Technical Information

# Hydrokraft Open Loop Piston Pumps

X Series



VICKERS by Danfoss

BC442975253403en-000102

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# Introduction

- Axial piston pumps with swashplate design for reliable operation and long life.
- Pressure up to 420 bar. Rated speed up to 1800 $min^{-1}$. Higher speeds possible on request.
- Oversize shafts and bearings.
- Rotating and pressure-loaded parts are pressure balanced.
- Integrated pilot pump, filter and pressure relief valves available.
- "Building block" design gives these pumps a wide range of application.

| Available displacement sizes |
|---|
| 66 ccm/rev |
| 90 ccm/rev |
| 130 ccm/rev |
| 180 ccm/rev |
| 250 ccm/rev |

**Displacement controls**

**DF** - Pressure compensator

**LR** - Power limiter control

**ST** - Electronic flow control

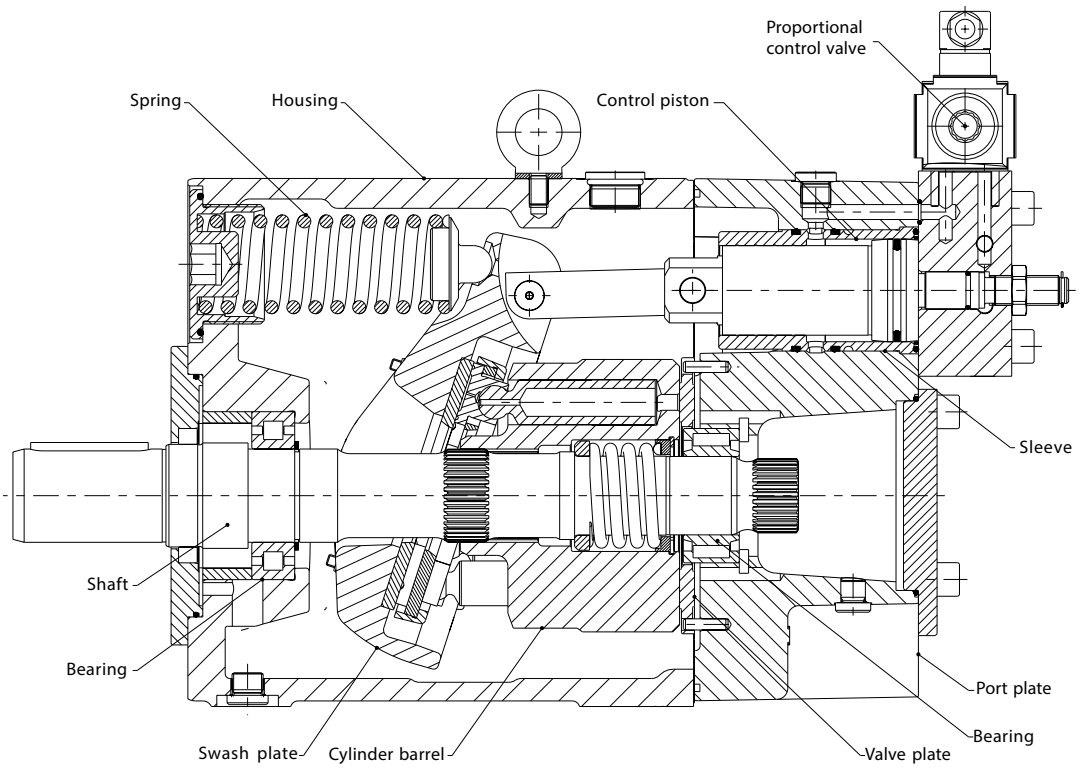
**FM** - Screw adjustment flow control

**ZP** - Dual displacement control

**SP** - Electronic flow control

**ES** - Electric motor flow control

**Typical Section of Open Loop PVX Pump**




**Note**

Dimensional data provided in this catalog is subject to change without notice.

# Model code

Open Loop Pumps
**X** Series - Basic Pumps

- ● Preferred standard option
- ◍ Other standard option
- ○ Special option on request
- X Not available

**P V X * – * * * M * * * * * * * 1 * * * S * * A**

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

| | | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | **Pump** | | | | | |
| **P** | – | Open loop pump | | ● | ● | ● | ● | ● |
| 2 | | | **Displacement** | | | | | |
| **V** | – | Variable | | ● | ● | ● | ● | ● |
| **F** | – | Fixed | | ● | ● | ● | ● | X |
| 3 | | | **Pump Series** | | | | | |
| **X** | – | "X" series | | ● | ● | ● | ● | ● |
| 4 | | | **Configuration** | | | | | |
| **S** | – | Single unit | | ● | ● | ● | ● | ● |
| **F** | – | Front unit | | ○ | ○ | ○ | ○ | ○ |
| **M** | – | Middle unit | | ○ | ○ | ○ | ○ | ○ |
| **R** | – | Rear unit | | ○ | ○ | ○ | ○ | ○ |
| 5 | | | **Separator** | ● | ● | ● | ● | ● |
| 6 7 8 | | | **Displacement cm³/rev (in³/rev)** | | | | | |
| **066** | – | 066 cm³/rev (4 in³/rev) ▲ | | ● | X | X | X | X |
| **090** | – | 090 cm³/rev (5.5 in³/rev) | | X | ● | X | X | X |
| **130** | – | 130 cm³/rev (8 in³/rev) | | X | X | ● | X | X |
| **180** | – | 180 cm³/rev (11 in³/rev) | | X | X | X | ● | X |
| **250** | – | 250 cm³/rev (15.3 in³/rev) | | X | X | X | X | ● |
| *** | – | Non-standard(PFX only) ◊ | | ○ | ○ | ○ | ○ | X |
| ◊ Non-standard displacements (cm³/rev): | | | | | | | | |
| **066** | – | 44/50 | | | | | | |
| **090** | – | 75 | | | | | | |
| **130** | – | 94/112 | | | | | | |
| **180** | – | 160 | | | | | | |
| 9 | | | **Basic Standard** | | | | | |
| **M** | – | Metric | | ● | ● | ● | ● | ● |
| 10 11 | | | **Mounting Flange** | | | | | |
| **02** | – | ISO 3019/2-125A2SW | | ● | ● | X | X | X |
| **04** | – | ISO 3019/2-160A2SW | | X | X | ● | ● | X |
| **06** | – | ISO 3019/2 200A2SW | | X | X | X | X | ● |
| 12 | | | **Rotation Direction** | | | | | |
| **R** | – | Clockwise | | ● | ● | ● | ● | X |
| **L** | – | Counter-clockwise | | ○ | ○ | ○ | ○ | X |
| 13 | | | **Maximum displacement** | | | | | |
| **0** | – | Max. displacement adjusting screw | | | | | | |
| | | With control DF/ZP | | ● | ● | ● | ● | ● |
| | | With control ST +DF | | ● | ● | ● | ● | ● |
| | | With control ST +LR | | X | X | X | X | X |
| | | With control LR/SP/FM/ES | | X | X | X | X | X |
| **4** | – | Fixed mechanical stop ring side A (max displacement) | | ○ | ○ | ○ | ○ | ○ |
| **5** | – | Fixed mechanical stop ring side B (min. displacement) | | ○ | ○ | ○ | ○ | ○ |
| | | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

| | | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|---|
| 14 15 | | | **Thru drive options** | | | | | |
| **00** | – | None | | ● | ● | ● | ● | ● |
| **0A** | – | SAE A | | ○ | ○ | ○ | ○ | ○ |
| **0B** | – | SAE B | | ○ | ○ | ○ | ○ | ○ |
| **0C** | – | SAE C | | ○ | ○ | ○ | ○ | ○ |
| **0P** | – | Pilot pump(8cm³/rev) | | ○ | ○ | ○ | ○ | ○ |
| **0X** | – | For tandem units | | ○ | ○ | ○ | ○ | ○ |
| 16 | | | **Main Ports** | | | | | |
| **1** | – | SAE ports - Metric bolts | | ● | ● | ● | ● | ● |
| 17 | | | **Main port orientation** | | | | | |
| **R** | – | Radial (side ports) | | ● | ● | ● | ● | ● |
| **A** | – | Axial (in-line rear) | | ○ | ○ | ○ | ○ | ○ |
| ▼ For fixed units only radial ports available | | | | | | | | |
| 18 19 | | | **Main drive shaft end** | | | | | |
| **01** | – | ISO straight key | | ● | ● | ● | ● | ● |
| **02** | – | ISO spline | | ○ | ○ | ○ | ○ | ○ |
| 20 | | | **Drive shaft seal configuration** | | | | | |
| **S** | – | Single shaft seal | | ● | ● | ● | ● | ● |
| 21 | | | **Seal material** | | | | | |
| **V** | – | FKM | | ● | ● | ● | ● | ● |
| **F** | – | FKM + front bearing flushing prepared | | ○ | ○ | ○ | ○ | ○ |
| **K** | – | FKM with HP lubrication | | ○ | ○ | ○ | ○ | ○ |
| **L** | – | For HFC Hp-Lub + front flushing | | ○ | ○ | ○ | ○ | ○ |
| **M** | – | For HFC Hp-Lub + front + rear flushing | | ○ | ○ | ○ | ○ | ○ |
| **G** | – | For HFC front + rear flushing | | ○ | ○ | ○ | ○ | ○ |
| **A** | – | EPDM / PTFE | | ○ | ○ | ○ | ○ | ○ |
| 22 | | | **Yoke position indicator** | | | | | |
| **0** | – | No position indicator | | ● | ● | ● | ● | ● |
| **V** | – | Visual indicator | | ○ | ○ | ○ | ○ | ○ |
| **P** | – | Voltage indicator ▲ | | ○ | ○ | ○ | ○ | ○ |
| **M** | – | Voltage + visual indicator ▲ | | ○ | ○ | ○ | ○ | ○ |
| **L** | – | Current + visual indicator | | ○ | ○ | ○ | ○ | ○ |
| | | ▲ SP control only | | | | | | |
| 23 | | | **Surface coating** | | | | | |
| **A** | – | Primer blue ▼ | | ● | ● | ● | ● | ● |
| **0** | – | Rust inhibitor oil | | ○ | ○ | ○ | ○ | ○ |
| ▼ Other finishes on request. | | | | | | | | |
| 24 | | | **Control model code** | | | | | |
| See fields 24 to 48 on following pages. | | | | | | | | |
| | | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

**Note:**

▲ 66cc will get new design (similar to 90 cc) and all counter-clockwise of 66cc will be outfaced in 2018.

# Control overview

For additional control options
Please look into details of modelcoding

Open Loop Pumps
**X** Series - Basic Pumps

**D F** Pressure compensator
with or without load sense

**L R** Power limiter control
with or without pressure compensation
with or without load sense

**S T** Electronic flow control
electrial feedback, neutral postion at max. displacement
with or without pressure and/or power limiter override

**F M** Screw adjustment flow control
manual flow control by screw adjustment

**Z P** Dual displacement control
flow control for 2 displacements, switchable by on/off valve

**Preferred**
•shortest lead time
•cost effective

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**S P** Electronic flow control
electr. feedback, neutral position at zero displacement
with or without pressure limiter override

**E S** Electric motor flow control
electromechanical flow control with gearbox and limit switches

**On request only**
•longer lead times
•standard pricing

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**Note:** FE, HG, DP, SM and DQ old controls should not be used anymore.

# Model code

Open Loop Pumps
**X** Series - **DF** Control

- ● Preferred standard option
- ◍ Other standard option
- ○ Special option on request

| D | F | 0 | 0 | 0 | A | * | * | 0 | 0 | 0 | 0 | * | 0 | 0 | * | * | * | * | * | * | * | * | * | * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |

| | | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|---|
| 24 25 | | **Control Type** | | | | | | |
| **DF** | – | Pressure compensator | | ● | ● | ● | ● | ● |
| 26 | | **Displacement adjustment options** | | | | | | |
| **0** | – | Not applicable | | | | | | |
| 27 28 | | **Electronic amplifier** | | | | | | |
| **00** | – | Not applicable | | | | | | |
| 29 | | **Yoke displacement zone** | | | | | | |
| **A** | – | Single side of centre "A" | | ● | ● | ● | ● | ● |
| 30 | | **Additional functions** | | | | | | |
| **0** | – | None | | ● | ● | ● | ● | ● |
| **1** | – | Load sensing (standard Δp = 15 bar) | | ● | ● | ● | ● | ● |
| **A** | – | 2-level pressure compensator, 4/2 solenoid valve | | ○ | ○ | ○ | ○ | ○ |
| **B** | – | 2-level pressure compensator, 4/3 solenoid valve | | ○ | ○ | ○ | ○ | ○ |
| 31 | | **Pressure control options** | | | | | | |
| **0** | – | None i.e. pilot operated with remote port (standard arrangement) | | ● | ● | ● | ● | ● |
| **F** | – | Remote port without pilot valve | | ○ | ○ | ○ | ○ | ○ |
| **K** | – | Electro - proportionalrelief valve, complete with electronic card | | ○ | ○ | ○ | ○ | ○ |
| **L** | – | Electro - proportionalrelief valve with OBE | | ○ | ○ | ○ | ○ | ○ |
| **S** | – | Slow upstroke screw adjustment | | ○ | ○ | ○ | ○ | ○ |
| 32 33 34 | | **Power control** | | | | | | |
| **000** | – | Not applicable | | | | | | |
| 35 | | **Pilot oil filter** | | | | | | |
| **0** | – | Not applicable | | | | | | |
| | | | Pump Size | 66 | 90 | 130 | 180 | 250 |

| | | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|---|
| 36 | | **Venting valve** | | | | | | |
| **0** | – | None | | ● | ● | ● | ● | ● |
| **1** | – | Solenoid valve ▼ | | ○ | ○ | ○ | ○ | ○ |
| ▼ Specify voltage in 39 | | | | | | | | |
| 37 | | **Position monitoring** | | | | | | |
| **0** | – | Not applicable | | | | | | |
| 38 | | **Electric motor type** | | | | | | |
| **0** | – | Not applicable | | | | | | |
| 39 | | **Control voltage** | | | | | | |
| **0** | – | Not applicable | | ● | ● | ● | ● | ● |
| **H** | – | 24V DC (preferred voltage) | | ● | ● | ● | ● | ● |
| **B** | – | 110V AC 50 Hz / 120V AC 60 Hz | | ○ | ○ | ○ | ○ | ○ |
| **D** | – | 230V AC 50 Hz / 240V AC 60 Hz | | ○ | ○ | ○ | ○ | ○ |
| 40 41 42 43 | | **Customer adjustment specification** | | | | | | |
| **0000** | – | None | | ● | ● | ● | ● | ● |
| ******** | – | Danfoss assigned numberas per data specified in table below ◊ | | ○ | ○ | ○ | ○ | ○ |
| 44 45 46 | | **Special features** | | | | | | |
| **000** | – | None | | ● | ● | ● | ● | ● |
| ******* | – | Defined by Danfoss | | ○ | ○ | ○ | ○ | ○ |
| 47 48 | | **Design number** | | | | | | |
| ****** | – | 10-99 assigned by Danfoss | | ● | ● | ● | ● | ● |
| | | | Pump Size | 66 | 90 | 130 | 180 | 250 |

◊ **Example for customer adjustment specifications**

| Special pressure adjustment | Main stage pressure control | Pilot valve ▲ pressure control | Load sense Δp |
|---|---|---|---|
| Standard setting (bar) | 20 | 90 | 15 |
| Max. setting (bar) | 40 | 350 | 40 |
| Customer-specified adjustment (bar) | ..... | ..... | ..... |

▲ **Note:** Setting must be at least 30bar.

| Special max. Displ. Adjustment | Minimum displacement | Maximum displacement |
|---|---|---|
| Standard | 0 $cm^3$/rev | 100% |
| Customer-specified adjustment ($cm^3$/rev) | ..... | ..... |

**Note:** Special pressure adjustments and/or maximumdisplacment adjustments are the most commonreasons for using this option. Max. displacement adjustable by screw or stop ring- refer basic pumpmodel code pos 13.

# Model code

- ● Preferred standard option
- ◍ Other standard option
- ○ Special option on request

Open Loop Pumps
**X** Series - **LR** Control

| L | R | 0 | 0 | 0 | A | * | * | * | * | * | 0 | * | 0 | 0 | * | * | * | * | * | * | * | * | * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |

| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 24 25 | | **Control type** | | | | | |
| **LR** | – | Power control | ● | ● | ● | ● | ● |
| 26 | | **Displacement adjustment options** | | | | | |
| **0** | – | Not applicable | | | | | |
| 27 28 | | **Electronic amplifier** | | | | | |
| **00** | – | Not applicable | | | | | |
| 29 | | **Yoke displacement zone** | | | | | |
| **A** | – | Single side of centre "A" | ● | ● | ● | ● | ● |
| 30 | | **Additional functions** | | | | | |
| **2** | – | Pressure limiter ▲ | ● | ● | ● | ● | ● |
| **3** | – | Load sensing and pressure limiter (standard Δp = 15 bar) | ● | ● | ● | ● | ● |
| ▲ To select Power Control without Pressure Limiter, specify ... LR ... A2F. | | | | | | | |
| 31 | | **Pressure control options** | | | | | |
| **0** | – | None i.e. pilot operated with remote port (standard arrangement) | ● | ● | ● | ● | ● |
| **F** | – | Remote port without pilot valve | ○ | ○ | ○ | ○ | ○ |
| **K** | – | Electro - proportionalrelief valve, complete with electronic card | ○ | ○ | ○ | ○ | ○ |
| **L** | – | Electro - proportionalrelief valve with OBE | ○ | ○ | ○ | ○ | ○ |
| **S** | – | Slow upstroke screw adjustment | ○ | ○ | ○ | ○ | ○ |
| 32 33 34 | | **Power control specification** | | | | | |
| *** | – | 3-digit value in kW at 1500 rpm | ● | ● | ● | ● | ● |
| 35 | | **Pilot oil filter** | | | | | |
| **0** | – | Not applicable | | | | | |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 36 | | **Venting valve** | | | | | |
| **0** | – | None | ● | ● | ● | ● | ● |
| **1** | – | Solenoid valve ▼ | ○ | ○ | ○ | ○ | ○ |
| ▼ Specify voltage in 39 | | | | | | | |
| 37 | | **Position monitoring** | | | | | |
| **0** | – | Not applicable | | | | | |
| 38 | | **Electric motor type** | | | | | |
| **0** | – | Not applicable | | | | | |
| 39 | | **Control Voltage** | | | | | |
| **0** | – | Not applicable | ● | ● | ● | ● | ● |
| **H** | – | 24V DC (Preferred voltage) | ● | ● | ● | ● | ● |
| **B** | – | 110V AC 50 Hz / 120V AC 60 Hz | ○ | ○ | ○ | ○ | ○ |
| **D** | – | 230V AC 50 Hz / 240V AC 60 Hz | ○ | ○ | ○ | ○ | ○ |
| 40 41 42 43 | | **Customer adjustment specification** | | | | | |
| **0000** | – | None | ● | ● | ● | ● | ● |
| **** | – | Danfoss assigned numberas per data specified in table below ◊ | ○ | ○ | ○ | ○ | ○ |
| 44 45 46 | | **Special features** | | | | | |
| **000** | – | None | ● | ● | ● | ● | ● |
| *** | – | Defined by Danfoss | ○ | ○ | ○ | ○ | ○ |
| 47 48 | | **Design number** | | | | | |
| ** | – | 10-99 assigned by Danfoss | ● | ● | ● | ● | ● |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

◊ **Example for customer adjustment specifications A2 29 30**

| Special pressure adjustment | Main stage pressure control | Pilot valve ▲ pressure control | Load sense Δp |
|---|---|---|---|
| Standard setting (bar) | 20 | 90 | 15 |
| Max. setting (bar) | 40 | 350 | 40 |
| Customer-specified adjustment (bar) | ..... | ..... | ..... |

▲ **Note:** Setting must be at least 30bar.

| Special max. Displ. Adjustment | Minimum displacement | Maximum displacement |
|---|---|---|
| Standard | 0 cm³/rev | 100% |
| Customer-specified adjustment (cm³/rev) | ..... | ..... |

**Note:** Special pressure adjustments and/or maximumdisplacment adjustments are the most commonreasons for using this option. Max. displacement adjustable by screw or stop ring- refer basic pumpmodel code pos 13.

# Model code

- ● Preferred standard option
- ◍ Other standard option
- ○ Special option on request

Open Loop Pumps
**X** Series - **ST** Control
21 = **K, M** or **L** mandatory
(HP lubrication)
22 = **L** mandatory
(electrical yoke position indicator)

| S | T | * | * | * | A | * | * | * | * | * | * | * | 0 | 0 | 0 | * | * | * | * | * | * | * | * | * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |

| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 24 25 | | **Control type** | | | | | |
| **S T** | – | Electronic flow control by proportional valve | ● | ● | ● | ● | ● |
| 26 | | **Displacement adjustment options** | | | | | |
| **C** | – | With CETOP 3 proportional valve | ● | ● | ● | ● | ● |
| **A** | – | With CETOP 3 interface (no valve) | ○ | ○ | ○ | ○ | ○ |
| **D** | – | CETOP 3 proportional valve KBSDGV-4 with OBE (electr. amplifier necessary for flow control) | ○ | ○ | ○ | ○ | ○ |
| **G** | – | CETOP 3 Axis-Pro OBE valve with integr. flow control (no add. amplifier necessary) | ○ | ○ | ○ | ○ | ○ |
| 27 28 | | **Electronic amplifier** | | | | | |
| **03** | – | With ER9.3 amplifier card | ● | ● | ● | ● | ● |
| **05** | – | With DIN rail module | ○ | ○ | ○ | ○ | ○ |
| **00** | – | Without electronics | ○ | ○ | ○ | ○ | ○ |
| 29 | | **Yoke displacement zone** | | | | | |
| **A** | – | Single side of centre "A" | ● | ● | ● | ● | ● |
| 30 | | **Extra functions** | | | | | |
| **0** | – | Without additional options | ● | ● | ● | ● | ● |
| **4** | – | Pressure limiter override | ○ | ○ | ○ | ○ | ○ |
| **5** | – | Pressure limiter and power limiter override | ○ | ○ | ○ | ○ | ○ |
| 31 | | **Pressure limiter control options** | | | | | |
| **0** | – | Including pilot relief valve and remote port option | ● | ● | ● | ● | ● |
| **F** | – | Remote port only | ○ | ○ | ○ | ○ | ○ |
| **K** | – | Proportional relief valve + EEA-PAM amplifier card | ○ | ○ | ○ | ○ | ○ |
| **L** | – | Proportional relief valve with integrated Electronics OBE | ○ | ○ | ○ | ○ | ○ |
| 32 33 34 | | **Power control setting options** | | | | | |
| **000** | – | No power limiter override | ● | ● | ● | ● | ● |
| *** | – | 3-digit value in kW at 1500 rpm | ● | ● | ● | ● | ● |
| 35 | | **Pilot oil filter** | | | | | |
| **0** | – | Without filter | ● | ● | ● | ● | ● |
| **E** | – | Filter with electr. indicator | ○ | ○ | ○ | ○ | ○ |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 36 | | **Pilot oil supply** | | | | | |
| **A** | – | Internal pilot oil supply only | ● | ● | ● | ● | ● |
| **B** | – | External pilot oil supply only | ○ | ○ | ○ | ○ | ○ |
| **C** | – | Internal + external pilot oil supply by check valve | ○ | ○ | ○ | ○ | ○ |
| 37 | | **Position monitoring** | | | | | |
| **0** | – | Not applicable | | | | | |
| 38 | | **Electric motor type** | | | | | |
| **0** | – | Not applicable | | | | | |
| 39 | | **Control voltage** | | | | | |
| **0** | – | Not applicable | | | | | |
| 40 41 42 43 | | **Customer adjustment specification** | | | | | |
| **0000** | – | None | ● | ● | ● | ● | ● |
| **** | – | Danfoss assigned numberas per data specified in table below ◊ | ○ | ○ | ○ | ○ | ○ |
| 44 45 46 | | **Special features** | | | | | |
| **000** | – | None | ● | ● | ● | ● | ● |
| *** | – | Defined by Danfoss | ○ | ○ | ○ | ○ | ○ |
| 47 48 | | **Design number** | | | | | |
| ** | – | 10-99 assigned by Danfoss | ● | ● | ● | ● | ● |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

◊ **Example for customer adjustment specifications A4/A5 29 30**

| Special pressure adjustment | Main stage pressure control | Pilot valve ▲ pressure control |
|---|---|---|
| Standard setting (bar) | 20 | 90 |
| Max. setting (bar) | 40 | 350 |
| Customer-specified adjustment (bar) | ..... | ..... |

▲ **Note:** Setting must be at least 30bar.

| Special max. Displ. Adjustment | Minimum displacement | Maximum displacement |
|---|---|---|
| Standard | 0 $cm^3$/rev | 100% |
| Customer-specified adjustment ($cm^3$/rev) | ..... | ..... |

**Note:** Special pressure adjustments and/or maximumdisplacment adjustments are the most common reasons for using this option. Max. displacement adjustable by screw or by stop ring- refer basic pump model code pos 13.

**Notes:**

- ST control requires a min. operation pressure of >25 bar for operation. For internal pilot oil supply it must be assured that this load pressure can be provided. Below this min. pressure value pump will automatically go on max. stroke.
- External ST control pilot pressure needs to be equal or more than 35% of max. load pressure

# Model code

● Preferred standard option
○ Special option on request

Open Loop Pumps
**X** Series - **FM** Control

| F | M | 0 | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | * | * | * | * | * | * | * | * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |

| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 24 25 | | **Control type** | | | | | |
| **FM** | – | Screw adjustment control displacement range 50-100% | ● | ● | ● | ● | ● |
| 26 | | **Displacement adjustment options** | | | | | |
| **G** | – | Not applicable | | | | | |
| 27 28 | | **Electronic amplifier** | | | | | |
| **00** | – | Not applicable | | | | | |
| 29 | | **Yoke displacement zone** | | | | | |
| **A** | – | Single side of centre "A" | ● | ● | ● | ● | ● |
| 30 | | **Additional functions** | | | | | |
| **0** | – | Not applicable | | | | | |
| 31 | | **Pressure control options** | | | | | |
| **0** | – | Not applicable | | | | | |
| 32 33 34 | | **Power control specification** | | | | | |
| **000** | – | Not applicable | | | | | |
| 35 | | **Pilot oil filter** | | | | | |
| **0** | – | Not applicable | | | | | |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 36 | | **Venting valve** | | | | | |
| **0** | – | Not applicable | | | | | |
| 37 | | **Position monitoring** | | | | | |
| **0** | – | Not applicable | | | | | |
| 38 | | **Electric motor type** | | | | | |
| **0** | – | Not applicable | | | | | |
| 39 | | **Control voltage** | | | | | |
| **0** | – | Not applicable | | | | | |
| 40 41 42 43 | | **Customer adjustment specification** | | | | | |
| **0000** | – | None | ● | ● | ● | ● | ● |
| **** | – | Danfoss assigned numbers as per data specified in table below ◊ | ○ | ○ | ○ | ○ | ○ |
| 44 45 46 | | **Special features** | | | | | |
| **000** | – | None | ● | ● | ● | ● | ● |
| *** | – | Defined by Danfoss | ○ | ○ | ○ | ○ | ○ |
| 47 48 | | **Design number** | | | | | |
| ** | – | 10-99 assigned by Danfoss | ● | ● | ● | ● | ● |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

**◊ Example for customer adjustment specifications**

| Special max. Displ. adjustment | Minimum displacement | Maximum displacement |
|---|---|---|
| Standard | 50% | 100% |
| Customer-specified adjustment ($cm^3$/rev) | ..... | ..... |

**Note:** Special pressure adjustments and/or maximum displacment adjustments are the most common reasons for using this option.

**Notes:**

- Adjustable only with load pressure ≤30 bar
- Factory setting 100%

# Model code

Open Loop Pumps
**X** Series - **ZP** Control

- ● Preferred standard option
- ◍ Other standard option
- ○ Special option on request

| Z | P | * | * | * | A | 0 | 0 | 0 | 0 | 0 | 0 | * | 0 | 0 | 0 | * | * | * | * | * | * | * | * | * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |

| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 24 25 | | **Control type** | | | | | |
| **ZP** | – | Dual displacement control | ● | ● | ● | ● | ● |
| 26 | | **Displacement adjustment options** | | | | | |
| **1** | – | 4/2 solenoid valve | ● | ● | ● | ● | ● |
| **A** | – | With CETOP 3 interface (no valve) | ○ | ○ | ○ | ○ | ○ |
| 27 28 | | **Electronic amplifier** | | | | | |
| **00** | – | Not applicable | | | | | |
| 29 | | **Yoke displacement zone** | | | | | |
| **A** | – | Single side of center "A" | ● | ● | ● | ● | ● |
| 30 | | **Extra functions** | | | | | |
| **0** | – | Not applicable | | | | | |
| 31 | | **Pressure limiter control options** | | | | | |
| **0** | – | Not applicable | | | | | |
| 32 33 34 | | **Power control specification** | | | | | |
| **000** | – | Not applicable | | | | | |
| 35 | | **Pilot oil filter** | | | | | |
| **0** | – | Not applicable | | | | | |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 36 | | **Pilot oil supply** | | | | | |
| **A** | – | Internal pilot oil supply only | ● | ● | ● | ● | ● |
| **B** | – | External pilot oil supply only | ○ | ○ | ○ | ○ | ○ |
| **C** | – | Internal + external pilot oil supply by check valve | ○ | ○ | ○ | ○ | ○ |
| 37 | | **Position monitoring** | | | | | |
| **0** | – | Not applicable | | | | | |
| 38 | | **Electric motor type** | | | | | |
| **0** | – | Not applicable | | | | | |
| 39 | | **Control Voltage** | | | | | |
| **0** | – | Not applicable | | | | | |
| 40 41 42 43 | | **Customer adjustment specification** | | | | | |
| **0000** | – | None | ● | ● | ● | ● | ● |
| ******** | – | Danfoss assigned numberas per data specified in table below ◊ | ○ | ○ | ○ | ○ | ○ |
| 44 45 46 | | **Special features** | | | | | |
| **000** | – | None | ● | ● | ● | ● | ● |
| ******* | – | Defined by Danfoss | ○ | ○ | ○ | ○ | ○ |
| 47 48 | | **Design number** | ● | ● | ● | ● | ● |
| ****** | – | 10-99 assigned by Danfoss | | | | | |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

**◊ Example for customer adjustment specifications**

| Special max. Displ. Adjustment | Minimum displacement | Maximum displacement |
|---|---|---|
| Standard | 0 $cm^3$/rev | 100% |
| Customer-specified adjustment ($cm^3$/rev) | ..... | ..... |

**Note:** Special pressure adjustments and/or maximumdisplacment adjustments are the most commonreasons for using this option.

**Notes:**

- Basic position has max. displacement (solenoid de-engerized)
- Standard setting for minimum displacement: 50%

# Model code

● Preferred standard option
◍ Other standard option
○ Special option on request

Open Loop Pumps
**X** Series - **SP** Control
22 = **P or M** mandatory
(electrical yoke position indicator)

| S | P | * | * | * | A | * | * | * | * | * | * | 0 | 0 | 0 | 0 | * | * | * | * | * | * | * | * | * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |

| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 24 25 | | **Control type** | | | | | |
| **SP** | – | Displacement adjustment control via proportional valve | ○ | ○ | ○ | ○ | ○ |
| 26 | | **Displacement adjustment options** | | | | | |
| **C** | – | CETOP 3 proportional valve KDG4V3 | ● | ● | ● | ● | ● |
| **A** | – | CETOP 3 interface only | ○ | ○ | ○ | ○ | ○ |
| 27 28 | | **Electronic amplifier** | | | | | |
| **03** | – | With ER9.3 amplifier card | ● | ● | ● | ● | ● |
| **05** | – | With DIN rail module | ○ | ○ | ○ | ○ | ○ |
| **00** | – | Without electronics | ○ | ○ | ○ | ○ | ○ |
| 29 | | **Yoke displacement zone** | | | | | |
| **A** | – | Single side of centre "A" | ● | ● | ● | ● | ● |
| 30 | | **Additional functions** | | | | | |
| **0** | – | None | ● | ● | ● | ● | ● |
| **4** | | Pressure limiter override | ● | ● | ● | ● | ● |
| 31 | | **Pressure control options** | | | | | |
| **0** | – | Including pilot relief valve and remote port option | ● | ● | ● | ● | ● |
| **F** | – | Remote port only | ○ | ○ | ○ | ○ | ○ |
| **K** | – | Proportional relief valve + EEA-PAM amplifier card | ○ | ○ | ○ | ○ | ○ |
| **L** | – | Relief valve with integrated Electronics OBE | ○ | ○ | ○ | ○ | ○ |
| 32 33 34 | | **Power control specification** | | | | | |
| **000** | – | Not applicable | | | | | |
| 35 | | **Pilot oil filter** | | | | | |
| **E** | – | Filter with electrical and visual indicator | ● | ● | ● | ● | ● |
| **0** | – | None | ○ | ○ | ○ | ○ | ○ |
| **V** | – | Filter with electrical and visual indicator | ○ | ○ | ○ | ○ | ○ |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 36 | | **Venting valve** | | | | | |
| **0** | – | Not applicable | | | | | |
| 37 | | **Position monitoring** | | | | | |
| **0** | – | Not applicable | | | | | |
| 38 | | **Electric motor type** | | | | | |
| **0** | – | Not applicable | | | | | |
| 39 | | **Control voltage** | | | | | |
| **0** | – | Not applicable | | | | | |
| 40 41 42 43 | | **Customer adjustment specification** | | | | | |
| **0000** | – | None | ● | ● | ● | ● | ● |
| ******** | – | Danfoss assigned numberas per data specified in table below ◊ | ○ | ○ | ○ | ○ | ○ |
| 44 45 46 | | **Special features** | | | | | |
| **000** | – | None | ● | ● | ● | ● | ● |
| ******* | – | Defined by Danfoss | ○ | ○ | ○ | ○ | ○ |
| 47 48 | | **Design number** | | | | | |
| ****** | – | 10-99 assigned by Danfoss | ● | ● | ● | ● | ● |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

◊ **Example for customer adjustment specifications**

| **Special pressure adjustment** | **Main stage pressure control** | **Pilot valve ▲ pressure control** |
|---|---|---|
| Standard setting (bar) | 20 | 90 |
| Max. setting (bar) | 40 | 350 |
| Customer-specified adjustment (bar) | ..... | ..... |

▲ **Note:** Setting must be at least 30bar.

| **Special max. Displ. Adjustment** | **Minimum displacement** | **Maximum displacement** |
|---|---|---|
| Standard | 0 $cm^3$/rev | 100% |
| Customer-specified adjustment ($cm^3$/rev) | ..... | ..... |

**Note:** Special pressure adjustments and/or maximumdisplacment adjustments are the most commonreasons for using this option. Max. displacement adjustable by screw or by stop ring- refer basic pumpmodel code pos 13.

