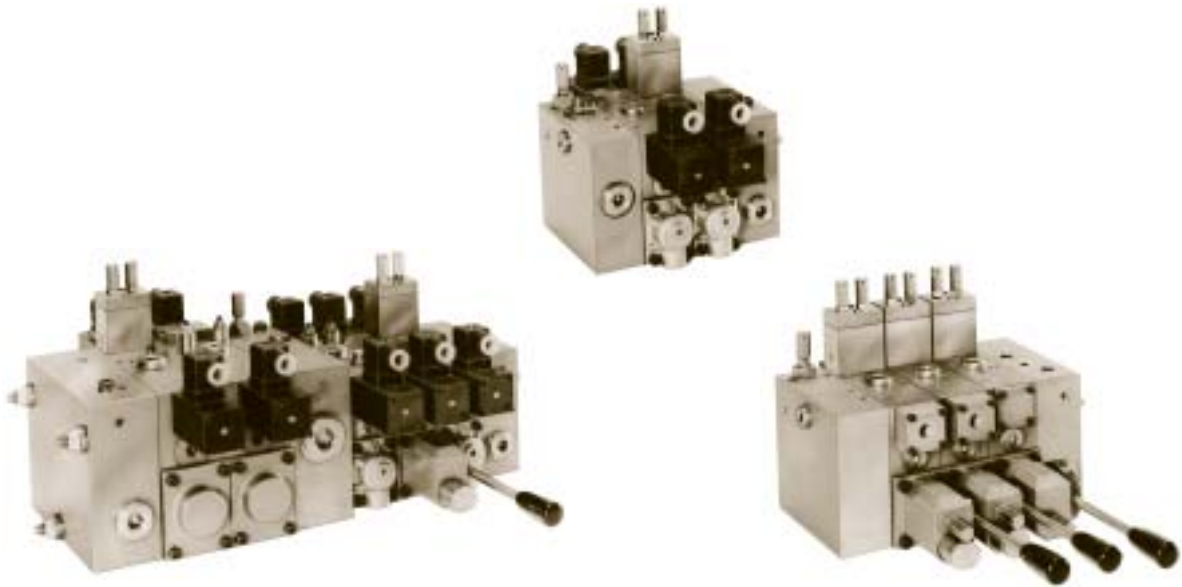


## MFC PROPORTIONAL DIRECTIONAL CONTROL VALVE

Electrical, Manual and Hydraulic operation  
Size 1/2" and 1" + combination

Series F12K  
and  
Series F18K



### FEATURES

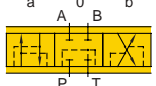
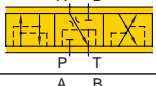


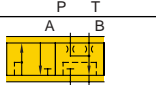
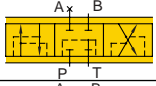
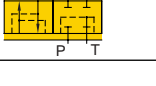

- \* Different flow combinations with combiplate.
- \* Adaptable to all pump systems.
- \* Several functions can be very precisely controlled independent of pressure drops.
- \* The load independent output flow is proportional to the input signal.
- \* Max. operating pressure 350 bar (5000 psi).
- \* Operating pressures can be set individually at ports A & B (option).
- \* Different main spool types.
- \* Main spools with different nominal flows.
- \* Flow can be tailored to suit requirements still using the full spool stroke by selecting different spool sizes, by adjusting (100 to 50%) or stroke limitation. Separate settings on ports A & B are possible.
- \* Tests for the determination of pressure differential flow characteristics conforms to ISO 4411.
- \* Tests for determining steady-state and dynamic performance conform with the appropriate methods described in ISO 6403.
- \* Identification of valve ports conforms to ISO 9461:1992.
- \* Identification plates according to EN 982:1994 (ISO 4413).
- \* Graphic symbols are in accordance with ISO 1219-1:1991.
- \* Excellent control resolution.
- \* Control sections are available as:
  - Electrical proportional series F..KE
  - Manual proportional series F..KH and
  - Hydraulic proportional series F..KOAny combination of these control options is possible.
- \* Energy saving achieved by load-sensing options with a fixed or variable volume pump.
- \* Control solenoids available in explosion-proof design II 2 EEx m II T4 (even up to IP-57).

# TECHNICAL DATA

|   | <b>F12K</b>  | <b>F18K</b>  |
|---|--|--|
| Mounting position                                       | Optional   | Optional   |
| Size working ports                                      | 1/2" BSP<br>(SAE optional)   | 1" BSP<br>(SAE optional)   |
| Operating pressure (P,A,B)                              | ...350 bar (5000 psi)  | ...350 bar (5000 psi)  |
| Max. pressure (T)                                       | 35 bar (500 psi)   | 35 bar (500 psi)   |
| Pressure setting range                                  | 13...350 bar (186...5000 psi)  | 13...350 bar (186...5000 psi)  |
| Pressure drop over 2-way compensator (A,B)              | 7 bar (100 psi)  | 7 bar (100 psi)  |
| Internal pilot pressure setting                         | approx.25 bar (358 psi)  | approx.25 bar (358 psi)  |
| Lever force   | 35N (7.8 lbs)  | 35N (7.8 lbs)  |
| Max. flow   | 75l/min (20 USgpm)<br>(see page 9)                                       | 200l/min (53 USgpm)<br>(see page 11)                                     |
| Flow setting  | 50% of all nominal flows (option)  | 50% of all nominal flows (option)  |
| Pilot flow  | ...1.25 l/min (0.33 USgpm)<br>(depending on valve design)                | ...1.25 l/min (0.33 USgpm)<br>(depending on valve design)                |
| Internal leakage A/B-T                                  | 20 cm <sup>3</sup> /min (.005 USgpm)<br>@ 150 bar (2145 psi)<br>& 32 cSt | 55 cm <sup>3</sup> /min (.015 USgpm)<br>@ 150 bar (2145 psi)<br>& 32 cSt |
| Pilot pressure  | 6-20 bar (86-286 psi)  | 6-20 bar (86-286 psi)  |
| Spool stroke  | 5.25 mm (.207 inch)  | 7 mm (.275 inch)   |
| Spool overlap   | 24% of the stroke  | 21.5% of the stroke  |
| Lever stroke  | 28°  | 32°  |
| Fluid   | Mineral oil according to<br>DIN 51524/51525                              | Mineral oil according to<br>DIN 51524/51525                              |
| Fluid temperature range                                 | -30...+80°C (-22°...+176°F)  | -30...+80°C (-22°...+176°F)  |
| Viscosity range   | 10...500 cSt, optimal 30 cSt   | 10...500 cSt, optimal 30 cSt   |
| Contamination level max.                                | according to NAS 1638 Class 8<br>or ISO 17/14                            | according to NAS 1638 Class 8<br>or ISO 17/14                            |
| Nominal voltage   | 12 V DC, 24 V DC   | 12 V DC, 24 V DC   |
| Nominal current   | 12 V DC = 1.200 mA<br>24 V DC = 600 mA                                   | 12 V DC = 1.200 mA<br>24 V DC = 600 mA                                   |
| Reaction time from neutral -<br>to max. - spoolposition | 170 msec.  | 400 msec <sup>1)</sup>   |
| Hysteresis  | 3%   | 4%   |
| Continuous operating                                    | 100%   | 100%   |
| Type of protection                                      | IP 65, optional IP67/II 2 EEx m II T4                                    | IP 65, optional IP67/II 2 EEx m II T4                                    |
| Recommended dither frequency                            | 100Hz  | 100Hz  |

<sup>1)</sup> possible 270 msec.

*If the performance characteristics outlined above do not meet your own particular requirements, please consult AMCA.*

| Main Spool type | Symbols   | Operation Characteristic  | Spool positions:  |
|-----------------|---|---|---|
| A<br>4/3 way    |  | In neutral position all ports blocked.*   | See operation on page 5                                     |
| B<br>4/3 way    |  | In neutral position port A to T. Throttle flow approx. 20% of nominal flow.*                  | Port functions:<br>P = Pressure<br>T = Tank<br>A + B = User |
| C<br>4/3 way    |  | In neutral position P blocked, A & B to T.*<br>Throttled flow A & B to T 20% of nominal flow. |   |
| D<br>4/3 way    |  | In neutral position port B to T. Throttle flow approx. 20% of nominal flow.*                  |   |
| F<br>4/2 way    |  | In position b all ports blocked.*   |   |
| G<br>4/2 way    |  | In neutral position P blocked A & B to T.*<br>Throttled flow A & B to T 20% of nominal flow   |   |
| K<br>3/3 way    |  | In neutral position all ports blocked.*<br>Additional in position b, port A blocked.*         |   |
| O<br>3/2 way    |  | In position b all ports blocked.<br>Additional in position a, port B blocked.*                |   |

\* with inlet plate F.KU pump circulating pressure drop at minimum.  
"Free flow" to tank.

## DESCRIPTION

The AMCA Multi Flow Control - F..K - valve, enables the control of several loads simultaneously from only a single hydraulic pressure source. The MFC-valve was the first on the market to allow several loads to be controlled virtually independently due to the fact that each directional control section is fitted with a 2-way pressure compensator as standard.

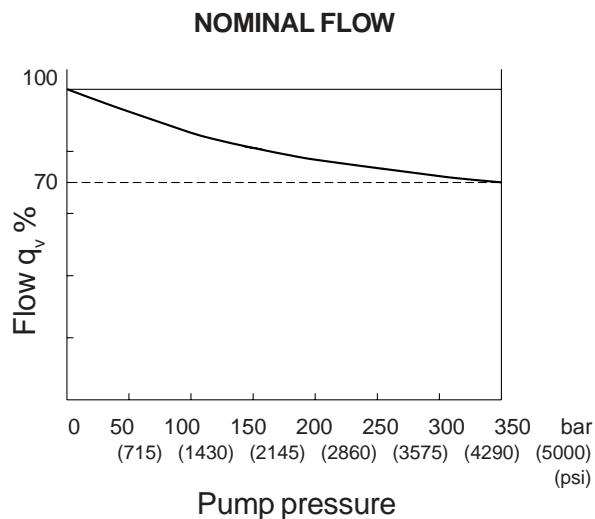
An arrangement using a commercially available pressure compensator valve on the inlet side of the proportional control valve makes the flow control more dependent of the supply pressure. This is caused by the fact that the flow will greatly decrease if there is a high differential pressure over the pressure compensator valve due to the hydrodynamic forces acting on the valve spool. While a large load may require a pump pressure of 350 bar (5000 psi) on one control section, a light load connected to another directional control section and requiring only 20 bar (286 psi), will decrease to 70% of the nominal flow rate of the valve under normal condition. Please follow the flow-pressure curve indicated in Fig. 1.

AMCA improved the control even further, a sophisticated compensator is standard. This compensator is the unique feature which allows the MFC-valve to successfully control several loads simultaneously & pressure independently with a reduced flow variation. Even less than 5% is possible!(Fig.2)

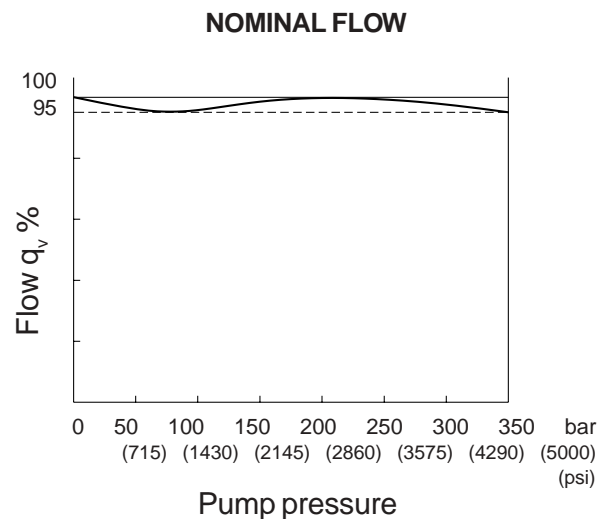
The valve can be supplied with electrical (E), manual (H) and hydraulic (O) controls as well as with an auxiliary manual control on E and O if required. Several optional adjustments and compensators can be provided.

The MFC is also available for load sensing systems. From the data it can be seen that using the AMCA MFC-valve enables the maximum flow rate and maximum supply pressure to be separately adjusted for each service port. These options make the valve particularly user friendly with easy adaption to the control system to give the required characteristics desired.

### Influence of pump pressure to flow variation



**Fig. 1**  
With commercially available compensator



**Fig. 2**  
AMCA MFC-valve

## OPERATION

### **AMCA-MFC-F..K in combination with a fixed volume pump (Example 1 on page 6).**

This combination allows several loads to be connected in parallel for simultaneously and independent operation regardless of the load/pump pressure variations while the flow through the valve can be proportionally controlled between zero and a preset maximum limit.

#### **Inlet Plate**

The circuit diagram (example 1, page 6) shows a fixed volume pump connected to an inlet plate with a pressure compensator acting as a by-pass flow control valve and also as a circulating valve when the directional spools of the control valve sections are in neutral position.

The pump pressure delivered to port P1 is applied to the bottom face of the pressure compensator spool and the spring chamber is connected via shuttle valves to the "load-pressure check back"-system.

In neutral position of the directional control spools, the "load-pressure check back"-system is vented to tank.

Under these conditions, the spring side of the compensator spool is affected only by the return pressure of the tank connection and a small amount of spring force (minimum circulating pressure drop). If one or more control valve sections of the MFC are used, the highest load pressure arising is applied over the shuttle valve cascade to the spring loaded face of the compensator regulating spool.

The maximum load-pressure can be restricted by the adjustable pilot relief valve on the inlet plate.

#### **Control Valves with Load-Sensing**

To operate a particular load, the appropriate 4/3-directional control spool is moved into an actuated position. The pressurised working ports are connected to the "load pressure check back"-system.

So that the pump pressure matches the highest load pressure of all working ports and at the same time, the respective load-pressure is fed to the spring chambers of the 2-way pressure compensators fitted to each directional control spool on the different valve sections.

Directional control spools and pressure compensators act as series flow control valves, so that the flow from each control section remains constant at all times.

The flows can be controlled in proportion to the input signals connected totally independently of one another and regardless of the individual loads.

