Interpretation 032

of

AC75 Class Rule Version 1.7 issued 4th November 2019

Rules References:

22.5 The only devices permitted for controlling the flow of hydraulic fluid through an **HCC** are:

(a) **force input devices**, only as expressly permitted in Rule 21.2;

(b) **mechanically** operated valves;

(c) valves actuated by an **ECC**;

(d) two-port devices, not controlled by an **ECC**, that limit flow to one direction, regulate flow and/or regulate pressure, such as:

(i) two-port pressure relief valves;

(ii) two-port check valves;

(iii) two-port pressure-compensated flow control valves; and

(iv) two-port devices with fixed or adjustable orifices; and

(e) devices, not controlled by an **ECC**, that limit flow to one direction, regulate flow and/or regulate pressure, providing that such a device is subject to the pressure of no more than one **actuator chamber**, which shall always be the same **actuator chamber**, and is always isolated from all other **actuator chambers**.

22.6 For the avoidance of doubt, the following types of components are prohibited as they are capable of using feedback from the **yacht state** and are not listed within the permitted exceptions of Rules 22.5 (d) and 22.5 (e):

(a) external pilot-operated sequence valves;

(b) external pilot-operated counter balance valves;

(c) external pilot-operated pressure relief valves;

(d) valves that use internal feedback to control flow rate in proportion to an electrical input;

(e) hydraulic devices with more than two ports that provide logic between:

(i) different **control functions**;

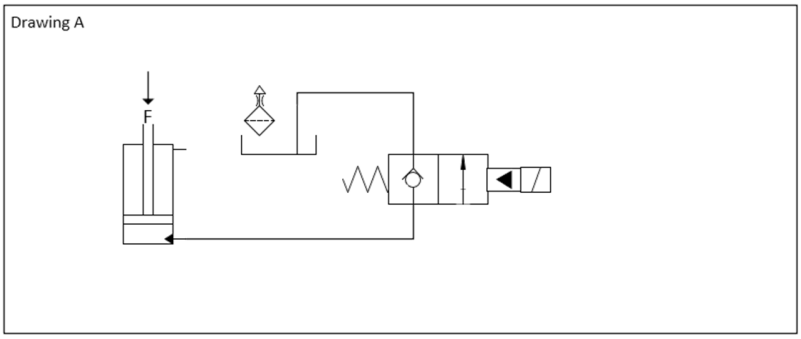
(ii) different **hydraulic actuators** of the same **control function**;

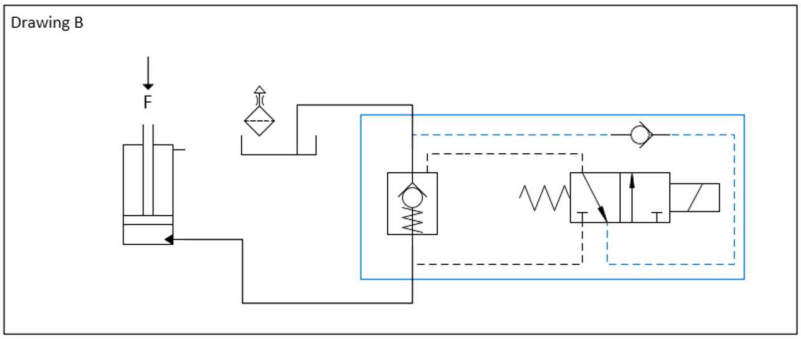
(iii) different **actuator chambers** of the same **hydraulic actuator**; and

(iv) different pressure supply lines; and

(f) variable displacement pumps that change their characteristics automatically in response to pressure, unless that automation is achieved using only those devices that are permitted by Rules 22.5 (d) and 22.5 (e).

Background:





Questions:

1. Drawing A shows a single acting cylinder that can be discharged to a vented tank via a valve. The cylinder can be refilled from the tank when the **external force** is reversed. The specification of the valve is shown in the Appendix. Note that valves of this type take the pilot pressure from port 2.
    a. Is the valve as drawn controlled by an **ECC**?
    b. Is the valve as drawn actuated by an **ECC**?
    c. Is this arrangement legal according to the **AC Class Rule**? If Yes, please indicate which part of rule 22.5 permits this valve. If No, please indicate which part/parts of the class rule is/are infringed by the arrangement.

2. The valve in drawing B is a Pilot operated check valve controlled by a valve actuated by an **ECC**.
    a. Is the Pilot operated check valve as drawn controlled by an **ECC**?
    b. Is the Pilot operated check valve as drawn actuated by an **ECC**?
    c. Does this arrangement comply with the **AC75 Class Rule**? If Yes, please indicate which part of rule 22.5 permits this valve. If No, please indicate which part/parts of the **AC 75 Class Rule** is/are infringed by the arrangement.

