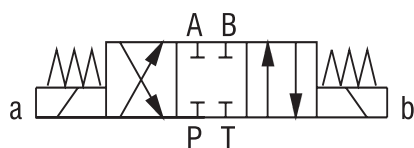


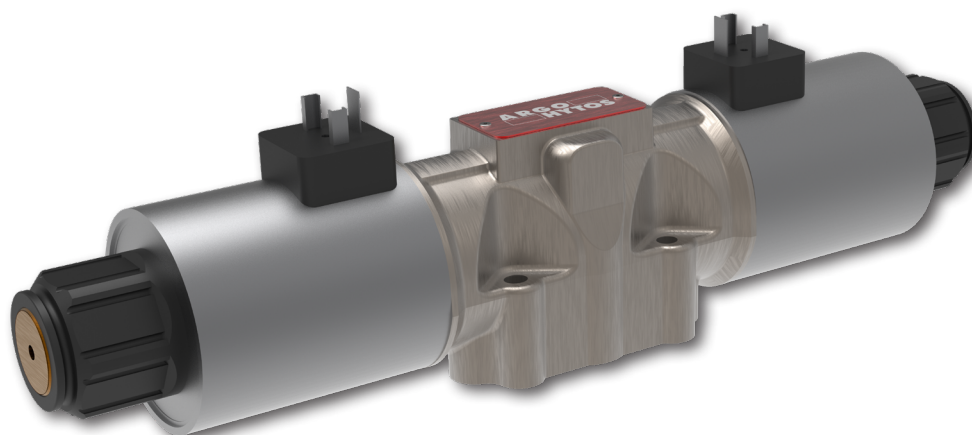
INSTRUCTIONS FOR USE OF THE PRODUCT

**4/2 and 4/3 SPOOL, HYDRAULIC DIRECTIONAL CONTROL VALVE with  
BODY AND CONNECTION PATTERN ACCORDING TO ISO 4401**

**RPE4-10**



**EN**



**Important!** Read the instructions before using the product.  
Save the instructions for future reference.

If the operating instructions are lost, new ones can be found on the ARGO-HYTOS website [www.argo-hytos.com](http://www.argo-hytos.com)

The following is the authorised translation of original operating instruction RPE4-10 no. 14039\_2cz\_03/2025, issued by the manufacturer:

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|                                                                                                        |                                                                                                   |                                                                                     |
|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>EU PROHLÁŠENÍ O SHODĚ</b><br><b>EU DECLARATION OF CONFORMITY</b><br><b>EU-KONFORMITÄTSERKLÄRUNG</b> |                                                                                                   |  |
| Výrobce / Manufacturer / Hersteller:                                                                   | ARGO-HYTOS s.r.o.                                                                                 |                                                                                     |
| Adresa / Address / Adresse:                                                                            | Dělnická 1306<br>CZ – 543 15 VRCHLABÍ<br>Česká republika / Czech Republic / Tschechische Republik |                                                                                     |
| Identifikační číslo (DIČ)/ Ident. No. / Ident. Nr.:                                                    | CZ47452498                                                                                        |                                                                                     |

F12-050.4

Výrobek / Product / Erzeugnis:

|                            |                  |                            |                     |
|----------------------------|------------------|----------------------------|---------------------|
| C14B*; C19B*; C22B*; C31A* | DC/AC            | C14B*; C19B*; C22B*; C31A* | Hx 8007             |
| Název / Name / Bezeichnung | Typ / Type / Typ | JS / Size / NG             | Katalog / Catalogue |

Účel použití / Goal of the use / Zweck der Verwendung:

Cívka ovládacího elektromagnetu sloužící k ovládání hydraulických prvků.  
Coil for operating solenoids that is predetermined for controlling hydraulic components.  
Spule für Magnete zur Steuerung hydraulische Ventilen.