The maximum output flow of the working ports A and

B can be adjusted separately from 100% to 50% by altering the two flow limiters (code R), which control the pressure drop of the "load pressure check back"-system.

During operation the maximum load pressure can be set with pilot relief valves (code D, E and F). The same function can be achieved by using the remote control ports  $V_a$  and/or  $V_b$  (code W,X and Y). Versions with shock/suction valves in A and B (code Z) are also available.

#### **End Plate**

Several different end plate versions are available. For AMCA-MFC with electrically controlled valves the version with a reducing valve for internal pilot pressure is recommended (F..KPE), otherwise use for external pilot pressure feeding, max. 28 bar (400 psi) (F..KPX). The version with a reducing valve can also be used for the feeding point, 28 bar (400 psi), for a hydraulic joystick.

An extra pump-connection (P2) and a LS-signal of a second valve-block on the "Z-port" belong to the variants. The assembly kit is included in the end plate ordering code.

### **AMCA-MFC-F..K in combination with a variable volume (load-sensing) pump (Example 2).**

The MFC-valve offers further advantages by being able to work with a "load sensing pump".

The "load pressure check back"-system of the MFC is connected to the load sensing port (LS) at the selected inlet plate (page 6) and to the compensator control of the variable volume pump.

This maintains a constant pressure drop " $\Delta p$ " between the load- and pump pressure and maintains a constant flow.

In this case the load sensing pump overrides the function of the pressure compensator valve on the inlet plate (example 1), but with minimum power consumption.

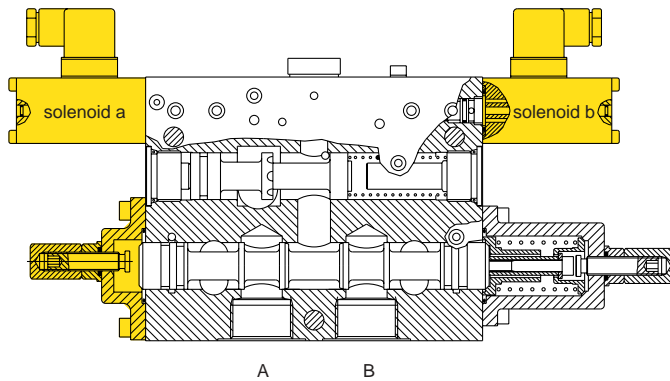
#### **Combiplate**

If different flows are needed, for example 200 and 75 l/min (53 and 20 USgpm) or less, a combination plate is available to connect the series F12K to the series F18K.

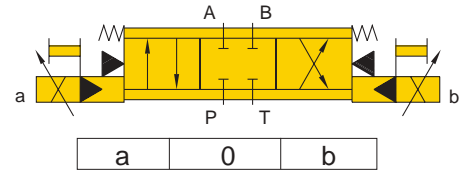
This is the most cheapest and flexible way for a compact combination of proportional directional control valves.

The combiplate is available for modelnumber F18KN, F18KS, F18KU and F18KR.

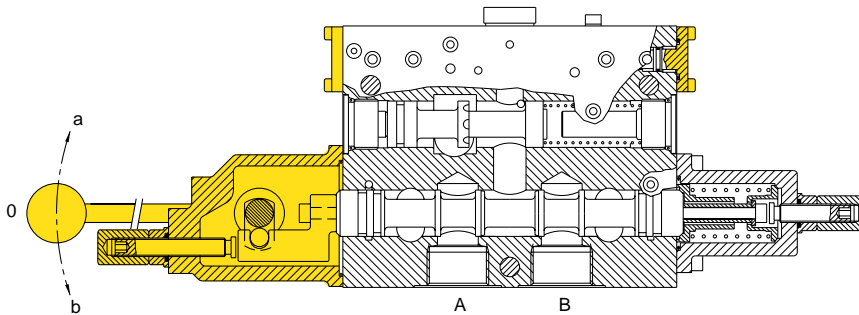
# OPERATION



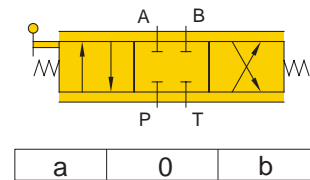
## ELECTRICAL F...KE



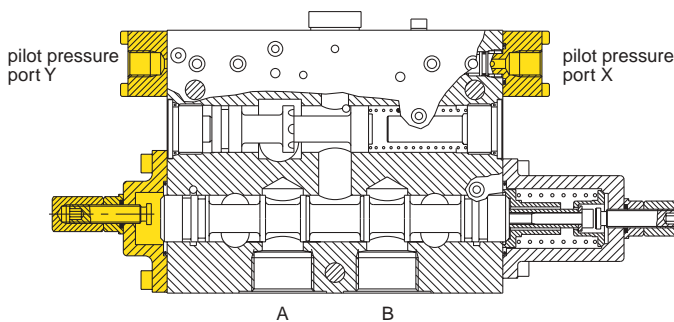
Solenoids  
 a = solenoid a energized; port A to pump  
 0 = solenoid a and b de-energized  
 b = solenoid b energized; port B to pump.



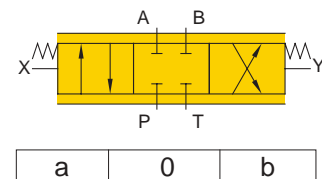
## MANUAL F...KH



Lever positions  
 a = port A to pump  
 0 = neutral position  
 b = port B to pump



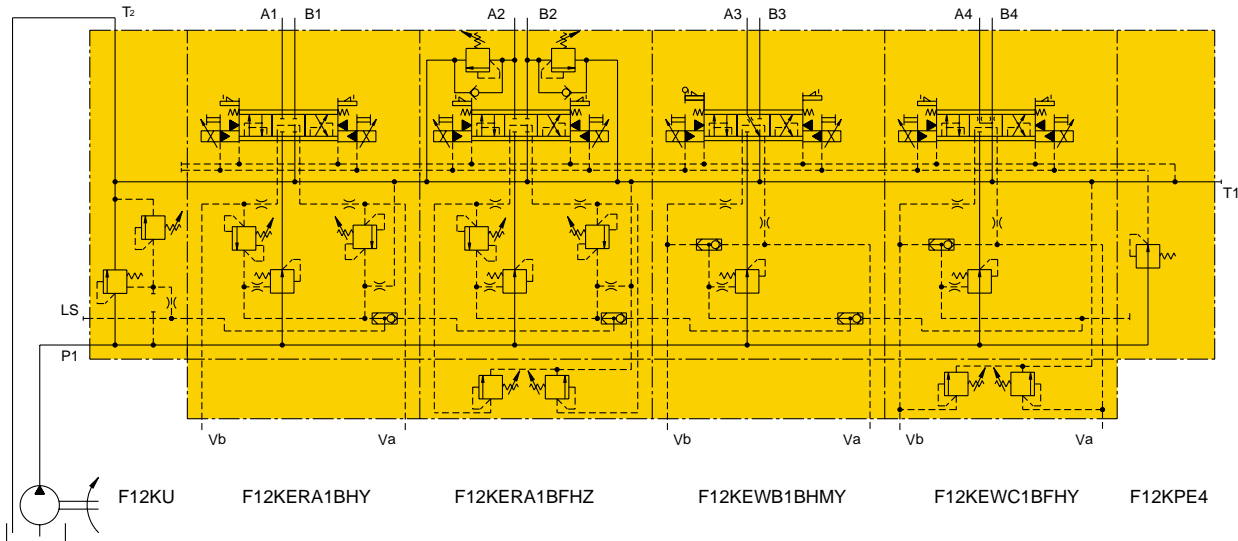
## HYDRAULIC F...KO



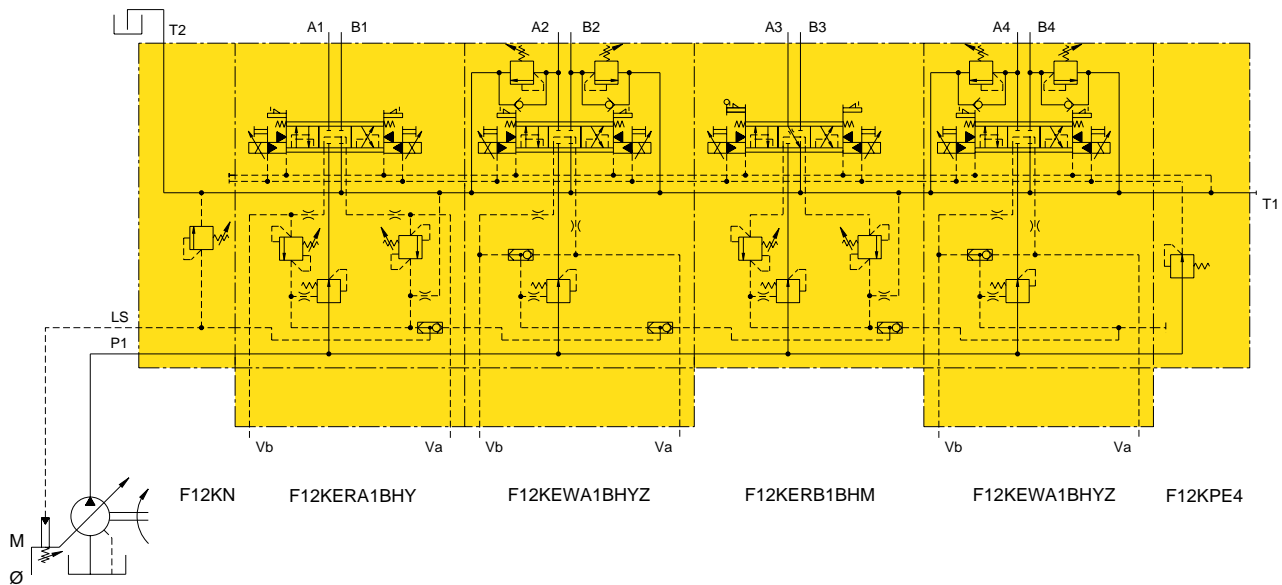
Pilot pressure ports  
 a = pilot pressure port X under pressure;  
 port A to pump  
 0 = pilot pressure ports X and Y without  
 pressure  
 b = pilot pressure port Y under pressure;  
 port B to pump.

