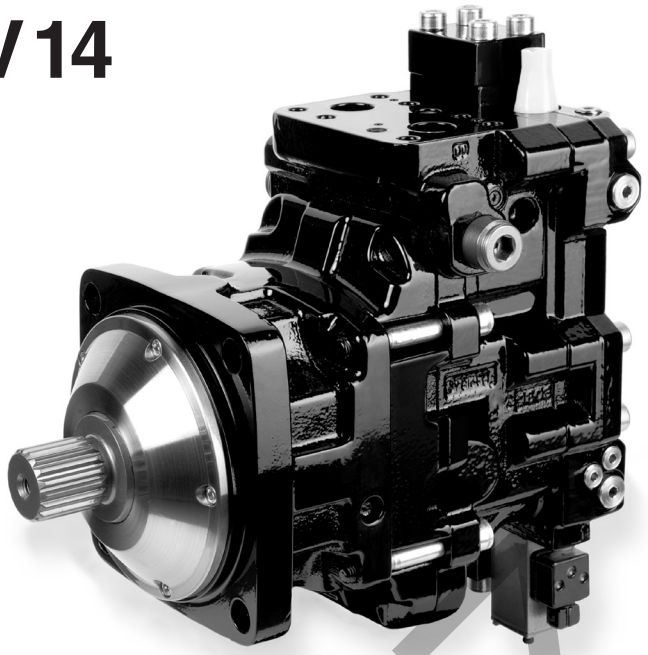
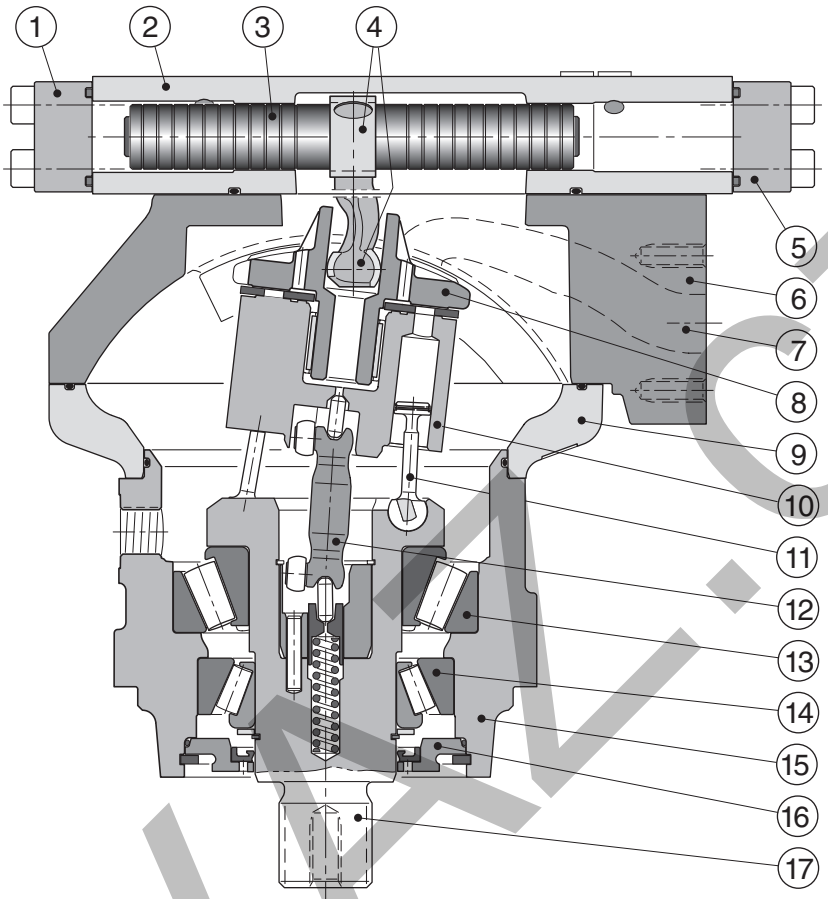
V14



V14 cross section

1. End cover, min displ.
2. Control module
3. Setting piston
4. Connecting arm
5. End cover, max displ.
6. Connection module
7. Main pressure port
8. Valve segment
9. Intermediate housing
10. Cylinder barrel
11. Spherical piston with laminated piston ring
12. Synchronizing shaft
13. Inner roller bearing
14. Outer roller bearing
15. Bearing housing
16. Shaft seal with retainer
17. Output shaft



Specifications

V14 frame size	110	160
Displacement [cm³/rev]		
- max, at 35°	110	160
- min, at 6.5°	22	32
Operating pressure [bar]		
- max intermittent 1)	480	480
- max continuous	420	420
Operating speed [rpm]		
- at 35°, max intermittent 1)	3 900	3 400
- at 35°, max continuous	3 400	3 000
- at 6.5°–20°, max intermittent 1)	6 500	5 700
- at 6.5°–20°, max continuous	5 700	5 000
- min continuous	50	50

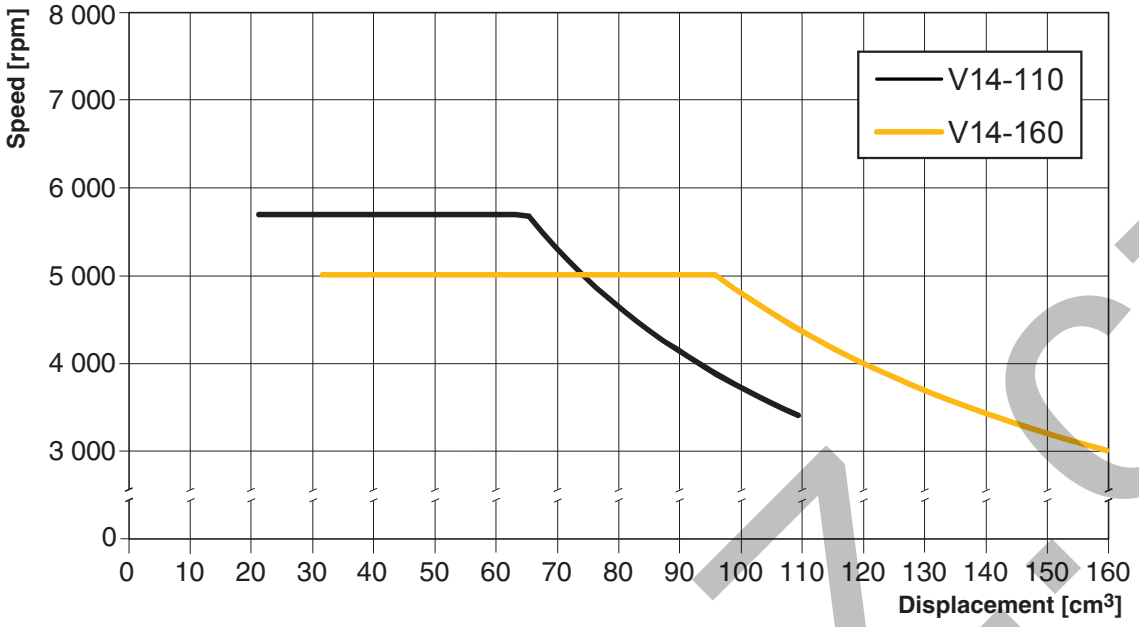
1) Max 6 seconds in any one minute.

Specifications

V14 frame size	110	160
Flow [l/min]		
- max intermittent 1)	430	550
- max continuous	375	480
Torque (theor.) at 100 bar [Nm]	175	255
Max otput power 1) [kW]	262	335
Corner power [kW]		
- intermittent 1)	570	730
- continuous	440	560
Mass moment of inertia		
($x10^{-3}$) [kg m²]	8.2	14.5
Weight [kg]	54	68

1) Max 6 seconds in any one minute.

Continuous Speed vs. Displacement



Efficiency diagrams

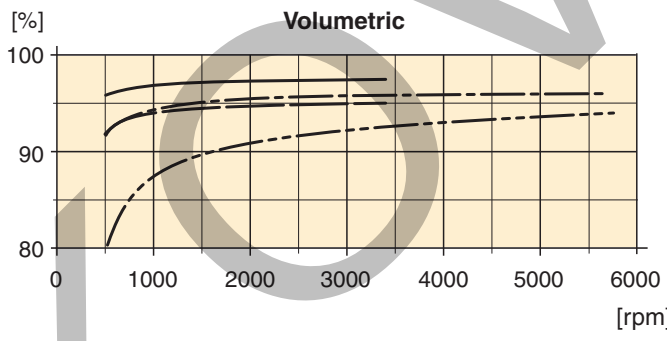
The following diagrams show volumetric, mechanical and overall efficiencies versus shaft speed at 210 and 420 bar operating pressure, and at full (35°) and reduced (10°) displacements.

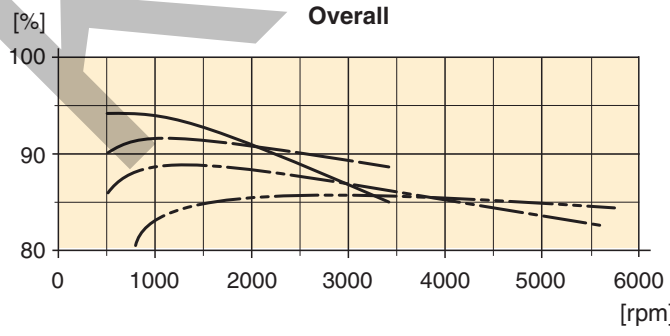
Information on efficiencies for a specific load condition can be made available from Parker Hannifin.

210 bar at full displacement
420 bar " " "

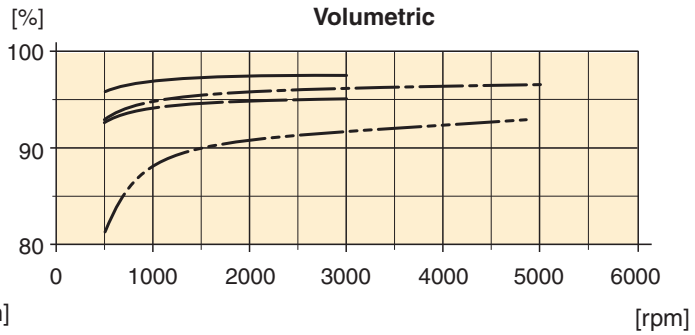
210 bar at reduced displacement
420 bar " " "

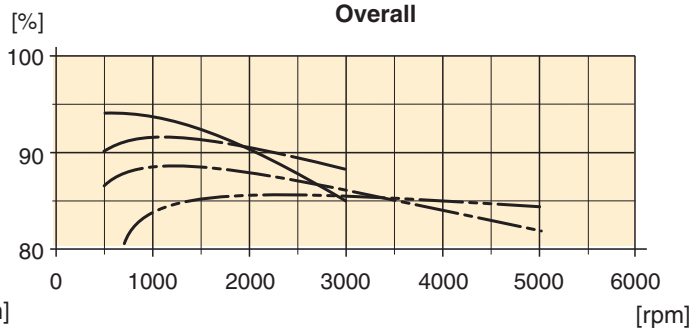
V14-110





V14-160





Controls - general information

The following V14 controls satisfy most application requirements:

- **AC**, **AD** and **AH** (automatic pressure compensators)
- **EO** and **HO** (two-position controls)
- **EP** and **HP** (proportional controls)
- **HPC/EPC** (HP/EP control with pressure cut off, see page 45)

All controls utilize a servo piston that connects to the valve segment (refer to the illustration on page 32).

The built-in four-way servo valve determines the position of the servo piston and, in turn, the displacement.

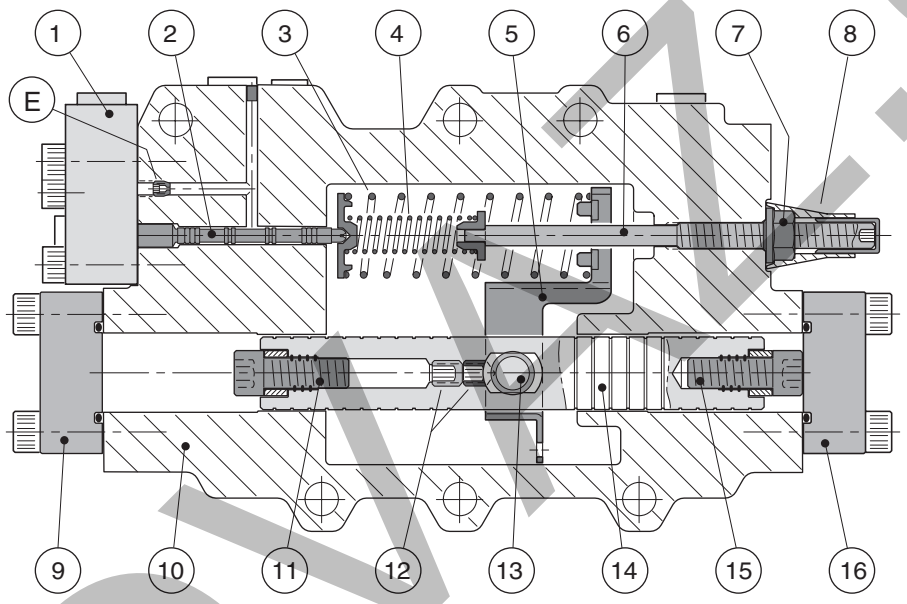
The displacement angle (between output shaft and cylinder barrel) ranges from 35° (max) to 6.5° (min).