3. Consider drawing B again. The devices shown in the blue box are supplied as a single valve, together with a datasheet describing it as a "Solenoid Valve, Normally Closed, Pilot operated, Poppet Type (2/2)". Does this arrangement comply with the **AC75 Class Rule**? If Yes, please indicate which part of rule 22.5 permits this valve. If No, please indicate which part/parts of the **AC75 Class Rule** is/are infringed by the arrangement.

4. If the answer to question 1.c. is Yes, but the answer to question 3 is No, why does the **Rules Committee** see the two systems as different?

Interpretation:

Not applicable.

Answers:

1.
   a. Not evident from the supplied information.
   b. Not evident from the supplied information.
   c. The question does not specify whether this valve is connected to an **ECC** or if the **ECC** controls the valve. For the purposes of answering 1.c it is assumed that the solenoid actuator is electrically connected to and receives electrical signals to drive it from an **ECC.** With that assumption, yes. It is permitted by rule 22.5(c), with the stated assumptions in the supplied specification and in Drawing A, that it is a two port device, and with the statement in the question that the pilot pressure is taken internally (from port 2).

2.
   a. No.
   b. No.
   c. The arrangement in Drawing B, containing three valves, a low-pressure accumulator and an actuator chamber, as drawn, is rule compliant. The question additionally asks which part of rule 22.5 permits this valve. It isn't clear which of the three valves the question refers to. The pilot operated check valve shown is permitted by rule 22.5(e) as it is subject to the pressure of no more than one actuator chamber.

3. Question 3 contains inconsistent information so can only be answered in part and by stating assumptions.

   Question 1 and Question 3 both assert that the attached datasheet describes the valve in Drawing A, and also describes the contents of the blue box in Drawing B. Please supply more detail from the manufacturer to clarify the inconsistencies.
   Question 1 notes that, "valves of this type take the pilot pressure from port 2." The circuit in the blue box of Diagram B shows the pilot operated check valve as taking its pilot pressure from either port 1 or port 2 depending on the position of the solenoid. It isn't clear whether the valve referred to in question 3 is the same as the valve described in question 1.

   Question 3 asserts that the circuit within the blue box, comprising three valves, is supplied as one valve. Please provide a datasheet with sufficient detail to confirm that the devices shown in the blue box are supplied as a single valve.

   Setting aside whether the contents of the blue box are provided as a single valve with a corresponding datasheet, question 3 also asks whether "the arrangement complies with the **AC75 Class Rule**." The arrangement in Drawing B containing three valves, a low-pressure accumulator and an actuator chamber, as drawn, is rule-compliant. The question additionally asks which part of rule 22.5 permits this valve. It isn't clear which of the three valves in the blue box the question refers to. The pilot operated check valve shown is permitted by rule 22.5(e) as it is subject to the pressure of no more than one actuator chamber.

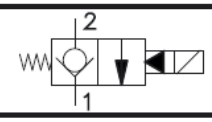
4. Not applicable.

APPENDIX:

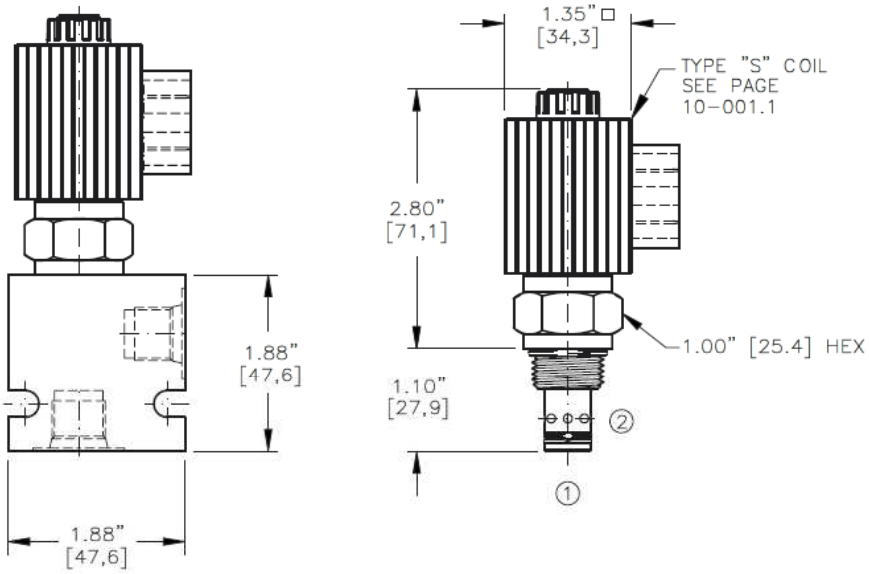
EMDV-08-C7

BUCHER hydraulics

SOLENOID VALVE, NORMALLY CLOSED.
PILOT OPERATED, POPPET TYPE (2/2)



TORQUE:
Steel = 35/40 Ft-Lb. [47/54 Nm]
Aluminum = 25/30 Ft-Lb. [34/41 Nm]



NOTES:
1. FOR ALUMINUM OR STEEL VALVE HOUSING CONFIGURATIONS SEE PAGE 0-011.1
2. SOLENOIDS AVAILABLE WITH DIODES - CONSULT FACTORY.
3. FOR "AC" COILS USE RECTIFIED DIN CONNECTOR 20828.

