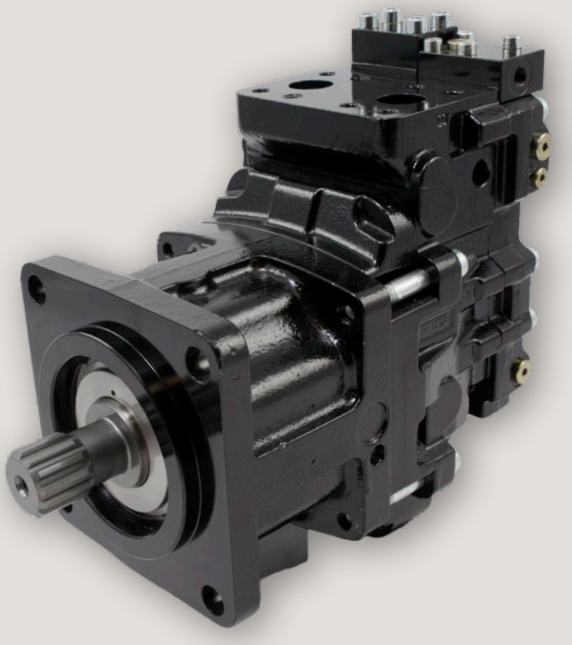
V14 Series Axial Piston Variable Motors Service Manual

V14



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V14 cross section

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11. Spherical piston with laminated piston ring
12. Synchronizing shaft
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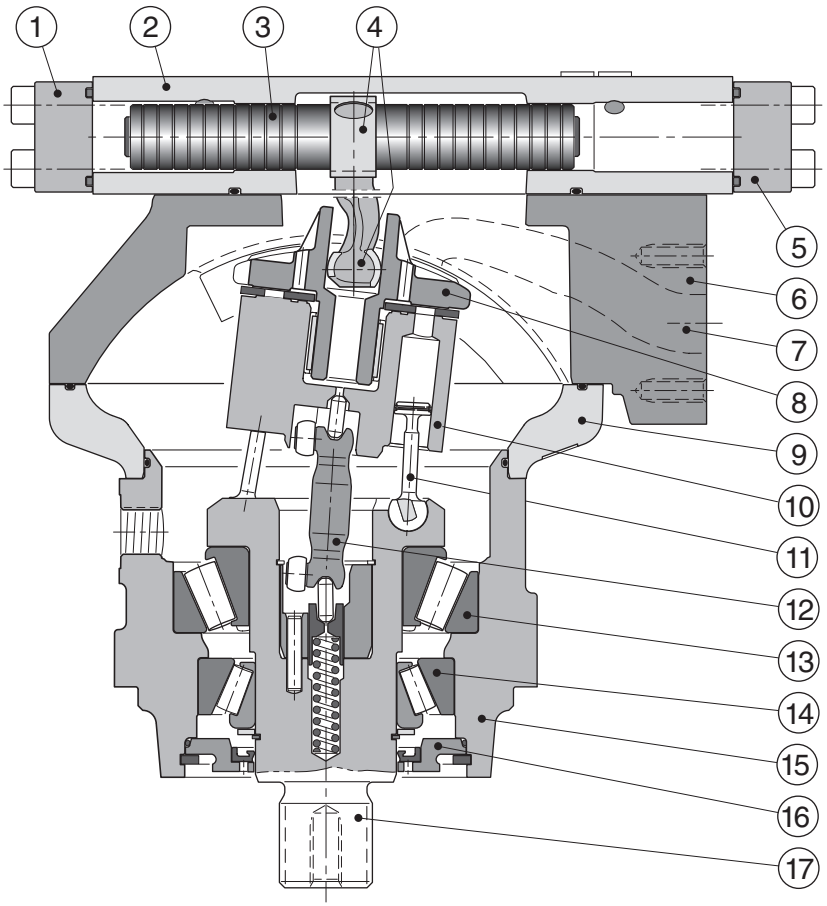


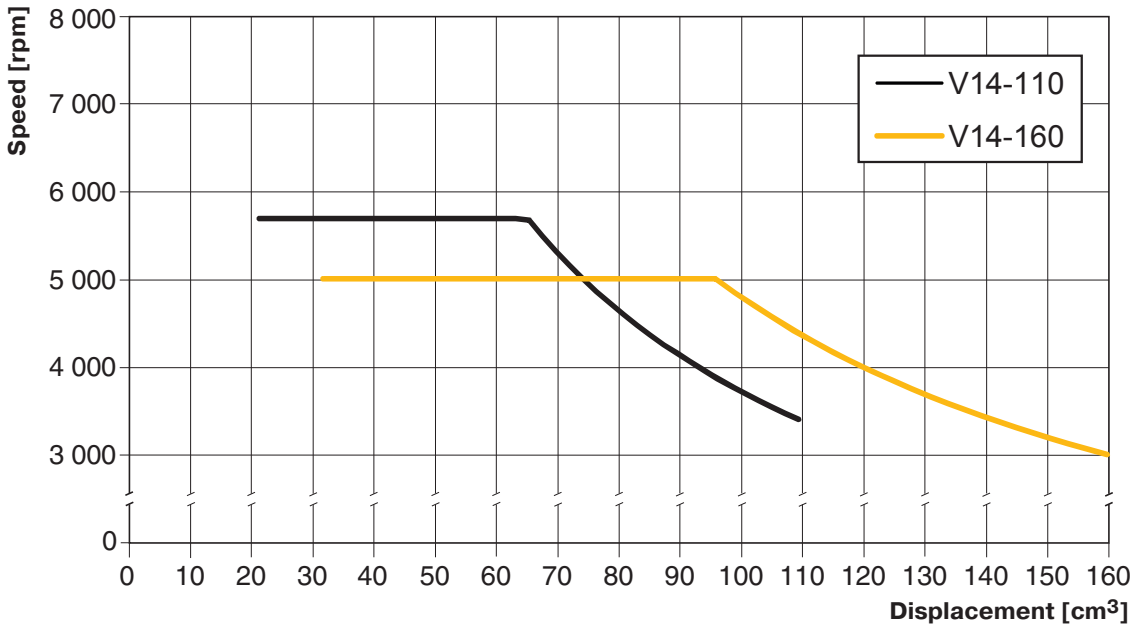
Specifications

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)]	3900	3400
- at 35°, max continuous	3400	3000
- at 6.5° – 20°, max intermittent [1)]	6500	5700
- at 6.5° – 20°, max continuous	5700	5000
- min continuous	50	50

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

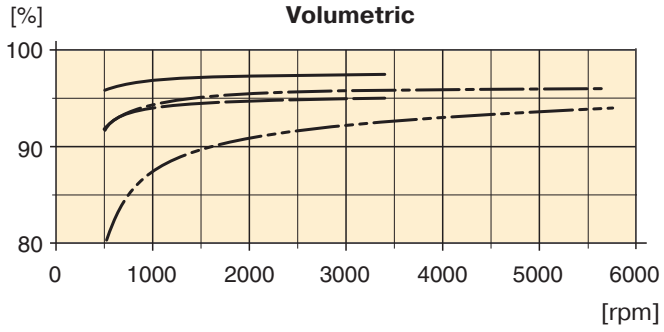
The following diagrams show volumetric, mechanical and overall efficiencies versus shaft speed at 210 and 420 bar operating pressure, and at full (35°) and reduced (10°) displacements.

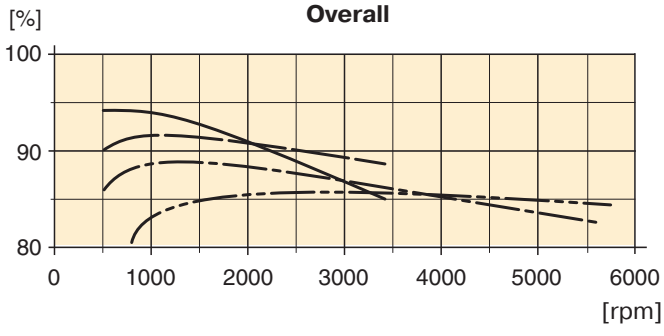
Information on efficiencies for a specific load condition can be made available from Parker Hannifin.

210 bar at full displacement
420 bar " " "

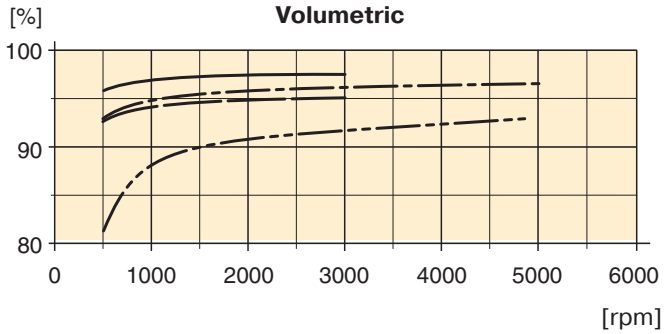
210 bar at reduced displacement
420 bar " " "

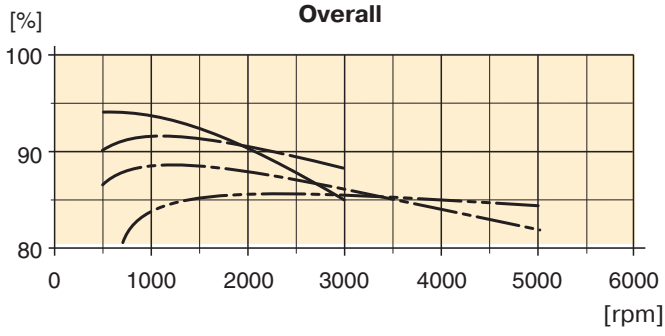
V14-110





V14-160





Controls – general information

The following V14 controls satisfy most application requirements:

- **AC** 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 39)

All controls utilize a servo piston that connects to the valve segment (refer to the illustration on page 27).

