

Hydraulic Units UP110



motion and progress

| Contents | Page |
|--|-------------|
| 1 Power pack housings | 4 |
| 1.1 Single acting circuit: electric control version | 4 |
| 1.2 Single acting circuit: manual control version | 4 |
| 2 Gear pumps | 5 |
| 3 Tanks | 6 |
| 3.1 Square plastic tanks from 1.5 to 3.5 litres capacity | 6 |
| 3.2 Square plastic tanks from 6 to 12 litres capacity | 6 |
| 3.3 Round plastic tanks from 6 to 14 litres capacity | 7 |
| 3.4 Tank assembling position | 7 |
| 3.5 Tank fixing kits | 8 |
| 4 Suction/return assembly kits for plastic tanks | 8 |
| 4.1 Suction assembly kits for square tanks from 1.5 to 3.5 litres | 8 |
| 4.2 Suction assembly kits for square tanks from 6 to 12 litres | 9 |
| 4.3 Suction assembly kits for round tanks from 6 to 14 litres | 9 |
| 5 Electric motors | 10 |
| 5.1 D.C. Electric motors | 10 |
| 5.2 A.C. Electric motors | 12 |
| 6 Drives | 13 |
| 6.1 Drives for D.C. motors | 13 |
| 6.2 Drives for A.C. motors | 13 |
| 6.3 Drive E145 code 200960400400 | 13 |
| 6.4 Drive E156 code 200659600280 | 13 |
| 6.5 Drive E131 code 200960400430 | 14 |
| 6.6 Drive E132 code 200960400440 | 14 |
| 6.7 Drive E133 code 200960400420 | 14 |
| 6.8 Drive E137 code 200960400450 | 14 |
| 7 Cartridge valves | 15 |
| 7.1 General information | 15 |
| 7.2 Pressure relief valve | 16 |
| 7.3 Solenoid operated directional valve: MF** (multifunction valve) - Normally closed | 17 |
| 7.4 Solenoid operated directional valve: MF** Normally open, poppet type | 18 |
| 7.5 Hand lever control | 19 |
| 7.6 MF valve cavity | 22 |
| 7.7 Directional valve solenoids | 22 |
| 7.8 Example of hydraulic power pack ordering code | 23 |

General specifications

The positive experience acquired on the UP100 project, allowed us to develop a new and advanced hydraulic unit named UP110.

It's specifically designed for all machine applications requiring single acting actuators.

The UP110 does not replace UP100 range but it is a completion of the same.

Main features

1. Single acting circuit:

Available as single acting circuit solenoid operated normally closed or normally open or manual operated normally closed

2. Very compact dimensions

Two housing sides completely free (no assembled parts). Easy assembling and handling, thanks to "MF" MULTIFUNCTION cartridge valve: Check, Unloading and Compensated flow control functions are all integrated in the MF single cartridge valve.

Easy to assemble, easy to replace

3. UP100-UP110 Interchangeability

The interchangeability for many accessories used in UP100 version like tanks, electric motors and couplings is granted.

New components

1. Housing:

- Pressure die casting aluminium alloy housing, completely new in its design.

- External dimensions: 133x133x40 mm (same of the UP100 power pack)

- Port: 1/4" BSP (3/8" BSP and SAE6 as available alternative)

Fixed holes: nr.2 threaded M10x1.5x82 as per UP100 power pack

- Maximum operating pressure: 230 bar, (Peak pressure P3 = 250 bar allowed)

- Filter conveyor with inspection and cleaning easiness.

2. External gear pump AP100

New project: pump body, balancing plate and back cover, completely new

Back cover: allows a simplified assembling using the same suction kit for all the different horizontal tank mounting positions P01-P02-P03-P04

Pump displacement range: 1.2 - 1.7 - 2.5 - 3.5 - 5 - 6.5 - 8 - 10 cc.p.r

3. Valves and cavities.

Cavity **a** : relief valve VM01 (same type used in UP100 version)

Cavity **c** : MF - TVS = multifunction ON-OFF solenoid operated, normally closed.

MF - TOS = multifunction ON-OFF solenoid operated, normally open.

Both valves have:

- Integrated check valve function.

- Integrated flow control valve function.

Fixed flow set range: 02 - 03 - 04 - 05 - 06 - 09 - 11 - 16 l/min.

- Standard voltage: 12,24, V. DC - 24, 110, 220 V. AC

- New coil 27 Watt, DIN43650, IP65

Cavity **c** : MF - TVM = multifunction manual lever control, normally closed

- Integrated check valve function.

- Integrated flow control valve function (only on customer request).

-Lever with or without electric micro switch control.

UP110 **c** cavity valve is located at the same position of the present UP100 **c** cavity.

Directives and standards

- Atex:

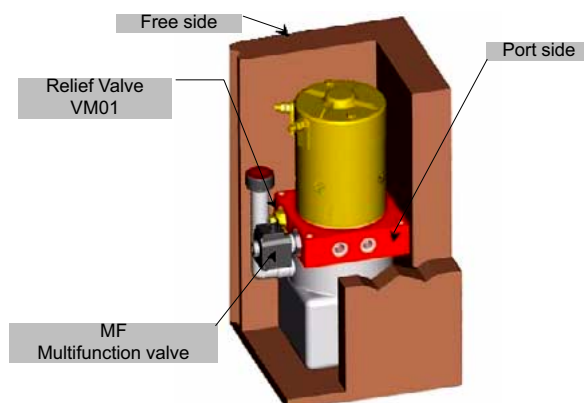


ATTENTION!: The equipment and protective systems of these catalogue ARE NOT intended for use in potentially explosive atmospheres that is to say where there is an explosive atmosphere referred to in Article 2 of the Directive 99/92/EC and referred to Article 1.3 of the Directive 94/9/EC.

- 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 operating blocks for hydraulic applications.

For any other UP110 specifications not introduced in this catalogue, please refer to the UP100 catalogue 200-P-991214-E



1 Power pack housings

1.1 Single acting circuit: electric control version

Cavity a = VM (Relief Valve)

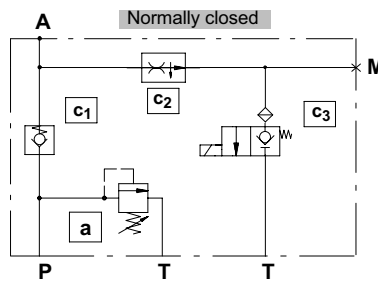
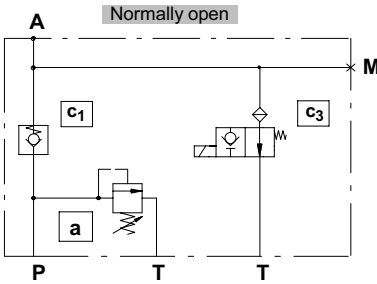
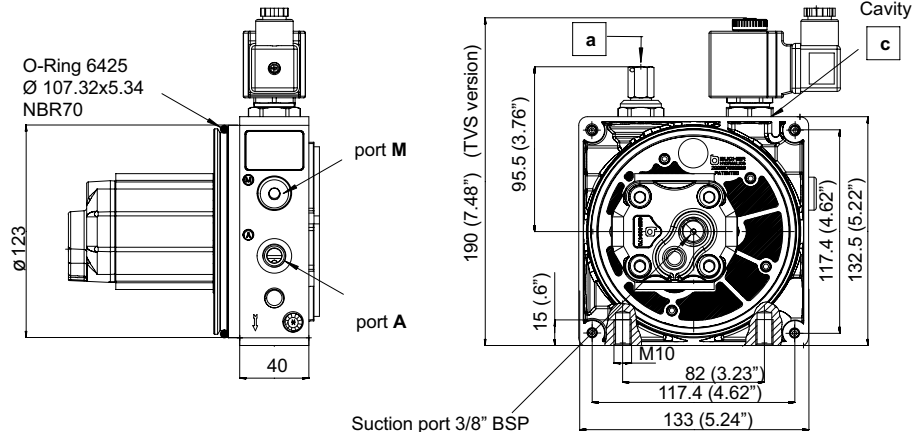
Cavity c = MF*

(Multifunction valve)

C1= hold check function

C2= flow control function if needed

C3= unloading function



M port is located after the C2 flow control valve

1.2 Single acting circuit: manual control version

Cavity a = VM

(Relief Valve)

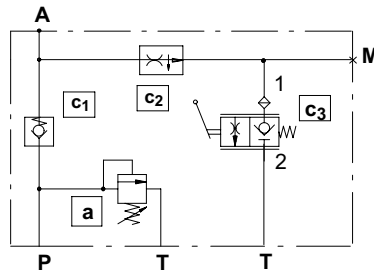
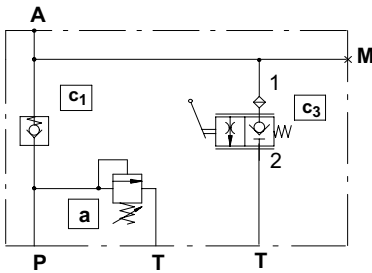
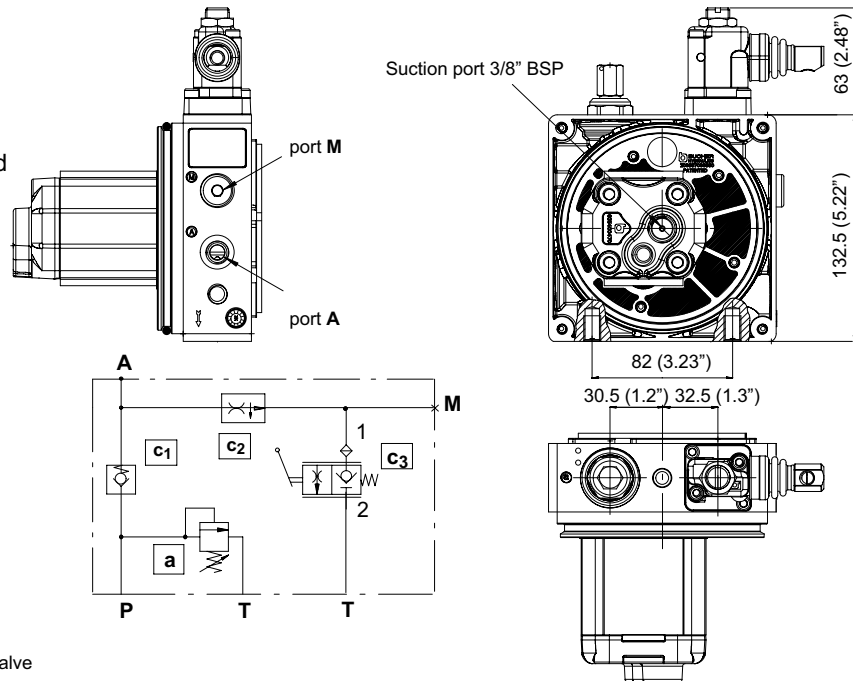
Cavity c = MF*

(Multifunction valve)