# CIRCUITS

## Example 1: AMCA-MFC with a fixed displacement pump

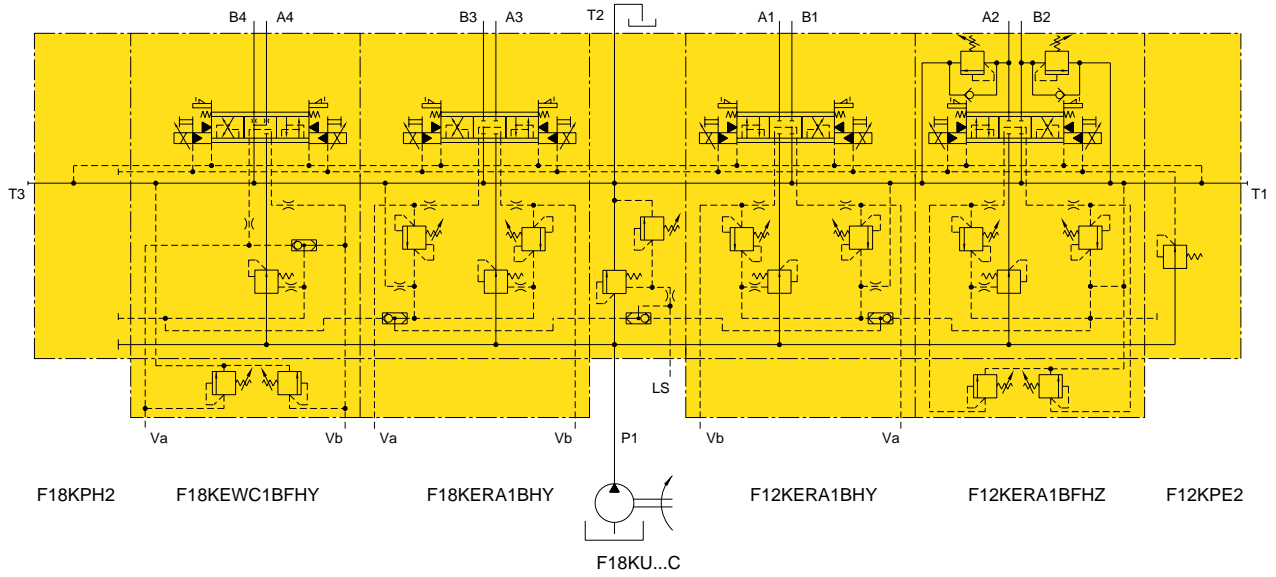


## Example 2: AMCA-MFC with a variable displacement pump with load- sensing control

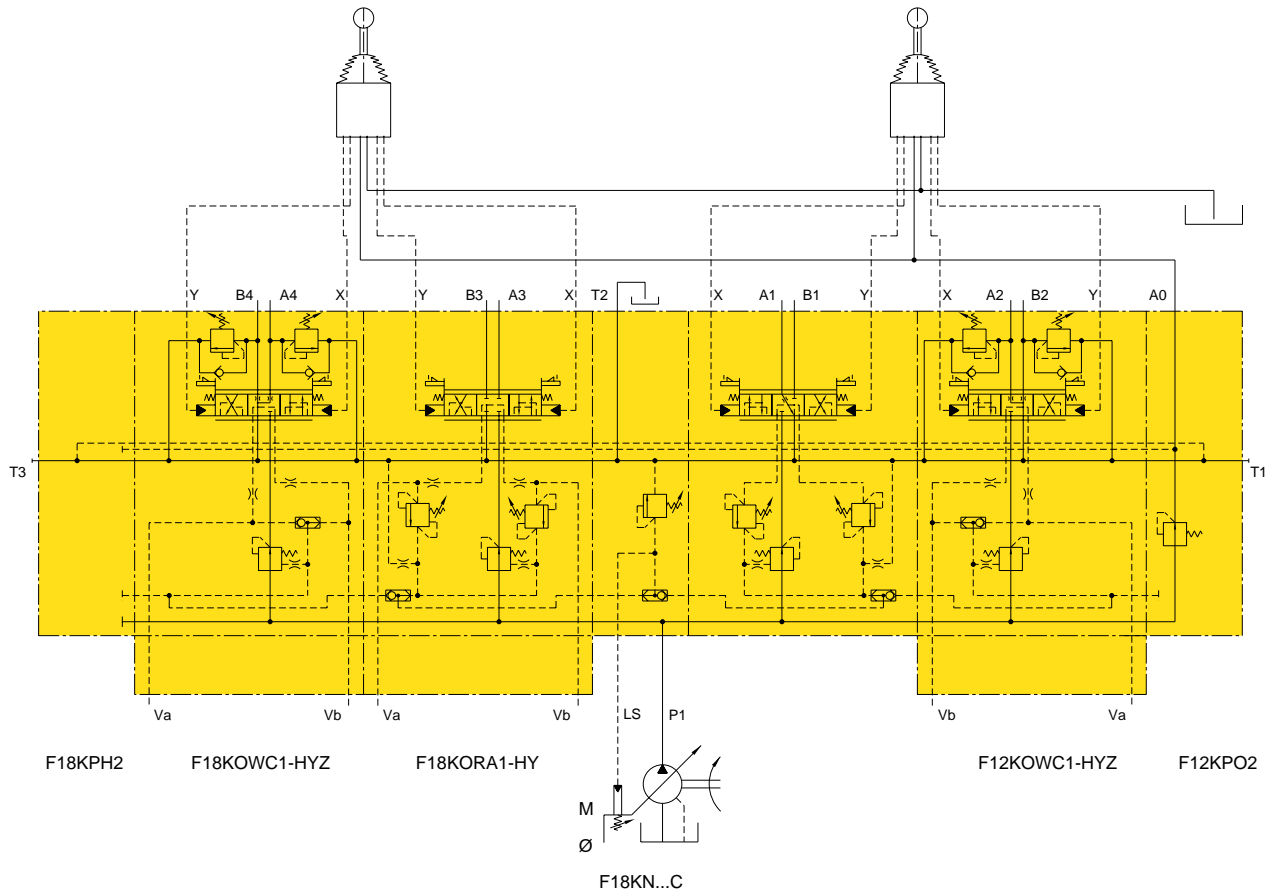


# CIRCUITS

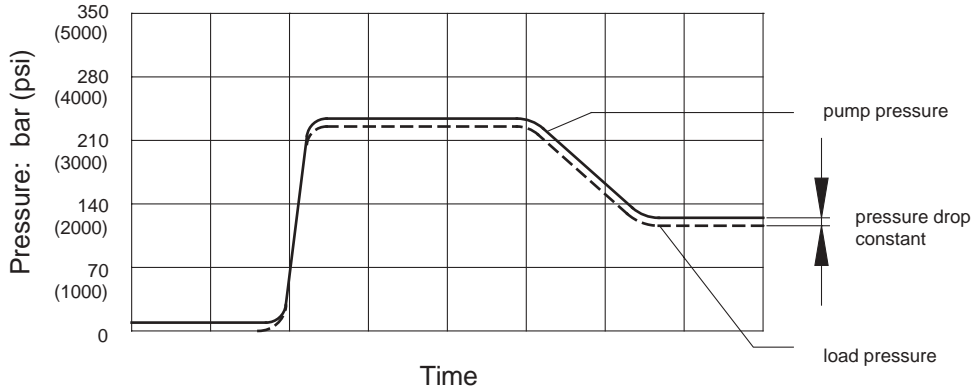
## Example 3: AMCA-MFC with combiplate F18KU...C



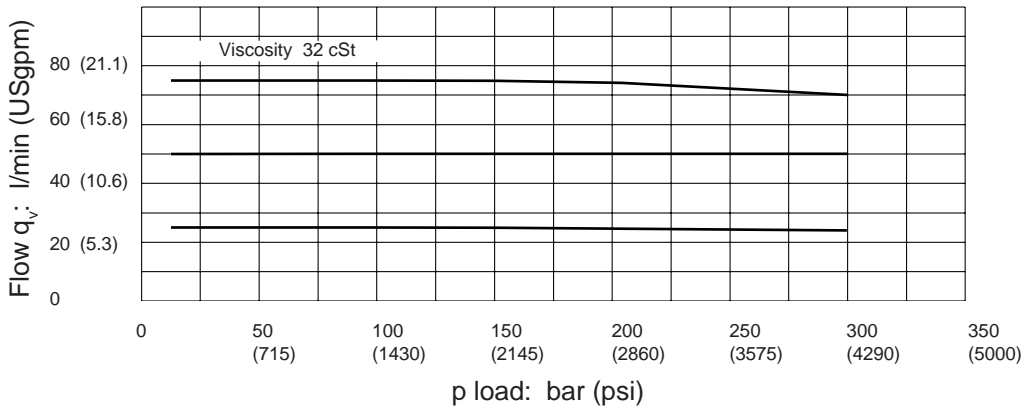
## Example 4: AMCA-MFC with combiplate F18KN...C



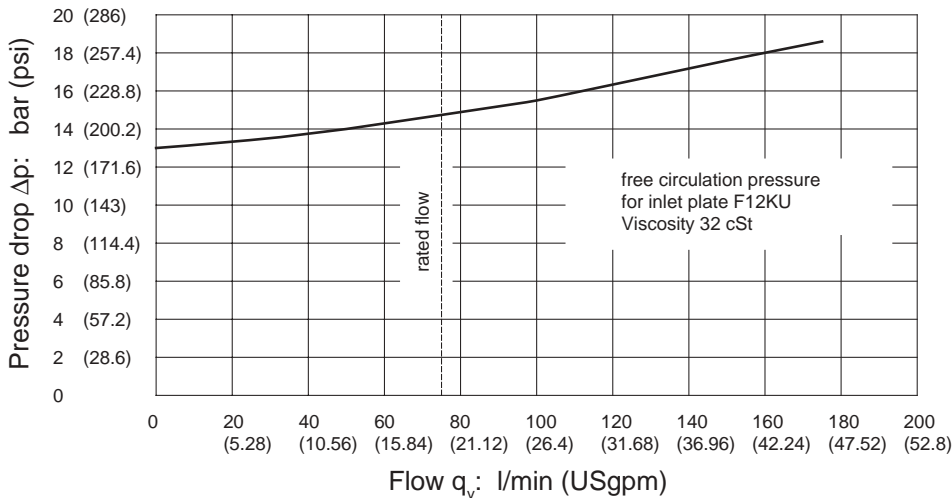
Constant flow at load pressure variation (example)



Load-characteristics  $q_v - p$

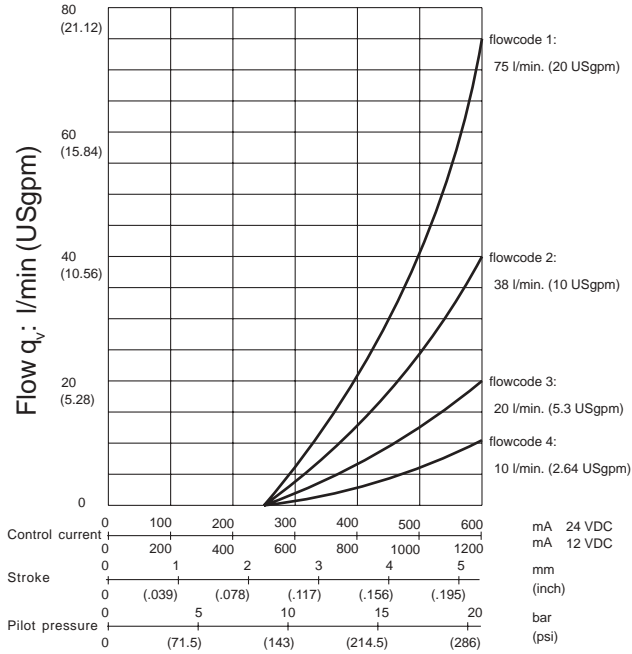


Flow  $P \rightarrow T2$

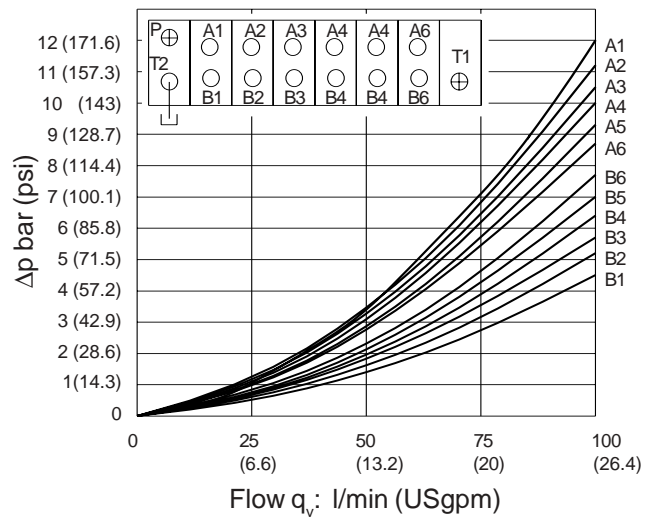


Please note: In systems with a pumpflow > 160 l/min. (42.24 USgpm) use endplate with P2 port (ordering code F12KP..P)

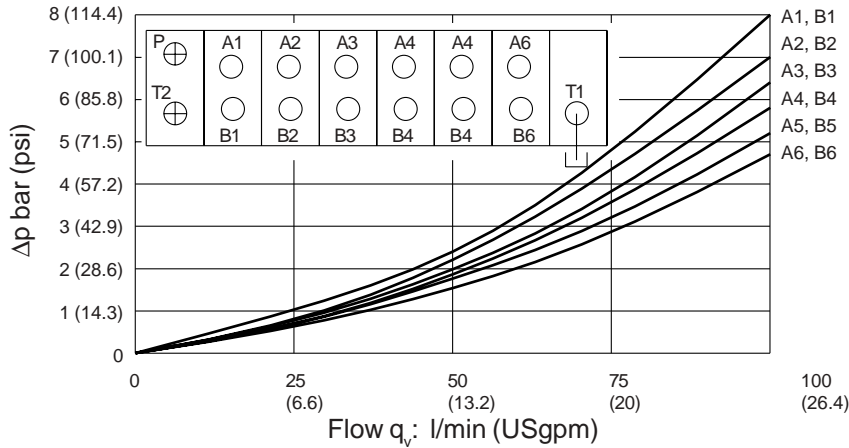
Nominal flow P → A/B



Pressure drop A/B → T2

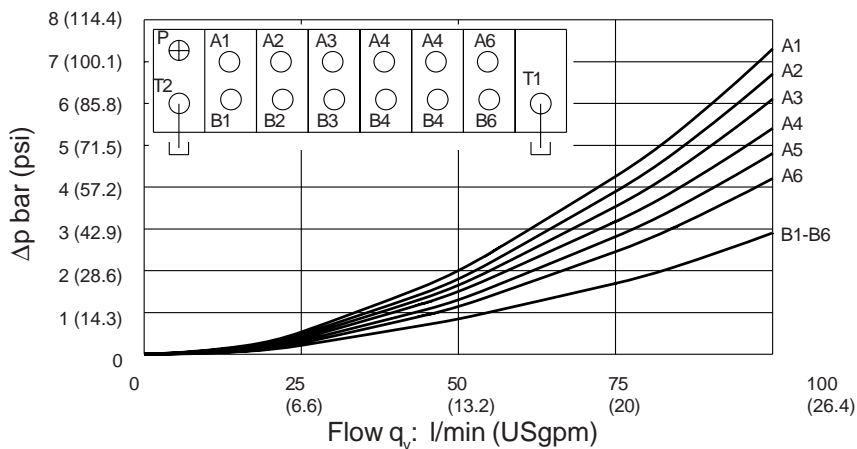


Pressure drop A/B → T1

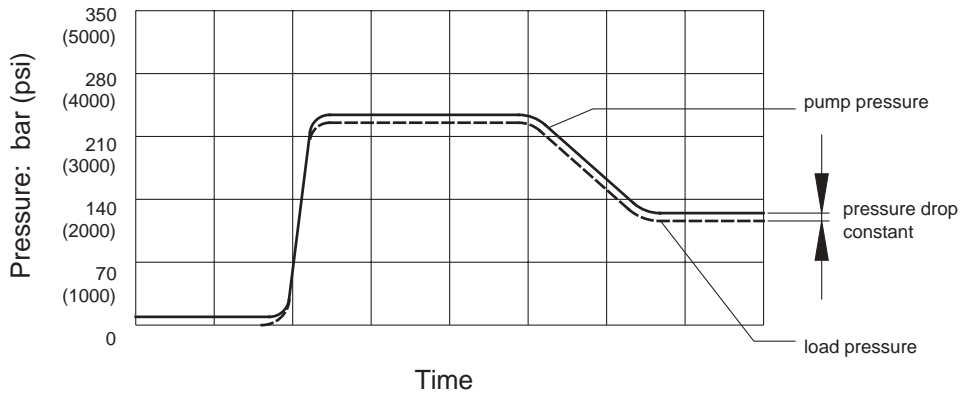


Measured with A-spool and max. spoolopening. Viscosity 32cSt.

