COOPERATIVE PATENT CLASSIFICATION

MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

ENGINEERING IN GENERAL

FLUID-PRESSURE ACTUATORS; HYDRAULICS OR PNEUMATICS IN GENERAL

SYSTEMS ACTING BY MEANS OF FLUIDS IN GENERAL; FLUID-PRESSURE ACTUATORS, e.g. SERVOMOTORS; DETAILS OF FLUID-PRESSURE SYSTEMS, NOT OTHERWISE PROVIDED FOR

NOTE

In this subclass, the following terms are used with the meaning stated:

- "Telemotor" means a system or device in which a substantially constant amount of fluid is trapped between an input member and an output member to act as a fluid link;
- "Servomotor" means a fluid-pressure actuator, e.g. a piston and cylinder, directly controlled by a valve or other device which is responsive to operation of an initial controlling member; "Servomotor" does not cover a telemotor. The initial controlling member may be adjacent to the servomotor or at a distance, and may be, for example a hand lever.

1/00 Installations or systems with accumulators; Supply reservoir or sump assemblies
1/02 . Installations or systems with accumulators
1/021 . . (used for damping)
1/022 . . (used as an emergency power source, e.g. in case of pump failure)
1/024 . . (used as a supplementary power source, e.g. to store energy in idle periods to balance pump load)
1/025 . . (used for thermal compensation, e.g. to collect expanded fluid and to return it to the system as the system fluid cools down)
1/027 . . having accumulator charging devices
1/0275 . . . (with two or more pilot valves, e.g. for independent setting of the cut-in and cut-out pressures)
1/033 . . with electrical control means
1/04 . . Accumulators
1/045 . . . {Dead weight accumulators}
1/08 . . using a gas cushion; Gas charging devices; Indicators or floats therefor
1/083 . . . . {the accumulator having a fusible plug}
1/086 . . . . {the gas cushion being entirely enclosed by the separating means, e.g. foam or gas-filled balls}
1/10 . . . . with flexible separating means
1/103 . . . . . {the separating means being bellows}
1/106 . . . . . {characterised by the way housing components are assembled}
1/12 . . . . . attached at their periphery (flexible separating means in the form of a tube F15B 1/16)
1/125 . . . . . . . [characterised by the attachment means (F15B 1/14 takes precedence)]
1/14 . . . . . by means of a rigid annular supporting member
1/16 . . . . . in the form of a tube
1/165 . . . . . . . {in the form of a bladder}
1/18 . . . . . Anti-extrusion means
1/20 . . . . . fixed to the separating means
1/22 . . . . . Liquid port constructions
1/24 . . . . . with rigid separating means, e.g. pistons
1/26 . . Supply reservoir or sump assemblies
1/265 . . . {with pressurised main reservoir}
3/00 Intensifiers or fluid-pressure converters, e.g. pressure exchangers; Conveying pressure from one fluid system to another, without contact between the fluids {(fluid-driven pumps F04B 9/08)}
5/00 Transducers converting variations of physical quantities, e.g. expressed by variations in positions of members, into fluid-pressure variations or vice versa; Varying fluid pressure as a function of variations of a plurality of fluid pressures or variations of other quantities (F15B 9/00 takes precedence)
5/003 . . {characterised by variation of the pressure in a nozzle or the like, e.g. nozzle-flapper system}
5/006 . . {with electrical means, e.g. electropneumatic transducer (F15B 5/003 takes precedence)}

Fluid-pressure actuator systems (systems peculiar to the control of a particular machine or apparatus covered in a single other class, see the class for such machine or apparatus)

NOTE

This heading relates to moving members into one or more definite positions by means of fluid pressure. Pump, motor and control features so far as not peculiar to this purpose are classified in the relevant classes.

