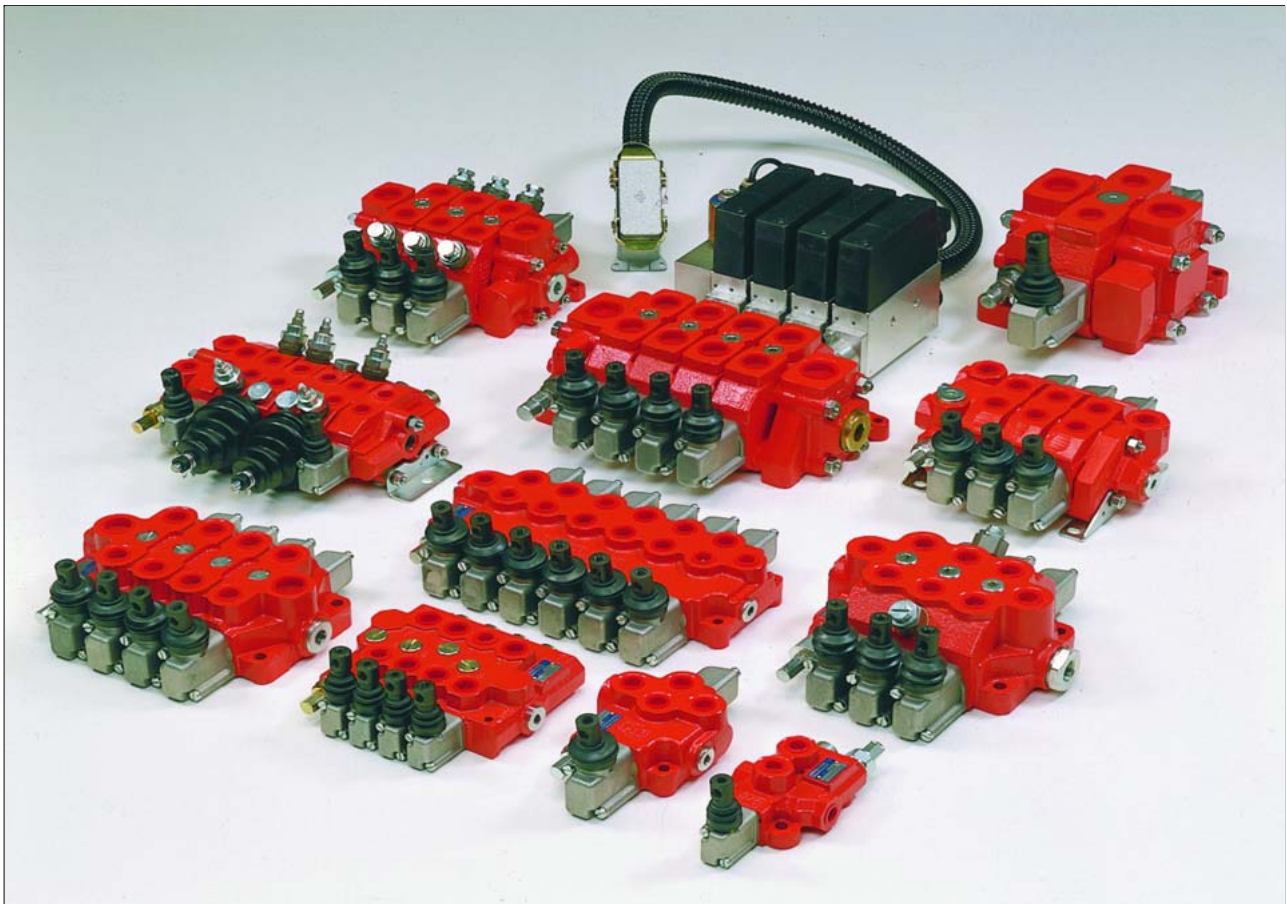
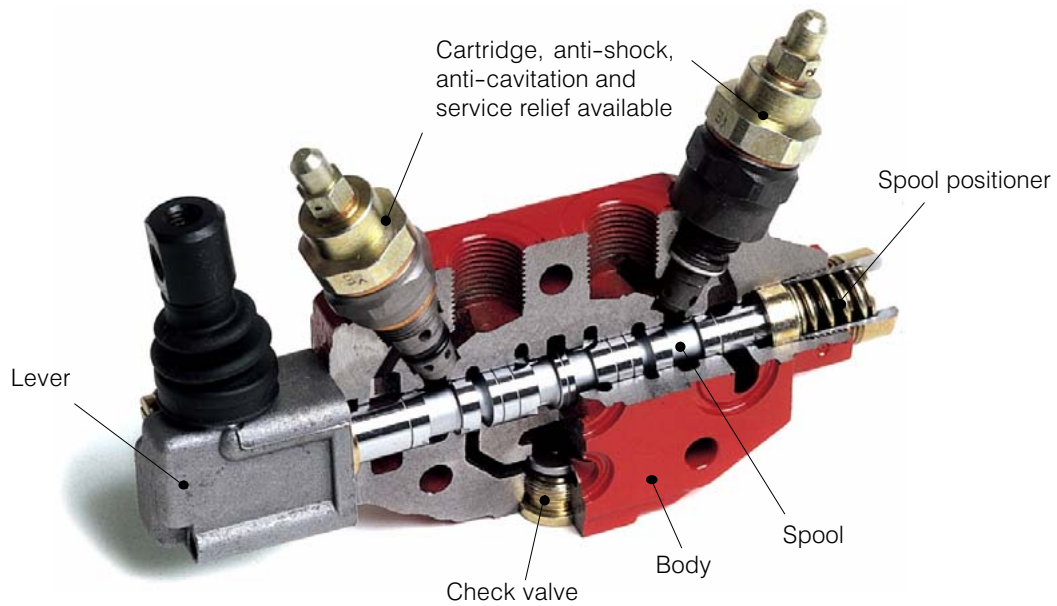