# Model code

● Preferred standard option
◍ Other standard option
○ Special option on request

Open Loop Pumps
**X** Series - **ES** control

| E | S | * | 0 | 0 | A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | * | * | 0 | * | * | * | * | * | * | * | * | * |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |

| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 24 25 | | **Control type** | | | | | |
| **ES** | – | Displacement adjustment control via electric motor | ○ | ○ | ○ | ○ | ○ |
| 26 | | **Displacement adjustment options** | | | | | |
| **N** | – | Electric motor, medium response | ● | ● | ● | ● | ● |
| **M** | – | Electric motor, fast response | ○ | ○ | ○ | ○ | ○ |
| **P** | – | Electric motor, slow response | ○ | ○ | ○ | ○ | ○ |
| 27 28 | | **Control electronics** | | | | | |
| **00** | – | Not applicable | | | | | |
| 29 | | **Yoke displacement zone** | | | | | |
| **A** | – | Single side of centre "A" | ● | ● | ● | ● | ● |
| 30 | | **Additional functions** | | | | | |
| **0** | – | Not applicable | | | | | |
| 31 | | **Pressure control options** | | | | | |
| **0** | – | Not applicable | | | | | |
| 32 33 34 | | **Power control specification** | | | | | |
| **000** | – | Not applicable | | | | | |
| 35 | | **Pilot oil filter** | | | | | |
| **0** | – | Not applicable | | | | | |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 36 | | **Venting valve** | | | | | |
| **0** | – | Not applicable | | | | | |
| 37 | | **Position monitoring** | | | | | |
| **A** | – | 4 limit switches | ● | ● | ● | ● | ● |
| **B** | – | 8 limit switches | ○ | ○ | ○ | ○ | ○ |
| **P** | – | 4 limit switches + yoke pos. feedback (potentiometer) | ○ | ○ | ○ | ○ | ○ |
| **T** | – | 8 limit switches + yoke pos. feedback (potentiometer) | ○ | ○ | ○ | ○ | ○ |
| 38 | | **Electric motor type** | | | | | |
| **2** | – | Motor with brake (IP54) | ● | ● | ● | ● | ● |
| **3** | – | Motor without brake (explosion proof) | ○ | ○ | ○ | ○ | ○ |
| 39 | | **Control voltage** | | | | | |
| **0** | – | Not applicable | | | | | |
| 40 41 42 43 | | **Customer adjustment specification** | | | | | |
| **0000** | – | None | ● | ● | ● | ● | ● |
| **** | – | Danfoss assigned to number as per data specified in table below ◊ | ○ | ○ | ○ | ○ | ○ |
| 44 45 46 | | **Special features** | | | | | |
| **000** | – | None | ● | ● | ● | ● | ● |
| *** | – | Defined by Danfoss | ○ | ○ | ○ | ○ | ○ |
| 47 48 | | **Design Number** | | | | | |
| ** | – | 10-99 assigned by Danfoss | ● | ● | ● | ● | ● |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

**◊ Example for customer adjustment specifications**

| Special max. Displ. Adjustment | Minimum displacement | Maximum displacement |
|---|---|---|
| Standard | 0 $cm^3$/rev | 100% |
| Customer-specified adjustment ($cm^3$/rev) | ..... | ..... |

**Note:** Special response times (see table in ES section of Control options) and/or maximum displacement adjustments are the most common reasons for using this option

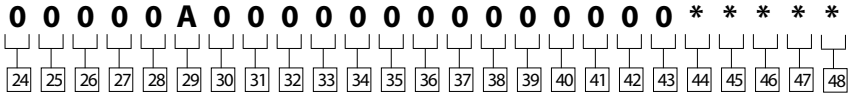
| Pump size | Adjustment time (sec) 26 | | |
|---|---|---|---|
| | **M** | **N** | **P** |
| 066/090 | 7,5 | 15 | 38 |
| 130/180 | 18 | 35 | 86 |
| 250 | 10 | 20 | 48 |

# Model code

- ● Preferred standard option
- ○ Other standard option
- X Not available

Open Loop Pumps
**X** Series - No control: 2 = **F**

## Fixed displacement PF X Models




| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 24 25 | | **Control type** | | | | | |
| **00** | – | No control | ● | ● | ● | ● | X |
| 26 | | **Displacement adjustment options** | | | | | |
| **0** | – | Not applicable | | | | | |
| 27 28 | | **Control electronics** | | | | | |
| **00** | – | Not applicable | | | | | |
| 29 | | **Yoke displacement zone** | | | | | |
| **A** | – | Single side of center "A" | ● | ● | ● | ● | X |
| 30 | | **Additional functions** | | | | | |
| **0** | – | Not applicable | | | | | |
| 31 | | **Pressure control options** | | | | | |
| **0** | – | Not applicable | | | | | |
| 32 33 34 | | **Power control specification** | | | | | |
| **000** | – | Not applicable | | | | | |
| 35 | | **Pilot oil filter** | | | | | |
| **0** | – | Not applicable | | | | | |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

| | | Pump Size | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| 36 | | **Venting valve** | | | | | |
| **0** | – | Not applicable | | | | | |
| 37 | | **Position monitoring** | | | | | |
| **0** | – | Not applicable | | | | | |
| 38 | | **Electric motor type** | | | | | |
| **0** | – | Not applicable | | | | | |
| 39 | | **Control voltage** | | | | | |
| **0** | – | Not applicable | | | | | |
| 40 41 42 43 | | **Customer adjustment specification** | | | | | |
| **0000** | – | None | ● | ● | ● | ● | X |
| 44 45 46 | | **Special features** | | | | | |
| **000** | | None | ● | ● | ● | ● | X |
| *** | | Defined by Danfoss | ○ | ○ | ○ | ○ | X |
| 47 48 | | **Design number** | | | | | |
| ** | | 10-99 assigned by Danfoss | ● | ● | ● | ● | X |
| | | **Pump Size** | **66** | **90** | **130** | **180** | **250** |

**Note:** Available displacement 6, 7, 8 (Page 4)

# Model code

● Preferred standard option

Combination pumpunit

**P * X C - * * * * * * * * * * * * * * * * * * * * * H C 8 1 * * * * * * * * * * ***

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

| | | Unit Position | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 1 | | **Combination unit** | | | | |
| **P** | – | Pump | ● | ● | ● | ● |
| 2 | | **Displacement** | | | | |
| **F** | – | Fixed | ● | ● | ● | ● |
| **V** | – | Variable | ● | ● | ● | ● |
| 3 | | **Pump Series** | | | | |
| **X** | – | "X" series (ex-30 design) | ● | ● | ● | ● |
| 4 | | **Unit type** | | | | |
| **C** | – | Combination unit | ● | ● | ● | ● |
| 5 | | **Separator** | | | | |
| 6 7 8 | | **First displacement cm³/rev (in³/rev)** | | | | |
| **066** | – | 66 (4.0) | ● | | | |
| **090** | – | 90 (5.5) | ● | | | |
| **130** | – | 130 (7.9) | ● | | | |
| **180** | – | 180 (11.0) | ● | | | |
| **250** | – | 250 (15.3) | ● | | | |
| For special displacements, see basic pump model code | | | | | | |
| 9 10 | | **First control type** | | | | |
| **00** | – | No control (Fixed displacement only) | ● | | | |
| **DF** | – | Pressure compensator | ● | | | |
| **LR** | – | Power limiter control | ● | | | |
| **ST** | – | Electronic flow control | ● | | | |
| **FM** | – | Screw adjustment flow control | ● | | | |
| **ZP** | – | Dual displacement control | ● | | | |
| | | **Unit Position** | **1** | **2** | **3** | **4** |

| | | Unit Position | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 11 12 13 | | **Second displacement cm³/rev (in³/rev)** | | | | |
| | – | Options as first displacement | | ● | | |
| 14 15 | | **Second control type** | | | | |
| | – | Options as first displacement | | ● | | |
| 16 17 18 | | **Third displacement** | | | | |
| **0** | – | Options as displacement | | | ● | |
| 19 20 | | **Third control type** | | | | |
| **A** | – | Options as control | | | ● | |
| 21 22 23 | | **Fourth displacement** | | | | |
| | – | Options as displacement | | | | ● |
| 24 25 | | **Fourth control type** | | | | |
| | – | Options as control | | | | ● |
| 26 27 28 29 | | **Assembly number** | | | | |
| **HC81** | | | ● | ● | ● | ● |
| 30 31 32 33 34 35 36 37 38 39 | | **Assembly number** Defined by Danfoss | ● | ● | ● | ● |
| | | **Unit Position** | **1** | **2** | **3** | **4** |

X- Series Open Loop Pumps

## Form Page

The 48-digit coding system has been developed to identify all configuration options for the "X" series (Open Loop) fixed and variable displacement pumps. The Model Code lets you specify a unit with the desired features. All 48 digits must be present when ordering.

You may wish to photocopy the matrix below to ensure that each number is entered in the correct box. If adjustments other than the standard setting ( 40 to 43 ) or special features ( 44 to 46 ) are needed, please provide the information when ordering.

For combination units, you may need to provide an additional model code. In such a case, each single pump section must be specified separately using this or other Danfoss catalog information. Where characters are already stated in the blank Model Code, there is no option available.

| Explanation for each character | Codes |
|---|---|
| Basic Pump Model Code | 1 to 23 |
| Control Options | 24 to 39 |
| Customer Adjustment Specification | 40 to 43 |
| Special Features | 44 to 46 |
| Design Number | 47 & 48 |
| Combination Units Model Code | 1 to 39 |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P** | | **X** | | **–** | | | | | | | | | | | | | | | | | | | | |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| | | | | | | | | | | | | | | | | | | | | | | | | |

# Pump specifications

Metric

| **Model** | | | **66** | **90** | **130** | **180** | **250** |
|---|---|---|---|---|---|---|---|
| Design | | | Swashplate – Axial piston pump | | | | |
| Type of mounting | | | Flange or foot-mounted - Combination units foot mounted only | | | | |
| Pipe connection Flange<br>ISO 6162-1 (SAE J518 code 61)<br>ISO 6162-2 (SAE J518 code 62) | <br>B<br>A | <br>psi | <br>P38M (1 1/2" - 500)<br>P25M (1" - 6000) | <br>P51M (2" - 500)<br>P25M (1" - 6000) | <br>P64M (2 1/2" - 500)<br>P25M (1" - 6000) | <br>P64M (2 1/2" - 500)<br>P32M (1 1/4" - 6000 | <br>P89M (3 1/2" - 500)<br>P32M (1 1/4" - 6000) |
| Direction of rotation | | | Clockwise, Counterclockwise on request | | | | |
| Mounting attitude | | | Horizontal, other mounting options are available on request | | | | |
| Ambient temperature range | min<br>max | °C | -20<br>50 | | | | |
| Weight | M | kg | 55 | 75 | 106 | 114 | 212 |
| Moment of inertia | J | kg m² | 0.016 | 0.016 | 0.045 | 0.045 | 0.146 |

**Hydraulic characteristics**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Rated pressure (100% duty cycle) | $p_N$ | bar | 350 | | | | |
| Inlet pressure | $p1_{min}$<br>$p1_{max}$ | bar | 0.85 abs<br>10 | 0.85 abs<br>10 | 0.95 abs<br>10 | 0.95 abs<br>10 | 1.0 abs<br>10 |
| Max. pressure to ISO 5598:2008 | $p2_{max}$ | bar | 420 | | | | |
| Hydraulic fluid | | | Hydraulic oil to DIN 51524 part 2<br>See fluid recommendations in application data | | | | |
| Hydraulic fluid temperature range | min<br>max | °C | -25 (on start up)<br>90 | | | | |
| Viscosity range for continuous operation | min<br>max | cSt | 10<br>75 | | | | |
| Maximum permissible start viscosity | max | cSt | 1000 | | | | |
| Cleanliness | ISO 4406 | | 18/15/13 | | | | |
| Maximum geometric displacement | Vg | cm³/rev | 66 | 90 | 130 | 180 | 250 |
| Speed range | min<br>max | rev/min | 150<br>1800 | | | | |
| Case pressure (over pressure)<br>n = 1200 rev/min<br>n = 1500 rev/min<br>n = 1800 rev/min | $p_{case}$ | bar | <br>3.5<br>2.7<br>2.2 | <br>3.5<br>2.7<br>1.2 | <br>3.2<br>2.5<br>2.0 | <br>3.2<br>1.5<br>2.0 | <br>2.8<br>2.1<br>1.7 |

The differential between case pressure and inlet pressure should not exceed 0,5 bar.

**Drive**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Driving torque<br>($p_N$ = 350 bar, Vg at 1500 rev/min, $\eta$ = 100%) | $M1_{single}$ | Nm | 367 | 501 | 724 | 1002 | 1392 |
| Power consumption<br>($p_N$ = 350 bar, n = 1500 rev/min, $\eta$ = 100%) | $P1_{single}$ | kW | 57,8 | 78,8 | 113,8 | 157,5 | 218,8 |

**Combination units**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Maximum driving torque limited to splined shaft only - comb. unit | $M1_{Comb.}$ | Nm | 2x367 | 2x501 | 2x724 | 2x1002 | 2x1392 |

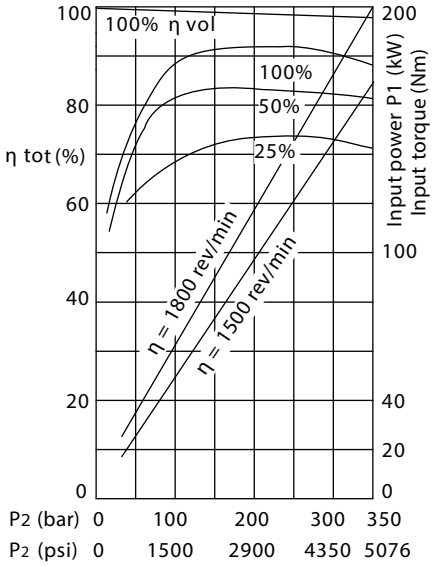
# Pump specifications

US

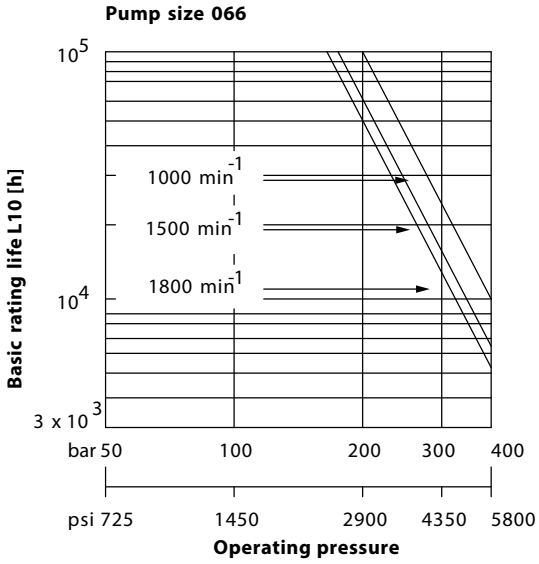
| Model | | | 66 | 90 | 130 | 180 | 250 |
|---|---|---|---|---|---|---|---|
| Design | | | Swashplate – Axial piston pump | | | | |
| Type of mounting | | | Flange or foot-mounted - Combination units foot mounted only | | | | |
| Pipe connection Flange<br>ISO 6162-1 (SAE J518 code 61)<br>ISO 6162-2 (SAE J518 code 62) | <br>B<br>A | <br>psi | <br>P38M (1 1/2" - 500)<br>P25M (1" - 6000) | <br>P51M (2" - 500)<br>P25M (1" - 6000) | <br>P64M (2 1/2" - 500)<br>P25M (1" - 6000) | <br>P64M (2 1/2" - 500)<br>P32M (1 1/4" - 6000 | <br>P89M (3 1/2" - 500)<br>P32M (1 1/4" - 6000) |
| Direction of rotation | | | Clockwise, Counterclockwise on request | | | | |
| Mounting attitude | | | Horizontal, other mounting options are available on request | | | | |
| Ambient temperature range | Min<br>Max | °F | -4<br>122 | | | | |
| Weight | M | lb | 121 | 165 | 234 | 251 | 467 |
| Moment of inertia | J | lb ft² | 0.38 | 0.38 | 1.068 | 1.068 | 3.465 |
| **Hydraulic characteristics** | | | | | | | |
| Rated pressure (100% duty cycle) | $p_N$ | psi | 5000 | | | | |
| Inlet pressure | $p1_{min}$<br>$p1_{max}$ | psi | 12,3<br>145 | 12,3<br>145 | 13,8<br>145 | 13,8<br>145 | 14,5<br>145 |
| Max. pressure to ISO 5598:2008 | $p2_{max}$ | psi | 6000 | | | | |
| Hydraulic fluid | | | Hydraulic oil to DIN 51524 part 2<br>See fluid recommendations in application data | | | | |
| Hydraulic fluid temperature range | min<br>max | °F | -13 (on start up)<br>194 | | | | |
| Viscosity range for continuous operation | min<br>max | cSt | 10<br>75 | | | | |
| Maximum permissible start viscosity | max | cSt | 1000 | | | | |
| Cleanliness | ISO 4406 | | 18/15/13 | | | | |
| Maximum geometric displacement | Vg | in³ | 4.0 | 5.5 | 8.0 | 11.0 | 15.3 |
| Speed range | min<br>max | rev/min | 150<br>1800 | | | | |
| Case pressure (overpressure)<br>n = 1200 rev/min<br>n = 1500 rev/min<br>n = 1800 rev/min | $p_{case}$ | psi | <br>50<br>39<br>32 | <br>50<br>39<br>32 | <br>46<br>36<br>29 | <br>46<br>36<br>29 | <br>40<br>30<br>24 |
| The differential between case pressure and inlet pressure should not exceed 3,625 psi. | | | | | | | |
| **Drive** | | | | | | | |
| Driving torque<br>($p_N$ = 5075psi, Vg at 1500 rev/min, η = 100%) | $M1_{single}$ | lbf ft | 271 | 369 | 534 | 739 | 1027 |
| Power consumption<br>($p_N$ = 5075psi, n = 1500 rev/min, = 100%) | $P1_{single}$ | hp | 77.5 | 105.5 | 152.5 | 211 | 293 |
| **Combination units** | | | | | | | |
| Maximum driving torque limited to splined shaft only - comb. unit | $M1_{Comb.}$ | lbf ft | 2x271 | 2x369 | 2x534 | 2x739 | 2x1027 |

# Performance curves
# 066 & 090 Series

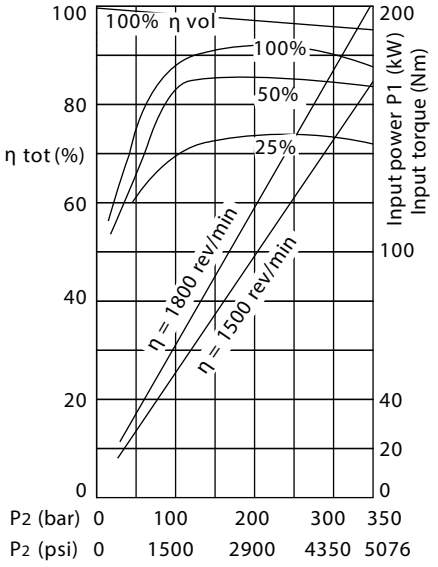
**Power efficiency performance curve**
**Size 066**



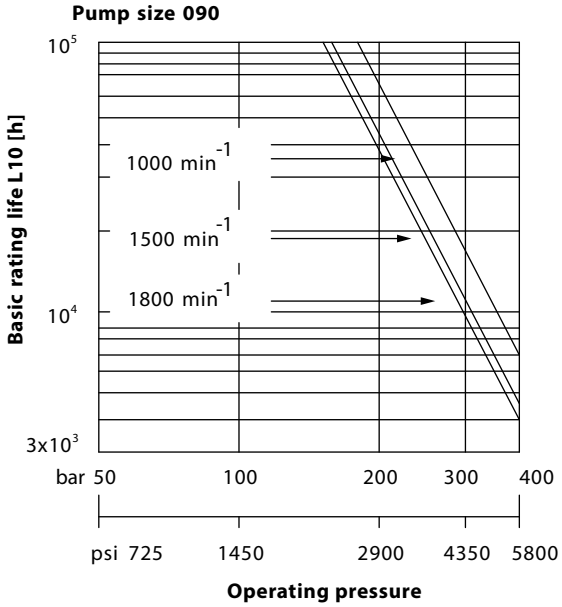

**Theoretical bearing lifetime**
**Size 066**




**Power efficiency performance curve**
**Size 090**

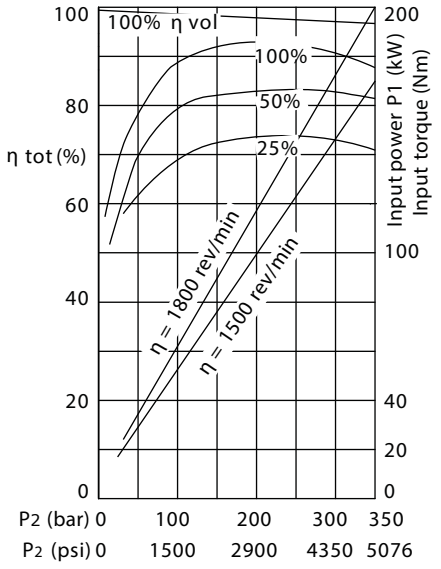



**Theoretical bearing lifetime**
**Size 090**

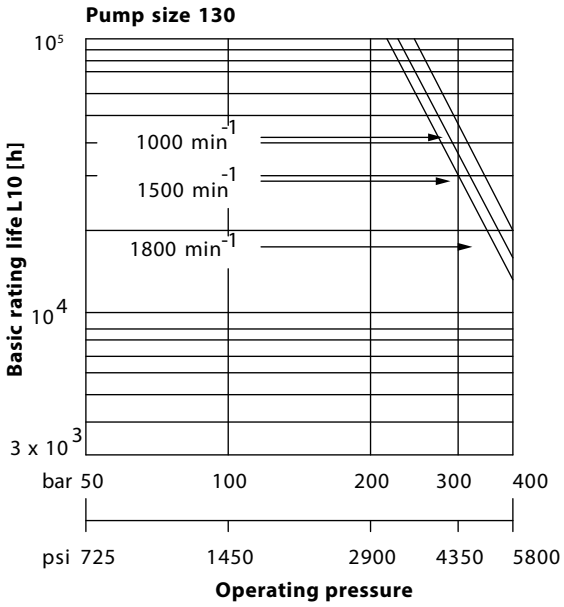


# Performance curves
# 130 & 180 Series

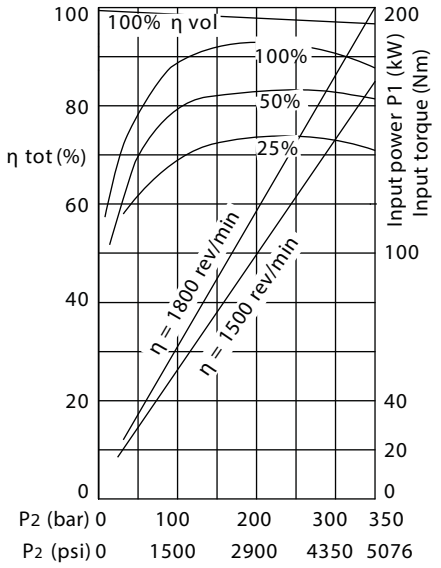
**Power efficiency performance curve**
**Size 130**



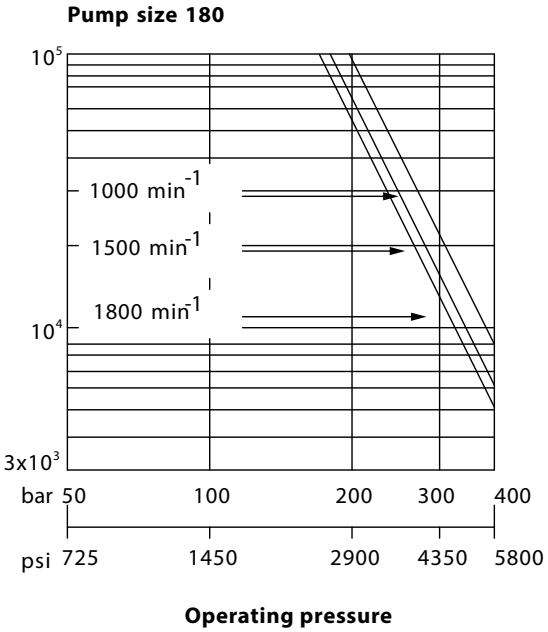

**Theoretical bearing lifetime**
**Size 130**




**Power efficiency performance curve**
**Size 180**

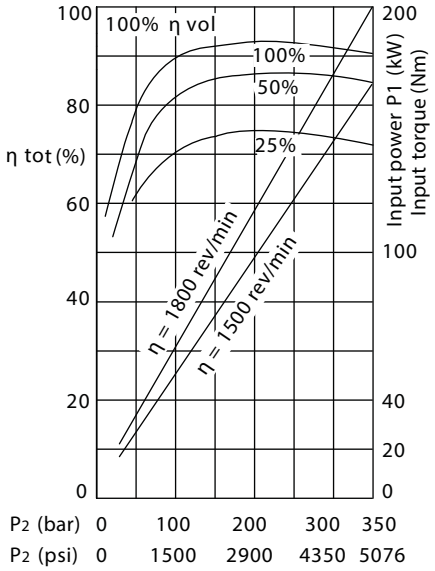



**Theoretical bearing lifetime**
**Size 180**

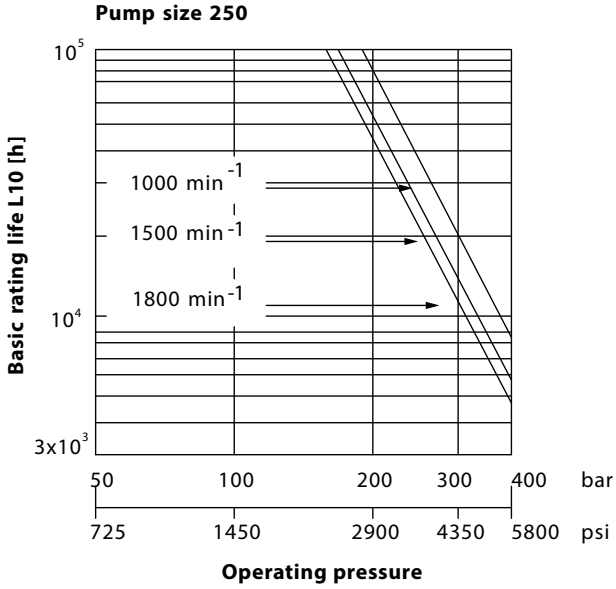


# Performance curves
# 250 Series

**Power efficiency performance curve**
**Size 250**




**Theoretical bearing lifetime**
**Size 250**



# Installation and start-up

**Warning**

Care should be taken that mechanical and hydraulic resonances are avoided in the application of the pump. Such resonances can seriously compromise the life and/or safe operation of the pump.

**Drive Data**

Mounting attitude should be horizontal using the appropriate case drain ports to ensure that the case remains full of fluid at all times. Consult your local Danfoss representative if a different arrangement is required. In those cases where geometric tolerances of mounting are critical, or where specific tolerance ranges are required and not specified, consult Danfoss engineering for specific limits.

Direction of shaft rotation, viewed from the prime mover end, must be as indicated in the model designation on the pump – either right hand (clockwise) or left hand (counterclockwise). Direct coaxial drive through a flexible coupling is recommended. If drives imposing radial shaft loads are considered, please consult your Danfoss representative.

**Start-up Procedure**

Make sure the reservoir and circuit are clean and free of dirt/debris prior to filling with hydraulic fluid. Fill the reservoir with filtered oil and fill to a level sufficient enough to prevent vortexing at the suction connection to pump inlet. It is good practice to clean the system by flushing and filtering, using an external slave pump.

**Caution**

Before the pump is started, fill the case through the uppermost drain port with hydraulic fluid of the type to be used. The case drain line must be connected directly to the reservoir and must terminate below the oil level. Once the pump is started, it should prime within a few seconds. If the pump does not prime, check to make sure that there are no restrictions between the reservoir and the inlet to the pump, and that the pump is being rotated in the proper direction, and that there are no air leaks in the inlet line and connections. Also check to make sure that trapped air can escape at the pump outlet. After the pump is primed, tighten the loose outlet connections, then operate for five to ten minutes (unloaded) to remove all trapped air from the circuit. If the reservoir has a sight gage, make sure the fluid is clear – not milky.

**Fluid Cleanliness**

Hydrokraft pumps are rated in anti-wear petroleum fluids with a contamination level of 18/15/13 per ISO 4066. Operation in fluids with levels more contaminated than this is not recommended. Fluids other than petroleum, severe service cycles, or temperature extremes are cause for adjustment of these codes. Please contact your Danfoss Representative for specific duty cycle recommendation.

Danfoss Hydrokraft pumps, as with any variable displacement piston pumps, will operate with apparent satisfaction in fluids up to the rating specified here. Experience has shown however, that pump and hydraulic system life is not optimized with high fluid contamination levels (high ISO cleanliness codes).

Proper fluid condition is essential for long and satisfactory life of hydraulic components and systems. Hydraulic fluid must have the correct balance of cleanliness, materials, and additives for protection against wear of components, elevated viscosity and inclusion of air.

Essential information on the correct methods for treating hydraulic fluid is included in Danfoss publication 561 "Danfoss Guide to Systemic Contamination Control" available from your local Danfoss distributor. In this publication, filtration and cleanliness levels for extending the life of axial piston pumps and other system components are listed. Included is an excellent discussion of the selection of products needed to control fluid condition.

# Application Data and Fluid Recommendations

| Fluid Type | DIN/ISO Classification | Rated Pressure $p_N$ (bar) | Maximum Speed (rev/min) ■ | | | Recommended Seal Material | Maximum Operating Temperature (°C) | Bearing Life |
|---|---|---|---|---|---|---|---|---|
| | | | 130 & 180 cm³ | 250 &360 cm³ | 500 & 750 cm³ | | | |
| Water Glycol ▲ | HFC | 250 | 1800 | 1500 | 1250 | NBR | 45 | 25-100% |
| HFDR (phosphateester based) | HFDR | 350 | 1500 | 1200 | 1000 | FKM | 60 | 100% ▼ |
| HFDU (glycol based) | HFDU | 350 | 1500 | 1200 | 1000 | FKM | 60 | 100% ▼ |
| HFDU (ester based) | HFDU | 350 | 1800 | 1500 | 1250 | FKM | 60 | 100% ▼ |
| HEES (synthetic ester) | HEES | 350 | 1800 | 1500 | 1250 | FKM | 60 | 100% ▼ |

■ See general specifications for speed limitation depending on displacement.

▲ For HFC operation, bearing flushing is mandatory. Highest speed only recommended at optimized application conditions.
Use Model Code 21 = "C" for seal option, and contact your Danfoss representative for validation.
Seal material can differ on an individual pump depending on specific seal function.
Bearing life with HFC fluid depends significantly on fluid temperature, cleanliness, quality, flushing and application parameters.
Typical values vary between 25% and 100% compared to mineral oil.

▼ Only fluids with fully saturated esters (iodine value <10) should be used.
HFDU and HEES fluids can be used at full ratings, but need to be monitored continuosly to maintain quality and performance. The following important values should always be checked:
- Water content (<= 500 ppm)
- Fluid cleanliness (18/15/13 per ISO 4406)
- TAN value (no significant change from new oil)
- Viscosity (no significant change from new oil)
- Additives (no significant change from new oil)

Under harsh operation conditions, especially with regard to temperature and water content, ester-based HFDU and HFDR fluids are prone to hydrolysis, the resulting chemical processes and products of which could damage seals and other pump components. In general, the susceptibility to temperature and contamination is significantly higher than with standard mineral oils.
In line with Danfoss Germany GmbH T&C warranty conditions covering use of HFDR/HFDU/HEES fluids, fluid-related damage is excluded.

### Case/Bearing Flushing

Case and bearing flushing are mandatory for HFC fluid operation, and recommended for all other conditions where the pump is operating for longer intervals at low pressure i.e. <20 bar (<300 psi) and/or low flow at high pressure (compensated mode).

**Estimated Flushing Flow Values at 1500 rev/min**

| Pump Size (cm³/rev) | Flushing Flow (l/min) |
|---|---|
| 066/90 | 4/5,5 |
| 130/180 | 7,5/11 |
| 250 | 15 |

### Vertical Mounting

Vertical mounting of Hydrokraft pumps is possible, but venting and lubrication of shaft bearings can require special flushing and installation procedures. For details, please refer to the Hydrokraft Application Guideline Presentation available from your Danfoss representative.

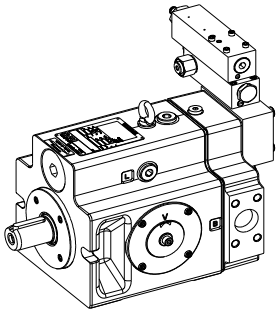
### High pressure lubrication / Hydrostatic Balancing for Yoke Bearings (half-cup bearings)

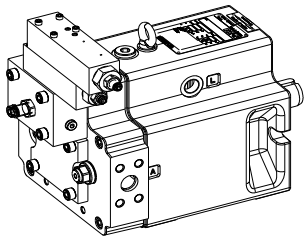
High-pressure bearing lubrication and balancing (Model Code 21 = "K") is recommeded for operating conditions with either high cycle frequencies (very short up/downstroke times) and/or where the swashplate is constantly maintained at a certain angle for long periods of time (compensated mode).



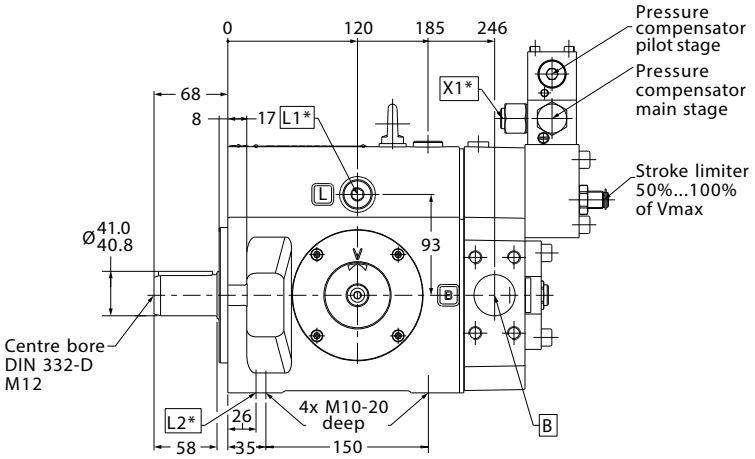
For details and additional information, please refer to the "Hydrokraft Application Guideline Presentation" available from your Danfoss Representative.