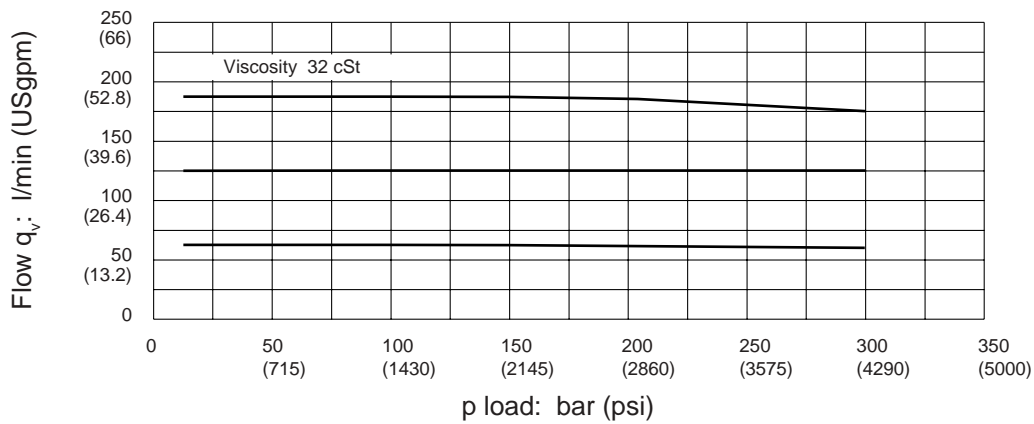
Pressure drop A/B → T1 & T2



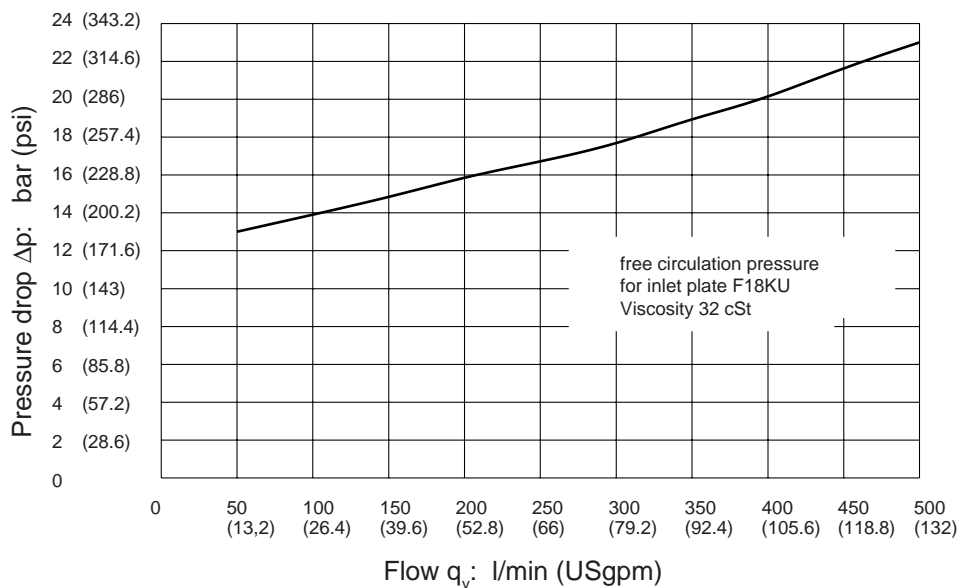
Constant flow at load pressure variation (example)



Load-characteristics  $q_v - p$

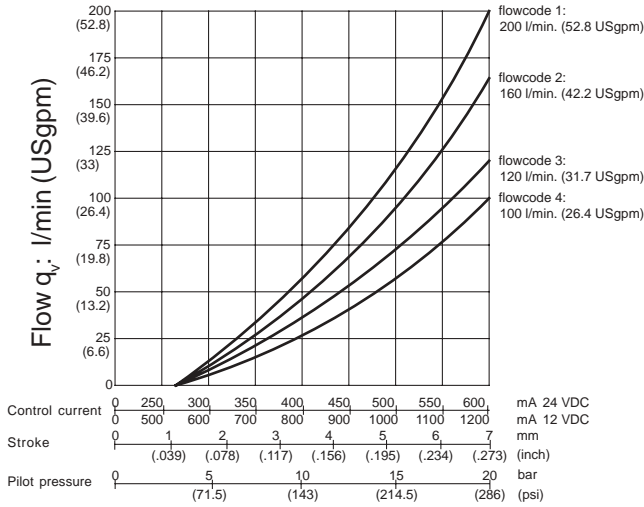


Flow P → T2

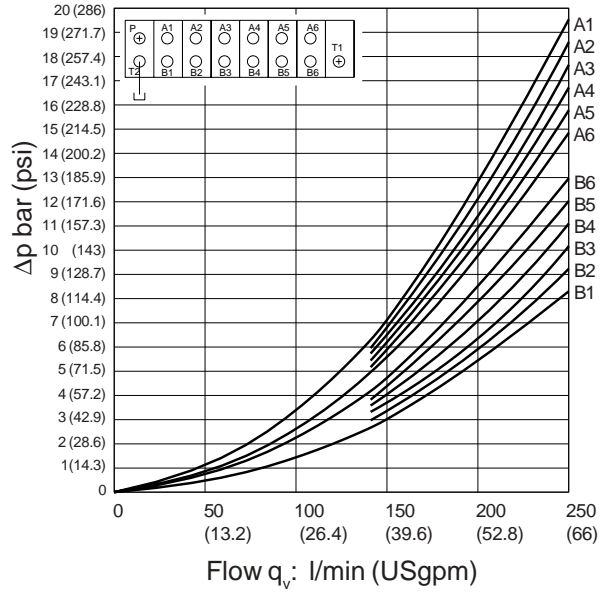


Please note: In systems with a pumpflow > 320 l/min. (84.48 USgpm) use endplate with P2 port (ordering code F18KP..P)

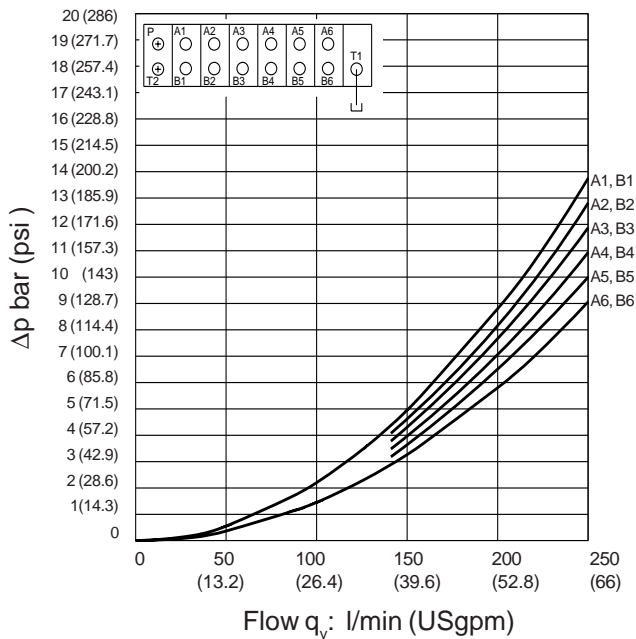
Nominal flow P → A/B



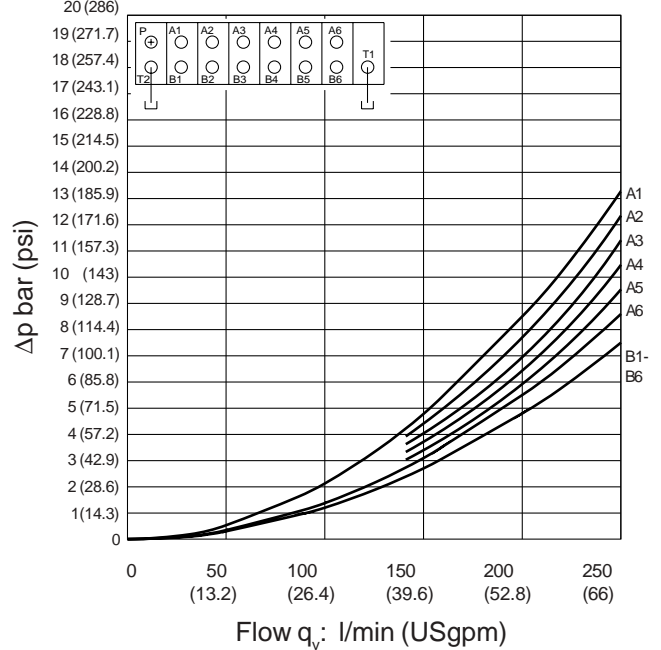
Pressure drop A/B → T2



Pressure drop A/B → T1

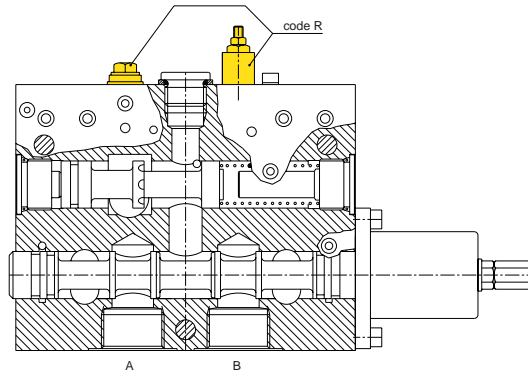


Pressure drop A/B → T1 & T2

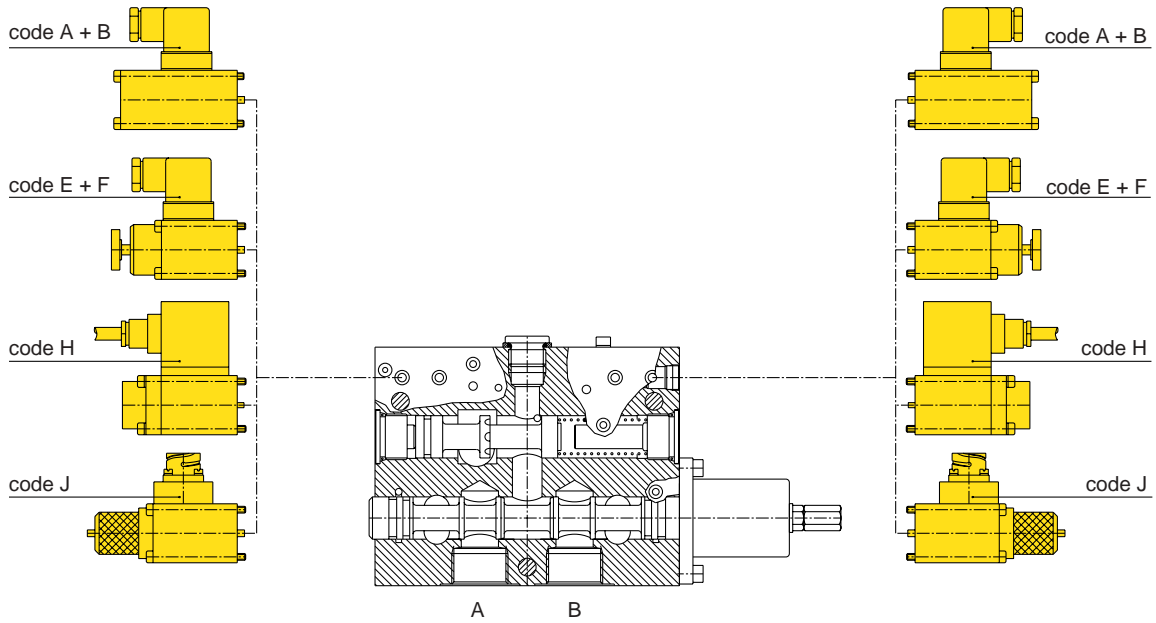


Measured with A-spool and max. spoolopening.  
 Viscosity 32cSt.

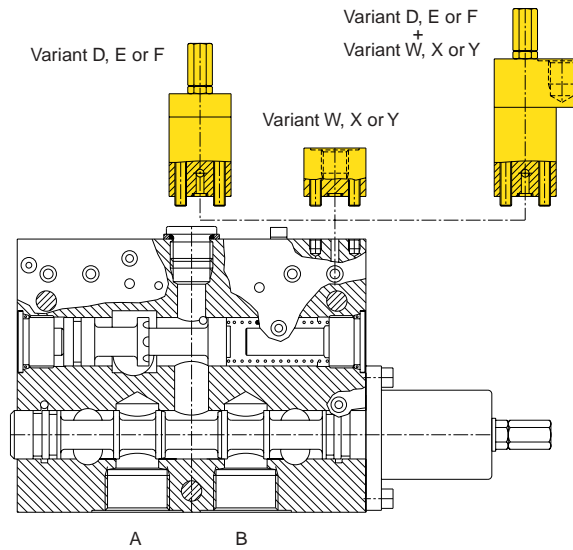
**FLOW LIMITATION**



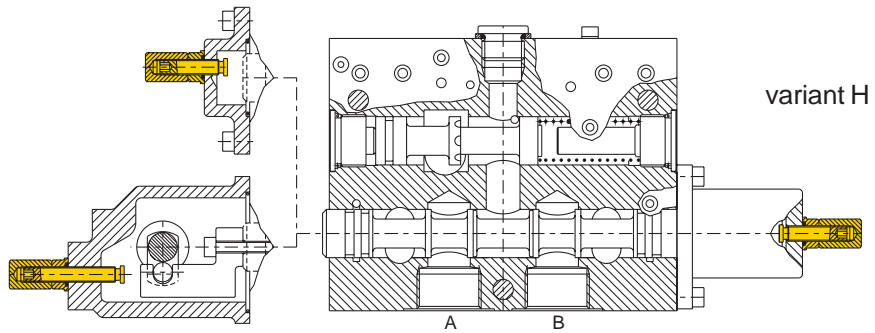
**SOLENOIDS**



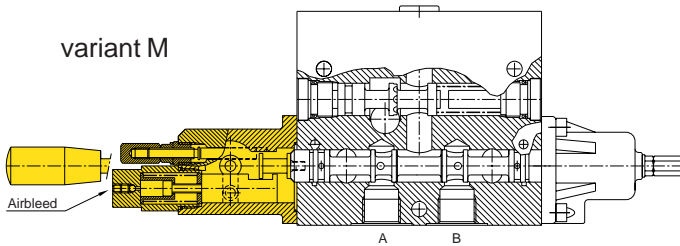
**PORT PRESSURE SETTING AND/OR PORT REMOTE CONTROL**