7/00 Systems in which the movement produced is definitely related to the output of a volumetric pump; Telemotors
7/001 . . {With multiple inputs, e.g. for dual control}
7/003 . . {with multiple outputs}
7/005 . . {With rotary or crank input}
7/006 . . . {Rotary pump input}
7/008 . . . {with rotary output}
Fluid-pressure actuator systems

Servomotor systems without provision for follow-up action: (Circuits therefor) (F15B 3/00 takes precedence)

11/100 . . . Systems with continuously-operating input and output apparatus
11/104 . . . In which the ratio between pump stroke and motor stroke varies with the resistance against the motor
11/06 . . . Details (F15B 15/00 takes precedence)
11/08 . . . Input units; Master units
11/10 . . . Compensation of the liquid content in a system (F15B 7/08 takes precedence)

9/11 . . . Servomotors with follow-up action, [e.g. obtained by feed-back control.] i.e. in which the position of the actuated member conforms with that of the controlling member
9/02 . . . with servomotors of the reciprocatable or oscillatable type
9/03 . . . with electrical control means (F15B 9/07, 9/09, 9/17 take precedence)
9/04 . . . controlled by varying the output of a pump with variable capacity
9/06 . . . controlled by means using a fluid jet
9/07 . . . with electrical control means
9/08 . . . controlled by valves affecting the fluid feed or the fluid outlet of the servomotor (F15B 9/06 takes precedence)
9/09 . . . with electrical control means
9/10 . . . in which the controlling element and the servomotor each controls a separate member, these members influencing different fluid passages or the same passage
9/12 . . . in which both the controlling element and the servomotor control the same member influencing a fluid passage and are connected to that member by means of a differential gearing
9/14 . . . with rotary servomotors
9/16 . . . Systems essentially having two or more interacting servomotors [e.g. multi-stage (F15B 18/00, 20/00 take precedence)]
9/17 . . . with electrical control means

11/036 . . . by means of servomotors having a plurality of working chambers
11/0365 . . . [Tandem constructions]
11/04 . . . for controlling the speed (F15B 11/024 takes precedence)
11/0406 . . . [during starting or stopping (F15B 11/048 takes precedence)]
11/0413 . . . [in one direction only, with no control in the reverse direction, e.g. check valve in parallel with a throttle valve]
11/042 . . . by means in the feed line {i.e. “meter in”} (F15B 11/046, 11/05 takes precedence)
11/0423 . . . [by controlling pump output or bypass, other than to maintain constant speed]
11/0426 . . . [by controlling the number of pumps or parallel valves switched on]
11/044 . . . by means in the return line {i.e. “meter out”} (F15B 11/046, 11/05 takes precedence)
11/0445 . . . [with counterbalance valves, e.g. to prevent overrunning or for braking]
11/046 . . . depending on the position of the working member
11/048 . . . with deceleration control
11/05 . . . specially adapted to maintain constant speed, e.g. pressure-compensated, load-responsive { (F15B 11/161 takes precedence)}
11/055 . . . [by adjusting the pump output or bypass]
11/06 . . . involving features specific to the use of a compressible medium, e.g. air, steam
11/064 . . . with devices for saving the compressible medium
11/068 . . . with valves for gradually putting pneumatic systems under pressure
11/072 . . . Combined pneumatic-hydraulic systems (F15B 11/032 takes precedence)
11/0725 . . . [with the driving energy being derived from a pneumatic system, a subsequent hydraulic system displacing or controlling the output element]
11/076 . . . with pneumatic drive or displacement and speed control or stopping by hydraulic braking
11/08 . . . with only one servomotor
11/10 . . . in which the servomotor position is a function of the pressure [also pressure regulators as operating means for such systems, the device itself may be a position indicating system]
11/12 . . . providing distinct intermediate positions; with step-by-step action
11/121 . . . [providing distinct intermediate positions (F15B 11/13 takes precedence)]
11/122 . . . [by means of actuators with multiple stops]
11/123 . . . [by means of actuators with fluid-operated stops]
11/125 . . . [by means of digital actuators, i.e. actuators in which the total stroke is the sum of individual strokes]
11/126 . . . [by means of actuators of the standard type with special circuit controlling means (F15B 11/125 takes precedence)]
11/127 . . . [with step-by-step action]
11/128 . . . [by means of actuators of the standard type with special circuit controlling means]
11/13 . . . using [separate dosing] chambers of predetermined volume
11/15 . . . with special provision for automatic return
13/00 Details of servomotor systems ([F15B 1/04, F15B 1/26, F15B 3/00, F15B 7/08, F15B 11/02, F15B 11/10, F15B 15/00) take precedence] { Valves for servomotor systems }