Servo supply pressure is obtained from the pressurized, main port through the corresponding, built-in shuttle valve.

The response time (i.e. from max-to-min or from min-to-max displacement) is determined by restrictor nozzles in the servo valve supply and return lines; refer to the schematics.

NOTE: The modulating pressure/current, $\Delta p/\Delta I$ values are valid for motors that are not diplacement limited.

AC pressure compensator



Cross section of the AC pressure compensator module.

1. AC control cover
2. Servo valve spool
3. Modulating spring
4. Threshold spring
5. Feedback arm
6. Threshold adjustment screw
7. Seal nut
8. Two-part seal (threshold adjustm't) *
9. End cover (max displ.)
10. Control module housing
11. Max displ. limiting screw/bushing
12. Set screws
13. Connecting arm
14. Setting piston
15. Min displ. limiting screw/bushing
16. End cover (min displ.).

E. Orifice location; refer to the hydraulic schematics, pages 35-38.

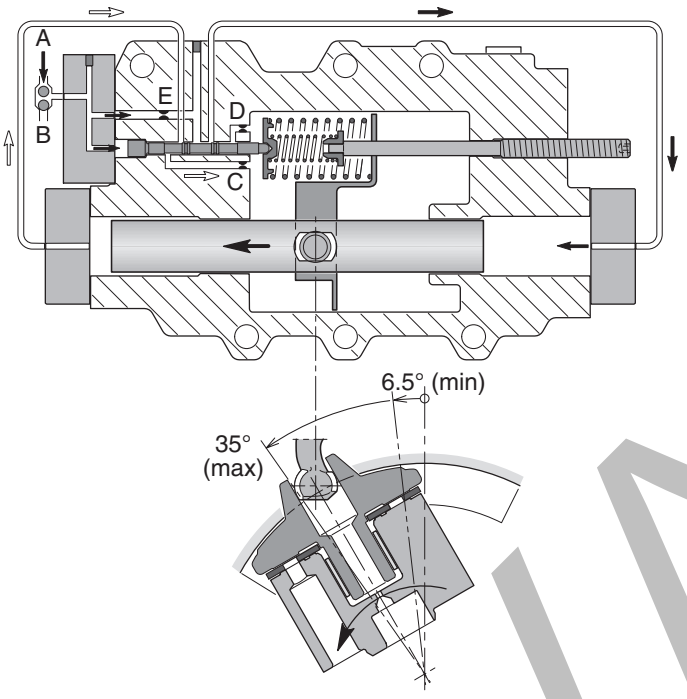
* Yellow cap = factory set.
Red cap 3797065 available as spare part

AC compensator function

Refer to the illustration below (left):

When pressure in port A (or B) increases, the servo valve spool is pushed to the right, directing flow to the right hand setting chamber - the setting piston moves to the left; displacement and output torque increases.

At the same time, the shaft speed decreases correspondingly (at a constant pump flow to the motor).

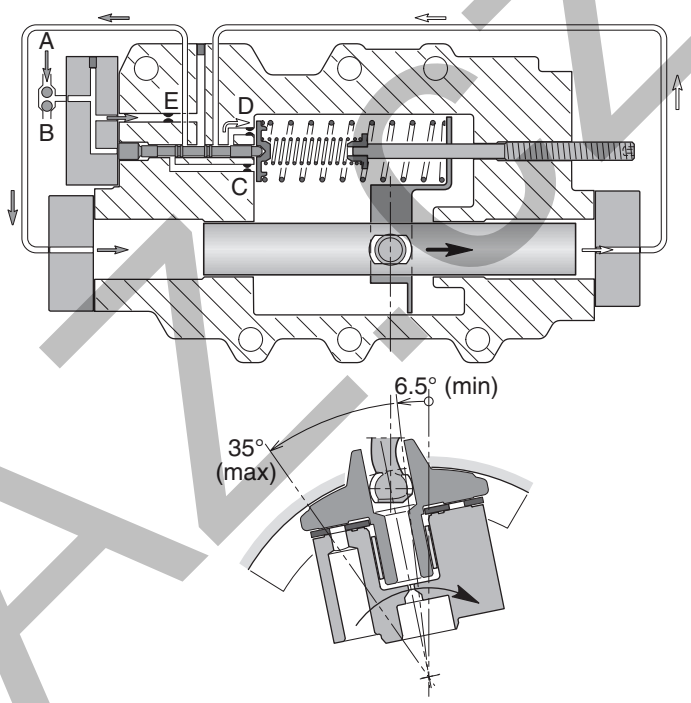


AC function (displ. increases at increasing system pressure).

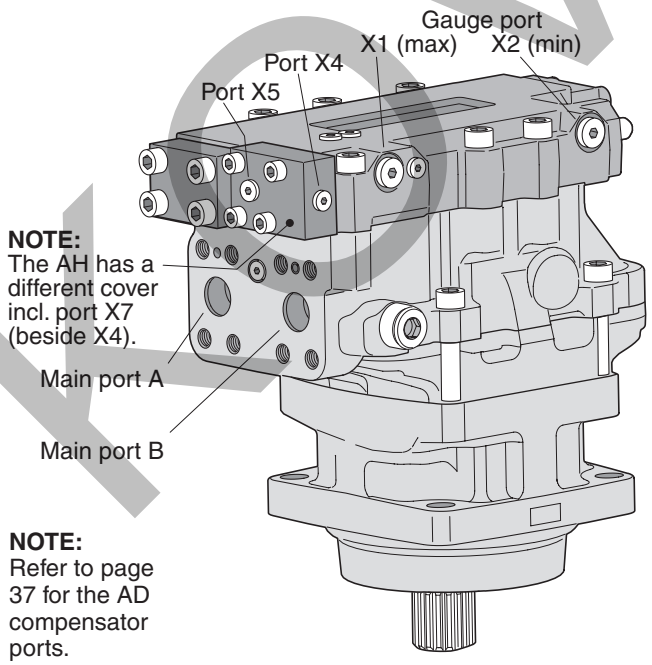
Refer to the illustration below (right):

When pressure in port A (or B) decreases, the servo valve spool moves to the left, directing flow to the left hand setting chamber - the setting piston moves to the right; displacement and output torque decreases.

At the same time, the shaft speed increases correspondingly (at a constant pump flow to the motor).



AC function (displ. decreases at decreasing system pressure).



NOTE:
The AH has a different cover incl. port X7 (beside X4).

NOTE:
Refer to page 37 for the AD compensator ports.

Port locations - V14- with AC or AH compensator.

Gauge/pilot ports (AH compensator)	
X1	Setting piston pressure (decreasing displ.)
X2	Setting piston pressure (increasing displ.)
X4	Servo supply pressure (before orifice and filter)
X5	Pilot pressure
X7	Override pressure (on the AH)
Port sizes:	
–	M14x1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18 O-ring boss (SAE version).

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Trollhättan, Sweden

AC compensator function (cont'd)

The AC compensator is used in off-road vehicle hydrostatic propel transmissions. The compensator automatically adjusts motor displacement between available max and min to the output torque requirement (up to max available system pressure).

Normally, the motor stays in the minimum displacement position. When there is a demand for additional torque, e.g. when the vehicle enters an upgrade, the displacement increases (providing more torque) while the motor shaft speed decreases proportionally.

The threshold pressure, where displacement starts to increase ('p_s'; refer to the AC diagram), is adjustable between 100 and 400 bar.

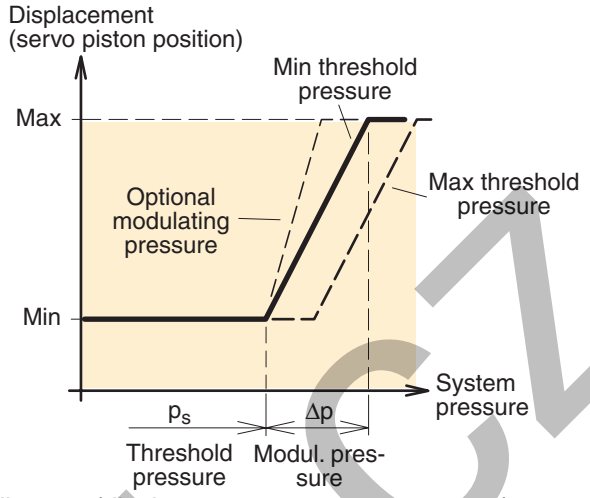
To reach max displacement, an additional modulating pressure (Δp) above the threshold pressure is required.

To satisfy specific hydraulic circuit requirements, a modulating pressure of 15, 25, 50 or 80 bar can be selected.

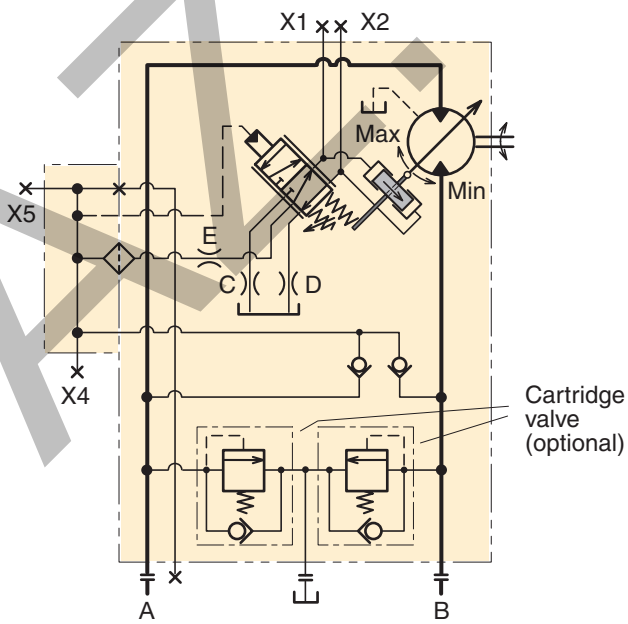
The pressure compensator is supplied with a small filter installed in the AC control cover (between ports X4 and X5); refer to the schematic below right.

Gauge/pilot ports (AC and AH compensators):	
X1	Setting piston pressure (decreasing displ.)
X2	Setting piston pressure (increasing displ.)
X4	Servo supply pressure (before orifice and filter)
X5	Pilot pressure
Port sizes:	
–	M14x1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18 O-ring boss (SAE version).

NOTE: Port locations are shown in the illustration on page 35.



AC diagram (displacement vs. system pressure).



AC schematic (shown: control moving towards min displ.)

AD pressure compensator

The AD control is similar to the AC (shown on previous pages) but incorporates a solenoid controlled override function and a brake defeat valve.

Override

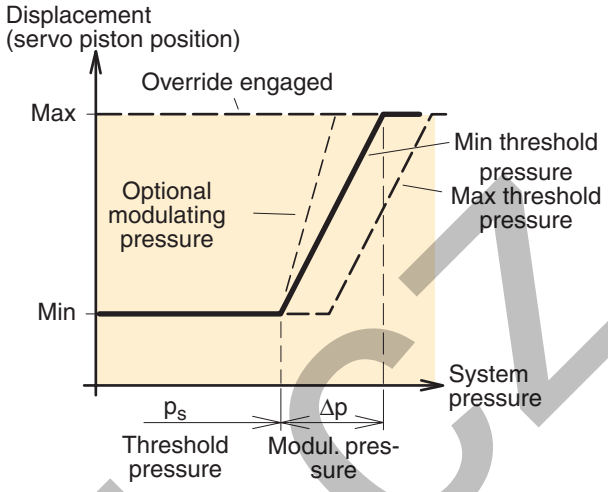
- The override consists of a piston built into a special end cover and an external solenoid.
- When the solenoid is energized, system pressure is directed to the piston which in turn pushes on the servo valve spool. This causes the motor to lock in the max displacement position, irrespective of system pressure (min 30 bar).
- Solenoids are available in 12 VDC (designated **L**) and 24 VDC (design. **H**); the required current is 2 and 1 A respectively.

Brake defeat valve

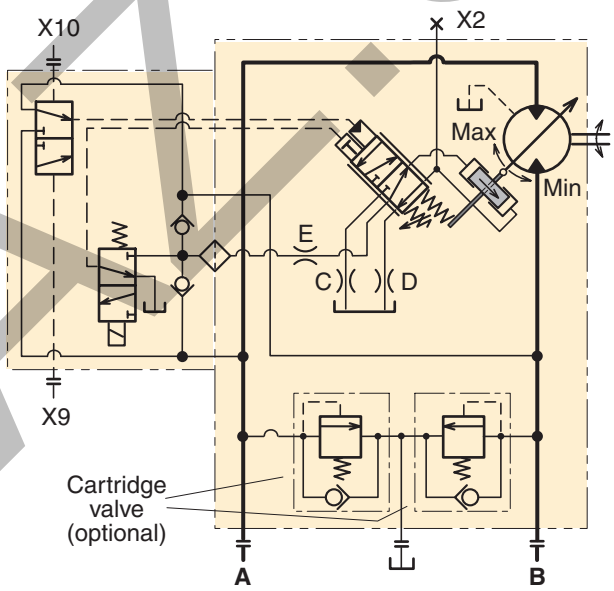
- The brake defeat function, which is also built into the special end cover, consist of a two-position, three-way valve. Ports X9 and X10 (refer to the schematic) are connected to the corresponding ports of the pump displacement control.
- The function prevents any pressure in the motor return port to influence the pressure compensator. Say, e.g., that motor port A is pressurized to move the vehicle 'forward'. Thus, back pressure in return port B, which develops in the braking mode, will not cause the compensator to move towards the max displacement position and vehicle braking will be smooth.
- Likewise, when port B is pressurized when the vehicle moves 'backward', braking presssure in port A will not influence the compensator.