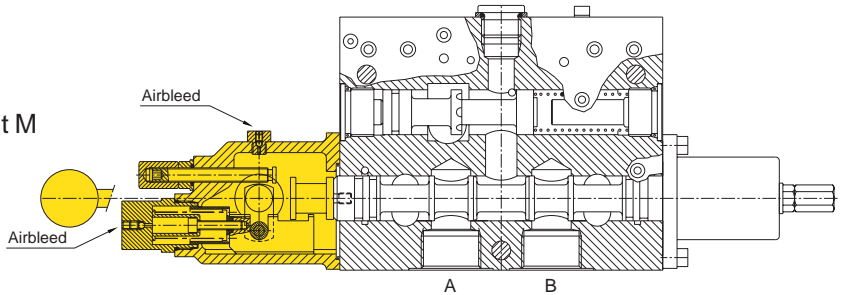
**STROKE LIMITATION (STANDARD)**



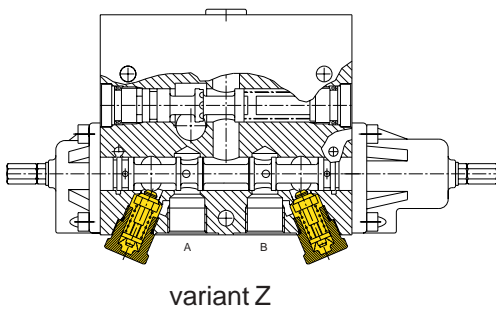
**ADDITIONAL MANUAL CONTROL F12K**



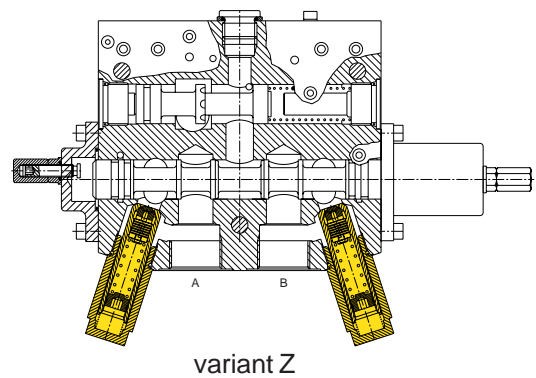
**ADDITIONAL MANUAL CONTROL F18K**



**SHOCK SUCTION VALVES F12K**



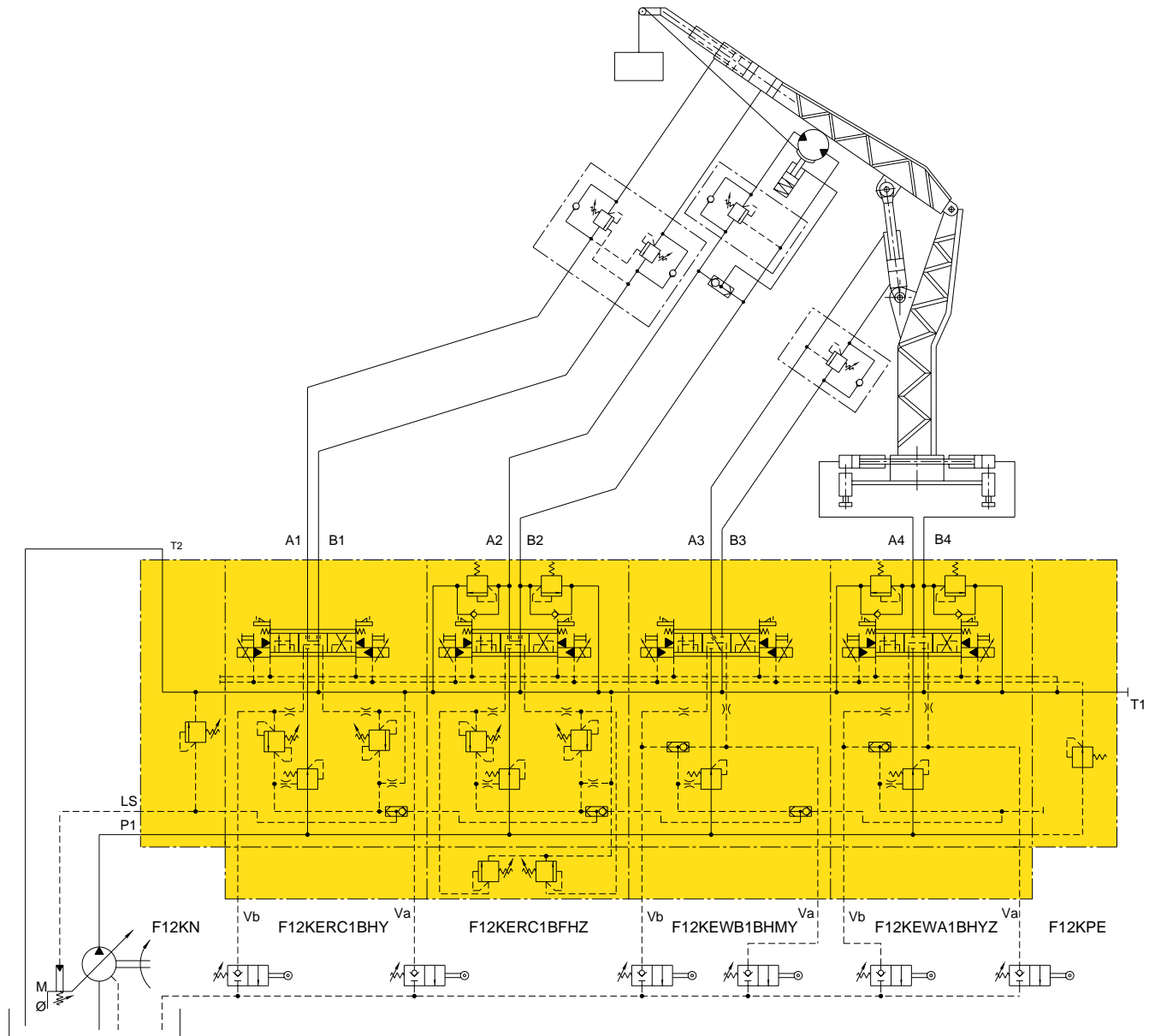
**SHOCK SUCTION VALVES F18K**





"HYDRALIFT" - PIPE HANDLING CRANE

Example



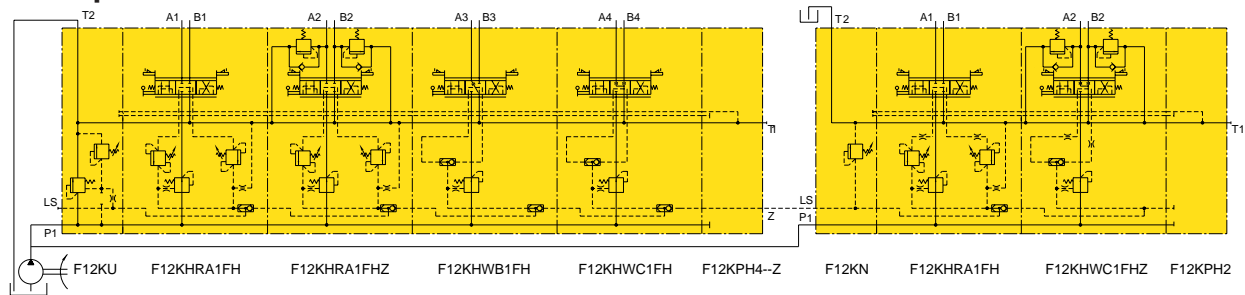


*SKYWORKER*



*CONCRETE PUMP*

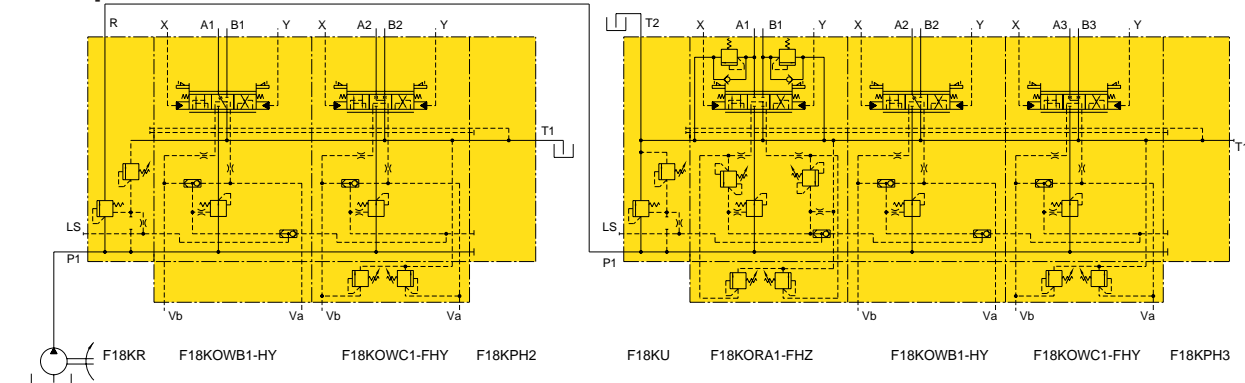
**Example:**



**Parallel circuit with fixed displacement pumps.**

When two valve blocks of the same size, or different size are to be combined, port Z in the end plate can be used. This port is to be connected to port LS of the following valve block, which requires only a simple inlet plate F..KN (see ordering code). In this case, the valves are in parallel, and it is only the LS line between Z and LS which is connected in series.

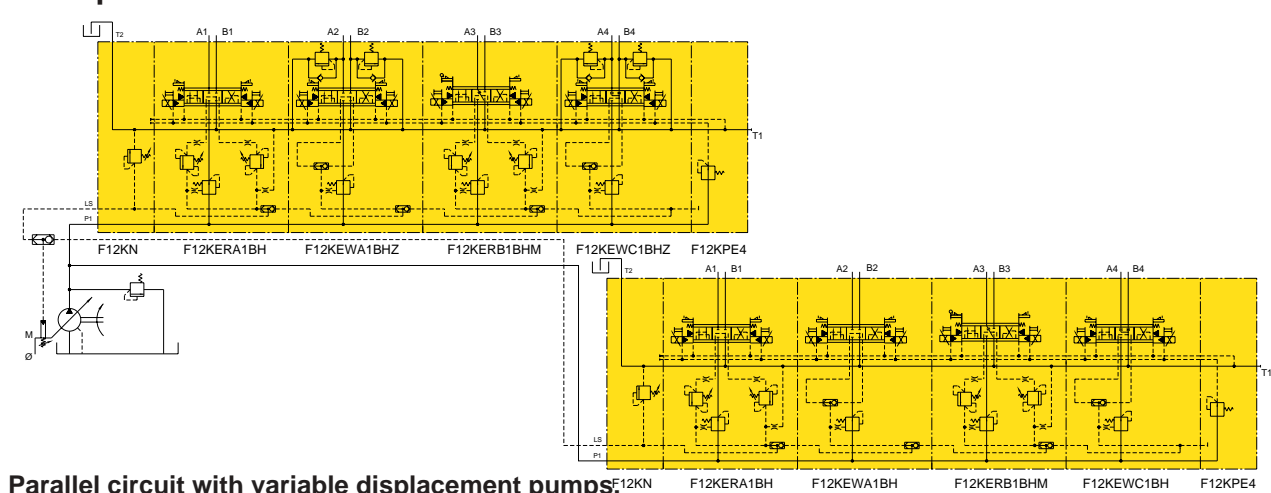
**Example:**



**Series circuit with fixed displacement pumps.**

With the inlet plate F..KR there is an additional possibility of directing the pumpflow from P to R in order to feed another circuit. The valve block combination with the inlet plate F..KR generally must have a T1 connection to tank on the end plate.

**Example:**



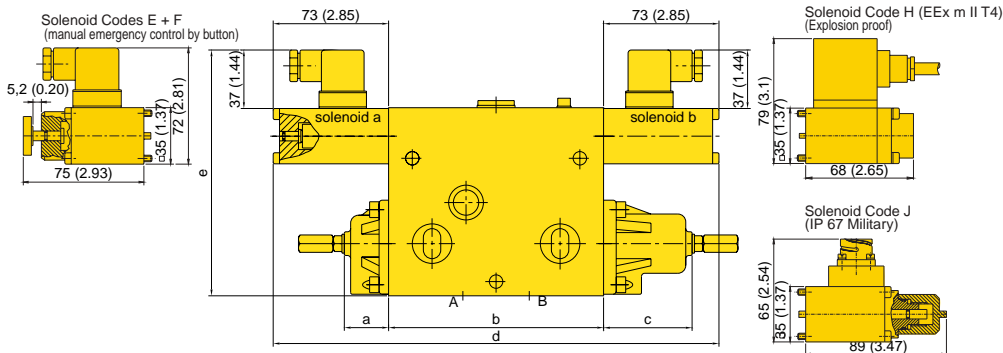
**Parallel circuit with variable displacement pumps.**

This system with variable displacement (LS) pump makes it possible to have a load independent simultaneous use of several directional control valves.

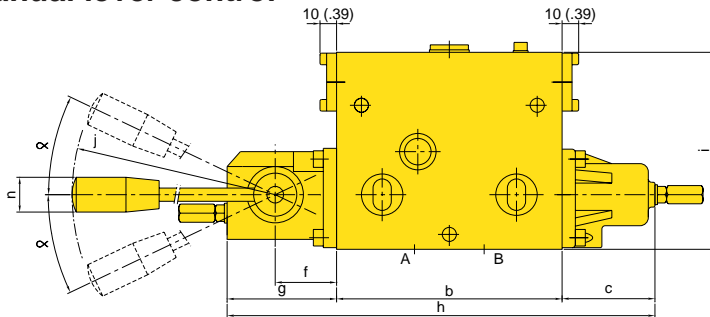
Both inlet plates are a simple F..KN, which LS connecting lines are connected over a shuttle valve to the LS port of the pump.