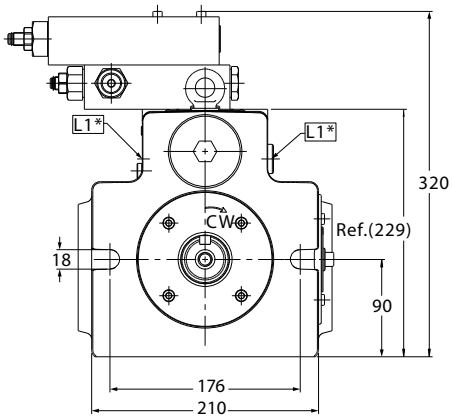
# Pump dimensions PVXS-066

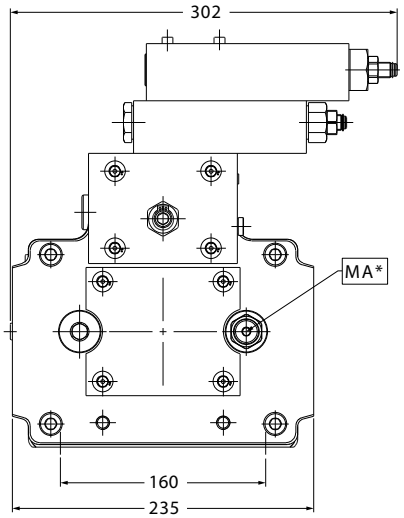


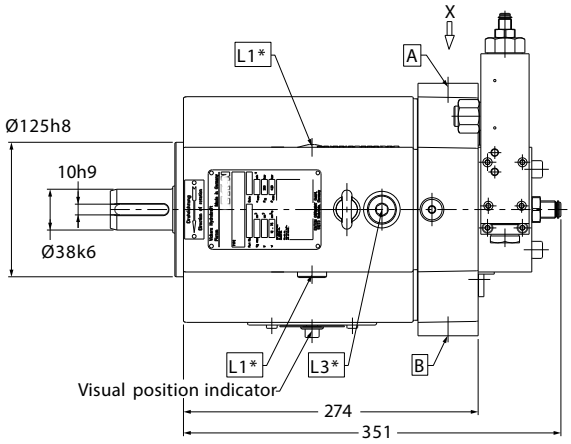


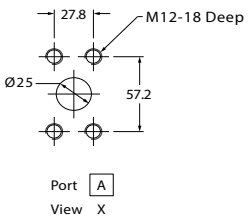
Options illustrated:
16 = **1** (A & B ports SAE, metric Thread)
17 = **R** (A & B ports radial)
18 19 = **01** (ISO keyed shaft)
22 = **V** (visual indicator)
24 25 = **DF** control (pressure compensator)

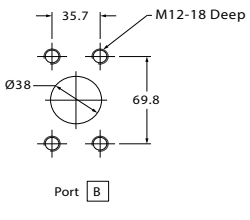


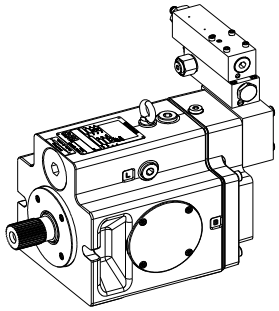



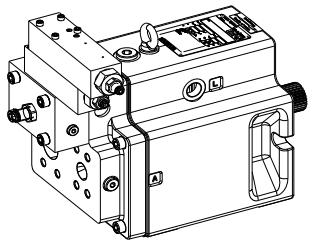



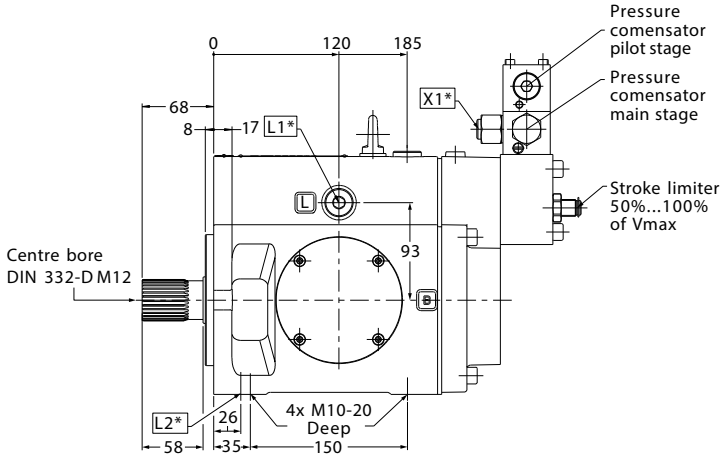

| | | |
|---|---|---|
| **A** | – | Systempressure port ISO 6162-2 P25M (SAE J518 CODE 62-1" - 6000 PSI) |
| **B** | – | Inlet port ISO 6162-1 P38M (SAE J518 CODE61 - 1 1/2" 500 PSI) |
| **L1** | – | Drain port M22x1.5 (According to mounting position use upper port) |
| **L2** | – | M18x1.5-12 Deep supplementary drain or bleed plug. Must be drained in addition to L1 if the pumpis installed with the shaft input end pointing upwards. |
| **L3** | – | Oil filling 7/8" - 14 UNF or Bleed plug |
| **MA** | – | Gauge portsystem pressure G1/4" |
| **X1** | – | Remote port pressure compensator G 1/4"- 12.5 Deep |
| **...*** | | Connection with plug |

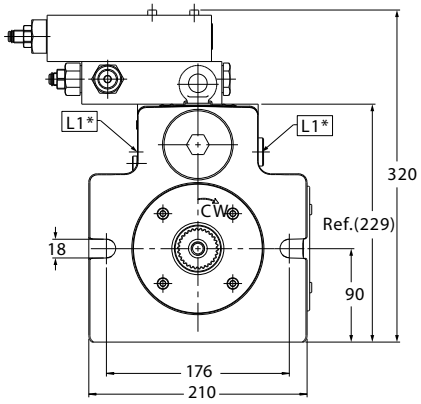
# Pump dimensions PVXS-066

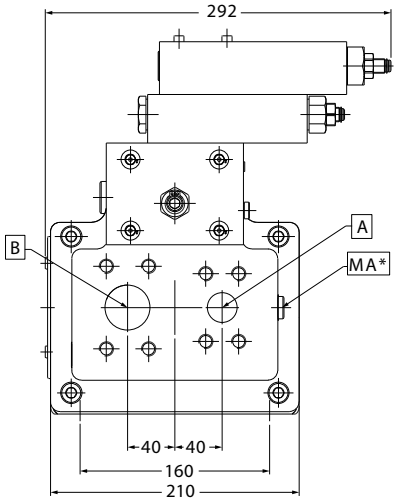


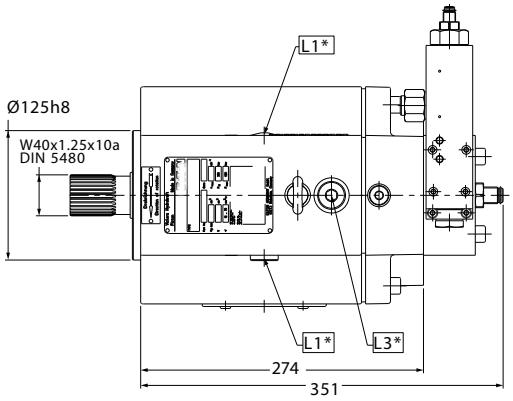


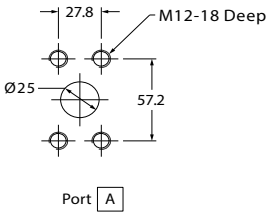
Options illustrated:
16 = **1** (A & B ports SAE, metric Thread)
17 = **A** (A & B ports axial)
18 19 = **02** (Splined shaft)
22 = **0** (no position indicator)
24 25 = **DF** control (pressure compensator)

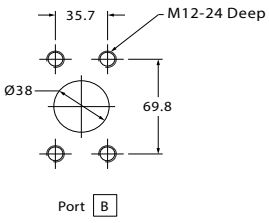


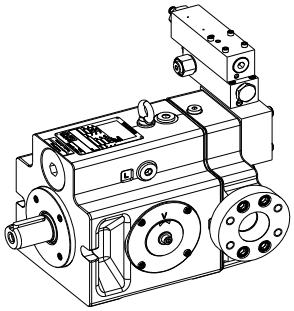



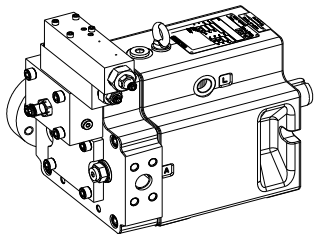



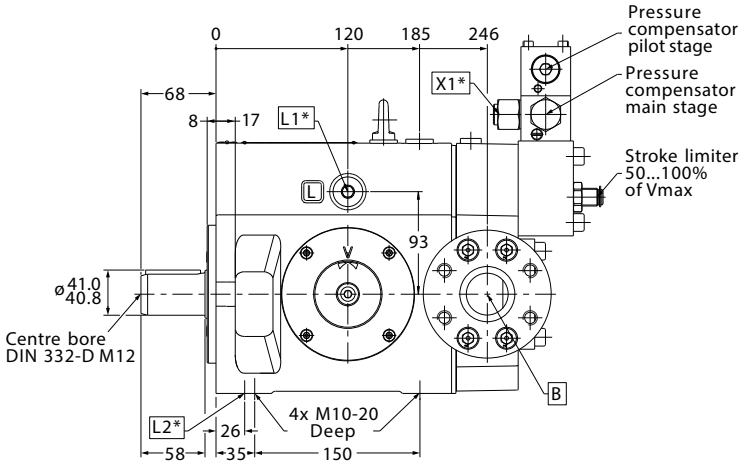

| | | |
|---|---|---|
| **A** | – | System pressure port ISO 6162-2 P25M (SAE J518 CODE 62-1" - 6000 PSI) |
| **B** | – | Inlet port ISO 6162-1 P38M (SAE J518 CODE61 - 1 1/2" 500 PSI) |
| **L1** | – | Drain port M22x1.5 (According to mounting position use upper port) |
| **L2** | – | M18x1.5-12 Deep supplementary drain or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing upwards. |
| **L3** | – | Oil filling 7/8" - 14 UNF or Bleed plug |
| **MA** | – | Gauge port system pressure G1/4" |
| **X1** | – | Remote port pressure compensator G 1/4"- 12.5 Deep |
| **...*** | | Connection with plug |

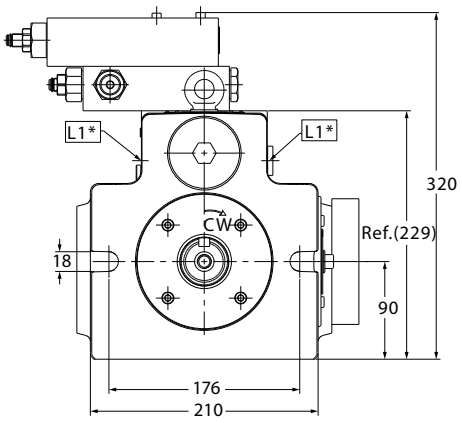
# Pump dimensions PVXS-090

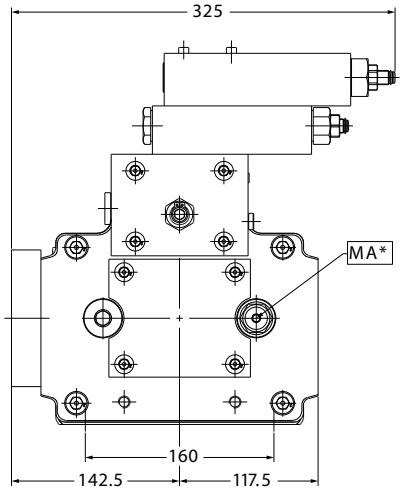


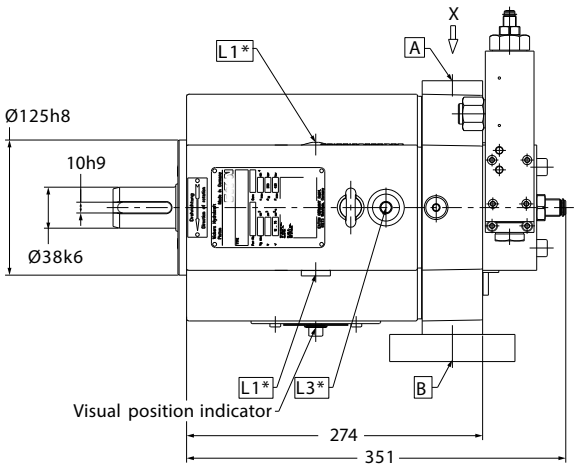


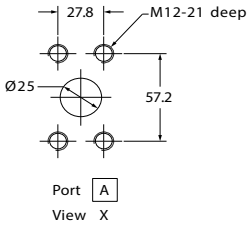
Options illustrated:
16 = **1** (A & B ports SAE, metric Thread)
17 = **R** (A & B ports radial)
18 19 = **01** (ISO keyed shaft)
22 = **V** (visual indicator)
24 25 = **DF** control (pressure compensator)

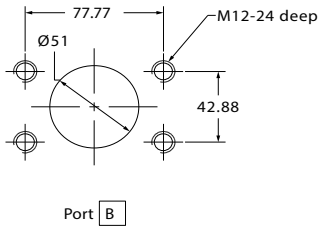


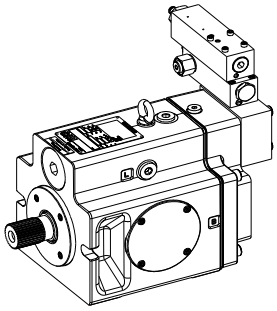



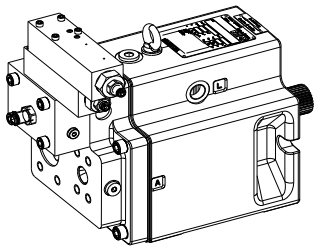



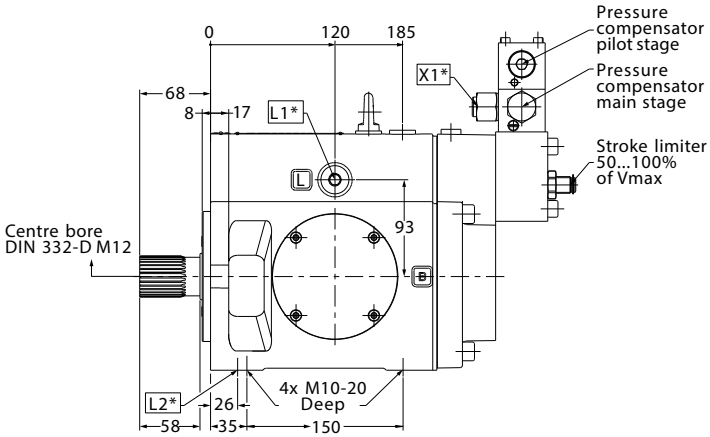

| | | |
|---|---|---|
| **A** | – | Systempressure port ISO 6162-2 P25M (SAE J518 CODE 62-1" - 6000 PSI) |
| **B** | – | Inlet port ISO 6162-1 P51M (SAE J518 CODE61 - 2" 3000 PSI) |
| **L1** | – | Drain port M22x1.5 (According to mounting position use upper port) |
| **L2** | – | M18x1.5-12 Deep supplementary drain or bleed plug. Must be drained in addition to L1 if the pumpis installed with the shaft input end pointing upwards. |
| **L3** | – | Oil filling 7/8" - 14 UNF or Bleed plug |
| **MA** | – | Gauge portsystem pressure G1/4" |
| **X1** | – | Remote port pressure compensator G 1/4"- 12.5 Deep |
| **...*** | | Connection with plug |

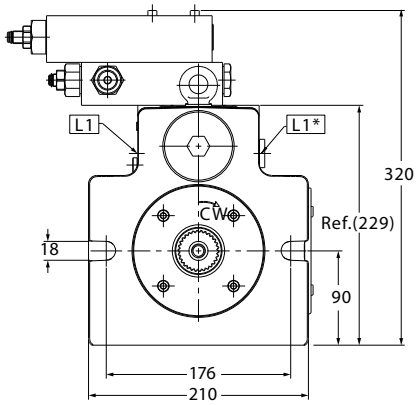
# Pump dimensions PVXS-090

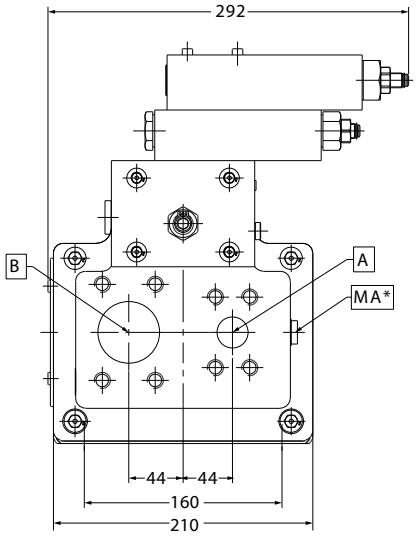
Options illustrated:
16 = **1** (A & B ports SAE, metric Thread)
17 = **A** (A & B ports axial)
18 19 = **02** (Splined shaft)
22 = **0** (no position indicator)
24 25 = **DF** control (pressure compensator)

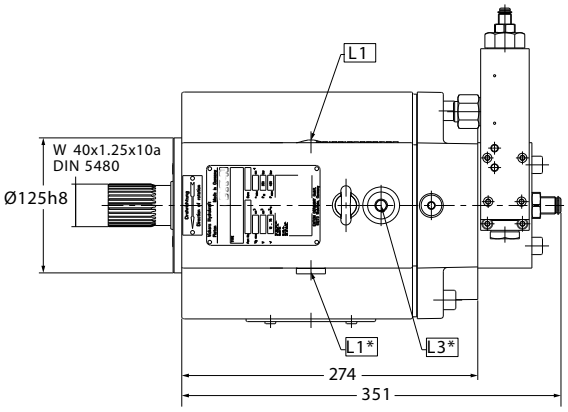


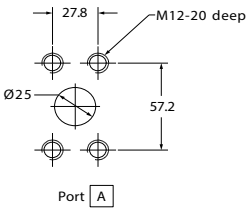


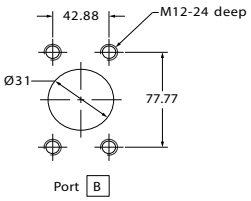


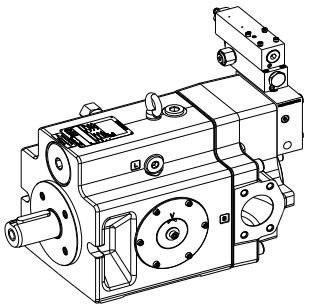



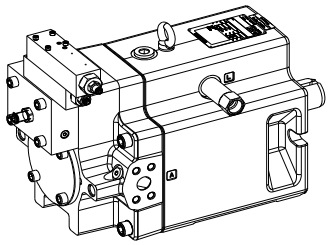



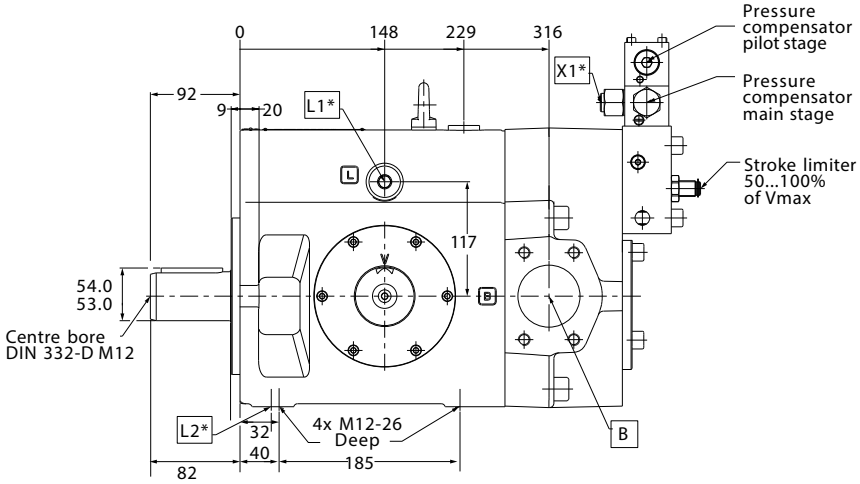

| | | |
|---|---|---|
| **A** | – | System pressure port ISO 6162-2 P25M (SAE J518 CODE 62-1" - 6000 PSI) |
| **B** | – | Inlet port ISO 6162-1 P51M (SAE J518 CODE61 - 2" 3000 PSI) |
| **L1** | – | Drain port M22x1.5 (According to mounting position use upper port) |
| **L2** | – | M18x1.5-12 Deep supplementary drain or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing upwards. |
| **L3** | – | Oil filling 7/8" - 14 UNF or Bleed plug |
| **MA** | – | Gauge port system pressure G1/4" |
| **X1** | – | Remote port pressure compensator G 1/4"- 12.5 Deep |
| **...*** | | Connection with plug |

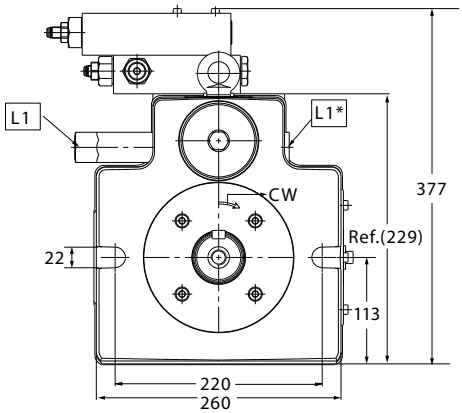
# Pump dimensions
# PVXS-130

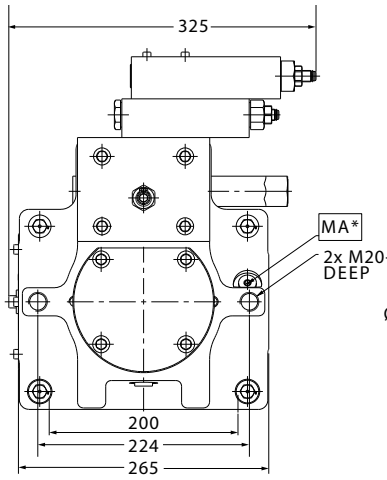


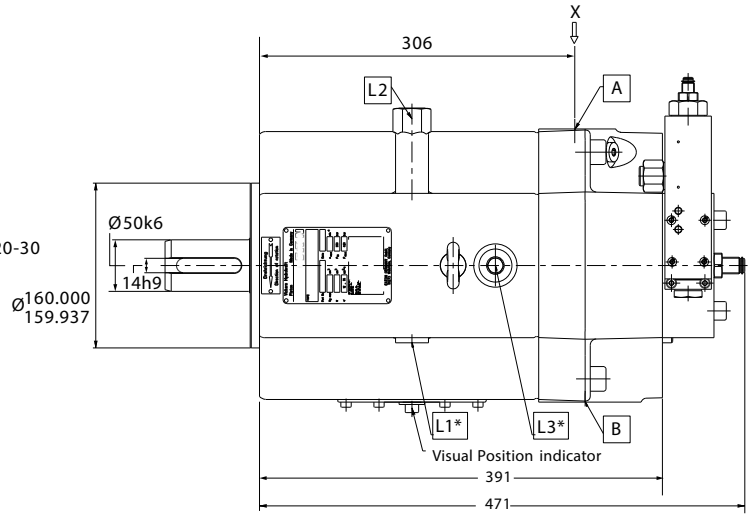


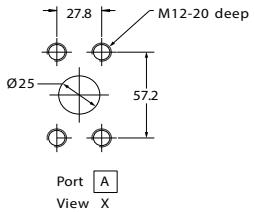
Options illustrated:
16 = **1** (A & B ports SAE, metric Thread)
17 = **R** (A & B ports radial)
18 19 = **01** (ISO keyed shaft)
22 = **V** (visual indicator)
24 25 = **DF** control (pressure compensator)

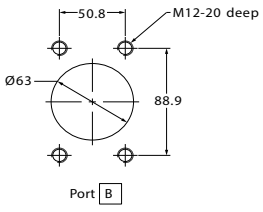


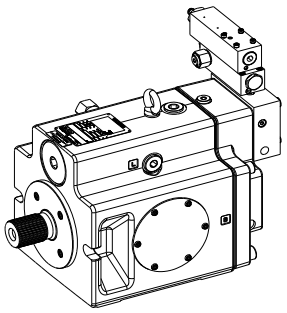



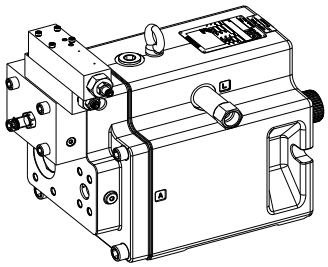



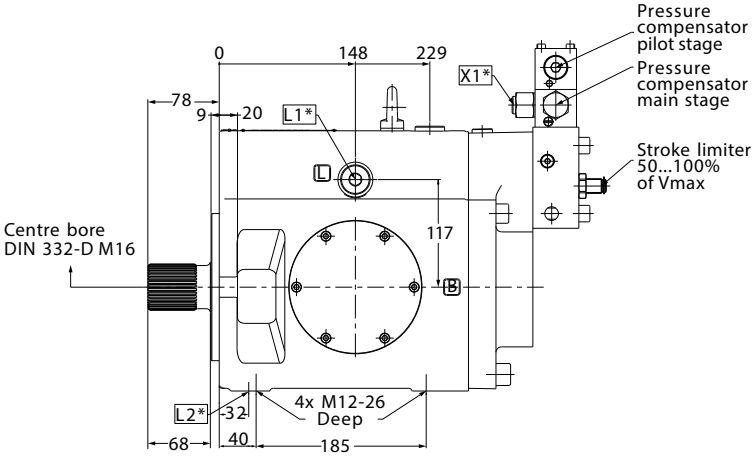

| | | |
|---|---|---|
| **A** | – | System pressure port ISO 6162-2 P25M (SAE J518 CODE 62-1" - 6000 PSI) |
| **B** | – | Inlet port ISO 6162-1 P64M (SAE J518 CODE 61 - 2 1/2" 500 PSI) |
| **L1** | – | Drain port M26x1.5 (According to mounting position use upper port) |
| **L2** | – | M18x1.5-12 Deep supplementary drain or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing upwards. |
| **L3** | – | Oil filling 1 1/16" - 14 UNF or Bleed plug |
| **MA** | – | Gauge port system pressure G1/4" |
| **X1** | – | Remote port pressure compensator G 1/4"- 12.5 Deep |
| **...*** | | Connection with plug |

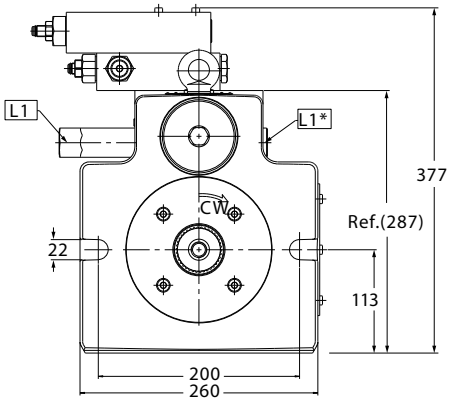
# Pump dimensions PVXS-130

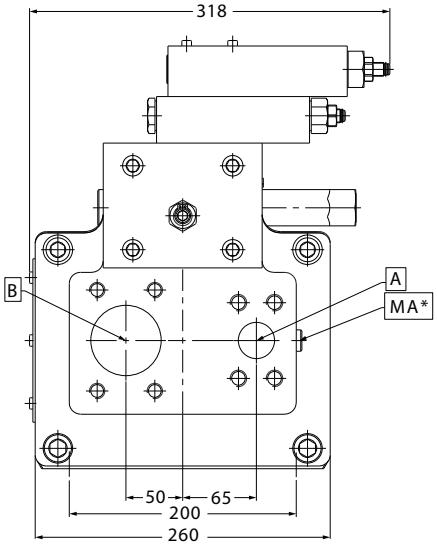


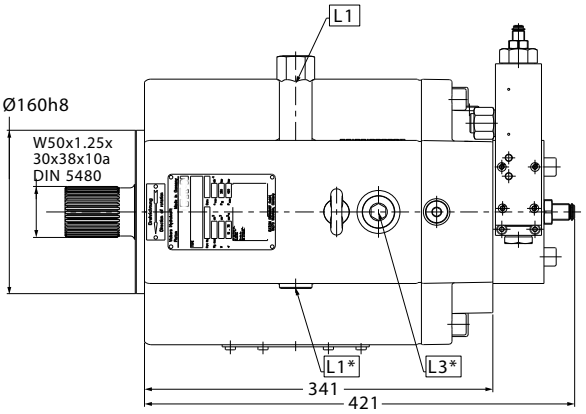


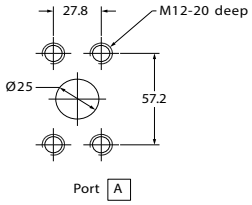
Options illustrated:
16 = **1** (A & B ports SAE, metric Thread)
17 = **A** (A & B ports axial)
18 19 = **02** (Splined shaft)
22 = **0** (no position indicator)
24 25 = **DF** control (pressure compensator)

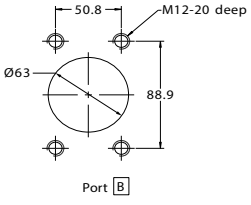


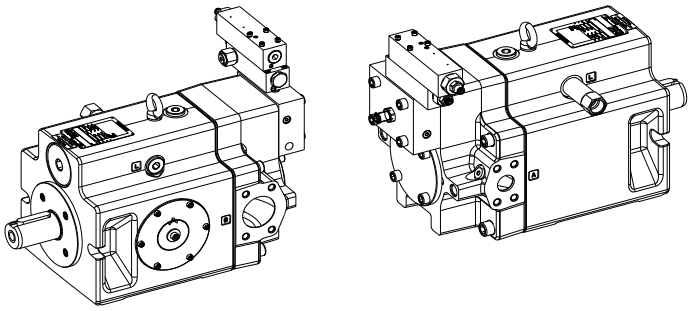



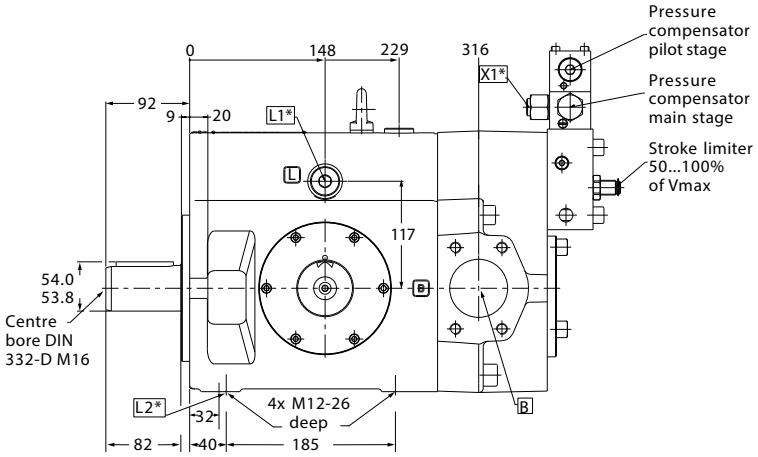



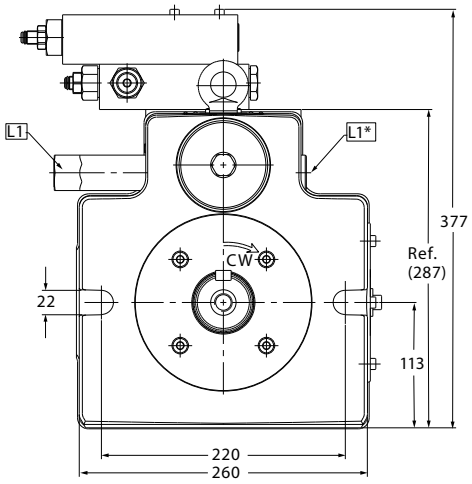

| | | |
|---|---|---|
| **A** | – | System pressure port ISO 6162-2 P25M (SAE J518 CODE 62-1" - 6000 PSI) |
| **B** | – | Inlet port ISO 6162-1 P64M (SAE J518 CODE61 - 2 1/2" 500 PSI) |
| **L1** | – | Drain port M26x1.5 (According to mounting position use upper port) |
| **L2** | – | M18x1.5-12 Deep supplementary drain or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing upwards. |
| **L3** | – | Oil filling 1 1/16" - 14 UNF or Bleed plug |
| **MA** | – | Gauge port system pressure G1/4" |
| **X1** | – | Remote port pressure compensator G 1/4"- 12.5 Deep |
| **...*** | | Connection with plug |

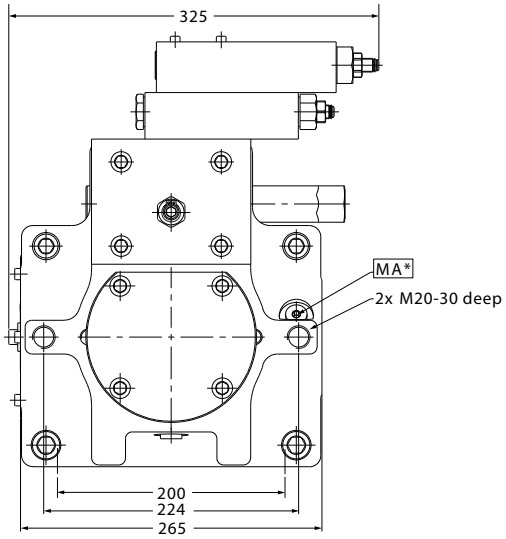
# Pump dimensions PVXS-180

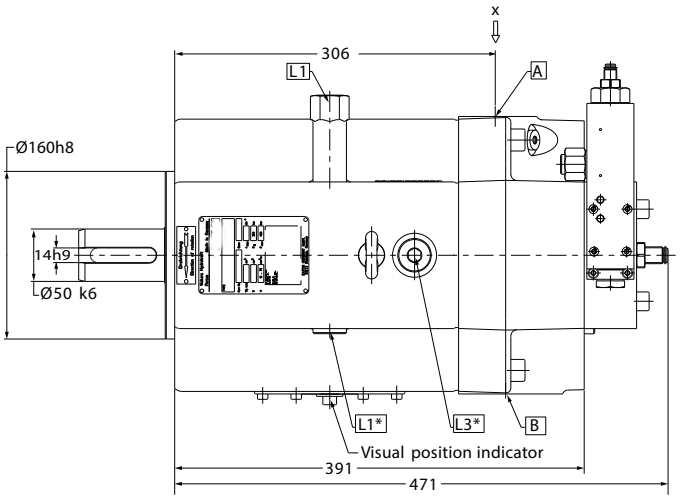


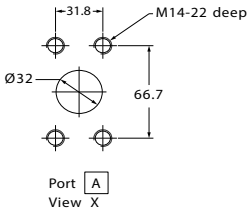
Options illustrated:
16 = **1** (A & B ports SAE, metric Thread)
17 = **R** (A & B ports radial)
18 19 = **01** (ISO keyed shaft)
22 = **V** (visual indicator)
24 25 = **DF** control (pressure compensator)

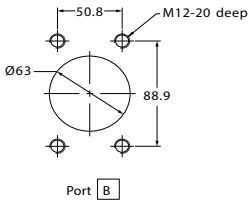


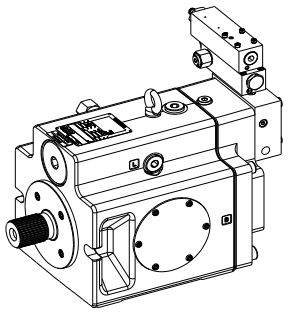



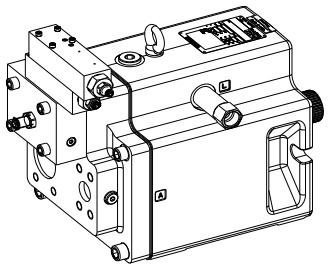



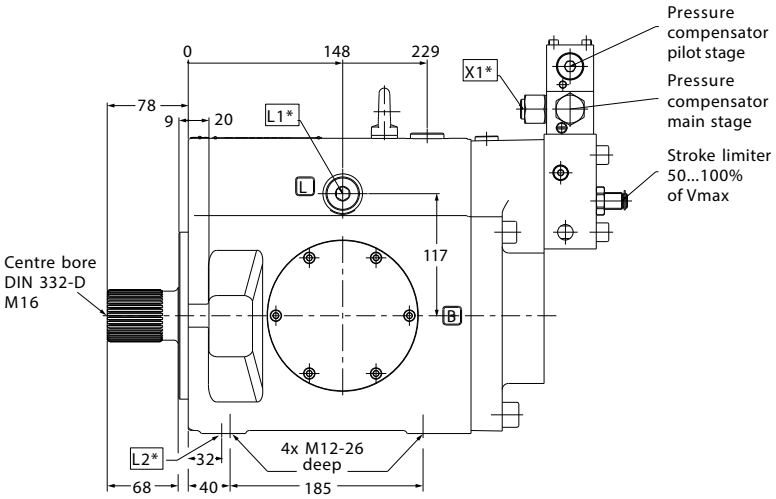

| | | |
|---|---|---|
| **A** | – | System pressure port ISO 6162-2 P32M (SAE J518 CODE 62-1 1/4" - 6000 PSI) |
| **B** | – | Inlet port ISO 6162-1 P64M (SAE J518 CODE 61 - 2 1/2" 500 PSI) |
| **L1** | – | Drain port M26x1.5 (According to mounting position use upper port) |
| **L2** | – | M18x1.5-12 Deep supplementary drain or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing upwards. |
| **L3** | – | Oil filling 1 1/16" - 14 UNF or Bleed plug |
| **MA** | – | Gauge port system pressure G1/4" |
| **X1** | – | Remote port pressure compensator G 1/4"- 12.5 Deep |
| **...*** | | Connection with plug |

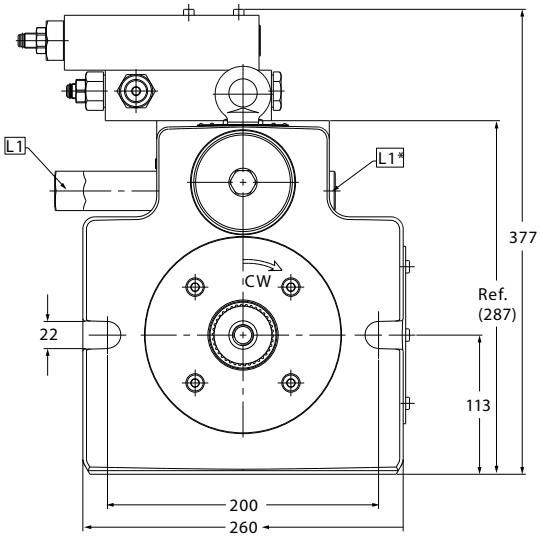
# Pump dimensions PVXS-180

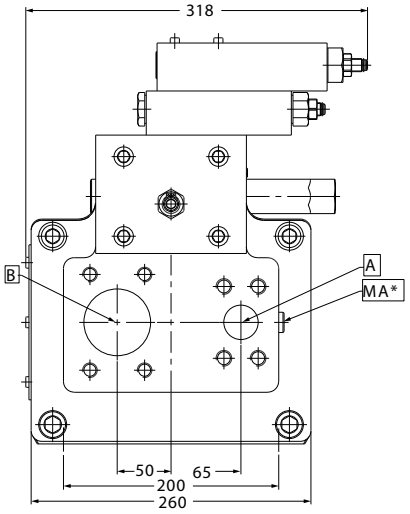


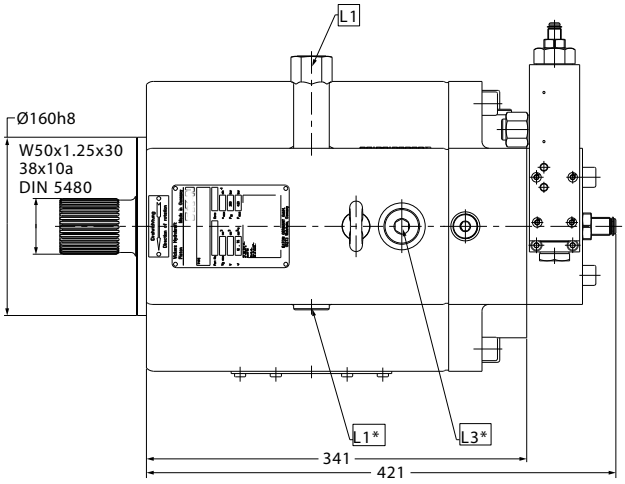


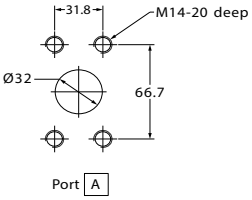
Options illustrated:
16 = **1** (A & B ports SAE, metric Thread)
17 = **A** (A & B ports axial)
18 19 = **02** (Splined shaft)
22 = **0** (no position indicator)
24 25 = **DF** control (pressure compensator)