Tímto prohlašujeme, že výrobek splňuje požadavky níže uvedených zákonných předpisů a technických norem a je za podmínek obvyklého a určeného použití bezpečný.  
We declare herewith that the product meets requirements of the subsequently designated laws and technical standards and is safe under conditions of the usual and intended use.  
Wir erklären hiermit, dass das Erzeugnis mit den nachfolgend bezeichneten Rechtsvorschriften und technischen Normen übereinstimmt und unter den Bedingungen der gewöhnlichen und bestimmten Verwendung sicher ist.

Směrnice EU / EU Directives / EU-Richtlinien

|              |                                                                                                                                                                                                                                                                                                                                                                           |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2014/35/EU   | The harmonisation of the laws of Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.<br>Richtlinie zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung elektrischer Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen auf dem Markt. |
| 2014/30/EU   | The harmonisation of the laws of the Member States relating to electromagnetic compatibility<br>Richtlinie zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit                                                                                                                                                      |
| 2011/65/EU   | The restriction of the use of certain hazardous substances in electrical and electronic equipment.<br>Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten                                                                                                                                                                        |
| 2015/863 /EU | Amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances<br>Änderung von Anhang II der Richtlinie 2011/65/EU des Europäischen Parlaments und des Rates hinsichtlich der Liste der Stoffe, die Beschränkungen unterliegen                                                                      |

Technické normy a předpisy / Technical standards / Technische Normen und Vorschriften:

ČSN EN ISO 12100:2011; ČSN EN ISO 9227:2017, ČSN EN 60529:1993+A1:2001+A2:2014+Opr.1:2019,  
ČSN EN 60664-1 ed.2:2008, ČSN EN 60204-1 ed.3:2019, ČSN EN 61000-6-2 ed.3:2006+změna A1:2019;  
ČSN EN 61000-6-3 ed.2:2007+A1:2011+ Opr.1:2013; ČSN EN 61000-6-4 ed.2:2007+A1:2011;  
EN 50581:2012 (RoHS)

Upozornění: / Warning: / Beachtung: ( ▲ 1 )

AC cívka nevyhovuje podmínkám v souladu s mezinárodní normou EN 61000-6-3:2007. Výrobek je určen pouze k začlenění do jiného strojního zařízení tak, že vznikne strojní zařízení stanovené k posuzování shody. Strojní zařízení nesmí být uvedeno do provozu, dokud nebude vydáno prohlášení o shodě tohoto zařízení.  
AC coil not satisfy of conditions according to international standard EN 61000-6-3:2007. The product is determined only for incorporation into another machine equipment in such a way that some new machine equipment for conformity examination be created. The machine equipment must not be put in the operation until conformity declaration of this machine equipment.  
AC Spulen entsprechen nicht der internationalen Norm EN61000-6-3: 2007. Das Erzeugnis ist bestimmt nur zur Eingliederung in eine andere Maschineneinrichtung auf solche Weise, dass eine neue zur Konformitätsbeurteilung vorgesehene Maschineneinrichtung entsteht. Die Maschineneinrichtung darf nicht in Betrieb eingesetzt werden, solange eine Konformitätserklärung dieser Maschineneinrichtung nicht herausgegeben ist.

Vrchlabí, 3.5.2023

Ing. Tomáš Vatrás

Místo a datum vydání /  
Place and date of issue /

Vedoucí konstrukce ventilů /  
R&D valves manager /  
R&D Ventile manager:

Podpis /  
Signature /  
Unterschrift:



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### Related documents:

Document HC 0060: General Information for the use of products

Product catalogue HC 4039: 4/2 and 4/3 Electromagnetically controlled distributor RPE4-10

Product catalogue HC 8007: Coils for valve control electromagnets

Product catalogue HC 8008: Connectors according to EN 175301-803, shape A and metric connectors M12