Gauge/pilot ports (AD compensator):	
X2	Setting piston pressure (increasing displ.)
X9	Pressure (from the pump control) to the brake defeat valve (for port A)
X10	Pressure (from the pump control) to the brake defeat valve (for port B)
Port sizes:	
–	M14x1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18 O-ring boss (SAE version).

NOTE: X2 port is shown in the illustration on page 35.



AD diagram (displacement vs. system pressure).



AD schematic (shown: override solenoid not engaged; the compensator moves towards min displacement).

AH pressure compensator

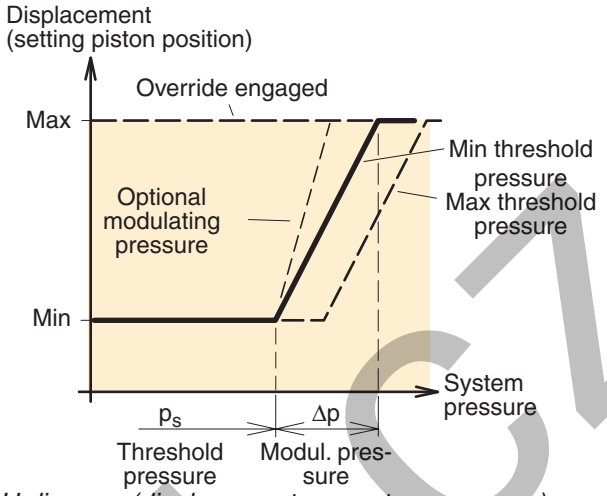
The AH compensator is similar to the AD (shown on previous page) but incorporates only an hydraulic override device. It is utilized in hydrostatic transmissions where a high degree of manoeuvrability at low vehicle speeds is desirable.

When the override is pressurized, the setting piston moves to the max displacement position irrespective of system pressure, provided the servo supply pressure is at least 30 bar.

Required override pressure, port X7 (min 20 bar):

$$p_7 = \frac{p_S + \Delta p}{24} \quad [bar]$$

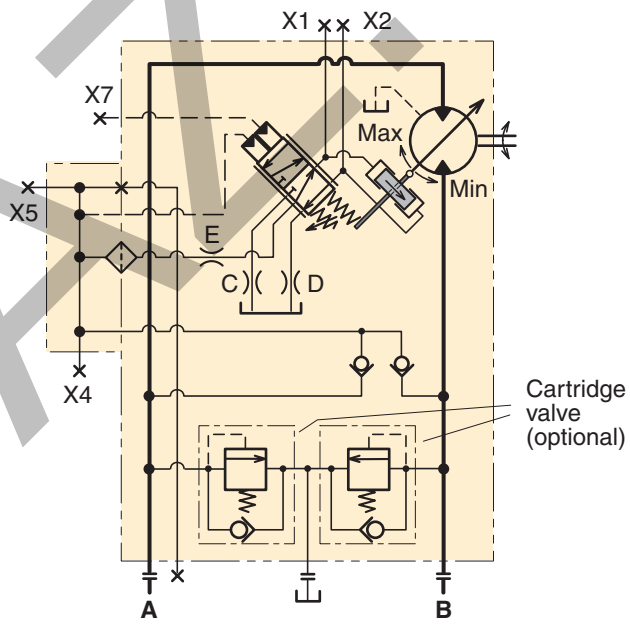
p_7 = Override pressure
p_s = System pressure
Δp = Modulating pressure



AH diagram (displacement vs. system pressure).

Gauge/pilot ports (AH compensator):	
X1	Setting piston pressure (decreasing displ.)
X2	Setting piston pressure (increasing displ.)
X4	Servo supply pressure (before orifice and filter)
X5	Pilot pressure
X7	Override pressure
Port sizes:	
–	M14x1.5 (ISO and cartridge versions)
–	$^9/_{16}$"-18 O-ring boss (SAE version).

NOTE: Port locations are shown in the illustration on page 35.



AH schematic (shown: override port X7 not pressurized; the compensator is moving towards min displacement).

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EO, EP, HO and HP controls (general information)

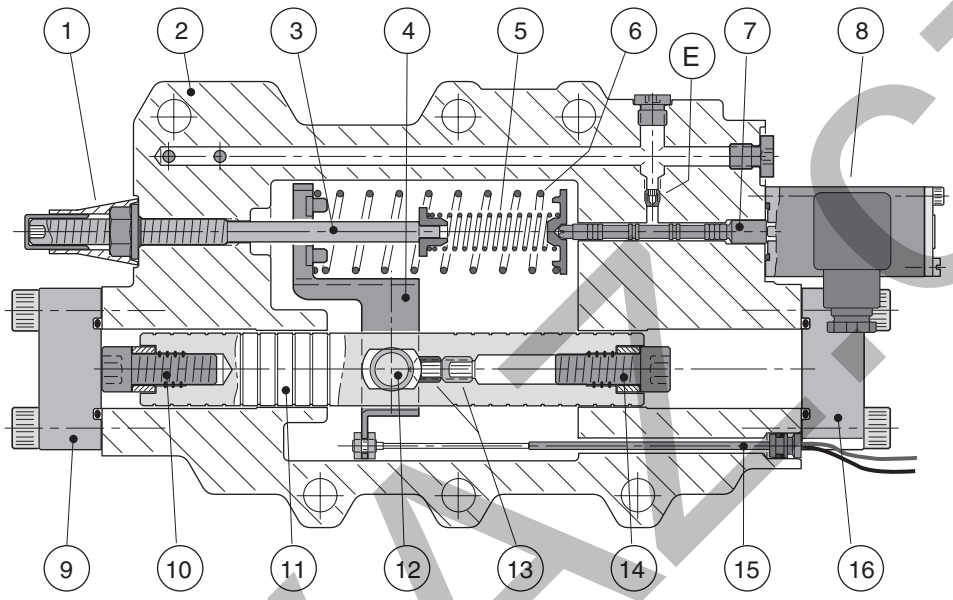
Basically, these controls function in a similar way.

At increasing solenoid current (EP) or increasing pilot pressure (HP) the control moves towards the min displacement position.

At decreasing current or pilot pressure, the control retracts towards max displacement.

In comparison with EP and HP, the EO and HO controls have no modulating spring; this means that only min and max displacements can be obtained with these controls.

Max and min displacements can be limited by a screw with spacer bushing as shown below.



Cross section of the EP control module.

1. Two-part seal (threshold adjustm't) *
2. Control module housing
3. Threshold adjustment screw
4. Feedback arm
5. Threshold spring
6. Modulating spring (EP, HP only)
7. Servo valve spool
8. Solenoid (EO, EP only); cover on HO, HP
9. End cover (max displ. limit)
10. Max displ. limiting screw/bushing
11. Setting piston
12. Connecting arm
13. Set screws
14. Min displ. limiting screw/bushing
15. Setting piston position sensor
16. End cover (min displ. limit)

E. Orifice location; refer to the hydraulic schematics, pages 40-45.

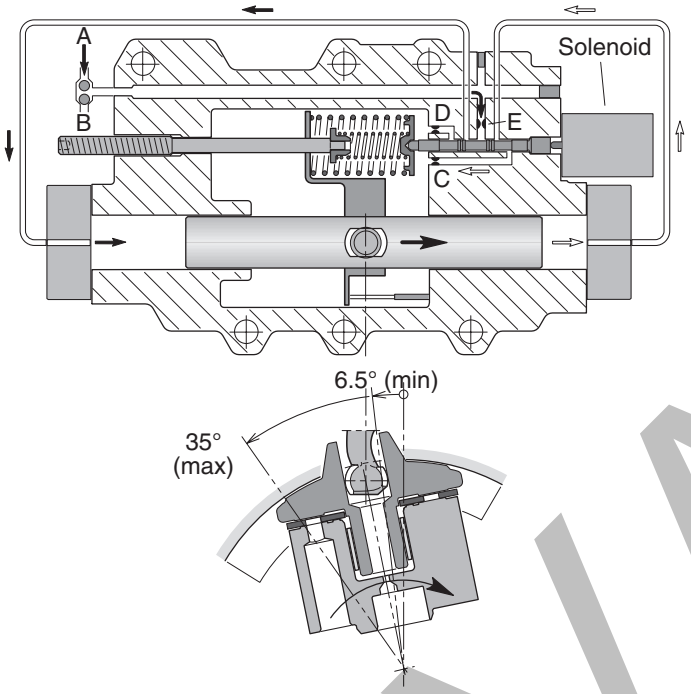
* Yellow cap = factory set.
Red cap 3797065 available as spare part

EP control function (solenoid current increasing)

NOTE: Valid also for the HP at increasing pilot pressure.

Refer to the illustration below left:

At an increasing current (above the threshold value), the solenoid spool pushes left on the servo valve spool, and flow is directed to the left hand setting chamber - the setting piston moves to the right and the displacement decreases. This means, that the shaft speed in-creases while the output torque decreases correspondingly (at a constant pump flow and system pressure).



EP control function (displ. decrease at increasing current).

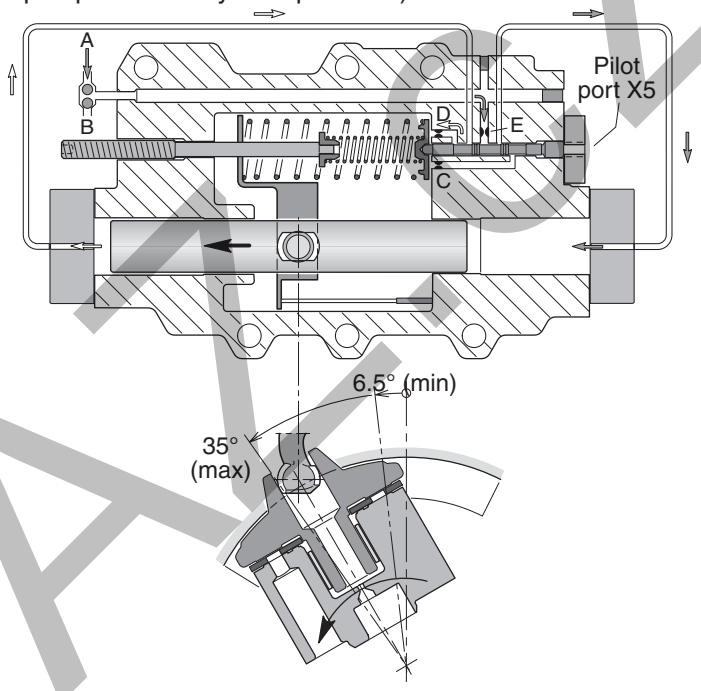
HP control function (decreasing pilot pressure)

NOTE: Valid also for the EP at decreasing current.

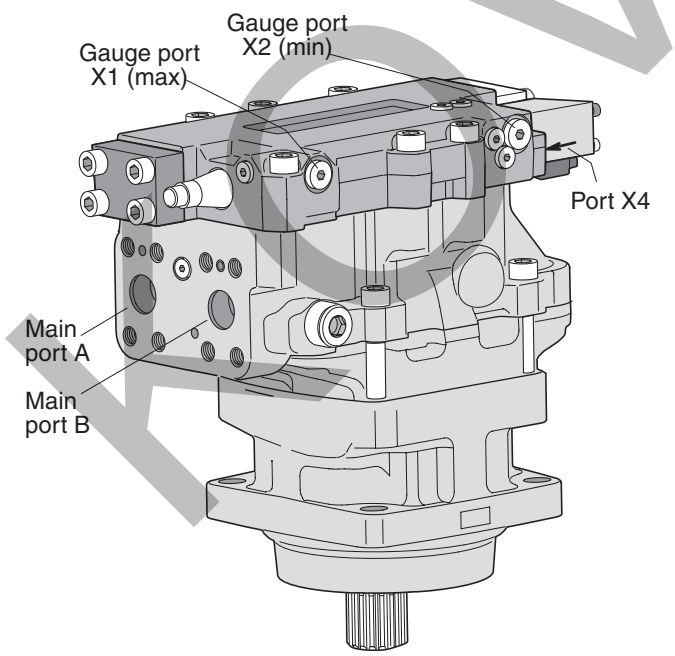
Refer to the illustration below right:

When the pilot pressure decreases, the servo valve spool moves to the right and flow is directed to the right hand setting chamber - the setting piston moves to the left and the displacement increases.

The shaft speed now decreases and the available output torque increases correspondingly (at a constant pump flow and system pressure).



HP control function (displ. increase at decreasing pilot press.).

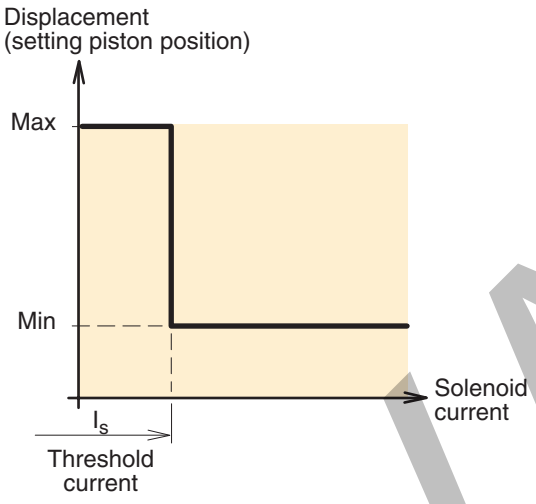


Port locations - V14- with EO or EP control.

