

# High-pressure load-sensing control block in sandwich plate design M4-22



- ▶ Applications: Crane, drilling rigs, forestry machinery, other construction machinery
- ▶ Sandwich plate design with up to 8 directional valve sections
- ▶ Size 22, series 1X
- ▶ Nominal pressure
  - on the pump side 350 bar
  - on the consumer side 420 bar
- ▶ Maximum flow
  - on the pump side: 500 l/min (inlet), 600 l/min (with **P1** and **P2** port)
  - on the consumer side: 400 l/min

## Features

- ▶ Flow control independent on load pressure
  - Open center for fixed pump
  - Closed center for variable pump
- ▶ Type of actuation: mechanical, hydraulic, electro-hydraulic (switching, proportional)
- ▶ Flow
  - Load pressure-compensated
  - High repetition accuracy
  - Low hysteresis
  - Adjustable via stroke limiter
- ▶ Pressure limitation
  - Inlet plate:
    - Pilot operated pressure valves with large nominal width
  - Directional valves / consumer ports:
    - Compact pressure valves with feed function
- ▶ LS pressure relief
  - Adjustable per consumer port
  - External pressure setting per consumer port possible

## Contents

|                        |    |
|------------------------|----|
| Functional description | 2  |
| Technical data         | 3  |
| Ordering codes         | 5  |
| Order examples         | 8  |
| Closed center          | 9  |
| Inlet plates           | 10 |
| Pressure compensator   | 12 |
| Control spool          | 13 |
| Flow                   | 13 |
| Types of actuation     | 14 |
| LS pressure relief     | 15 |
| Secondary valves       | 15 |
| End plates             | 16 |
| Dimensions             | 17 |
| Related documentation  | 19 |

## Functional description

### Control block M4-22

The directional valves are proportional valves according to the load-sensing principle. They can be actuated mechanically, hydraulically or electro-hydraulically.

### Consumer control with electro-hydraulic actuation

The control spool (2) is used to determine the flow direction and the flow level that reaches the consumer ports (A or B).

In non-actuated state, the control spool (2) is centered by the compression spring (11). There is no connection from P to A or B.

The electric control current determines the level of the pilot pressure in the spring chambers and thereby the stroke of the control spool (2) (P → A; P → B).

The pressure compensator (3) keeps the pressure differential on the control spool (2) and thereby the flow to the consumers constant.

### Load pressure compensation

The pressure compensator (3) regulates pressure changes on the consumers or on the pump. The flow to the consumers remains constant, including with varying loads.

### Flow limitation

The maximum flow can be individually mechanically set using the stroke limiters (6).

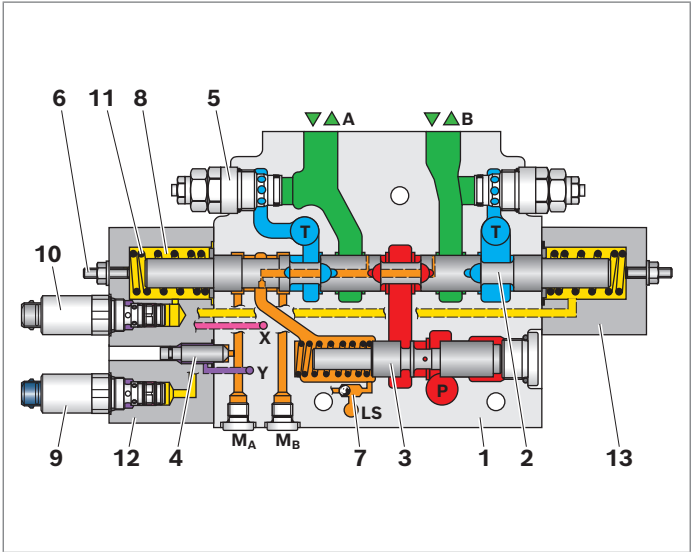
### Pressure limitation

The LS pressure for each consumer port can optionally be overridden internally via the LS pressure relief valves (4) or externally via the LS ports M<sub>A</sub>, M<sub>B</sub>.

Pressure valves (5) with large nominal widths with combined feed function protect consumer ports A and B against pressure peaks.

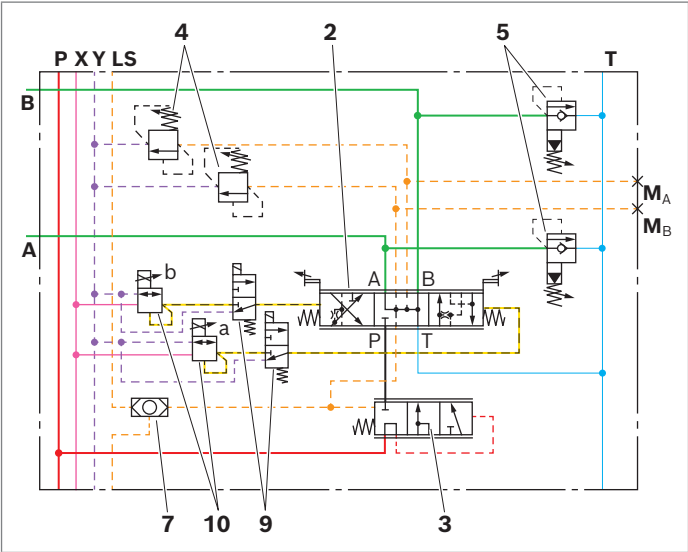
The highest load pressure on the pump is reported via the LS line and the integrated shuttle valve (7).

#### Sectional view M4-22



- |                                                       |                            |
|-------------------------------------------------------|----------------------------|
| 1 Housing                                             | 7 LS shuttle valve         |
| 2 Control spool                                       | 8 Spring chamber           |
| 3 Pressure compensator                                | 9 Pilot oil switch-off     |
| 4 LS pressure relief valve                            | 10 Pressure reducing valve |
| 5 Pressure relief valve with integrated feed function | 11 Compression spring      |
| 6 Stroke limiter                                      | 12 Cover A side            |
|                                                       | 13 Cover B side            |

#### Symbol M4-22



| Ports                           |                            |
|---------------------------------|----------------------------|
| P                               | Pump port                  |
| A, B                            | Consumer port              |
| T                               | Tank port                  |
| X                               | Pilot oil supply           |
| Y                               | Return line                |
| a, b                            | Pilot oil port             |
| LS                              | Load-sensing signal        |
| M <sub>A</sub> , M <sub>B</sub> | LS pressure measuring port |