Spare parts catalogue HC 8010: Spare parts catalogue

## An overview of signal words and warning signs used in the text

|                                                                                           |                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  DANGER  | Signal word combined with a warning sign used to signify that a dangerous situation which could result in death or serious injury is imminent.                            |
|  WARNING | Signal word combined with a warning sign used to signify a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.                 |
|  CAUTION | Signal word combined with a warning sign used to signify the occurrence of a potentially dangerous situation that could result in death or serious injury if not avoided. |

## List of other symbols and signs used in the text

| Symbol, sign | Description of the meaning of the symbol, sign |
|--------------|------------------------------------------------|
| AC           | Designation for alternating current, voltage   |
| DC           | Designation for direct current, voltage        |
| FMP, FKM     | Fluoroelastomer (synthetic rubber)             |
| NBR          | Rubber used for the manufacture of seals       |
| PA           | Polyamide                                      |
| PE           | Polyethylene                                   |

## Glossary of technical terms used

- › **A hydraulic mechanism** is a mechanism in which energy is transferred by the pressure energy of the working fluid
- › **The volumetric flow rate Q** is the amount of fluid, in volume units, that flows through a given flow cross-section per unit time ( $\text{m}^3\text{s}^{-1}$  in SI units, l/min in practice)
- › **The control electromagnet** is used for remote control of valves. The electromagnet consists of a mechanical control system, transmitting motion to the slide, and an excitation coil, which generates a magnetic field that provides motion to the cylindrical armature inside the control system.
- › **The valve connection pattern** describes the relative position of the channel holes and the holes for the connection bolts on the valve body base, as defined by ISO 4401.
- › **A distributor** is a slide valve that changes the connection of the channels in the body by moving the slide. It is used in hydraulic circuits to change the direction of movement of a piston in a cylinder or the direction of rotation of the output shaft of a rotary hydraulic motor or to block the flow of fluid and stop appliances.
- › **The slide position sensor** is a non-contact inductive sensor that responds to the presence of a ferromagnetic core, firmly mechanically connected to the slide.
- › **The valve nominal diameter** (DN, NG) indicates the flow rate of the valve, which corresponds to the flow rate of a straight pipe with a specified internal diameter (DN). For example, the valve nominal diameter DN 06 means that a pipe with an internal diameter of  $d = 6 \text{ mm}$  should be used for its connection.
- › **The distributor slide** is the key control element moving in the valve body hole. The collars of the slide close / open the individual channels.
- › **Pressure** is the force acting on a unit area (the SI unit is Pascal ( $1 \text{ Pa} = \text{Nm}^{-2}$ ), in practice  $1 \text{ bar} = 0.1 \text{ MPa}$ ).
- › **Power** in hydraulics is calculated as the product of pressure and volume flow. The limit power curves indicate the limit combinations of pressure and volume flow at which reliable valve function is still ensured.
- › **4/2, 4/3** is an abbreviated designation of the valve description. Four means that it is a four-way valve, i.e. having four channels (P-pressure, T - return, leading to the tank, A and B leading to the appliance). Two (three) means that it is a two-position (three-position) valve, when the slide takes two (three) positions. The basic one, in which it is held by springs, and the working one, in which it is moved by the force of an electromagnet.

## 1. Product use

**The RPE3-10 valve** is a hydraulic four-way two-position or three-position slide distributor with body, directly controlled by electromagnet(s), designed for connection to a plate with DN 10 connection pattern according to ISO 4401. The product is designed to control the direction of movement of the output member of the appliance, or to stop it.

**The valve with built-in slide position sensor(s)** is intended for use in systems with increased requirements for reliability and safety, e.g. control hydraulic circuits of presses, plastic injection presses, molding machines, construction machines, etc.