C1= check function

C2= flow control function if needed

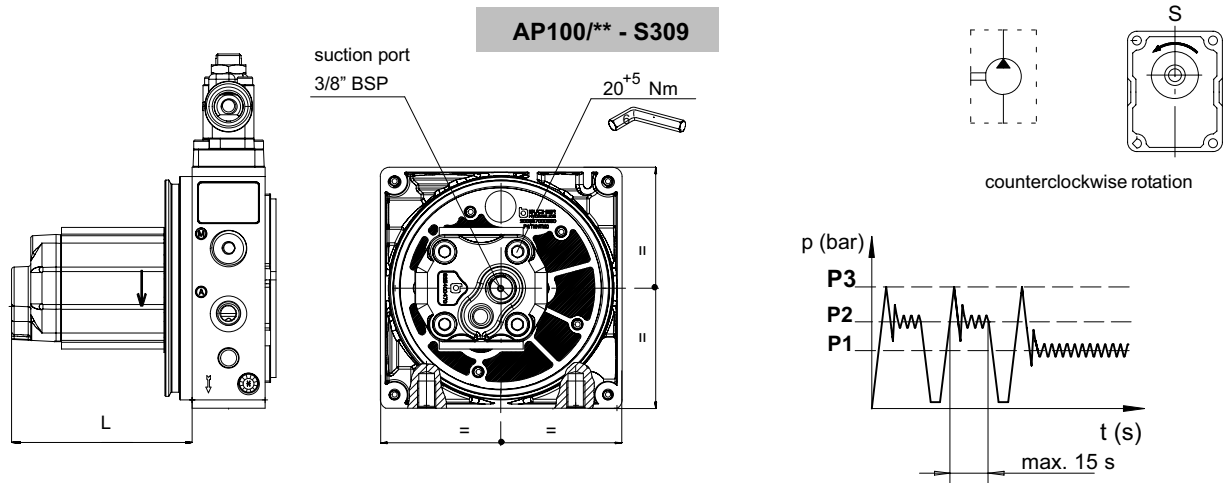
C3= unloading function



M port is located after the C2 flow control valve

| Port A | Port M | Type | Body code |
|----------|----------|--------------|--------------|
| 1/4" BSP | 1/4" BSP | UP110K1G2-01 | 200740431500 |
| 3/8" BSP | 1/4" BSP | UP110K1G3-01 | 200740431530 |
| SAE6 | SAE6 | UP110K1S2-02 | 200740431540 |

2 Gear pumps



Example Pump Hi-Lo Series

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|--|--|--|--|---|---|---|---|
| 2 | A | P | 1 | 0 | 0 | / | 2 | , | 5 | | | | | S | 3 | 0 | 9 |
|---|---|---|---|---|---|---|---|---|---|--|--|--|--|---|---|---|---|

Pressure levels:

P1 = continuous operating pressure

P2 = intermittent operating pressure

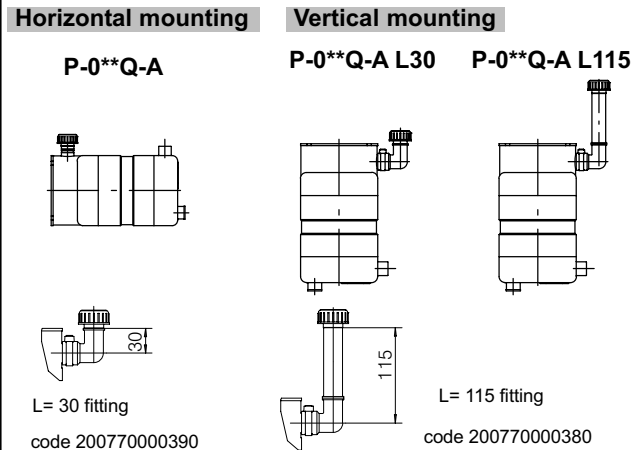
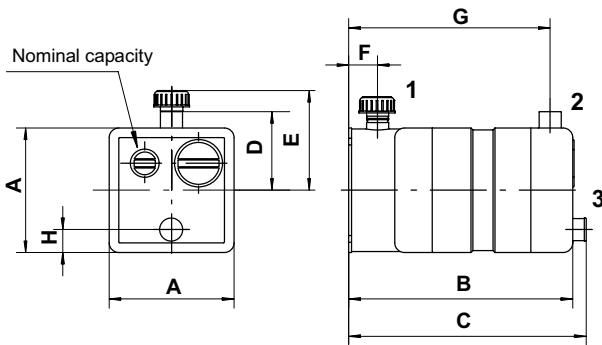
P3 = peak pressure

| Displacement | | AP100 | | Order code | L | | Max. pressure | | | | | | n. min. | | n. max. | |
|----------------------|-----------|----------------|--------------|------------|------|-----|---------------|-----|------|------|------|------|---------|------|---------|--|
| cm ³ /rev | Cu.In.P.R | Pump type | P1 | | | | P2 | P3 | P<P1 | P>P1 | P<P1 | P>P1 | | | | |
| | | | bar | | PSI | bar | PSI | bar | PSI | bar | PSI | | | | | |
| 1.2 | .073 | AP100/1.2 S309 | 200748210270 | 86.1 | 3.40 | 210 | 3000 | 230 | 3300 | 250 | 3600 | 800 | 1000 | 4500 | 5000 | |
| 1.7 | .103 | AP100/1.7 S309 | 200748220230 | 88.1 | 3.47 | 210 | 3000 | 230 | 3300 | 250 | 3600 | 650 | 800 | 4500 | 5000 | |
| 2.5 | .152 | AP100/2.5 S309 | 200748230340 | 91.4 | 3.60 | 210 | 3000 | 230 | 3300 | 250 | 3600 | 650 | 800 | 4500 | 5000 | |
| 3.5 | .213 | AP100/3.5 S309 | 200748240240 | 95.7 | 3.77 | 210 | 3000 | 230 | 3300 | 250 | 3600 | 650 | 800 | 3500 | 4000 | |
| 4.3 | .262 | AP100/4.3 S309 | 200748250160 | 99.3 | 3.91 | 210 | 3000 | 230 | 3300 | 250 | 3600 | 550 | 700 | 3500 | 4000 | |
| 5.0 | .305 | AP100/5.0 S309 | 200748260230 | 102.1 | 4.02 | 210 | 3000 | 230 | 3300 | 250 | 3600 | 500 | 650 | 3000 | 3500 | |
| 6.5 | .396 | AP100/6.5 S309 | 200748270260 | 107.1 | 4.22 | 190 | 2700 | 220 | 3150 | 240 | 3400 | 500 | 650 | 2500 | 3000 | |
| 7.8 | .476 | AP100/7.8 S309 | 200748280130 | 112.7 | 4.44 | 180 | 2600 | 210 | 3000 | 230 | 3300 | 500 | 650 | 2500 | 3000 | |
| 10 | .610 | AP100/10 S309 | 200748290800 | 121.8 | 4.79 | 150 | 2150 | 180 | 2600 | 200 | 2900 | 500 | 650 | 2000 | 2500 | |

N.B. HI-Lo gear pump versions available in different displacement combinations on demand. For availability please contact our Sales Department

3 Tanks

3.1 Square plastic tanks from 1.5 to 3.5 litres capacity

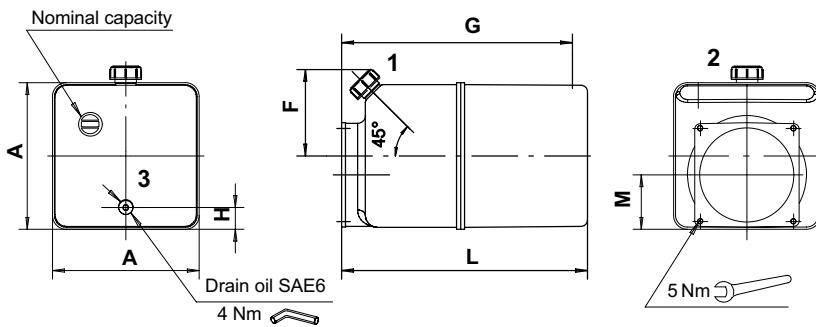


| Example | Tank | Fitting | Pos |
|---------|---------------|---------|-------|
| 3 | P 0 3 5 Q - A | | P 0 1 |

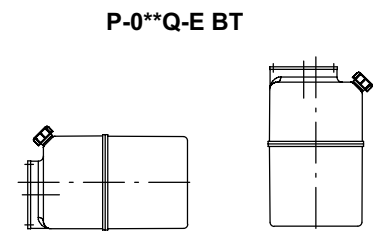
| Example | Tank | Fitting | Pos |
|---------|---------------|---------|-------|
| 3 | P 0 3 5 Q - A | L 3 0 | P 1 5 |

| Nom cap | Type | Code | A | | B | | C | | D | | E | | F | | G | | H | |
|---------|----------|--------------|-----|------|-----|------|-----|------|----|------|-----|------|----|------|-----|------|----|------|
| | | | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch |
| 1.5 l | P-015Q-A | 200973410020 | 130 | 5.2 | 132 | 5.2 | 145 | 5.7 | 82 | 3.3 | 104 | 4.1 | 30 | 1.2 | 107 | 4.3 | 24 | 1.0 |
| 1.6 l | P-016Q-A | 200973490010 | 130 | 5.3 | 150 | 5.9 | | | 82 | 3.3 | 104 | 4.1 | 30 | 1.2 | | | | 1.0 |
| 2.5 l | P-025Q-A | 200973420020 | 130 | 5.3 | 235 | 9.3 | 248 | 9.8 | 82 | 3.3 | 104 | 4.1 | 30 | 1.2 | 210 | 8.3 | 24 | 1.0 |
| 3.5 l | P-035Q-A | 200973430020 | 130 | 5.3 | 300 | 11.8 | 313 | 12.3 | 82 | 3.3 | 104 | 4.1 | 30 | 1.2 | 275 | 10.8 | 24 | 1.0 |

3.2 Square plastic tanks from 6 to 12 litres capacity



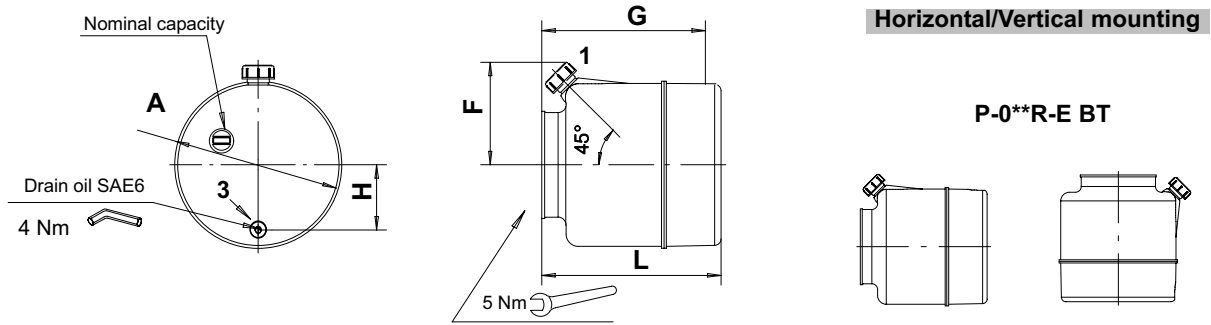
Horizontal/Vertical mounting



| Example | Tank | Fitting | Pos |
|---------|-------------------|---------|-------|
| 3 | P 0 8 0 Q - E B T | | P 0 1 |

| Nom cap | Type | Code | A | | L | | F | | G | | H | | M | |
|---------|-------------|--------------|-----|------|-----|------|-----|------|-----|------|----|------|----|------|
| | | | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch |
| 6 l | P-060Q-E BT | 200973490100 | 180 | 7.1 | 310 | 12.2 | 110 | 4.4 | 291 | 11.5 | 25 | 1.0 | 66 | 2.6 |
| 8 l | P-080Q-E BT | 200973450030 | 180 | 7.1 | 365 | 14.4 | 110 | 4.4 | 346 | 13.7 | 25 | 1.0 | 66 | 2.6 |
| 10 l | P-100Q-E BT | 200973460030 | 180 | 7.1 | 420 | 16.6 | 110 | 4.4 | 401 | 15.8 | 25 | 1.0 | 66 | 2.6 |
| 12 l | P-120Q-E BT | 200973490110 | 180 | 7.1 | 490 | 19.3 | 110 | 4.4 | 471 | 18.6 | 25 | 1.0 | 66 | 2.6 |