**Technical data**

| General                                                                                                          |                           |                   |                                                                                                                                   |                                                                                                                                                                                                                                                 |    |
|------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Weight                                                                                                           | Inlet plate               | kg                | P                                                                                                                                 | J                                                                                                                                                                                                                                               |    |
|                                                                                                                  |                           |                   | 28                                                                                                                                | 28                                                                                                                                                                                                                                              |    |
|                                                                                                                  | Directional valve section | kg                | M                                                                                                                                 | H                                                                                                                                                                                                                                               | W  |
|                                                                                                                  |                           |                   | 24                                                                                                                                | 29                                                                                                                                                                                                                                              | 33 |
|                                                                                                                  | End plate                 | kg                | 13                                                                                                                                |                                                                                                                                                                                                                                                 |    |
| Installation position                                                                                            |                           |                   | Ideally horizontal to the spool axis                                                                                              |                                                                                                                                                                                                                                                 |    |
| Consumer line connections                                                                                        |                           |                   | SAE flange ports, see page 17                                                                                                     |                                                                                                                                                                                                                                                 |    |
| Ambient temperature range                                                                                        |                           | θ                 | °C                                                                                                                                | −20 to +80                                                                                                                                                                                                                                      |    |
| Priming (standard)                                                                                               |                           |                   | One-coat paint RAL 5010 (more on request)                                                                                         |                                                                                                                                                                                                                                                 |    |
| Surface protection acc. to IEC 60068-2-11                                                                        | Standard priming          | h                 | 96                                                                                                                                |                                                                                                                                                                                                                                                 |    |
|                                                                                                                  |                           |                   |                                                                                                                                   |                                                                                                                                                                                                                                                 |    |
| Hydraulic                                                                                                        |                           |                   |                                                                                                                                   |                                                                                                                                                                                                                                                 |    |
| Maximum working pressure at port                                                                                 | P                         | $p_{\max}$        | bar                                                                                                                               | 350                                                                                                                                                                                                                                             |    |
|                                                                                                                  | A, B                      | $p_{\max}$        | bar                                                                                                                               | 420                                                                                                                                                                                                                                             |    |
|                                                                                                                  | LS                        | $p_{\max}$        | bar                                                                                                                               | 350                                                                                                                                                                                                                                             |    |
|                                                                                                                  | T                         | $p_{\max}$        | bar                                                                                                                               | 30                                                                                                                                                                                                                                              |    |
|                                                                                                                  | Y                         | $p_{\max}$        | bar                                                                                                                               | Must be drained to reservoir without pressure                                                                                                                                                                                                   |    |
| Maximum pilot pressure at port                                                                                   | a, b                      | $p_{\text{St}}$   | bar                                                                                                                               | 35                                                                                                                                                                                                                                              |    |
|                                                                                                                  | X                         | $p_{\text{St}}$   | bar                                                                                                                               | 35                                                                                                                                                                                                                                              |    |
| Pilot pressure range                                                                                             | hydraulic                 | $p_{\text{St}}$   | bar                                                                                                                               | 8.5 to 22.5                                                                                                                                                                                                                                     |    |
|                                                                                                                  | electro-hydraulic         | $p_{\text{St}}$   | bar                                                                                                                               | 8.7 to 26                                                                                                                                                                                                                                       |    |
| Recommended hydraulic pilot control devices                                                                      |                           |                   | TH6 control curve 97, see data sheet 64552 or 64555                                                                               |                                                                                                                                                                                                                                                 |    |
| Required pump controller                                                                                         |                           |                   | Controller without LS connection to reservoir, e.g. DFR1, DRS                                                                     |                                                                                                                                                                                                                                                 |    |
| Maximum primary pressure relief                                                                                  |                           | $p$               | bar                                                                                                                               | 370 (set at the factory according to ordering code), min. 20 bar above the pressure cut-off value of the pump                                                                                                                                   |    |
| LS pressure relief                                                                                               |                           | $p$               | bar                                                                                                                               | 50 to 350<br>(Set at the factory according to ordering code)<br>The highest reduce response pressure of the valve block LS pressure relief valves set at the factory must be at least 20 bar lower than the pressure cut-off value of the pump. |    |
| Maximum flow at port                                                                                             | P                         | $q_{\text{Vmax}}$ | l/min                                                                                                                             | 500<br>600 with P1 and P2 port                                                                                                                                                                                                                  |    |
|                                                                                                                  | A, B                      | $q_{\text{Vmax}}$ | l/min                                                                                                                             | 400 with pressure compensator and load-holding function                                                                                                                                                                                         |    |
| Hydraulic fluid                                                                                                  |                           |                   | Mineral oil (HL, HLP) according to DIN 51524, HEES (synthetic ester) according to ISO 15380 and other hydraulic fluids on request |                                                                                                                                                                                                                                                 |    |
| Hydraulic fluid temperature range                                                                                |                           | θ                 | °C                                                                                                                                | −20 to +80                                                                                                                                                                                                                                      |    |
| Viscosity range                                                                                                  |                           | ν                 | mm²/s                                                                                                                             | 10 to 380                                                                                                                                                                                                                                       |    |
| Maximum admissible degree of contamination of the hydraulic fluid<br>Cleanliness level according to ISO 4406 (c) |                           |                   | Level 20/18/15, we recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$                                       |                                                                                                                                                                                                                                                 |    |

| Electrical                                                    |                           |                                                                                                                       |
|---------------------------------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Electrical pilot control valves                               |                           | FTWE4K...; see data sheet 58008<br>FTDRE4K...; see data sheet 58038                                                   |
| Recommended amplifier<br>(other actuating options on request) |                           | RA 1-0/10 (1 section), see data sheet 95230<br>RA 2-1/10, (4 to 6 sections), see data sheet 95230<br>BODAS controller |
| Connector version                                             | 1 and 3                   | Junior Timer, 2-pin (AMP)                                                                                             |
|                                                               | 8 and 9                   | DT04-2P (DEUTSCH)                                                                                                     |
| Type of protection according to<br>ISO 20653                  | Connector version 1 and 3 | IP6K5 <sup>1)</sup>                                                                                                   |
|                                                               |                           | IP6K7 and IP6K9K <sup>1)</sup><br>(only with Rexroth type R901022127 and R900313533)                                  |
|                                                               | Connector version 8 and 9 | IP6K5, IP6K7 and IP6K9K <sup>1)</sup>                                                                                 |

**Notice**

- For applications outside these values, please consult us!
- The technical data were determined at a viscosity of  $\nu = 30 \text{ mm}^2/\text{s}$  (HLP46: 50 °C).

<sup>1)</sup> With installed and locked plug-in connector. Plug-in connectors are not included in the scope of delivery and must be ordered separately, see data sheet 08006

## Ordering codes

### Specifications on the name plate

The ordering code is used to record the technical features and requirements. The Rexroth sales organization uses the ordering code to derive a short type and a material number.

### Example: M4-22 control block with three directional valve sections

| 01 | 02 |      | 03 | 04 | 05 |   | 06 | 07    | 08 | 09  |   | 10 | 11 |   |
|----|----|------|----|----|----|---|----|-------|----|-----|---|----|----|---|
| M4 | -  | 1234 | -  | 1  | 0  | / | 3  | M4-22 | J  | W41 | - | V  | 11 | * |

|    |                                                              |
|----|--------------------------------------------------------------|
| 01 | Series: Load-sensing control block M4                        |
| 02 | 4 to 6-digit control block number                            |
| 03 | Series 1X (unchanged installation and connection dimensions) |
| 04 | Series amendment status                                      |
| 05 | Total number of directional valve sections (1 to 8)          |
| 06 | Directional valve size                                       |
| 07 | Inlet plate                                                  |
| 08 | Actuation A side                                             |
| 09 | Sealing material FKM                                         |
| 10 | Line connections: SAE flange ports                           |
| 11 | Optional: Special designation                                |

## Inlet plate

|                   |    |    |    |    |
|-------------------|----|----|----|----|
|                   | 01 | 02 | 03 | 04 |
| <b>M4-22-1X</b> / |    |    |    |    |

## Design, system

|    |               |          |
|----|---------------|----------|
| 01 | Open center   | <b>P</b> |
|    | Closed center | <b>J</b> |

## Primary pressure relief

|    |                                                                                                           |          |
|----|-----------------------------------------------------------------------------------------------------------|----------|
| 02 | Without primary pressure relief valve (can be retrofitted, not possible with open center inlet <b>P</b> ) | <b>Q</b> |
|    | With primary pressure relief valve (specified pressure in bar, 3-digit)                                   | ...      |

## Pilot oil supply

|    |                                |          |
|----|--------------------------------|----------|
| 03 | With internal pilot oil supply | <b>Y</b> |
|    | For external pilot oil supply  | <b>X</b> |

