

## 4/2 and 4/3 directional spool valve solenoid-operated, direct-acting soft-shift 4WEW 10

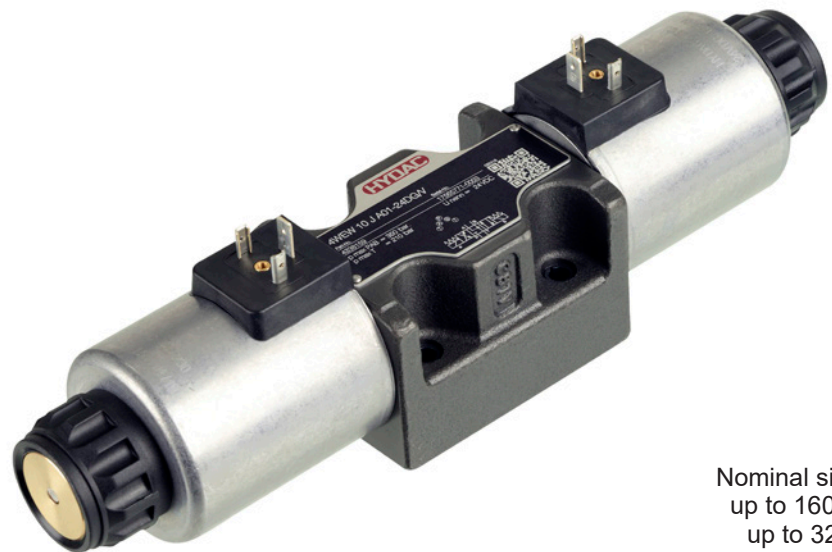
### DESCRIPTION

HYDAC 4/2 and 4/3 directional spool valves of the 4WEW 10 series are directional valves which are designed to open and close flow paths in oil-hydraulic systems. The valve operates by an oil-immersed solenoid. During this process, the solenoid pushes the valve's control spool into the position which will obtain the desired flow path.

An orifice in the magnetic spool and special valve spools with fine control grooves work together to dampen the movement and a soft shifting process.

### FEATURES

- Direct-acting, solenoid-operated spool valve
- Interface according to DIN 24340 Form A10, ISO 4401-05
- Removable, high-performance solenoid coil, no need to open the hydraulic system during replacement
- Coil rotatable by 360°, allows flexible installation
- Electrical connection in several versions available
- Soft-shift process reduces shocks in hydraulic systems
- With concealed manual override, additional versions available



Nominal size 10  
up to 160 l/min  
up to 320 bar

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## MODEL CODE

**4WEW 10 E A01 - 24 D G /V**

### Type

Solenoid-operated directional valve with 4 main ports, soft-shift

### Nominal size

10

### Spool symbol

See page 3

### Series

A01 = specified by the manufacturer

### Rated voltage of the solenoid coil<sup>1)</sup>

24 = 24 VDC

\* only in combination with the electrical connection G

### Type of voltage

D = DC voltage

### Electrical connection (for details, see page 7)<sup>1)</sup>

G = device connector, DIN EN 175301-803 A

### Material of seal

/N = NBR

/V = FKM

### Manual override (for details, see page 7)

Not specified = with concealed manual override (standard)

/M1 = with manual override

/M4 = with knurled nut

<sup>1)</sup> Other models on request

## SPOOL TYPES / SYMBOLS

### 4/2 DIRECTIONAL SPOOL VALVES

| Type | Basic symbol | With intermediate position |
|------|--------------|----------------------------|
| D    |              |                            |
| HA   |              |                            |
| JA   |              |                            |

### 4/3 DIRECTIONAL SPOOL VALVES

| Type | Basic symbol | With intermediate position |
|------|--------------|----------------------------|
| E    |              |                            |
| H    |              |                            |
| J    |              |                            |

## FUNCTION

The solenoid-operated directional spool valves of the 4WEW 10 type are used to control nominal flow and consist of one valve casing (1) with an associated valve spool (2). Depending on the type, each valve is equipped with at least two return springs (3) and one or two pole tubes (4) and solenoid coils (5).