3.3 Round plastic tanks from 6 to 14 litres capacity

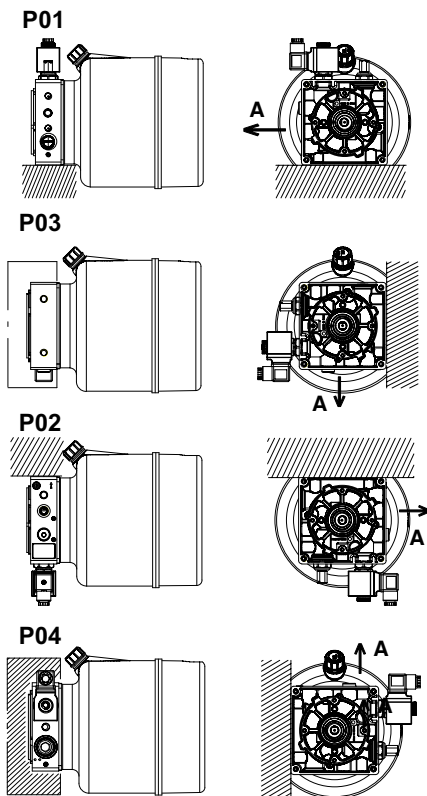


| Example | Tank | Fitting | Pos |
|---------|-------------------|---------|-------|
| 3 | P 0 8 0 R - E B T | | P 0 1 |

| Nom cap | Type | Code | A | | L | | F | | G | | H | |
|---------|-------------|--------------|-----|------|-----|------|-----|------|-----|------|----|------|
| | | | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch |
| 6 l | P-060R-E BT | 200973490290 | 200 | 7.1 | 220 | 8.7 | 127 | 5 | 201 | 8.0 | 80 | 3.2 |
| 8 l | P-080R-E BT | 200973450100 | 200 | 7.1 | 285 | 11.3 | 127 | 5 | 266 | 10.5 | 80 | 3.2 |
| 10 l | P-100R-E BT | 200973460100 | 200 | 7.1 | 325 | 16.6 | 127 | 5 | 306 | 12.1 | 80 | 3.2 |
| 12 l | P-120R-E BT | 200973490300 | 200 | 7.1 | 410 | 16.6 | 127 | 5 | 391 | 15.4 | 80 | 3.2 |
| 14 l | P-140R-E BT | 200973490180 | 200 | 7.1 | 490 | 19.3 | 127 | 5 | 471 | 18.6 | 80 | 3.2 |

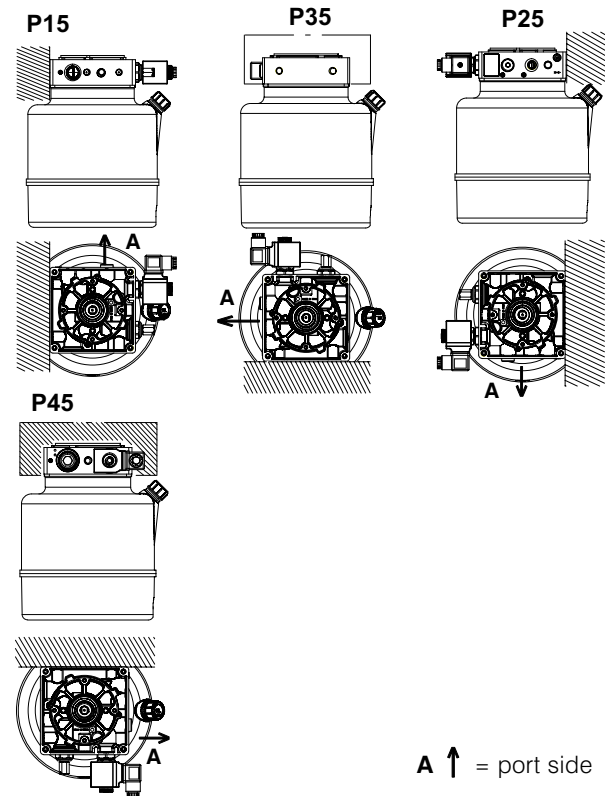
3.4 Tank assembling position

Horizontal



| Example | Tank | Fitting | Pos |
|---------|-------------------|---------|-------|
| 3 | P 0 8 0 R - E B T | | P 0 1 |

Vertical



A ↑ = port side

| Example | Tank | Fitting | Pos |
|---------|-------------------|---------|-------|
| 3 | P 0 8 0 R - E B T | | P 0 1 |

3.5 Tank fixing kits

Fixing kit for plastic tank up to 2.5 litres capacity, Code 200771900150



- 200544116021 Tank fixing clip
- 200677400400 Tank fixing bracket (q.ty 2)
- 200671100101 Bracket spacer (q.ty 2)
- 200521203007 M6X18 fixing bolt (q.ty 2)

Fixing kit for plastic tanks 3.5 litres capacity , Code 200771900160



- 200544116021 Tank fixing clip
- 200677400400 Tank fixing bracket (q.ty 2)
- 200671100101 Bracket spacer (q.ty 2)
- 200521203007 M6X18 fixing bolt (q.ty 2)

To assemble the vertical tanks do not use the tank fixing clip code 200544116021

Fixing kit for vertical tanks from 6 to 14 litres capacity, Code 200771900280



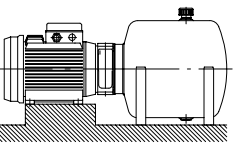
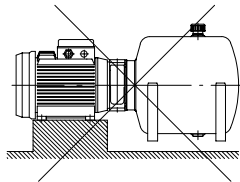
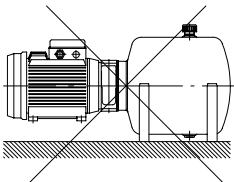
- 200677400400 Tank fixing bracket (q.ty 4)
- 200521203007 M6X18 fixing bolt (q.ty 4)

Fixing kit for horizontal tanks from 6 to 14 litres capacity, Code 200771900310



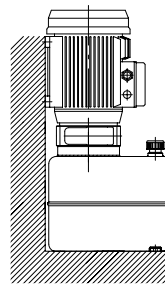
- 200544116021 Tank fixing clip
- 200677400400 Tank fixing bracket (q.ty 4)
- 200521203007 M6X18 fixing bolt (q.ty 4)

Horizontal assembling for power pack with plastic/metal tanks



IMPORTANT!
Overhanging assembling configurations for motor or tank are not admitted

Vertical assembling for power pack with plastic/metal tanks



IMPORTANT!
For hydraulic units assembling electric motors equal or higher than 1.5 HP- 1.1KW, it's recommended to order the B34 frame size version.
Consequently it is recommended to fix the hydraulic unit by the electric motor feet or when possible both electric motor and tank feet.

4 Suction/return assembly kits for plastic tanks

4.1 Suction assembly kits for square tanks from 1.5 to 3.5 litres

| Pump S309 | Horizontal positions P01, P02, P03, P04 | | | |
|-----------|---|--------------|--------------|--------------|
| | P-015Q-* | P-016Q-* | P-025Q-* | P-035Q-* |
| AP100/1.2 | 200685001370 | 200759902120 | 200759902120 | 200759902120 |
| AP100/1.7 | | | | |
| AP100/2.5 | | | | |
| AP100/3.5 | | | | |
| AP100/4.3 | | | | |
| AP100/5 | | | | |
| AP100/6.5 | | | | |
| AP100/8 | | | | |
| AP100/10 | | | | |

| Pump S309 | Vertical positions P15, P35, P25, P45 | | | |
|-----------|---------------------------------------|--------------|--------------|--------------|
| | P-015Q-* | P-016Q-* | P-025Q-* | P-035Q-* |
| AP100/1.2 | 200759901940 | 200759901760 | 200759901990 | 200759902020 |
| AP100/1.7 | 200759901940 | 200759901760 | 200759901990 | 200759902020 |
| AP100/2.5 | 200759901930 + washer 200530751672 | 200759901760 | 200759901990 | 200759902020 |
| AP100/3.5 | | 200759901940 | 200759901980 | 200759902020 |
| AP100/4.3 | | 200759901940 | 200759901980 | 200759901780 |
| AP100/5 | | 200759901940 | 200759901980 | 200759901780 |
| AP100/6.5 | | | 200759901880 | 200759901780 |
| AP100/8 | | | 200759901880 | 200759901780 |
| AP100/10 | | | 200759901770 | 200759901860 |

4.2 Suction assembly kits for square tanks from 6 to 12 litres

| Pump S309 | Vertical positions P01, P02, P03, P04 | | | |
|-------------------|---------------------------------------|----------|----------|----------|
| | P-060Q-* | P-080Q-* | P-100Q-* | P-120Q-* |
| All AP100 version | 200759901830 | | | |