## Monobloc and Sectional Directional Control Valves



**Monobloc and Sectional Directional Control Valves**



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Monobloc control valves	Nominal Flow Rate
HDM140	40 l/min
HDM11P/2-3-4-5-6	45 l/min
HDM11S/1-2-3-4-5-6	45 l/min
HDM18/1-2-3-4	70 l/min
HDM25/1-2	100 l/min

Sectional control valves	Nominal Flow Rate
HDS07	25 l/min
HDS11	45 l/min
HDS15	60 l/min
HDS20	80 l/min
HDS30	120 l/min

## 1 Hydraulic system

### 1.1 General directions for circuit installation of system

#### 1.1.1 Cleanliness

Before cabling pipelines, make sure that pipelines hollows are thoroughly clean (metal and flexible pipes), likewise fittings and seals.

The same care should be exercised during assembling and servicing operations, adopting clean procedures and working in an environment free of chips, swarf, dust and other possible sources.

#### 1.1.2 Tank

The recommended tank capacity must be 2 ÷ 3 times the pump flow rate Q (unit volume per minute) for intermittent duties, or 6 ÷ 7 x Q for continuous duties, and up to 10 ÷ 12 x Q for heavy duties with demanding continuity, pressure and temperature conditions.

The suggested temperature of the oil in the tank should not exceed 60° C (140° F); if this limit cannot be guaranteed by the dimensions of the tank alone, a heat exchanger must be installed.

#### 1.1.3 Pipeline diameters

The oil speed must be kept within safe limits, beyond which the operation of the system could be adversely affected.

As a general guide, recommendable limits are:

0.5 ÷ 1.5 m/s (1.7 ÷ 5 ft./s) suction

0.8 ÷ 2 m/s (2.2 ÷ 6.6 ft./s) return

2 ÷ 5 m/s (6.6 ÷ 17 ft./s) pressure

Lower speeds are adapted for applications typified by low pressure or continuous duty.

Remember that flow speed in m/s is determined by the formula  $[(Q/d^2) \times 21.2]$

where

"Q" is the flow rate in liters/min.

"d" is the internal diameter of the pipe in mm.

#### 1.1.4 Filters

Filtration 10 micron must be assured where solenoid or pilot operated valves are in use, and ≤ 30 micron in other cases. Except in certain special applications, the filter is usually assembled on the return line, that the size of element must be compatible with the maximum unloading flow rate.

#### 1.1.5 Oil

Use only a mineral based hydraulic oil responding to ISO/DIN 6743/4.

The system should be operated only with hydraulic oil containing anti-foaming and antioxidant additives. Other types of fluid can use serious damage and jeopardize its correct operation.