## Options

|    |                                                                      |          |
|----|----------------------------------------------------------------------|----------|
| 04 | <b>Without</b> pilot oil switch-off, <b>without</b> LS damping valve | <b>1</b> |
|    | <b>With</b> pilot oil switch-off                                     | <b>2</b> |
|    | <b>With</b> LS damping valve                                         | <b>3</b> |
|    | <b>With</b> pilot oil switch-off, <b>with</b> LS damping valve       | <b>4</b> |

## Directional valve section

|                   |                                     |    |    |    |    |    |    |    |    |    |    |
|-------------------|-------------------------------------|----|----|----|----|----|----|----|----|----|----|
|                   | 01                                  | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 |
| <b>M4-22-2X</b> / |                                     |    |    |    |    |    |    |    |    |    |    |
|                   | 1st directional valve section       |    |    |    |    |    |    |    |    |    |    |
|                   |                                     |    |    |    |    |    |    |    |    |    |    |
|                   | 2nd directional valve section       |    |    |    |    |    |    |    |    |    |    |
|                   |                                     |    |    |    |    |    |    |    |    |    |    |
|                   | 3rd directional valve section, etc. |    |    |    |    |    |    |    |    |    |    |

## Pressure compensator

|    |                                                                                |          |
|----|--------------------------------------------------------------------------------|----------|
| 01 | <b>With</b> pressure compensator, <b>with</b> load-holding function (standard) | <b>S</b> |
|    | <b>With</b> pressure compensator, <b>without</b> load-holding function         | <b>T</b> |
|    | <b>Without</b> pressure compensator, <b>without</b> load-holding function      | <b>Q</b> |

## LS pressure relief and housing variant<sup>1)</sup>

|    |                                                                                                  |          |          |          |
|----|--------------------------------------------------------------------------------------------------|----------|----------|----------|
|    |                                                                                                  | 02       | 03       | 04       |
| 02 | <b>Without</b> LS pressure relief valve (LS-PRV cannot be retrofitted; only <b>Z</b> possible)   | <b>Z</b> |          | <b>Z</b> |
| 04 | <b>With</b> threaded plug (LS-DB retrofittable; <b>Z</b> not possible)                           | <b>Q</b> |          | <b>Q</b> |
|    | <b>With</b> LS pressure relief valve (specified pressure in bar, 3-digit; <b>Z</b> not possible) | ...      |          | ...      |
| 03 | Housing with measuring ports                                                                     |          | <b>M</b> |          |
|    | Housing without measuring ports (only for mechanical actuation <b>M</b> )                        |          | <b>Z</b> |          |

## Spool type<sup>1)</sup>

|    |                        |          |
|----|------------------------|----------|
| 05 | Control spool <b>E</b> | <b>E</b> |
|    | Control spool <b>J</b> | <b>J</b> |
|    | Control spool <b>Q</b> | <b>Q</b> |

## Flow

|    |                                                                           |         |
|----|---------------------------------------------------------------------------|---------|
| 06 | Flow in consumer port <b>A</b> and <b>B</b> (parameter in l/min, 3-digit) | ...-... |
|----|---------------------------------------------------------------------------|---------|

<sup>1)</sup> For symbols, see "Control spool" on page 13.

 = preferred program

**Actuation A side**

|    |                                    |                           |           |
|----|------------------------------------|---------------------------|-----------|
| 07 | Mechanical <sup>2)</sup>           | Spring-centered           | <b>M</b>  |
|    | Hydraulic                          | Standard                  | <b>H</b>  |
|    |                                    | with pilot oil switch-off | <b>H3</b> |
|    | Electro-hydraulically proportional | Standard                  | <b>W2</b> |
|    |                                    | with pilot oil switch-off | <b>W3</b> |
|    | Electro-hydraulically switchable   | Standard                  | <b>W4</b> |

**Supply voltage and connector version<sup>3)</sup>**

|    |                           | 24 V     | 12 V     |
|----|---------------------------|----------|----------|
| 08 | Junior Timer, 2-pin (AMP) | <b>1</b> | <b>3</b> |
|    | DT04-2P (DEUTSCH)         | <b>8</b> | <b>9</b> |

**Damping valve<sup>4)</sup>**

|    |                                         |           |
|----|-----------------------------------------|-----------|
| 09 | <b>Without</b> damping valve (standard) | <b>00</b> |
|    | <b>With</b> damping valve Ø0.6 mm       | <b>06</b> |
|    | <b>With</b> damping valve Ø0.8 mm       | <b>08</b> |

**Secondary valves for consumer ports A and B**

|    |                                                                                                        |             |
|----|--------------------------------------------------------------------------------------------------------|-------------|
| 10 | <b>Without</b> secondary valve, with threaded plug (secondary valves can be retrofitted) <sup>5)</sup> | <b>Q</b>    |
| 11 | <b>With</b> pressure/feed valve, adjustable                                                            | <b>H...</b> |

**End plate, additional information**

|                   |    |    |    |    |
|-------------------|----|----|----|----|
|                   | 01 | 02 | 03 | 04 |
| <b>M4-22-2X</b> / |    |    |    | *  |

**End plate**

| 01 | With internal LS unloading | Without internal LS unloading | With <b>P2</b> port | With <b>T2</b> port |            |
|----|----------------------------|-------------------------------|---------------------|---------------------|------------|
|    | •                          |                               |                     |                     | <b>LA</b>  |
|    | •                          |                               | •                   |                     | <b>LP</b>  |
|    | •                          |                               |                     | •                   | <b>LT</b>  |
|    | •                          |                               | •                   | •                   | <b>LPT</b> |
|    |                            | •                             |                     |                     | <b>LZ</b>  |
|    |                            | •                             | •                   |                     | <b>LR</b>  |
|    |                            | •                             | •                   | •                   | <b>LRT</b> |

**Sealing material**

|    |                           |          |
|----|---------------------------|----------|
| 02 | FKM (fluorocarbon rubber) | <b>V</b> |
|----|---------------------------|----------|

**Line connections**

|    |                               |           |
|----|-------------------------------|-----------|
| 03 | SAE flange ports              | <b>11</b> |
| 04 | Further details in plain text | *         |

2) Mechanical actuation only possible without LS pressure relief valve (**ZZZ**).

3) Information only required for type of actuation **H3**, **W2**, **W3** and **W4**.

Plug-in connectors are not included in the scope of delivery and must be ordered separately, see data sheet 08006.

4) Information only required for type of actuation **H** and **H3**.

5) Secondary valves must be present in the hydraulic circuit.

 = preferred program

Order examples

Open center

- Example:

– 3-fold control block with 3 directional valve sections

– Electro-hydraulically actuated

– Fixed pump  $q_{V,max} = 400\text{ l/min}$
- Inlet plate

– Open center

– With primary pressure relief valve, set to 250 bar

– With internal pilot oil supply

– Without pilot oil switch-off and LS damping valve
- 1st directional valve section

– With pressure compensator, with load-holding function

– Without LS pressure relief valves

– Spool symbol J

– Flow in port **A** and **B** 400 l/min

– Type of actuation: hydraulic with pilot oil switch-off

– With Junior Timer, 2-pin (AMP) 24 V

– Secondary valve bores plugged
- 2nd directional valve section

– With pressure compensator, with load-holding function

– With LS pressure relief valves for consumer ports **A** and **B**, set to 180 bar

– Spool symbol J

– Flow in port **A** and **B** 400 l/min

– Type of actuation: electro-hydraulically proportional

– With Junior Timer, 2-pin (AMP) 24 V

– Secondary valve: non-adjustable pressure/feed valve for consumer port **A** 100 bar, adjustable pressure/feed valve for consumer port **B** 230 bar

– With secondary valve for consumer ports **A** and **B**, set to 350 bar
- 3rd directional valve section