13/002 [ Modular valves, i.e. consisting of an assembly of interchangeable components ]
13/004 [ Cartridge valves ]
13/006 [ Modular components with multiple uses, e.g. kits for either normally-open or normally-closed valves, interchangeable or reprogrammable manifolds ]
13/008 [ Throttling member profiles ]
13/01 [ Locking-valves or other detent { i.e. load-holding } devices ]
13/015 [ using an enclosed pilot flow valve ]
13/02 [ Fluid distribution or supply devices characterised by their adaptation to the control of servomotors ]
13/021 [ Valves for interconnecting the fluid chambers of an actuator ]
13/022 [ Flow-dividers; Priority valves ]
13/023 [ Excess flow valves, e.g. for locking cylinders in case of hose burst ]
13/024 [ Pressure relief valves ]
13/025 [ Pressure reducing valves ]
13/026 [ Pressure compensating valves ]
13/027 [ Check valves ]
13/028 [ Shuttle valves ]
13/029 [ Counterbalance valves ]
13/04 [ for use with a single servomotor ]
13/0401 [ Valve members; Fluid interconnections therefor ]
13/0402 [ for linearly sliding valves, e.g. spool valves ]
13/0403 [ a secondary valve member sliding within the main spool, e.g. for regeneration flow (F15B 13/0418 takes precedence) ]
13/0405 [ for seat valves, i.e. poppet valves ]
13/0406 [ for rotary valves ]
13/0407 [ Means for damping the valve member movement ]
13/0409 [ Position sensing or feedback of the valve member ]
13/041 [ with two positions ]
13/0412 [ with three positions ]
13/0413 [ with four or more positions ]
13/0414 [ Dosing devices ]
13/0416 [ with means or adapted for load sensing ]
13/0417 [ Load sensing elements; Internal fluid connections therefor; Anti-saturation or pressure-compensation valves ]
13/0418 [ Load sensing elements sliding within a hollow main valve spool ]
13/042 [ operated by fluid pressure (F15B 13/0401, F15B 13/0416 take precedence) ]
13/0422 [ with manually-operated pilot valves, e.g. joysticks ]
13/0424 [ the joysticks being provided with electrical switches or sensors ]
13/0426 [ with fluid-operated pilot valves, i.e. multiple stage valves ]
13/0428 [ with switchable internal or external pilot pressure source ]
13/043 [ with electrically-controlled pilot valves ]
13/0431 [ the electrical control resulting in an on-off function ]
13/0433 [ the pilot valves being pressure control valves (F15B 13/0435, F15B 13/0436, F15B 13/0438 take precedence) ]
13/0435 [ the pilot valves being sliding valves ]
13/0436 [ the pilot valves being of the steerable jet type ]
13/0438 [ the pilot valves being of the nozzle-flapper type ]
13/044 [ operated by electrically-controlled means, e.g. solenoids, torque-motors ]
13/0442 [ with proportional solenoid allowing stable intermediate positions ]
13/0444 [ with rotary electric motor ]
13/0446 [ with moving coil, e.g. voice coil ]
13/0448 [ Actuation by solenoid and permanent magnet ]
13/06 [ for use with two or more servomotors ]
13/07 [ in distinct sequence ]
13/08 [ Assemblies of units, each for the control of a single servomotor only ]
13/0803 [ Modular units ]
13/0807 [ Manifolds ]
13/081 [ Laminated constructions ]
13/0814 [ Monoblock manifolds ]
13/0817 [ Multiblock manifolds ]
13/0821 [ Attachment or sealing of modular units to each other ]
13/0825 [ the modular elements being mounted on a common member, e.g. on a rail ]
13/0828 [ characterised by sealing means of the modular units ]
Fluid-actuated devices for displacing a member from one position to another; Gearing associated therewith

- Mechanical layout characterised by the means for converting the movement of the fluid-actuated element into movement of the finally-operated member
  - with oscillating cylinder
  - for mechanically converting rectilinear movement into non-rectilinear movement