The valve is hydraulically controlled by solenoids (5) which operate the valve spool. A solenoid is a converter which converts electrical energy into mechanical energy. In this process, the energised solenoid causes the oil-immersed magnetic spool (6) to make a linear stroke movement. The solenoid uses the guide rod (7) to move the valve spool into the desired position. This causes the nominal flow directions between the respective ports to be released or closed.

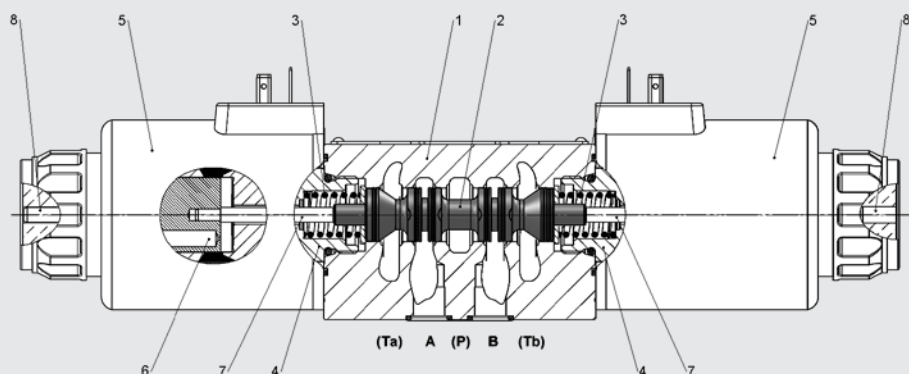
An orifice in the magnetic spool and fine control grooves in the valve spool work together to slow down the switching process and lessen pressure drops. This significantly reduces shocks in the hydraulic system.

To obtain the valves' optimum switching capacity, the pole tube's pressure-tight chamber should always be vented and filled with oil.

If the solenoid has been de-energised, the valve spool is pushed back into the starting position by the appropriate return spring

The manual override (8) enables valve operation without energising the solenoid.

## SECTION VIEW



## TECHNICAL DATA <sup>1</sup>

| General specifications                            |   |
|---|---|
| MTTF <sub>d</sub> :                               | According to EN ISO 13849-1:2015 Tables C1 & C2   |
| Ambient temperature range:                        | [°C] -20 to +60   |
| Installation position:                            | No orientation restrictions   |
| Weight:   | [kg] 4.0 with one solenoid;<br>6.0 with two solenoids   |
| Material:   | Valve casing: Cast iron   |
|   | Pole tube: Steel  |
|   | Coil casing: Steel  |
|   | Name plate: Aluminium   |
| Surface coating:                                  | Valve casing: Phosphate plated  |
|   | Pole tube: Zn coating   |
|   | Coil casing: ZnNi coating   |
| Hydraulic specifications                          |   |
| Operating pressure:                               | [bar] Port A, B, P: $p_{max} = 320$<br>Port T: $p_{max} = 210$  |
| Nominal flow:                                     | [l/min] See performance limits on page 5  |
| Operating fluid:                                  | Hydraulic oil to DIN 51524 Part 1, 2 and 3  |
| Media operating temperature range:                | [°C] -20 to +80   |
| Viscosity range:                                  | [mm <sup>2</sup> /s] 15 to 400  |
| Permitted contamination level of operating fluid: | Class 20/18/15 according to ISO 4406  |
| Max. switching frequency:                         | [1/h] 7,000   |
| Manual override:                                  | Up to approx. 50 bar tank pressure available  |
| Sealing material:                                 | FKM (standard), NBR   |
| Electrical specifications                         |   |
| Response time:                                    | [ms] Response times highly dependent on viscosity, pressure and application (see sample curves, page 5) |
| Type of voltage:                                  | DC  |
| Rated voltage:                                    | [V] 24  |
| Voltage tolerance:                                | [%] ±10   |
| Nominal power:                                    | [W] 38  |
| Duty cycle:                                       | [%] 100   |
| Max. surface temperature of the coil:             | [°C] 150  |
| Protection class according to DIN EN 60529:       | With electrical connection "G" IP65 <sup>2</sup>  |