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

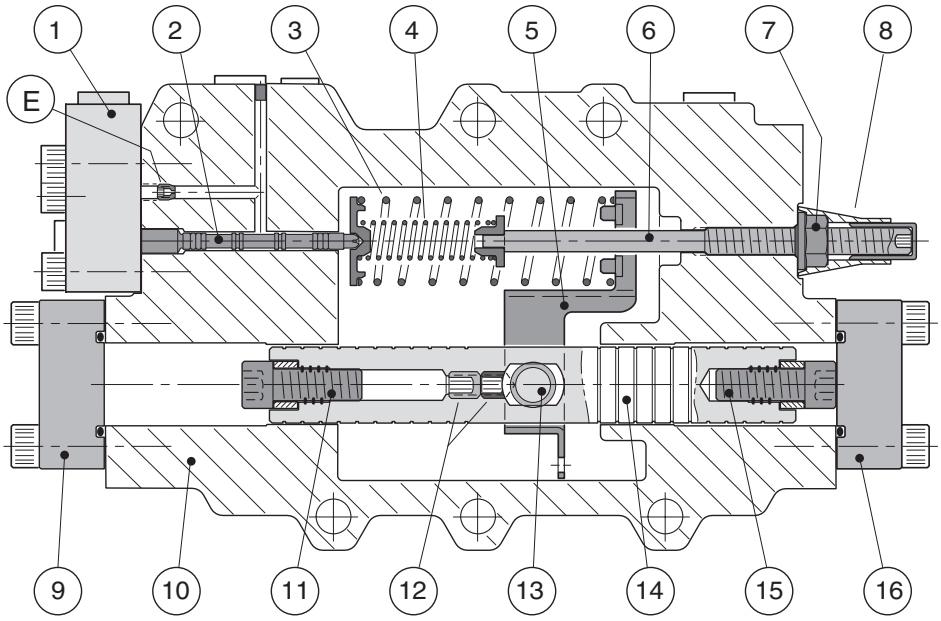
The displacement angle (between output shaft and cylinder barrel) ranges from 35° (max) to 6.5° (min).

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 31 to 32.

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

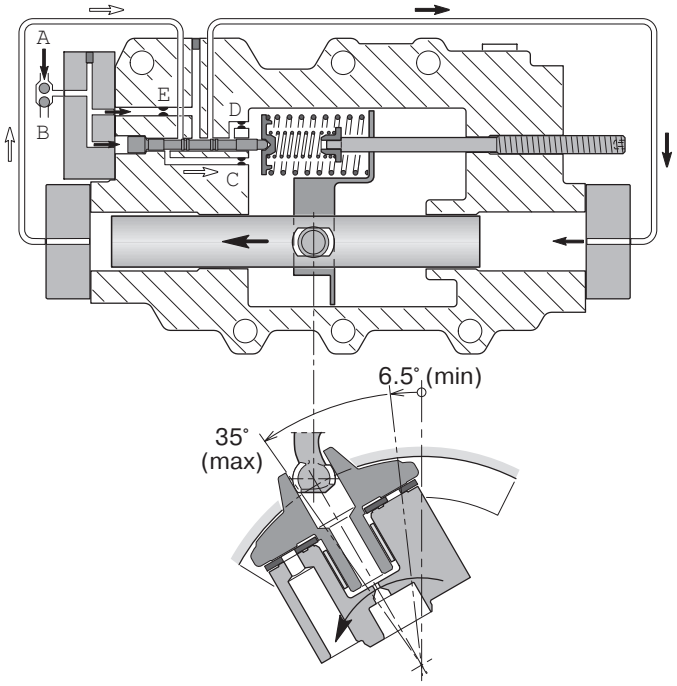
Parker Hannifin
Pump & Motor Division Europe
Trollhättan, Sweden

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).

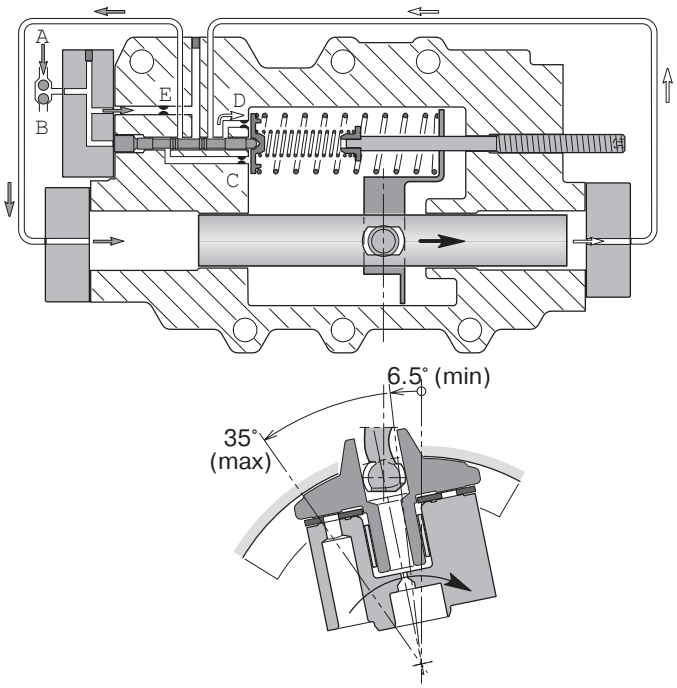


AC function (displ. increases at increasing system pressure).

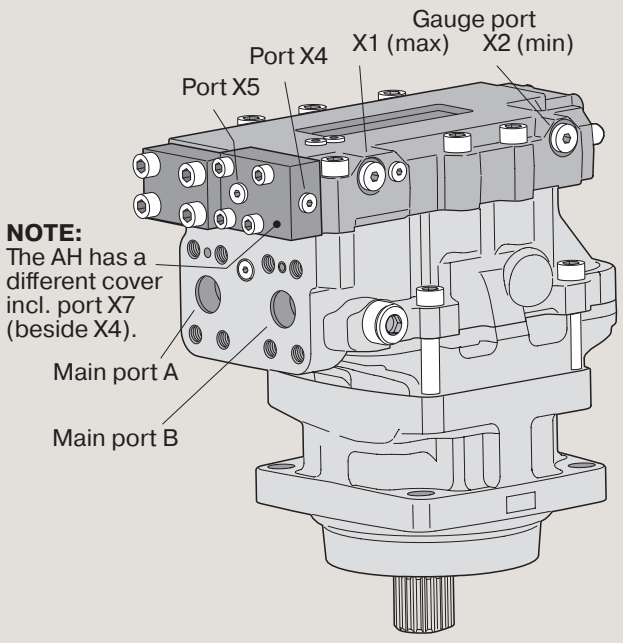
Refer to the illustration below (right):

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).



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).

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.

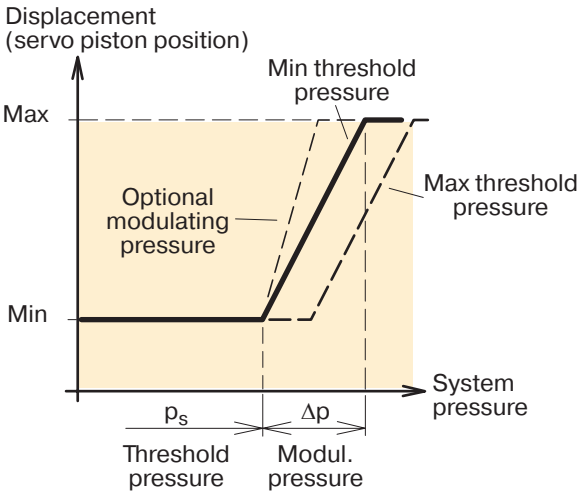
To reach max displacement, an additional modulating pressure (Δp) above the threshold pressure is required.

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

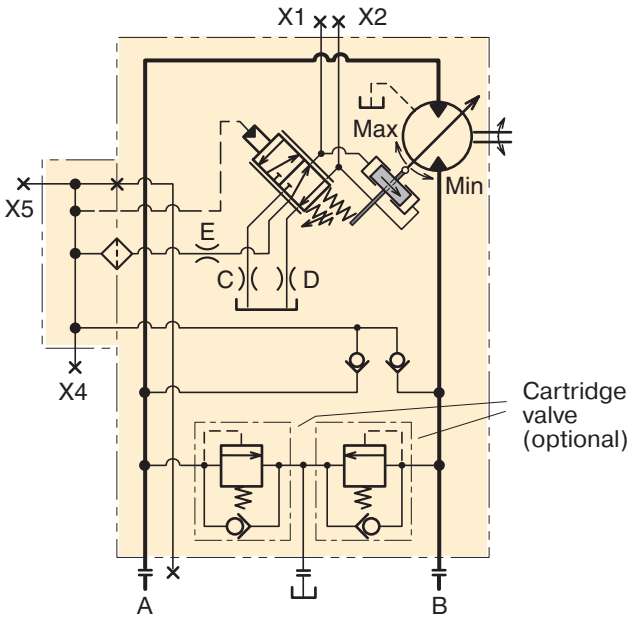
The pressure compensator is supplied with a small filter installed in the AC control cover (between ports X4 and X5); refer to the schematic below right.

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:	
–	M14 x 1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18 O-ring boss (SAE version).

NOTE: Port locations are shown in the illustration on page 30.



AC diagram (displacement vs. system pressure).