- [by unidirectional means]
- [Actuator having both linear and rotary output, i.e. dual action actuator]
- [the motor being of the rack-and-pinion type]
- [the motor being of the scotch yoke type]
- [the motor being of the helical type]
  - Characterised by the construction of the motor unit
  - [the motor being of the slotted cylinder type]
  - [the motor being of the rodless piston type, e.g. with cable, belt or chain]
  - [with magnetic coupling]
  - [the motor using combined actuation, e.g. electric and fluid actuation]
  - the motor being of diaphragm type
  - [using inflatable bodies that contract when fluid pressure is applied, e.g. pneumatic artificial muscles or McKibben-type actuators]
  - the motor being of the pinching-roller type

- of the oscillating-vane or curved-cylinder type
- [of the curved-cylinder type]
- of the straight-cylinder type
- [in clusters, e.g. multiple cylinders in one block]
- [with two or more independently movable working pistons]
- [with non-rotatable piston]
- [of non-circular cross-section]
- [Component parts; Constructional details]
- (Cylinders (F15B 15/1438 takes precedence))
- (End caps (F15B 15/1438 takes precedence))
- [Cylinder to end cap assemblies]
- [End cap sealings]
- [Pistons; Piston to piston rod assemblies]
- [Piston sealings]
- [Piston rods (F15B 15/1447 takes precedence)]
- [Piston rod sealings]
- [Hollow piston sliding over a stationary rod inside the cylinder]
- (Guiding means other than in the end cap (F15B 15/1466 takes precedence))
- [Special return means]
- [Lost-movement means between the piston and the output]
- [Special means for cooling or heating]
- [Fluid interconnections, e.g. fluid connectors, passages]
- [with screw mechanism attached to the piston]
- of the telescopic type
- [with synchronisation of sections]
- of differential-piston type
- Combined units comprising both motor and pump
- Pyrotechnical actuators
- Other details [., e.g. assembly with regulating devices]
- [Externally-operated valves mounted in or on the actuator]
- [Control means for piston speed or actuating force without external control, e.g. control valve inside the piston (F15B 11/02, F15B 15/22 take precedence)]
- [Combined actuation, e.g. electric and fluid actuated]
- [Special fluid pressurisation means, e.g. thermal or electrolytic]
- for accelerating or decelerating the stroke
- [for accelerating the stroke, e.g. by area increase]
- [having a piston with a piston extension or piston recess which throttles the main fluid outlet as the piston approaches its end position]
- [having a piston with a piston extension or piston recess which completely seals the main fluid outlet as the piston approaches its end position]
- [having a piston which closes off fluid outlets in the cylinder bore by its own movement]
- [with valve stems operated by contact with the piston end face or with the cylinder wall]
Common features of fluid actuator systems; Fluid-pressure actuator systems or details thereof, not covered by any other group of this subclass

Servomotor systems with fluidic control

Systems with different interchangeable components, e.g. using preassembled kits

Filling or draining of fluid systems

Compensation or avoidance of ambient pressure variation

Reduction of noise or vibration

Servomotor systems with programme control derived from a store or timing device; Control devices therefor

Special measures taken in connection with the properties of the fluid

Removal or measurement of solid or liquid contamination, e.g. filtering

Controlling the temperature of the fluid

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**WARNING**

Group F15B 21/042 is impacted by reclassification into groups F15B 21/0423 and F15B 21/0427.

Groups F15B 21/042, F15B 21/0423, and F15B 21/0427 should be considered in order to perform a complete search.

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**WARNING**

Group F15B 21/0423 is incomplete pending reclassification of documents from group F15B 21/042.

Groups F15B 21/042 and F15B 21/0423 should be considered in order to perform a complete search.

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**WARNING**

Group F15B 21/0427 is incomplete pending reclassification of documents from group F15B 21/042.

Groups F15B 21/042 and F15B 21/0427 should be considered in order to perform a complete search.

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Removal or measurement of undissolved gas, e.g. de-aeration, venting or bleeding

Compensating for variations in viscosity or temperature

Preventing foaming, churning or cavitation

Arrangements for compressed air preparation, e.g. comprising air driers, air condensers, filters, lubricators or pressure regulators

Use of special fluids, e.g. liquid metal; Special adaptations of fluid-pressure systems, or control of elements therefor, to the use of such fluids

[Use of electro- or magnetosensitive fluids, e.g. electrophoretical fluid]

Servomotor systems incorporating electrically operated control means [F15B 21/02, F15B 21/065] take precedence