Dimensions in millimetres (inches)

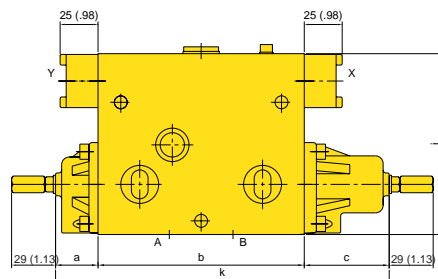
**Electrical control**



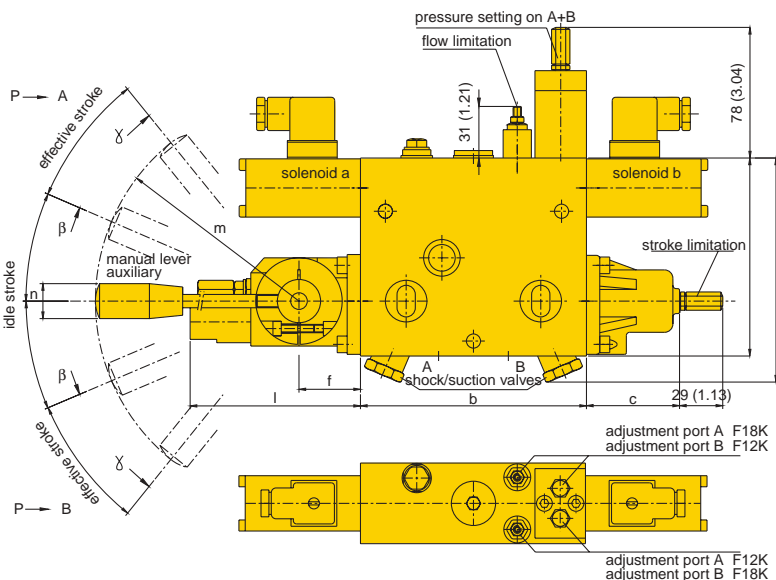
**Manual lever control**



**Hydraulic control**



**Directional control valve with variants**



**SERIES F12K F18K**

Connecting threads DIN-ISO-228

|                        |            |            |
|------------------------|------------|------------|
| A,B                    | 1/2" BSP * | 1" BSP *   |
| P1,P2,T1,T2,T3         | 3/4" BSP * | 1" BSP *   |
| AO,L,LS,Va,Vb,X,X1,Y,Z | 1/4" BSP * | 1/4" BSP * |

\* Other thread on request

Dimensions: mm (inch)

|   |              |               |
|---|--------------|---------------|
| a | 28 (1.09)    | 23,5 (0.92)   |
| b | 136 (5.30)   | 180 (7.02)    |
| c | 56 (2.18)    | 65 (2.54)     |
| d | 282 (11.10)  | 326 (12.71)   |
| e | 157 (6.12)   | 177,5 (6.92)  |
| f | 37 (1.44)    | 45 (1.76)     |
| g | 66 (2.57)    | 94 (3.67)     |
| h | 258 (10.06)  | 339 (13.22)   |
| i | 119 (4.64)   | 141 (5.50)    |
| j | 165 (6.44)   | 280 (10.92)   |
| k | 220 (8.58)   | 268,5 (10.47) |
| l | 102,5 (4.04) | 121,5 (4.74)  |
| m | 165 (6.44)   | 280 (10.92)   |
| n | Ø21 (0.82)   | Ø30 (1.17)    |
| r | 135 (5.27)   | 207 (8.07)    |
| α | 25°          | 33°           |
| β | 23°          | 33°           |
| γ | 48°          | 53°           |

Weight: N (lbs)

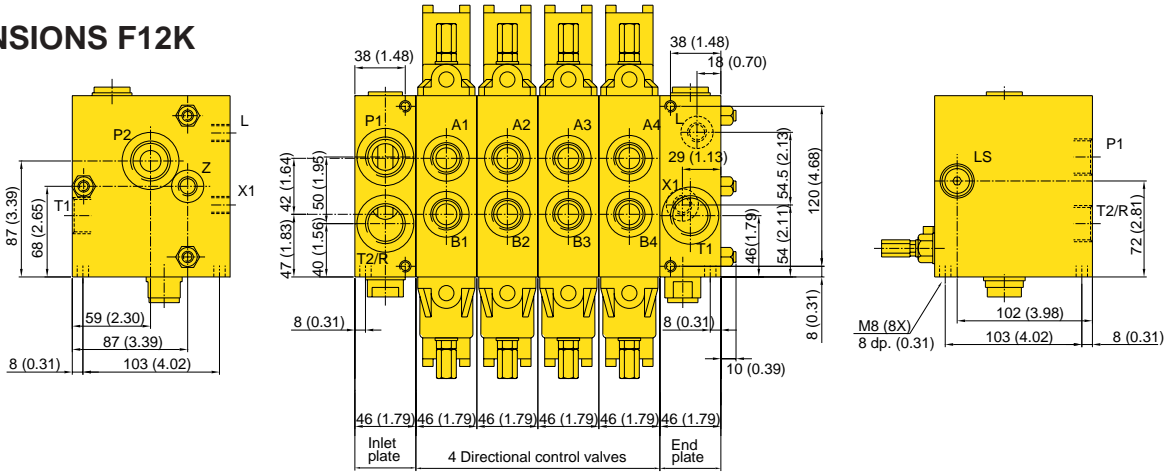
|             |           |            |
|-------------|-----------|------------|
| Inlet plate | 46 (10.1) | 93 (20.5)  |
| Valve F..KE | 61 (13.4) | 118 (26.5) |
| Valve F..KH | 72 (15.9) | 123 (27.1) |
| Valve F..KO | 61 (13.4) | 118 (26.5) |
| End plate   | 49 (10.8) | 95 (20.9)  |
| Combi plate |           | 93 (20.5)  |

Weight assembly kit: N (lbs)

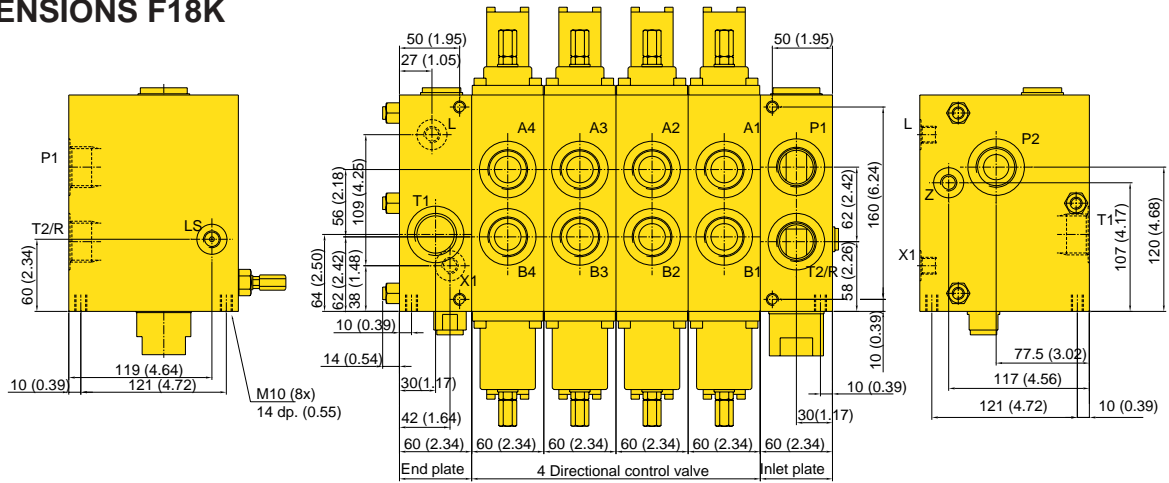
|                       |            |            |
|-----------------------|------------|------------|
| with 1 control valve  | 1,47 (0.3) | 2,94 (0.7) |
| with 2 coltrol valves | 1,96 (0.4) | 3,92 (0.9) |
| with 3 control valves | 2,35 (0.5) | 5,00 (1.1) |
| with 4 control valves | 2,75 (0.6) | 6,08 (1.4) |
| with 5 control valves | 3,24 (0.7) | 7,16 (1.6) |
| with 6 control valves | 3,63 (0.8) | 8,24 (1.9) |
| with 7 control valves | 4,12 (0.9) | 9,32 (2.1) |
| with 8 control valves | 4,51 (1.0) | 10,3 (2.3) |

Dimensions in millimetres (inches)

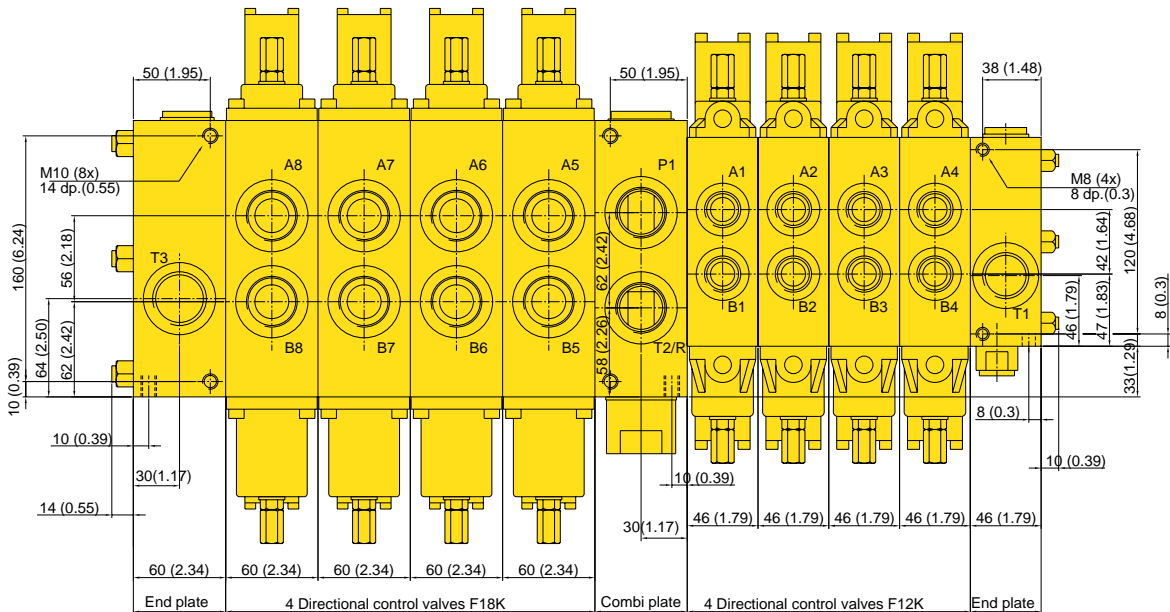
**DIMENSIONS F12K**



**DIMENSIONS F18K**



**DIMENSIONS F12K IN COMBINATION WITH F18K**



## MAINTENANCE DATA

### Mounting procedure / Installation

- It is absolutely essential to ensure that the MFC and their pipelines are to be laid free of distortion and stress when being fitted. For connections, use only fittings with parallel thread, never tapered screw thread.
- It is recommended to make additional use of the second T port in the presence of high return-flow rates (e.g. cylinder with area ratio 2:1) and for MFC valves with a large number of control valves.
- It is recommended to connect a differential cylinder with the bottom side on the B-port, because the pressure drop from the B-port to tank is lower than from the A-port.
- Avoid ingress of contaminants during mounting.

### Fluid maintenance

Due to the construction, these AMCA-valves, are not highly susceptible to particulate (silt type) lock, nor to contaminant wear. Therefore the contaminant sensitivity is very low.

- Use mineral oil (recommended ISO/VG-32). Other fluids on request.
- Keep the contamination level better or equal NAS 1638 class 8 or ISO 17/14.

### Start-up procedure

- Start the system-flushing procedure with the adjustment-screw of relief valve (see fig. A) fully released to achieve the minimum pressure.
- Turning the adjustment-screw clockwise ( $360^\circ$  turn = ca. 100 bar, 1430 psi), the maximum load-pressure rises up to the desired level. (max. 350 bar, 5000 psi). During this adjustment the end-users (cylinder and/or motor) should be blocked.
- Check the valve-function and the tightness of fittings etc.
- If necessary use the stroke limiting screws and the bleeding screws to bleed the endcaps and handle mechanism, during the system bleeding.

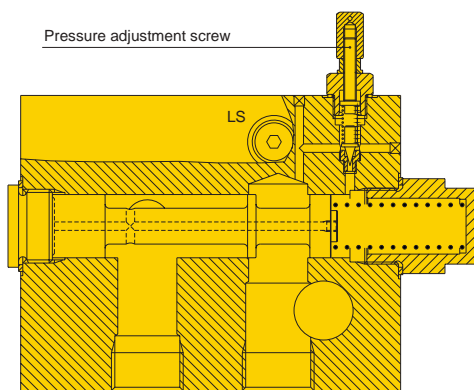


Fig.A

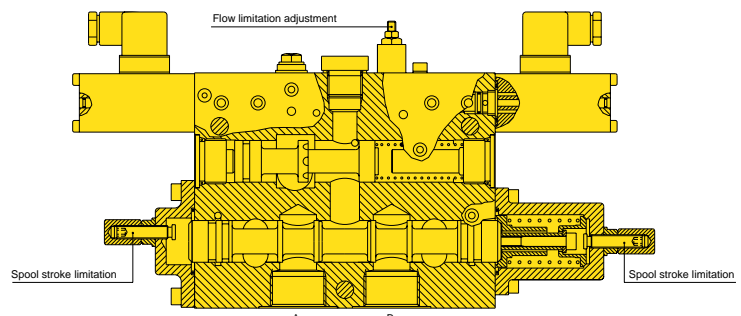


Fig.B

### Flow-adjustment

Factory-setting of flows, as ordered in ordering code. If, after long life-cycle, re-adjustment should be necessary, two possibilities are available, depending on the configuration:

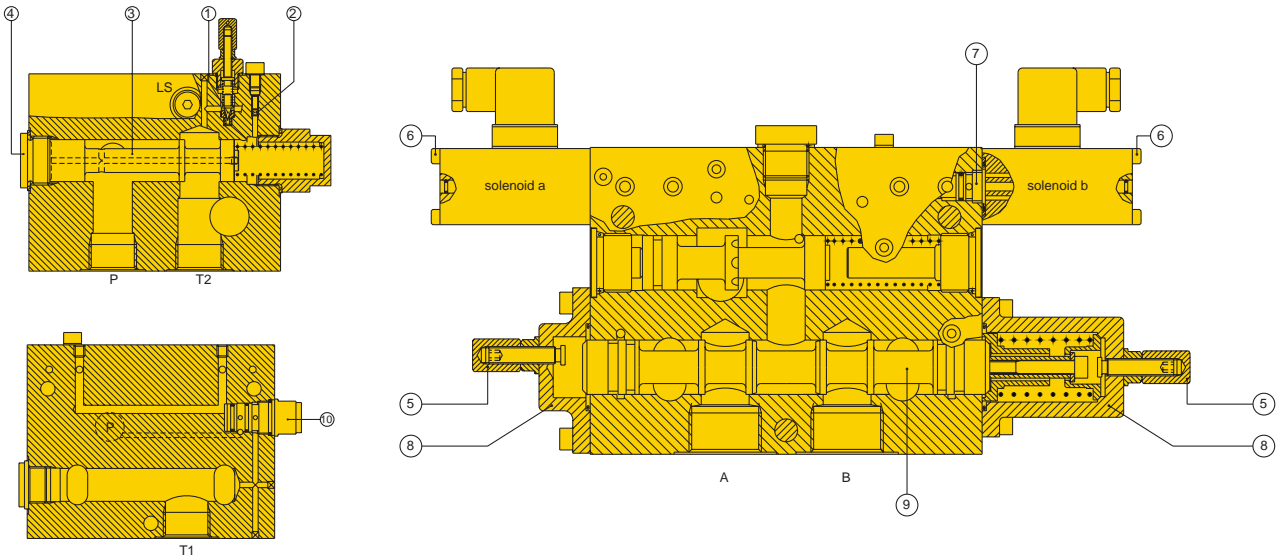
1. Stroke limiter (see fig. B)
  - Remove cover-screw of stroke limiter
  - Loosen the lock-nut
  - Turn the stroke limiting screw (width 4) clockwise to reduce flow and anti-clockwise to enlarge flow.
  - Tighten lock-nut.
2. With flow limitation, adjustment (see fig. B)
  - Loosen the lock-nut (width 8)
  - Turn the adjustment screw (width 2,5) clockwise to reduce the flow
  - Turn anti-clockwise to enlarge the flow
  - Tighten lock-nut.