## 2. Product use risks and limitations

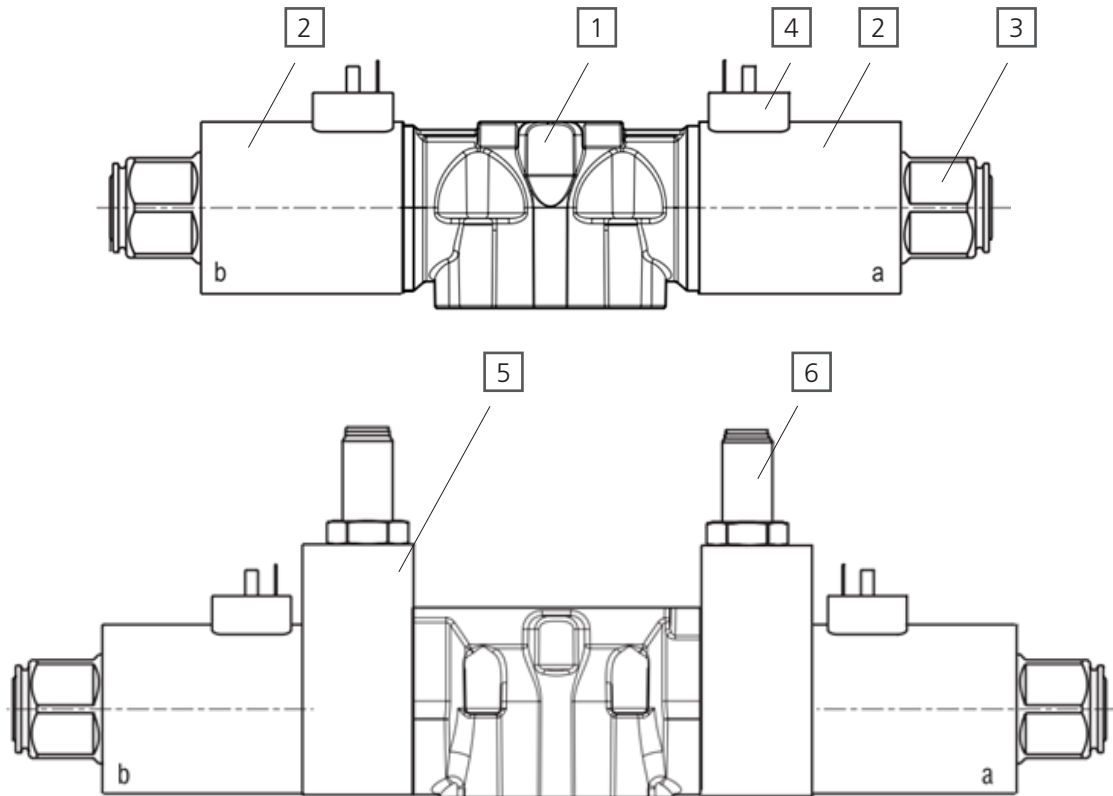
|                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>DANGER</p>    | <p><b>Maximum operating pressure</b></p> <p>The valve may be used for a maximum working fluid pressure of 350 bar in the P, A, B channels and 210 bar in the T channel. Exceeding the maximum pressure can damage the valve and if the compressive strength value of 525 bar in the P, A, B or 315 bar in the T channel is exceeded, the valve will rupture.</p>                                                                                                                                                                                                                                                                                                                                                        |
|  <p>DANGER</p>    | <p><b>Limited hydraulic power</b></p> <p>In the catalogue and in the instructions for use of the product, there is a graph with the limit powers for individual connections – types of the slide valves. Power means the mutual combination of operating pressure and volume flow. If the limit power curves are exceeded, there is a risk of unreliable function or loss of product function.</p>                                                                                                                                                                                                                                                                                                                      |
|  <p>WARNING</p>   | <p><b>Tightening the valve</b></p> <p>The valve may be mounted on a connection surface with corresponding flatness and roughness with the connection pattern DN 10 according to ISO 4401 (see p. 6.21 Valve assembly). The four fastening screws M6x45 DIN 912-10.9 must be tightened crosswise with a tightening torque of 14+1 Nm. Use original screws with increased tensile strength. Failure to comply with the conditions of correct fastening risks the release of the valve by pressure and leakage of the working fluid.</p>                                                                                                                                                                                   |
|  <p>CAUTION</p>   | <p><b>Maximum operating temperature and tightness</b></p> <p>The maximum operating temperature must not exceed the temperature range for the given type of seal material, otherwise there will be loss of tightness and leakage of the working fluid.<br/>Seal material NBR: -30 to +80 °C<br/>FPM (Viton®) seal material: - 20 to + 80 °C</p>                                                                                                                                                                                                                                                                                                                                                                          |
|  <p>CAUTION</p>   | <p><b>Maximum operating temperature and function</b></p> <p>The maximum operating temperature of the fluid must not exceed 80 °C and the maximum ambient temperature must not exceed 50°C. This combination of temperatures determines the maximum winding temperature of the electromagnet coil. When the temperature is exceeded, the resistance of the coil winding increases and the strength of the electromagnet, and thus the hydraulic performance of the valve, decreases. There is also a risk of damage to the coil wire insulation, short circuit and loss of electromagnet function. Also, the correct function of the position sensor is only guaranteed in the temperature range of -25 °C to 80 °C.</p> |
|  <p>CAUTION</p> | <p><b>Valve surface temperature</b></p> <p>The surface temperature of the valve including the control electromagnet can exceed 100°C due to the temperature of the working fluid, pressure losses in the valve converted into heat and heating of the coil winding. Do not touch the surface of the valve and electromagnet while the circuit is the operating mode or after shutdown until it has cooled to a safe temperature. Risk of skin burns.</p>                                                                                                                                                                                                                                                                |
|  <p>CAUTION</p> | <p><b>Used working fluids</b></p> <p>The valves may only be used for normal working fluids, especially hydraulic oils. (see chapter 3. Product description). As a working fluid, it is prohibited to use, in particular:</p> <ul style="list-style-type: none"> <li>› water and aqueous solutions that will cause corrosion and loss of the valve function</li> <li>› easily flammable or explosive fluids, the heating of which may cause a fire or explosion when passing through the valve</li> <li>› aggressive fluids (e.g. acids and hydroxides) which will damage the valve and cause loss of function.</li> </ul>                                                                                               |