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

AH pressure compensator

The AH compensator incorporates an hydraulic over-ride 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):

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

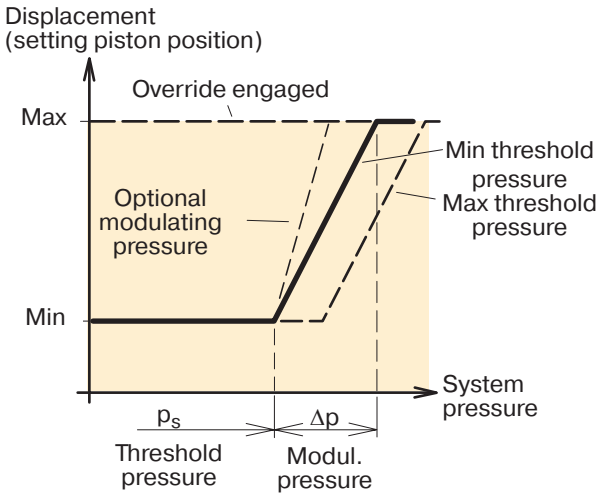
p_7 = Override pressure

p_s = System pressure

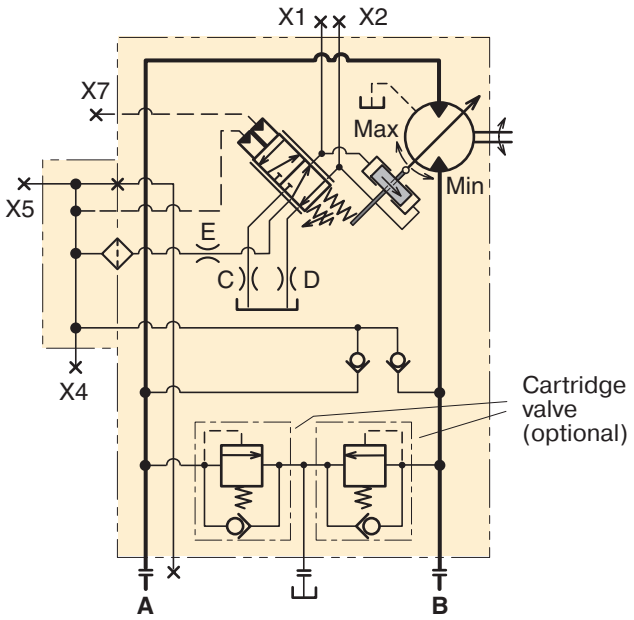
Δp = Modulating pressure

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 30.



AH diagram (displacement vs. system pressure).



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

EO, EP, HO and HP controls

(general information)

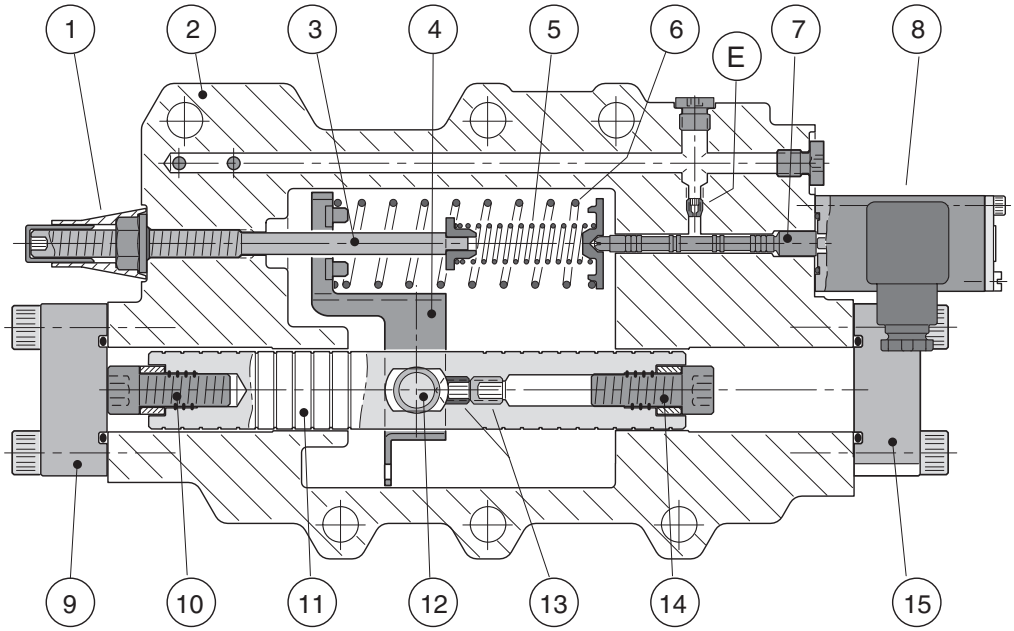
Basically, these controls function in a similar way.

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. End cover (min displ. limit)

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

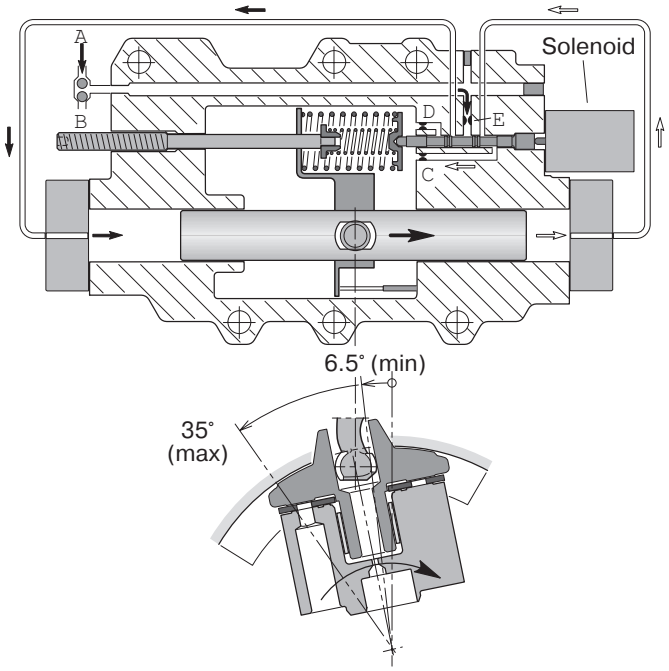
* Yellow cap = factory set.
Red cap 3797065 available as spare part

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).

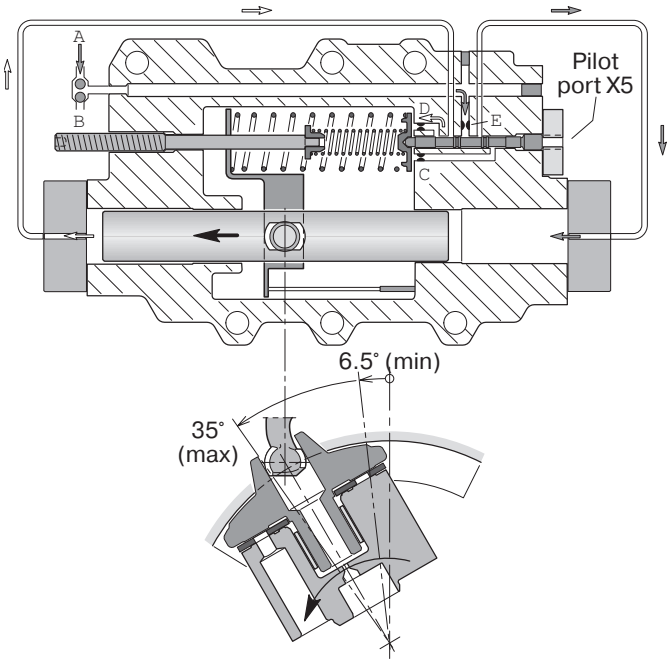
HP control function (decreasing pilot pressure)

NOTE: Valid also for the EP at decreasing current.

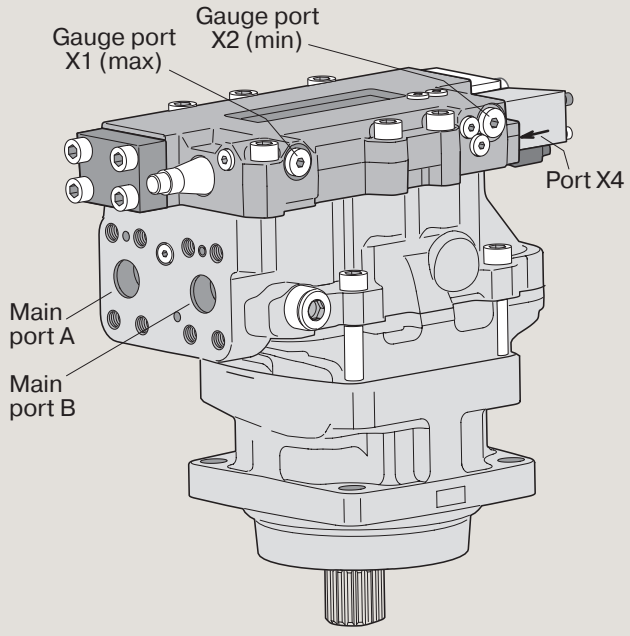
Refer to the illustration below right:

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.).

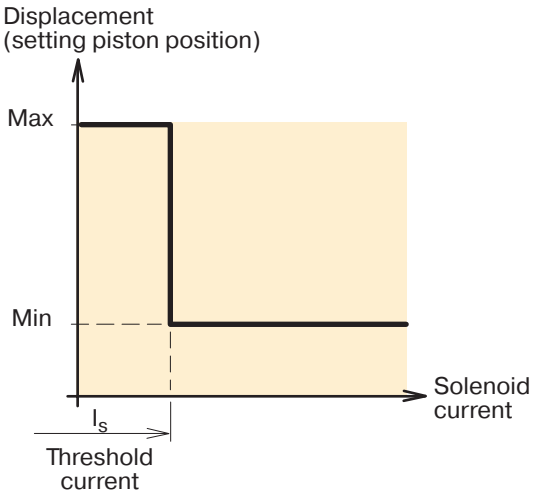


Port locations – V14- with EO or EP control.

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:	
–	M14 x 1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18 O-ring boss (SAE version).