– With pressure compensator, with load-holding function

– With LS pressure relief valve for consumer port **A** 180 bar, consumer port **B** 120 bar

– Spool symbol J

– Flow in port **A** and **B** 85 l/min

– Type of actuation: electro-hydraulically proportional with pilot oil switch-off

– With Junior Timer, 2-pin (AMP) 24 V

– With secondary valve for consumer ports **A** and **B**, set to 350 bar
- End plate, additional information

– With internal LS unloading

– FKM seals

– SAE flange ports

Ordering codes:

Short type, inlet plate

|   |    |   |    |   |    |   | 01 | 02  | 03 | 04 |
|---|----|---|----|---|----|---|----|-----|----|----|
| 3 | M4 | - | 22 | - | 1X | / | P  | 250 | Y  | 1  |

1st directional valve section

| 01 | 02 | 03 | 04 | 05 | 06      | 07 | 08 | 09 | 10 | 11 |
|----|----|----|----|----|---------|----|----|----|----|----|
| S  | Z  | Z  | Z  | J  | 400-400 | H3 | 1  | 00 | Q  | Q  |

2nd directional valve section

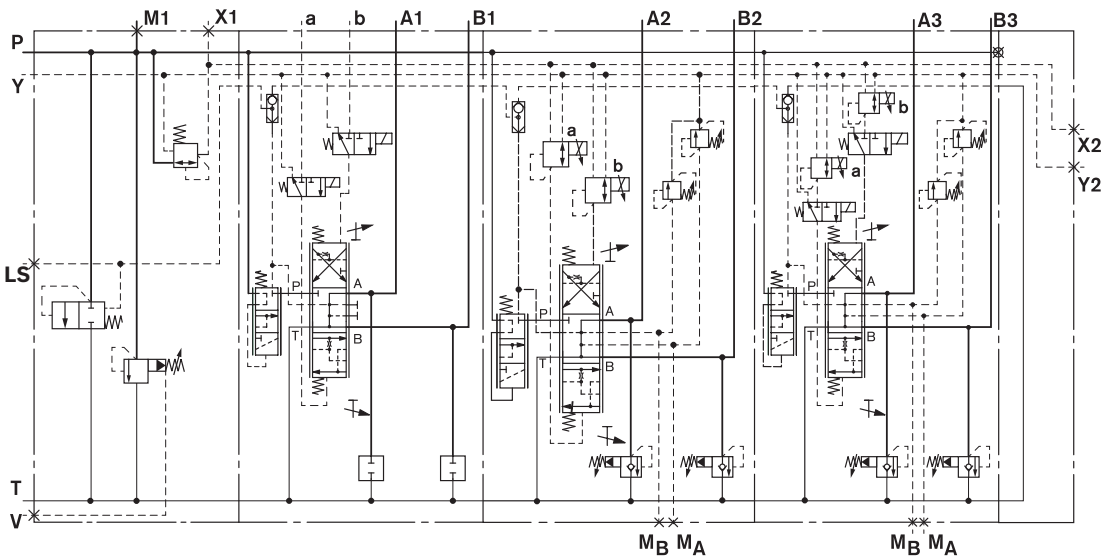
| 01 | 02  | 03 | 04  | 05 | 06      | 07 | 08 | 10   | 11   |
|----|-----|----|-----|----|---------|----|----|------|------|
| S  | 180 | M  | 180 | J  | 400-400 | W2 | 1  | H350 | H350 |

3rd directional valve section

| 01 | 02  | 03 | 04  | 05 | 06      | 07 | 08 | 10   | 11   |
|----|-----|----|-----|----|---------|----|----|------|------|
| S  | 180 | M  | 120 | J  | 085-085 | W3 | 1  | H350 | H350 |

End plate, additional information

|    |    |    |
|----|----|----|
| 01 | 02 | 03 |
| LA | V  | 11 |



**Closed center**

**Example:**

- 3-fold control block with 3 directional valve sections
- Electro-hydraulically actuated
- Variable pump  $q_{V, \max} = 400 \text{ l/min}$

**Inlet plate**

- Closed center
- With primary pressure relief valve, set to 250 bar
- With internal pilot oil supply
- With LS damping valve

**1st directional valve section**

- With pressure compensator, with load-holding function
- Without LS pressure relief valves
- Spool symbol J
- Flow in port **A** and **B** 400 l/min
- Type of actuation: hydraulic with pilot oil switch-off
- With Junior Timer, 2-pin (AMP) 24 V
- Secondary valve bores plugged

**2nd directional valve section**

- With pressure compensator, with load-holding function
- With LS pressure relief valves for consumer ports **A** and **B**, set to 180 bar
- Spool symbol J
- Flow in port **A** and **B** 400 l/min
- Type of actuation: electro-hydraulically proportional
- With Junior Timer, 2-pin (AMP) 24 V
- Secondary valve: non-adjustable pressure/feed valve for consumer port **A** 100 bar, adjustable pressure/feed valve for consumer port **B** 230 bar
- With secondary valve for consumer ports **A** and **B**, set to 350 bar

**3rd directional valve section**

- With pressure compensator, with load-holding function
- With LS pressure relief valve for consumer port **A** 180 bar, consumer port **B** 120 bar
- Spool symbol J
- Flow in port **A** and **B** 200 l/min
- Type of actuation: electro-hydraulically proportional with pilot oil switch-off
- With Junior Timer, 2-pin (AMP) 24 V
- With secondary valve for consumer ports **A** and **B**, set to 350 bar

**End plate, additional information**

- With internal LS unloading
- FKM seals
- SAE flange ports

**Ordering codes:**

Short type, inlet plate

|   |    |   |    |   |    |   | 01 | 02  | 03 | 04 |
|---|----|---|----|---|----|---|----|-----|----|----|
| 3 | M4 | - | 22 | - | 1X | / | J  | 250 | Y  | 3  |

1st directional valve section

|   | 01 | 02 | 03 | 04 | 05      | 06 | 07 | 08 | 09 | 10 | 11 |
|---|----|----|----|----|---------|----|----|----|----|----|----|
| S | Z  | Z  | Z  | J  | 400-400 | H3 | 1  | 00 | Q  | Q  |    |

2nd directional valve section

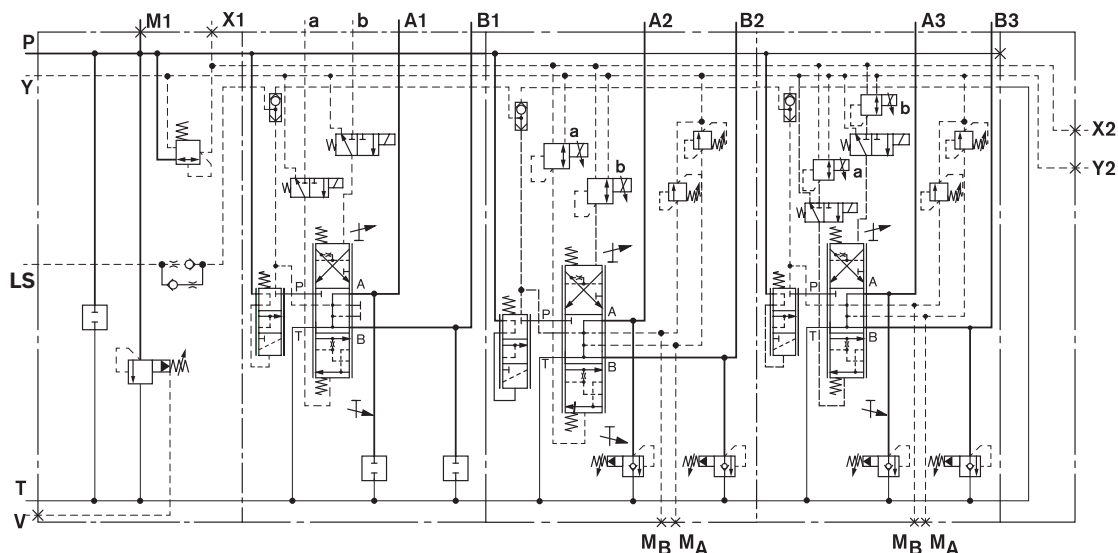
|   | 01  | 02 | 03  | 04 | 05      | 06 | 07 | 08   | 10   | 11 |
|---|-----|----|-----|----|---------|----|----|------|------|----|
| S | 180 | M  | 180 | J  | 400-400 | W2 | 1  | H350 | H350 |    |