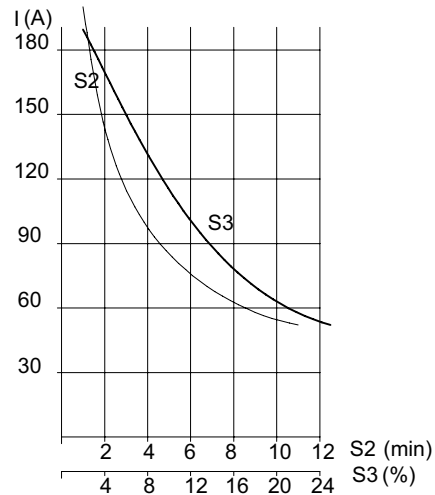
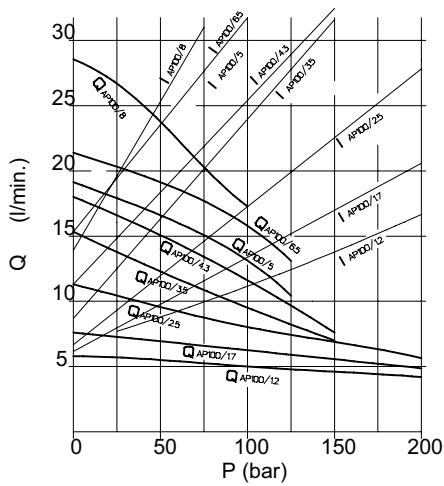
| Pump S309 | Vertical positions P15, P35, P25, P45 | | | |
|-----------|---------------------------------------|--------------|--------------|--------------|
| | P-060Q-* | P-080Q-* | P-100Q-* | P-120Q-* |
| AP100/1.2 | 200759901790 | 200759902160 | 200759902050 | 200759901900 |
| AP100/1.7 | 200759901790 | 200759902160 | 200759902050 | 200759901900 |
| AP100/2.5 | 200759902020 | 200759901800 | 200759902050 | 200759901900 |
| AP100/3.5 | 200759902020 | 200759901800 | 200759902050 | 200759901900 |
| AP100/4.3 | 200759902020 | 200759901800 | 200759901810 | 200759901870 |
| AP100/5 | 200759902020 | 200759901800 | 200759901810 | 200759901870 |
| AP100/6.5 | 200759901780 | 200759902030 | 200759901810 | 200759901870 |
| AP100/8 | 200759901780 | 200759902030 | 200759902040 | 200759901870 |
| AP100/10 | 200759901780 | 200759902030 | 200759902040 | 200759901890 |

4.3 Suction assembly kits for round tanks from 6 to 14 litres

| Pump S309 | Vertical positions P01, P02, P03, P04 | | | | |
|-------------------|---------------------------------------|----------|----------|----------|----------|
| | P-060R-* | P-080R-* | P-100R-* | P-120R-* | P-140R-* |
| All AP100 version | 200759901820 | | | | |

| Pump S309 | Vertical positions P15, P35, P25, P45 | | | | |
|-----------|---------------------------------------|--------------|--------------|--------------|--------------|
| | P-060R-* | P-080R-* | P-100R-* | P-120R-* | P-140R-* |
| AP100/1.2 | 200759901880 | 200759901780 | 200759901790 | 200759902050 | 200759901900 |
| AP100/1.7 | 200759901880 | 200759901780 | 200759901790 | 200759901810 | 200759901900 |
| AP100/2.5 | 200759901880 | 200759901780 | 200759901790 | 200759901810 | 200759901900 |
| AP100/3.5 | 200759901970 | 200759901860 | 200759901790 | 200759901810 | 200759901900 |
| AP100/4.3 | 200759901770 | 200759901860 | 200759901790 | 200759901810 | 200759901870 |
| AP100/5 | 200759901770 | 200759901860 | 200759902130 | 200759902040 | 200759901870 |
| AP100/6.5 | 200759901770 | 200759902010 | 200759902130 | 200759902040 | 200759901870 |
| AP100/8 | 200759901920 | 200759902010 | 200759901780 | 200759902040 | 200759901870 |
| AP100/10 | 200759901960 | 200759901990 | 200759901780 | 200759902160 | 200759901890 |

24 V - 2200 W



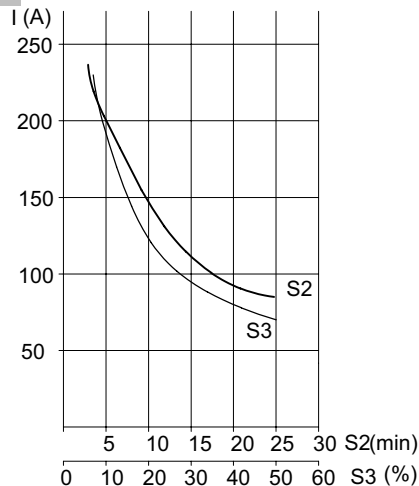
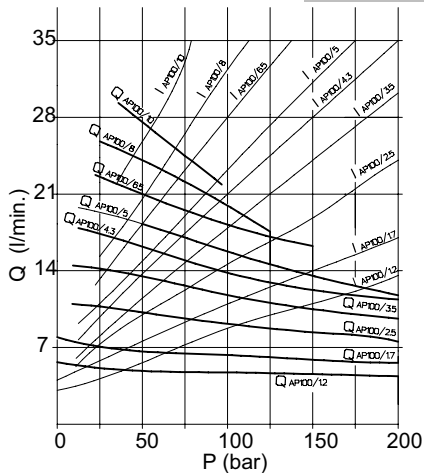
Voltage: **24 V** Insulation class: **F**
 Nominal Power: **3000 W** Brushes kit: **200544138011**
 Protection index: **IP43**

| | Motor | Motor with relay | Standard mounting position |
|-------------------|-----------------------------------|-----------------------------------|------------------------------|
| Rotation Right | | | Motor mounting position |
| Type | 24 V - 3000 W C248AK/Z0 | 24 V - 2200 W C248AK/Z1 | Relay mounting positions |
| Code | 200543924601 | 200543924602 | |
| Relay | | Heavy duty | |
| Relay type | | R212 | |
| | | Standard positions only | |

Example

| | | | | | | | | | | | | | | |
|---|----------------|---|---|---|---|---|---|------|-------|---|--|--|------|--|
| 5 | Electric motor | | | | | | | Pos. | Relay | | | | Pos. | |
| | C | 2 | 4 | 8 | A | K | / | Z | 0 | S | | | | |

24 V - 3000 W



5.2 A.C. Electric motors

| Frame size B14 SINGLE PHASE motor | | | | |
|-----------------------------------|------|------|------|--------------|
| Power | | Size | Type | Code |
| kW | HP | | | |
| 0.25 | 0.33 | 71 | T209 | 200543161221 |
| 0.37 | 0.5 | 71 | T201 | 200543161823 |
| 0.55 | 0.75 | 80 | T202 | 200543162231 |
| 0.75 | 1 | 80 | T203 | 200543162631 |
| 1.1 | 1.5 | 90 | T204 | 200543163041 |
| 1.5 | 2 | 90 | T205 | 200543163441 |
| 2.2 | 3 | 100 | T206 | 200543164051 |

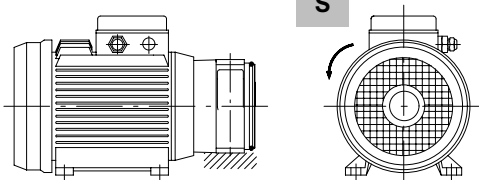
| Frame size B34 SINGLE PHASE motor | | | | |
|-----------------------------------|------|------|------|--------------|
| Power | | Size | Type | Code |
| kW | HP | | | |
| 0.25 | 0.33 | 71 | T709 | 200543161223 |
| 0.37 | 0.5 | 71 | T701 | 200543161822 |
| 0.55 | 0.75 | 80 | T702 | 200543162233 |
| 0.75 | 1 | 80 | T703 | 200543162633 |
| 1.1 | 1.5 | 90 | T704 | 200543163042 |
| 1.5 | 2 | 90 | T705 | 200543163442 |
| 2.2 | 3 | 100 | T706 | 200543164052 |

| Frame size B14 THREE PHASE motor | | | | | |
|-----------------------------------|-------|------|------|------|--------------|
| | Power | | Size | Type | Code |
| | kW | HP | | | |
| According to IE2 efficiency class | 0.25 | 0.33 | 71 | T009 | 200543561221 |
| | 0.37 | 0.5 | 71 | T001 | 200543561821 |
| | 0.55 | 0.75 | 80 | T002 | 200543562231 |
| | 0.75 | 1 | 80 | T003 | 200543562635 |
| | 1.1 | 1.5 | 90 | T004 | 200543563047 |
| | 1.5 | 2 | 90 | T005 | 200543563451 |
| | 2.2 | 3 | 100 | T006 | 200543564058 |
| | 3 | 4 | 100 | T007 | 200543564854 |
| | 4 | 5.5 | 100 | T008 | 200543565065 |

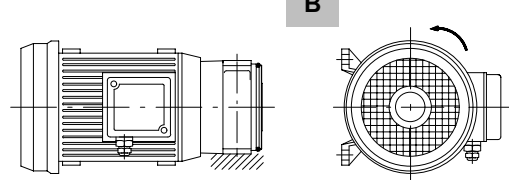
| Frame size B34 THREE PHASE motor | | | | | |
|-----------------------------------|-------|------|------|------|--------------|
| | Power | | Size | Type | Code |
| | kW | HP | | | |
| According to IE2 efficiency class | 0.25 | 0.33 | 71 | T509 | 200543561222 |
| | 0.37 | 0.5 | 71 | T501 | 200543561822 |
| | 0.55 | 0.75 | 80 | T502 | 200543562232 |
| | 0.75 | 1 | 80 | T503 | 200543562634 |
| | 1.1 | 1.5 | 90 | T504 | 200543563046 |
| | 1.5 | 2 | 90 | T505 | 200543563450 |
| | 2.2 | 3 | 100 | T506 | 200543564057 |
| | 3 | 4 | 100 | T507 | 200543564853 |
| | 4 | 5.5 | 100 | T508 | 200543565064 |

Mounting position

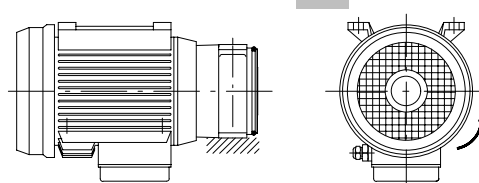
Standard position



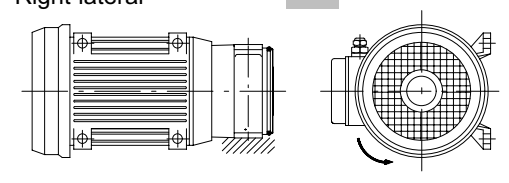
Left lateral



Reversal position



Right lateral



| Example | Electric motor | Pos |
|---------|----------------|-----|
| 5 | T 5 0 3 | S |

| Relay | Pos |
|-------|-----|
| | |

N.B.: Looking at the fan side the e. motor must rotate counterclockwise

6 Drives

The tables allow selection to select the correct drive in function of the selected motor.