Note: Flow limitation adjustment to set in situation without pressure only.

### Overrunning

The inlet 3-way pressure compensator operates as an "inlet-side" control system. To prevent "overrunning" or "fall-off" in the event of a negative load, suitable brake or overcentre valves will need to be installed between the load and the control valve section. These valves must be capable of providing the necessary control pressure simultaneously.

## TROUBLE SHOOTING



### A. SYSTEM PRESSURE TOO LOW OR SET PRESSURE CANNOT BE REACHED

#### 1. Relief valve cartridge fouled

Cause: dirt particles jammed between cone and seat. (1)

Solution: turn adjustment anti-clock wise, activate a directional valve several times. If necessary, dismantle. If damaged, replace cone and seat (if necessary).  
Examine the system filter.

#### 2. Damping throttle (2) blocked (dirt or fouled)

If necessary remove, clean and replace.

#### 3. MUV-spool (3) jammed open

When removing lower end-cover (4) the spring should push out the spool. Remove and examine the spool and bore for damage. Deburr with care. Flush the spool to remove dirt.

#### 4. Faults in other components of the system

Damaged pump, motor, seals etc.

Note: The set pressure can only be reached if a cylinder is at the end of its stroke or a motor is stalled.

### B. USER MOVES ERRATICALLY

#### 1. Air in system

Bleed both end-caps with stroke limiting screws (5), or with the bleeding screws in handle mechanism (if present).

Slacken bolts (6) fixing the solenoids to body and retighten after repeated operation.

#### 2. Pilot valve faulty

Remove solenoid and screws out of the pilotvalve (7), check signalbore 0.6mm (0.023 inch) in the pilotspool on dirt.

If persistent, swap pilot valve (7) to another section to detect faulty unit.

#### 3. Excessive friction of directional spool

Remove both end-caps (8) and examine spool (9) and bore from dirt or damage. Deburr with care.

Examine system filter.

Also spool lock, when mounting faces are not flat.

#### 4. Excessive damping

See B2.

#### 5. Excessive friction in other components of the system.

### C. USER DOES NOT MOVE OR MOVES AT SLOW SPEED

#### 1. Damping throttle blocked or dirty

See A2.

#### 2. Relief valve setting too low

See A1.

#### 3. Directional spool does not shift

See B3 or pilot pressure reducing valve (10) is dirty, clean and replace.

#### 4. MUV-spool jammed open

See A3.

#### 5. There is insufficient user load.

### D. PUMP DOES NOT UNLOAD

#### 1. MUV-spool jammed

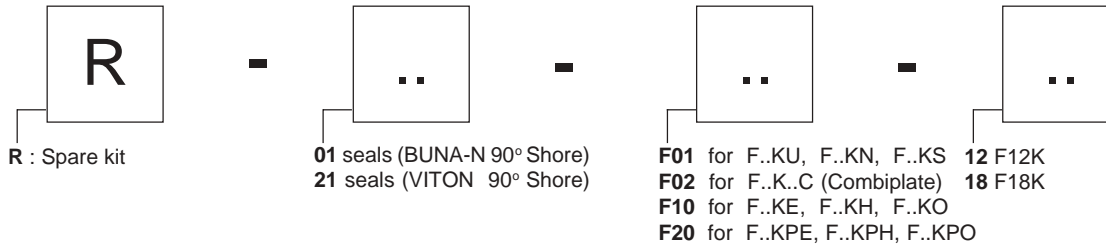
See A3

#### 2. Directional spool not centring

Excessive friction (see B3).

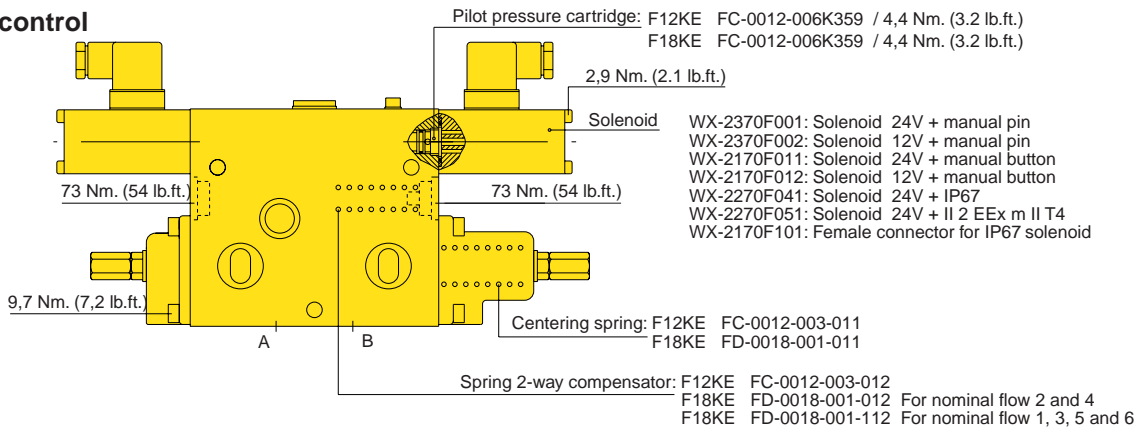
Electrical fault. Check the electrical circuit.

Spare part kits F12K/F18K

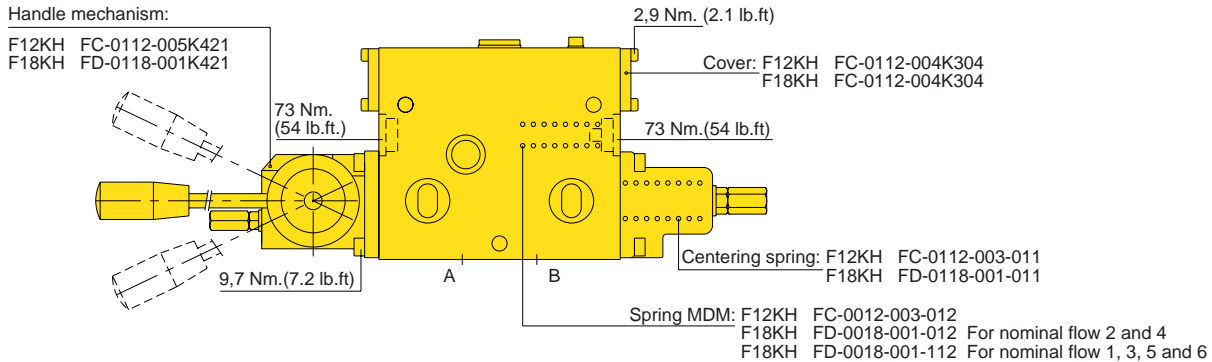


Recommended spare parts / Maximum tightening torques

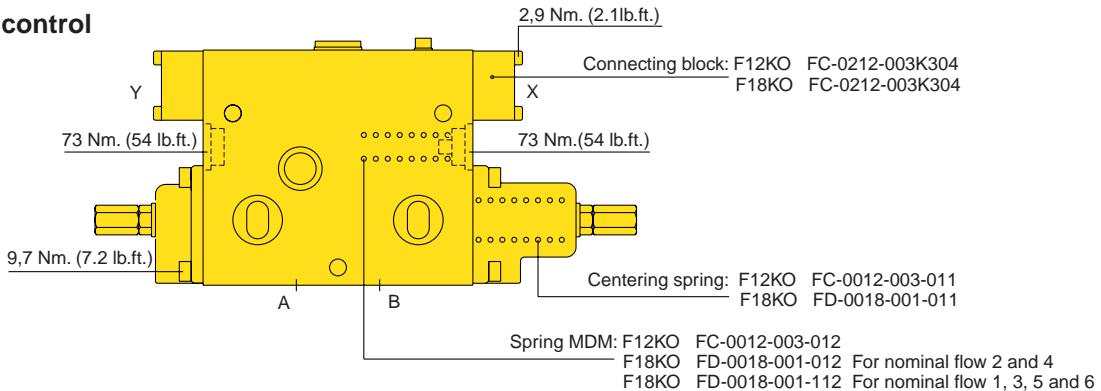
Electrical control



Manual lever control

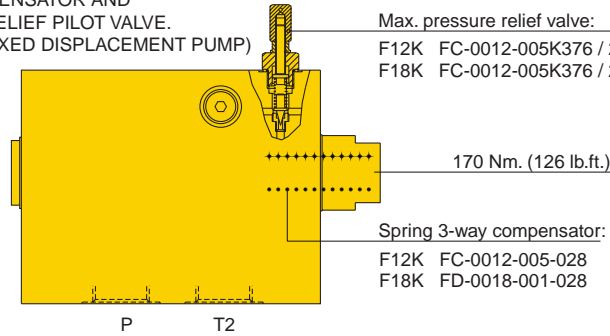


Hydraulic control



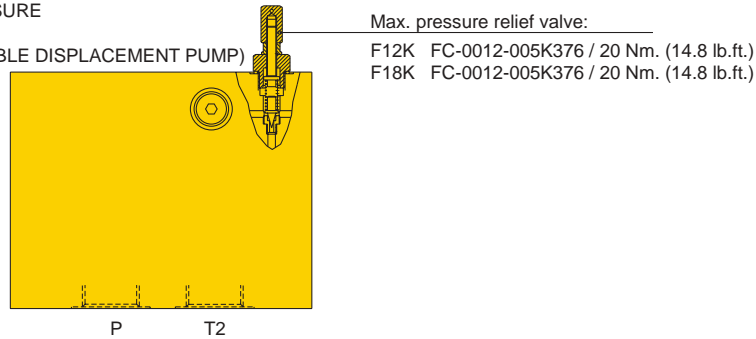
**Inlet plate**

WITH 3-WAY COMPENSATOR AND  
MAX.PRESSURE RELIEF PILOT VALVE.  
(SYSTEMS WITH FIXED DISPLACEMENT PUMP)



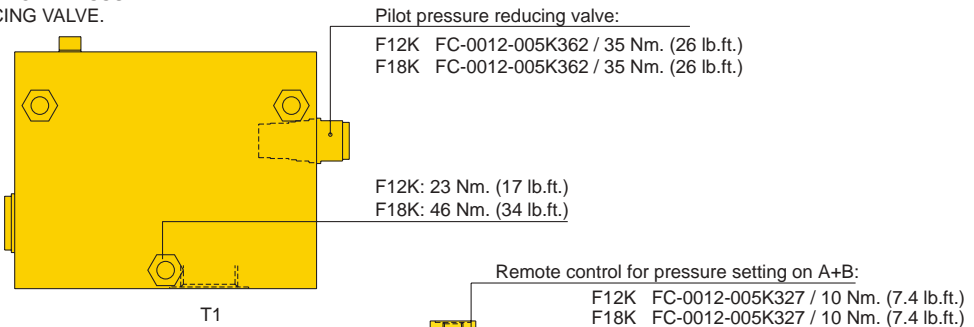
**Inlet plate**

ONLY WITH MAX.PRESSURE  
RELIEF PILOT VALVE.  
(SYSTEMS WITH VARIABLE DISPLACEMENT PUMP)



**End plate**

WITH PILOT PRESSURE  
REDUCING VALVE.



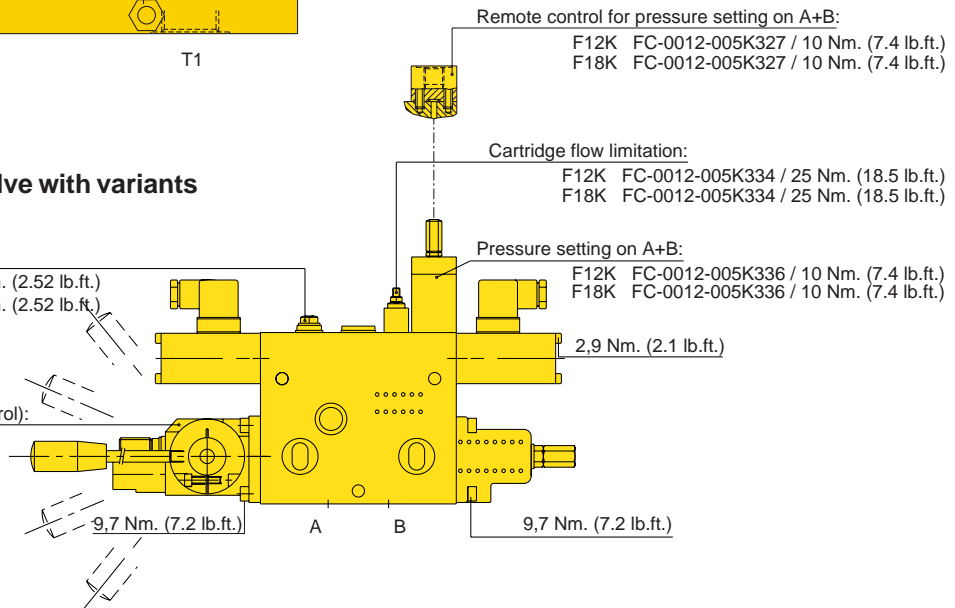
**Directional control valve with variants**

Pre load valve:

F12K FC-0012-006K365 / 34 Nm. (2.52 lb.ft.)  
F18K FC-0012-006K365 / 34 Nm. (2.52 lb.ft.)