3rd directional valve section

|   | 01  | 02 | 03  | 04 | 05      | 06 | 07 | 08   | 10   | 11 |
|---|-----|----|-----|----|---------|----|----|------|------|----|
| S | 180 | M  | 120 | J  | 200-200 | W3 | 1  | H350 | H350 |    |

End plate, additional information

|    | 01 | 02 | 03 |
|----|----|----|----|
| LA | V  | 11 |    |



## Inlet plates

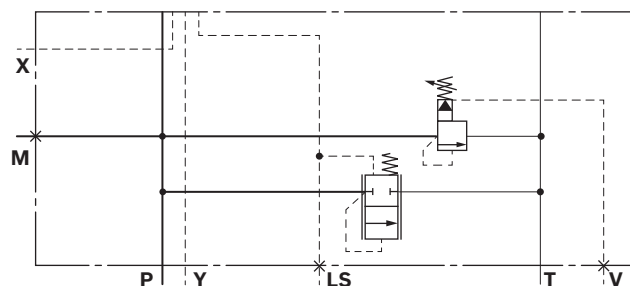
### Open center (P)

#### With primary pressure relief valve, for external pilot oil supply

Ordering code:

|   |     |   |   |
|---|-----|---|---|
| P | ... | X | 1 |
|---|-----|---|---|

- Specified pressure in bar required after **P** (3-digit)
- Without pilot oil switch-off, without LS damping valve

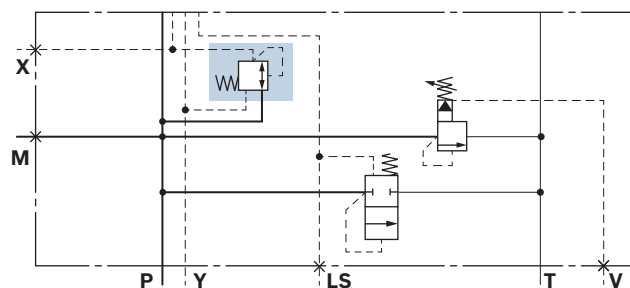


#### With primary pressure relief valve, with internal pilot oil supply

Ordering code:

|   |     |   |   |
|---|-----|---|---|
| P | ... | Y | 1 |
|---|-----|---|---|

- Specified pressure in bar required after **P** (3-digit)
- Without pilot oil switch-off, without LS damping valve



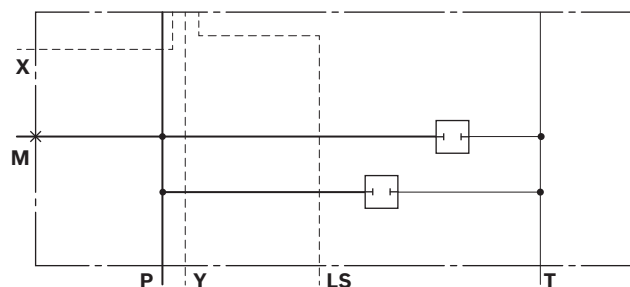
### Closed center (J)

#### Without primary pressure relief valve, for external pilot oil supply

Ordering code:

|   |   |   |   |
|---|---|---|---|
| J | Q | X | 1 |
|---|---|---|---|

- Without pilot oil switch-off, without LS damping valve

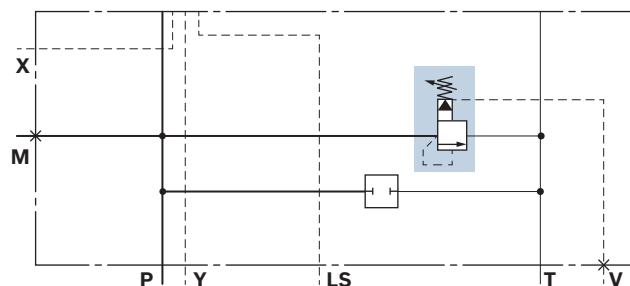


#### With primary pressure relief valve, for external pilot oil supply

Ordering code:

|   |     |   |   |
|---|-----|---|---|
| J | ... | X | 1 |
|---|-----|---|---|

- Specified pressure in bar required after **J** (3-digit)
- Without pilot oil switch-off, without LS damping valve

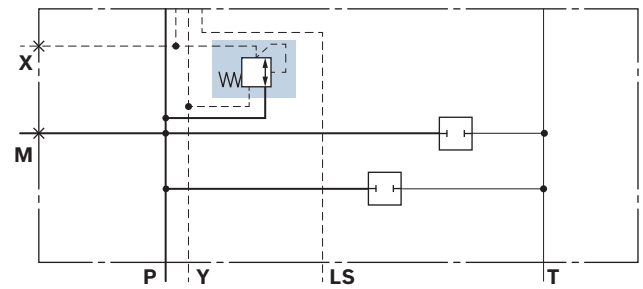


### Without primary pressure relief valve, with internal pilot oil supply

Ordering code:

|   |   |   |   |
|---|---|---|---|
| J | Q | Y | 1 |
|---|---|---|---|

- ▶ Without pilot oil switch-off, without LS damping valve

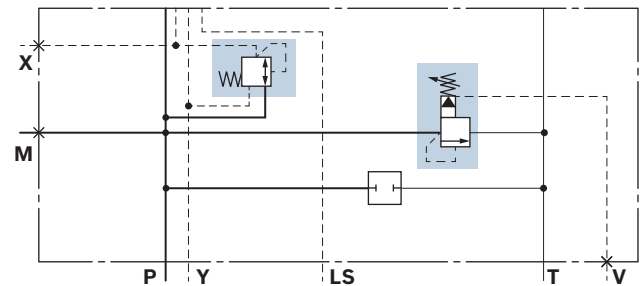


### With primary pressure relief valve, with internal pilot oil supply

Ordering code:

|   |     |   |   |
|---|-----|---|---|
| J | ... | Y | 1 |
|---|-----|---|---|

- ▶ Specified pressure in bar required after J (3-digit)
- ▶ Without pilot oil switch-off, without LS damping valve

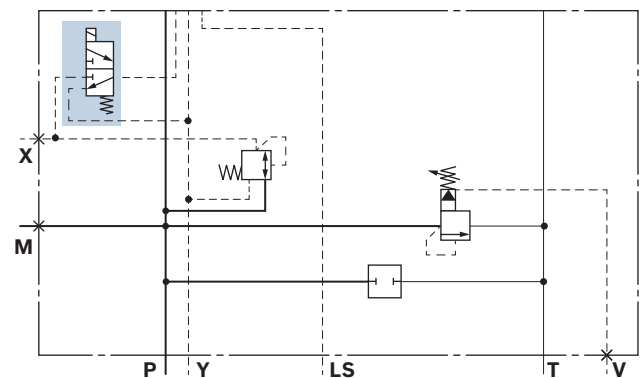


### With primary pressure relief valve, with internal pilot oil supply

Ordering code:

|   |     |   |   |
|---|-----|---|---|
| J | ... | Y | 2 |
|---|-----|---|---|

- ▶ Specified pressure in bar required after J (3-digit)
- ▶ With pilot oil switch-off