6.1 Drives for D.C. motors

| Motor type | | | Voltage | Power | Type |
|------------|-----------|------------------|---------|--------|------|
| C135AK/X0 | C135AK/X1 | C135AK/X0 + R107 | 12 V | 1600 W | E145 |
| C240AK/Y0 | C240AK/Y1 | C240AK/X0 + R210 | 24 V | 2200 W | |
| C248AK/Z0 | | C248AK/Z1 | 24 V | 3000 W | E156 |

6.2 Drives for A.C. motors

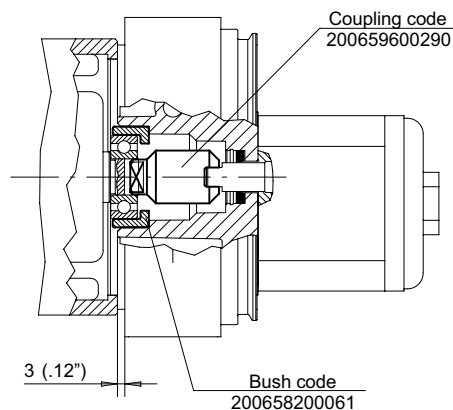
6.2.1 Single phase

| Motor type | Power | | Type |
|------------|-------|------|------|
| | kW | HP | |
| T209-T709 | 0.25 | 0.33 | E133 |
| T201-T701 | 0.37 | 0.5 | |
| T202-T702 | 0.55 | 0.75 | E131 |
| T203-T703 | 0.75 | 1 | |
| T204-T704 | 1.1 | 1.5 | E132 |
| T205-T705 | 1.5 | 2 | |
| T206-T706 | 2.2 | 3 | E137 |
| | | | |

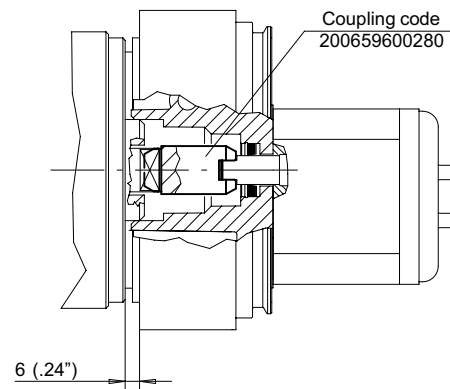
6.2.2 Single phase

| Motor type | Power | | Type |
|------------|-------|------|------|
| | kW | HP | |
| T009-T509 | 0.25 | 0.33 | E133 |
| T001-T501 | 0.37 | 0.5 | |
| T002-T502 | 0.55 | 0.75 | E131 |
| T003-T503 | 0.75 | 1 | |
| T004-T504 | 1.1 | 1.5 | E132 |
| T005-T505 | 1.5 | 2 | |
| T006-T506 | 2.2 | 3 | E137 |
| T007-T507 | 3 | 4 | |
| T008-T508 | 4 | 5.5 | |

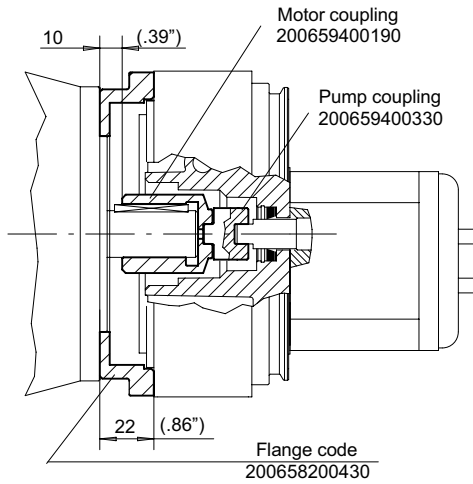
6.3 Drive E145 code 200960400400



6.4 Drive E156 code 200659600280

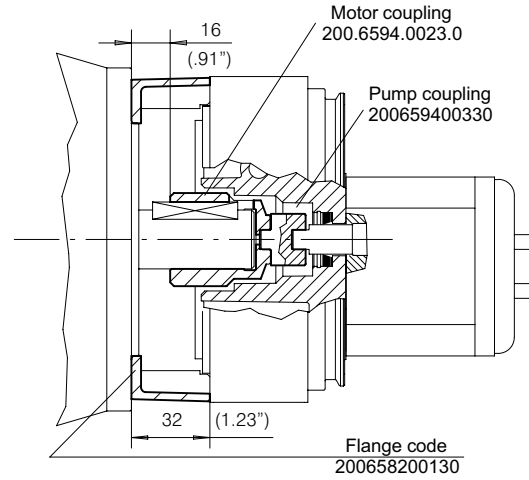


6.5 Drive E131 code 200960400430



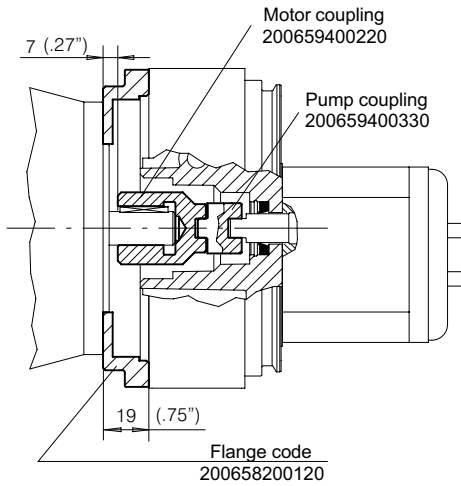
Screw kit code 200771900340

6.6 Drive E132 code 200960400440



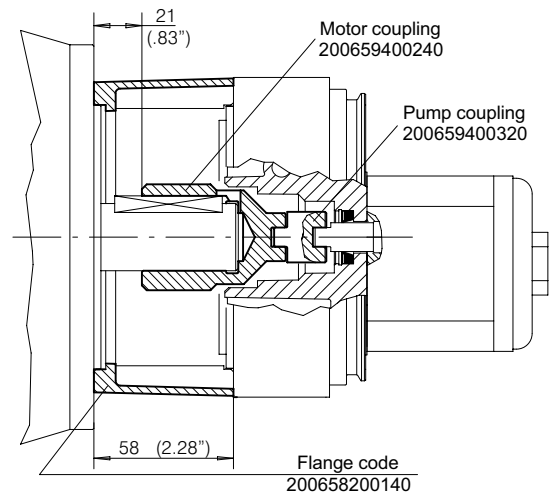
Screw kit code 200771900350

6.7 Drive E133 code 200960400420



Screw kit code 200771900361

6.8 Drive E137 code 200960400450



Screw kit code 200771900370

7 Cartridge valves

7.1 General information

This chapter includes all technical information relating to valves for use in conjunction with the housings described in the section 1.

Complete the designation codes for the selected valve according to the technical information and guidelines given for each component.

7.1.1 Materials

Bucher Hydraulics cartridge valves are manufactured using steel of high mechanical strength.

Friction and potential wear are minimized by special heat treatments. Surface heat treatments protect parts exposed to the external environment. Standard seals are Buna N, with backup ring in PTFE.

For application requiring special compound (Viton, etc.) consult our Sales Dept.

7.1.2 Indication for use

Use mineral oil based hydraulic fluids to ISO/DIN standard, only. Recommended viscosity range: 20-120 mm²/s (cSt) maximum viscosity 700 mm²/s (cSt).

For different fluids and operating conditions, consult our Sales Dept.

All valves showed in the present catalogue are marked with correct flow direction, please observe it always.

Valves must never be tampered with or modified.

Any unwarranted interference may adversely affect the safety and correct operation of the entire system.

Seals and backup rings are user-serviceable.

The appropriate replacement kit is indicated for each valve.

Before installing a valve in its cavity, ensure that the housing and all components of the system are clean.

Smear external seals lightly with grease, and check that any filters installed are correctly positioned.

Tighten the valve to the specified torque setting.

7.1.3 General technical information

All valves with leakage-free operating characteristics are 100% factory tested.

Nonetheless, the guaranteed maximum leakage may be exceeded if the valve is installed in a system with inadequate filtration.

In the case of valves subject to adjustable setting, such as the pressure relief and if not specified in the order, we set them according standard setting values indicated at page 16/24.

7.1.4 Solenoid valves

The correct selection of the solenoid valve is related to the maximum flow rate and operating pressure values.

In a system with a single acting cylinder, therefore, it must be considered that the effective rate of flow through the unloading solenoid valve is not the flow delivered by the pump, but rather the momentary flow exhausted from the cylinder, or the restricted flow needing a pressure-compensated flow control valve, if installed.

The nominal voltage is the value indicated on the solenoid.

Effective voltage must be measured at the terminals of the solenoid connector.

A maximum allowed tolerance of +10% in relation to the nominal value is accepted. Incorrectly power supply components and cables (which length has to be as shorter as possible) and/or low battery charge can cause not correct solenoid valve operation.

All solenoids indicated are designed for d.c. operation.

Operation with a.c. supply requires the use of a special connector incorporating a bridge rectifier. When energized with a.c. voltage, the solenoids can operate at 50 or 60 Hz frequency, without distinction.

The connection used for standard solenoids are to DIN 43650. Solenoid with different connections (Kostal, direct wiring, etc.) can be supplied on request, after agreement with our Sales Dept.

The solenoid can be rotated through 360°, and the connector positioned at 90° intervals.

Specified performance data was recorded in stabilized solenoid operated temperature and voltage at the -10% of the nominal value.

All solenoid valves are fitted with protective O-rings installed between the tube and the solenoid.

This protects internal parts from condensation and contaminants, which could cause malfunction. Standard solenoids are not suitable for operation in environments where there is any risk of explosion (see page 3).

7.1.5 General notes on d.c. power input

A swift and secure coupling is obtained using the special connector (type 200.544110009).

The cable coming from the d.c. power source (batteries, rectified a.c. main supply, etc.) must be connected as indicated in the diagram.

The negative and positive polarity of the wire need not be verified for connection purposes. The connector incorporates a terminal for earthing the solenoid.

It is important to check that the grommet and armour clamp nut are correctly assembled, as this prevents the cable being wrenched from connector.

7.1.6 General notes on a.c. power input

Solenoid valves can be operated off the a.c. mains supply using a special connector (type 200544110012) which converts the current to provide the d.c. input required by the solenoid.

The connector in question is identified by a symbol marked both on the top and on the bottom face.

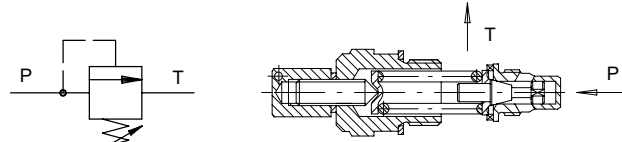
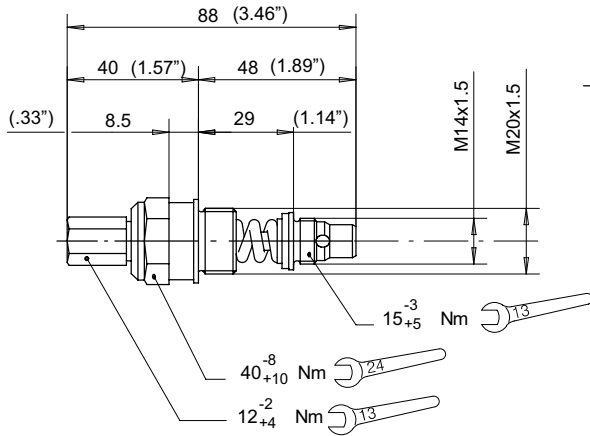
The conversion from alternate to direct current is effected by a rectifier circuit comprising a four-diode bridge, and a voltage-dependent resistor protecting against over voltages in the power supply circuit. Accordingly, the solenoid are designed to operate correctly only when connected to a diode bridge which reduces the input voltage by 10%. The earth connection is made by way of the terminal provided.

For users wishing to make up special circuits and blocks with Bucher Hydraulics S.p.A. cartridge valves, it is important to observe the indications given below when machining the cavities.