Gauge/pilot ports (EO and EP controls):	
X1	Setting piston pressure (decreasing displ.)
X2	Setting piston pressure (increasing displ.)
X4	Servo supply pressure (before orifice)
Port sizes:	
–	M14x1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18 O-ring boss (SAE version).

EO electric two-position control

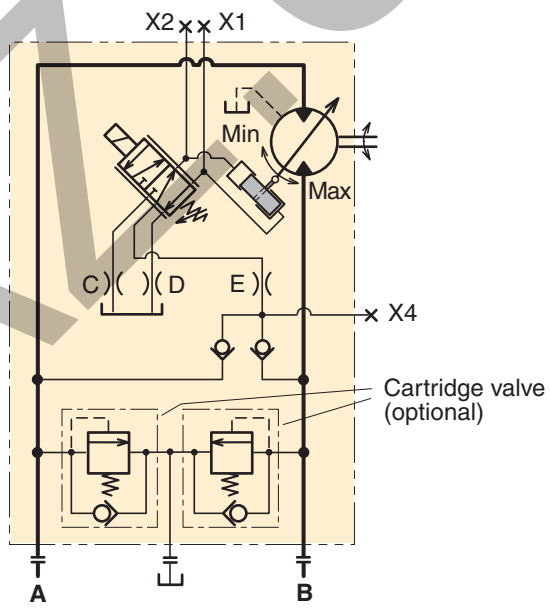
- The EO is a two-position control where the position of the setting piston is governed by a DC solenoid (acting on the servo spool) which is attached to the control module (refer to the illustration on page 40).
- The EO is utilized in transmissions where only two operating modes are required - low speed/high torque and high speed/low torque.
- The setting piston, normally in the max displacement position, shifts to min displacement as soon as the solenoid is activated.
- Intermediate displacements cannot be obtained with this control.



Gauge/pilot ports (EO and EP controls):	
X1	Setting piston pressure (decreasing displ.)
X2	Setting piston pressure (increasing displ.)
X4	Servo supply pressure (before orifice)
Port sizes:	
–	M14x1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18 O-ring boss (SAE version).

NOTE: Port locations are shown in the illustration on page 40.

- Servo pressure is supplied internally (through a check valve from the utilized high pressure port); refer to the schematic below.
- The solenoid is either 12 or 24 VDC, requiring 1 200 mA and 600 mA respectively.
- The male connector (type 'Junior Timer') is permanently installed on the solenoid. The corresponding female connector is not included. **Note:** The female connector is available as spare part P-N 3781939.
- The threshold current of the 12 VDC solenoid is factory set at 400 mA; it is adjustable between 200 and 500 mA. The 24 VDC solenoid is factory set at 200 mA and is adjustable between 100 and 500 mA.

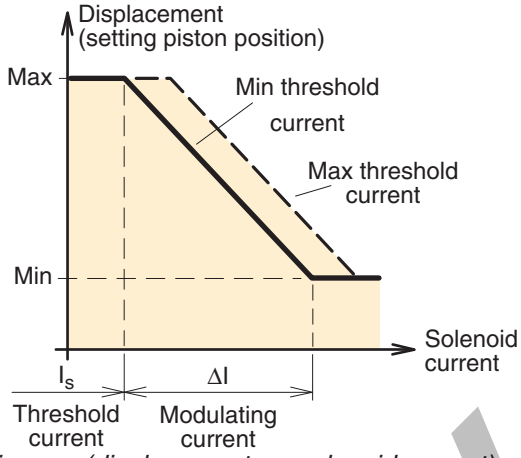


EO schematic (shown: non-activated solenoid; control in max displacement position).

EP electrohydraulic proportional control

- The EP electrohydraulic proportional control is used in hydrostatic transmissions requiring a continuously variable shaft speed. The position of the setting piston is governed by a DC solenoid (acting on the servo valve spool), attached to the control module (refer to the illustration on page 40).
- When the solenoid current increases above the threshold value, the setting piston starts to move from max towards min displacement. The displacement vs. solenoid current is shown in the diagram below.

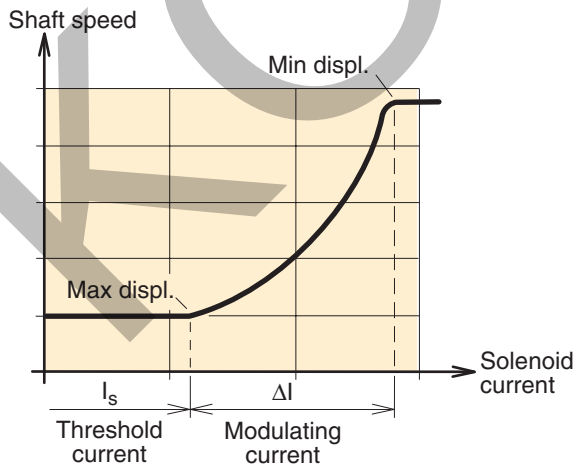
NOTE: The shaft speed is **not** proportional to the solenoid current; refer to the bottom diagram.



EP diagram (displacement vs. solenoid current).

Gauge/pilot ports (EO and EP controls):	
X1	Setting piston pressure (decreasing displ.)
X2	Setting piston pressure (increasing displ.)
X4	Servo supply pressure (before orifice)
Port sizes:	
–	M14x1.5 (ISO and cartridge versions)
–	$^9/_{16}$"-18 O-ring boss (SAE version).

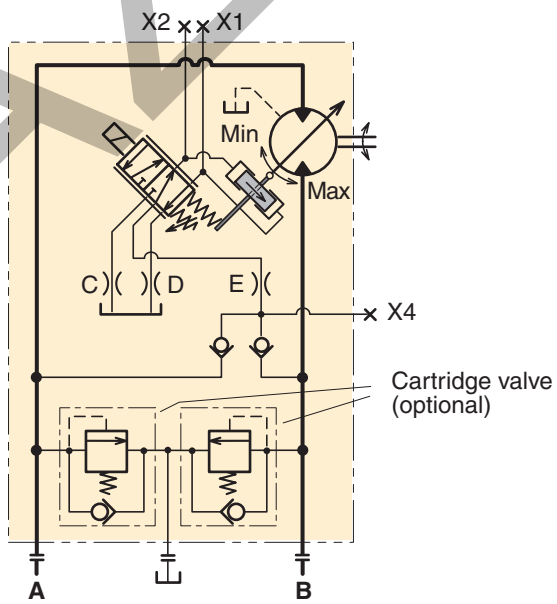
NOTE: Port locations are shown in the illustration on page 40.



Please note: The shaft speed is **not** proportional to the solenoid current.

- The solenoid is either 12 or 24 VDC, requiring 1200 and 600 mA respectively.
- The male connector (type 'Junior Timer') is permanently installed on the solenoid. The corresponding female connector is not included. **Note:** The female connector is available as spare part P-N 3781939
- The threshold current of the 12 VDC solenoid is factory set at 400 mA; it is adjustable between 200 and 500 mA. The 24 VDC solenoid is factory set at 200 mA and is adjustable between 100 and 250 mA.
- When utilizing the full displacement range, the required modulating current (ΔI) is 600 mA (12V solenoid) and 300 mA (24 V solenoid) for V14-110, 345 mA (24 V solenoid) for V14-160 respectively. In order to minimize hysteresis, a pulse-width modulated control signal of 50 to 60 Hz should be provided.

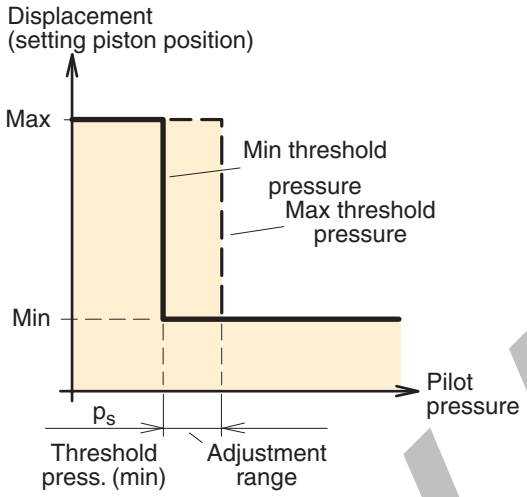
NOTE: The modulating current (ΔI) is not adjustable.



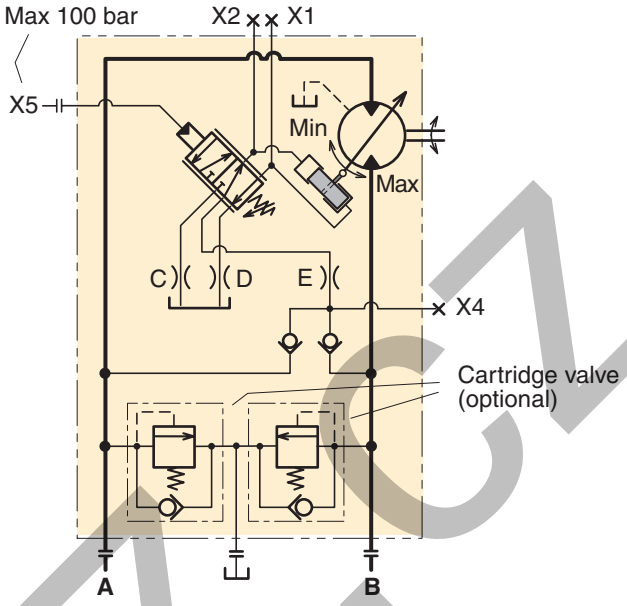
EP schematic (shown: non-activated solenoid; control moving towards max displacement).

HO hydraulic two-position control

- The two-position HO control is similar to the EO (page 41) but the control signal is hydraulic. The position of the setting piston is governed by the built-in servo valve spool (same as on all controls).
- When the applied pilot pressure (port X5) exceeds the pre-set threshold value, the setting piston moves from the max to the min displacement position.
- Positions between max and min cannot be obtained with this control.
- The threshold pressure is factory set at 10 bar but is adjustable between 5 and 25 bar.

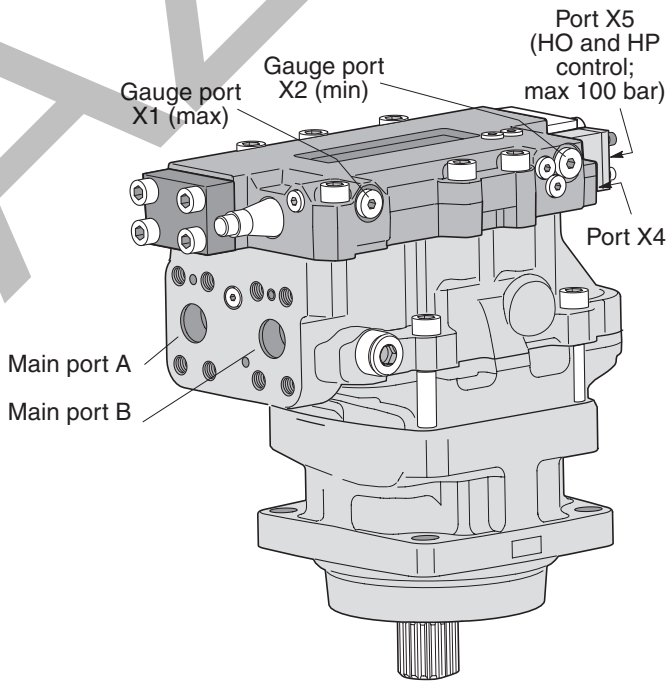


HO diagram (displacement vs. pilot pressure).



HO schematic (shown: port X5 not pressurized; control in max displ. position).

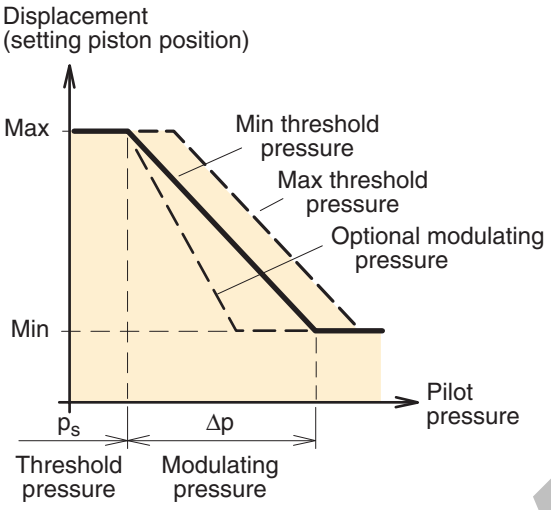
Gauge/pilot ports (HO and HP controls):	
X1	Setting piston pressure (decreasing displ.)
X2	Setting piston pressure (increasing displ.)
X4	Servo supply pressure (before orifice)
X5	External pilot pressure (max 100 bar; HO and HP control)
Port sizes:	
–	M14x1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18 O-ring boss (SAE version).



Port locations - V14-110 with HO or HP control.