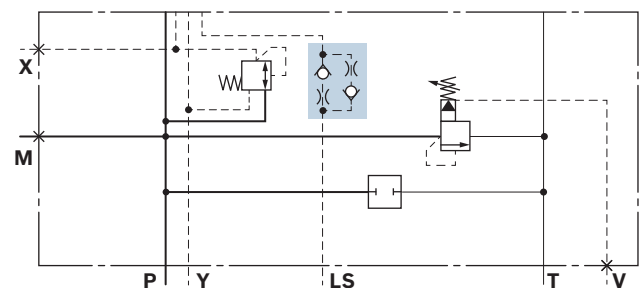


### With primary pressure relief valve, with internal pilot oil supply

Ordering code:

|   |     |   |   |
|---|-----|---|---|
| J | ... | Y | 3 |
|---|-----|---|---|

- ▶ Specified pressure in bar required after J (3-digit)
- ▶ With LS damping valve



### Pilot oil supply (Y)

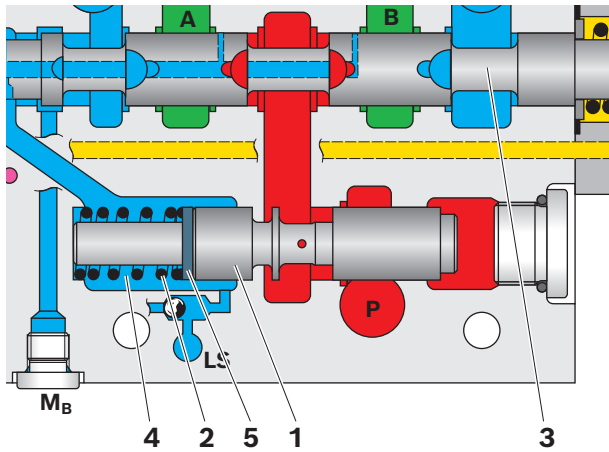
- ▶ Pressure limitation 45 bar
- ▶ Pilot pressure max. 30+5 bar

### Notice

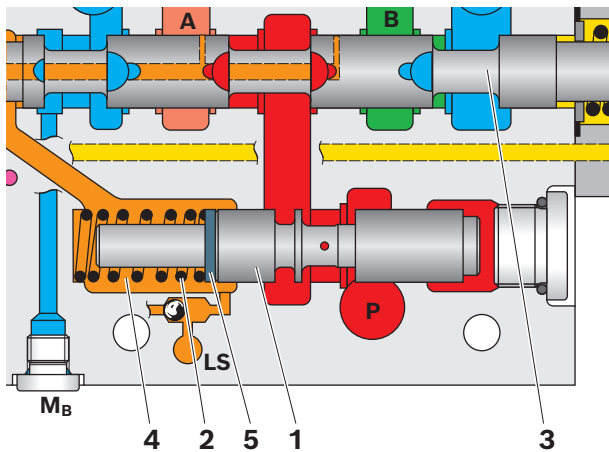
With internal pilot oil supply, pilot oil for other consumers can also be directed via the X port. However, this can affect the switching times on the M4-22. Please consult technical sales for information about potential impacts. With an external pilot oil supply, the X port is not generally plugged. It must be plugged if it is not in use (e.g. with hydraulic control H).

## Pressure compensator

### ▼ Control spool in central position



### ▼ Control spool actuated



In the control spool central position there is no connection from **P** to the consumer ports **A** and **B**. Pump pressure shifts the compensator spool (**1**) to the left against the spring (**2**) in this operating condition.

When the control spool (**3**) (= metering orifice) is actuated, the LS pressure reaches the spring chamber (**4**) and shifts the pressure compensator spool to the right into the control position. The flow is also kept constant in parallel operation of consumers with different load pressures.

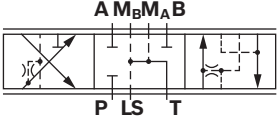
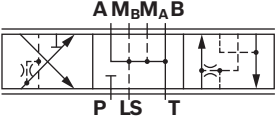
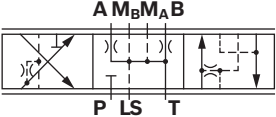
The pressure compensator **S** is equipped with load-holding function. This function is not leak-free.

It is equipped with one ring (**5**) as standard. The number of rings fitted depends on the required flow.

| Type     | Summary                                                                                                                                                            | Symbol |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| <b>S</b> | <ul style="list-style-type: none"> <li>▶ With pressure compensator</li> <li>▶ With load-holding function<sup>1)</sup></li> <li>▶ Maximum flow 400 l/min</li> </ul> |        |
| <b>T</b> | <ul style="list-style-type: none"> <li>▶ With pressure compensator</li> <li>▶ Without load-holding function</li> <li>▶ Maximum flow 400 l/min</li> </ul>           |        |
| <b>Q</b> | <ul style="list-style-type: none"> <li>▶ Without pressure compensator</li> <li>▶ Without load-holding function</li> <li>▶ Maximum flow 400 l/min</li> </ul>        |        |

<sup>1)</sup> This load-holding function is not leak-free

Control spool

| Hydraulic cylinder as consumer                                                                 | Hydraulic motors as consumers                                                                  | Application with defined residual opening (A/B → T), consumer port unloaded in neutral position  |
|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| E <div></div> | J <div></div> | Q <div></div> |

Flow

This is an overview of the preferred spool types.  
Further spool types are available on request. Individual adaptation of the spool and groove geometry for the desired control behavior is possible.

Symmetric control spools

| Spool type | Pressure compensator | Number of rings |         | Flow in l/min |         |         |         |
|------------|----------------------|-----------------|---------|---------------|---------|---------|---------|
| E, J, Q    | S                    | 2               | 400-400 | 300-300       | 200-200 | 130-130 | 080-080 |
|            |                      | 1               | 360-360 | 270-270       | 180-180 | 115-115 | 072-072 |
|            |                      | 0               | 320-320 | 240-240       | 160-160 | 100-100 | 065-065 |

Example:

- Spool type J
- Pressure compensator S
- Setpoint value:  $q_{\text{consumers}} = 380 \text{ l/min}$

Solution:

- 360-liter spool + 2 rings = 400 l/min
- Set 380 liters via stroke limiter.

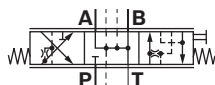
Notice

Place directional valve sections with maximum flow as close as possible to the pump inlet.