Recommended viscosity is between 20 and 120 mm<sup>2</sup>/s.

Contamination levels must be no higher than class 18/15 as prescribed by ISO 4406.

Check that the oil level is correct when filling the tank.

Selection of the right viscosity range will depend principally on the temperature and filtration parameters, the oil should be changed following the first 3000 hours operation and every 5000 hours thereafter.

#### 1.1.6 Fittings

The threaded ports of the directional control valve housing are machined to DIN 3852 form x.

Accordingly, fittings with STRAIGHT THREADED ENDS only should be used (e.g. DIN 3852 form A or B).

In the interest of safety, fittings with TAPER THREADED ENDS (e.g. DIN 3852 form C) should never be used, as these can cause deformation and cracks in the valve housing.

Our warranty conditions will be not valid in the case of tapered fittings utilization.

### 1.2 Directional control valves Operating and maintenance guide-lines

Always exercise the utmost care when carrying out any operation on the valves (assembling, stripping, tests) and pay scrupulous attention to cleanliness: this will prevent the valves from the risk of being seriously damaged attributable to chips, dust and other foreign matter.

When washing a machine to which valves are mounted, never expose the valves themselves to liquids containing detergents or corrosive agents, or to high pressure jets, which may damage them or cause rust and corrosion.

#### 1.2.1 Spools assembling

The location of spools in the valve housing does not present any particular difficulty.

First, make sure the O-ring seals are faultlessly clean, then proceed to insert the spool into its socket, checking for smooth and unhindered sliding movement.

Finally, fit the seals with the relative alignment rings, then fix on the position control and the handle assembly.

#### 1.2.2 Assembling of valve sections

Before proceeding with the assembling of sectional valves, make sure that the mounting surface is strictly flat. Start by locating all the O-rings in their respective seats, applying a light layer of grease.

The bolts must be gradually tightened by small increments up to the prescribed torque (see table chapter 1.9).

Under no circumstances attempt doing this operation without the aid of a torque wrench; the bolts must be torqued up gradually and in alternation, as excessive or unevenly applied force can cause the spools to jam.

Conversely, an insufficient tightening torque can result in oil leaks and extrusion of the seals.

The operation of bolts tightening should be effected with oil components at ambient temperature (20 ÷ 30 C).

After completing the assembling and tightening operations, verify that the spools continue to slide freely and proceed with final testing.

### 1.3 Generals

Recommended conditions for obtaining the best performance of the system: we recommend to strictly follow the conditions advised here above, failing which warranty shall be void.

## 1.4 Directives and standards

### - Atex:

The equipment and protective systems of these catalogue ARE NOT intended for use in potentially explosive atmospheres that is to say where there is an explosive atmosphere referred to in Article 2 of the Directive 99/92/EC and referred to Article 1.3 of the Directive 94/9/EC.

### - Machinery safety

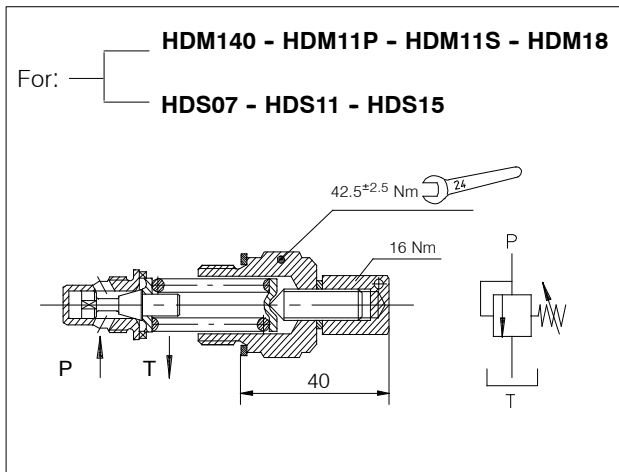
Hydraulic directional control valves are excluded by Directive 98/37/EC