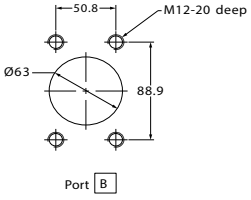


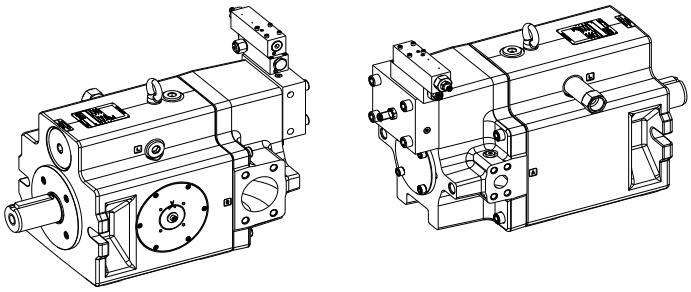



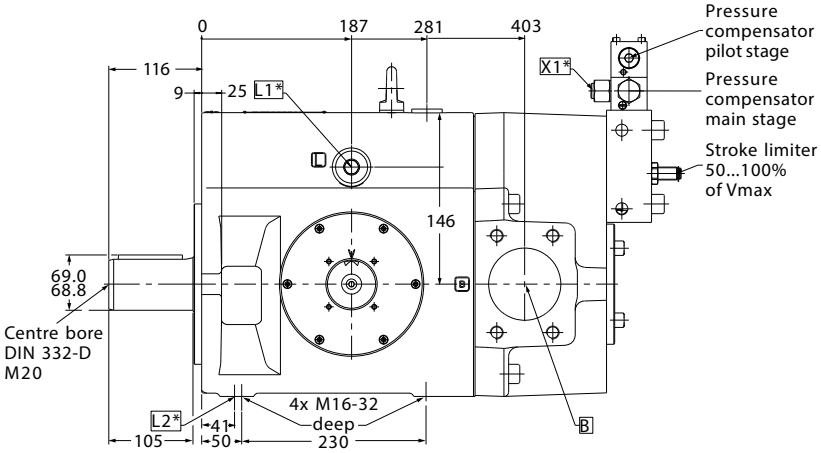



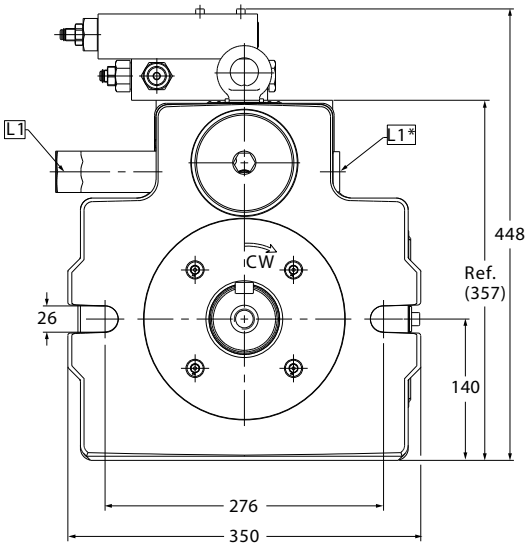

| | | |
|---|---|---|
| **A** | – | System pressure port ISO 6162-2 P32M (SAE J518 CODE 62-1 1/4" - 6000 PSI) |
| **B** | – | Inlet port ISO 6162-1 P64M (SAE J518 CODE61 - 2 1/2" 500 PSI) |
| **L1** | – | Drain port M26x1.5 (According to mounting position use upper port) |
| **L2** | – | M18x1.5-12 Deep supplementary drain or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing upwards. |
| **L3** | – | Oil filling 1 1/16" - 14 UNF or Bleed plug |
| **MA** | – | Gauge port system pressure G1/4" |
| **X1** | – | Remote port pressure compensator G 1/4"- 12.5 Deep |
| **...*** | | Connection with plug |

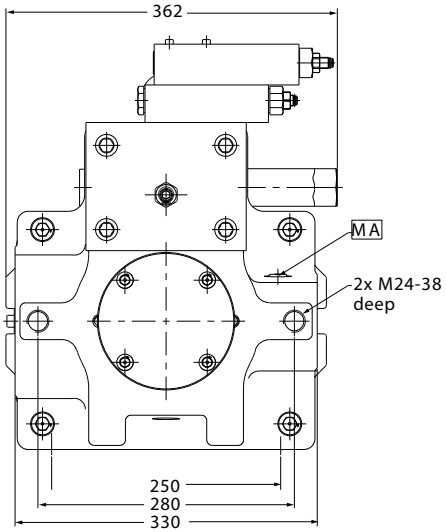
# Pump dimensions PVXS-250

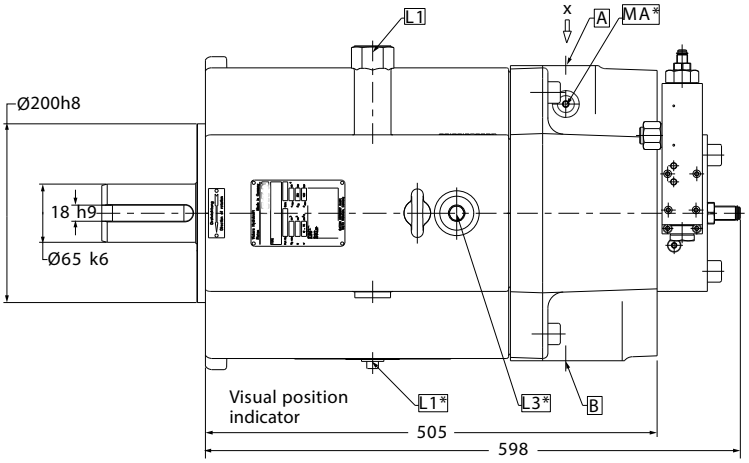


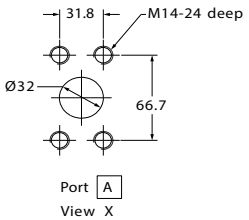
Options illustrated:
16 = **1** (A & B ports SAE, metric Thread)
17 = **R** (A & B ports radial)
18 19 = **01** (ISO keyed shaft)
22 = **V** (visual indicator)
24 25 = **DF** control (pressure compensator)

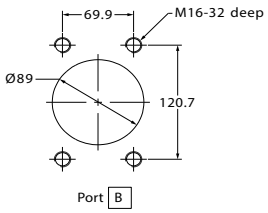


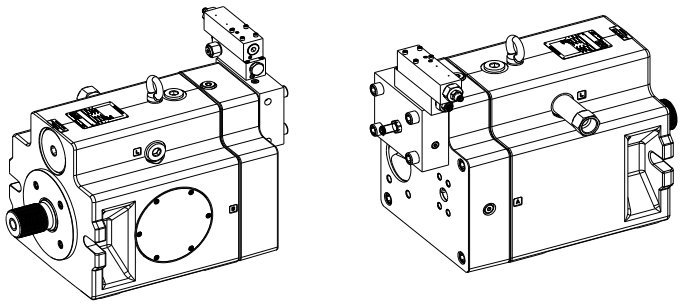



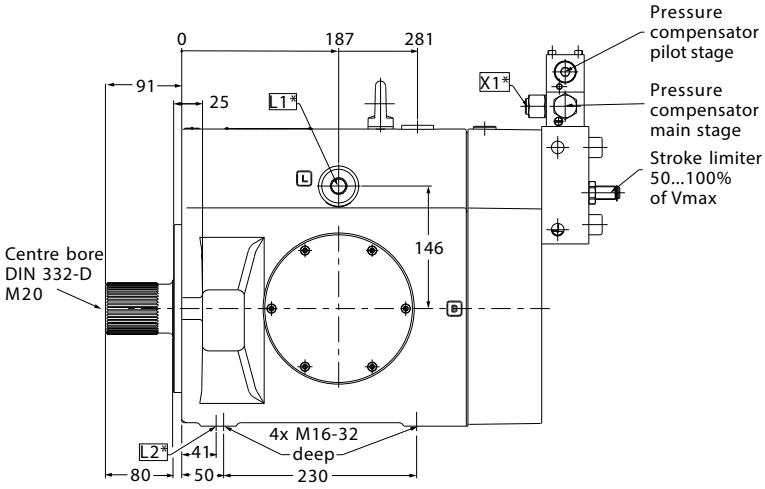



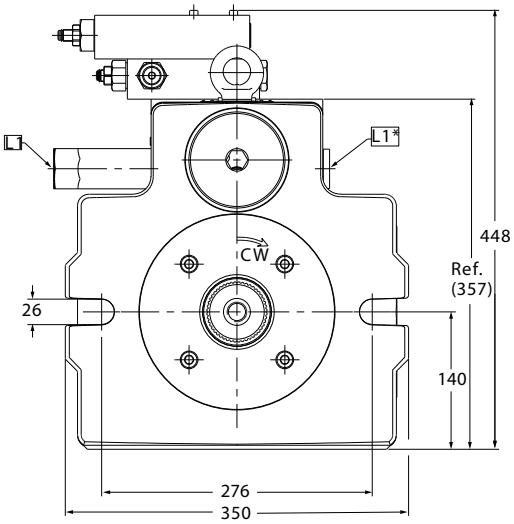

| | | |
|---|---|---|
| **A** | – | System pressure port ISO 6162-2 P32M (SAE J518 CODE 62-1 1/4" - 6000 PSI) |
| **B** | – | Inlet port ISO 6162-1 P89M (SAE J518 CODE 61 - 3 1/2" 500 PSI) |
| **L1** | – | Drain port M33x2 (According to mounting position use upper port) |
| **L2** | – | M18x1.5-12 Deep supplementary drain or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing upwards. |
| **L3** | – | Oil filling 1 5/16" - 14 UNF or Bleed plug |
| **MA** | – | Gauge port system pressure G1/4" |
| **X1** | – | Remote port pressure compensator G 1/4"- 12.5 Deep |
| **...*** | | Connection with plug |

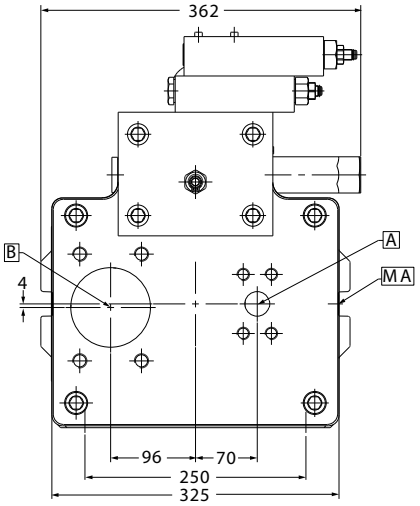
# Pump dimensions
# PVXS-250

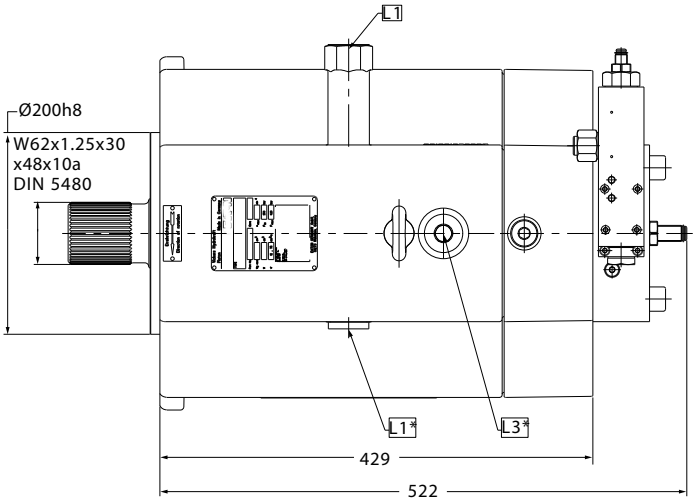


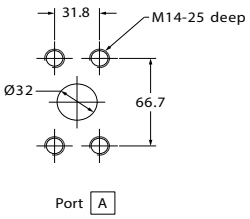
Options illustrated:
16 = **1** (A & B ports SAE, metric Thread)
17 = **A** (A & B ports axial)
18 19 = **02** (Splined shaft)
22 = **0** (no position indicator)
24 25 = **DF** control (pressure compensator)

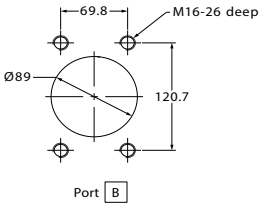



| | | |
|---|---|---|
| **A** | – | System pressure port ISO 6162-2 P32M (SAE J518 CODE 62-1 1/4" - 6000 PSI) |
| **B** | – | Inlet port ISO 6162-1 P89M (SAE J518 CODE61 - 3 1/2" 500 PSI) |
| **L1** | – | Drain port M33x2 (According to mounting position use upper port) |
| **L2** | – | M18x1.5-12 Deep supplementary drain or bleed plug. Must be drained in addition to L1 if the pump is installed with the shaft input end pointing upwards. |
| **L3** | – | Oil filling 1 5/16" - 14 UNF or Bleed plug |
| **MA** | – | Gauge port system pressure G1/4" |
| **X1** | – | Remote port pressure compensator G 1/4"- 12.5 Deep |
| **...*** | | Connection with plug |

# Control Options DF

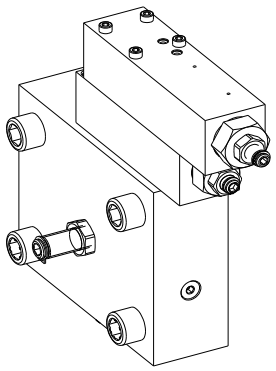
**General Description**

Energy-saving hydraulic drives are possible with pressure compensated and/or power controlled pumps, especially in combination with the Load sensing option.

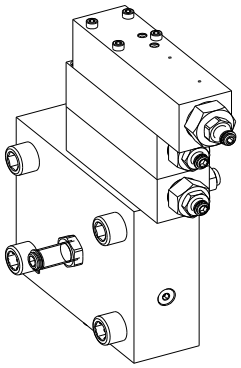
**Control options DF**

System pressure remains constant for the entire volume flow rate. System pressure can be set manually, hydraulically or electronically.

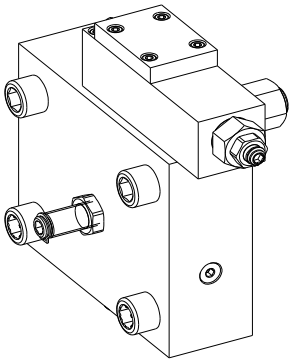
The standard Hydrocraft pressure compensator is pilot operated, has a remote port and is very stable.



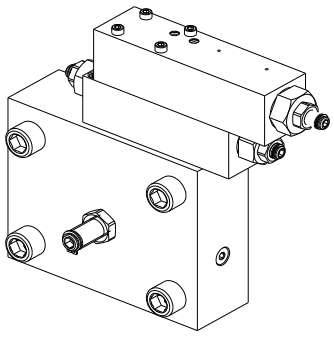
**DF000A00**



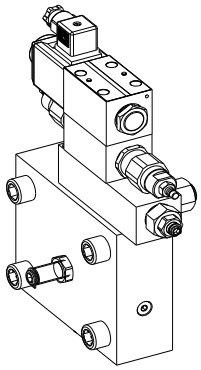
**DF000A010**



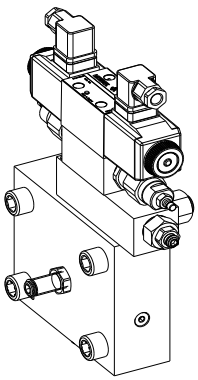
**DF000A0F**



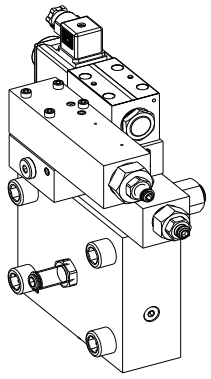
**DF000A0S**



**DF000AA**

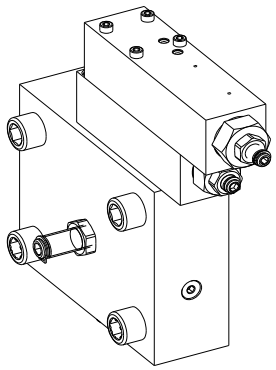


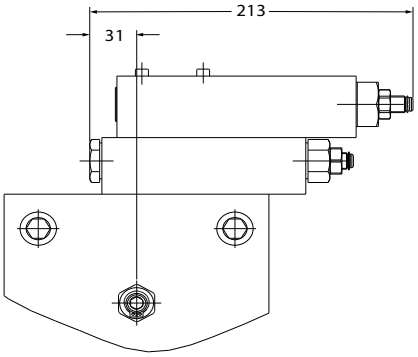
**DF000AB**

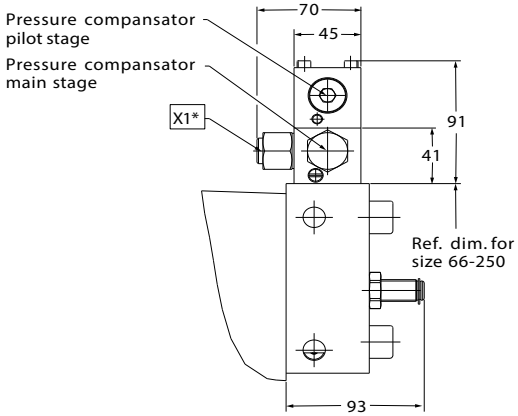


**DF000A0_ _ _ _ _100H**

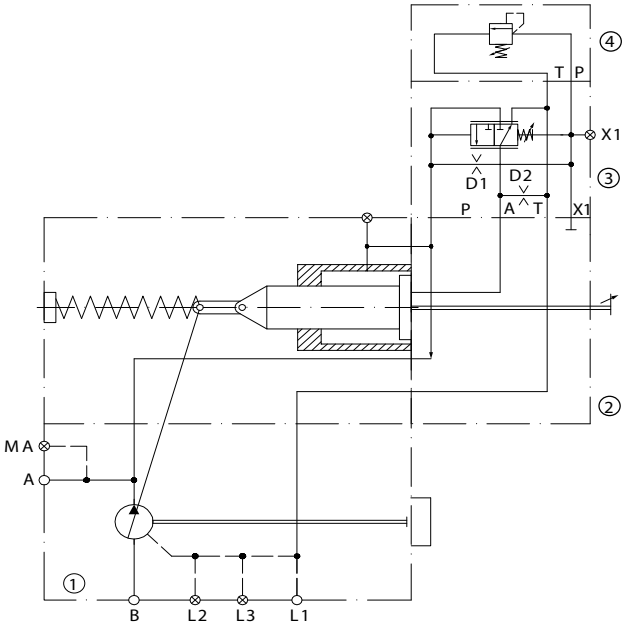
# Control Options DF
# A0





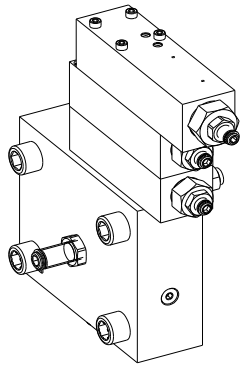



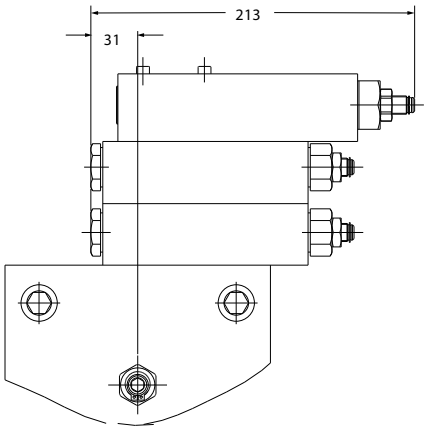

X1 Remote port pressure comensator. G 1/4"-12.5 DEEP
...* Connection with plug.

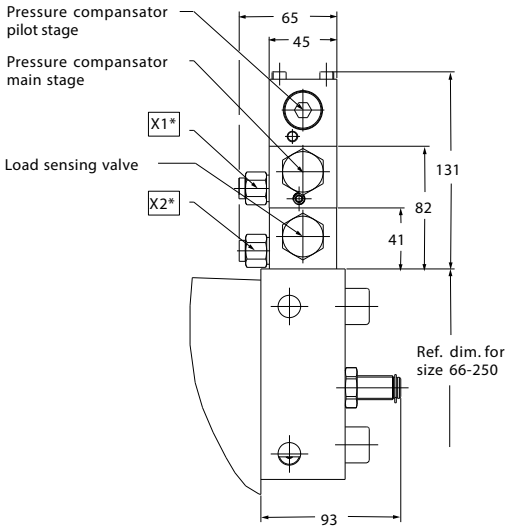



| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure compensator |
| **1** | – | Basic pump |
| **2** | – | Connection plate for DF-control |
| **3** | – | Pressure compensator, main stage |
| **4** | – | Pressure compensator, pilot stage |

# Control Options DF
# A10



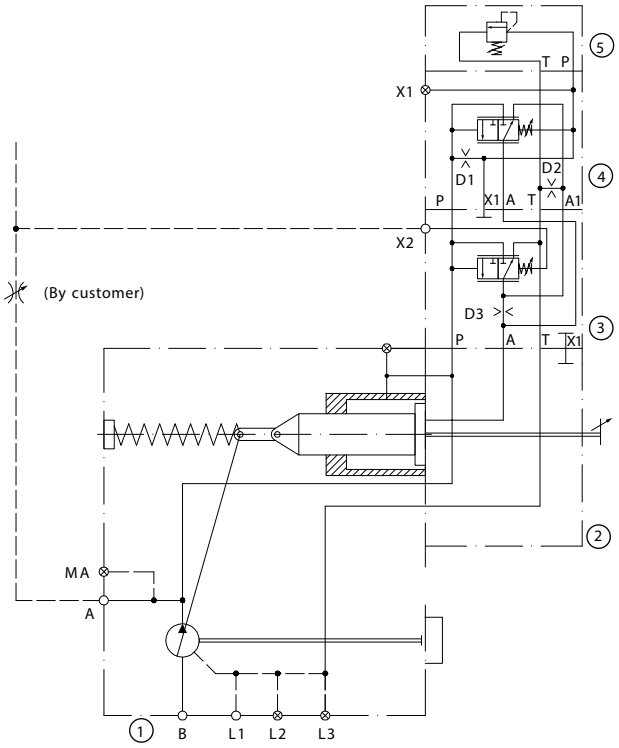



X1 Remote port pressure comensator. G 1/8"-12.5 DEEP

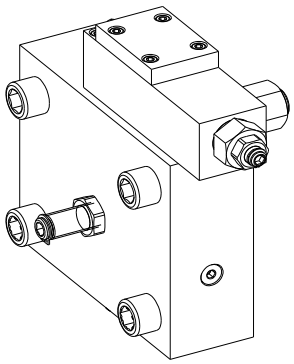
X2 Remote port load sensing. G 1/8"

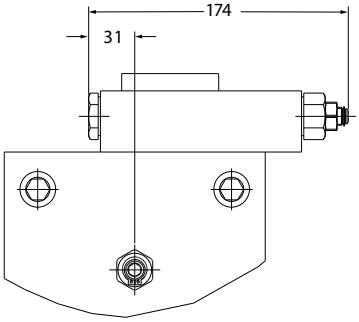
...* Connection with plug.

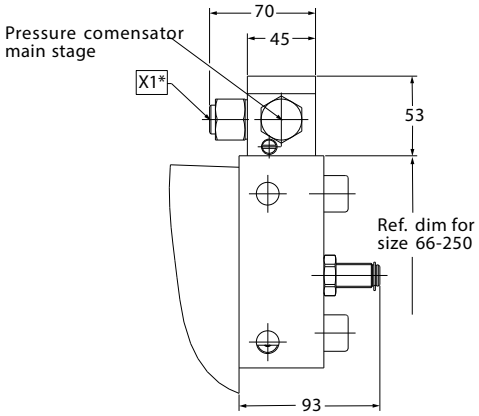



| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure compensator |
| **X2** | – | Remote port load sense |
| **1** | – | Basic pump |
| **2** | – | Connection plate for DF-control |
| **3** | – | Pressure compensator-load sense stage |
| **4** | – | Pressure compensator main stage |
| **5** | – | Pressure compensator pilot stage |

# Control Options DF
# A0F

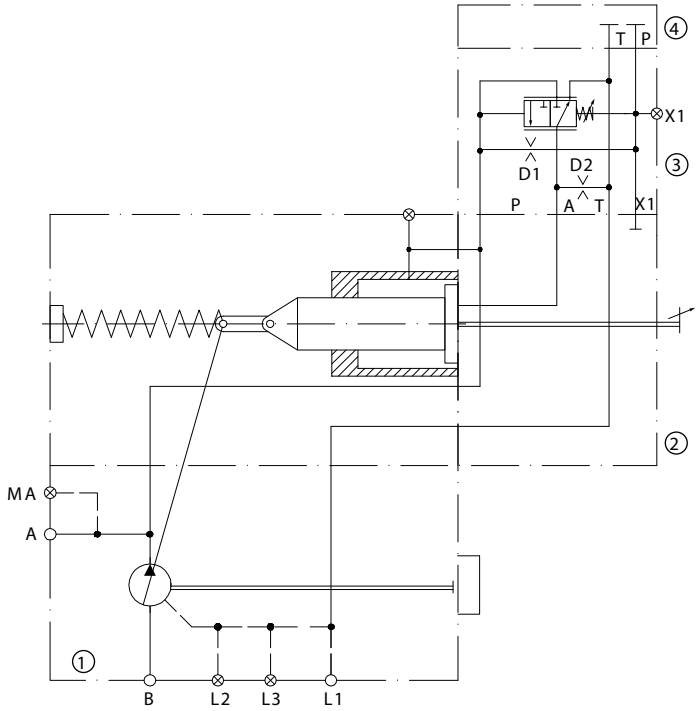




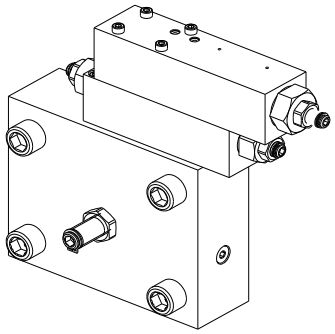

X1 Remote port pressure comensator. G 1/4"-12.5 DEEP

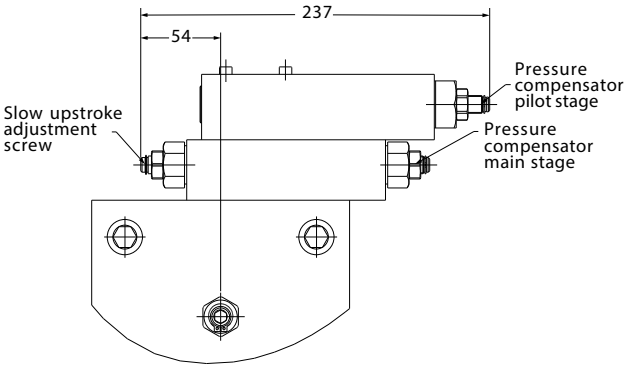
...* Connection with plug.

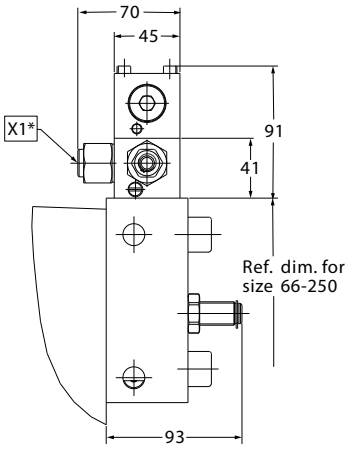



| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure compensator |
| **1** | – | Basic pump |
| **2** | – | Connection plate for DF-control |
| **3** | – | Pressure compensator, main stage |
| **4** | – | Closing plate |

# Control Options DF
# A0S

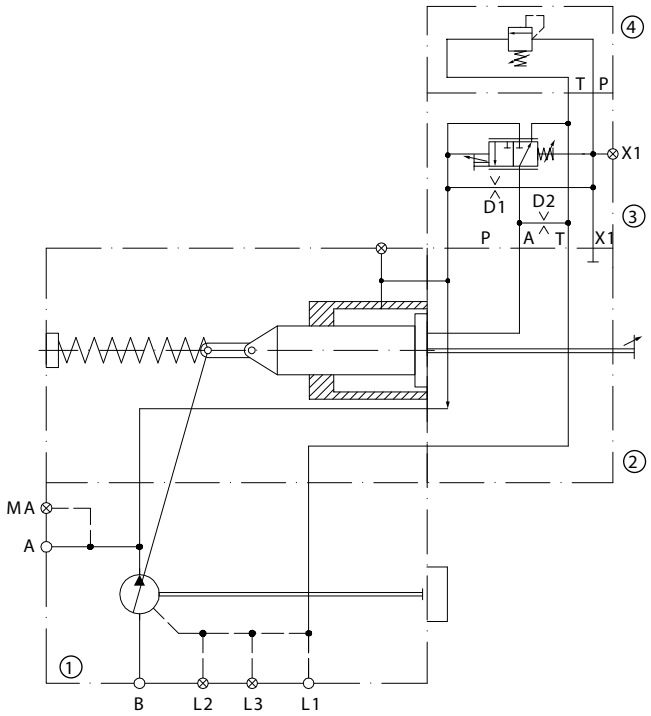




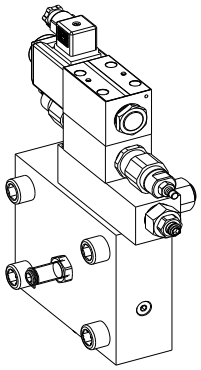

X1 Remote port pressure comensator. G 1/4"-12.5 DEEP

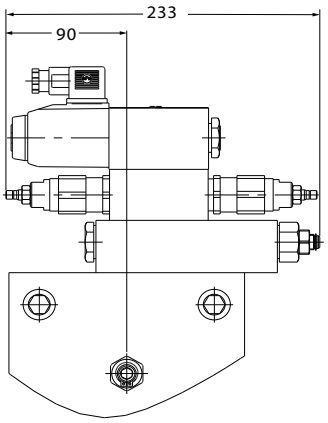
...* Connection with plug.



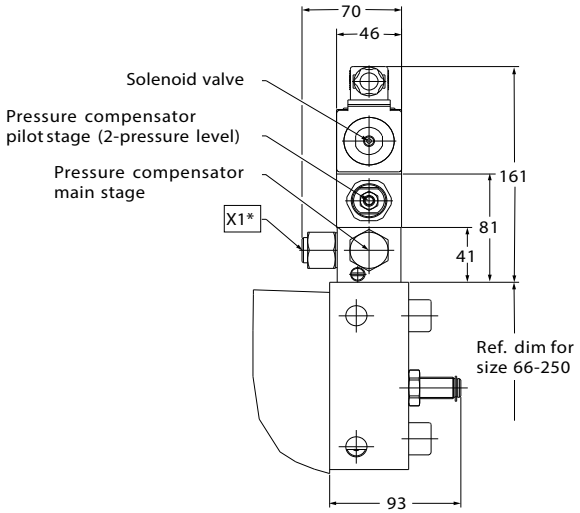

| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure compensator |
| **1** | – | Basic pump |
| **2** | – | Connection plate for DF-control |
| **3** | – | Pressure compensator, main stage with slow upstroke adjustment screw |
| **4** | – | Pressure compensator, pilot stage |

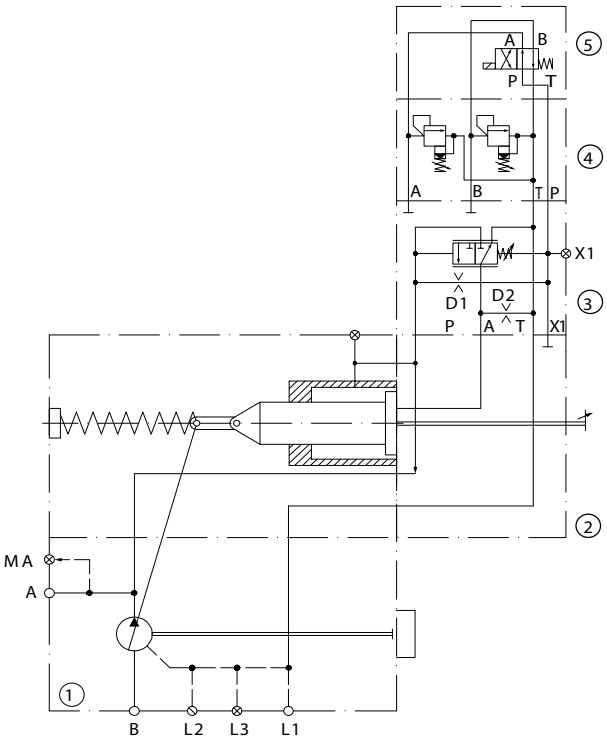
# Control Options DF
# AA





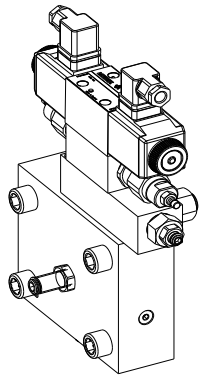

X1 Remote portpressure comensator. G 1/4"-12.5 DEEP
...* Connection with plug.