## Types of actuation

### Mechanical

M



- Tongue without hand lever

### Hydraulic

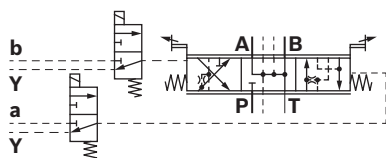
H



- Centering in central position by means of springs in case of non-actuation.
- Recommended hydraulic pilot control devices:  
Type 2TH6 and 4TH6 according to data sheet 64552 or 64555

### Hydraulic with pilot oil switch-off

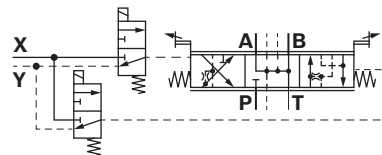
H3



- FTWE4K on/off valve according to data sheet 58008

### Electro-hydraulically switchable

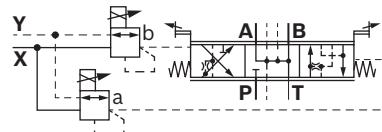
W4



- FTWE4K on/off valve according to data sheet 58008

### Electro-hydraulically proportional

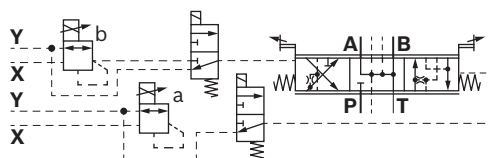
W2



- FTDRE4K proportional pressure reducing valve according to data sheet 58038

### Electro-hydraulically proportional with pilot oil switch-off

W3



- FTWE4K on/off valve according to data sheet 58008
- FTDRE4K proportional pressure reducing valve according to data sheet 58038

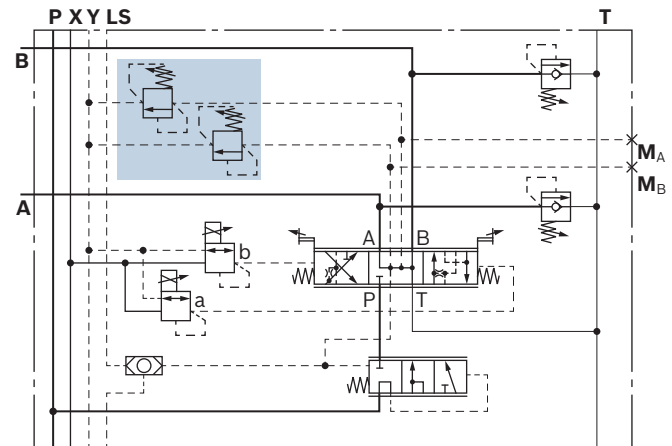
## LS pressure relief

### With LS pressure relief valves

Ordering code:

|   |     |   |     |   |         |    |   |   |      |      |
|---|-----|---|-----|---|---------|----|---|---|------|------|
| S | ... | M | ... | J | ...-... | W2 | 1 | - | H... | H... |
|---|-----|---|-----|---|---------|----|---|---|------|------|

- Specified pressure in bar for consumer port **A** and **B** (3-digit), e.g. **180M120**
- With the **QM** version, LS pressure relief can be retrofitted onto the directional valve.
- The LS pressure can be influenced externally via ports **M<sub>A</sub>** and **M<sub>B</sub>**. These ports can also be used as measuring ports.

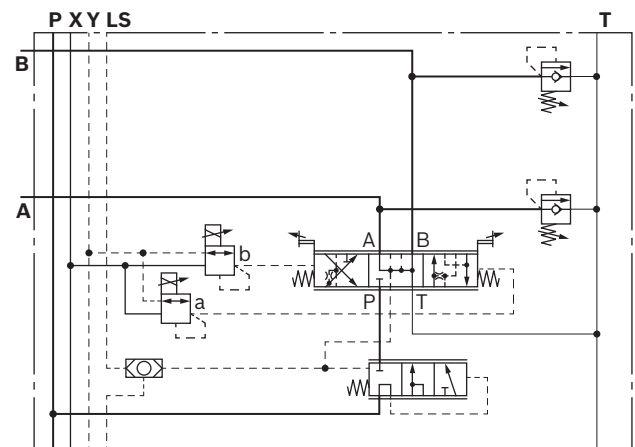


### Without LS pressure relief valves

Ordering code:

|   |   |   |   |   |         |    |   |   |      |      |
|---|---|---|---|---|---------|----|---|---|------|------|
| S | Z | Z | Z | J | ...-... | W2 | 1 | - | H... | H... |
|---|---|---|---|---|---------|----|---|---|------|------|

- LS pressure relief not retrofittable
- Housing without measuring ports



## Secondary valves

### Pressure valve/feed valve

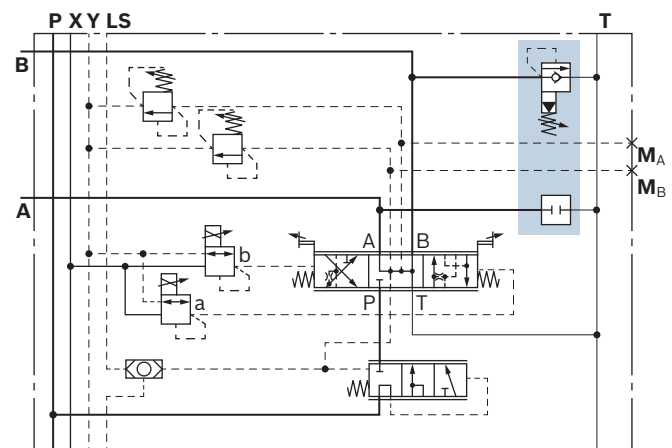
Ordering code:

|   |     |   |     |   |         |    |   |   |   |      |
|---|-----|---|-----|---|---------|----|---|---|---|------|
| S | ... | M | ... | J | ...-... | W2 | 1 | - | Q | H... |
|---|-----|---|-----|---|---------|----|---|---|---|------|

- Adjustable pressure/feed valve (type VMR2, see data sheet 18318-37)
- Specified pressure in bar required after **H** (3-digit)
- **Example: Q H210**  
**Q:** Threaded plug for consumer port **A** **H210:** Pressure/feed valve for consumer port **B**, set to 210 bar

#### Notice

Only suitable for reduction of pressure peaks, not to be used as a pressure relief valve!

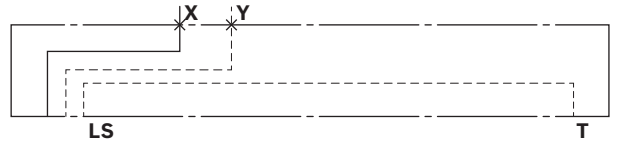


## End plates

### With internal LS unloading, without ports

Ordering code:

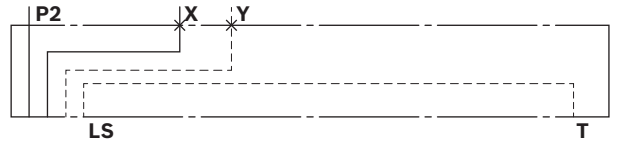
LA



### With internal LS unloading, with P2 port

Ordering code:

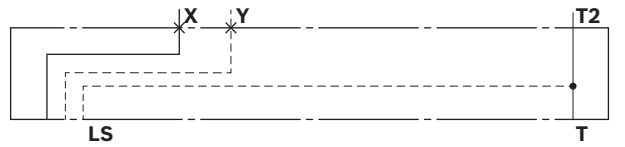
LP



### With internal LS unloading, with T2 port

Ordering code:

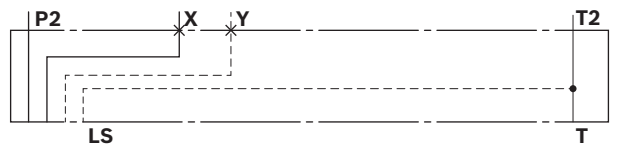
LT



### With internal LS unloading, with P2 and T2 ports

Ordering code:

LPT

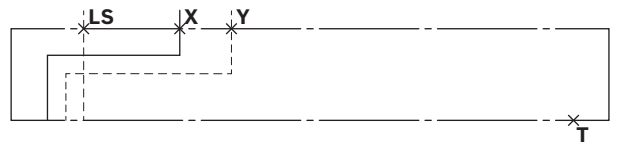


### Without internal LS unloading, with LS port

Ordering code:

LZ

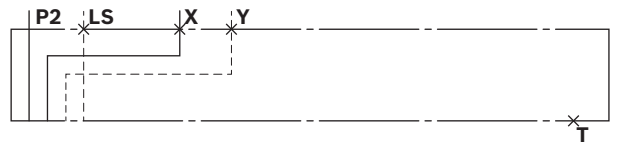
- ▶ LS unloading must be provided externally