### - ISO 9001: 2000

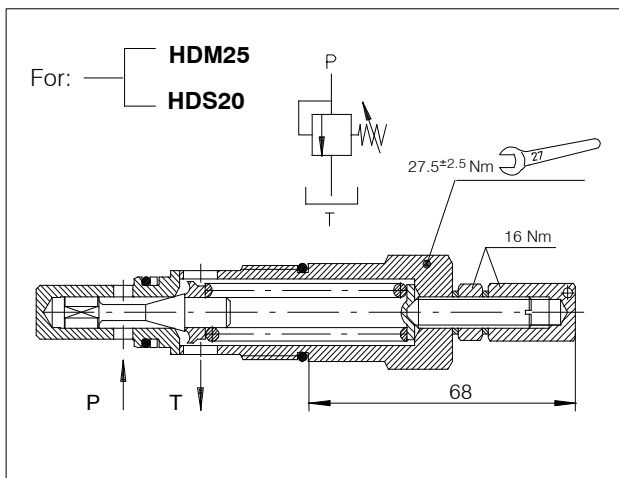
Bucher Hydraulics S.p.A. is certified for research, development and production of directional control valves, power units, gear pumps and motors, electro pumps, cartridge valves and integrated manifolds for hydraulic applications.

## 1.5 Main pressure relief valve RV

### 1.5.1 Direct Acting Relief Valve

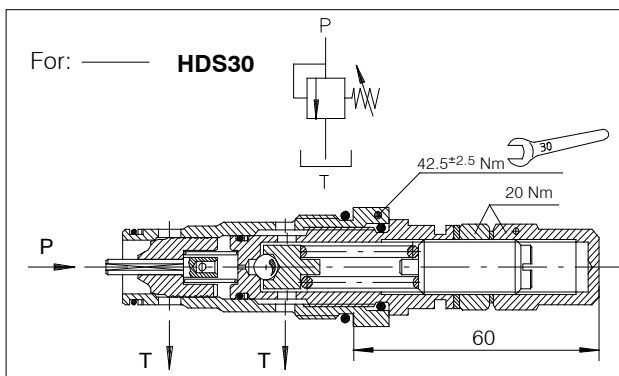


Pressure set range bar (PSI)	Type	Code	Spring code
0 - 30 (0-400)	<b>RV1 - 02</b>	200.7874.0070.0	200.6624.0147.0
31 - 95 (400-1300)	<b>RV1 - 06**</b>	200.7874.0072.0	200.6624.0145.0
96 - 210 (1300-3000)	<b>RV1 - 15</b>	200.7874.0074.0	200.6624.0148.0
211 - 320 * (3000-4600)	<b>RV1 - 26</b>	200.7874.0071.0	200.6624.0146.0
300 - 400 * (4300-5700)	<b>RV1 - 32</b>	200.7874.0073.0	200.6624.0149.0
<b>VC (plugged valve)</b>		200.9784.0014.0	-



Pressure set range bar (PSI)	Type	Code	Spring code
30 - 95 (400-1300)	<b>RV1 - 06**</b>	200.7874.0078.0	200.6624.0074.0
96 - 210 (1300-3000)	<b>RV1 - 15</b>	200.7874.0080.0	200.6624.0075.0
211 - 320* (3000-4600)	<b>RV1 - 26</b>	200.7874.0076.0	200.6624.0076.0
321 - 400* (4600-5700)	<b>RV1 - 32</b>	200.7874.0230.0	200.6624.0120.0
<b>VC (plugged valve)</b>		200.7784.0016.0	-

### 1.5.2 Piloted Acting Relief Valve

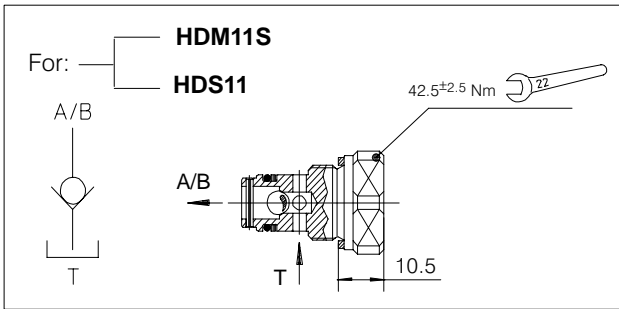


Pressure set range bar (PSI)	Type	Code	Spring code
0 - 320* (0-4600)	<b>RV1 - 15</b>	200.7874.0149.0	200.6624.0111.0
<b>VC (plugged valve)</b>		200.7784.0023.0	-