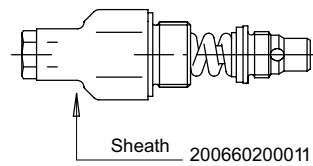
7.2 Pressure relief valve

Direct acting
Equilibrated piston
Adjustable setting
4 setting pressure range

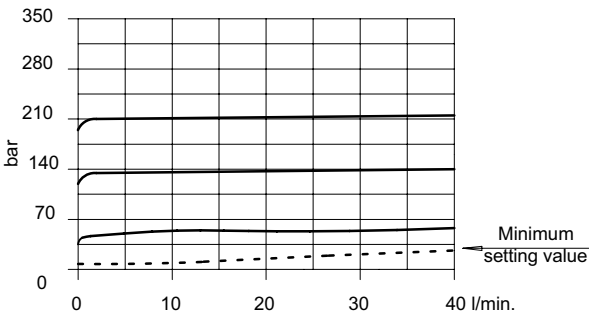
| Technical data | |
|-------------------|-------------------|
| Max. pressure | 300 bar |
| Max flow rate | 40 l/min |
| Temperature range | -20/+90 °C |
| Weight | 0.120 Kg |



Sheath shrink temperature: T= 60°C



Oil: Viscosity 37 mm²/s at 40°C



A heat-shrinkable sheath can be supplied, if requested to prevent the valve being tampered with.

When ordering, state in full the sheath part number, and, if the valve is to be supplied with sheath already fitted, the relief pressure setting required.

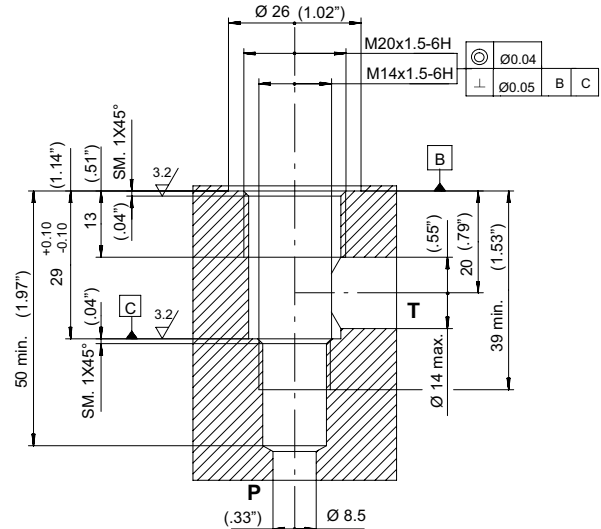
Maximum permissible pressure value: 230 bar

Pressure setting

For present values other than those indicated, replace the first two digits of the designation with the setting required. For example, required setting 120 bar: designation type 12 VM01. Always check that the required value falls within the standard ranges of adjustment.

IMPORTANT! A wrench with the appropriate hex. profile is required to secure the valve in its cavity.

Two-way cavity M20x1.5

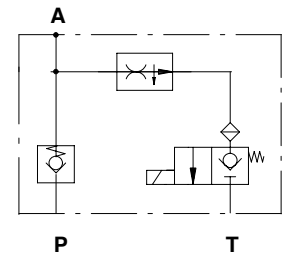
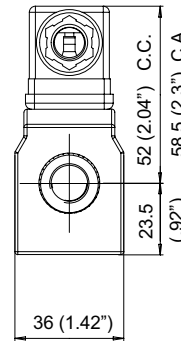
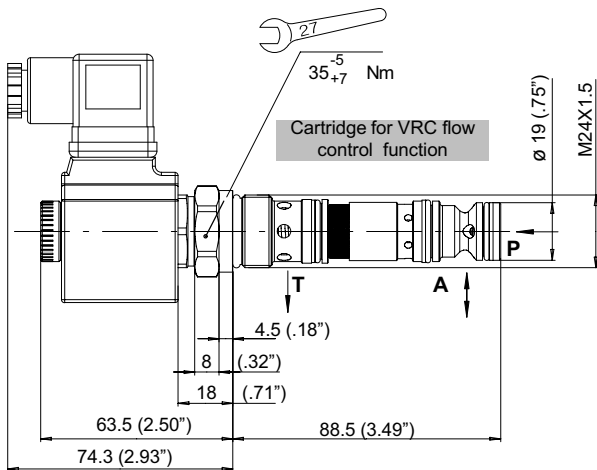


| Spring | Spring colour | Spring Code | Setting range | Standard setting | Type | Code |
|--------|---------------|--------------|---------------|------------------|---------------|--------------|
| 00 | | | Plugged | Without valve | 00VC00 | 200978400140 |
| 02 | | 200662401470 | 5 - 30 bar | 20 bar | 02VM01 | 200787400700 |
| 06 | Yellow | 200662401450 | 30 - 95 bar | 60 bar | 06VM01 | 200787400720 |
| 15 | Green | 200662401480 | 95 - 210 bar | 150 bar | 15VM01 | 200787400740 |
| 22 | Blue | 200662401460 | 200 - 300 bar | 220 bar | 22VM01 | 200787400710 |

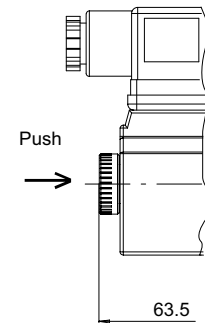
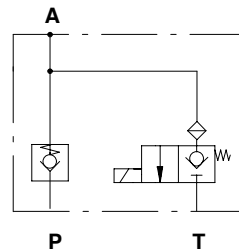
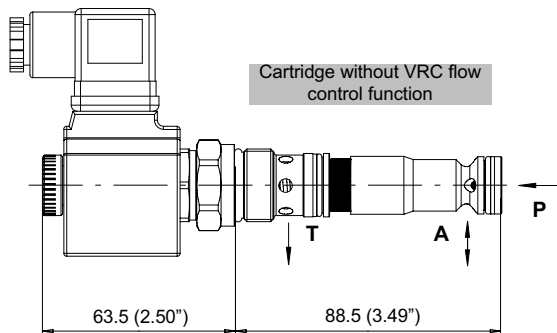
7.3 Solenoid operated directional valve: MF** (multifunction valve) - Normally closed

Normally closed
Poppet type
Direct acting

Flow from P to A (solenoid not energized)
Flow from A to T (el. motor must be OFF)

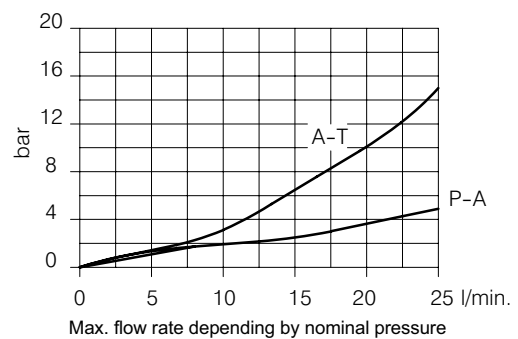


With manual override
(TVSE versions)

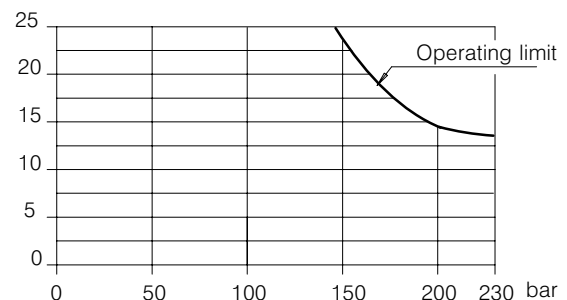


| Electric performances | | |
|------------------------------|----------------------|--------------|
| Max. pressure | 230 bar | |
| Max recommended pressure | 210 bar | |
| Max. flow (see the diagrams) | 14 l/min. 210 bar | |
| Rated power | 27 Watt | |
| Duty | ED= 100% | |
| Internal leakage | 0-5 drops/min. | |
| Temperature range | -20/+90° C | |
| Opening time (50-210 bar) | 15-80 ms. | |
| Closing time (50-210 bar) | 10-60 ms. | |
| O-Ring kit code | with VRC | 200974200370 |
| | without VRC | 200974200360 |

Oil: Viscosity 37 mm²/s at 40 °C (normally closed version)
Pressure drops: valve assembled in UP110 body



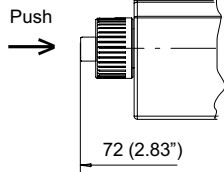
Voltage V= 10% and solenoid at the stabilized temperature



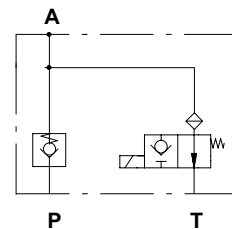
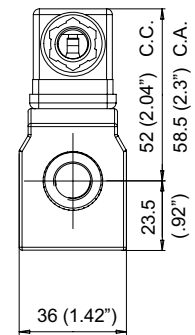
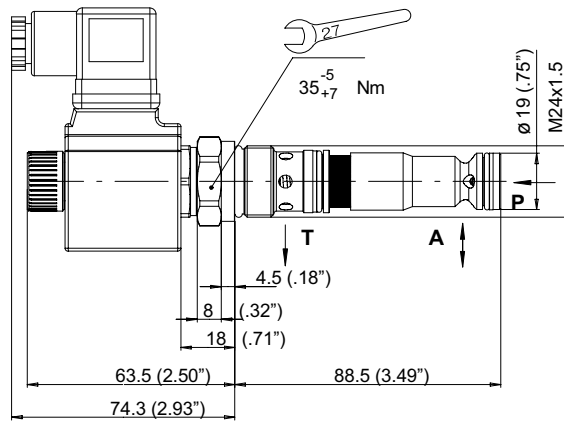
| Electrical version | | VAL MF | - | TVS | / | 09FC | - | 23 | - | HC |
|--|-------------|--------|---|-----|---|------|---|----|--|-------------|
| Multifunction valve | MF | | | | | | | | | |
| Normally closed | TVS | | | | | | | | | |
| Normally closed with manual override | TVSE | | | | | | | | | |
| | | | | | | | | | Connector type DIN 43650 | HC |
| Flow control function Tolerance: $\pm 15\%$ | Type | | | | | | | | Voltage Tolerance: $\pm 10\%$ | Type |
| 2 l/min | 02FC | | | | | | | | 12 VDC | 13 |
| 3 l/min | 03FC | | | | | | | | 24 VDC | 23 |
| 4 l/min | 04FC | | | | | | | | 24 VAC | 21 |
| 5 l/min | 05FC | | | | | | | | 110 VAC | 41 |
| 6 l/min | 06FC | | | | | | | | 220 VAC | 51 |
| 9 l/min | 09FC | | | | | | | | Mechanical part only (without coil and connector) | P.M. |
| 11 l/min | 11FC | | | | | | | | | |
| 12 l/min | 12FC | | | | | | | | | |
| 16 l/min | 16FC | | | | | | | | | |
| Without flow control function | 00FC | | | | | | | | | |