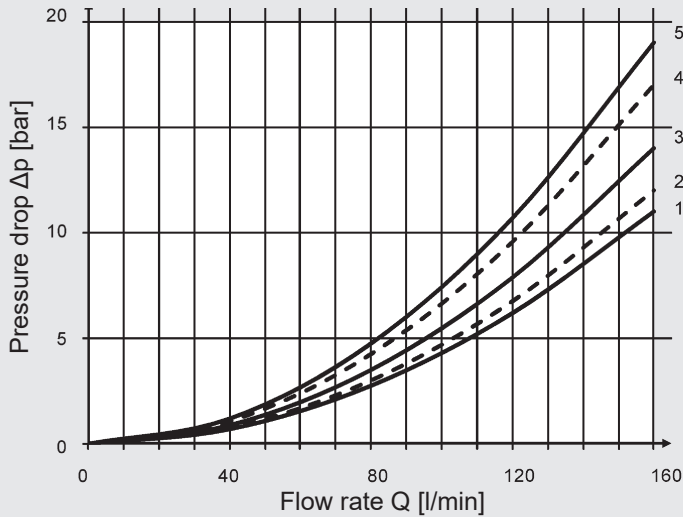
<sup>1</sup> see "Conditions and Instructions for Valves" in brochure 53.000

<sup>2</sup> If installed correctly

## PERFORMANCE

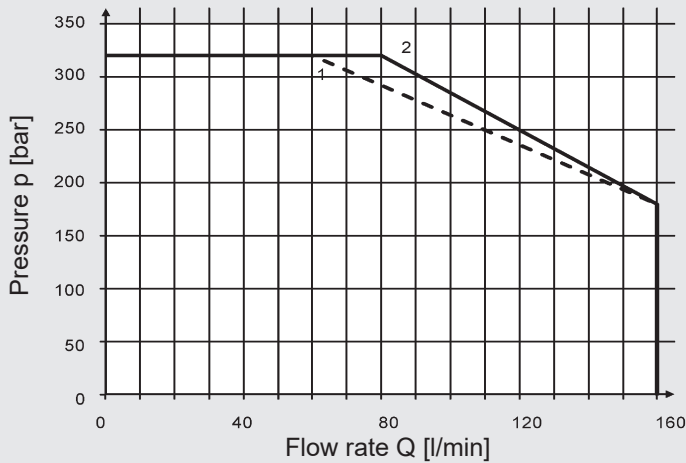
### Pressure drop

measured at  $v = 46 \text{ mm}^2/\text{s}$ ,  $T = 40 \text{ }^\circ\text{C}$



### Performance limits

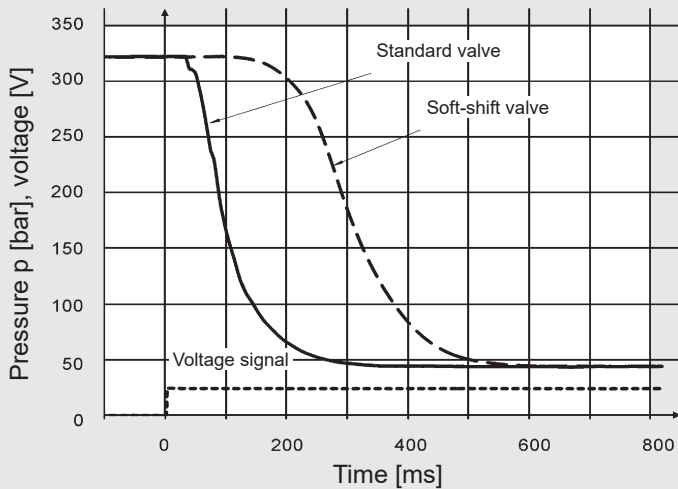
measured at  $v = 46 \text{ mm}^2/\text{s}$ ,  $T = 40 \text{ }^\circ\text{C}$



### Sample curves

Measured with flow from both sides  
(e.g.  $P \rightarrow A$  and  $B \rightarrow T$ )

Measured at symbol E at  $v = 46 \text{ mm}^2/\text{s}$ ,  $T = 40 \text{ }^\circ\text{C}$