Handle mechanism (auxiliary control):

F12K FC-0012-006K433  
F18K FD-0018-001K433



# ORDERING CODE - CONTROL VALVE

(For composing a valve block use a copy of the order form, page 26 or 27)

Ordering code: 

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| F | 1 | 2 | K | E |   |   |   |   |    |    |    |    |    |    |

**SERIES** \_\_\_\_\_

**SIZE** \_\_\_\_\_  
 12 = 1/2"  
 18 = 1"

**CONTROL** \_\_\_\_\_  
**E** = Electrically proportional  
**H** = Manual proportional  
**O** = Hydraulic proportional  
**9** = give description <sup>2)</sup>

**PROPORTIONAL FLOW SYSTEM** \_\_\_\_\_  
**W** = without flow limitation  
**R** = with flow limitation  
 (100...50% of nominal flow)

**MAIN SPOOL TYPE** \_\_\_\_\_  
**A,B,C,D,F,G,K,O.** (see page 2)

**VARIANTS**  
 w/o code = Buna-N seals (Std.)  
**D** = Pressure setting on A  
**E** = Pressure setting on B  
**F** = Pressure setting on A + B } only effective during operation

**H** = Stroke limitation (standard)  
**I** = Viton seals  
**M** = Additional manual control  
**S** = Seawater resistant (cast-iron end caps)  
 (Advice: for F..KE order also solenoid type J)

Remote control port V:  
**W** = for pressure setting on A  
**X** = for pressure setting on B  
**Y** = for pressure setting on A + B

**Z** = Shock/Suction valves port A + B  
**9** = give description <sup>2)</sup>

**NOMINAL FLOW (A + B): L/MIN (USGPM)** \_\_\_\_\_

| Flowcode: | F12K                           | F18K                           |
|-----------|--------------------------------|--------------------------------|
| <b>1</b>  | A+B: 75 (20)                   | A+B: 200 (52.8)                |
| <b>2</b>  | A+B: 38 (10)                   | A+B: 160 (42.2)                |
| <b>3</b>  | A+B: 20 (5.3)                  | A+B: 120 (31.7)                |
| <b>4</b>  | A+B: 10 (2.64)                 | A+B: 100 (26.4)                |
| <b>5</b>  | A: 75 (20) + B: 38 (10)        | A: 200 (52.8); B: 100 (26.4)   |
| <b>6</b>  | A: 38 (10) + B: 75 (20)        | A: 100 (26.4); B: 200 (52.8)   |
| <b>7</b>  | A: 38 (10) + B: 20 (5.3)       | A: 160 (42.2); B: 80 (21.1)    |
| <b>8</b>  | A: 20 (5.3)+ B: 38 (10)        | A: 80 (21.1); B: 160 (42.2)    |
| <b>9</b>  | give description <sup>2)</sup> | give description <sup>2)</sup> |

<sup>2)</sup> For special requirements please put in a 9 with a description. Please contact AMCA.

**Please note:**  
 In systems controlling overrunning loads, overcentre valves have to be installed in order to lock loads statically and also to control the load when moving to prevent runaway.

**SPECIFIC OPERATING SYSTEM**

**SOLENOID TYPE** (only in combination with control 'E' (pos 5) \_\_\_\_\_  
**A** = 12 VDC with emergency control by pin  
**B** = 24 VDC with emergency control by pin  
**E** = 12 VDC with emergency control by button  
**F** = 24 VDC with emergency control by button  
**H** = 24 VDC with II 2 EEx m II T4; IP 57  
**J** = 24 VDC with IP67

**POSITION LOCK** (only in combination with control 'H' (pos 5) \_\_\_\_\_  
**F** = spring return (spring ctr)  
**O** = no spring return  
**R** = with detent  
**B** = friction brake ctr.detent

**PILOT PRESSURE** (only in combination with control 'O' (pos 5) \_\_\_\_\_  
 - = std. 6-20 bar (86-286 psi)

## ORDERING CODE - INLET PLATE

(For composing a valve block use a copy of the order form, page 26 or 27)

### ORDERING CODE - INLET PLATE

Ordering code: 

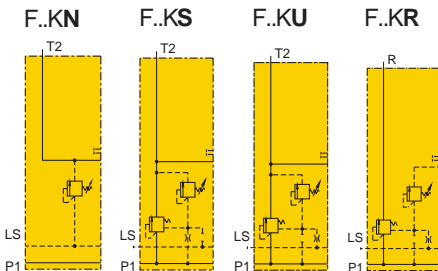
|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| F | 1 | 2 | K |   |   |   |   | - |    |    |    |    |    |    |

SERIES

SIZE

12 = 1/2"  
18 = 1"

PLATE VERSION



F..KN = For load sensing pump.  
F..KS = Like code N: with maximum pressure valve in P.  
F..KU = For constant pump.  
F..KR = Serial connection.

VARIANTS

w/o code = Buna-N seals (Std.)  
C = Combiplate (only F18K)  
I = Viton seals  
9 = give description <sup>1)</sup>

MAX. PRESSURE ADJUSTMENT IN BAR  
(max. 350 bar, 5000 psi)

Formula:  
... psi x 0.07 = ... bar  
(... bar x 14.3 = ... psi)

<sup>1)</sup> For special requirements please put in a 9 with a description. Please contact AMCA.

## ORDERING CODE - END PLATE

(For composing a valve block use a copy of the order form, page 26 or 27)

Ordering code: 

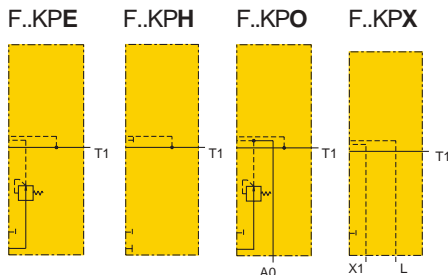
|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| F | 1 | 2 | K | P |   |   |   | - | -  |    |    |    |    |    |

SERIES

SIZE

12 = 1/2"  
18 = 1"

PLATE VERSION

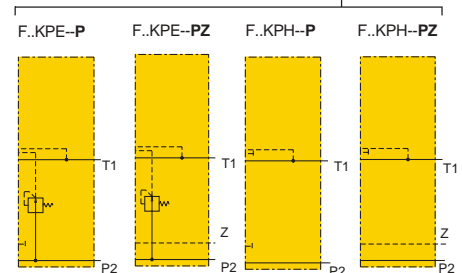


F12KPE = With built-in pressure reducing valve for internal pilot pressure. Only for electrical operating system.  
F12KPH = For muscular and hydraulic operating system.  
F12KPO = With built-in pressure reducing valve, feeding point A0 (28 bar, 400 psi) connecting port, for connecting a hydraulic joystick (see example 4 page 7). Only for hydraulic operating system.  
F12KPX = With X and L connecting ports for external pilot pressure feeding (max. 28 bar, 400 psi), in case of very low working pressures. Only for electrical operating system.

VARIANTS

w/o code = Buna-N seals (Std.)  
I = Viton seals  
P = with P-port  
Z = with Z-port

examples



Assembly kits

1 = with 1 control valve  
2 = with 2 control valves  
3 = with 3 control valves  
4 = with 4 control valves  
5 = with 5 control valves  
6 = with 6 control valves  
7 = with 7 control valves  
8 = with 8 control valves

**ORDER FORM F12K OR F18K**

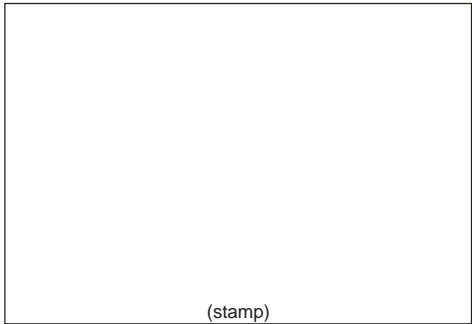
Company: .....

Name: .....

Order No.: .....

Quantity: .....  
(complete system)

Date: .....



**Inlet Plate**

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| F | 1 |   | K |   |   |   |   | - |    |    |    |    |    |    |

**Control Valves**  
(max. 8 sections)

|   |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
|   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1 | F | 1 |   | K |   |   |   |   |   |    |    |    |    |    |    |
| 2 | F | 1 |   | K |   |   |   |   |   |    |    |    |    |    |    |
| 3 | F | 1 |   | K |   |   |   |   |   |    |    |    |    |    |    |
| 4 | F | 1 |   | K |   |   |   |   |   |    |    |    |    |    |    |
| 5 | F | 1 |   | K |   |   |   |   |   |    |    |    |    |    |    |
| 6 | F | 1 |   | K |   |   |   |   |   |    |    |    |    |    |    |
| 7 | F | 1 |   | K |   |   |   |   |   |    |    |    |    |    |    |
| 8 | F | 1 |   | K |   |   |   |   |   |    |    |    |    |    |    |

**End Plate**

|  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|--|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|  | F | 1 |   | K | P |   |   | - | - |    |    |    |    |    |    |

**Order Example**  
 Inlet plate : F12KU280  
 Control valve 1 : F12KEWA1BM  
 Control valve 2 : F12KERB5B  
 Control valve 3 : F12KEWK1B  
 Control valve 4 : F12KERC6BH  
 End plate : F12KPE4

**DO NOT WRITE ON THIS CHART** - make a photocopy of this page and record the valve ordering code on the copy (then the chart can be used more than once)

# ORDER FORM F12K/F18K IN COMBINATION

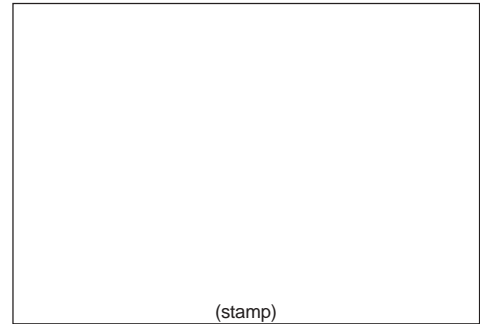
Company: .....

Name: .....

Order No.: .....

Quantity: .....  
(complete system)

Date: .....



End Plate

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| F | 1 | 8 | K | P |   |   | - | - |    |    |    |    |    |    |

Control Valves

(max. 8 sections)

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| F | 1 | 8 | K |   |   |   |   |   |    |    |    |    |    |    |
| F | 1 | 8 | K |   |   |   |   |   |    |    |    |    |    |    |
| F | 1 | 8 | K |   |   |   |   |   |    |    |    |    |    |    |
| F | 1 | 8 | K |   |   |   |   |   |    |    |    |    |    |    |
| F | 1 | 8 | K |   |   |   |   |   |    |    |    |    |    |    |
| F | 1 | 8 | K |   |   |   |   |   |    |    |    |    |    |    |
| F | 1 | 8 | K |   |   |   |   |   |    |    |    |    |    |    |

Combi Inlet Plate

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| F | 1 | 8 | K |   |   |   |   | - | C  |    |    |    |    |    |

Control Valves

(max. 8 sections)

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| F | 1 | 2 | K |   |   |   |   |   |    |    |    |    |    |    |
| F | 1 | 2 | K |   |   |   |   |   |    |    |    |    |    |    |
| F | 1 | 2 | K |   |   |   |   |   |    |    |    |    |    |    |
| F | 1 | 2 | K |   |   |   |   |   |    |    |    |    |    |    |
| F | 1 | 2 | K |   |   |   |   |   |    |    |    |    |    |    |
| F | 1 | 2 | K |   |   |   |   |   |    |    |    |    |    |    |
| F | 1 | 2 | K |   |   |   |   |   |    |    |    |    |    |    |

End Plate

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| F | 1 | 2 | K | P |   |   | - | - |    |    |    |    |    |    |

Order example:

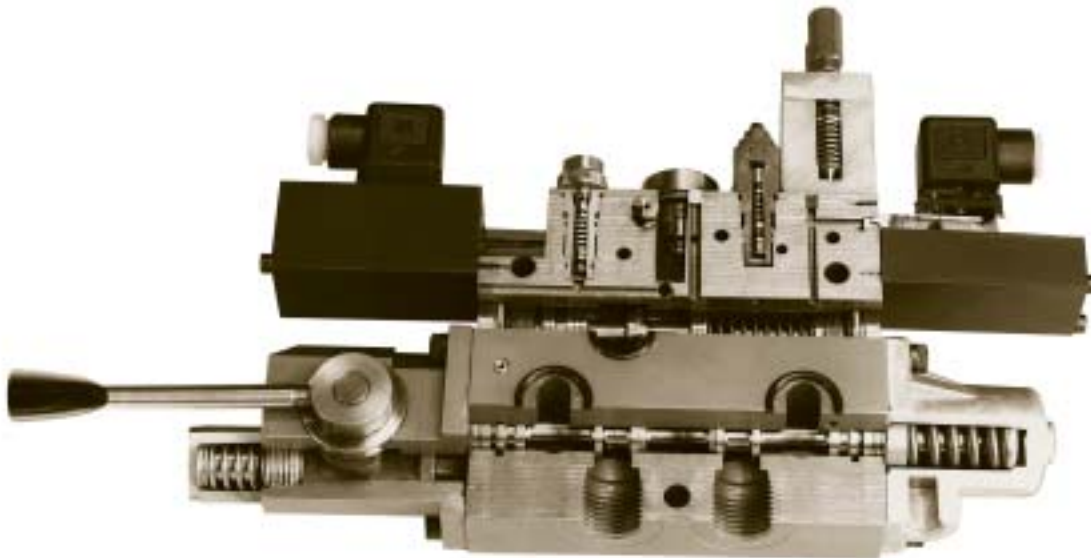
- End plate : F18KPH3
- Control valve 5 : F18KHWA2F
- Control valve 4 : F18KHWC2F
- Control valve 3 : F18KHWC1F
- Combi inlet plate : F18KU280C
- Control valve 1 : F12KHWC1F
- Control valve 2 : F12KHWC2R
- Endplate : F12KPH2

**DO NOT WRITE ON THIS CHART** - make a photocopy of this page and record the valve ordering code on the copy (then the chart can be used more than once)

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