7.4 Solenoid operated directional valve: MF** Normally open, poppet type

Direct acting
Flow from:
P to T
P to A



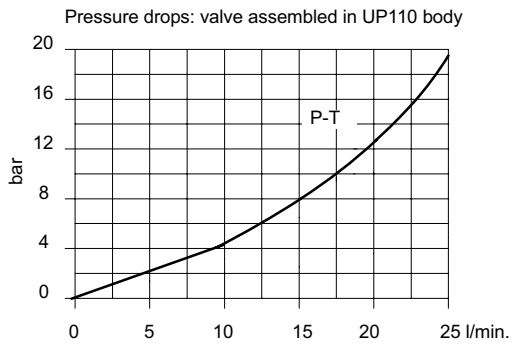
With manual override
(TOSE version)



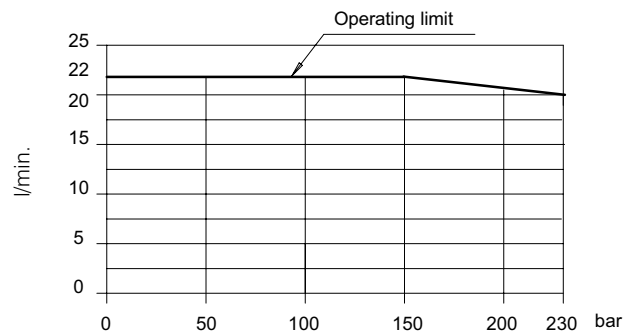
| Electric performances | |
|--------------------------|----------------------|
| Max. pressure | 230 bar |
| Max recommended pressure | 210 bar |
| Max. flow | 20 l/min. 230 bar |
| Rated power | 27 Watt |

| | |
|---------------------------|----------------|
| Intermittence | ED= 100% |
| Internal leakage | 0-5 drops/min. |
| Temperature range | -20/+90° C |
| Opening time (50-210 bar) | 15-80 ms. |
| Closing time (50-210 bar) | 10-60 ms. |
| O-Ring kit code | 200774200360 |

Oil: Viscosity 37 mm²/s at 40 °C (normally closed version)



Max. flow rate depending by nominal pressure

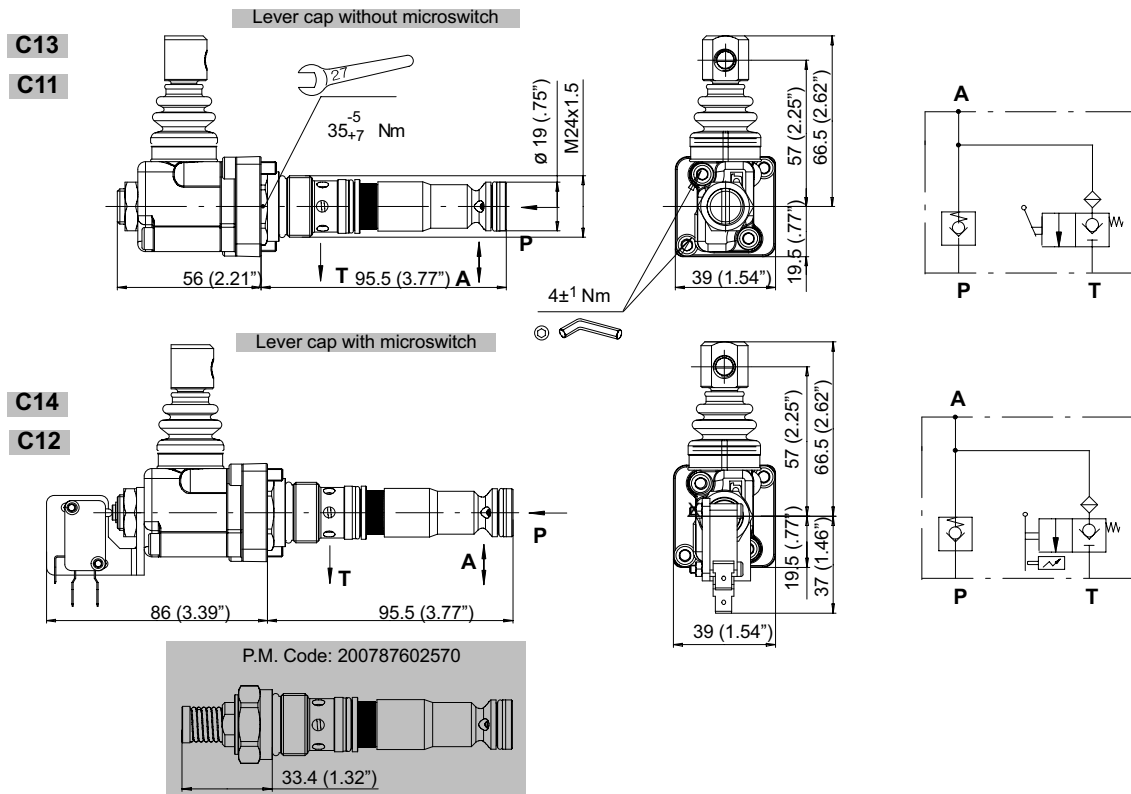


| | | | | | | | | | | | |
|---|-------------|---------------|---|------------|---|-------------|---|-----------|---|---|-------------|
| Electrical Version | | VAL MF | - | TOS | / | 00FC | - | 23 | - | HC | |
| Multifunction valve | MF | | | | | | | | | Connector type DIN 43650 | HC |
| Normally open | TOS | | | | | | | | | Voltage - Tolerance: ± 10 % | Type |
| Normally open with manual override | TOSE | | | | | | | | | 12 VDC | 13 |
| Flow control function | | | | | | | | | | 24 VDC | 23 |
| Not allowed with the normally open function | 00FC | | | | | | | | | 24 VAC | 21 |
| | | | | | | | | | | 110 VAC | 41 |
| | | | | | | | | | | 220 VAC | 51 |
| | | | | | | | | | | Mechanical part only (without coil and connector) | P.M. |

7.5 Hand lever control

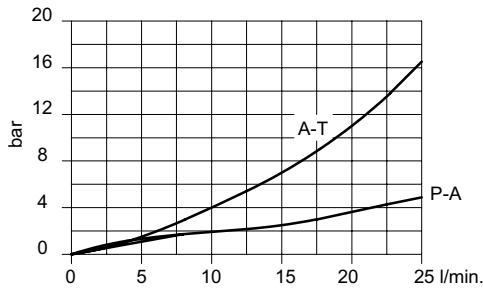
Flow from P to A (solenoid not energized)

Flow from A to T (el. motor must be OFF)



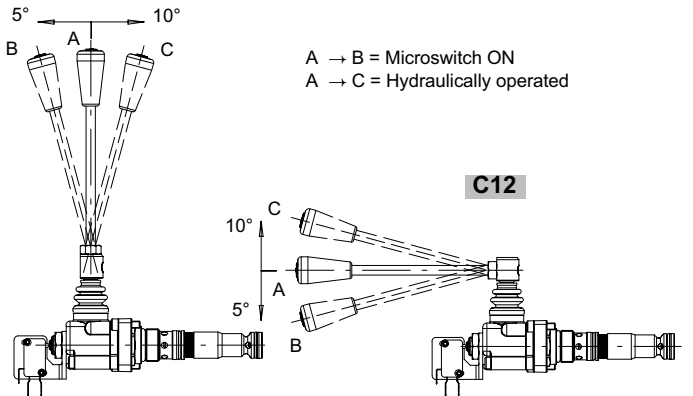
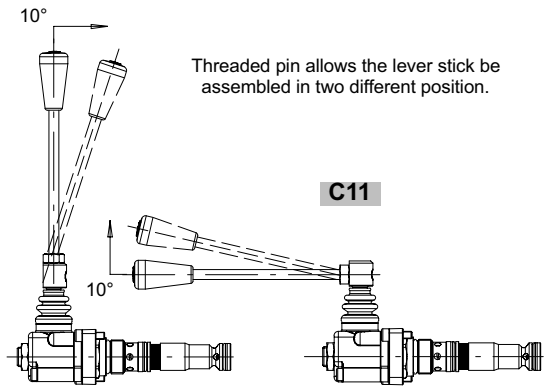
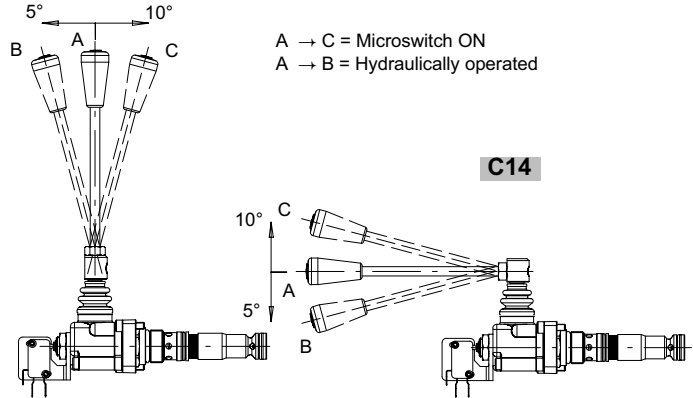
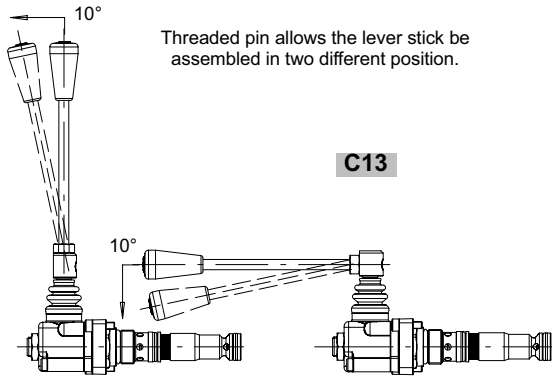
Oil: Viscosity 37mm²/s at 40°C A (normally closed version)

Pressure drops: valve assembled in UP110 body



Manual performances

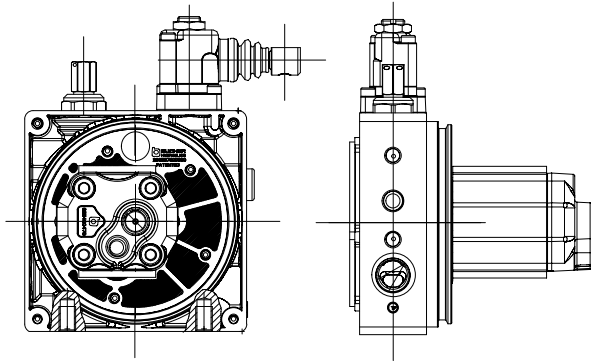
| | |
|--------------------------|----------------|
| Max pressure | 230 bar |
| Max recommended pressure | 210 bar |
| Max flow | 25 l/min |
| Internal leakage | 0-5 drops/min. |
| Temperature range | -20/+90 °C |
| O-Ring kit code | 200774200360 |



| | | | | | | | | |
|--|--------------|---------------|---|------------|---|------------|---|-------------|
| Manual version | | VAL MF | - | TVM | / | C13 | - | 00FC |
| Multifunction valve | MF | | | | | | | |
| Normally closed | TVM | | | | | | | |
| Lever type | Type | | | | | | | |
| Cap lever without microswitch (standard) | C13 | | | | | | | |
| Cap lever without microswitch | C11 | | | | | | | |
| Cap lever with microswitch (standard) | C14 | | | | | | | |
| Cap lever with microswitch | C12 | | | | | | | |
| Flow control function | Type | | | | | | | |
| Without flow control function | 00FC* | | | | | | | |