(with different modes)
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<td>Fluid pressure source, e.g. accumulator or variable axial piston pump</td>
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<td>2211/20515</td>
<td>Electric motor</td>
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<td>2211/26</td>
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<td>Control of multiple pressure sources</td>
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<td>2211/2652</td>
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<td>one or more pressure sources having priority</td>
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<td>2211/2656</td>
<td>by control of the pumps</td>
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<tr>
<td>2211/2658</td>
<td>by control of the prime movers</td>
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<td>2211/27</td>
<td>Directional control by means of the pressure source</td>
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<td>Control of the prime mover, e.g. hydraulic control</td>
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<td>2211/30</td>
<td>Directional control</td>
<td>. . . . . .</td>
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<tr>
<td>2211/305</td>
<td>characterised by the type of valves</td>
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<td>2211/30505</td>
<td>Non-return valves, i.e. check valves</td>
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<td>Cross-check valves</td>
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<td>2211/30515</td>
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<td>2211/3052</td>
<td>Shuttle valves</td>
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<td>2211/30525</td>
<td>Directional control valves, e.g. 4/3-directional control valve</td>
<td>. . . . . .</td>
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<tr>
<td>2211/3053</td>
<td>In combination with a pressure compensating valve</td>
<td>. . . . . .</td>
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<tr>
<td>2211/30535</td>
<td>the pressure compensating valve is arranged between pressure source and directional control valve</td>
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<tr>
<td>2211/3054</td>
<td>the pressure compensating valve is arranged between directional control valve and output member</td>
<td>. . . . . .</td>
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<tr>
<td>2211/30545</td>
<td>the pressure compensating valve is arranged between output member and directional control valve</td>
<td>. . . . . .</td>
</tr>
<tr>
<td>2211/3055</td>
<td>the pressure compensating valve is arranged between directional control valve and return line</td>
<td>. . . . . .</td>
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</table>
Inlet and outlet of the pressure compensating valve being connected to the directional control valve

Assemblies of multiple valves

having multiple valves for a single output member, e.g. for creating higher valve function by use of multiple valves like two 2/2-valves replacing a 5/3-valve

having two valves, one for each port of a double-acting output member

in a Wheatstone Bridge arrangement (also half bridges)

having additional valves for interconnecting the fluid chambers of a double-acting actuator, e.g. for regeneration mode or for floating mode (directional control valves having a regenerative position F15B 2211/3133; directional control valves having a floating position F15B 2211/3127)

having a single valve for multiple output members

having multiple valves for multiple output members

with additional valves between the groups of valves for multiple output members

characterised by the positions of the valve element

Neutral or centre positions

the pump port being closed in the centre position, e.g. so-called closed centre

the pump port being open in the centre position, e.g. so-called open centre

Special positions other than the pump port being connected to working ports or the working ports being connected to the return line

Floating position connecting the working ports and the return line

Regenerative position connecting the working ports or connecting the working ports to the pump, e.g. for high-speed approach stroke

the positions being discrete

the positions being continuously variable, e.g. as realised by proportional valves

characterised by the connections of the valve or valves in the circuit

being connected to a pressure source and a return line

having a single pressure source

having multiple pressure sources

being connected to a pressure source and an output member

having a single pressure source and a single output member

having multiple pressure sources and a single output member

having a single pressure source and multiple output members

having multiple pressure sources and multiple output members

being connected to an output member and a return line

having a single output member

having multiple output members

being connected to a pressure source, an output member and a return line

having a single pressure source and a single output member

having multiple pressure sources and a single output member

having a single pressure source and multiple output members

having multiple pressure sources and multiple output members

characterised by the type of actuation

mechanically

actuated by biasing means, e.g. spring-actuated

the biasing means being adjustable

manually, e.g. by using a lever or pedal

actuated by an output member of the circuit

with follow-up action

electrically or electronically

with signal modulation, e.g. pulse width modulation [PWM]

actuated by fluid pressure

Directional control combined with flow control

Flow control by regulating means in feed line, i.e. meter-in control

Flow control by regulating means in return line, i.e. meter-out control

Pilot pressure control

Pilot pressure sensing

Directional control combined with flow control and pressure control

Flow control

characterised by the type of flow control means or valve

with constant throttles or orifices

with variable throttles or orifices

with flow dividers

using valves

using volumetric pumps or motors

with flow combiners

with pressure compensating valves

the pressure compensating valve arranged upstream of the flow control means

the pressure compensating valve arranged downstream of the flow control means

Assemblies of multiple valves

the flow control means arranged in parallel with a check valve

with multiple valves in parallel flow paths, characterised by the positions of the valve element