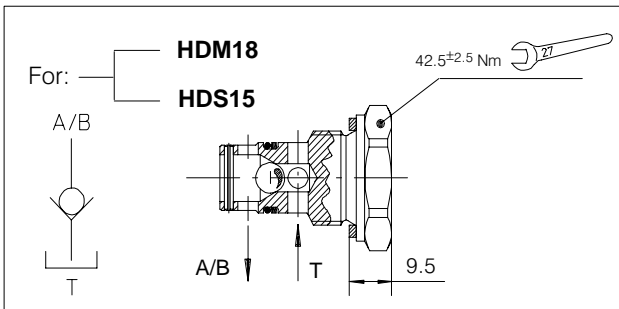
\* The maximum operating pressure for each valve series is indicated in the "Technical specification" at the first page of each valve section.

\*\*Example: RV1 - 06\*\*= 60 bar standard set value. Different set values have to be specified at the order. Please pay attention that any increasing/decreasing from 60 bar has to be fixed in step of 10 bar.

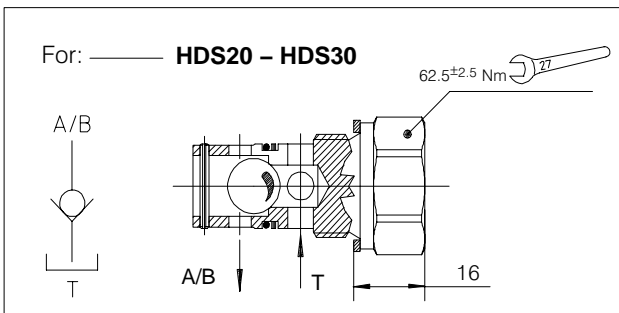
**1.6 Anti-cavitation valves C/...**



Type	Code
<b>C/A or C/B</b>	200.7876.0093.0
<b>VC (plugged valve)</b>	200.7784.0004.0

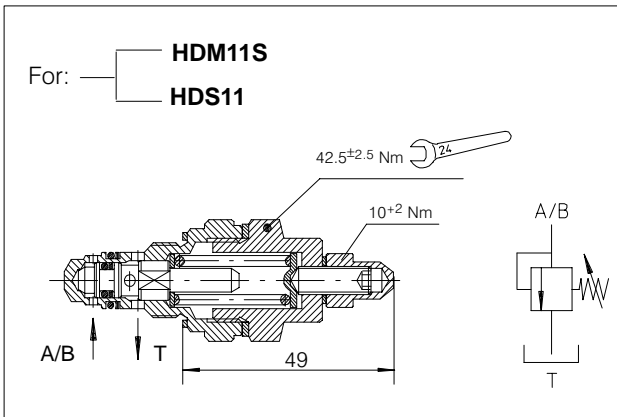


Type	Code
<b>C/A or C/B</b>	200.7876.0143.0
<b>VC (plugged valve)</b>	200.7784.0005.0

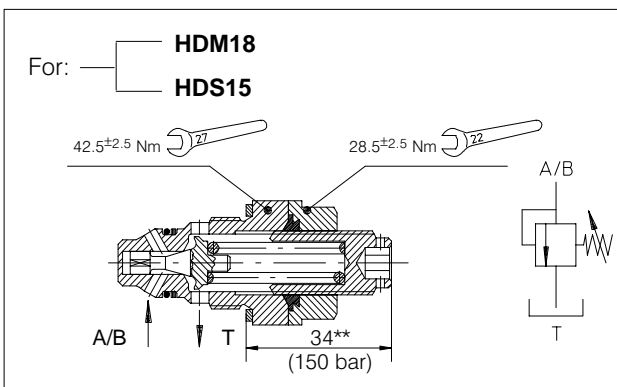


Type	Code
<b>C/A or C/B</b>	200.7876.0144.0
<b>VC (plugged valve)</b>	200.7784.0007.0

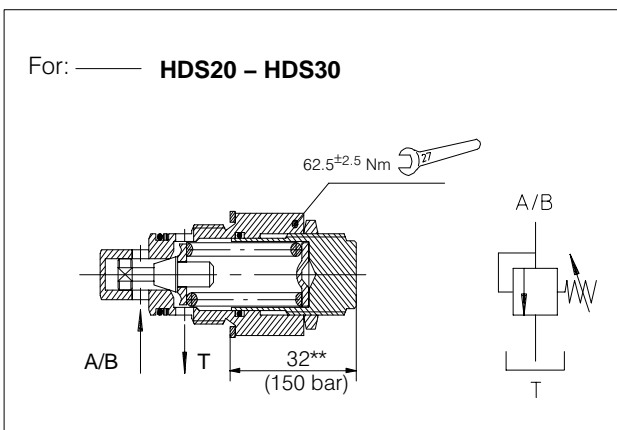
## 1.7 Anti-shock valves OA/...