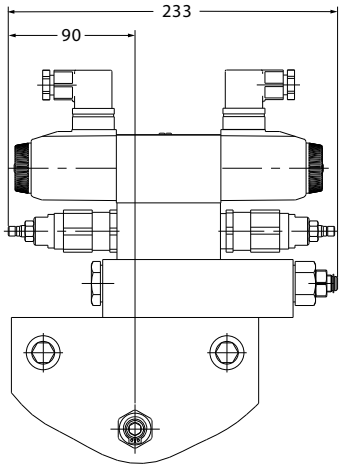


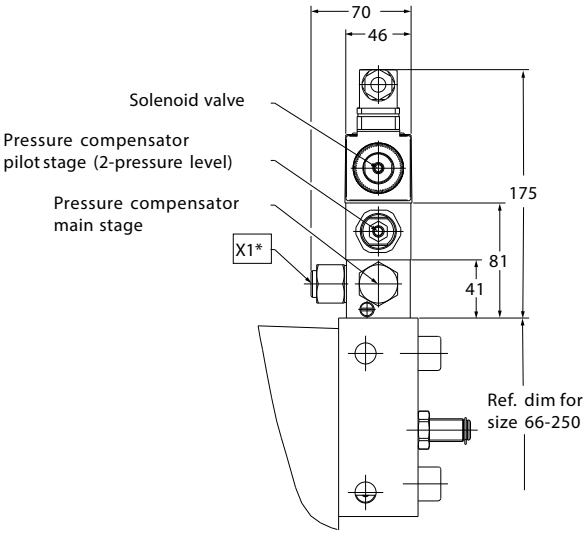




| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure compensator |
| **1** | – | Basic pump |
| **2** | – | Connection plate for DF-control |
| **3** | – | Pressure compensator, main stage |
| **4** | – | Pressure compensator, pilot stage (Dual relief function) |
| **5** | – | 4/2 Directional control valve |

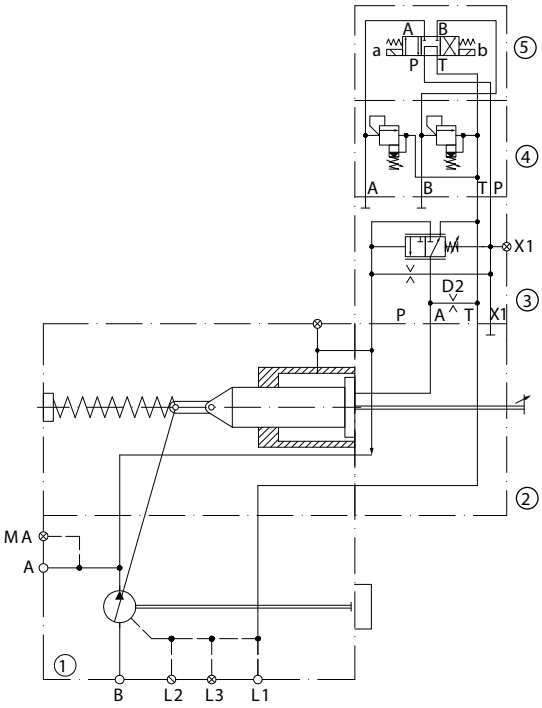
# Control Options DF AB





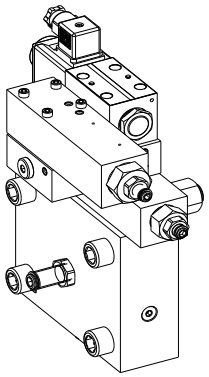



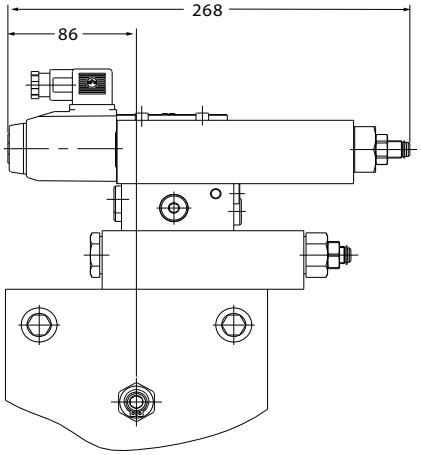

X1 Remote port pressure comensator. G 1/4"-12.5 DEEP
...* Connection with plug.




| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure compensator |
| **1** | – | Basic pump |
| **2** | – | Connection plate for DF-control |
| **3** | – | Pressure compensator main stage |
| **4** | – | Pressure compensator pilot stage (Dual relief function) |
| **5** | – | 4/3 Directional control valve |

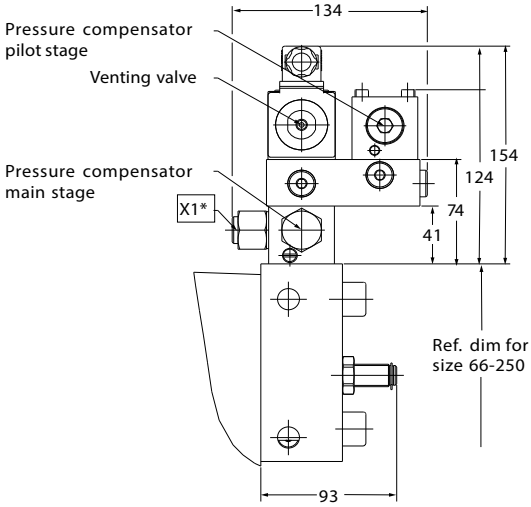
# Control Options DF
# A0_ _ _ _ _ _100H

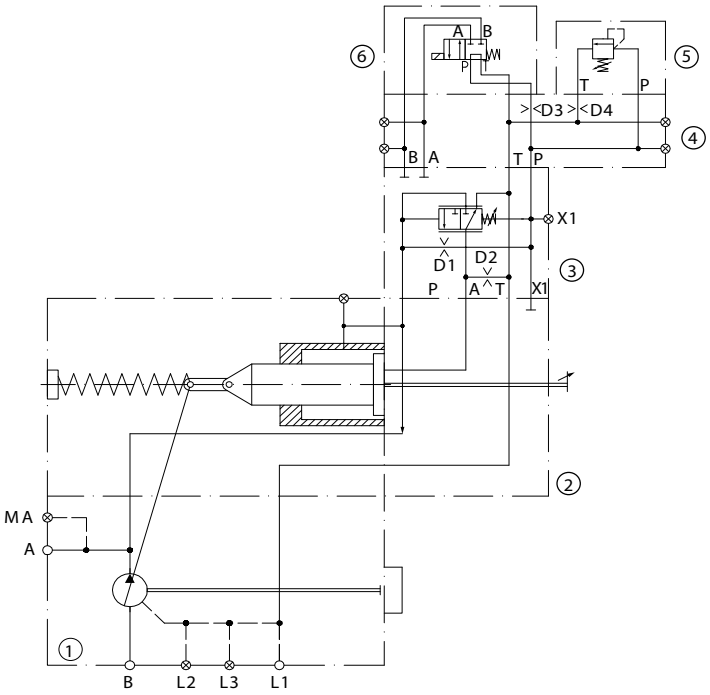





X1 Remote port pressure comensator. G 1/4"-12.5 DEEP

...* Connection with plug.




| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure compensator |
| **1** | – | Basic pump |
| **2** | – | Connection plate for DF-control |
| **3** | – | Pressure compensator, main stage |
| **4** | – | Intermediate plate |
| **5** | – | Pressure compensator, pilot stage |
| **6** | – | Venting valve |

# Control Options LR

**General Description**

Energy-saving hydraulic drives are possible with pressure compensated and/or power controlled pumps, especially in combination with the loadsensing option.

**LR controls**

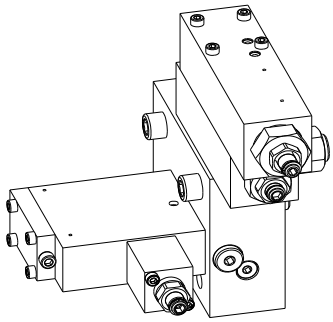
The typical p/Q curve is a hyperbola. For constant speed, the drive torque, i.e. the power used, is held constant.

The power hyperbola can be continuously adjusted between $P_{min}$ and $P_{max,}$ $P_{min}$ is given by the minimum setting of the control main stage (20bar approx.) and power loss of the pump.

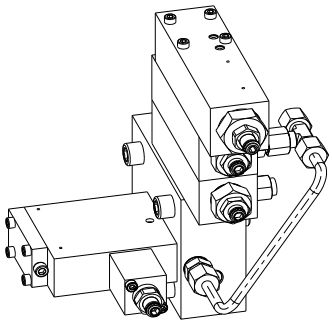
Both controller types can be combined with another or with additional options; for available options, see Model Code.

Maximum pump flow can be limited mechanically to between 50% and 100% by a screw. As an additional option, maximum (or minimum) flow can also be limited by a spacer inside the control cylinder (Model Code position 13 options **4**, **5** or **6,** in combination with customer adjustment specified in positions 40 to 43).

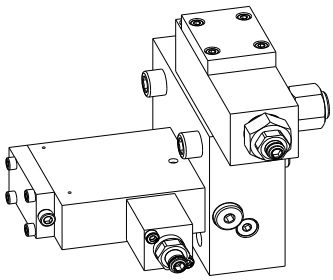
This solution is also recommended for severe operating conditions and the need for high repeatability over a long period of time. The setting must be defined before ordering since it cannot be modified in operation.



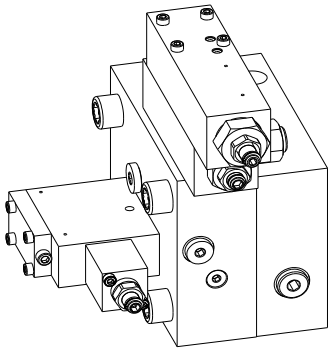
**PVX-066-180-LR000A20**



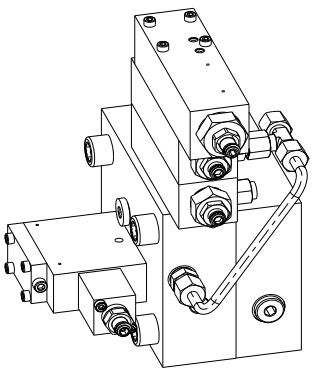
**PVX-066-180-LR000A30**



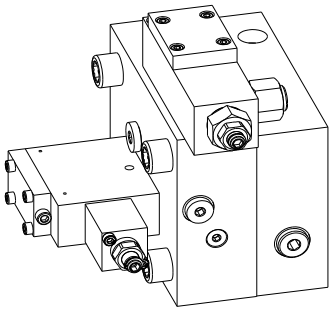
**PVX-066-180-LR000A2F**



**PVX-250-LR000A20**

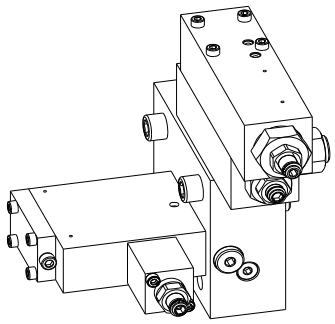


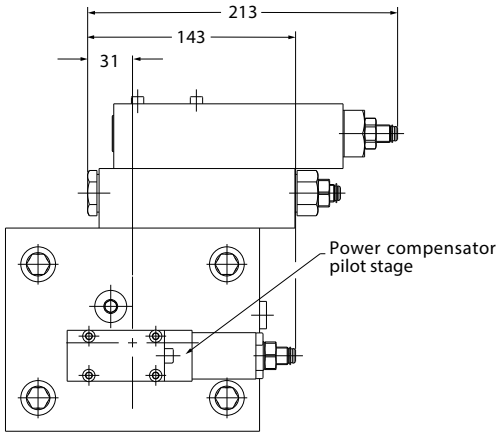
**PVX-250-LR000A30**

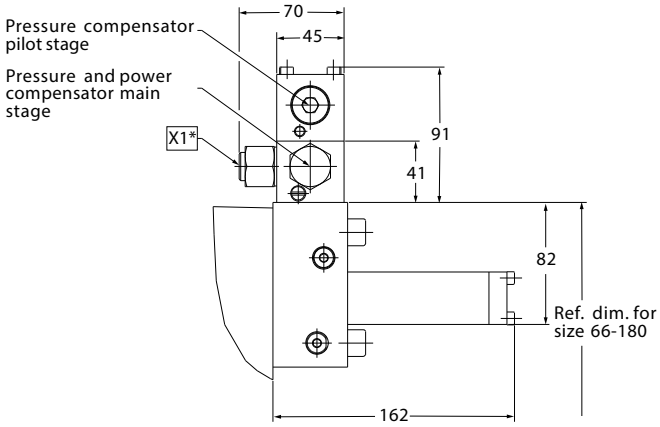


**PVX-250-LR000A2F**

# Control Options LR
# A20 size 066-180

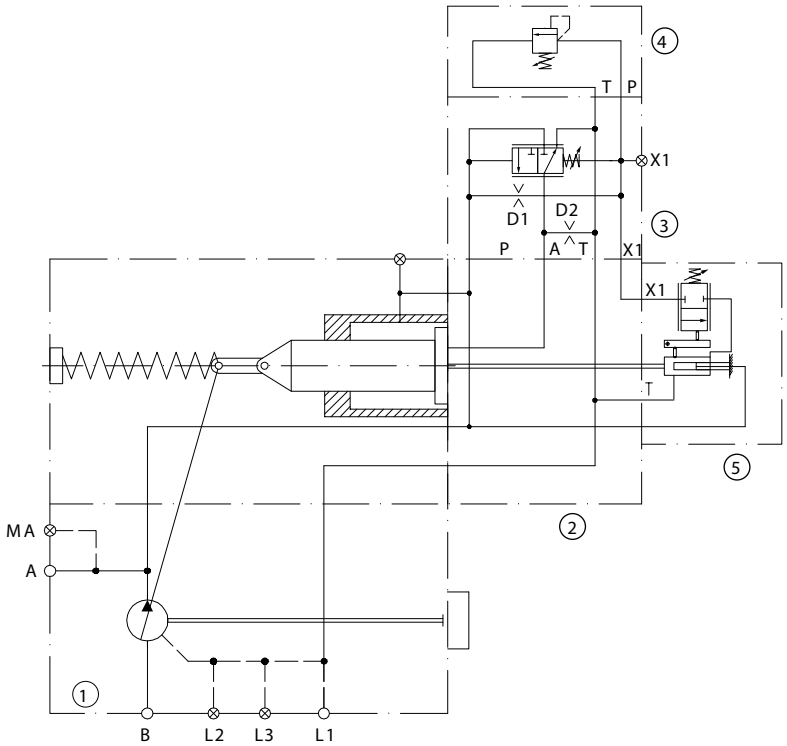





X1 Remote port pressure comensator. G 1/4"-12.5 DEEP

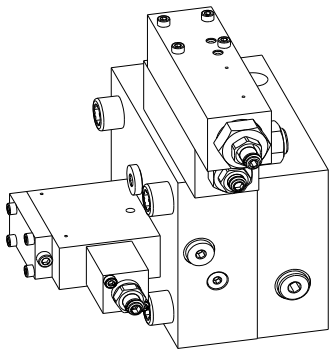
...* Connection with plug.

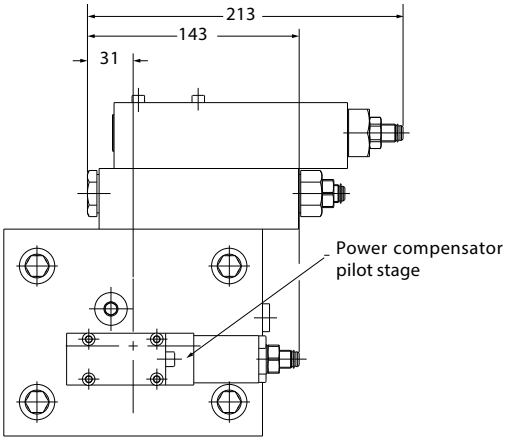


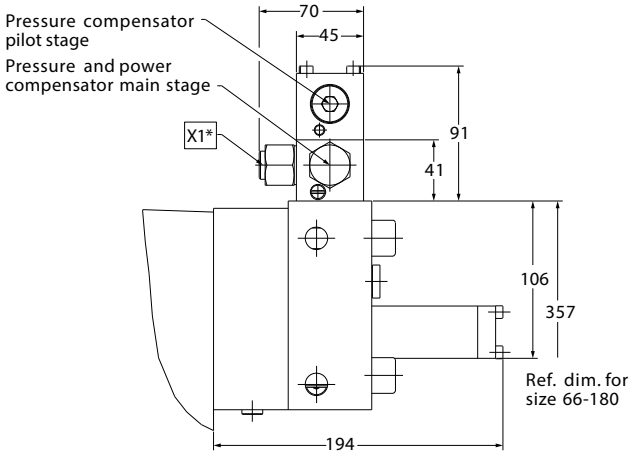

| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure compensator |

| | | |
|---|---|---|
| **1** | – | Basic pump |
| **2** | – | Connection plate for LR-control |
| **3** | – | Pressure and power compensator main stage |
| **4** | – | Pressure compensator pilot stage |
| **5** | – | Power compensator pilot stage |

# Control Options LR
# A20 size 250

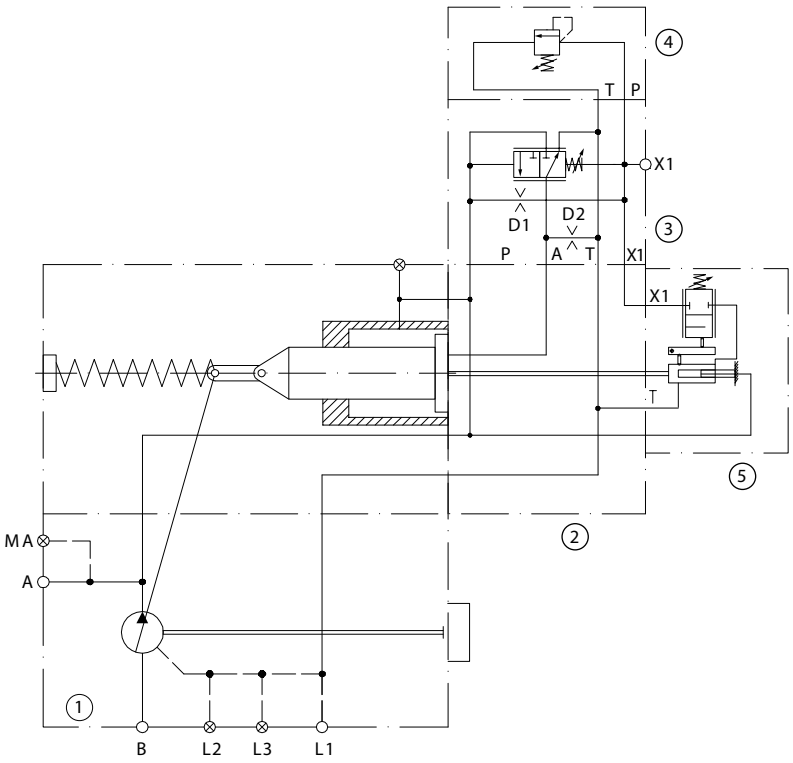




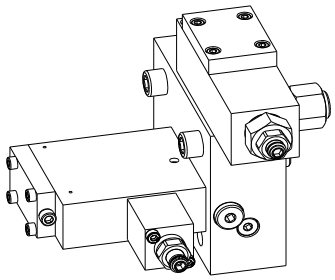

X1 Remote port pressure comensator. G 1/4"-12.5 DEEP

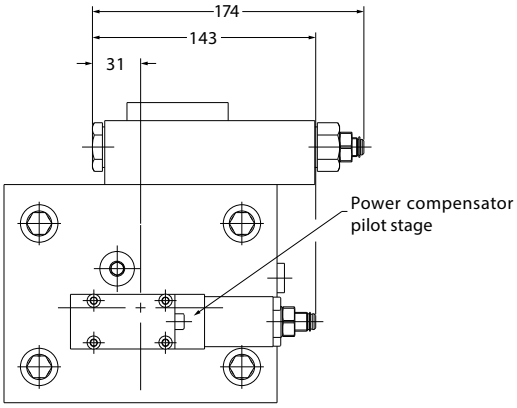
...* Connection with plug.

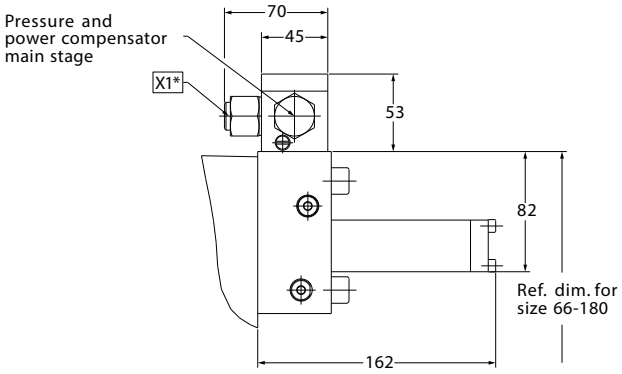



| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure compensator |
| **1** | – | Basic pump |
| **2** | – | Connection plate for LR-control |
| **3** | – | Pressure and power compensator main stage |
| **4** | – | Pressure compensator pilot stage |
| **5** | – | Power compensator pilot stage |

# Control Options LR
# A2F size 066-180

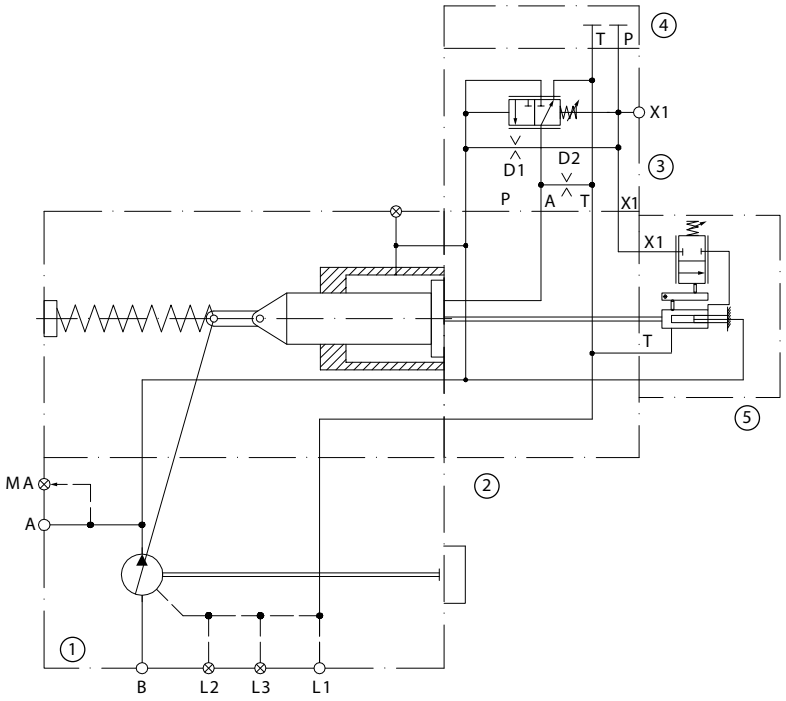




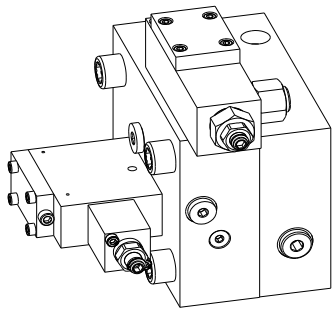

X1 Remote port pressure comensator. G 1/4"-12.5 DEEP

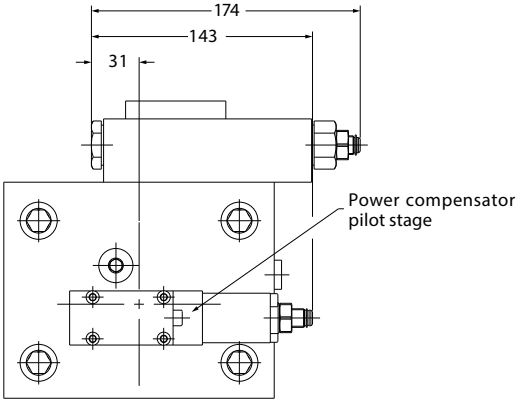
...* Connection with plug.



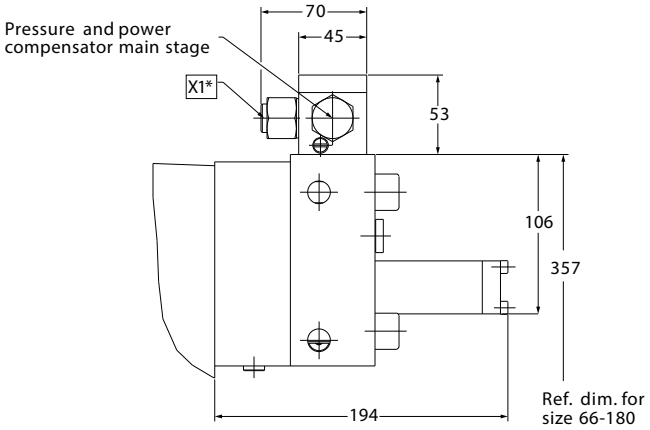

| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure compensator |
| **1** | – | Basic pump |
| **2** | – | Connection plate for LR-control |
| **3** | – | Pressure and power compensator main stage |
| **4** | – | Closing plate |
| **5** | – | Power compensator pilot stage |

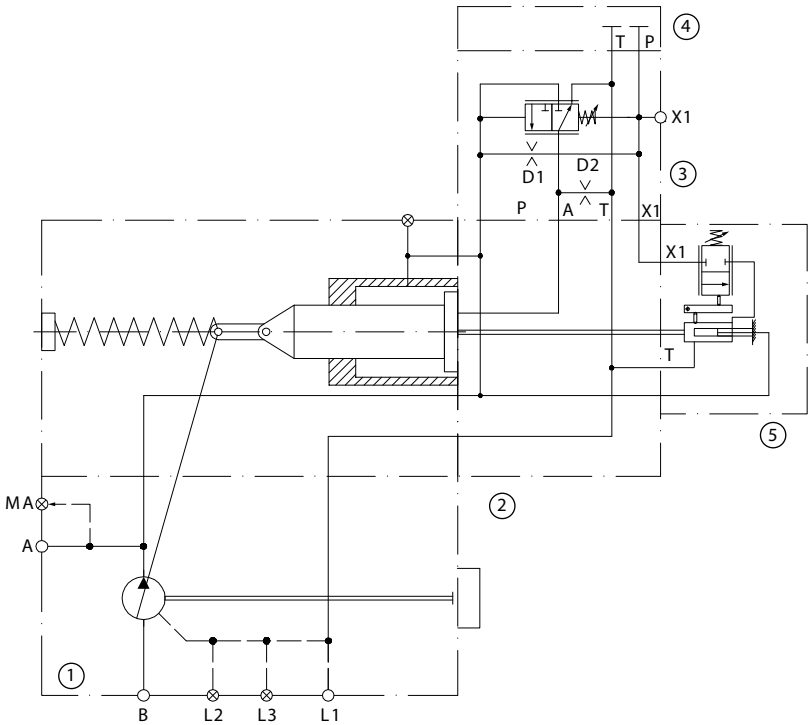
# Control Options LR
# A2F size 250





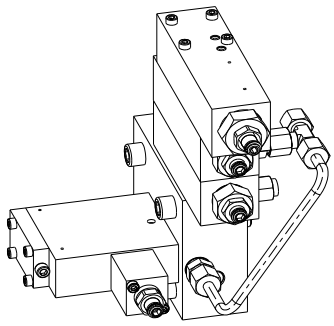

X1 Remote port pressure comensator. G 1/4"-12.5 DEEP
...* Connection with plug.

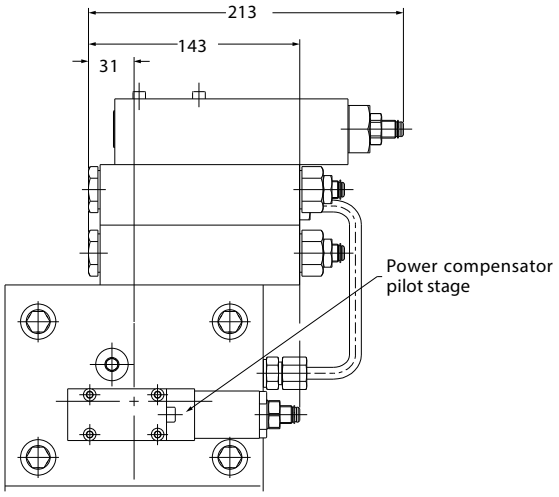


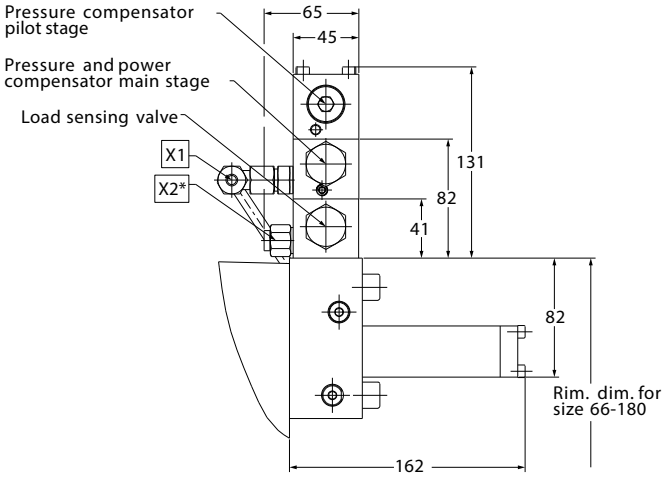




| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure compensator |
| **1** | – | Basic pump |
| **2** | – | Connection plate for LR-control |
| **3** | – | Pressure and power compensator main stage |
| **4** | – | Closing plate |
| **5** | – | Power compensator pilot stage |

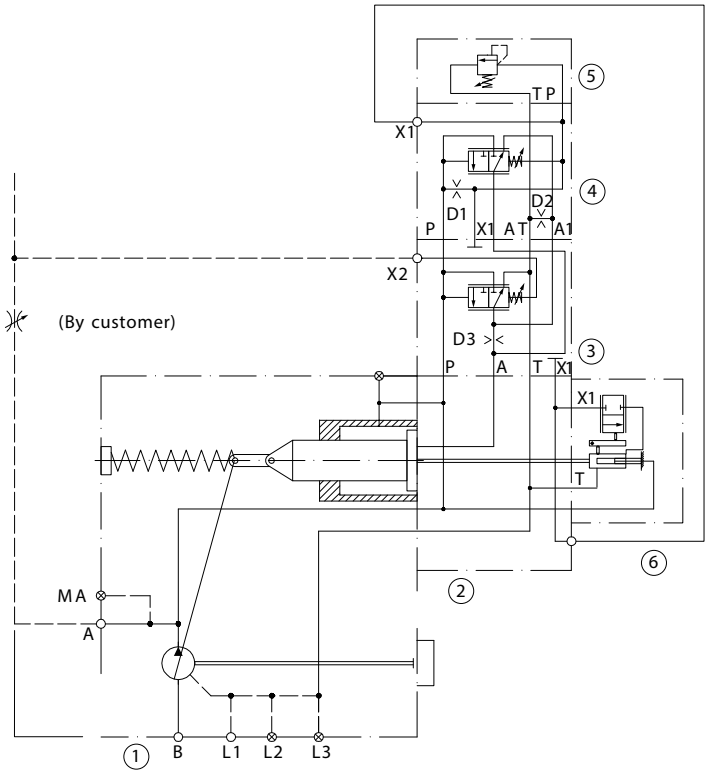
# Control Options LR
# A30 size 066-180





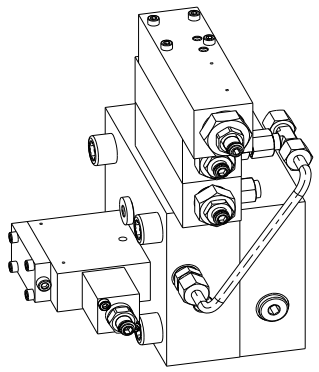



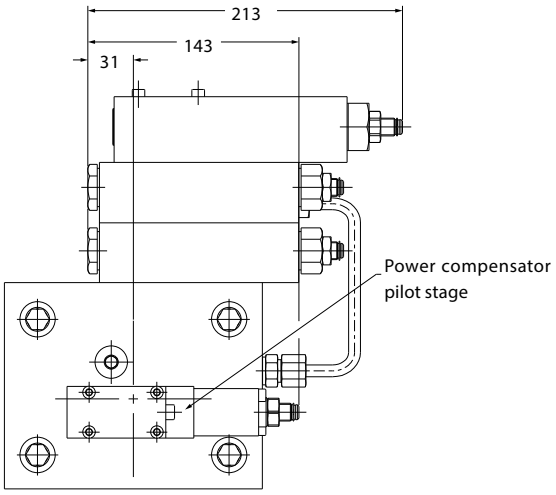

X1 Remote port pressure comensator 8S ACC. DIN EN ISO 8434-1
X2 Remote port load sensing. G 1/8"
...* Connection with plug.

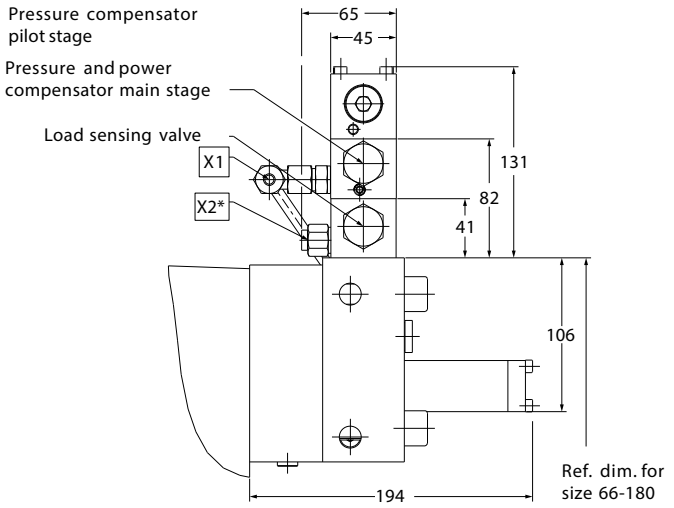



| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure compensator |
| **X2** | – | Remote port load sense |
| **1** | – | Basic pump |
| **2** | – | Connection plate for LR-control |
| **3** | – | Pressure compensator-load sense stage |
| **4** | – | Pressure and power compensator main stage |
| **5** | – | Pressure compensator pilot stage |
| **6** | – | Power compensator pilot stage |

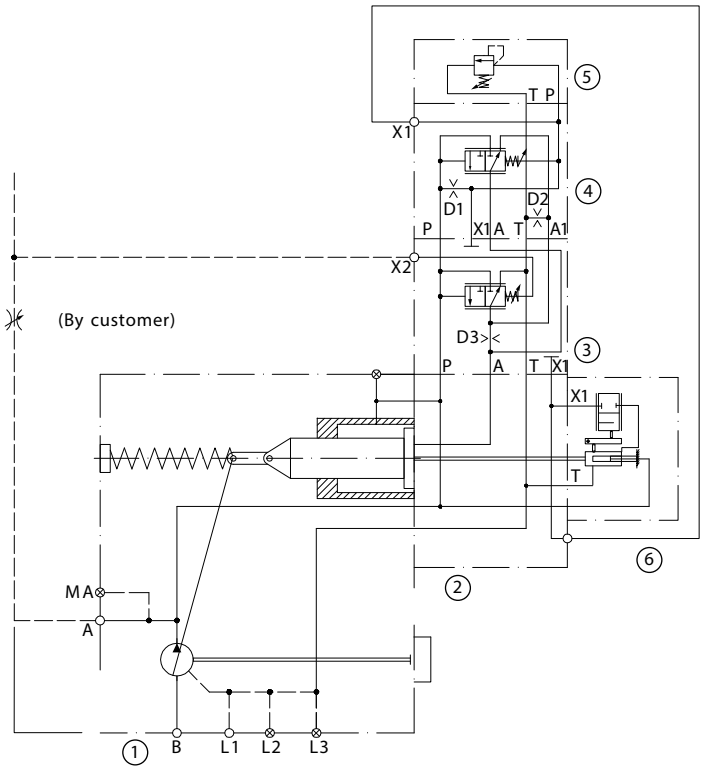
# Control Options LR
# A30 size 250






X1 Remote port pressure comensator 8s ACC. DIN EN ISO 8434-1
X2 Remote port load sensing. G 1/8"
...* Connection with plug.




| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure compensator |
| **X2** | – | Remote port load sense |
| **1** | – | Basic pump |
| **2** | – | Connection plate for LR-control |
| **3** | – | Pressure compensator-load sense stage |
| **4** | – | Pressure and power compensator main stage |
| **5** | – | Power compensator pilot stage |
| **6** | – | Power compensator pilot stage |

# Control Options ST

**General Description**

The energy-saving electrohydraulic displacement control type ST efficiently adjusts pump output by acting on the swashplate within electrically adjustable limits. The swashplate angle value is fed back to the controller unit via an electrical closed loop system.

A proportional valve and servo piston use the controller output signal to apply the required setting, resulting in a highly accurate dynamic control system.

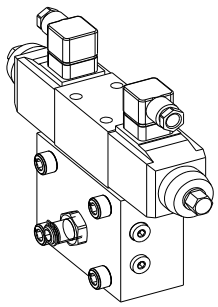
Hysteresis is approximately 1% of end value. The ST control can also be combined with hydromechanical relief valves for pressure and/or power control.

Maximum pump flow can be limited mechanically to between 50% and 100% by a screw. As an additional option, maximum (or minimum) flow can be set by a spacer inside the control cylinder (Model Code position 13 , options **4**, **5** or **6**, in combination with customer adjustment specified in positions 40 to 43 ).

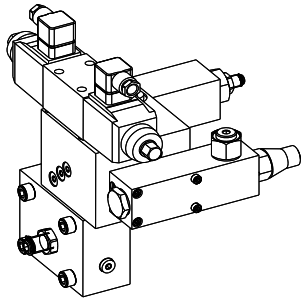
This solution is recommended for severe operating conditions and the need for high repeatability over a long period of time. The setting must be defined before ordering since it cannot be modified in operation.

ST control will replace old SP control type for PVX pumps.