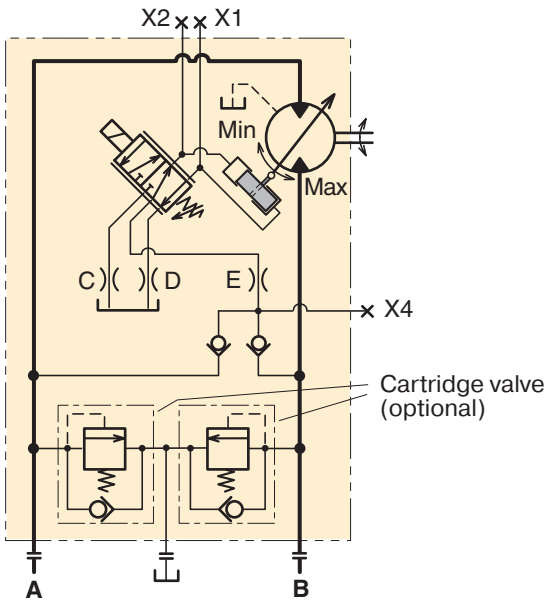
EO electric two-position control

- 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 34).
- 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.
- 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 Deutsch DT04-2P (IP67) is permanently installed on the solenoid. The corresponding female connector is not included. **Note:** The female connector is available as spare part P-N 3787488.
- 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 (EO and EP controls):	
X1	Setting piston pressure (decreasing displ.)
X2	Setting piston pressure (increasing displ.)
X4	Servo supply pressure (before orifice)
Port sizes:	
–	M14 x 1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18 O-ring boss (SAE version).

NOTE: Port locations are shown in the illustration on page 34.

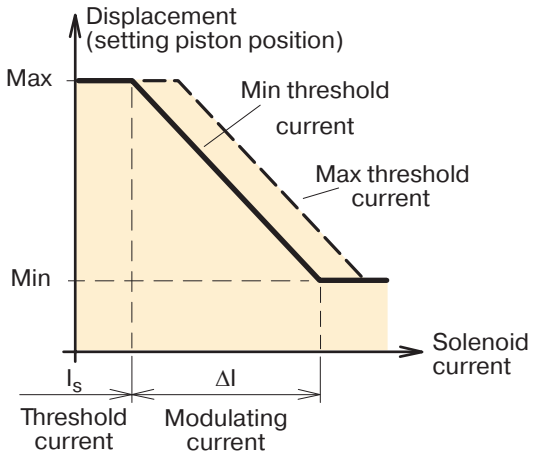


EO schematic (shown: non-activated solenoid; control in max displacement position).

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 34).
- 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.

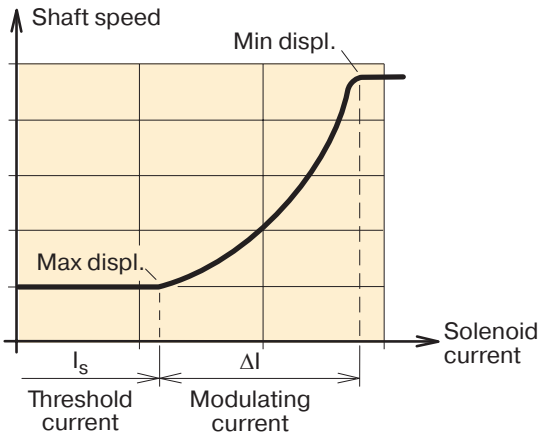
NOTE: The shaft speed is **not** proportional to the solenoid current; refer to the bottom diagram.



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).

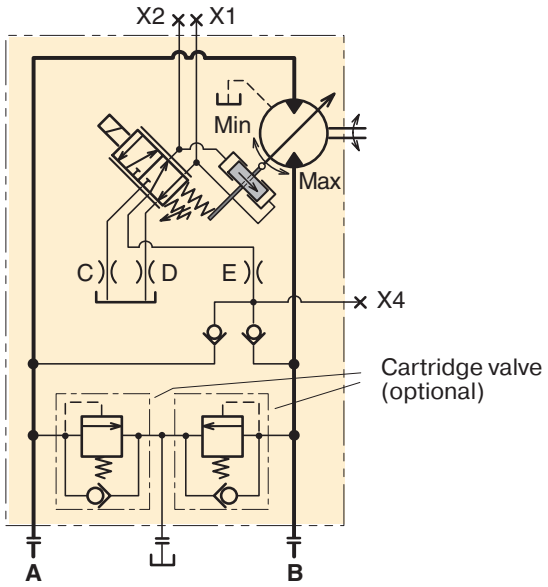
NOTE: Port locations are shown in the illustration on page 34.



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

- The solenoid is either 12 or 24 VDC, requiring 1 200 and 600 mA respectively.
- The male connector, type Deutsch DT04-2P (IP67) is permanently installed on the solenoid. The corresponding female connector is not included. **Note:** The female connector is available as spare part P-N 3787488.
- 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.

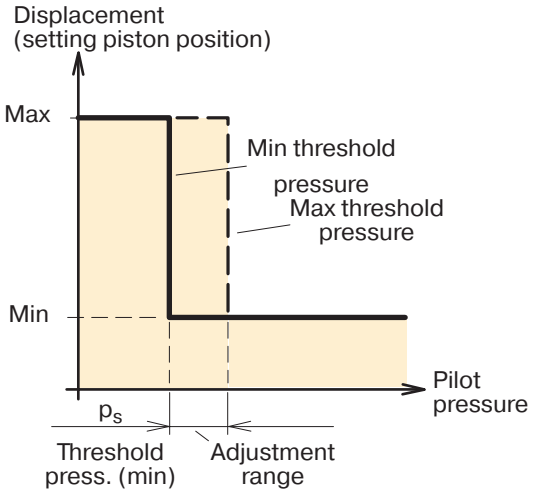
NOTE: The modulating current (ΔI) is not adjustable.



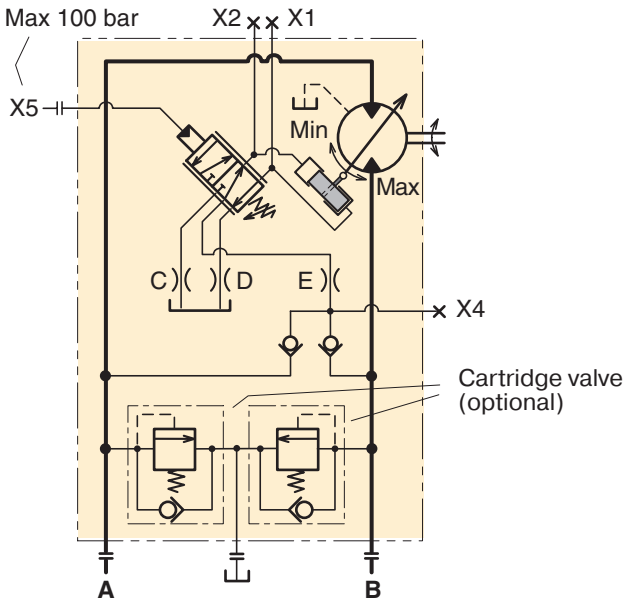
EP schematic (shown: non-activated solenoid; control moving towards max displacement).

HO hydraulic two-position control

- The two-position HO control is similar to the EO (page 35) 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.

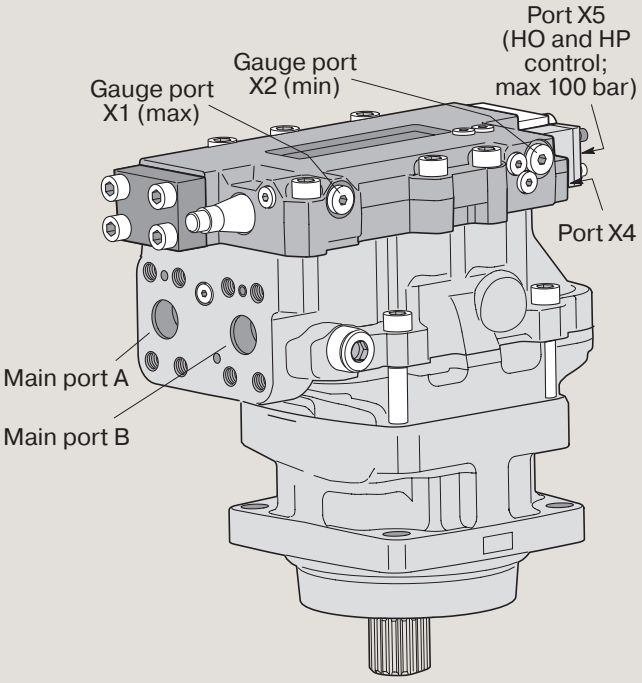


HO diagram (displacement vs. pilot pressure).



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

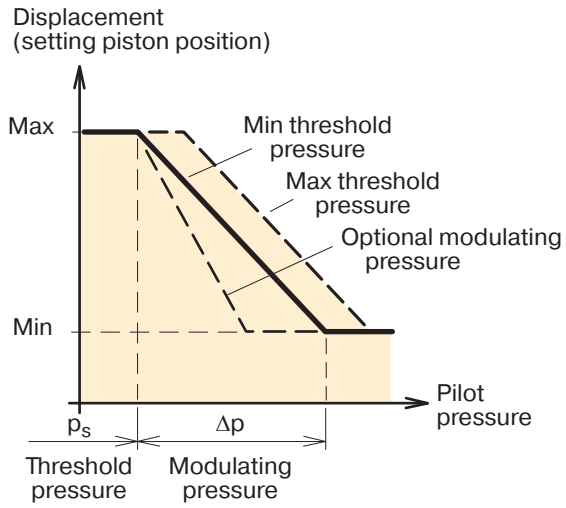
Gauge/pilot ports (HO and HP controls):	
X1	Setting piston pressure (decreasing displ.)
X2	Setting piston pressure (increasing displ.)
X4	Servo supply pressure (before orifice)
X5	External pilot pressure (max 100 bar; HO and HP control)
Port sizes:	
–	M14x1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18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



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

HP hydraulic proportional control

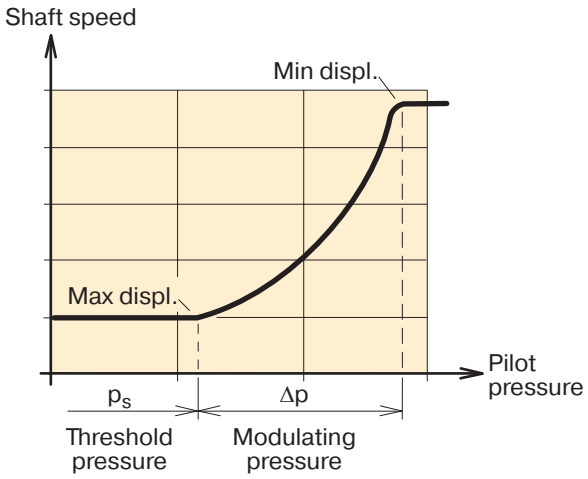
- Like the EP described on page 34, the HP proportional control offers continuously variable displacement, but the controlling signal is hydraulic.
- Normally, the setting piston stays in the max displacement position. When a sufficiently high pilot pressure (p_s) is applied to port X5, the setting piston 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:	
–	M14 x 1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18 O-ring boss (SAE version).