### Without internal LS unloading, with LS and P2 ports

Ordering code:

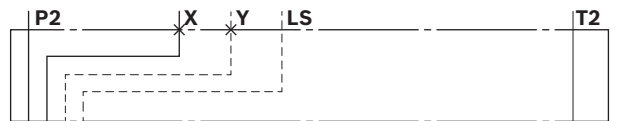
LR



### Without internal LS unloading, with LS, P2 and T2 ports

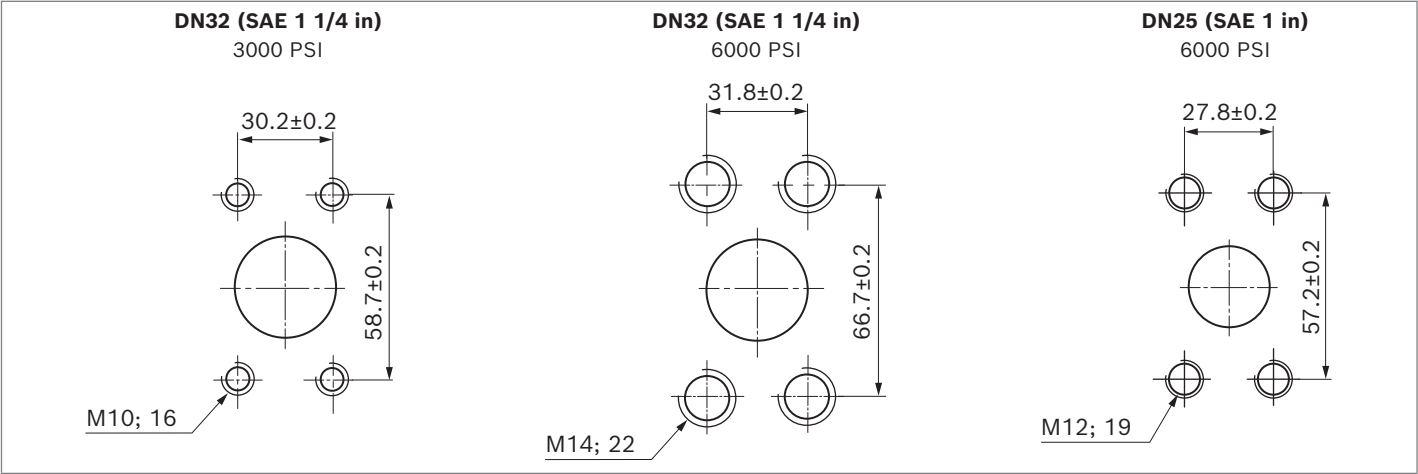
Ordering code:

LRT



Dimensions

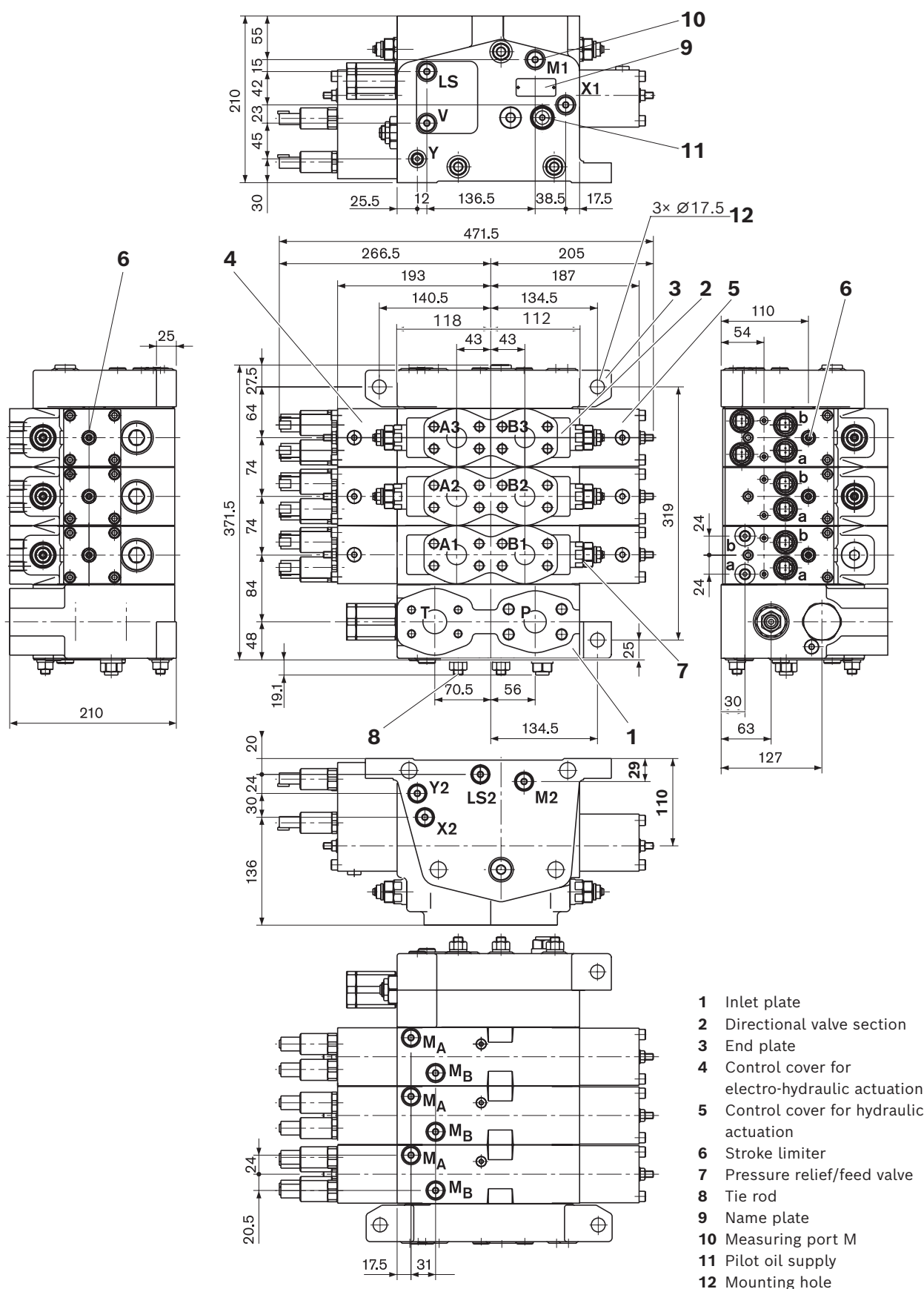
Porting pattern for SAE connection flange according to DIN ISO 6162



Line connections

| Ports                               |                               |                            |
|-------------------------------------|-------------------------------|----------------------------|
| <b>P</b>                            | DN32 (SAE 1 1/4 in), 6000 PSI | Pump port                  |
| <b>A, B</b>                         | DN25 (SAE 1 in), 6000 PSI     | Consumer port              |
| <b>T</b>                            | DN32 (SAE 1 1/4 in), 3000 PSI | Tank port                  |
| <b>X</b>                            |                               | Pilot oil supply           |
| <b>Y</b>                            |                               | Return line                |
| <b>a, b</b>                         |                               | Pilot oil port             |
| <b>LS</b>                           | G 1/4                         | Load-sensing signal        |
| <b>M</b>                            |                               | Pump measuring port        |
| <b>M<sub>A</sub>, M<sub>B</sub></b> |                               | LS pressure measuring port |
| <b>V</b>                            |                               | Vent port                  |

▼ **Control block in open center version**



## **Related documentation**

Further information on installation, commissioning, and operation can be found in the instruction manual 64025-B: "Control blocks for mobile applications".

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