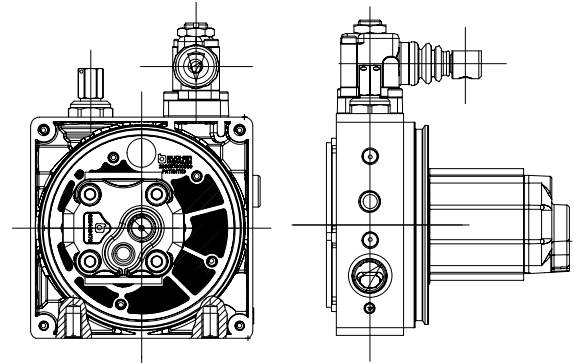
* for version requiring flow control function see page 18/24

Hand lever mounting position



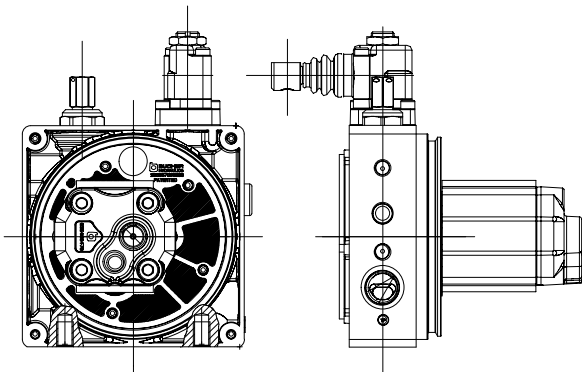
Hand Lever Lever stick

L 1 0 A L 0 0 *



Hand Lever Lever stick

L 1 4 A L 0 0 *



Hand Lever Lever stick

L 1 6 A L 0 0 *

Mounting allowed in housing type **K1** Cavity **C**

Mounting position Vers

1 U P 1 1 0 K 1

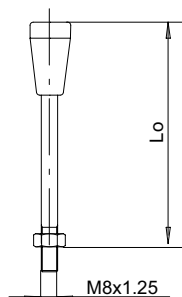
Cavity **C**

7 M F - T V M / C 1 3 - 0 0 F C

Lever stick

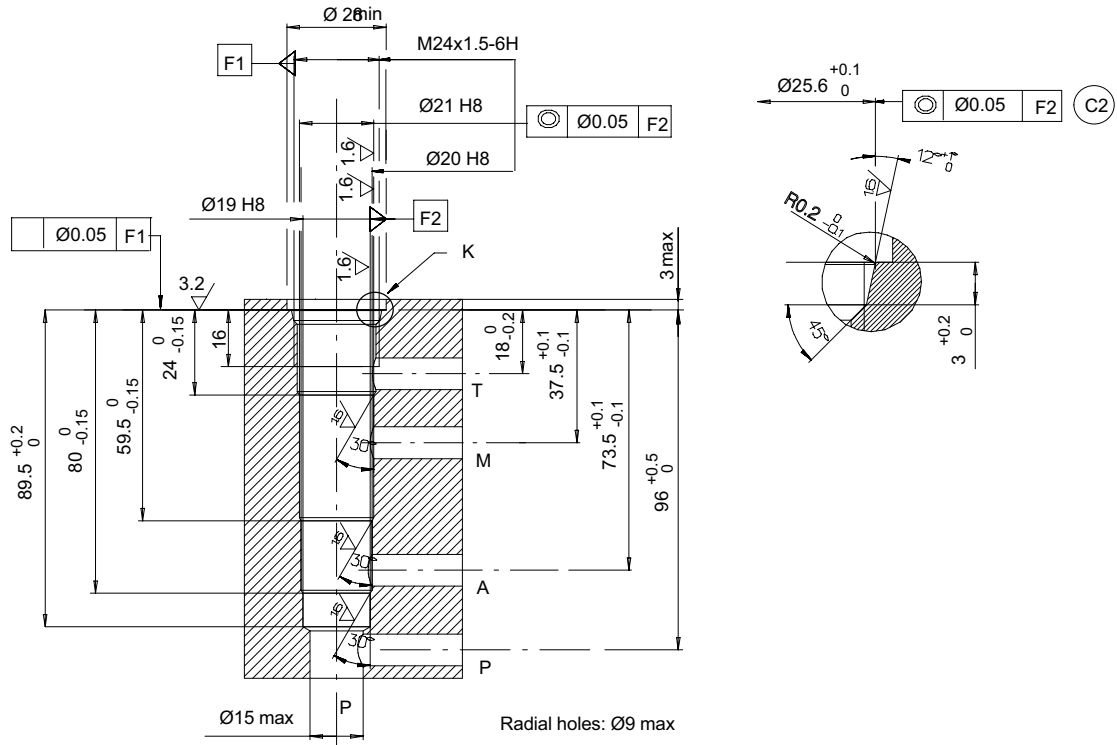
7 Lever stick

A L 0 0 1

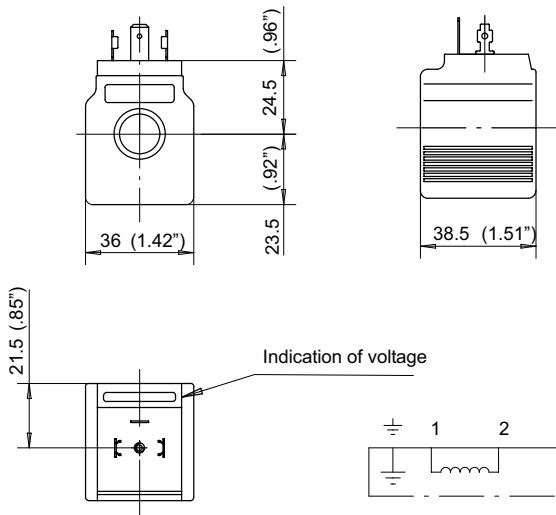


| L0 Length | Type | Code |
|-----------------------|--------------|--------------|
| 150 mm - 5.90 inches | AL001 | 200702210190 |
| 200 mm - 7.87 inches | AL002 | 200702210030 |
| 250 mm - 9.84 inches | AL003 | 200702210050 |
| 300 mm - 11.80 inches | AL004 | 200702210060 |

7.6 MF valve cavity



7.7 Directional valve solenoids



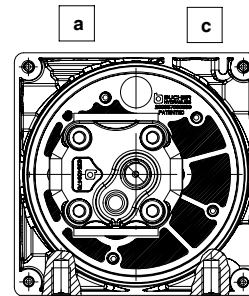
| For solenoid valve series | TVS TOS | Connectors | |
|---------------------------|-----------------|------------|--|
| Wire class | H (VDE0580) | | |
| Coil insulation | IP65 (DIN40050) | | |
| Duty rating | ED 100% | | |
| Connector style | DIN 43650 | | |
| Stabilized temperature | 70°C | | |
| Voltage tolerance | ± 10% | | DC 200544110009 - x= 27.5 mm |
| | | | AC 200544110012 - x= 34 mm |

| Voltage | Nominal voltage | Power (Watt) | Resistance (Ohm) | | Current (Ampere) | | Coil code | Coil + Connector Code |
|----------|-----------------|--------------|------------------|---------------|------------------|---------------|--------------|-----------------------|
| | | | Ambient T. | Stabilized T. | Ambient T. | Stabilized T. | | |
| 12 V DC | 12 V DC | 27.2 | 5.3 | 8 | 2.2 | 1.5 | 200674910100 | 200774910470 |
| 24 V DC | 24 V.DC | 27 | 21.3 | 32 | 1.12 | 0.75 | 200674920080 | 200774920230 |
| 24 V AC | 21.6 V.DC | 27.1 | 17.2 | 26 | 1.25 | 0.83 | 200674820050 | 200774820180 |
| 110 V AC | 98 V.DC | 27 | 355 | 530 | 0.27 | 0.18 | 200674840050 | 200774840180 |
| 220 V DC | 198 V.DC | 27.6 | 1422 | 2130 | 0.14 | 0.10 | 200674860060 | 200774860200 |

7.8 Example of hydraulic power pack ordering code

| | | | | |
|---|----------------------|---------------------|--------|------|
| 1 | Type of housing | Vers. | | |
| | UP110 / K1G201 | | | |
| 2 | Pump | Hi-Lo | Series | |
| | AP100 / 2.5 | | S309 | |
| 3 | Tank | Fitting | Pos. | |
| | P-060Q-ABT | | P01 | |
| 4 | Suction assembly kit | Tank fixing kit | | |
| | | | | |
| 5 | Electric motor | Pos. | Relay | Pos. |
| | C240AK / Y0 | A | | |
| 6 | Drive | | | |
| | E145 | | | |
| 7 | Cavity a | Cavity c | | |
| | 18VM01 | MF-TVS / 09FC-23-HC | | |
| | Hand lever | Stick lever | Volt | |
| | | | 23 | |

Cavities identification



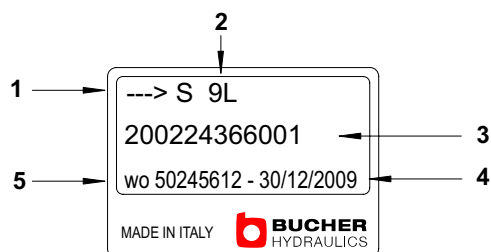
Composition of product code

UP110/K1G201 • AP100/2.5 • S309 P-060Q-ABT • P01 • C240AK/Y0 • A • E145

a) 18 VM01

c) MF-TVS/09FC-23-HC

Product identification plate example:



1 : Rotation (D= Clockwise rotation - S= Counterclockwise rotation)

2 : Manufacturing year and month

3 : Bucher Hydraulics S.p.A. product code

4 : Date

5 : Work order number

| Manufacturing month | Manufacturing year | | | | | | | |
|---------------------|--------------------|------|------|------|------|------|------|------|
| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
| January | 7M | 8A | 9A | 0A | 1A | 2A | 3A | 4A |
| February | 7N | 8B | 9B | 0B | 1B | 2B | 3B | 4B |
| March | 7P | 8C | 9C | 0C | 1C | 2C | 3C | 4C |
| April | 7Q | 8D | 9D | 0D | 1D | 2D | 3D | 4D |
| May | 7R | 8E | 9E | 0E | 1E | 2E | 3E | 4E |
| June | 7S | 8F | 9F | 0F | 1F | 2F | 3F | 4F |
| July | 7T | 8G | 9G | 0G | 1G | 2G | 3G | 4G |
| August | 7U | 8H | 9H | 0H | 1H | 2H | 3H | 4H |
| September | 7V | 8I | 9I | 0I | 1I | 2I | 3I | 4I |
| October | 7Z | 8J | 9J | 0J | 1J | 2J | 3J | 4J |
| November | 7X | 8K | 9K | 0K | 1K | 2K | 3K | 4K |
| December | 7Y | 8L | 9L | 0L | 1L | 2L | 3L | 4L |

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Classification: 440.405.000