Pressure set range bar (PSI)	Type	Code	Spring code
0 - 30 (0-400)	<b>OA/A02</b> <b>OA/B02</b>	200.7874.0092.0	200.6624.0113.0
31 - 130 (400-1900)	<b>OA/A06</b> <b>OA/B06</b>	200.7874.0094.0	200.6624.0070.0
131 - 300 (1900-4300)	<b>OA/A15*</b> <b>OA/B15</b>	200.7874.0093.0	200.6624.0077.0
<b>VC (plugged valve)</b>		200.7784.0004.0	-



Pressure set range bar (PSI)	Type	Code	Spring code
0 - 130 (0-1900)	<b>OA/A06</b> <b>OA/B06</b>	200.7874.0095.0	200.6624.0115.0
131 - 350 (1900-5000)	<b>OA/A15</b> <b>OA/B15</b>	200.7874.0096.0	200.6624.0116.0
<b>VC (plugged valve)</b>		200.7784.0005.0	-

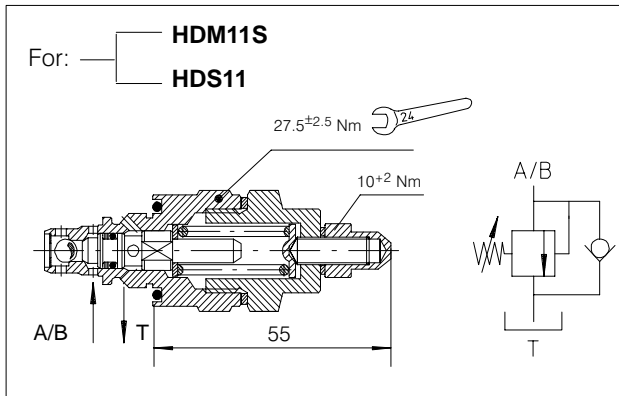


Pressure set range bar (PSI)	Type	Code	Spring code
0 - 95 (0-1300)	<b>OA/A06</b> <b>OA/B06</b>	200.7874.0108.0	200.6624.0145.0
96 - 210 (1300-3000)	<b>OA/A15</b> <b>OA/B15</b>	200.7874.0113.0	200.6624.0148.0
211 - 350 (3000-5000)	<b>OA/A26</b> <b>OA/B26</b>	200.7874.0110.0	200.6624.0146.0
<b>VC (plugged valve)</b>		200.7784.0007.0	-

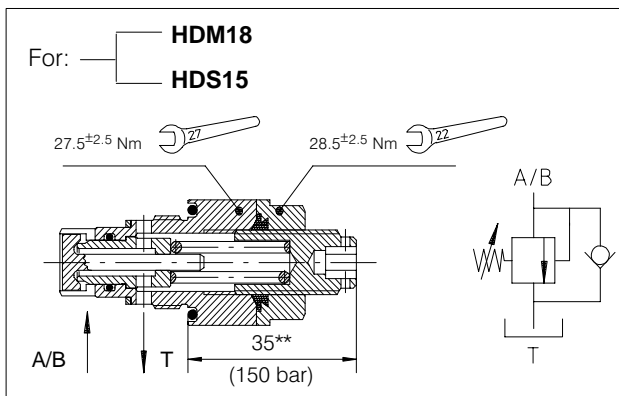
Example : OA/A15\*\* = 150 bar standard set value. Different set values have to be specified at the order. Please pay attention that any increasing/decreasing from 150 bar has to be fixed in step of 10 bar.