EMDV-08-X-C7-X-XXX X

BASIC

SIZE
08 = 3/4"-16UNF

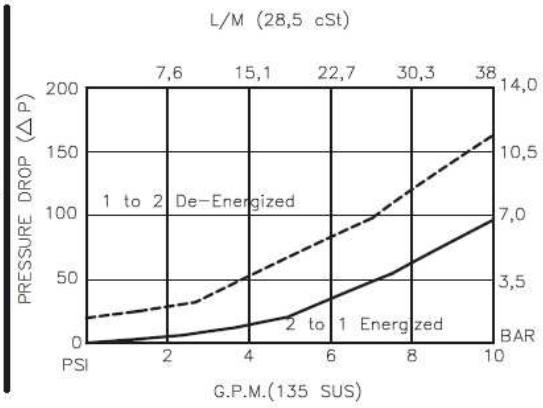
SEALS
N = BUNA "N"
V = VITON

TYPE
C7=NORMALLY CLOSED POPPET
2-WAY, 2-POSITION

PORTS
0 = CARTRIDGE ONLY
02BX = G 1/4" BSPP
06TX = SAE - #6
"A" = ALUM. HOUSING
"S" = STEEL HOUSING

TERMINALS
L =18GA. 24" LEADS
T =SPADE TERM.
B =BOLT TERM.
G =DIN43650
W =WEATHER-PACK
D =DEUTSCH-DT04-2P
M =METRI-PACK CONN.

VOLTAGE AMPS
12D = 12 VDC 1.7
24D = 24 VDC .9
36D = 36 VDC .6
48D = 48 VDC .5
115D = 115 VDC .2



Reference: 520-P-100210-EN-00/09.2015

EMDV-08-C7

BUCHER hydraulics

SOLENOID VALVE, NORMALLY CLOSED, PILOT OPERATED, POPPET TYPE (2/2)

DESCRIPTION

This unit is a NORMALLY CLOSED, TWO POSITION, cartridge type, poppet type, pilot operated, screw in type, solenoid operated, directional control valve.

OPERATIONS

When solenoid coil is de-energized, this valve allows no flow from ports 2 to 1 and free flow from ports 1 to 2. When solenoid coil is energized, the poppet in this valve is shifted and allows flow from ports 2 to 1 and restricted flow from ports 1 to 2.

FEATURES AND BENEFITS

Continuous-duty, very low heat rise & waterproof solenoid coil.
Interchangeable solenoid coils & terminations options available.
Hardened precision fitted poppet & sleeve provides reliable, long life.
Very efficient, wet-armature solenoid core tube construction.
All external carbon steel parts are plated for longer life against the elements.
All cartridge valves are 100% functionally tested.

Reference: 520-P-100210-EN-00/09.2015

EMDV-08-C7

BUCHER hydraulics

SOLENOID VALVE, NORMALLY CLOSED,
PILOT OPERATED, POPPET TYPE (2/2)

SPECIFICATIONS

OPERATING PRESSURE: 5,000 PSI [350 Bar]
PROOF PRESSURE: 10,000 PSI [700 Bar]
FLOW: 10.0 GPM [38 l/m] See performance chart.
INTERNAL LEAKAGE: 5 drops/min [0.25 cc/m] @ 5,000 PSI (350 Bar)
VALVE HOUSINGS: 2500 PSI [175 Bar] = Aluminum – Anodized.
5000 PSI [350 Bar] = Steel – Unplated.
OIL TEMPERATURE: –40° to +175° F. [–40° to +80° C.]
AMBIENT TEMPERATURE: –40° to +122° F. [–40° to +50° C.]
Please consult factory for continuously energized or high ambient temperature application (>122° F [50°C])
OPERATING MEDIA: All general purpose hydraulic fluids such as MIL–H–5606, SAE–#10, SAE–#20, etc.
RESPONSE TIME: First indication of change in pressure with 100% voltage supplied @ 80% of nominal flow rating.
* Pull–in: 50 ms
* Drop–Out: 50 ms
SEAL KIT: SKN–0821 Buna "N"
SKV–0821 Viton
INSTALLATION: No restrictions.
WEIGHT: .80 lb [0,36 kg] cartridge with coil only.
VALVE CAVITY: #C0820, See Page 0–011.0.

info.el@bucherhydraulics.com www.bucherhydraulics.com/commoncavity

Reference: 520-P-100210-EN-00/09.2015

END.