the positions being discrete

the positions being continuously variable, e.g. as realised by proportional valves

characterised by the connections of the flow control means in the circuit

being connected to a pressure source and a directional control valve

being connected to multiple pressure sources

being connected to an output member and a directional control valve
Pressure control means in the circuit characterised by the connections of the pressure element characterised by the positions of the valve means characterised by the type of pressure control means.

Flow control in one direction only
Flow control with pressure compensation
Control of a differential pressure
Control of a downstream pressure
Control of an upstream pressure

using counterbalance valves
using double counterbalance valves
characterised by the positions of the valve element
the positions being discrete
the positions being continuously variable, e.g. as realised by proportional valves
characterised by the connections of the pressure control means in the circuit

Circuit components or control therefor

Electronic controllers
Cooling or heating means
Filtering means
Secondary circuits
Feeding circuits
Filtering means
Electro-hydraulic controllers
Using input signals
Representing a pressure
The pressure being a pressure source supply pressure
The pressure being a load pressure
The pressure being a pilot pressure
Representing a flow rate
The flow rate being a pressure source flow rate
2211/6326 . . . . . . the flow rate being an output member flow rate
2211/6333 . . . . . . representing a state of the prime mover, e.g. torque or rotational speed
2211/6336 . . . . . . representing a state of the pressure source, e.g. swash plate angle
2211/6343 . . . . . . representing a state of a valve
2211/6346 . . . . . . representing a temperature
2211/635 . . . . . . Circuits providing pilot pressure to pilot pressure-controlled fluid circuit elements
2211/6355 . . . . . . having valve means
2211/65 . . . . . . Methods of control of the load sensing pressure
2211/651 . . . . . . characterised by the way the load pressure is communicated to the load sensing circuit
2211/652 . . . . . . the load sensing pressure being different from the load pressure
2211/653 . . . . . . the load sensing pressure being higher than the load pressure
2211/654 . . . . . . the load sensing pressure being lower than the load pressure
2211/655 . . . . . . Methods of contamination control, i.e. methods of control of the cleanliness of circuit components or of the pressure fluid
2211/66 . . . . . . Temperature control methods
2211/665 . . . . . . Methods of control using electronic components
2211/6651 . . . . . . Control of the prime mover, e.g. control of the output torque or rotational speed
2211/6652 . . . . . . Control of the pressure source, e.g. control of the swash plate angle
2211/6653 . . . . . . Pressure control
2211/6654 . . . . . . Flow rate control
2211/6655 . . . . . . Power control, e.g. combined pressure and flow rate control
2211/6656 . . . . . . Closed loop control, i.e. control using feedback
2211/6657 . . . . . . Open loop control, i.e. control without feedback
2211/6658 . . . . . . Control using different modes, e.g. four-quadrant-operation, working mode and transportation mode
2211/67 . . . . . . Methods for controlling pilot pressure
2211/70 . . . . . . Output members, e.g. hydraulic motors or cylinders or control therefor
2211/705 . . . . . . characterised by the type of output members or actuators
2211/7051 . . . . . . Linear output members
2211/7052 . . . . . . Single-acting output members
2211/7053 . . . . . . Double-acting output members
2211/7054 . . . . . . Having equal piston areas
2211/7055 . . . . . . having more than two chambers
2211/7056 . . . . . . Tandem cylinders
2211/7057 . . . . . . being of the telescopic type
2211/7058 . . . . . . Rotary output members
2211/71 . . . . . . Multiple output members, e.g. multiple hydraulic motors or cylinders
2211/7107 . . . . . . the output members being mechanically linked
2211/7114 . . . . . . with direct connection between the chambers of different actuators
2211/7121 . . . . . . the chambers being connected in series
2211/7128 . . . . . . the chambers being connected in parallel
2211/7135 . . . . . . Combinations of output members of different types, e.g. single-acting cylinders with rotary motors
2211/7142 . . . . . . the output members being arranged in multiple groups
2211/715 . . . . . . having braking means
2211/72 . . . . . . having locking means
2211/75 . . . . . . Control of speed of the output member
2211/755 . . . . . . Control of acceleration or deceleration of the output member