\*\* : This length changes as function of the pressure relief valve setting

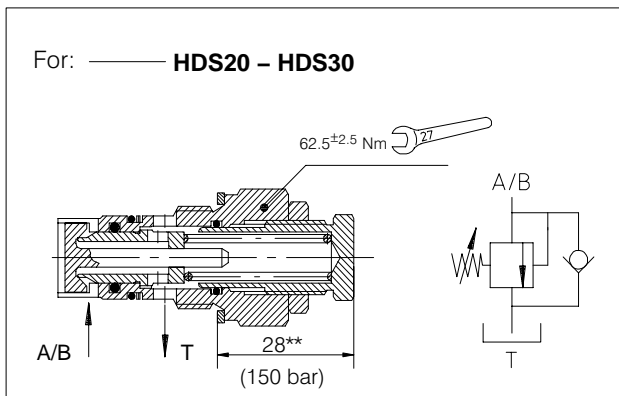
## 1.8 Anti-shock and anti-cavitation valves UC/...



Pressure set range bar (PSI)	Type	Code	Spring code
0 - 30 (0-400)	<b>UC/A02</b> <b>UC/B02</b>	200.7874.0126.0	200.6624.0113.0
31 - 130 (400-1900)	<b>UC/A06*</b> <b>UC/B06</b>	200.7874.0129.0	200.6624.0070.0
131 - 300 (1900-4300)	<b>UC/A15</b> <b>UC/B15</b>	200.7874.0127.0	200.6624.0077.0
<b>VC (plugged valve)</b>		200.7784.0004.0	-



Pressure set range bar (PSI)	Type	Code	Spring code
0 - 130 (0-1900)	<b>UC/A06</b> <b>UC/B06</b>	200.7874.0131.0	200.6624.0115.0
131 - 350 (1900-5000)	<b>UC/A15</b> <b>UC/B15</b>	200.7874.0132.0	200.6624.0116.0
<b>VC (plugged valve)</b>		200.7784.0005.0	-



Pressure set range bar (PSI)	Type	Code	Spring code
0 - 95 (0-1300)	<b>UC/A06</b> <b>UC/B06</b>	200.7874.0136.0	200.6624.0105.0
96 - 210 (1300-3000)	<b>UC/A15</b> <b>UC/B15</b>	200.7874.0138.0	200.6624.0107.0
211 - 350 (3000-5000)	<b>UC/A26</b> <b>UC/B26</b>	200.7874.0137.0	200.6624.0106.0
<b>VC (plugged valve)</b>		200.7784.0007.0	-

Example: UC/B06\* = 60 bar standard set value. Different set values have to be specified at the order. Please pay attention that any increasing/decreasing from 60 bar has to be fixed in step of 10 bar.

\*\* : This length changes as function of the pressure relief valve setting

## 1.9 Tightening torque values

Component description to be assembled	Nm
Position control sleeve screwed to spool	<b>10 + 2</b>
End caps handles (2 X M5 screws for HDM140-HDM11-HDS11)	<b>8 + 2</b>
End caps handles and position control sleeves (2 X M6 screws for HDM18-HDM25-HDS15-HDS20-HDS30)	<b>8 + 2</b>
"HDS07- HDS11" stack (3 X M8 bolt)	<b>16 + 2</b>
"HDS15" stack (3 X M8 bolt)	<b>18 + 2</b>
"HDS20" stack (4 X M8 bolt)	<b>20 + 5</b>
"HDS30" stack (4 X M10 bolt)	<b>25 + 5</b>

## 12 Valve controls

### 12.1 Summarizing table of electro-hydraulic/ pneumatic controls

Description	Type	HDM					HDS				
		140	11P	11S	18	25	07	11	15	20	30
Pneumatic ON-OFF	P	•		•	•	•		•	•	•	•
Pneumatic Proportional Control	PP				•	•			•	•	•
Electro-pneumatic ON-OFF	EP				•	•			•	•	•
Hydraulic ON-OFF	H	•		•	•	•		•	•	•	•
Hydraulic Proportional	HP				•	•			•	•	•
Electro-hydraulic ON-OFF internal pilot version	EHI				•				•	•	•
Electro-hydraulic ON-OFF external pilot version	EHE				•	•			•	•	•
Closed loop Electro-hydraulic Proportional analogic control	EHP				•	•			•	•	•
Electromagnetic ON-OFF	EPP				•				•		
Electromagnetic ON-OFF	EMC						•	•	•		
Load sensing control	LS			•	•		•	•	•	•	•

