# AH-4WE6...Type Solenoid-Operated Directional Valve 



AH-WE6...60S...type

Size (NG) 6<br>Max. Working Pressure: 315 bar<br>Max. Flow: $80 \mathrm{~L} / \mathrm{min}$

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## Features

- Direct operated directional solenoid valve,
- Porting pattern according to DIN 24340 form A, ISO 4401 and CETOP-RP 121 H
- Wet-pin AC or DC solenoids with detachable coil
- Pressure-tight chamber needs not to be opened for a coil change
- Electrical connection as individual or central connection


## Function and configurations

AH-WE6...60S...type valves are solenoid operated directional spool valves. They control the start, stop and direction of hydraulic oil flow. The directional control valves consist of valve body(1), one or two solenoids (2), the valve core (3), and one or two return springs (4). In the de-energized condition the valve core(3) is held in the neutral or initial position by means of return springs (4) (except for impulse spools). The control spool (3) is actuated via wet pin solenoids (2).

To ensure proper operation, the pressure chamber of the solenoid must be filled with oil.
The valve core(3) is moved to the expected position by solenoids(2) and pushing rod(5). This gives free-flow from $P$ to $A$ and $B$ to $T$ or $P$ to $B$ and $A$ to $T$.
When solenoid (2) is de-energized, the valve core (3) is returned to its initial position by means of the return springs (4). The solenoids may also control the valve core (3) by an optional override button(6) under the de-energized condition.


Damp insert

## Specification



## Symbols



## Characteristic curves (Measured at $\mathrm{t}=40^{\circ} \mathrm{C} \pm 5^{\circ} \mathrm{C}$, using HLP46)



7 Symbol "R" in switched positions B $\rightarrow A$ 8 Symbol " G " and " T " in neutral position $\mathrm{P} \rightarrow \mathrm{T}$
9 Symbol "H" in neutral position $\mathrm{P} \rightarrow \mathrm{T}$

| Spool <br> symbol | Flow direction |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | P to A | P to B | A to T | B to T |
| A, B | 3 | 3 | - | - |
| C | 1 | 1 | 3 | 1 |
| D, Y | 5 | 5 | 3 | 3 |
| E | 3 | 3 | 1 | 1 |
| F | 1 | 3 | 1 | 1 |
| T | 10 | 10 | 9 | 9 |
| H | 2 | 4 | 2 | 2 |
| J, Q | 1 | 1 | 2 | 1 |
| L | 3 | 3 | 4 | 9 |
| M | 2 | 4 | 3 | 3 |
| P | 3 | 1 | 1 | 1 |
| R | 5 | 5 | 4 | - |
| V | 1 | 2 | 1 | 1 |
| W | 1 | 1 | 2 | 2 |
| U | 3 | 3 | 9 | 4 |
| G | 6 | 6 | 9 | 9 |

## Technical data

| Fixing position |  |  | Optional |
| :---: | :---: | :---: | :---: |
| Environment temperature range |  | ${ }^{\circ} \mathrm{C}$ | -30 to +50 (NBR seal) |
|  |  | -20 to +50 (FKM seal) |
| Weight | Single solenoid |  | kg | 1.5 |
|  | Double solenoids | kg | 2.0 |
| Max.operating pressure | Port A,B,P | bar | 315 |
|  | Port T | bar | 210 (DC),160 (AC), when the operating pressure exceed the permission value, port T must be used as drain port for spool symbol $A$ and $B$ |
| Max. flow-rate |  | L/min | 80 (DC), 60 (AC) |
| Flow cross section (switching neutral position ) |  | $\mathrm{mm}^{2}$ | for symbol Q 6\% of nominal cross section |
|  |  | $\mathrm{mm}^{2}$ | for symbol W 3\% of nominal cross section |
| Fluid |  |  | Mineral oil suitable for NBR and FKM seal |
|  |  |  | Phosphate ester for FKM seal |
| Fluid temperature range |  | ${ }^{\circ} \mathrm{C}$ | -30 to +80 (NBR seal) |
|  |  | -20 to +80 (FKM seal) |
| Viscosity range |  |  | $\mathrm{mm}^{2} / \mathrm{s}$ | 2.8 to 500 |
| Degree of contamination |  |  | Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or $20 / 18 / 15$, ISO4406 |

## Electric data

| Type of voltage |  |  | DC | AC 50Hz |
| :---: | :---: | :---: | :---: | :---: |
| Usable voltage |  | V | 12,24,28 ${ }^{11}, 48,96,110,205,220$ | 110, 127, 220 |
| Permissible voltage (deviation) |  | \% | Standard solenoid:+10~-15; <br> Large-scope solenoid:+20~-30 |  |
| Power consumption |  | W | Standard solenoid:30; Large-s | pe solenoid:32 |
| Holding power |  | VA | - | 50 |
| Making capacity |  | VA | - | 220 |
| Duty |  |  | Continuous working |  |
| Switching time to ISO 6403 | ON | ms | 25 to 45 | 10 to 20 |
|  | OFF | ms | 10 to 25 | 15 to 40 |
| Switched frequency |  | times/h | to 15000 | to 7200 |
| Type of protection to DIN 40050 |  |  | IP65(Z4, Z5L plug), IP67 (K7 D | sch) |
| Max. coils temperature |  | ${ }^{\circ} \mathrm{C}$ | +150 | +180 |