## Performance assignment to the associated spools:

| Spool | Pressure drop |     |     |     |     | Performance limits |
|-------|---------------|-----|-----|-----|-----|--------------------|
|       | P→A           | B→T | P→B | A→T | P→T |                    |
| D     | 4             | 4   | 4   | 4   | –   | 2                  |
| E     | 3             | 3   | 3   | 3   | –   | 1                  |
| H, HA | 1             | 3   | 1   | 3   | 5   | 2                  |
| J, JA | 3             | 2   | 3   | 2   | –   | 1                  |

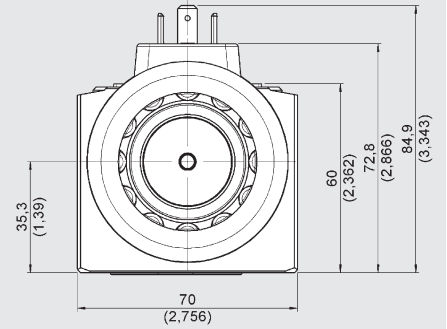
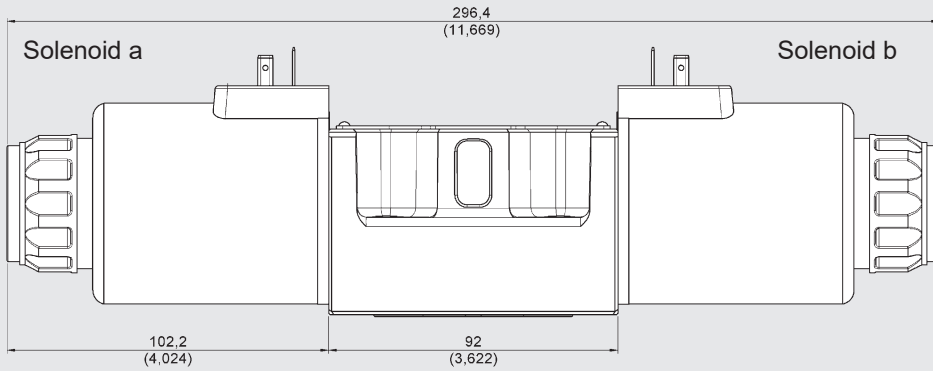
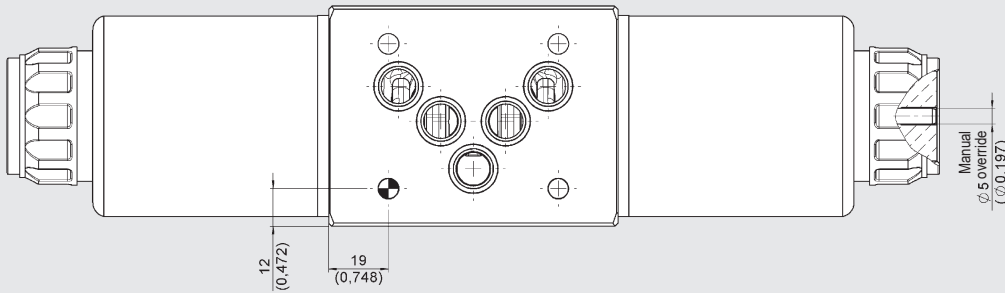
The performance limits were calculated with solenoids at operating temperature and 10% low voltage.

The specified performance limits are applicable for operation with two nominal flow directions.