2211/76 . . . . . . Control of force or torque of the output member
2211/761 . . . . . . Control of a negative load, i.e. of a load generating hydraulic energy
2211/763 . . . . . . Control of torque of the output member by means of a variable capacity motor, i.e. by a secondary control on the motor
2211/765 . . . . . . Control of position or angle of the output member
2211/7653 . . . . . . at distinct positions, e.g. at the end position
2211/7656 . . . . . . with continuous position control
2211/77 . . . . . . Control of direction of movement of the output member
2211/7708 . . . . . . in one direction only
2211/7716 . . . . . . with automatic return
2211/7725 . . . . . . with automatic reciprocation
2211/7733 . . . . . . providing vibrating movement, e.g. dither control for emptying a bucket
2211/7741 . . . . . . with floating mode, e.g. using a direct connection between both lines of a double-acting cylinder
2211/775 . . . . . . Combined control, e.g. control of speed and force for providing a high speed approach stroke with low force followed by a low speed working stroke with high force, e.g. for a hydraulic press
2211/78 . . . . . . Control of multiple output members
2211/781 . . . . . . one or more output members having priority
2211/782 . . . . . . Concurrent control, e.g. synchronisation of two or more actuators
2211/783 . . . . . . Sequential control
2211/785 . . . . . . Compensation of the difference in flow rate in closed fluid circuits using differential actuators
2211/80 . . . . . . Other types of control related to particular problems or conditions
2211/85 . . . . . . Control during special operating conditions
2211/851 . . . . . . during starting
2211/853 . . . . . . during stopping
2211/855 . . . . . . Testing of fluid pressure systems
2211/857 . . . . . . Monitoring of fluid pressure systems
2211/86 . . . . . . Control during or prevention of abnormal conditions
2211/8603 . . . . . . the abnormal condition being an obstacle
2211/8606 . . . . . . the abnormal condition being a shock
2211/8609 . . . . . . the abnormal condition being cavitation
2211/8613 . . . . . . the abnormal condition being oscillations
2211/8616 . . . . . . the abnormal condition being noise or vibration
2211/862 . . . . . . the abnormal condition being electric or electronic failure
2211/8623 . . . . . . Electric supply failure
2211/8626 . . . . . . Electronic controller failure, e.g. software, EMV, electromagnetic interference
2211/863 . . . . . . the abnormal condition being a hydraulic or pneumatic failure
2211/8633 . . . . . . Pressure source supply failure
2211/8636 . . . . . . Circuit failure, e.g. valve or hose failure
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>2211/864</td>
<td>Failure of an output member, e.g. actuator or motor failure</td>
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<tr>
<td>2211/8643</td>
<td>the abnormal condition being a human failure</td>
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<tr>
<td>2211/8646</td>
<td>the abnormal condition being hysteresis</td>
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<td>2211/865</td>
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<td>2211/875</td>
<td>Control measures for coping with failures</td>
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<td>2211/8752</td>
<td>Emergency operation mode, e.g. fail-safe operation mode</td>
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<tr>
<td>2211/8755</td>
<td>Emergency shut-down</td>
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<tr>
<td>2211/8757</td>
<td>Using redundant components or assemblies</td>
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<tr>
<td>2211/88</td>
<td>Control measures for saving energy</td>
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<tr>
<td>2211/885</td>
<td>Control specific to the type of fluid, e.g. specific to magnetorheological fluid</td>
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<tr>
<td>2211/8855</td>
<td>Compressible fluids, e.g. specific to pneumatics</td>
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<tr>
<td>2211/89</td>
<td>Control specific for achieving vacuum or &quot;negative pressure&quot;</td>
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<tr>
<td>2211/895</td>
<td>Manual override</td>
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<td>2215/00</td>
<td>Fluid-actuated devices for displacing a member from one position to another</td>
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<td>2215/30</td>
<td>Constructional details thereof</td>
</tr>
<tr>
<td>2215/305</td>
<td>Characterised by the use of special materials</td>
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</table>