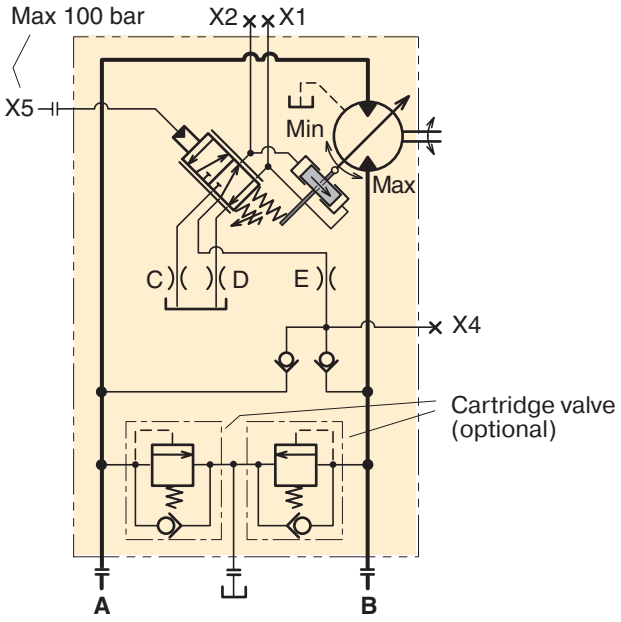
NOTE: Port locations are shown in the illustration on page 37.



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.

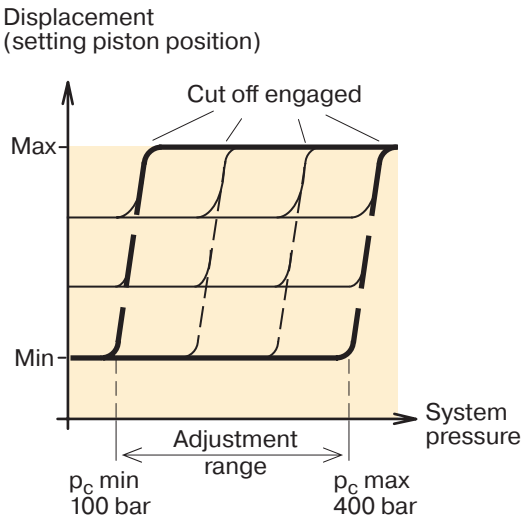
See also “Controls, Note” on page 29.

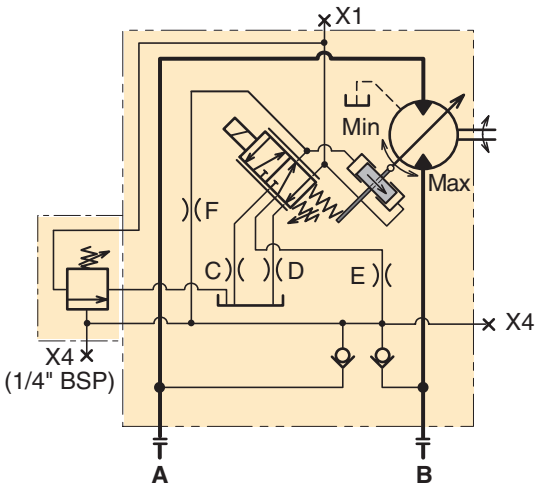


HP schematic (shown: port X5 not pressurized; control moving towards max displacement).

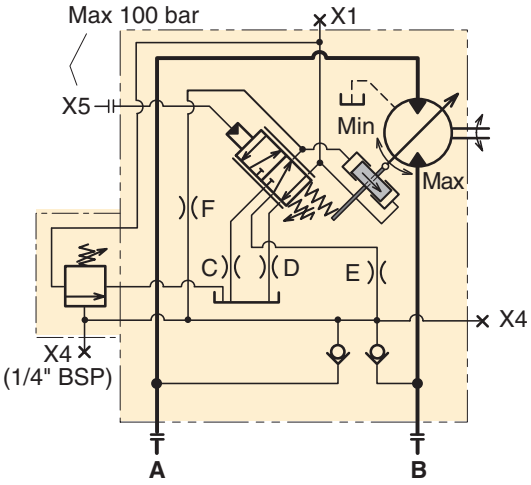
EPC/HPC, EP/HP control with pressure cut off

- 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. One revolution corresponds to 48 bar (696 psi)
- 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.





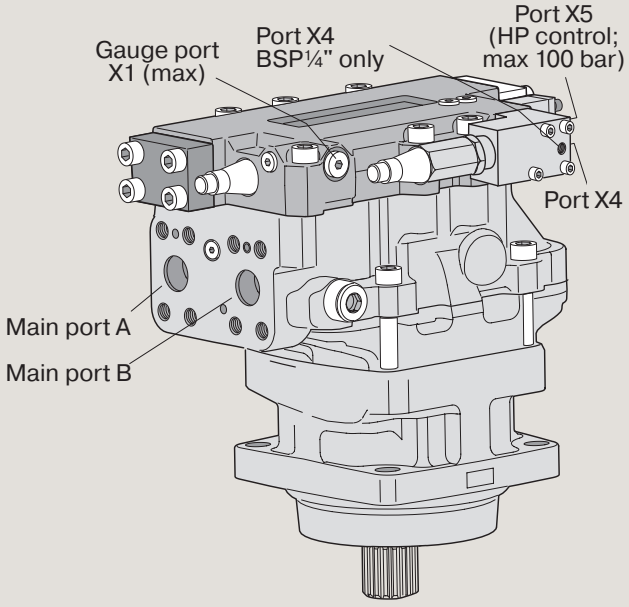
EPC schematic (control moving towards max displacement).



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

Gauge/pilot ports (EPC control):	
X1	Setting piston pressure (decreasing displ.)
X4	Servo supply pressure (before orifice)
X4	Servo supply pressure (on EPC) BSP¼" only
Port sizes:	
–	M14 x 1.5 (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) BSP¼" only
X5	External pilot pressure (max 100 bar)
Port sizes:	
–	M14x1.5 (ISO and cartridge versions)
–	$^{9}/_{16}$"-18 O-ring boss (SAE version).



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

Parker Hannifin
Pump & Motor Division Europe
Trollhättan, Sweden

ISO version

V14	–		–	I	V		–					–			–		–		–		/		–		
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 (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
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, AH)
H	24 VDC (EO, EP)
L	12 VDC (EO, EP)

Code	Control orifice set and solenoid for EPC (orifice dia in mm)
1	0.7
2	0.8
3	**1.0 (standard)**
4	1.2
5*	HPC
L*	EPC 12 V
H*	EPC 24 V
X	Special

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

Code	Valve options (pages 93 to 94)
N	None
B	Brake valve and pressure relief valves**
L	Flushing valve
P	Pressure relief valves
W	Load hold valve (for EPC/HPC only) ***

Code	Valve opening pressure
000	without pressure relief valve Pressure relief valve opening pressure [bar] (page 94)
	Alternatively: Flushing valve orifice (page 93)

Code	Sensor options (page 95)
N	None
P	Prepared for speed sensor

Factory issued for special versions

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

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

Note:

* Control orifice set is not selectable for HPC, EPC

** Contact Parker Hannifin for additional information

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

Cartridge version

V14	–		–	C	V		–					–			–		–		–		/		–		
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)
160	160 (cm³/rev)

Code	Mounting flange
C	Cartridge version

Code	Shaft seal
V	PPS

Frame size		110	160
Code	Shaft end		
C	DIN (ISO version)	x	-
D	DIN (ISO version)	-	x

Code	Control
AC	Pressure compensator
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, AH)
H	24 VDC (EO, EP)
L	12 VDC (EO, EP)

Code	Control orifice set and solenoid for EPC (orifice dia in mm)
1	0.7
2	0.8
3	**1.0 (standard)**
4	1.2
5*	HPC
L*	EPC 12 V
H*	EPC 24 V
X	Special

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

Code	Valve options (pages 93 to 94)
N	None
B	Brake valve and pressure relief valves**
L	Flushing valve
P	Pressure relief valves
W	Load hold valve (for EPC/HPC only) ***

Code	Valve opening pressure
000	without pressure relief valve Pressure relief valve opening pressure [bar] (page 94)
	Alternatively: Flushing valve orifice (page 93)

Code	Sensor options (page 95)
N	None
P	Prepared for speed sensor

Factory issued for special versions

Max and min displ. [cm³/rev]

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

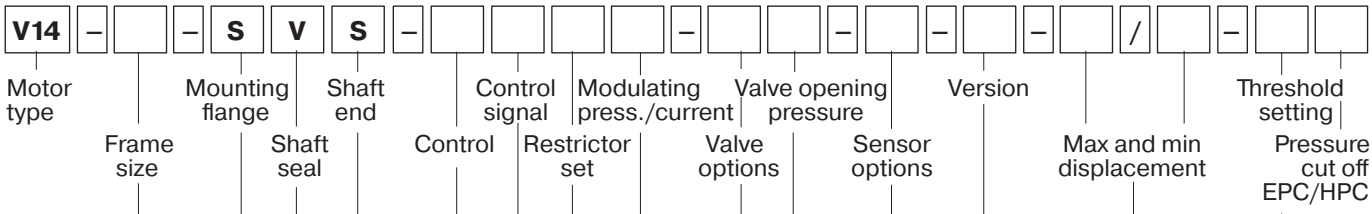
Note:

* Control orifice set is not selectable for HPC, EPC

** Contact Parker Hannifin for additional information

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

SAE version



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
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, AH)
H	24 VDC (EO, EP)
L	12 VDC (EO, EP)

Code	Control orifice set and solenoid for EPC (orifice dia in mm)
1	0.7
2	0.8
3	**1.0 (standard)**
4	1.2
5*	HPC
L*	EPC 12 V
H*	EPC 24 V
X	Special

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

Code	Valve options (pages 93 to 94)
N	None
B	Brake valve and pressure relief valves **
L	Flushing valve
P	Pressure relief valves
W	Load hold valve (for EPC/HPC only) ***

Code	Valve opening pressure
000	without pressure relief valve Pressure relief valve opening pressure [bar] (page 94)
	Alternatively: Flushing valve orifice (page 93)

Code	Sensor options (page 95)
N	None
P	Prepared for speed sensor

Factory issued for special versions

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

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

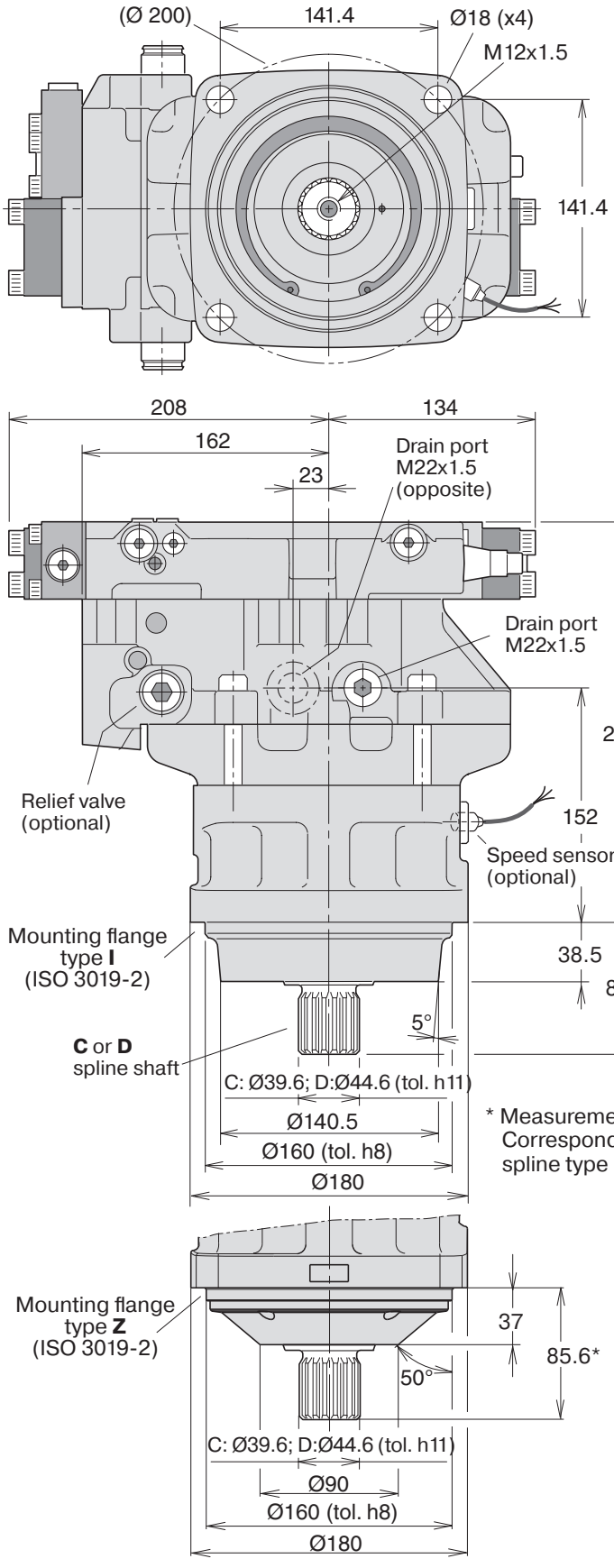
Note:

* Control orifice set is not selectable for HPC, EPC

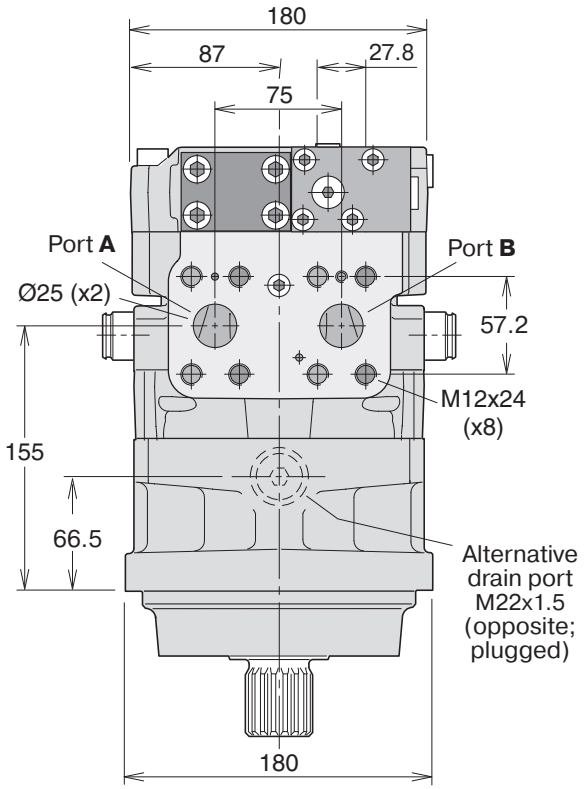
** Contact Parker Hannifin for additional information

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

V14-110, ISO version



Shown: V14-110-ISO with AC compensator



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

Spline type C[1] (DIN 5480)	
V14-110	W40 x 2 x 18 x 9 g

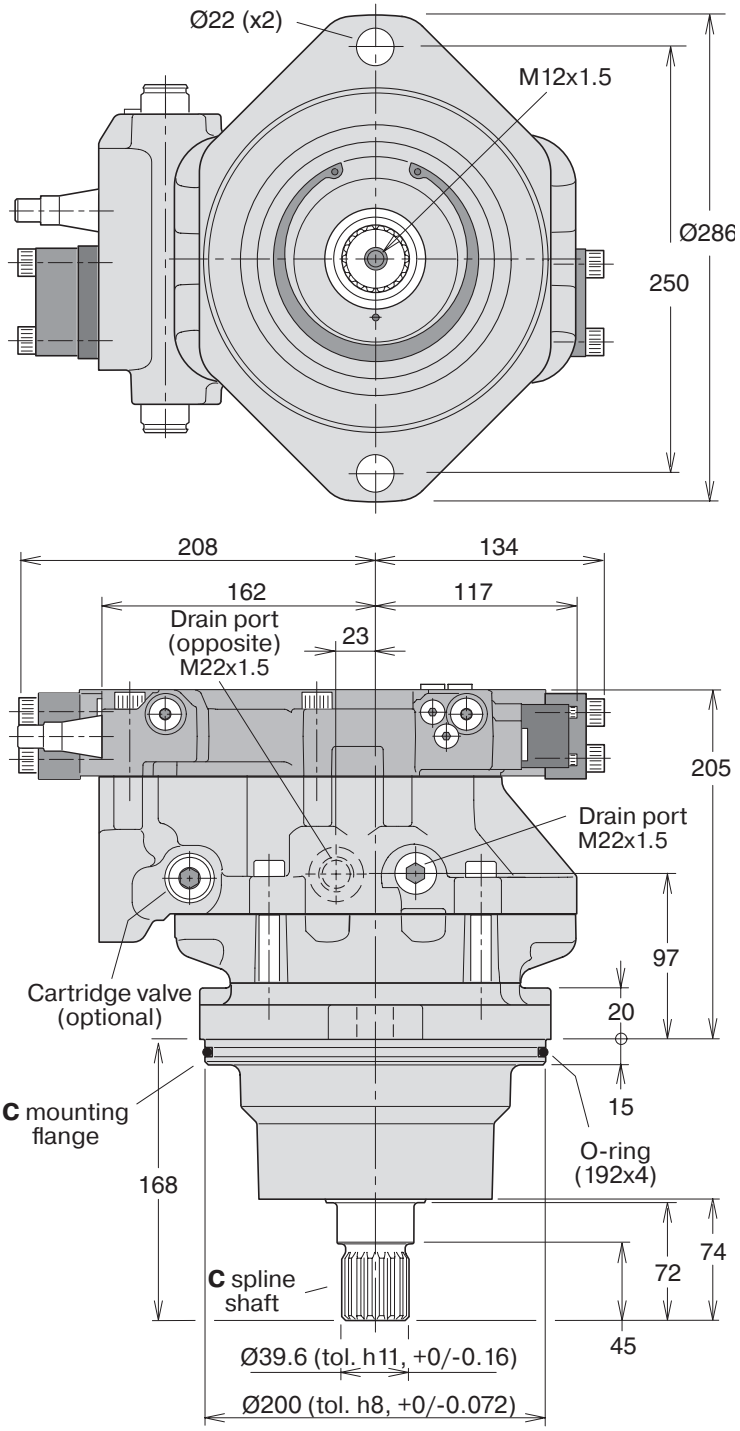
Spline type D[1] (DIN 5480)	
V14-110	W45 x 2 x 21 x 9 g