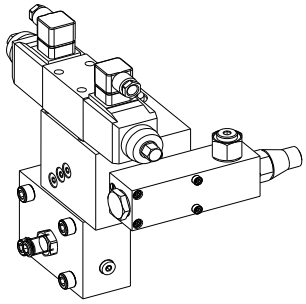
ST-control requires a min. operation pressure of >25 bar for operation. Below this min. pressure value pump will automatically go on max. displacement.



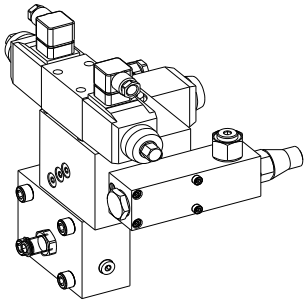
**STC03A00**



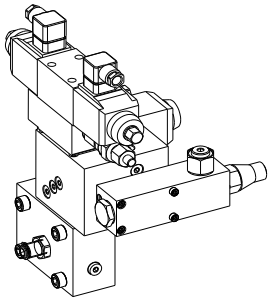
**STC03A40**



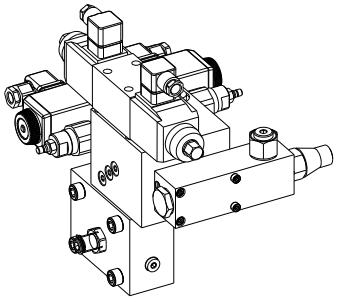
**STC03A4F**



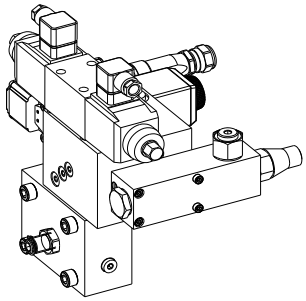
**STC03A4K**



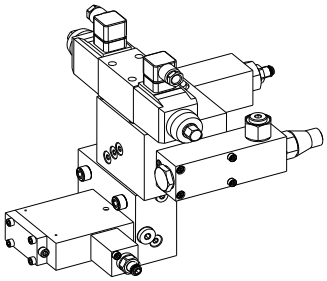
**STC03A4K_ _ _ _C**



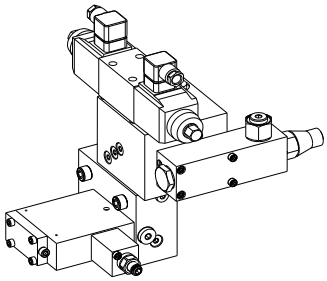
**STC03A4B**



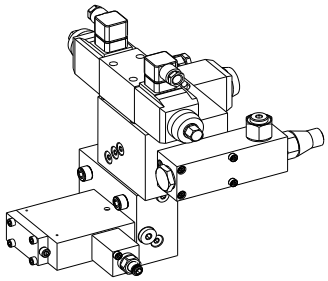
**STC03A4L**



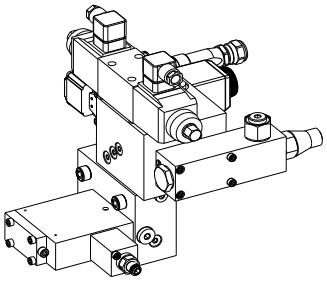
**STC03A50**



**STC03A5F**

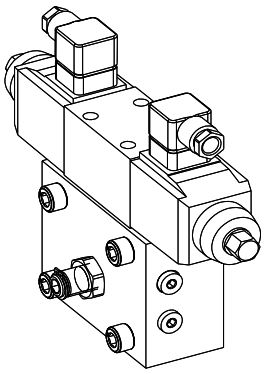


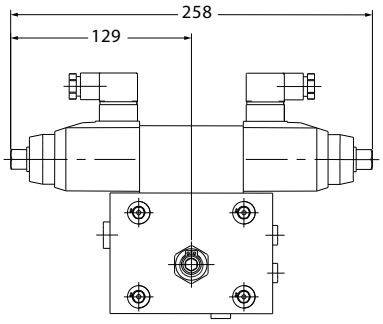
**STC03A5K**

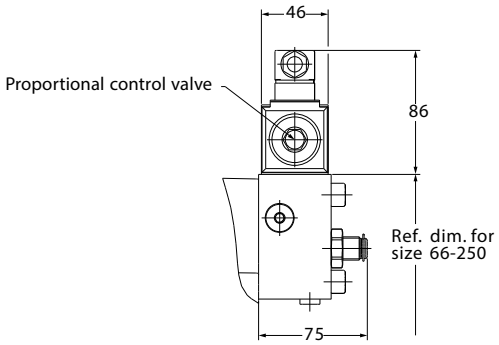


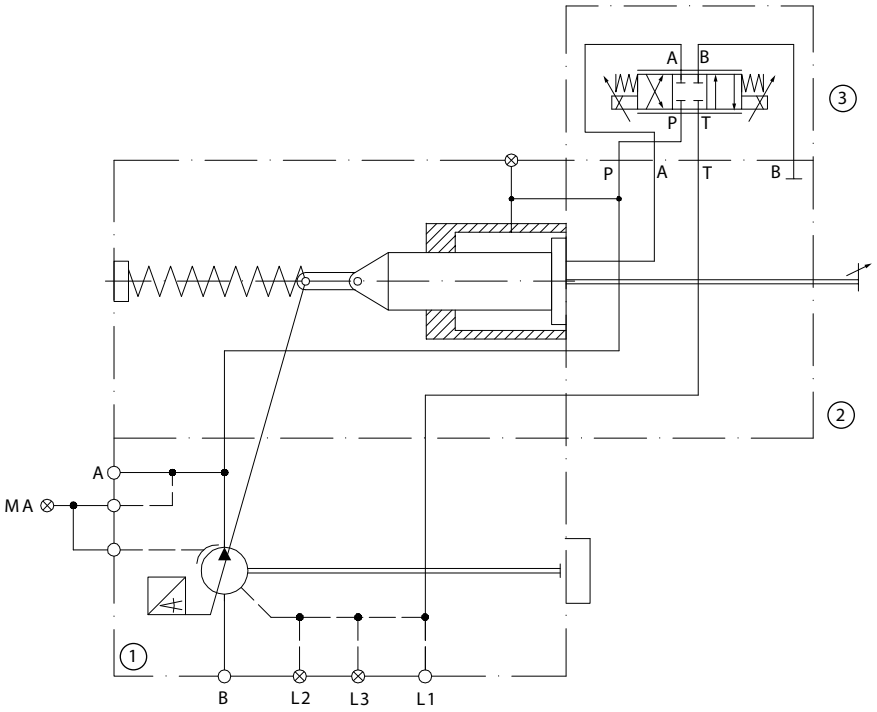
**STC03A5L**

# Control Options ST
# STC03A00



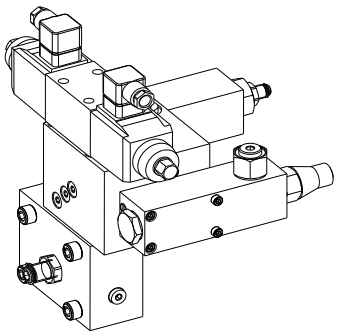


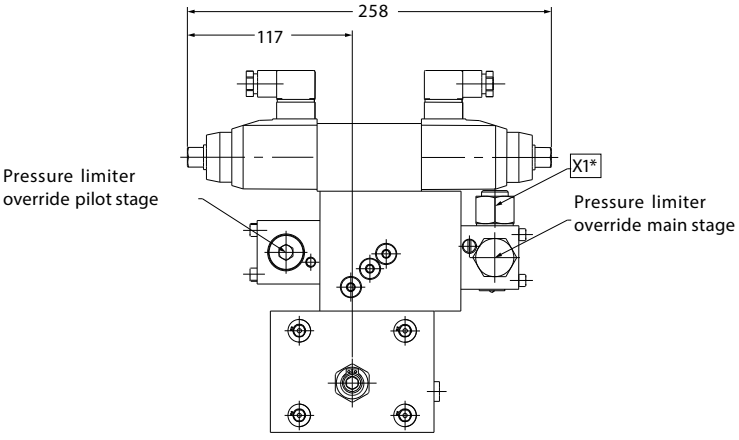



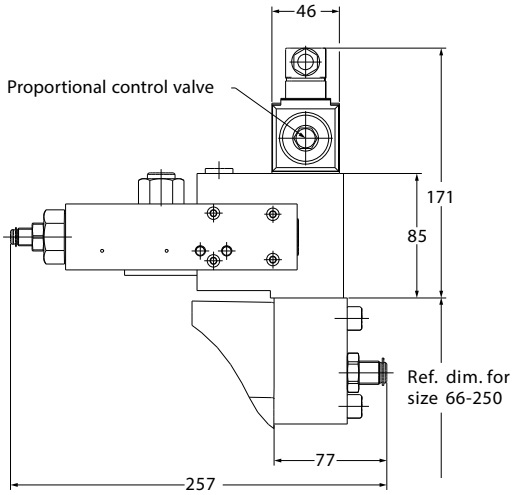




| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| | | |
| **1** | – | Basic pump |
| **2** | – | Connection plate |
| **3** | – | Proportional control valve |

# Control Options ST
# STC03A40

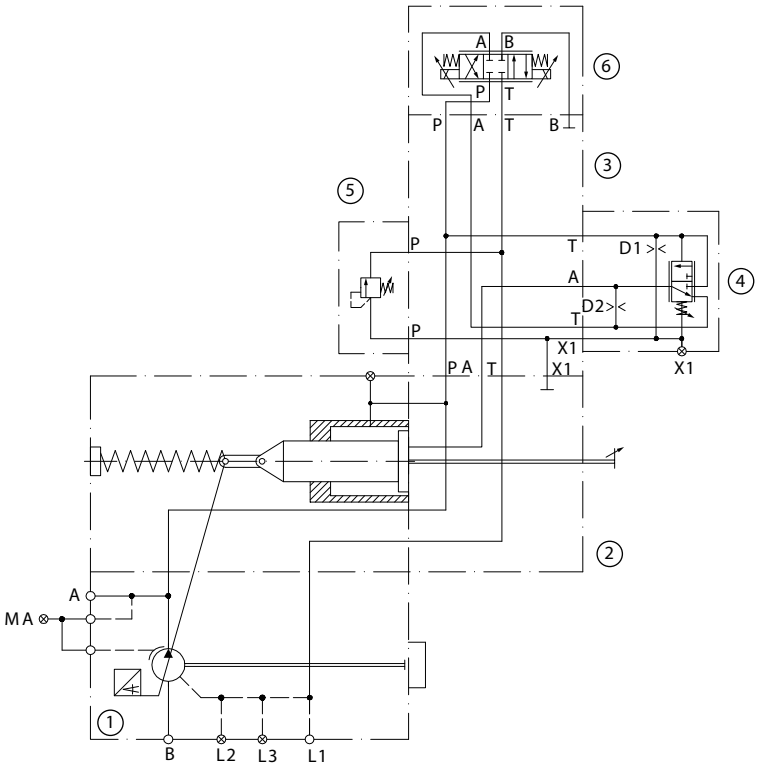




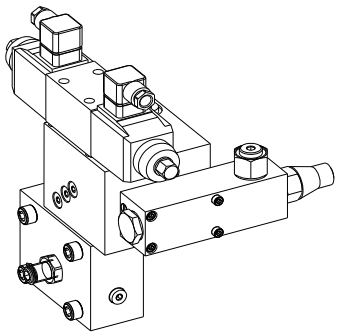

X1 Remote port pressure limiter override. G 1/4"-12.5 DEEP

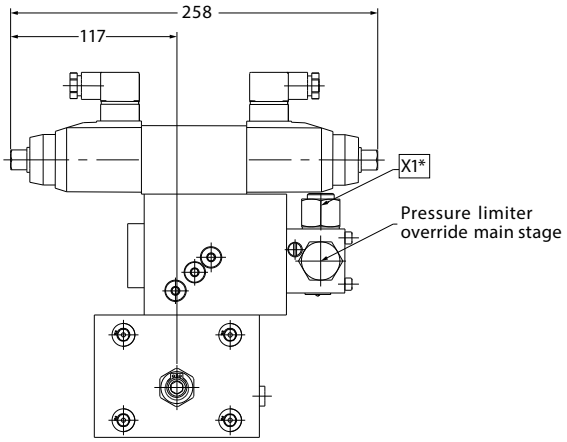
...* Connection with plug.

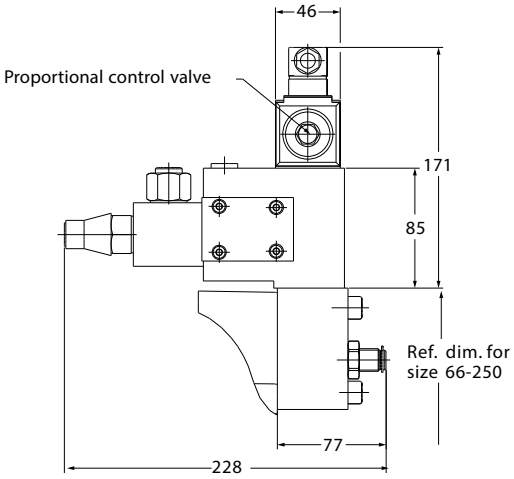



| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure limiter override |
| **1** | – | Basic pump |
| **2** | – | Connection plate |
| **3** | – | Connection plate for ST-control |
| **4** | – | Pressure limiter override main stage |
| **5** | – | Pressure limiter override pilot stage |
| **6** | – | 4/3 Directional control valve |
| **7** | – | Proportional control valve |

# Control Options ST
# STC03A4F

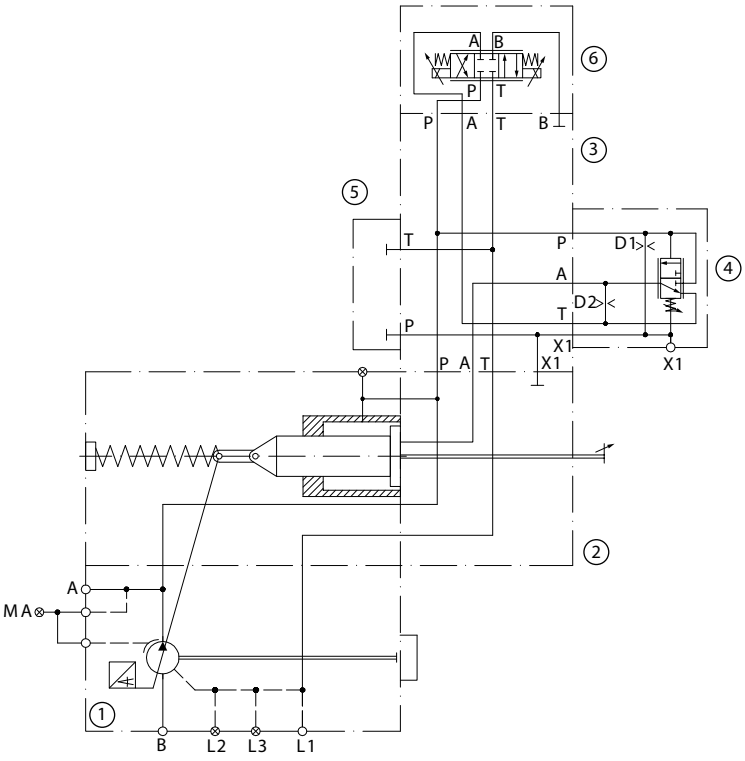




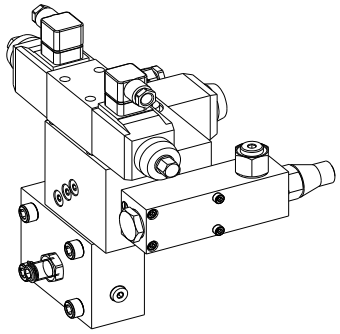

X1 Remote port pressure limiter override. G 1/4"-12.5 DEEP

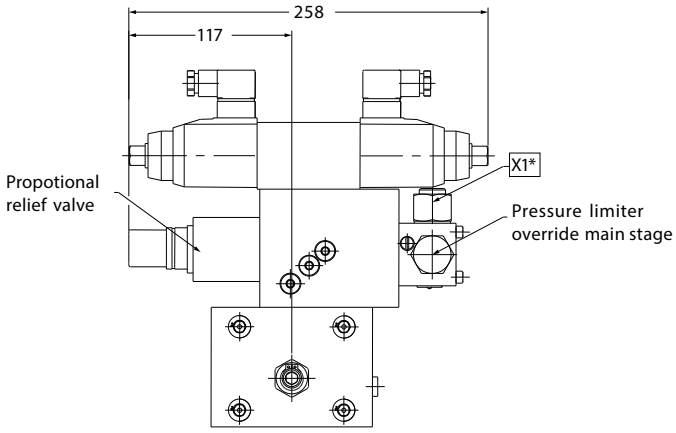
...* Connection with plug.

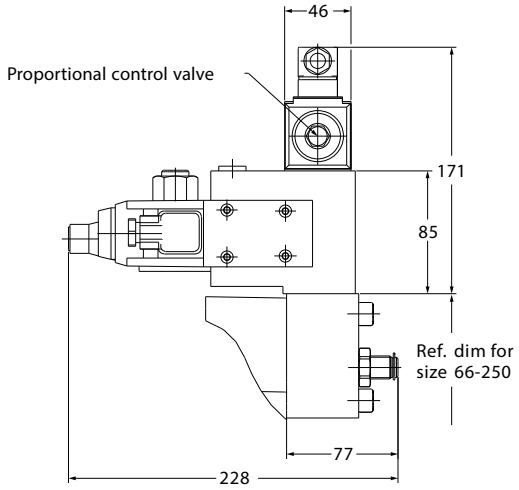



| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure limiter override |
| **1** | – | Basic pump |
| **2** | – | Connection plate |
| **3** | – | Connection plate for ST-control |
| **4** | – | Pressure limiter override main stage |
| **5** | – | Closing plate |
| **6** | – | Proportional control valve |

# Control Options ST
# STC03A4K

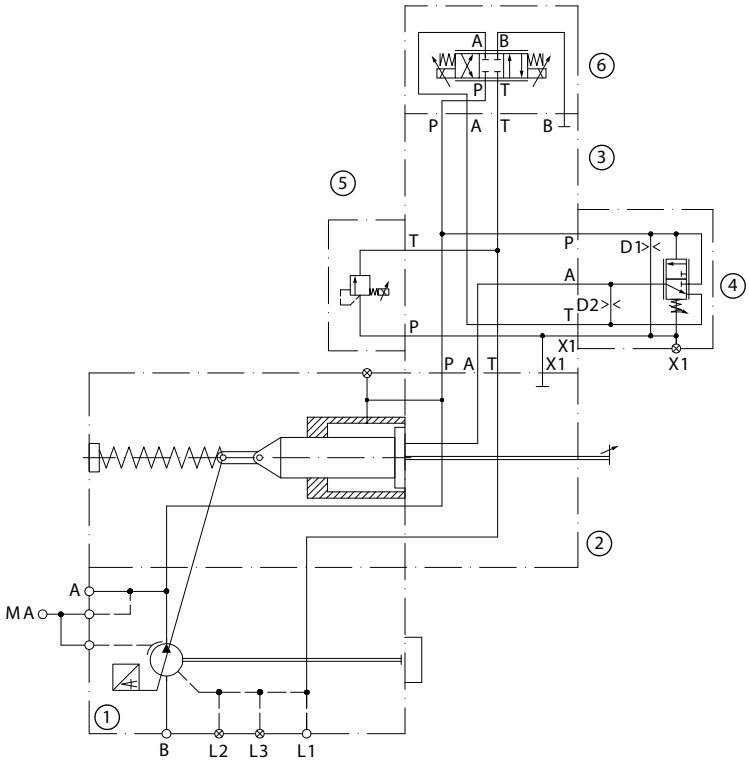




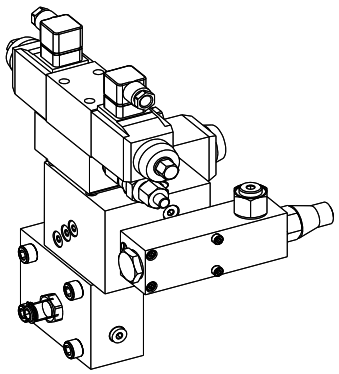

X1 Remote port pressure limiter override. G 1/4"-12.5 DEEP

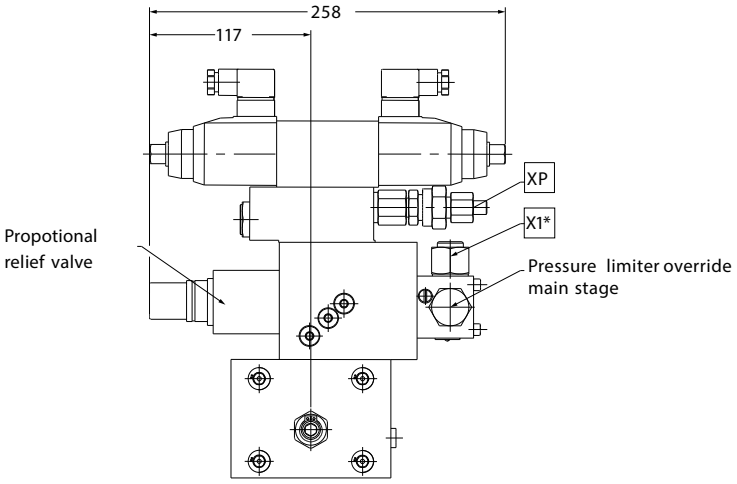
...* Connection with plug.

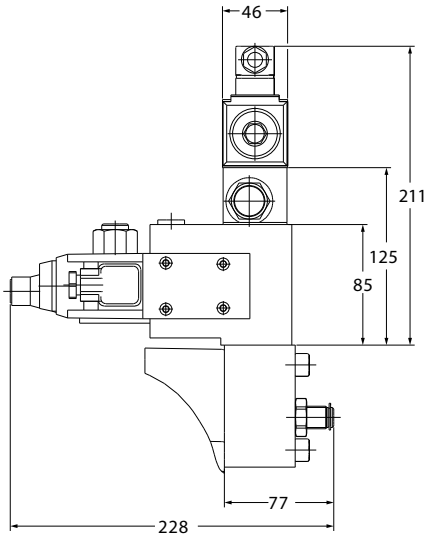



| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure limiter override |
| **1** | – | Basic pump |
| **2** | – | Connection plate |
| **3** | – | Connection plate for ST-control |
| **4** | – | Pressure limiter override main stage |
| **5** | – | Proportionalrelief valve |
| **6** | – | Proportional control valve |

# Control Options ST
# STC03A4K_ _ _ _C



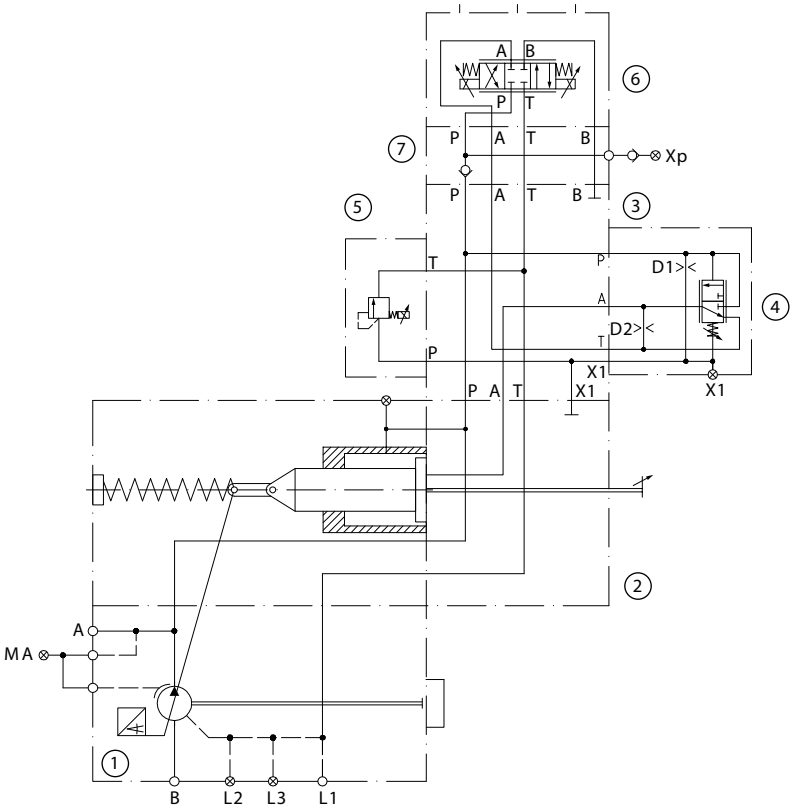



XP External pilot pressure (option VIA no retun valve) 10L ACC. DIN EN ISO 8434-1

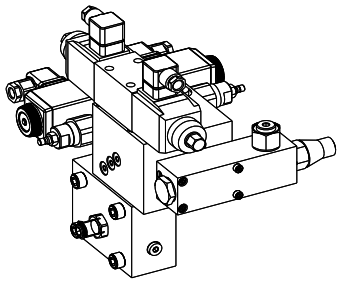
X1 Remote port pressure limiter override. G 1/4"-12.5 Deep

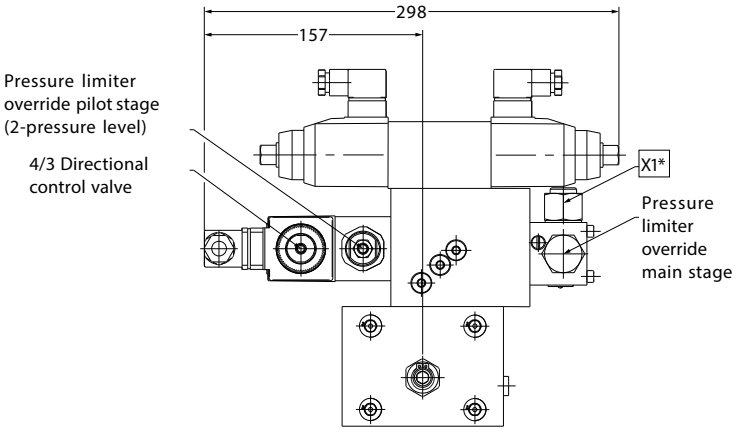
...* Connection with plug.

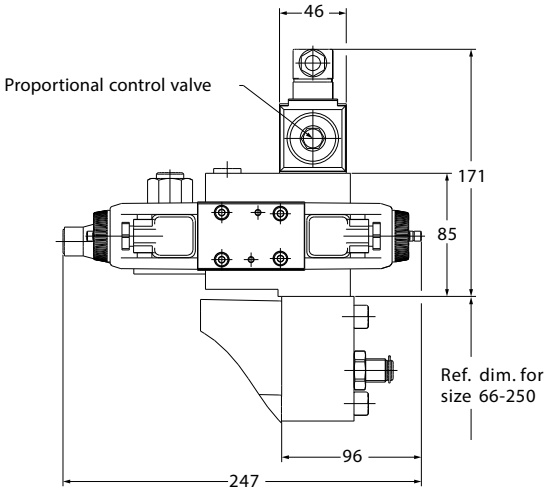



| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure limiter override |
| **XP** | – | External pilot pressure |
| **1** | – | Basic pump |
| **2** | – | Connection plate |
| **3** | – | Connection plate for ST-control |
| **4** | – | Pressure limiter override main stage |
| **5** | – | Proportionalrelief valve |
| **6** | – | Proportional control valve |
| **7** | – | Adaptor block for pilot oil option |

# Control Options ST
# STC03A4B

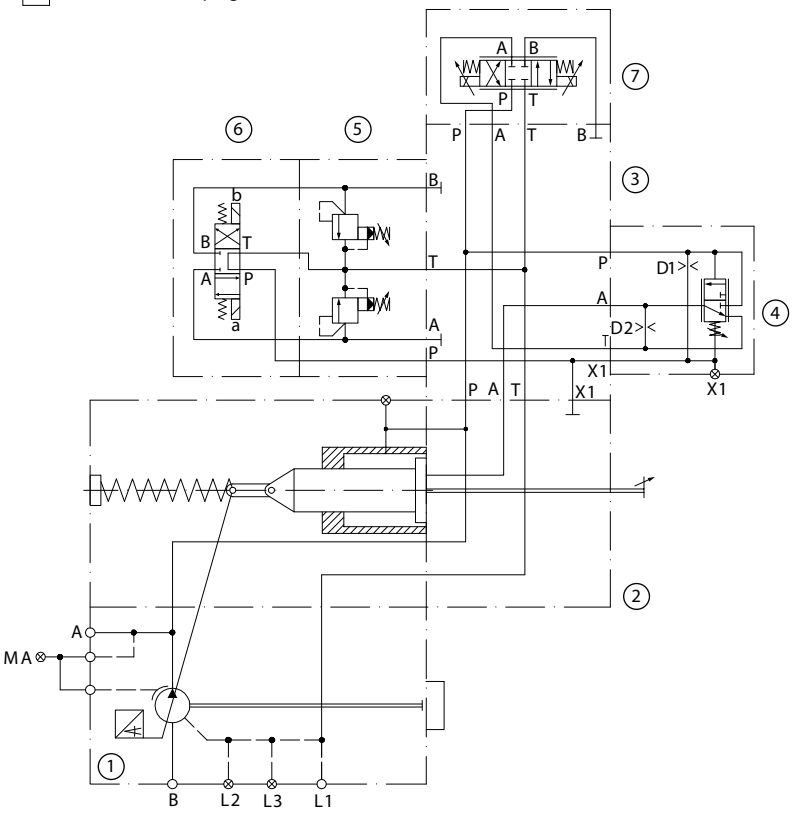




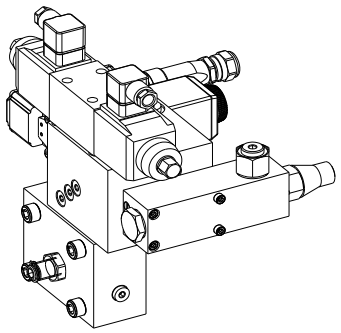

X1 Remote port pressure limiter override. G 1/4"-12.5 DEEP

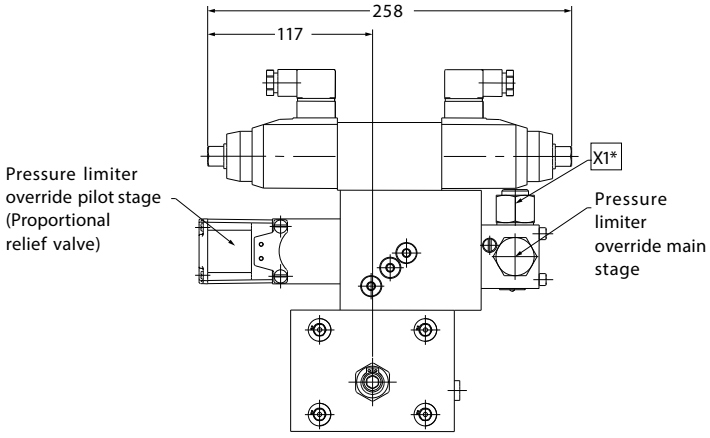
...* Connection with plug.

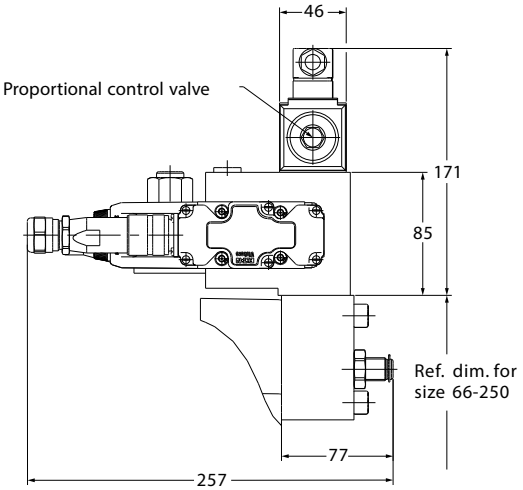



| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Systemport |
| **L1, L2** | – | Drain port |
| **L3, L2** | – | Drain port plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote pressure limiter override |
| **1** | – | Basic pump |
| **2** | – | Basic section plate |
| **3** | – | Connection plate for ST-control |
| **4** | – | Connection plate for limiter override main stage |
| **4** | – | Pressure limiter |
| **5** | – | Pressure limiter override pilot stage (Duel relief function) |
| **6** | – | 4/3 Directional control valve |
| **7** | – | Proportional control valve |
| **7** | – | Proportional control valve |

# Control Options ST
# STC03A4L

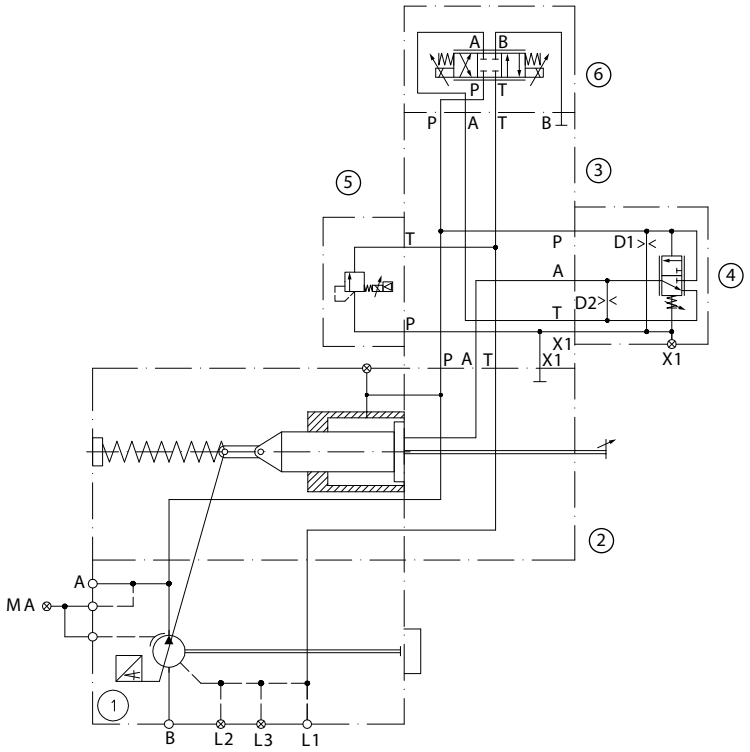




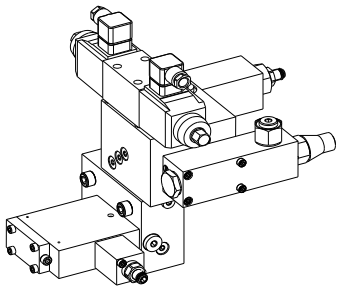

X1 Remote port pressure limiter override. G 1/4"-12.5 DEEP

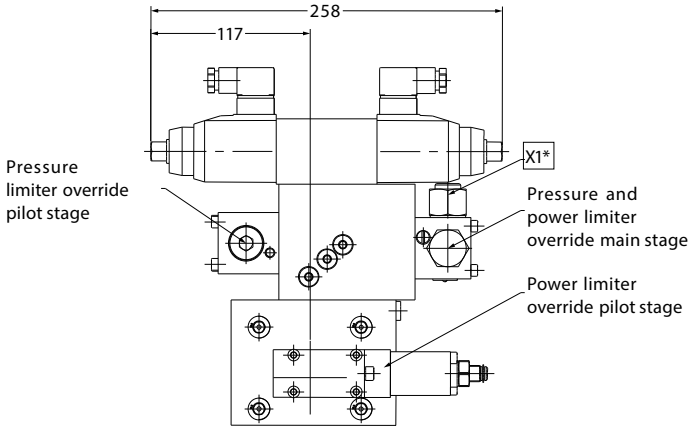
...* Connection with plug.