### 13 Example of designation for monobloc control valves

Body features				Spool features						Spool features					
HDM..	**	K**	**	*	**	L**	**	A**	B**	*	**	L**	**	A**	B**
1	2	3	4	5	6	7	8	9	10	5	6	7	8	9	10

<b>1</b>	Type	<b>5</b>	Spool variation
<b>2</b>	Number of spool	<b>6</b>	Spool action
<b>3</b>	Type of thread	<b>7</b>	Lever style
<b>4</b>	Setting RV	<b>8</b>	Option-Port valves (OA)
		<b>9</b>	Setting of port (A)
		<b>10</b>	Setting of port (B)

#### How to order

HDM11S	02	K10	15	A	01	L100	OA	A15	B26	C	02	L100	UC	A20	B20
--------	----	-----	----	---	----	------	----	-----	-----	---	----	------	----	-----	-----



## 14 Example of designation for sectional control valves

### 14.1 Example for manual valves

Inlet and Outlet cover features					Section features								Section features				
HDS**	**	T**	**	P**	**	K**	*	**	L**	**	A**	B**	**	K**	*	**	L**
1	2	3	4	5	6	7	8	9	10	11	12	13	6	7	8	9	10
1	Type				6	Position of the section											
2	Number of spools				7	Type of sectional body											
3	Inlet and outlet cover				8	Spool variation											
4	Setting RV				9	Spool action											
5	End cover				10	Lever style											
					11	Option - Port valves (UC/OA/C)											
					12	Setting of port (A)											
					13	Setting of port (B)											

#### How to order

HDS15	02	T01	15	P11	01	K11	A	08	L100	OA	A15	B26	02	K01	C	03	L100
-------	----	-----	----	-----	----	-----	---	----	------	----	-----	-----	----	-----	---	----	------

### 14.2 Example for valves with electroma-gnetic control EMC

Inlet and Outlet cover features					Section features								Section features				
HDS**	**	T**	**	P**	**	K**	*	**	**	**	A**	B**	**	K**	*	**	**
1	2	3	4	5	6	7	8	9	10	11	12	13	6	7	8	9	10
1	Type				6	Position of the section											
2	Number of spools				7	Type of sectional body											
3	Inlet and outlet cover				8	Spool variation											
4	Setting RV				9	Spool action											
5	End cover				10	Voltage											
					11	Option - Port valves (UC/OA/C)											
					12	Setting of port (A)											
					13	Setting of port (B)											

#### How to order

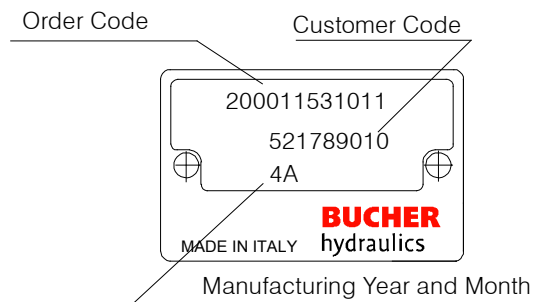
HDS11	02	T09	15	P04	01	K214	AE	01E	13	OA	A15	B26	02	K204	CE	03E	13
-------	----	-----	----	-----	----	------	----	-----	----	----	-----	-----	----	------	----	-----	----



Manufacturing month	Manufacturing year					
	2014	2015	2016	2017	2018	2019
January	4A	5A	6A	7A	8M	9M
February	4B	5B	6B	7B	8N	9N
March	4C	5C	6C	7C	8P	9P
April	4D	5D	6D	7D	8Q	9Q
May	4E	5E	6E	7E	8R	9R
June	4F	5F	6F	7F	8S	9S
July	4G	5G	6G	7G	8T	9T
August	4H	5H	6H	7H	8U	9U
September	4I	5I	6I	7I	8V	9V
October	4J	5J	6J	7J	8Z	9Z
November	4K	5K	6K	7K	8X	9X
December	4L	5L	6L	7L	8Y	9Y

note: RV1..- RV2..- RV3..: do not indicate the valves in the order code if the section is not preset for their assembly.

Product identification code



Bucher Hydraulics pursues a policy of continuous research and development, therefore the company reserves the right to modify all those technical features which need changing, whenever necessary and without prior notice.

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We reserve the right of modification without prior notice.