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

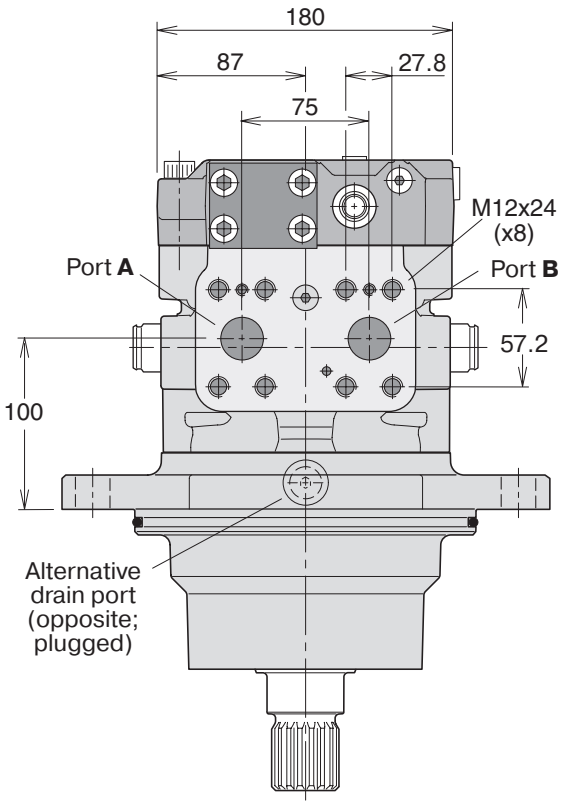
Ports	V14-110
Main ports	25 [1"]
Drain ports	M22 x 1.5

Main ports: ISO 6162, 41.5 MPa, type II

V14-110, Cartridge version



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



Spline type C [1] (DIN 5480)	
V14-110	W40 x 2 x 18 x 9 g

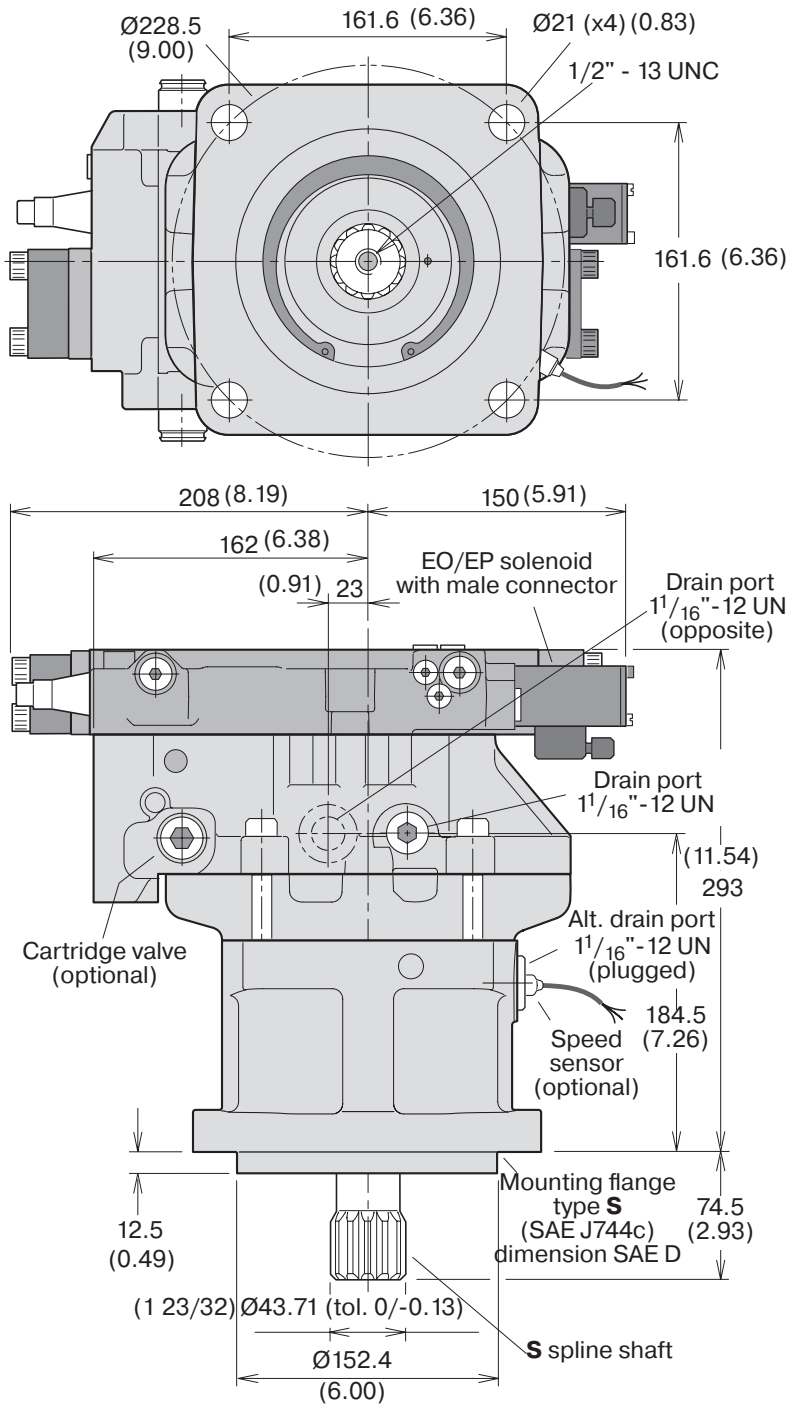
[1] '30° involute spline, side fit'.

Ports	V14-110
Main ports	25 [1"]
Drain ports	M22 x 1.5

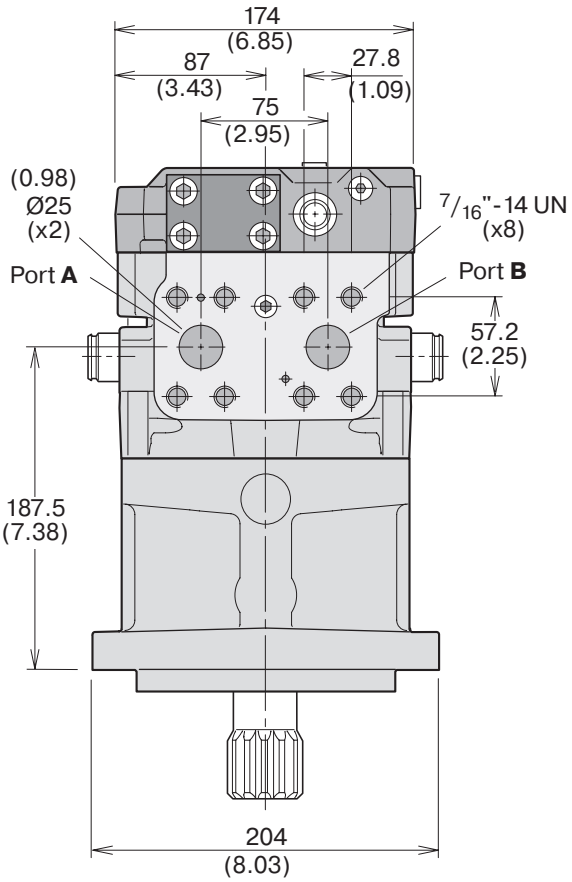
Main ports: ISO 6162, 41.5 MPa, type II

V14-110, SAE version

(inch)



Shown: V14-110-SAE with EO/EP control



Spline type S[1] (SAE J498b)	
V14-110	SAE 'D' (13T, 8/16 DP)

1) '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

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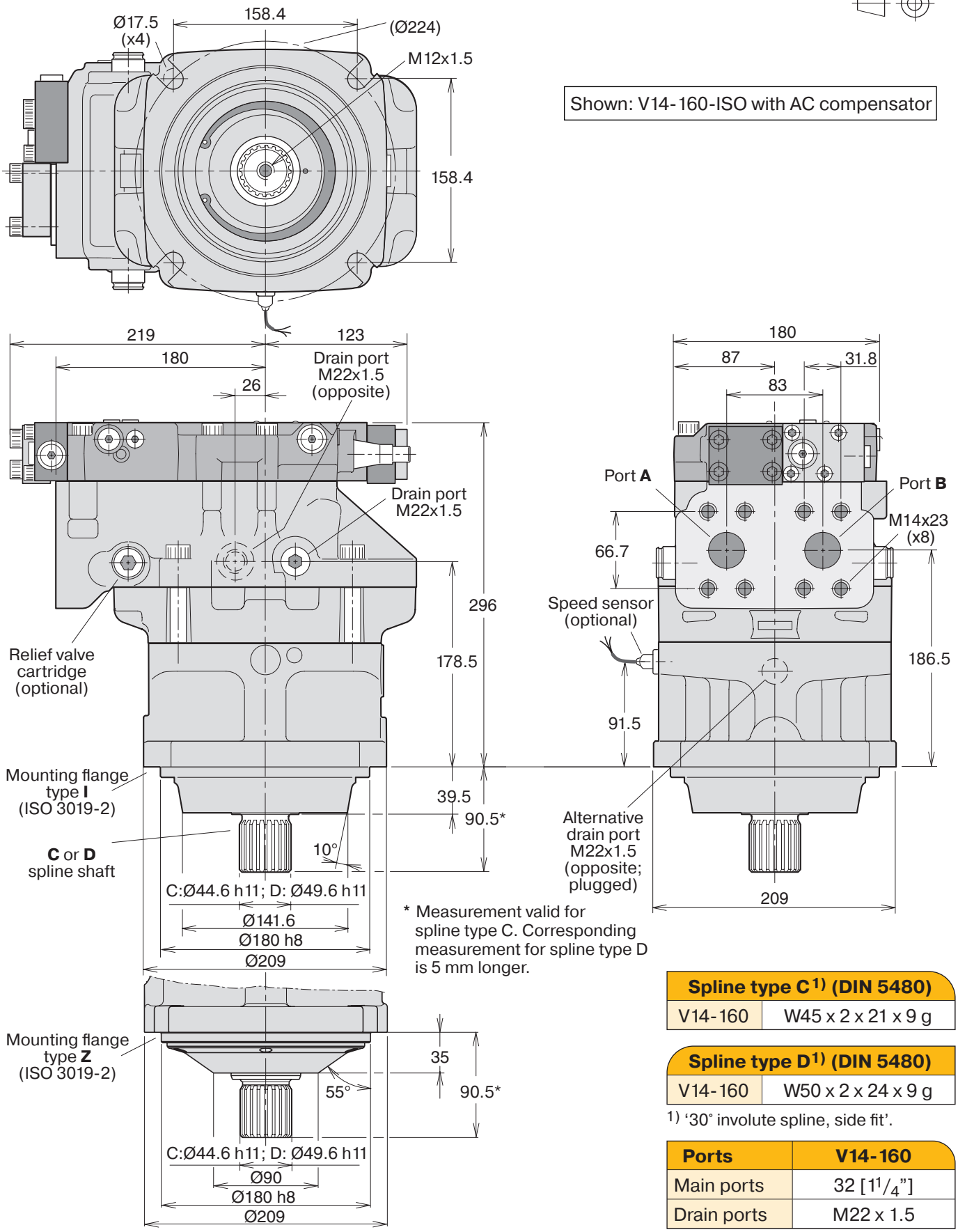
V14-160, ISO version