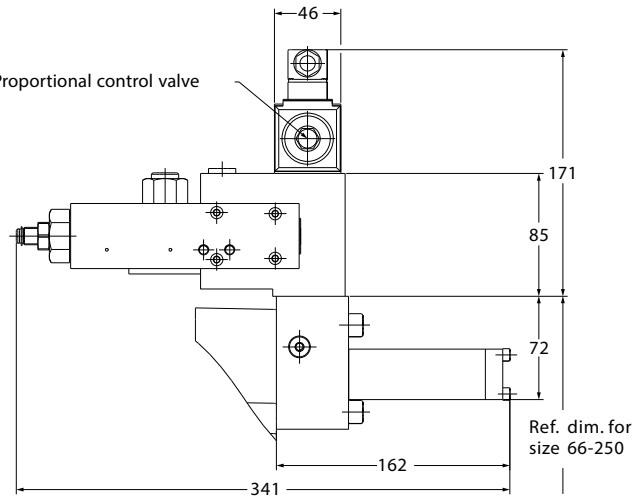



| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure limiter override |
| **1** | – | Basic pump |
| **2** | – | Connection plate |
| **3** | – | Connectionplate for ST-control |
| **4** | – | Pressure limiter override main stage |
| **5** | – | Pressure limiter override pilot stage (Proportional relief valve + OBE) |
| **6** | – | Proportional control valve |

# Control Options ST
# STC03A50

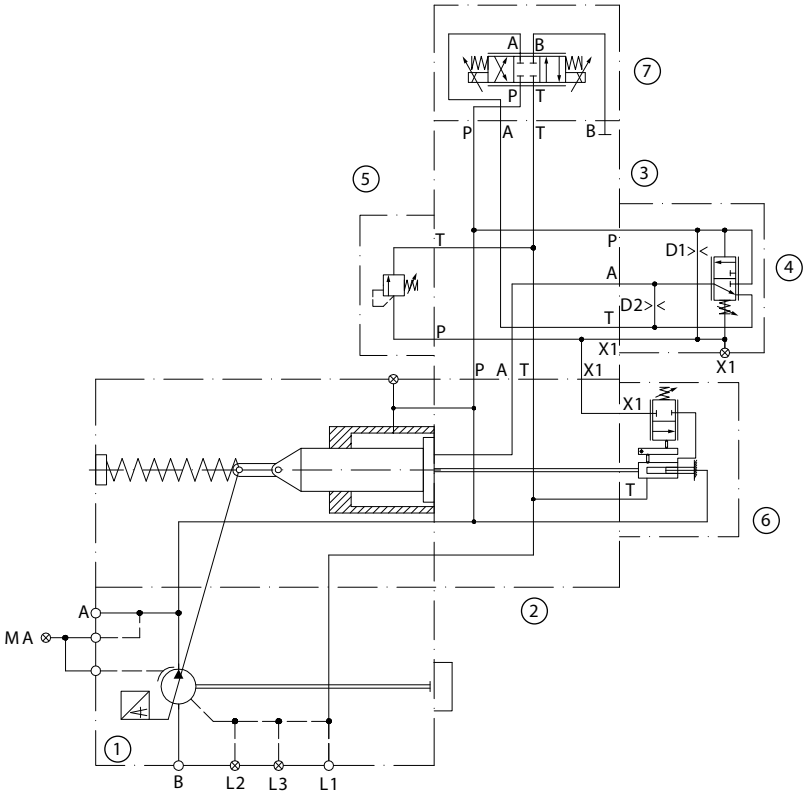




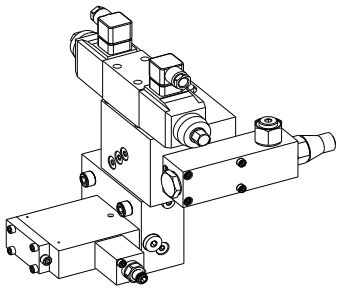

X1 Remote port pressure limiter override. G 1/4"-12.5 DEEP

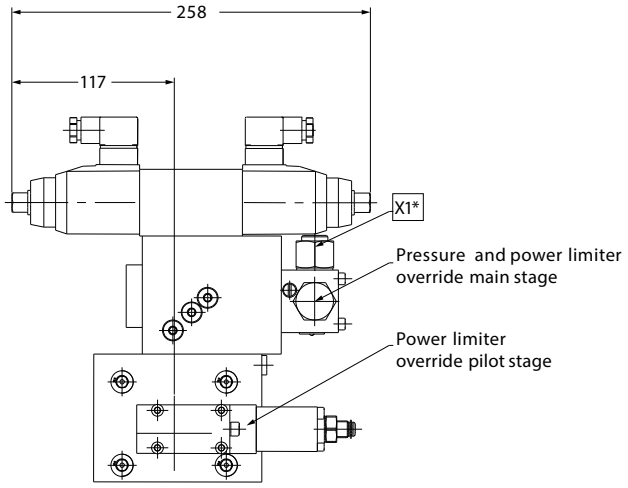
...* Connection with plug.




| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure limiter override |
| **1** | – | Basic pump |
| **2** | – | Connection plate |
| **3** | – | Connection plate for ST-control |
| **4** | – | Pressure and power limiter override main stage |
| **5** | – | Pressure limiter override pilot stage |
| **6** | – | Power limiter override pilot stage |
| **7** | – | Proportional control valve |

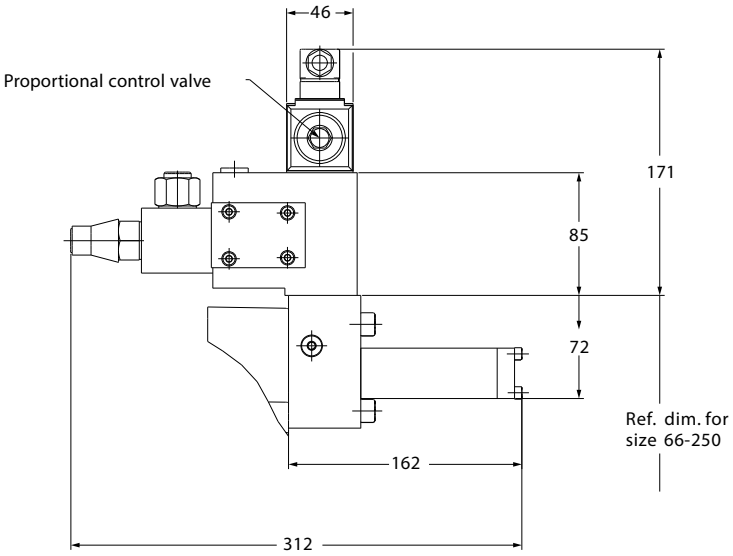
# Control Options ST
# STC03A5F

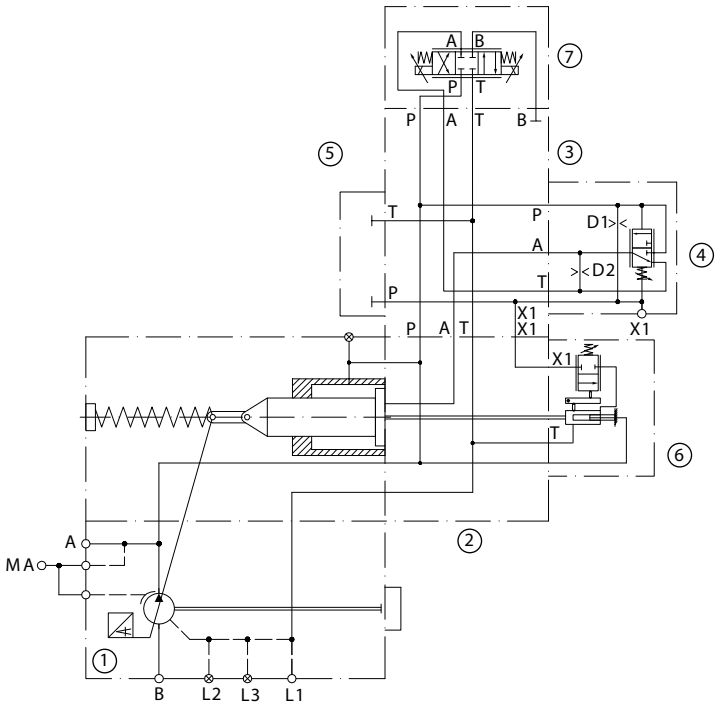





X1 Remote port pressure limiter override. G 1/4"-12.5 DEEP

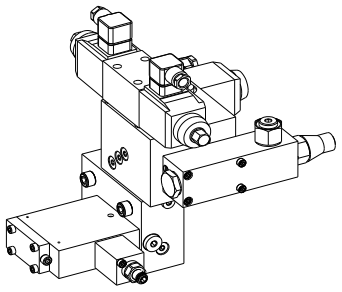
...* Connection with plug.

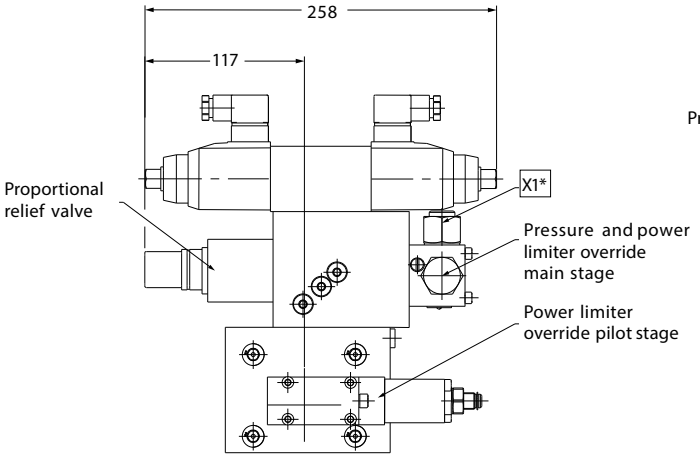


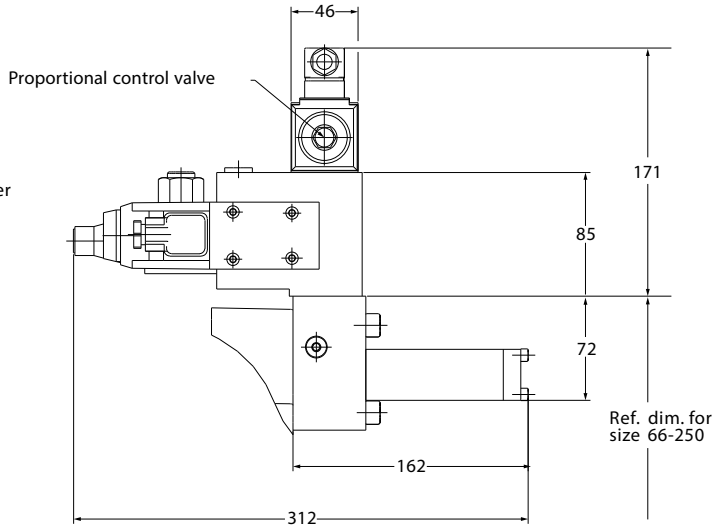




| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure limiter override |
| **1** | – | Basic pump |
| **2** | – | Connection plate |
| **3** | – | Connectionplate for ST-control |
| **4** | – | Pressure and power limiter override main stage |
| **5** | – | Closing plate |
| **6** | – | Power limiter override pilot stage |
| **7** | – | Proportional control valve |

# Control Options ST
# STC03A5K

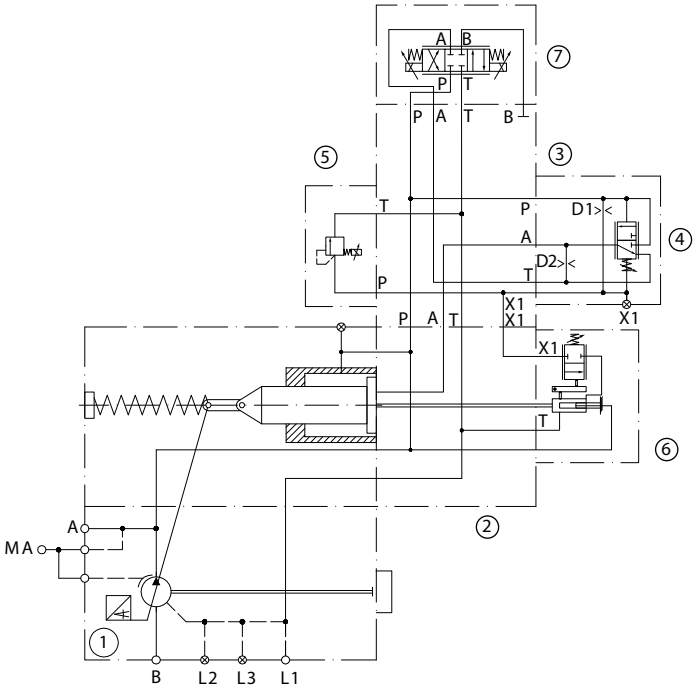




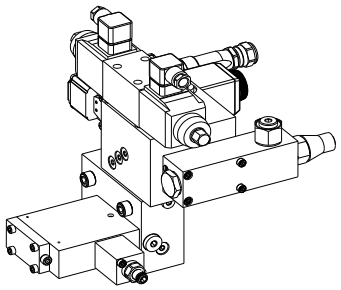

X1 Remote port pressure limiter override. G 1/4"-12.5 DEEP

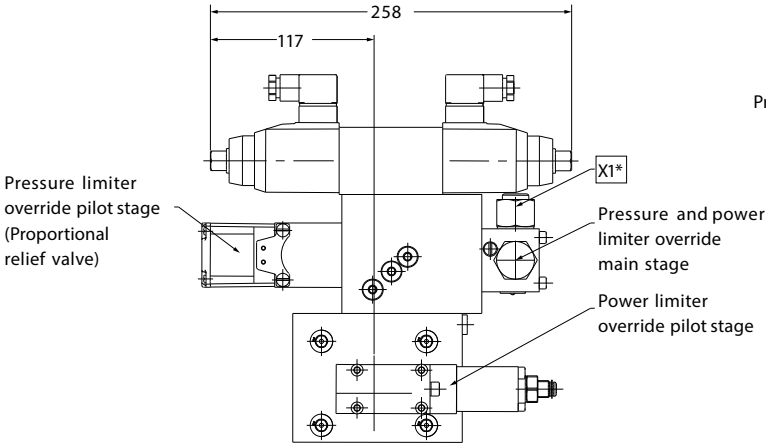
...* Connection with plug.

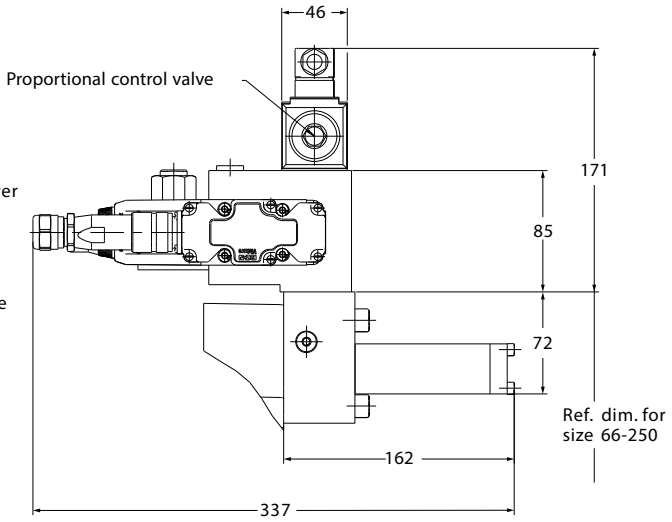



| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure limiter override |
| **1** | – | Basic pump |
| **2** | – | Connection plate |
| **3** | – | Connection plate for ST-control |
| **4** | – | Pressure and power limiter override main stage |
| **5** | – | Proportionalrelief valve |
| **6** | – | Power limiter override pilot stage |
| **7** | – | Proportional control valve |

# Control Options ST
# STC03A5L

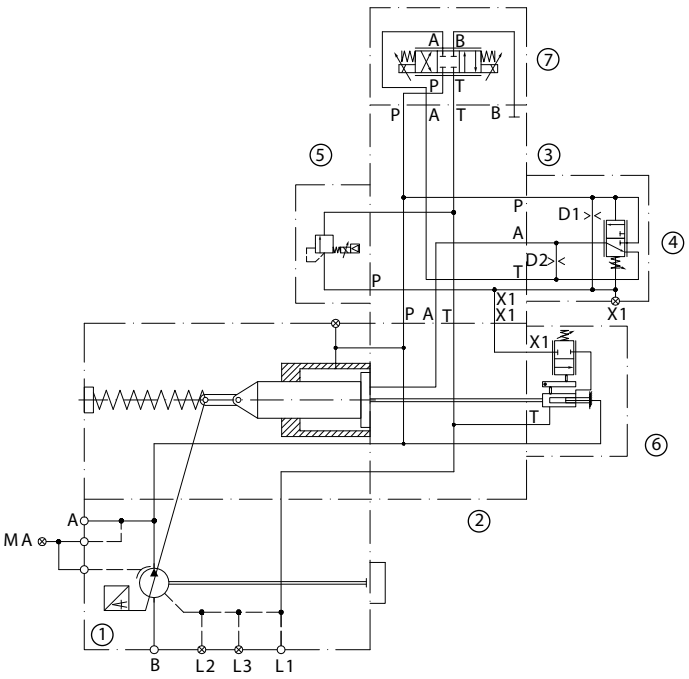





X1 Remote port pressure limiter override. G 1/4"-12.5 DEEP

...* Connection with plug.

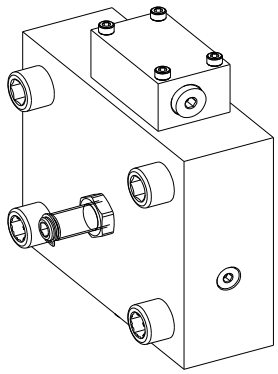



| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **X1** | – | Remote port pressure limiter override |
| **1** | – | Basic pump |
| **2** | – | Connection plate |
| **3** | – | Connectionplate for ST-control |
| **4** | – | Pressure and powerlimiter override main stage |
| **5** | – | Pressure limiter override pilot stage (Proportionalrelief valve + OBE) |
| **6** | – | Power limiter override pilot stage |
| **7** | – | Proportional control valve |

# Control Options FM

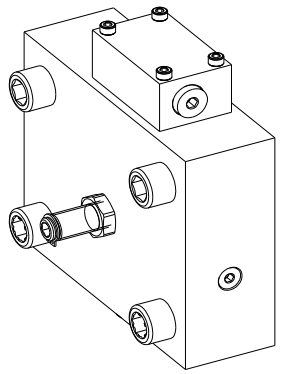
**General Description**

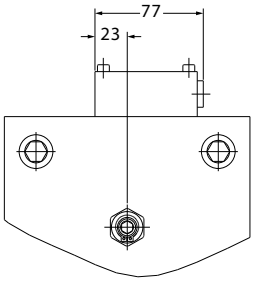
**FM** The FM - control is a displacement control where the pump flow can be manually adjusted by a screw. The maximum (and/or minimum) flow can be limited by a spacer inside the control cylinder (position number 13 in model coding, options **4, 5** or **6** in combination with customer adjustment specifications position **40-43** for the set values). The setting must be defined before ordering and cannot be modified during operation. FM-control is replacing old-style FE and HG control. Please be aware that adjustment of screw is only possible with load pressure below ca. 30 bar.

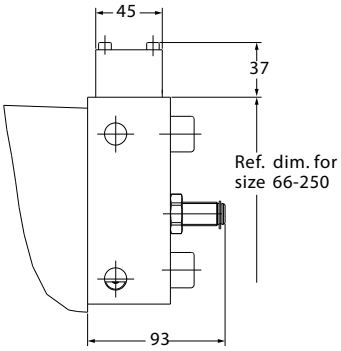


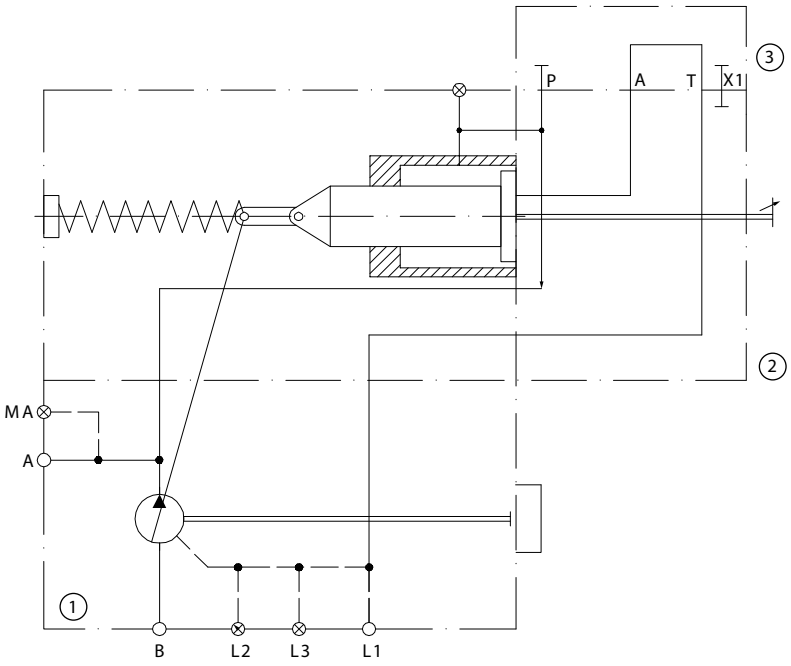
**FM000A0**

# Control Options FM
# FM000A0





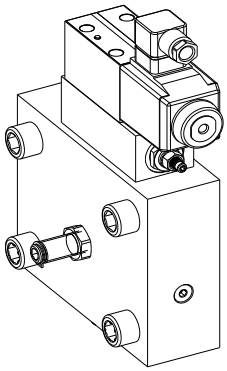




| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **1** | – | Basic pump |
| **2** | – | Connection plate for FM-control |
| **3** | – | Adaptor plate |

# Control Options ZP

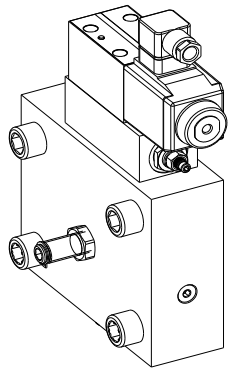
**General Description**

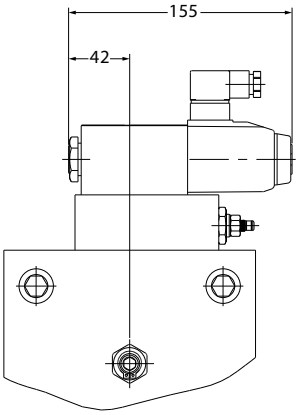
**ZP** The ZP-control is a dual-displacement control where the pump flow can be adjusted to two different positions by a solenoid valve. The maximum (and/or minimum) flow can be limited by a spacer inside the control cylinder (position number 13 in model coding, options **4**, **5** or **6** in combination with customer adjustment specifications position **40-43** for the set values). The setting must be defined before ordering and cannot be modified during operation. Standard setting will be max. displacement (with solenoid de-energized), and 50% of displacement with solenoid activated. Other adjustments need to be defined by customer adjustment specification code.

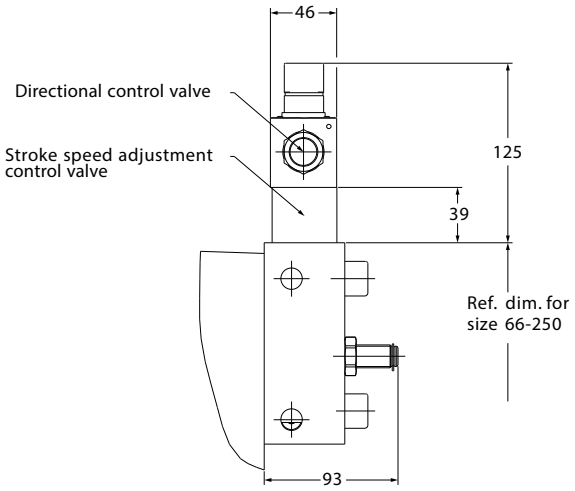


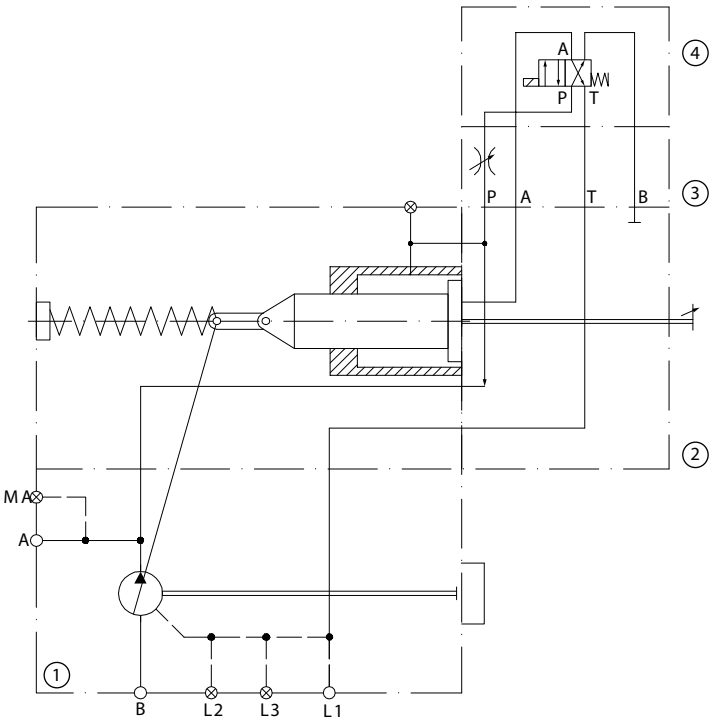
**ZP100A0**

# Control Options ZP
# ZP100A0






| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| | | |
| **1** | – | Basic pump |
| **2** | – | Connection plate for ZP-control |
| **3** | – | Stroke speed adjustment control valve |
| **4** | – | Directional control valve |

# Control Options SP

**General Description**

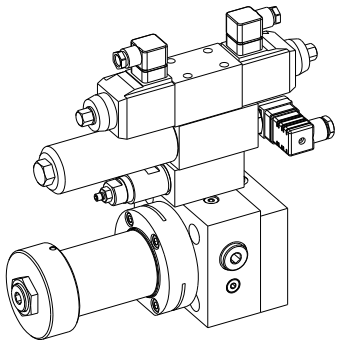
The energy-saving electrohydraulic displacement control type **SP** efficiently adjusts pump output by acting on the swashplate within electrically adjustable limits. The swashplate angle value is fed back to the controller unit via an electrical closed loop system.

A proportional valve and servo piston use the controller output signal to apply the required setting, resulting in a highly accurate dynamic control system.

Hysteresis is approximately 1% of end value. The SP control can also be combined with hydromechanical relief valves for pressure control.

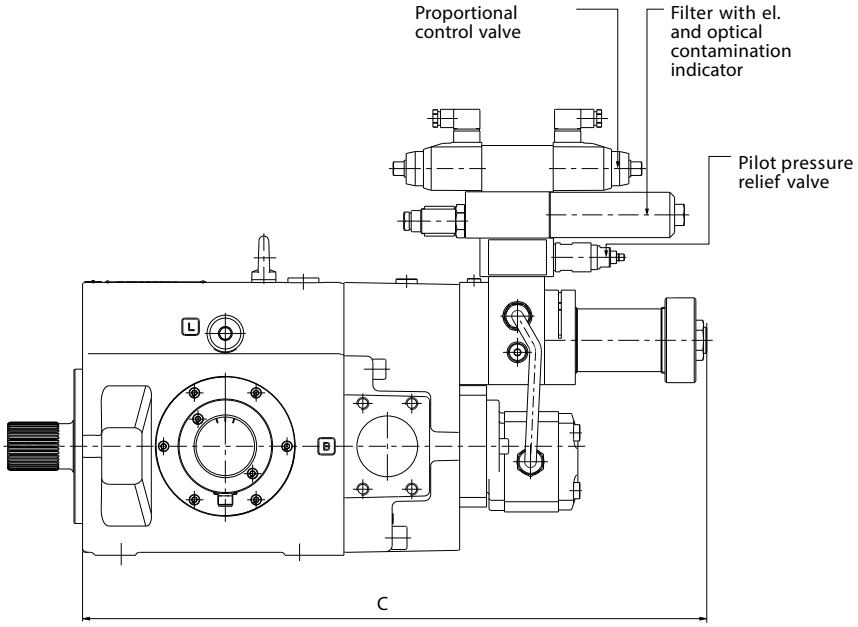
As an additional option, maximum (or minimum) flow can be set by a spacer inside the control cylinder (Model Code position 13 , options **4**, **5** or **6**, in combination with customer adjustment specified in positions 40 to 43 ).

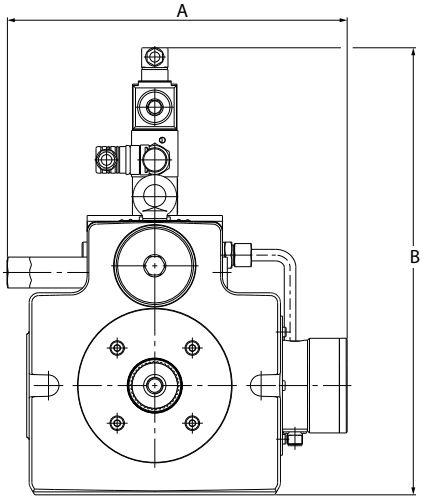
This solution is recommended for severe operating conditions and the need for high repeatability over a long period of time. The setting must be defined before ordering since it cannot be modified in operation..



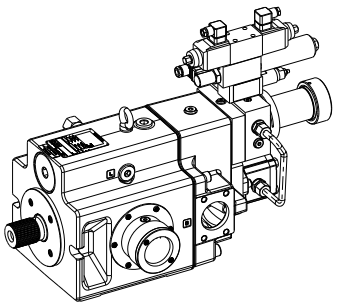
**SPC03A**

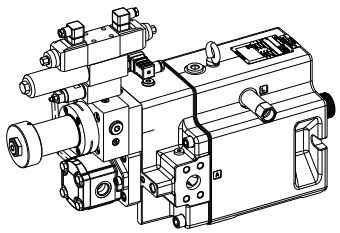
| | A | B | C |
|---|---|---|---|
| 066 | 291 | 407 | 501 |
| 090 | 291 | 407 | 501 |
| 130 | 352 | 463 | 647 |
| 180 | 352 | 463 | 647 |
| 250 | 217 | 534 | 813 |

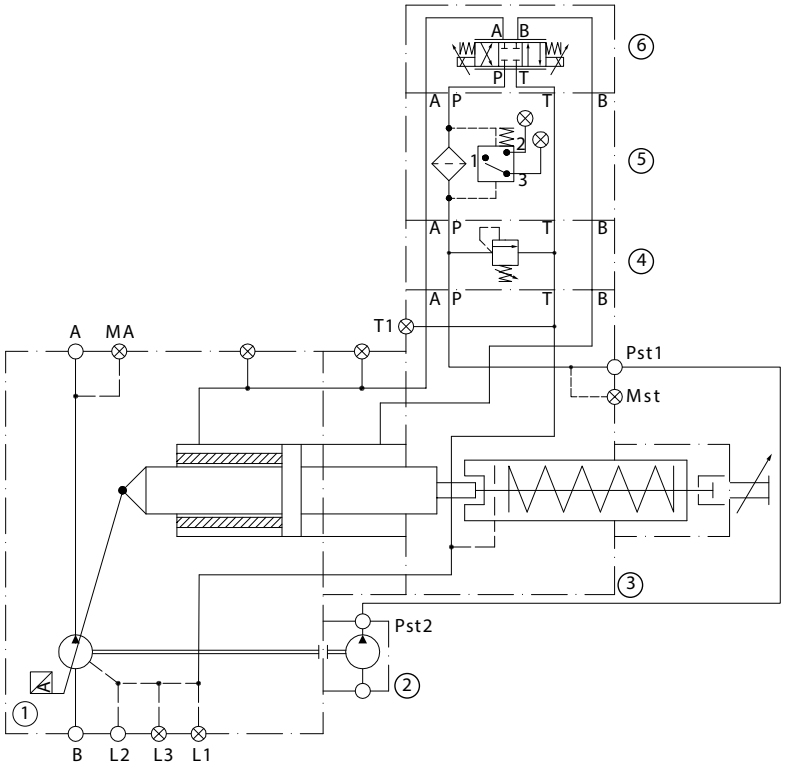


# Control Options SP
# SPC03A








| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **Pst1** | – | Ports for pilot pump |
| **Pst2** | – | Pilot pumpoutlet port |
| **Mst** | – | Gauge port-pilot pressure |
| **T1** | – | Return line of control circuit (optional) |
| **S** | – | Inlet of pilot pump |
| **1** | – | Basic pump |
| **2** | – | Pilot pump |
| **3** | – | Connectionplate for SP-control |
| **4** | – | Pilot pressure relief valve |
| **5** | – | Pilot oil filter |
| **6** | – | Proportional control valve |

# Control Options ES

Available to special order only.

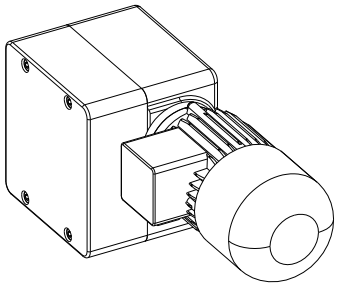
**General Description**

This unit is used for flow adjustment. It has a 3-phase electric servo-motor, worm-gear and a switchbox with 4 or (optional) 8 limit switches for different positions.

A potentiometer for stepless adjustment and/or position monitoring is also available. Response times from zero to maximum depend on the ratio selected and on the (fixed) speed of the servo-motor,

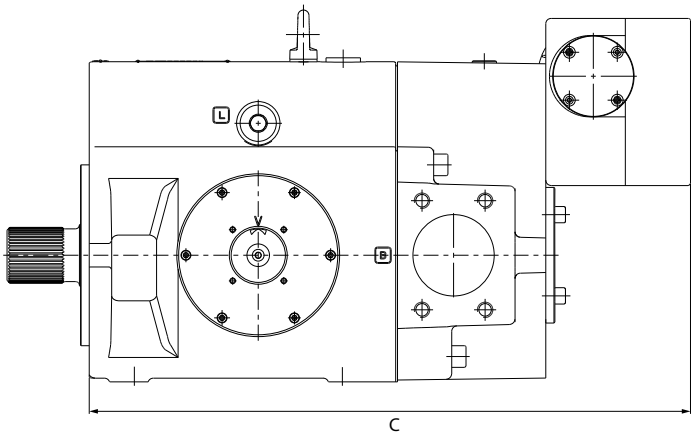
with the result that once the control is specified and built, response time are not variable in operation. Explosion Protection versions are also available.

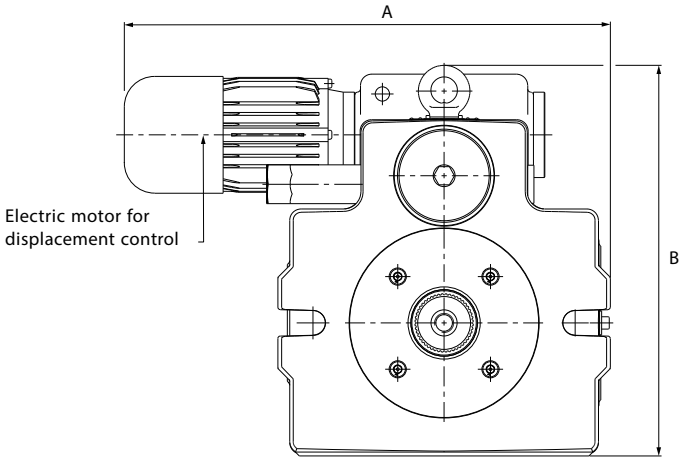
No Pressure/Power Limiter possible!