HP hydraulic proportional control

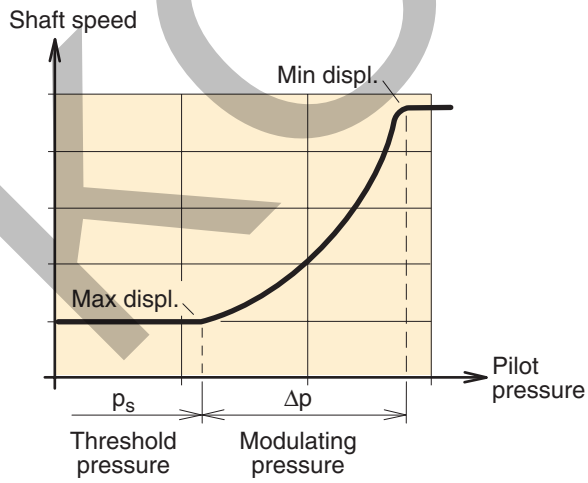
- Like the EP described on page 40, the HP proportional control offers continuously variable displacement, but the controlling signal is hydraulic.
- Normally, the setting piston stays in the max displacement position. When a sufficiently high pilot pressure (p_s) is applied to port X5, the setting piston starts to move towards the min displacement position.



HP diagram (displacement vs. pilot pressure).

Gauge/pilot ports (HP control):	
X1	Setting piston pressure (decreasing displ.)
X2	Setting piston pressure (increasing displ.)
X4	Servo supply pressure (before orifice)
X5	External pilot pressure (max 100 bar)
Port sizes:	
–	M14x1.5 (ISO and cartridge versions)
–	$^9/_{16}$"-18 O-ring boss (SAE version).

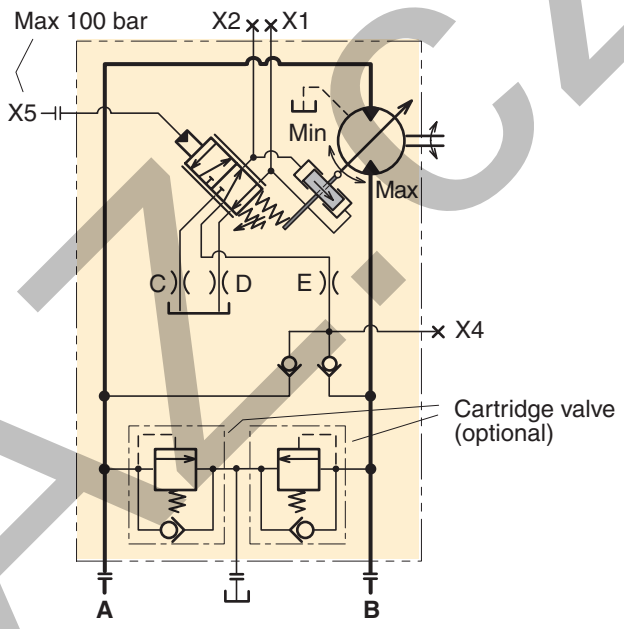
NOTE: Port locations are shown in the illustration on page 43.



Please note: The shaft speed is **not** proportional to the pilot pressure.

- As can be seen from the pilot pressure/displacement diagram below, the displacement changes in proportion to the applied modulating pressure.
- In contrast, the shaft speed is not proportional to the pilot pressure; refer to the bottom left diagram.
- To satisfy specific hydraulic circuit requirements, a modulating pressure of 15 or 25 bar can be selected; the threshold pressure (p_s) is set at 10 bar but is adjustable between 5 and 25 bar.

See also “Controls, Note” on page 34.



HP schematic (shown: port X5 not pressurized; control moving towards max displacement).

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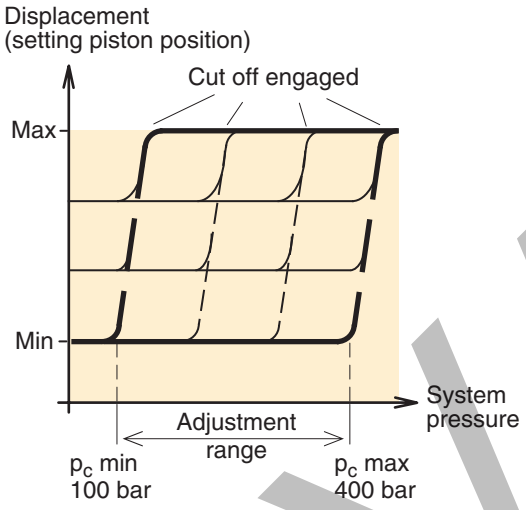
Trollhättan, Sweden

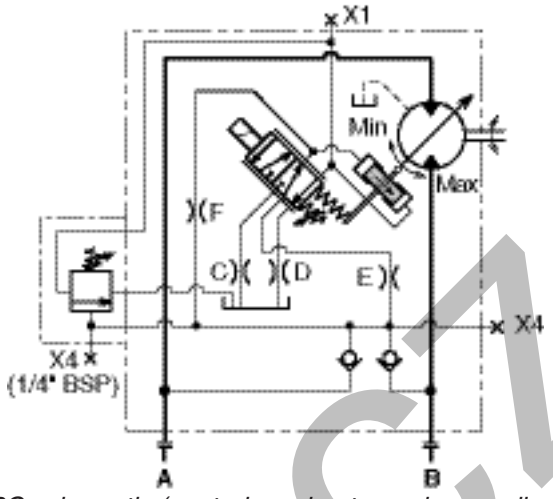
EPC/HPC, EP/HP control with pressure cut off

- The pressure cut off overlays the EP/HP control.
- If the system pressure increase, due to the load or reduced motor displacement to the setting of the pressure cut off valve, the control increases displacement. When displacement increases, the available torque increases as well but the system pressure remains constant.
- Pressure cut off setting range is 100-400 bar.
- Threshold pressure is preset from factory to 10 bar but is adjustable between 5 and 25 bar.
- For EPC the threshold current of the 12 VDC solenoid is factory set at 400 mA; it is adjustable between 200 and 500 mA. The 24 VDC solenoid is factory set at 200 mA and is adjustable between 100 and 250 mA.

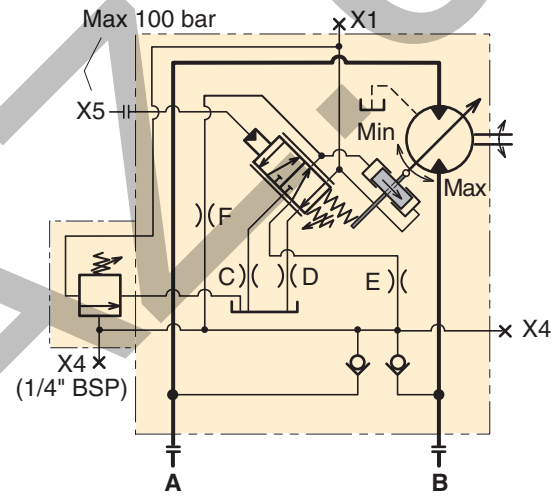


Gauge/pilot ports (EPC control):	
X1	Setting piston pressure (decreasing displ.)
X4	Servo supply pressure (before orifice)
X4	Servo supply pressure (on EPC) BSP1/4” only
Port sizes:	
–	M14x1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18 O-ring boss (SAE version).

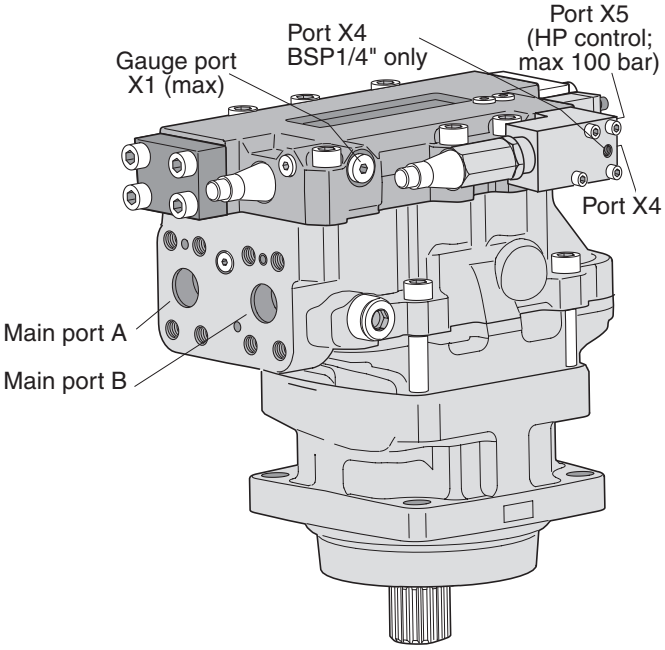
Gauge/pilot ports (HPC control):	
X1	Setting piston pressure (decreasing displ.)
X4	Servo supply pressure (before orifice)
X4	Servo supply pressure (on HPC) BSP1/4” only
X5	External pilot pressure (max 100 bar)
Port sizes:	
–	M14x1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18 O-ring boss (SAE version).



EPC schematic (control moving towards max displacement).



HPC schematic (shown: port X5 not pressurized; control moving towards max displacement).



Port locations - V14-110 with EPC/HPC control. (HPC shown)

V14-110/-160

Valve options (overview)

- Brake valve and pressure relief valves (opt. **B**;)*
- Flushing valve (option **L**; below)
- Pressure relief valves (option **P**; page 47)
- Extra valve block (option **R)***
- Load holding valve (option **W**)*

* Contact Parker Hannifin for additional information

Sensor options (overview)

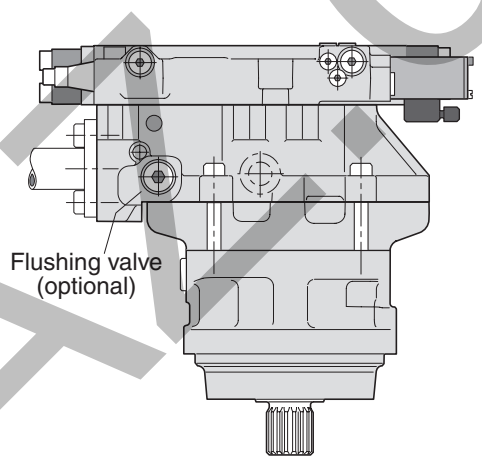
- Shaft speed sensor (option **P**; page 48)
- Setting piston position sensor (option **L**; page 49)

Flushing valve (option L)

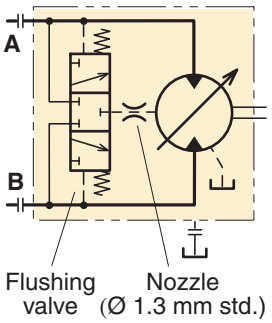
The V14 is available with a flushing (or shuttle) valve that supplies the motor with a cooling flow through the case. Cooling the motor may be required when operating at high speeds and/or power levels.

The flushing valve consists of a three-position, three-way spool valve built into the connection module. It connects the low pressure side of the main circuit to a nozzle (optional sizes below) that empties fluid into the motor case.

In a closed circuit transmission, the flushing valve re-moves part of the fluid in the main loop. The removed fluid is continuously being replaced by cool, filtered fluid from the low pressure charge pump on the main pump.



V14-110 (EP control) with built-in flushing valve.



Hydraulic schematic - V14 with built-in flushing valve.

Available nozzles

Ordering code	Orifice size [mm]	Status	Flow [l/min] at		
			15 bar	20 bar	25 bar
L010	1.0	Optional	2.3	2.7	3.0
L013	**1.3**	**Standard**	**3.9**	**4.5**	**5.0**
L015	1.5	Optional	5.2	6.0	6.7
L017	1.7	Optional	6.6	7.7	8.6
L020	2.0	Optional	9.2	10.6	11.9
L030	3.0	Optional	20.0	23.1	25.8

NOTE: 'L000' = plug

Pressure relief valves (option P)

To protect the motor (and the main hydraulic circuit) from unwanted, high pressure peaks, the V14 can be supplied with relief valve cartridges.

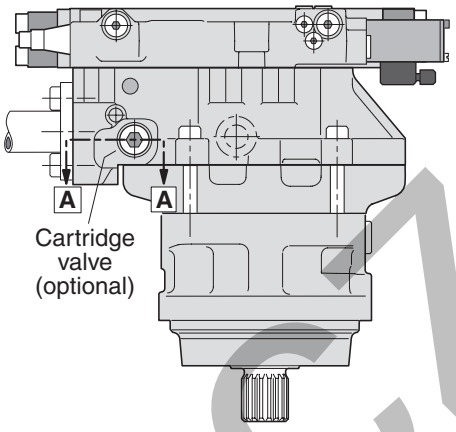
The individual cartridge (with integrated check valve function) has a non-adjustable, factory-set opening pressure, available in pressure settings shown below.

The cross section (below right) shows a situation, where the upper cartridge has opened because of high fluid pressure. This, in turn, forces the opposite cartridge to open to the low pressure area (this cartridge now acting as a check valve).

As shown, a small part of the flow may go directly to the reservoir.

PLEASE NOTE:

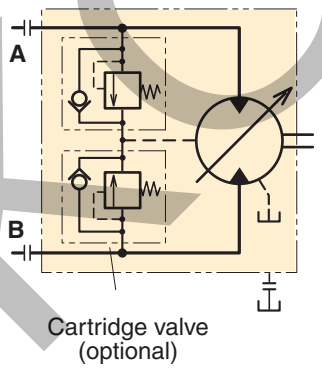
- The pressure relief cartridges should not be used as main pressure reliefs; in a motor application, they should only be relied on to limit short duration pressure peaks (or the temperature of the fluid which circulates through the motor will rapidly reach damaging high levels).
- The main pressure relief is usually installed in the main pump or in the directional control valve, or is line mounted between pump and motor.