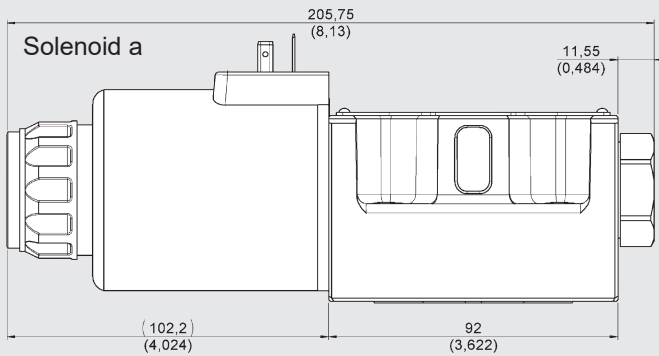
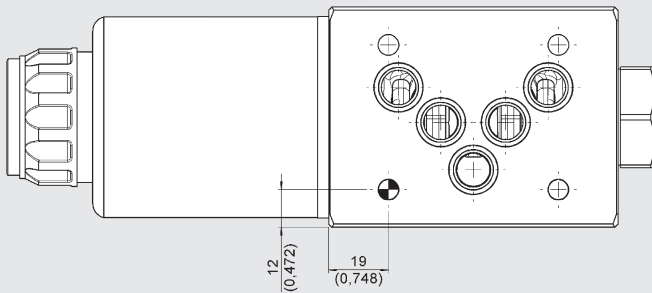
If there is only one nominal flow direction, the power limits may be lower.

# DIMENSIONS

With two solenoids

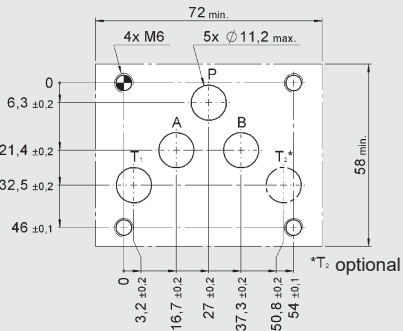


With one solenoid

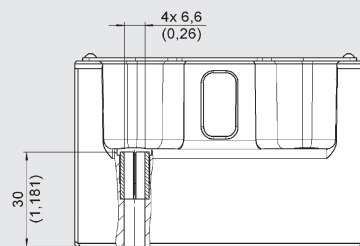


Interface

ISO 4401-05-04-0-05 (CETOP 5)



Clamping length



**Mounting screws:**

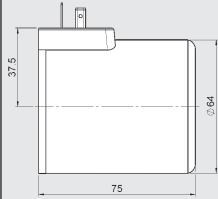
(not included in delivery)

DIN EN ISO 4762 – M6 x 40 – 10.9

Tightening torque: 10 Nm

## ELECTRICAL CONNECTIONS

**G**  
Device  
connector  
DIN EN  
175301-803 A

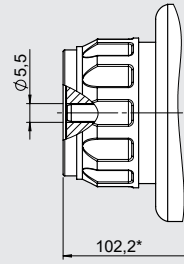


● IP65

Other models on request

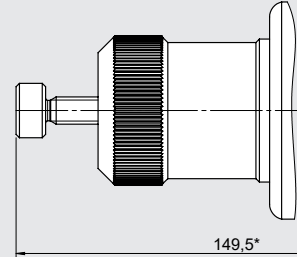
## MANUAL OVERRIDES

**Standard**  
with  
concealed  
manual  
override



Operation  
with tool

**M4**  
with  
knurled-  
head  
screw



Operation by  
turning the  
knurled-head  
screw

\* Dimensions up to valve casing

The valve can also be operated manually. There are 2 manual overrides available for this purpose.

The tank pressure should not exceed 50 bar. If the tank pressure is higher, the force required to operate the manual override increases accordingly.

For valves with two solenoids, simultaneous operation of both manual overrides is prohibited.

## ACCESSORIES

|                            | Designation                      | Part no. |
|----------------------------|----------------------------------|----------|
| Seal kits (4-part set)     | 12.42 x 1.78-NBR -80Sh           | 4348706  |
|                            | 12.4 2x 1.78-FKM -80Sh           | 4348705  |
| Mounting screws (4 pcs)    | DIN EN ISO 4762 - M6 x 40 - 10.9 | 3524314  |
| Solenoid coils             | COIL 24DG -75-3164 38W           | 4251230  |
| Seal kit for solenoid coil | Nut open, O-ring                 | 4348711  |
|                            | Z4 standard 2-pole without PE    | 394287   |
| Connector                  | ZW4 incl. rectifier              | 394293   |
|                            | Z4L incl. LED                    | 394285   |

## Note

The information in this brochure relates to the operating conditions and applications described. For applications not described, please contact the relevant technical department. All technical details are subject to change without notice.