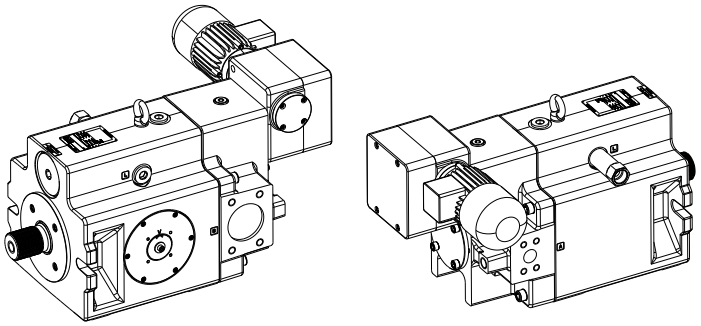
**ESN00A00**

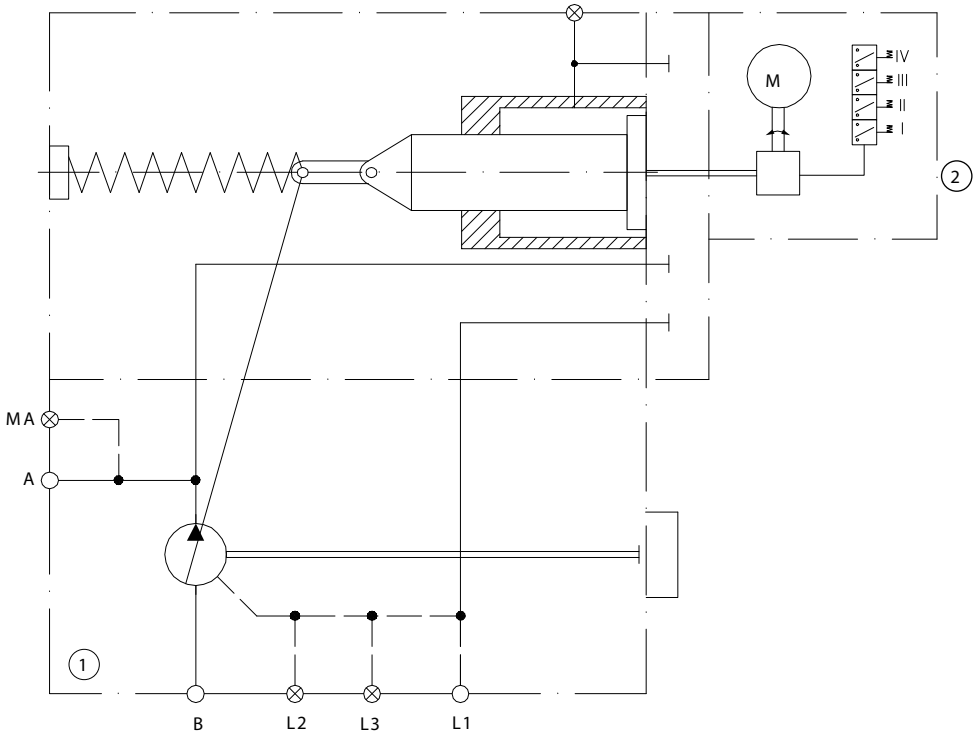
| | A | B | C |
|---|---|---|---|
| 066 | 291 | 407 | 501 |
| 090 | 291 | 407 | 501 |
| 130 | 352 | 463 | 647 |
| 180 | 352 | 463 | 647 |
| 250 | 217 | 534 | 813 |



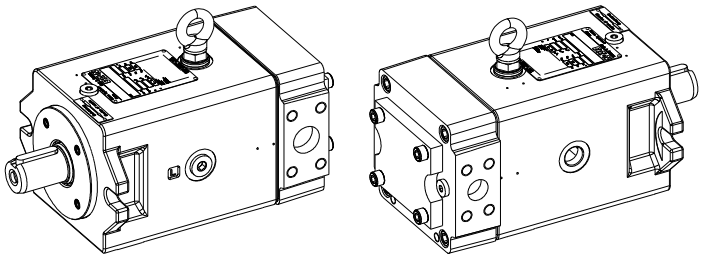
# Control Options ES
# ESN00A00



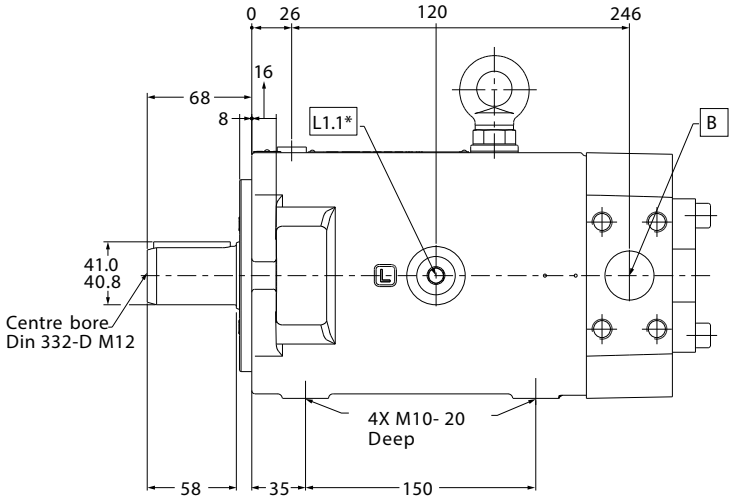


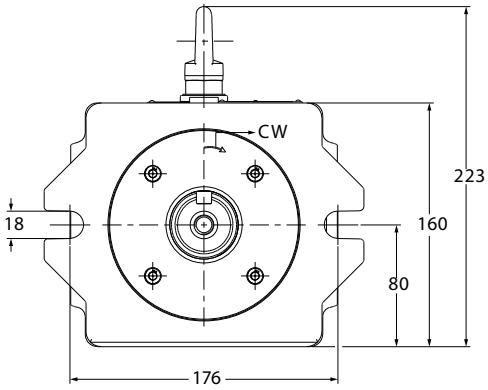

| | | |
|---|---|---|
| **A** | – | Systemport |
| **B** | – | Inlet port |
| **L1, L2** | – | Drain port |
| **L3** | – | Oil filling plug |
| **MA** | – | Gauge port-systempressure |
| **1** | – | Basic pump |
| **2** | – | Electric motorand limit switch for ES-control |

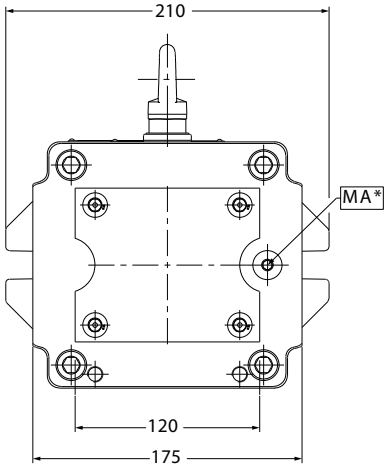
# General Dimensions
# PFXS-066

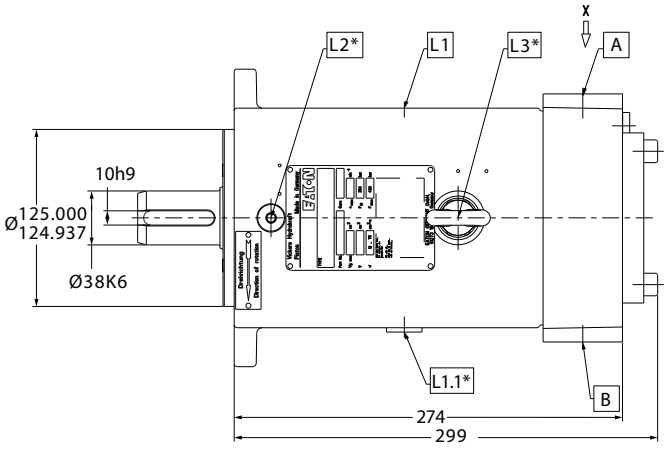


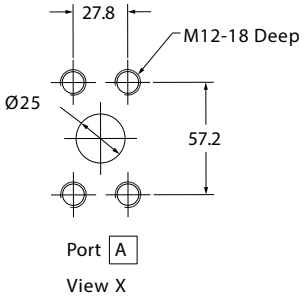
Options illustrated:
12 = **R** (Clockwise rotation)
14 15 = **00** (No thru drive)
18 19 = **01** (ISO keyed shaft)
22 = **0** (No yoke position indicator)
24 25 = **00** (Without control)

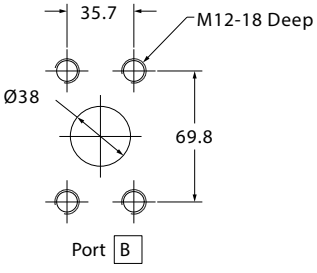


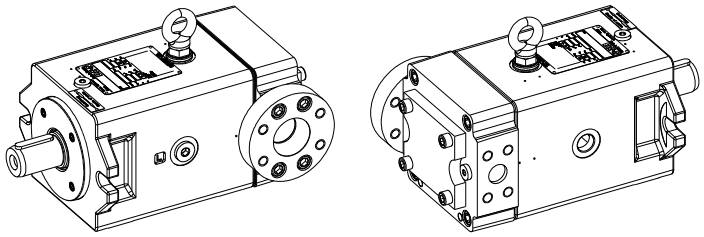



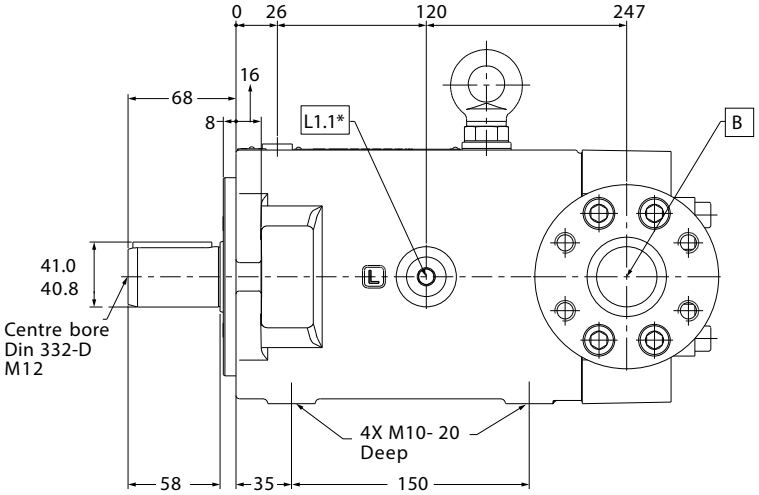



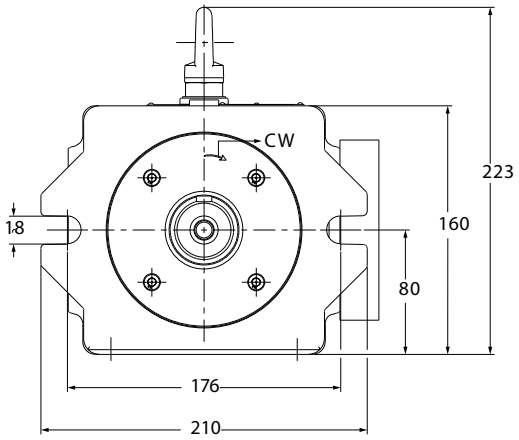

**A** – Systempressure port ISO 6162-2 P25M (SAE J518 CODE62-1" - 6000 PSI)
**B** – Inlet port ISO 6162-1 P38M (SAE J518 CODE61 - 1 1/2" 500 PSI)
**L1** – Drain port M26 x 1.5 (According to mounting position use upper port)
**L1.1** – Drain port 7/8"-14 UNF (According to mounting position use upper port)
**L2** – Ventilation port for vertical mounting G 1/4"- (Shaft upward)
**L3** – Oil filling plug M26 x 1.5
**MA** – Gauge port system pressure G 1/4"
**...*** – Connection with plug

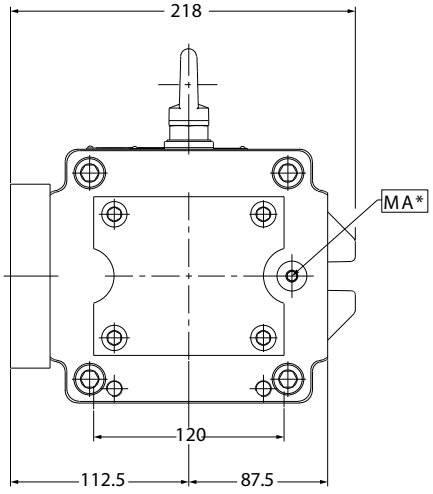
# General Dimensions
# PFXS-090

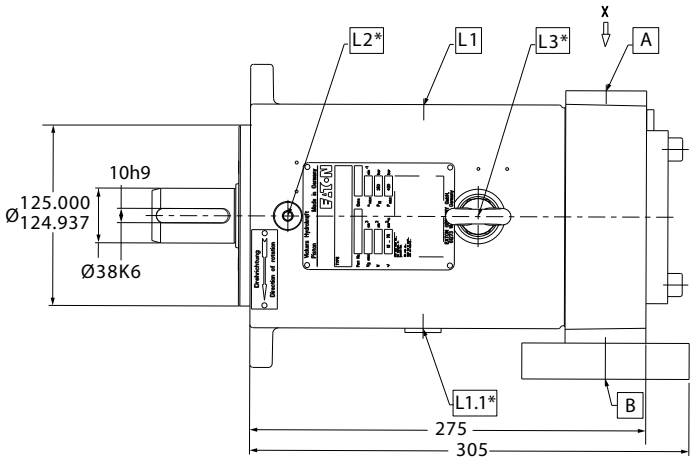


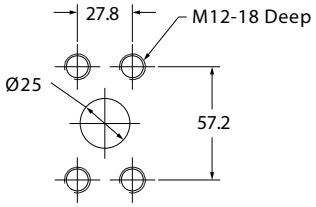
Options illustrated:
12 = **R** (Clockwise rotation)
14 15 = **00** (No thru drive)
18 = **01** (ISO keyed shaft)
22 = **0** (No yoke position indicator)
24 25 = **00** (Without control)



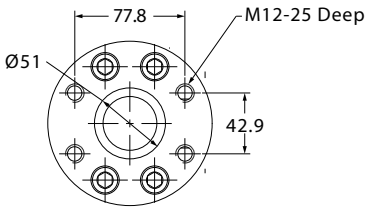



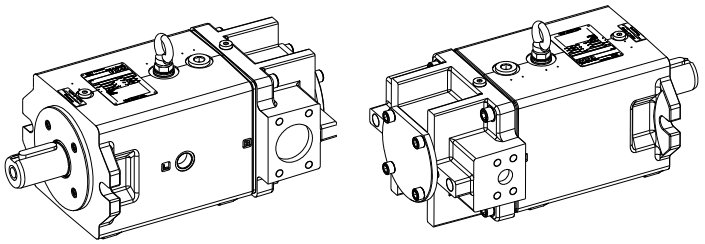

Port A
View X



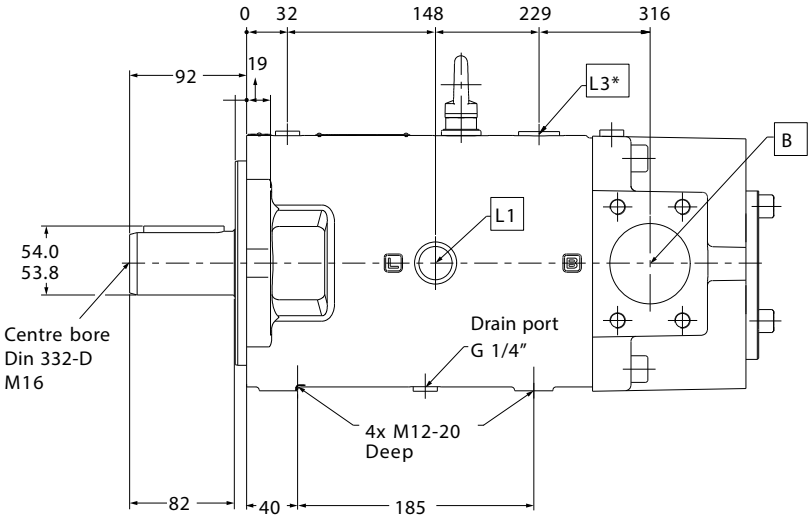

Port B

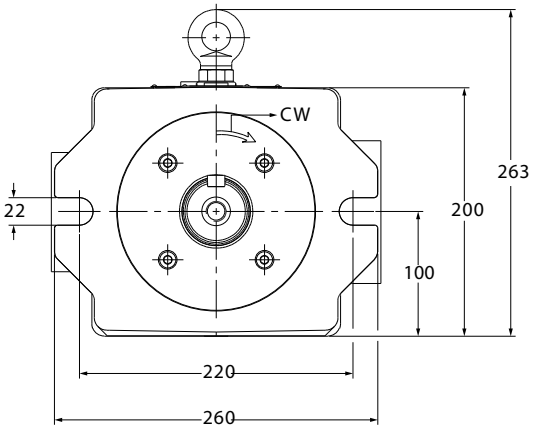
| | | |
|---|---|---|
| **A** | – | System pressure port ISO 6162-2 P25M (SAE J518 CODE 62 - 1" - 6000 PSI) |
| **B** | – | Inlet port ISO 6162-1 P51M (SAE J518 CODE 61 - 2 - 500PSI |
| **L1** | – | Drain port M26x1.5 (According to mounting position use upper port) |
| **L1.1** | – | Drain port 7/8"-14 UNF (According to mounting position use upper port) |
| **L2** | – | Ventilation port for vertical mounting G 1/4"- (Shaft upward) |
| **L3** | – | Oil filling plug M26 x 1.5 |
| **MA** | – | Gauge port system pressure G 1/4" |
| **...*** | – | Connection with plug |

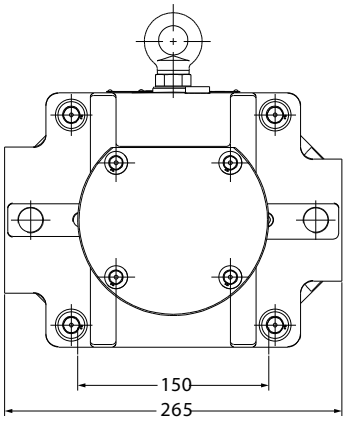
# General Dimensions
# PFXS-130

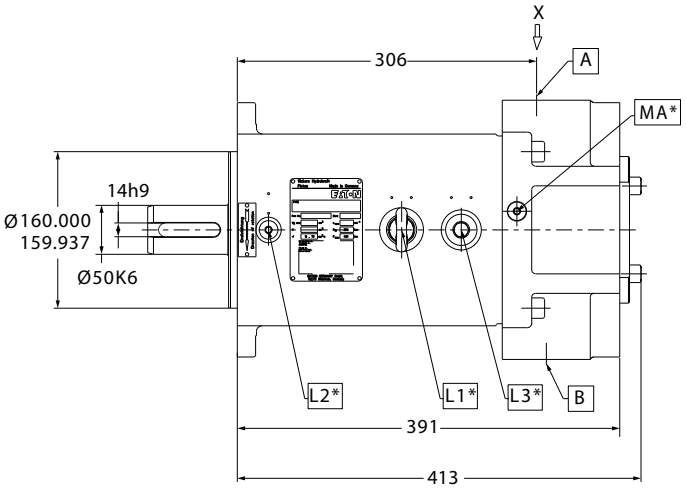


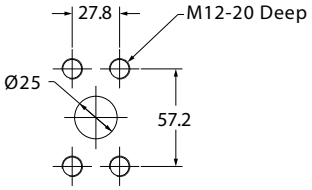
Options illustrated:
12 = **R** (Clockwise rotation)
14 15 = **00** (No thru drive)
18 = **01** (ISO keyed shaft)
22 = **0** (No yoke position indicator)
24 25 = **00** (Without control)



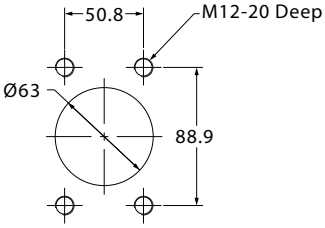



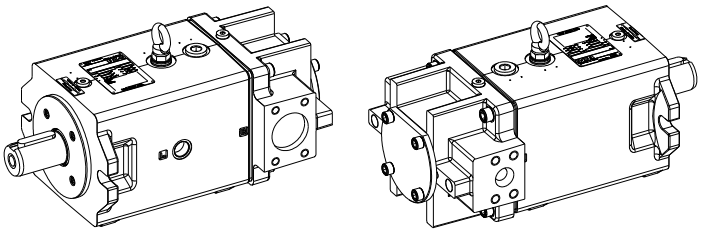

Port A
View X



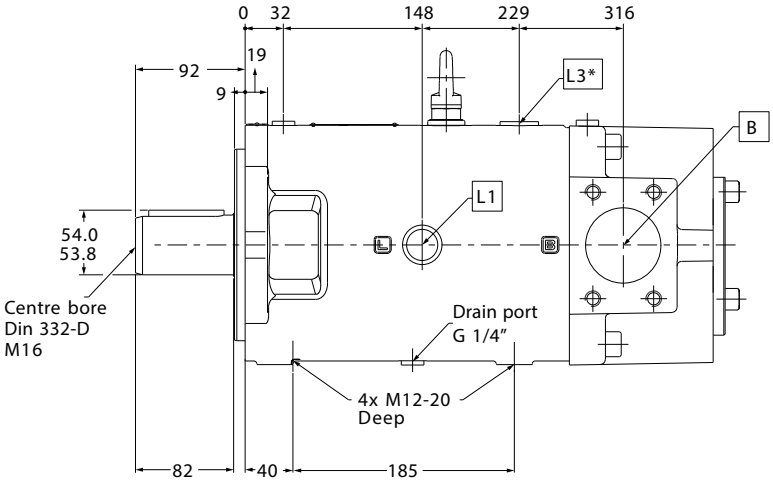

Port B

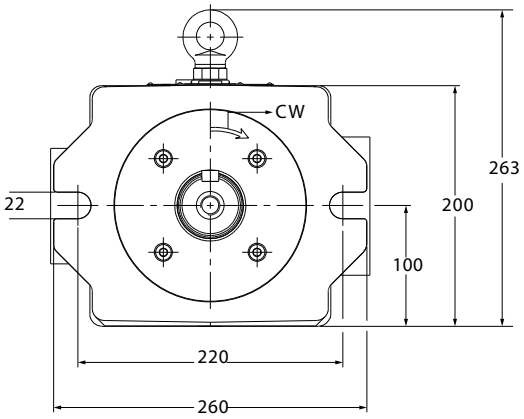
| | | |
|---|---|---|
| **A** | – | System pressure port ISO 6162-2 P25M (SAE J518 CODE62-1" - 6000 PSI) |
| **B** | – | Inlet port ISO 6162-1 P64M (SAE J518 CODE61 - 2 1/2" 500 PSI) |
| **L1** | – | Drain port M26 x 1.5 (According to mounting position use upper port) |
| **L2** | – | Ventilation port for vertical mounting G 1/4"-(Shaft upward) |
| **L3** | – | Oil filling plug 1 1/6"-12UNF |
| **MA** | – | Gauge port system pressure G 1/4" |
| **...*** | – | Connection with plug |

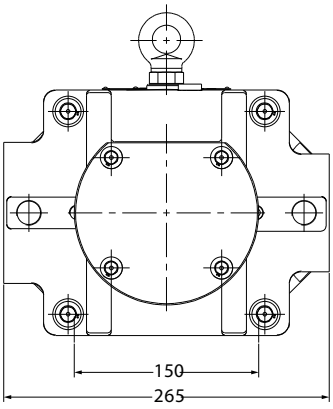
# General Dimensions
# PFXS-180

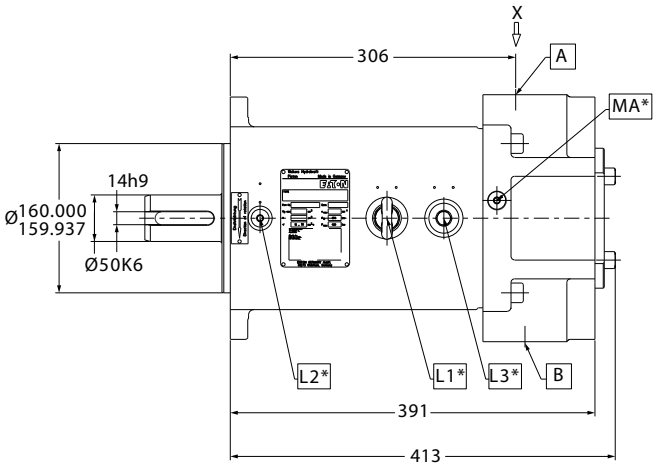


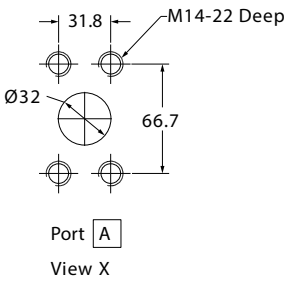
Options illustrated:
12 = **R** (Clockwise rotation)
14 15 = **00** (No thru drive)
18 = **01** (ISO keyed shaft)
22 = **0** (No yoke position indicator)
24 25 = **00** (Without control)

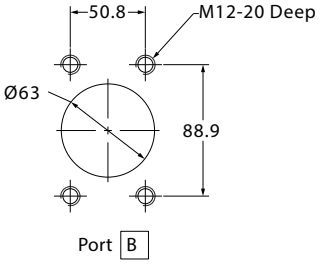


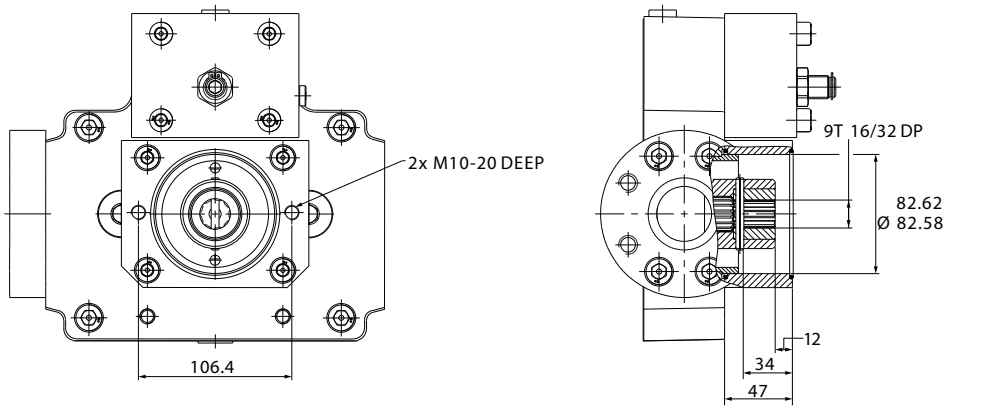

| | | |
|---|---|---|
| **A** | – | System pressure port ISO 6162-2 P32M (SAE J518 CODE62 - 1 1/4" - 6000 PSI) |
| **B** | – | Inlet port ISO 6162-1 P64M (SAE J518 CODE61 - 2 1/2" 500 PSI) |
| **L1** | – | Drain port M26 x 1.5 (According to mounting position use upper port) |
| **L2** | – | Ventilation port for vertical mounting G 1/4"- (Shaft upward) |
| **L3** | – | Oil filling 1 1/16"- 12 UNF |
| **MA** | – | Gauge port system pressure G 1/4" |
| **...*** | – | Connection with plug |

# Thru-Drive Options
# 060 and 090 Series

All thru-drives accept DIN ISO 3019-2 (SAE J744) mounting interface.
Other thru-drive interfaces available on request.
For basic pump details, see general Installation Dimensions.

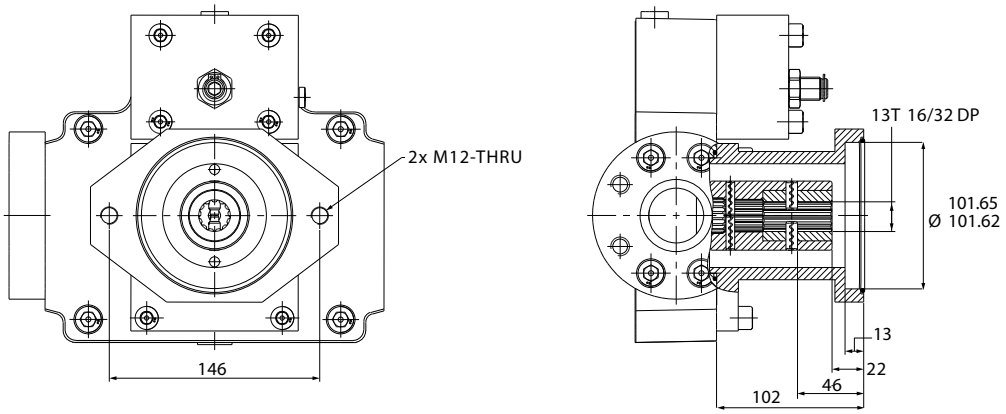
Option illustrated:

14 15 = **0A** (SAE A)



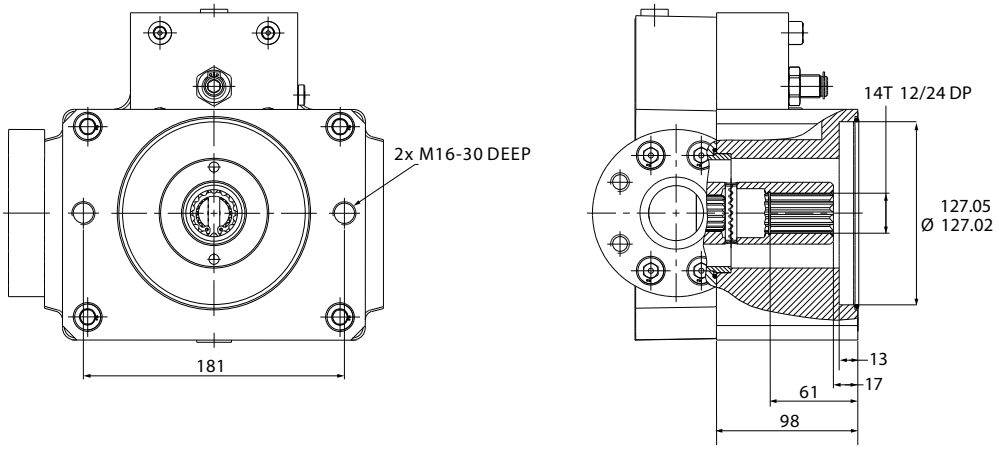

Option illustrated:

14 15 = **0B** (SAE B)




Option illustrated:

14 15 = **0C** (SAE C)

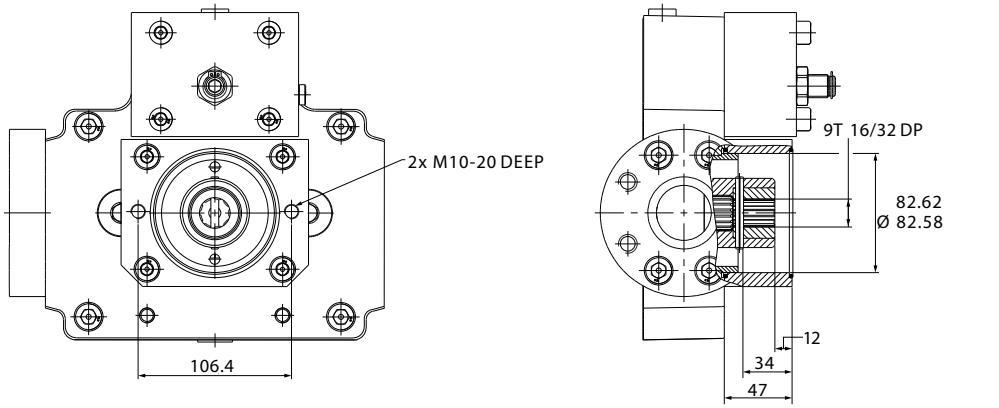


# Thru-Drive Options
# 130 and 180 Series

All thru-drives accept DIN ISO 3019-2 (SAE J744) mounting interface.
Other thru-drive interfaces available on request.
For basic pump details, see general Installation Dimensions.

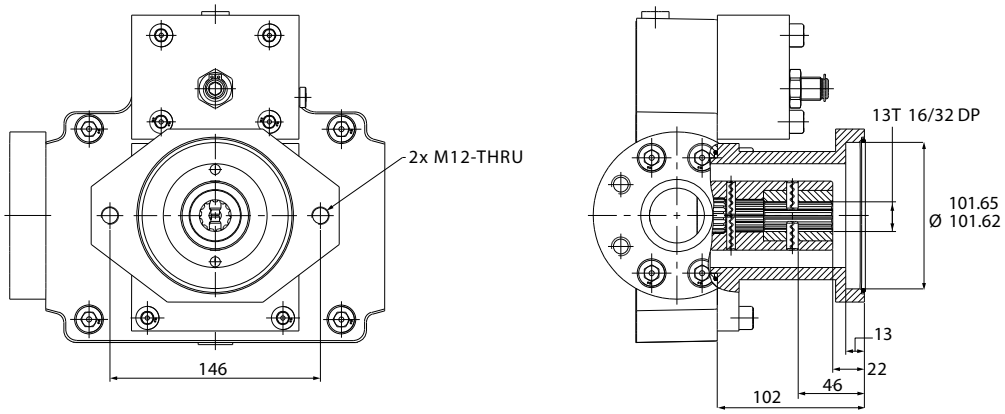
Option illustrated:

14 15 = **0A** (SAE A)



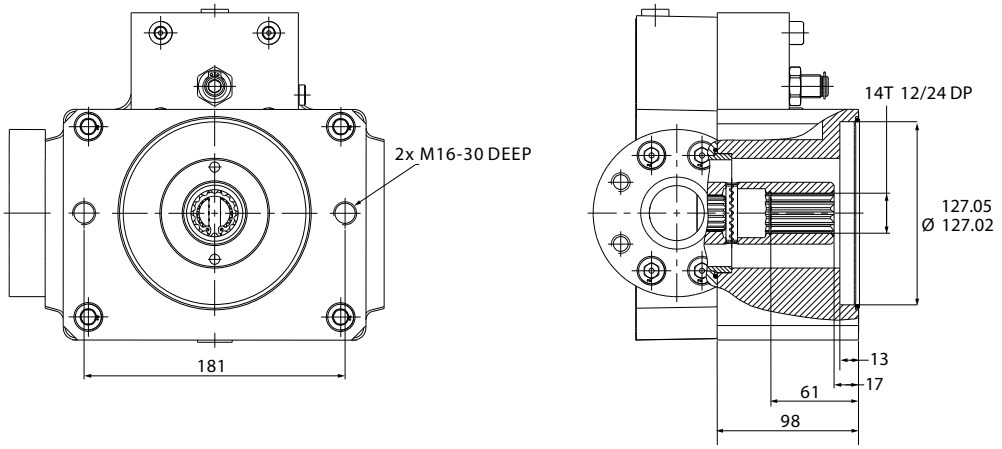

Option illustrated:

14 15 = **0B** (SAE B)




Option illustrated:

14 15 = **0C** (SAE C)

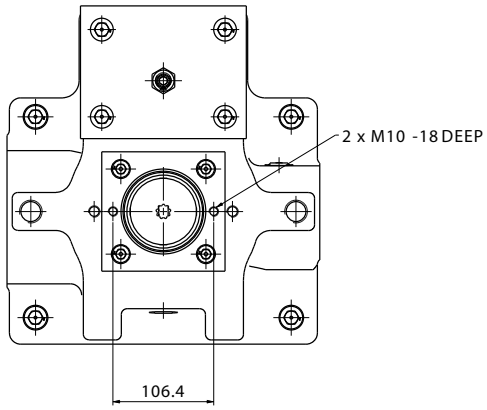


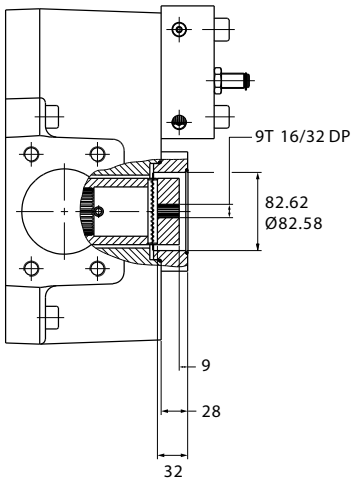
# Thru-Drive Options
# 250 Series

All thru-drives accept DIN ISO 3019-2 (SAE J744) mountinginterface.
Otherthru-drive interfaces available on request.
For basic pumpdetails, see general Installation Dimensions.

Option illustrated:

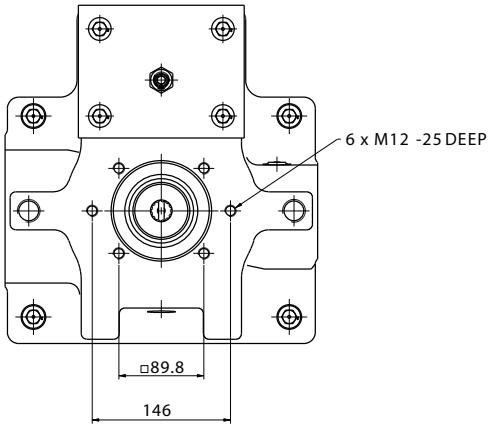
14 15 = **0A** (SAE A)

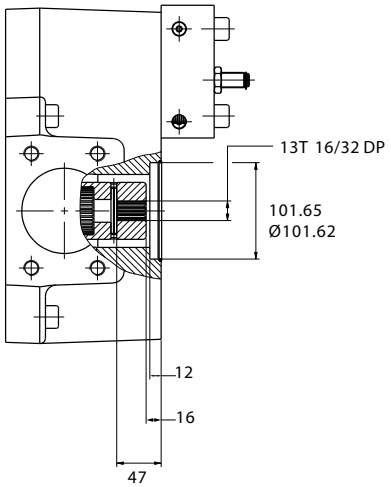



Option illustrated:

14 15 = **0B** (SAE B)



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