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

Spline type C[1] (DIN 5480)	
V14-160	W45 x 2 x 21 x 9 g

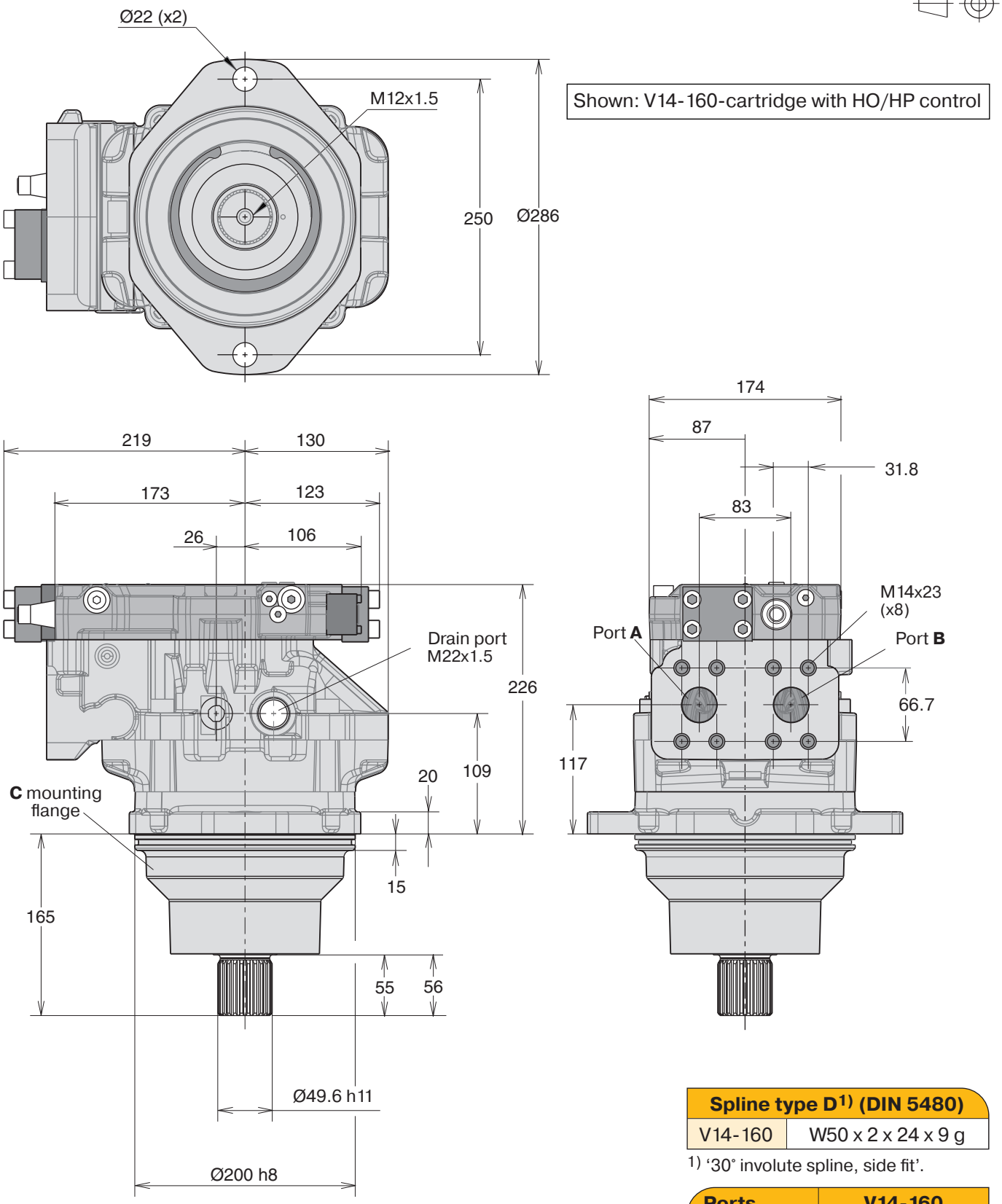
Spline type D[1] (DIN 5480)	
V14-160	W50 x 2 x 24 x 9 g

[1] '30° involute spline, side fit'.

Ports	V14-160
Main ports	32 [$1^1/_4$"]
Drain ports	M22 x 1.5

Main ports: ISO 6162, 41.5 MPa, type II

V14-160, Cartridge version



Shown: V14-160-cartridge with HO/HP control

Spline type D[1] (DIN 5480)	
V14-160	W50 x 2 x 24 x 9 g

[1] '30° involute spline, side fit'.

Ports	V14-160
Main ports	32 [1 1/4"]
Drain ports	M22 x 1.5

Main ports: ISO 6162, 41.5 MPa, type II

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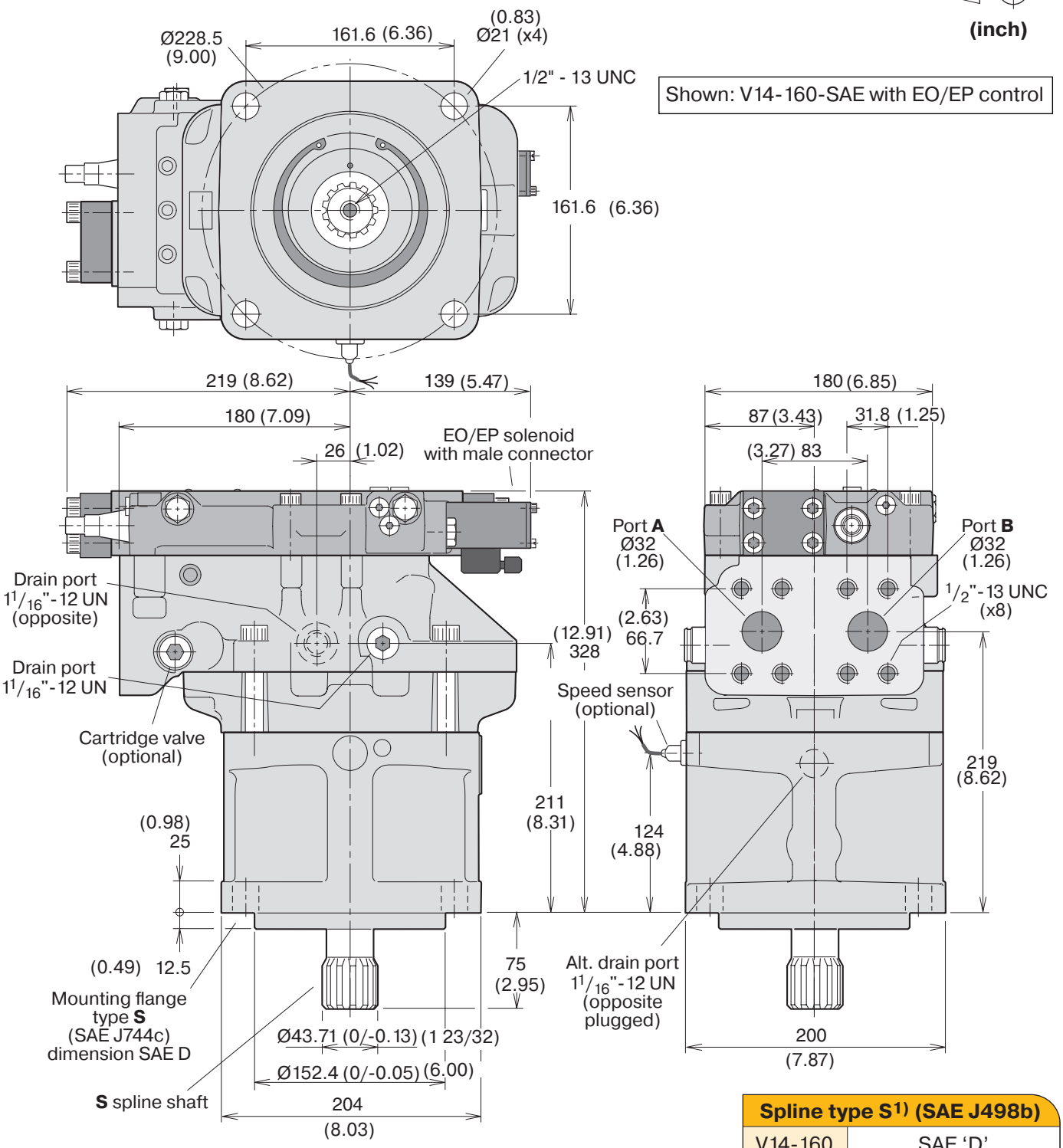
Trollhättan, Sweden

V14-160, SAE version

(inch)



Shown: V14-160-SAE with EO/EP control

Spline type S[1] (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