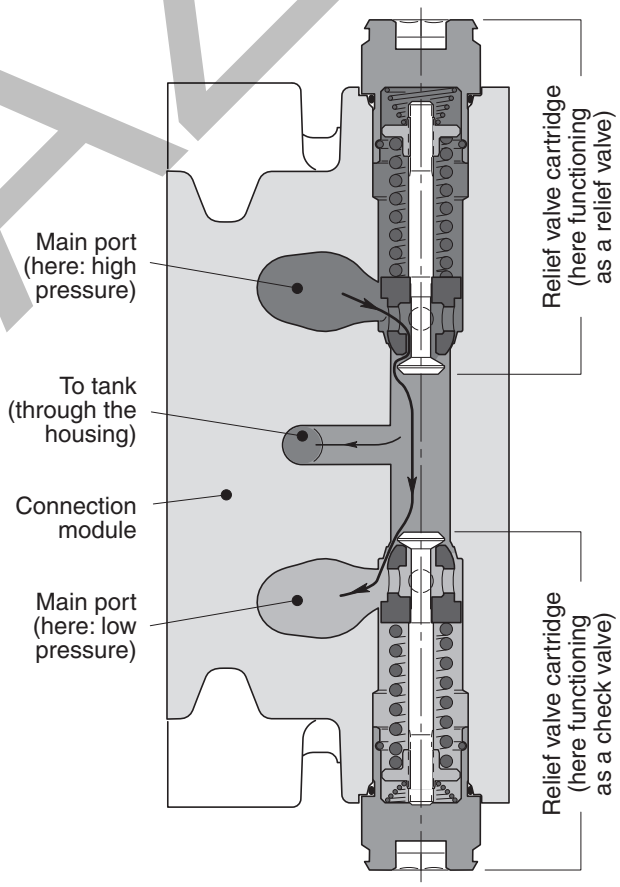
V14- 110 (EP control) with relief valve cartridges.

Available cartridges

Ordering code	Pressure setting [bar]	Part number
P300	300	3794616
P330	330	3794617
P350	350	3794618
P380	380	3794619
P400	400	3794620
P420	420	3793529
P450	450	3794622



Hydraulic schematic - V14 with cartridge valves.



Section A-A (showing pressure relief cartridges).

Shaft speed sensor (option P)

A speed sensor kit is available for the V14.

The ferrostat differential (Hall-effect) sensor installs in a separate, threaded hole in the V14 bearing housing.

The speed sensor is directed towards the V14 shaft flange and outputs a 2 phase shifted square wave signal within a frequency range of 0 Hz to 15 kHz. Number of pulses per shaft rev is 36 which, at 5 Hz, corresponds to approx. 8 rpm.

Ordering information

(refer to the ordering codes on pages 50-52)

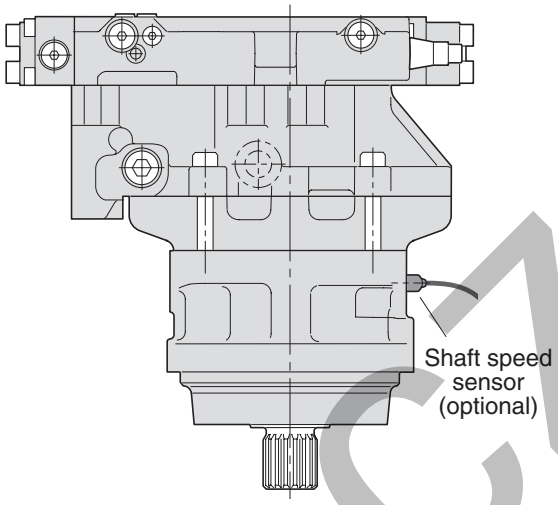
N - None

C - Prepared for setting piston position and shaft speed sensor. To be ordered separate*.

D - Setting piston position sensors and prepared for shaft speed sensor.

P - Prepared for shaft speed sensor. To be ordered separate*.

NOTE: Additional information is provided in our publication HY30-8301/UK, 'Speed sensor for series F11/F12 and V12/T12/V14', available from Parker Hannifin.



V14-160 (AC control) with speed sensor.

***How to order**

Please order the speed sensor on a separate order line next to the product order line.

Part number for speed sensor is 3785190.

High Speed / High Power operation

Running in procedure at mid. displacement

Running in procedure Parker Motors

We suggest the following procedure to run in the V14 motors.

1.Start @ 500 rpm, differential pressure 250 bar, outlet 10-15 bar.

2.Run until the drain temperature has passed its maximum* and has decreased 1-2 °C

3.Increase differential pressure to 350 bar

4.Run until the drain temperature has passed its maximum* and has decreased 1-2 °C

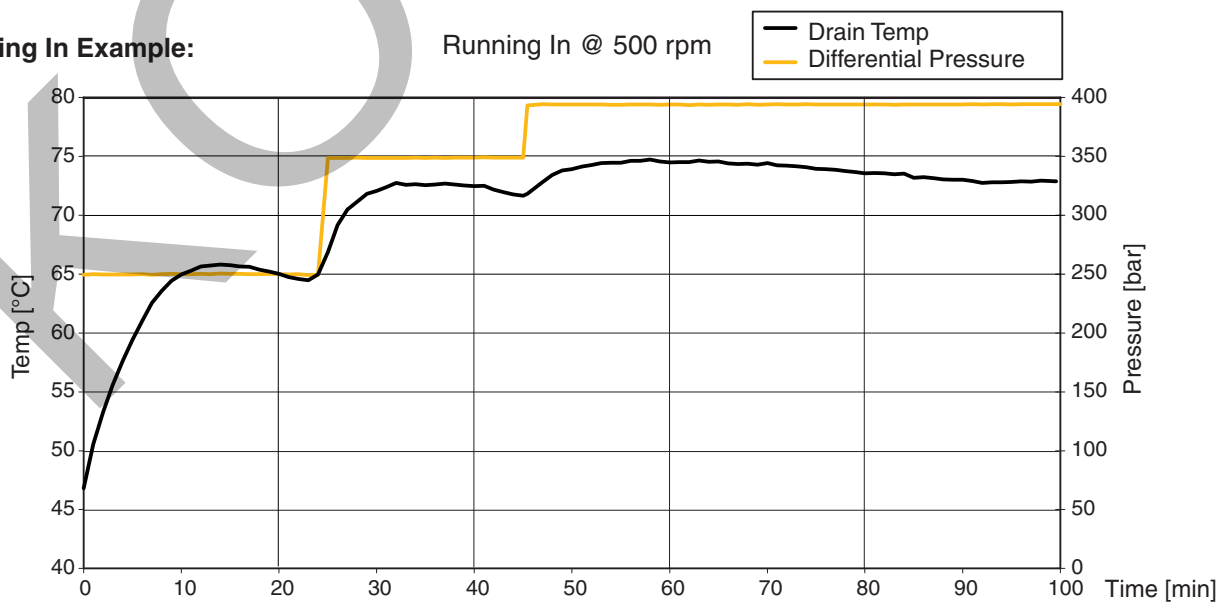
5.Increase differential pressure to 400 bar

6.Run until the drain temperature has passed its maximum* and has stabilized.

*If, at any point, the temperature tends to pass 100 °C, decrease the pressure at once.

Please make sure the drain temperature probe is in the drain oil flow to measure the correct temp.

Running In Example:



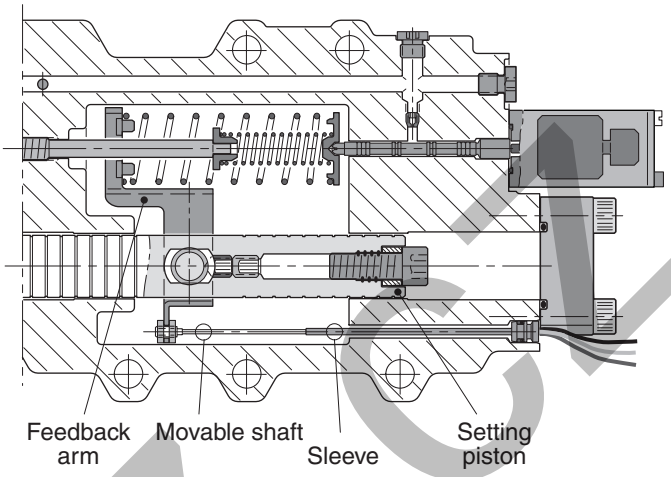
Setting piston position sensor (option L)

The setting piston position sensor, also referred to as a 'Sub-Miniature In-Cylinder Transducer', combines the best features associated with LVDT's (Linear Variable Differential Transformer) and potentiometers into one rugged, contactless, highly reliable position sensor.

The stationary part of the sensor, the sleeve, is provided with a flange that fits in a specially machined boring in the control module housing.

The movable shaft of the sensor is attached to the feedback arm as shown in the illustration to the right. When the sensor is properly connected to the electronic module (packed separately with an installation sheet), the produced output signal is proportional to the position of the setting piston.

In order to obtain the correct electrical max and min position settings, as determined by the utilized max and min displacements, the programming module (part of the electronic module, illustrated below right) must be adjusted; for further information please contact Parker Hannifin.

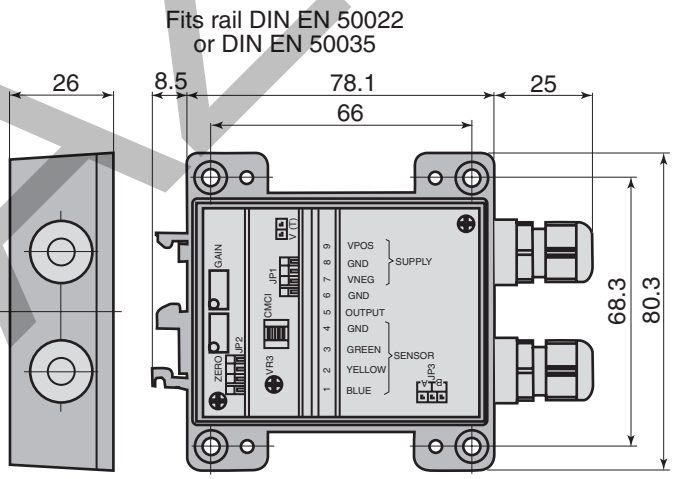


EP control section with setting piston position sensor.

Specifications

Supply voltage	10 to 60 VDC
Supply current	max 10 mA
Output voltage	0.5 to 4.5 VDC*
Output load	max 10 kΩ
Output current - shaft retracted	0.020 mA
- shaft extended	0.5 mA
Linearity	≤ 1% of stroke
Operational temperature	0 °C to +70 °C
Distance between sensor and electronic module	Max 30 m
Electrical wiring	PTFE insulated, heat shrink sleeved 500 mm long leads
Weight	100 g

***** Other voltages can be selected; contact Parker Hannifin.



Electronic module (incl. internal programming module).

Ordering information (refer to 'Sensor options' in the ordering codes on pages 50-52)

Basic V14 configuration (ISO, cartridge or SAE; see pages 50-52) – [ ] [ ]

Sensor options

Code	Sensor options
N	None
C	Prepared for setting piston position and shaft speed sensors
D	Setting piston position sensors and prepared for shaft speed sensor.
L	Setting piston position sensor
P	Prepared for shaft speed sensor
T	Prepared for setting piston position sensor

ISO version

Frame size	
Code	Displacem.
110	110 (cm^3/rev)
160	160 (cm^3/rev)

Code	Mounting flange
I	ISO flange
Z	ISO (optional)

Code	Shaft seal
V	PPS

Code	Shaft end
C	DIN (ISO version)
D	DIN (ISO version)

Code	Control
AC	Pressure compensator
AD	Press. compensator with electrohydraulic override and brake defeat valve
AH	Pressure compensator with hydraulic override
EO	Electrohydraulic, two-position
EP	Electrohydraulic, proportional
HO	Hydraulic, two-position
HP	Hydraulic, proportional

Code	Pilot control signal
C	Pressure cut off (EP, HP)
E	External pressure (AC, AH, HO, HP)
I	Internal pressure (AC, AD, AH)
H	24 VDC (AD, EO, EP)
L	12 VDC (AD, EO, EP)

Code	Control orifice set (orifice dia in mm)
1	0.7
2	0.8
3	1.0 (standard)
4	1.2
5	EPC/HPC
X	Special

Code	Control modulating pressure/current
N	AC, AD, AH, EO, HO: 0 bar; EP: Non-selectible current
A	15 [bar] (AC, AD, AH, HP, HPC)
B	25 [bar] (AC, AD, AH, HP, HPC)
C	50 [bar] (AC, AD, AH)
D	80 [bar] (AC, AD, AH)

Code	Valve options (pages 46-47)
N	None
B	Brake valve and pressure relief valves*
L	Flushing valve
P	Pressure relief valves
R	Extra valve block *
W	Load hold valve (for EPC/HPC only) **

Code	Valve opening pressure
000	without pressure relief valve Pressure relief valve opening pressure [bar] (page 47)
	Alternatively: Flushing valve orifice (page 46)

Code	Sensor options (pages 48-49)
N	None
C	Prepared for setting piston position sensor and shaft speed sensor
D	Setting piston position sensor and prepared for shaft speed sensor
L	Setting piston position sensor
P	Prepared for speed sensor
T	Prepared for setting piston position sensor

Factory issued for special versions

Max and min displ. [cm^3/rev]