## Performance limits

The specified switching performance limits are valid with two directions of flow.
Due to the flow forces acting within the valve, the permissible switching performance limit can be significantly lower with only one direction of flow! The switching performance limit was determined with the solenoid at operating temperature, at $15 \%$ under-voltage and without tank pre-loading.

| Solenoid DC |  | Solenoid AC-50Hz |  | Solenoid AC-60Hz |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Curve | Spool symbol | Curve | Spool symbol | Curve | Spool symbol |
| 1 | A, $\mathrm{B}_{1}$ | 11 | A, $\mathrm{B}_{1}$ | 19 | A, $\mathrm{B}_{1}$ |
| 2 | V | 12 | V | 20 | V |
| 3 | A, B | 13 | A, B | 21 | A, B |
| 4 | F, P | 14 | F, P | 22 | F, P |
| 5 | J | 15 | G, T | 23 | G, T |
| 6 | G, H, T | 16 | H | 24 | J, L, U |
| 7 | A/O, A/OF, L, U | 17 | A/O, A/OF, C/O, | 25 | A/O, A/OF, Q, W |
| 8 | C, D, Y |  | C/OF, D/O, D/OF | 26 | C, D, Y |
| 9 | M |  | E, J, L, M | 27 | H |
| 10 | E, $\mathrm{R}_{2}, \mathrm{C} / \mathrm{O}, \mathrm{C} / \mathrm{OF}$ |  | Q, $\mathrm{R}_{2}, \mathrm{U}, \mathrm{W}$ | 28 | C/O, C/OF, D/O |
|  | D/O, D/OF, Q, W | 18 | C, D, Y |  | D/OF, M, R, E, R 2 ) |




| Solenoid AC |  |  |
| :---: | :---: | :---: |
| Curve | Solenoid voltage |  |
| 11 to 18 | W 110 | $110 \mathrm{~V}, 50 \mathrm{~Hz}$ |
|  | W 127 | $127 \mathrm{~V}, 50 \mathrm{~Hz}$ |
|  | W 230 | $230 \mathrm{~V}, 50 \mathrm{~Hz}$ |

Performance limits (Measured at $\mathrm{t}=40^{\circ} \mathrm{C} \pm 5^{\circ} \mathrm{C}$, using HLP46)


| Solenoid AC |  |  |
| :---: | :---: | :---: |
| Curve | Solenoid voltage |  |
| 19 to 28 | $W 110$ | $110 \mathrm{~V}, 60 \mathrm{~Hz}$ |
|  | W230 | $230 \mathrm{~V}, 60 \mathrm{~Hz}$ |



| Solenoid DC |  |
| :---: | :---: |
| Curve | Solenoid voltage |
| 1 to $10_{1)}$ | 110,180 |


| Curve | Spool symbol | Curve | Spool symbol | Curve | Spool symbol |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 1 | A,B | 6 | T | $10_{1)}$ | E, R, C/O, C/OF, D/O, D/OF, Q, W |
| 2 | V | 7 | H | $10_{2)}$ | R, C/O, C/OF, D/O, D/OF, Q, W |
| 3 | F, P | 8 | C,D |  |  |
| 4 | J, L, U | 9 | M | 11 | A/O, A/OF |
| 5 | G |  |  | 12 | E |



| Solenoid AC |  |
| :---: | :---: |
| Curve | Solenoid voltage |
| 1 to 12 , see $10_{2)}$ | 220 |

Valve with DC or rectification AC solenoid


1 Solenoid
2 Manual override button
3.1 Plug-in connector to DIN 43650
3.2 Deutsch connector assembly

4 Junction box with lead and light, M $22 \times 1.5$ interface
5 Nameplate
6 O-ring: $9.25 \times 1.78$
$7 \quad$ Plug screw for valves with one solenoid
8 Space required to remove connector
9 Space required to remove coil
10.1 Dimension of 3-position valves, standard version 10.2 Dimension of 3-position valves, large-scope Type of voltage
11.1 Dimension of 2-position valves with solenoid at ' $A$ ', standard version
11.2 Dimension of 2-position valves with solenoid at 'A', large-scope Type of voltage
12.1 Dimension of 2-position valves with solenoid at ' $B$ ', standard version
12.2 Dimension of 2-position valves with solenoid at 'B', large-scope Type of voltage
13 Securing nut, tightening torque $\mathrm{M}_{\mathrm{A}}=4 \mathrm{Nm}$
14 Valve fixing screws.
Hexagon socket head cap screw
M5 $\times 50$ GB/T 70.1-10.9,
Tightening torque $M_{A}=8.9 \mathrm{Nm}$

## Valve with AC solenoid



1 Solenoid
2 Manual override button
3 Plug-in connector to DIN 43650 (rotatable $90^{\circ}$ )
4 Junction box with lead and light, M $22 \times 1.5$ interface
5 Nameplate
6 Seal rings $9.25 \times 1.78$
7 Plug screw for valves with one solenoid
8 Space required to remove connector
9 Space required to remove coil
10 Securing nut, tightening torque, $\mathrm{M}_{\mathrm{A}}=4 \mathrm{Nm}$
11 Valve fixing screws. Hexagon socket head cap screw $\mathrm{M} 5 \times 50 \mathrm{~GB} / \mathrm{T} 70.1-10.9$,
Tightening torque $\mathrm{M}_{\mathrm{A}}=8.9 \mathrm{Nm}$