Threshold setting
AC, AD, AH: Select pressure between 100 and 350 [bar]
EO, EP: 400 [mA] - 12 [VDC] 200 [mA] - 24 [VDC]
HO, HP: 10 [bar]

Note:
* Contact Parker Hannifin for additional information

** Possible to combined with pressure relief valve
Contact Parker Hannifin for additional information

Cartridge version

V14	–	110	–	C	V	C	–					–			–		–		–		/		–		
Motor type		Frame size		Mounting flange	Shaft seal	Shaft end		Control	Control signal	Restrictor set	Modulating press./current		Valve options	Valve opening pressure		Sensor options		Version		Max and min displacement		Threshold setting	Pressure cut off EPC/HPC	

Frame size	
Code	Displacem.
110	110 (cm³/rev)

Code	Mounting flange
C	Cartridge version

Code	Shaft seal
V	PPS

Code	Shaft end
C	DIN (ISO version)

Code	Control
AC	Pressure compensator
AD	Press. compensator with electrohydraulic override and brake defeat valve
AH	Pressure compensator with hydraulic override
EO	Electrohydraulic, two-position
EP	Electrohydraulic, proportional
HO	Hydraulic, two-position
HP	Hydraulic, proportional

Code	Pilot control signal
C	Pressure cut off (EP, HP)
E	External pressure (AC, AH, HO, HP)
I	Internal pressure (AC, AD, AH)
H	24 VDC (AD, EO, EP)
L	12 VDC (AD, EO, EP)

Code	Control orifice set (orifice dia in mm)
1	0.7
2	0.8
3	**1.0 (standard)**
4	1.2
5	EPC/HPC
X	Special

Code	Control modulating pressure/current
N	AC, AD, AH, EO, HO: 0 bar; EP: Non-selectible current
A	15 [bar] (AC, AD, AH, HP, HPC)
B	25 [bar] (AC, AD, AH, HP, HPC)
C	50 [bar] (AC, AD, AH)
D	80 [bar] (AC, AD, AH)

Code	Valve opening pressure
000	without pressure relief valve Pressure relief valve opening pressure [bar] (page 47)
	Alternatively: Flushing valve orifice (page 46)

Code	Valve options (pages 46-47)
N	None
B	Brake valve and pressure relief valves*
L	Flushing valve
P	Pressure relief valves
R	Extra valve block *
W	Load hold valve (for EPC/HPC only) **

Code	Sensor options (pages 48-49)
N	None
C	Prepared for setting piston position sensor and shaft speed sensor
D	Setting piston position sensor and prepared for shaft speed sensor
L	Setting piston position sensor
T	Prepared for setting piston position sensor

Factory issued for special versions

Max and min displ. [cm³/rev]

Threshold setting
AC, AD, AH: Select pressure between 100 and 350 [bar]
EO, EP: 400 [mA] - 12 [VDC] 200 [mA] - 24 [VDC]
HO, HP: 10 [bar]

Note:
* Contact Parker Hannifin for additional information

** Possible to combined with pressure relief valve
Contact Parker Hannifin for additional information

SAE version

V14	–		–	S	V	S	–					–			–		–		–		/		–		
Motor type		Frame size		Mounting flange		Shaft end		Control	Control signal	Restrictor set	Modulating press./current		Valve options	Valve opening pressure		Sensor options		Version		Max and min displacement		Threshold setting		Pressure cut off EPC/HPC

Frame size	
Code	Displacem.
110	110 (cm^3/rev)
160	160 (cm^3/rev)

Code	Mounting flange
S	SAE version

Code	Shaft seal
V	PPS

Code	Shaft end
S	SAE (SAE version)

Code	Control
AC	Pressure compensator
AD	Press. compensator with electrohydraulic override and brake defeat valve
AH	Pressure compensator with hydraulic override
EO	Electrohydraulic, two-position
EP	Electrohydraulic, proportional
HO	Hydraulic, two-position
HP	Hydraulic, proportional

Code	Pilot control signal
C	Pressure cut off (EP, HP)
E	External pressure (AC, AH, HO, HP)
I	Internal pressure (AC, AD, AH)
H	24 VDC (AD, EO, EP)
L	12 VDC (AD, EO, EP)

Code	Control orifice set (orifice dia in mm)
1	0.7
2	0.8
3	**1.0 (standard)**
4	1.2
5	EPC/HPC
X	Special

Code	Control modulating pressure/current
N	AC, AD, AH, EO, HO: 0 bar; EP: Non-selectible current
A	15 [bar] (AC, AD, AH, HP, HPC)
B	25 [bar] (AC, AD, AH, HP, HPC)
C	50 [bar] (AC, AD, AH)
D	80 [bar] (AC, AD, AH)

Code	Valve options (pages 46-47)
N	None
B	Brake valve and pressure relief valves*
L	Flushing valve
P	Pressure relief valves
R	Extra valve block *
W	Load hold valve (for EPC/HPC only) **

Code	Valve opening pressure
000	without pressure relief valve Pressure relief valve opening pressure [bar] (page 47)
	Alternatively: Flushing valve orifice (page 46)

Code	Sensor options (pages 48-49)
N	None
C	Prepared for setting piston position sensor and shaft speed sensor
D	Setting piston position sensor and prepared for shaft speed sensor
L	Setting piston position sensor
P	Prepared for speed sensor
T	Prepared for setting piston position sensor

Factory issued for special versions

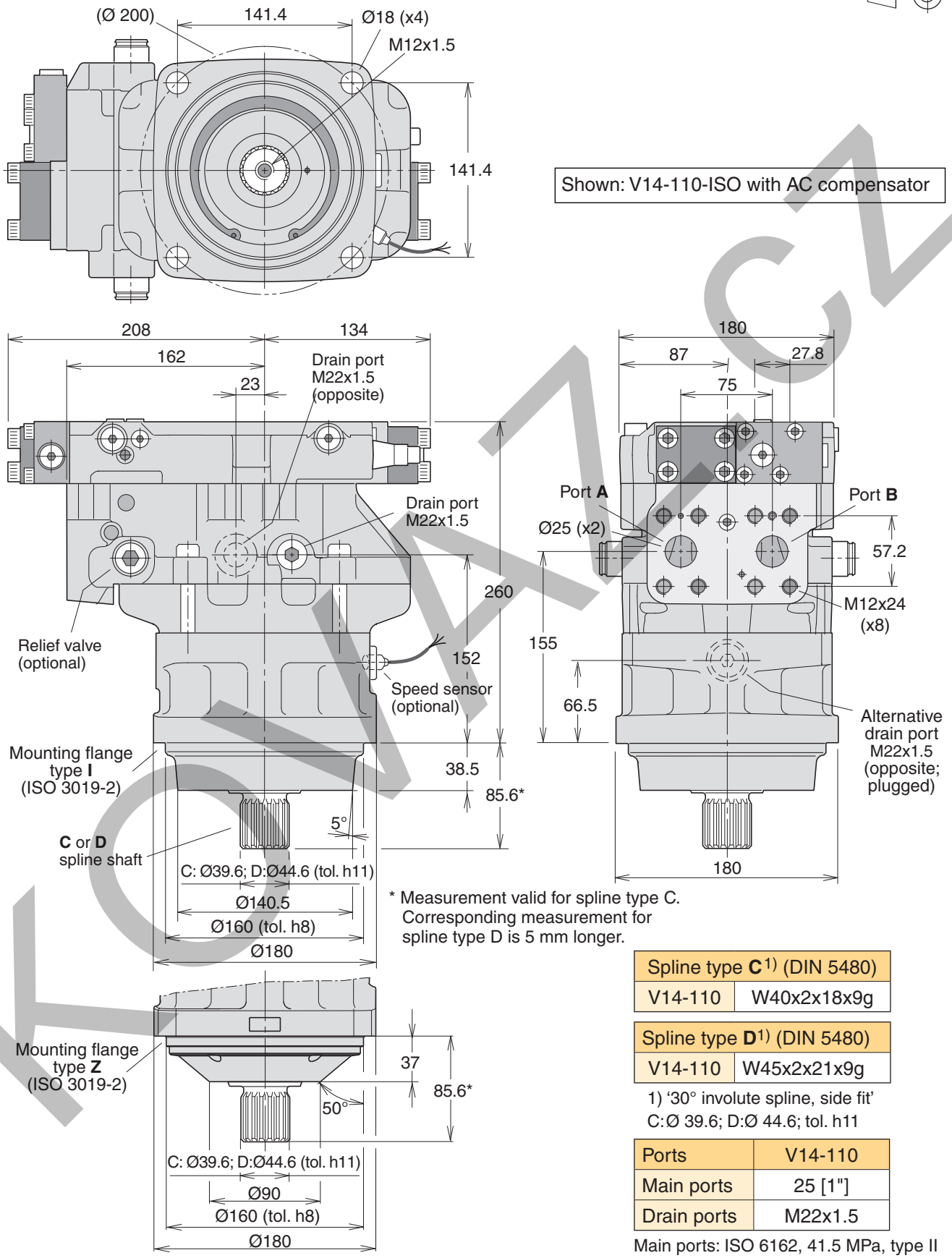
Max and min displ. [cm^3/rev]

Threshold setting
AC, AD, AH: Select pressure between 100 and 350 [bar]
EO, EP: 400 [mA] - 12 [VDC] 200 [mA] - 24 [VDC]
HO, HP: 10 [bar]

Note:
* Contact Parker Hannifin for additional information

** Possible to combined with pressure relief valve
Contact Parker Hannifin for additional information

V14-110, ISO version



* Measurement valid for spline type C.
Corresponding measurement for
spline type D is 5 mm longer.

Spline type **C** 1) (DIN 5480)	
V14-110	W40x2x18x9g

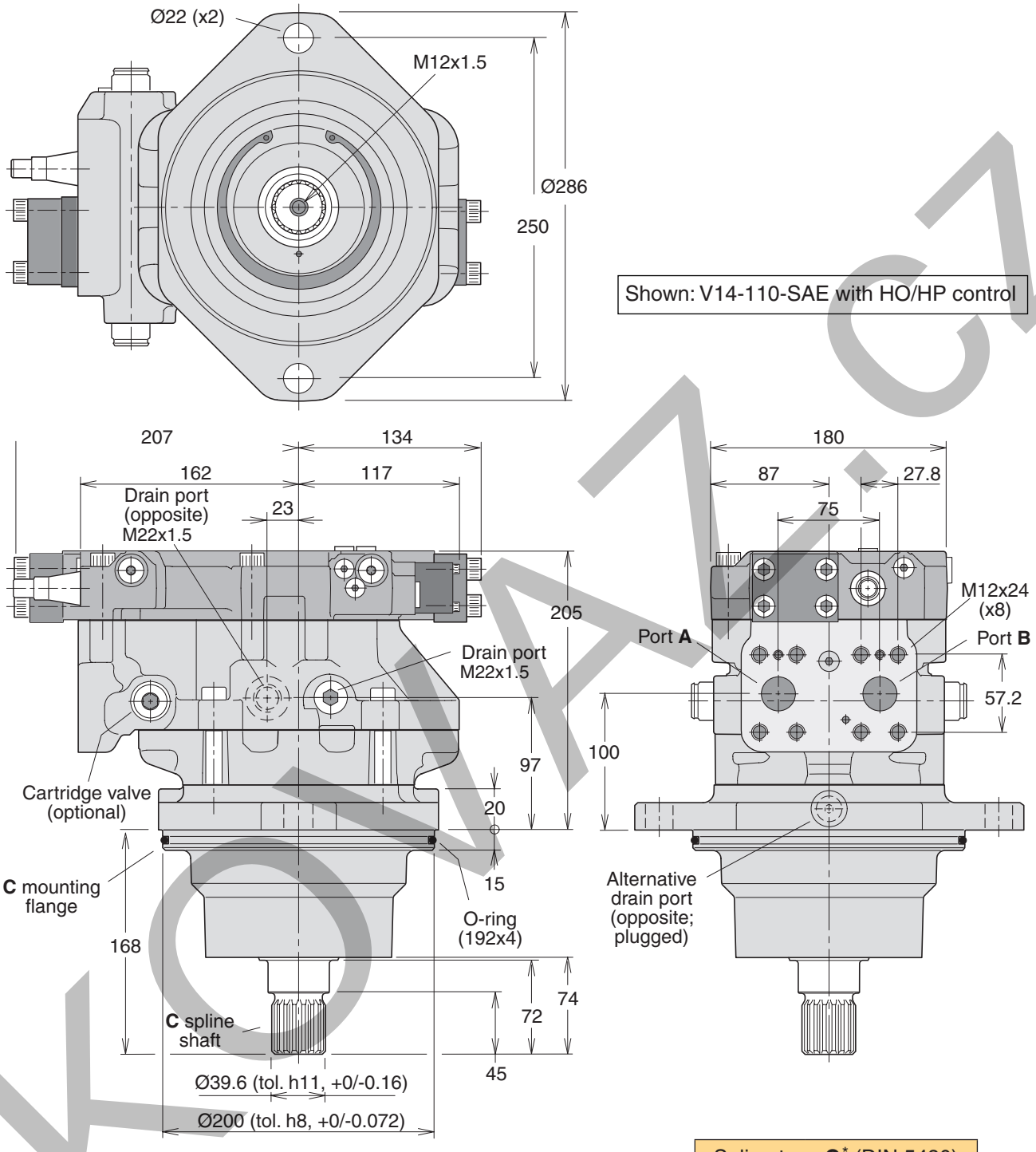
Spline type **D** 1) (DIN 5480)	
V14-110	W45x2x21x9g

1) '30° involute spline, side fit'
C:Ø 39.6; D:Ø 44.6; tol. h11

Ports	V14-110
Main ports	25 [1"]
Drain ports	M22x1.5

Main ports: ISO 6162, 41.5 MPa, type II

V14-110, Cartridge version



Shown: V14-110-SAE with HO/HP control

Spline type **C*** (DIN 5480)	
V14-110	W40x2x18x9g

* '30° involute spline, side fit'.

Ports	V14-110
Main ports	25 [1"]
Drain ports	M22x1.5

Main ports: ISO 6162, 41.5 MPa, type II

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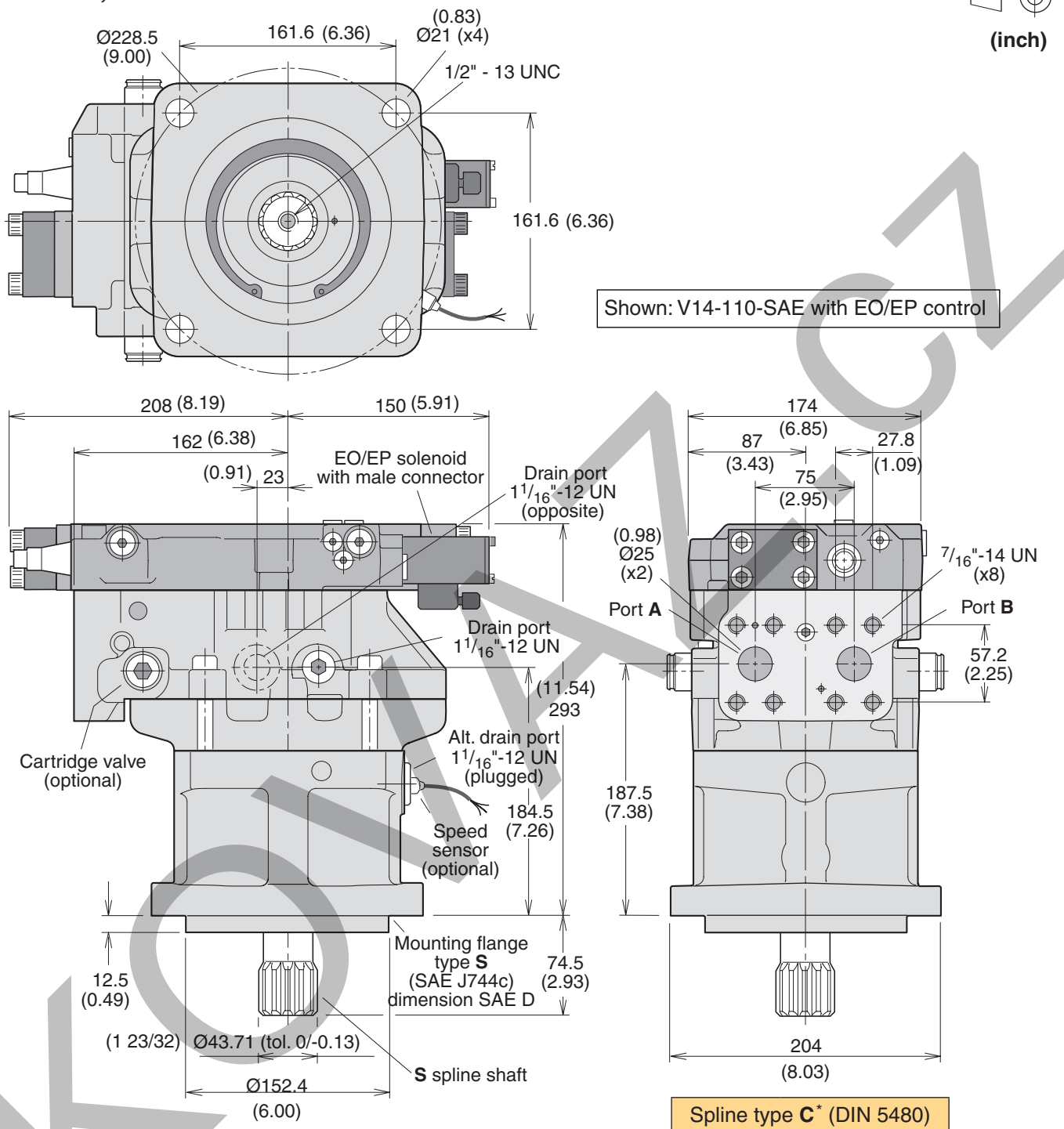
Trollhättan, Sweden

V14-110, SAE version

(inch)



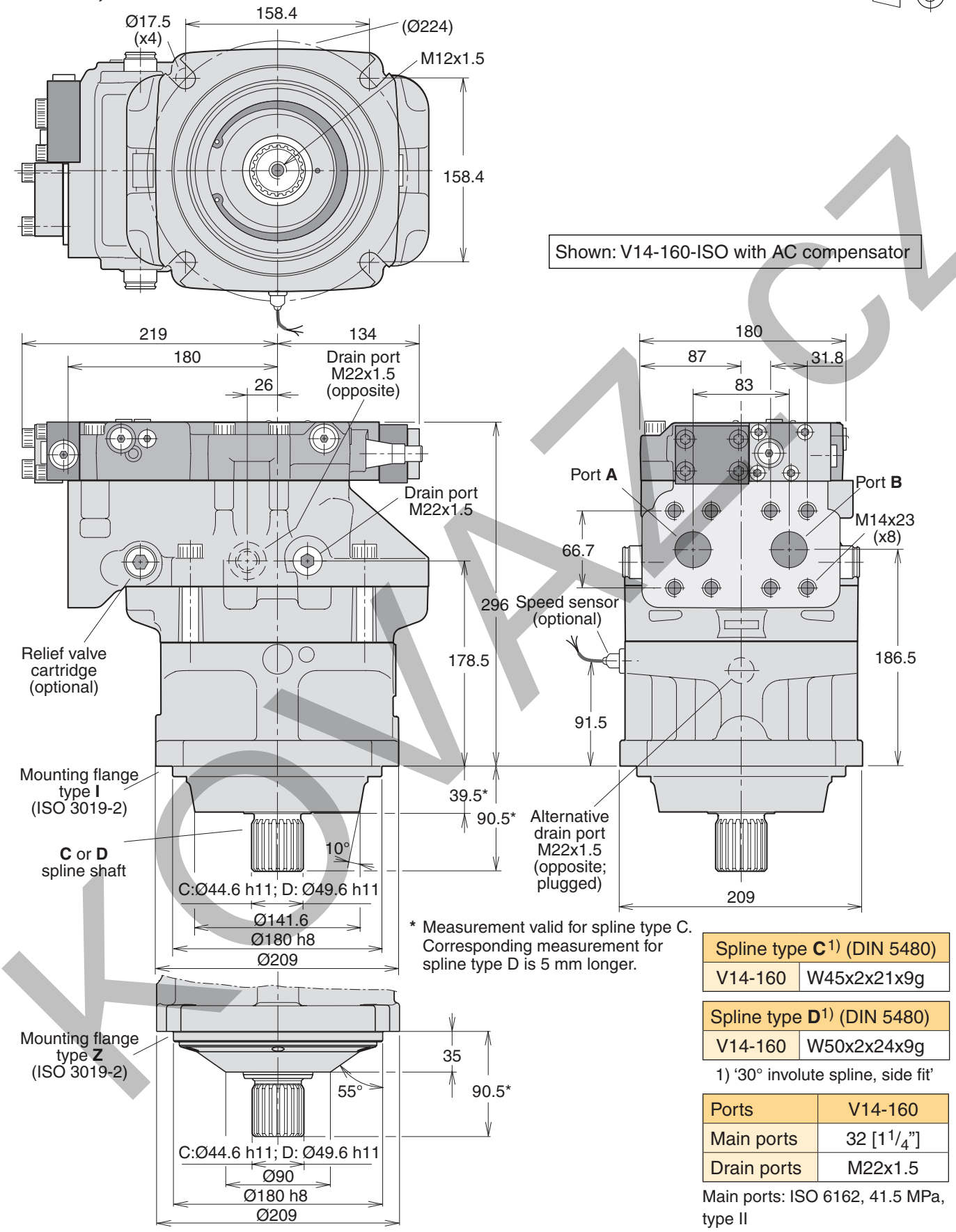
Spline type **C*** (DIN 5480)	
V14-110	SAE 'D' (13T, 8/16 DP)

***** '30° involute spline, side fit'.

Ports	V14-110
Main ports	25 [1"]
Drain ports	1 1/16"-12 UN

Main ports: SAE J518c, 6000 psi

V14-160, ISO version



* Measurement valid for spline type C. Corresponding measurement for spline type D is 5 mm longer.

Spline type **C** 1) (DIN 5480)	
V14-160	W45x2x21x9g

Spline type **D** 1) (DIN 5480)	
V14-160	W50x2x24x9g

1) '30° involute spline, side fit'

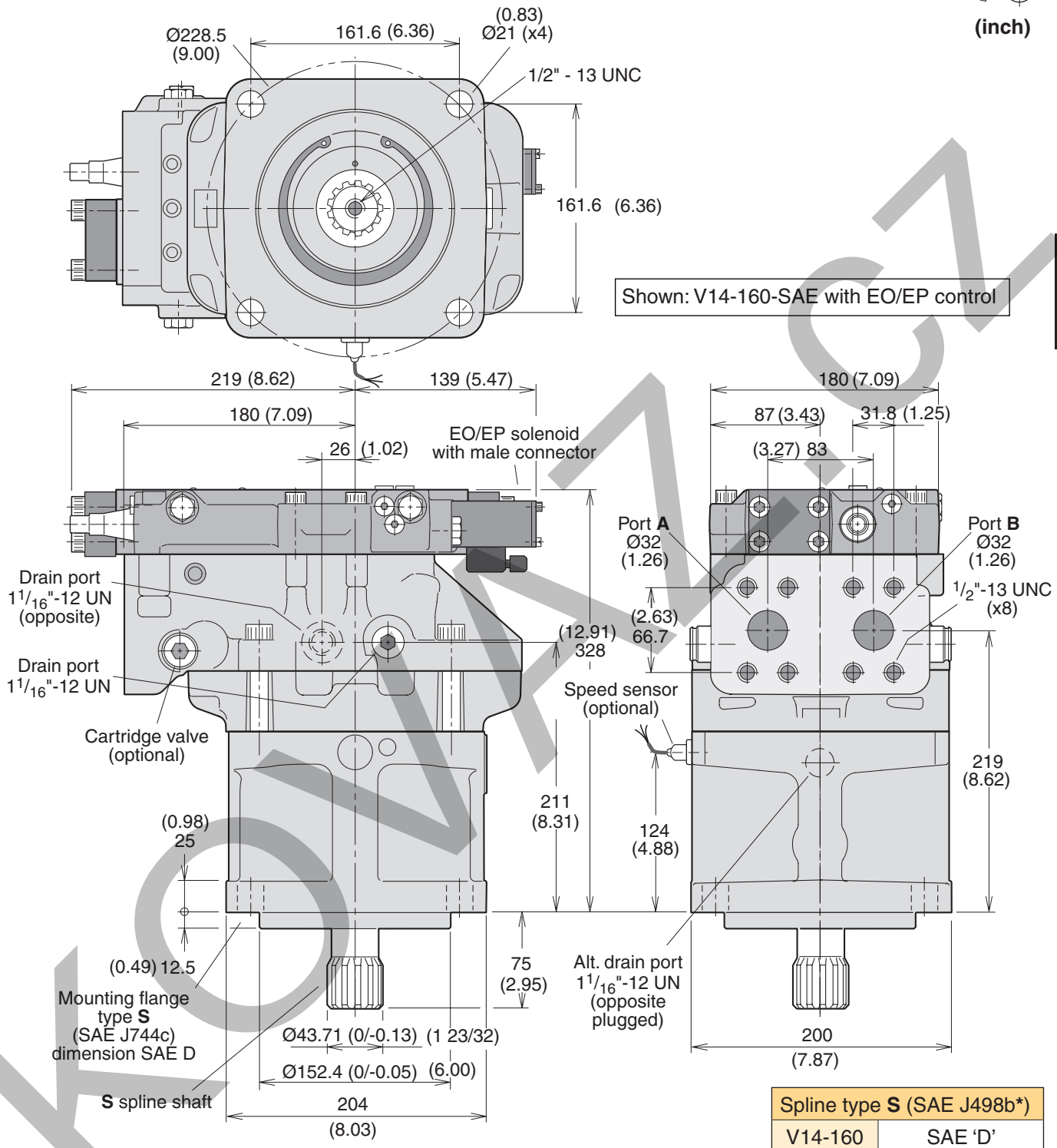
Ports	V14-160
Main ports	32 [$1^1/_4$"]
Drain ports	M22x1.5

Main ports: ISO 6162, 41.5 MPa, type II

Parker Hannifin
Pump and Motor Division
Trollhättan, Sweden

V14-160, SAE version

(inch)



Spline type **S** (SAE J498b*)	
V14-160	SAE 'D' (13T, 8/16 DP)

1) '30° involute spline, side fit'

Ports	V14-160
Main ports	32 [1 1/4"]
Drain ports	1 1/16"-12 UN

Main ports: SAE J518c, 6000 psi