### 3. Product description

The hydraulic distributor consists of a cast iron body with a DN 10 connection pattern according to ISO 4401 on the base (1). A hardened steel slide moves inside the body, which is held in the basic position by centring springs. The slide is moved to the working position by the power of the control electromagnet (2). The slide closes / connects the channels in the valve body with its collars (see the overview of slide connections). We classify the distributor in the group of valves for controlling the direction of liquid flow. That is, it changes the direction of movement of the output member of the appliance, or stops it.

The electromagnet (2) consists of a mechanical part – a control system, which transmits movement to the slider, and a coil, which creates a strong magnetic field by passing current through the coil winding. The coil is fixed on the control system with a plastic nut (3). The coils are connected to the electrical supply via the connector (4).

In the type of valve with a slide valve position sensor, a non-contact inductive sensor (5) is mounted between the body of the hydraulic part and the control electromagnet. The sensor responds to the position of the steel core firmly connected to the slide. The sensor is connected using a four-pin connector with M12x1 thread (6).



#### 3.1 Materials used:

Valve body – grey cast iron  
Slide – hardened steel  
Compression centring springs – patented steel wire for the production of springs  
Control system ring and pin – non-magnetic stainless steel with 10% nickel content in the alloy  
Control system plug – brass  
Control system attachment, pipe and anchor, coil shell, sensor body and flange – steel  
Coil body, coil encasement in casing, coil connector base – polyamide (PA)  
Coil winding – enamelled copper wire  
Type plate – anodized aluminium sheet  
Coil fixing nut – polyamide (PA) / closed nut (N1) – aluminium alloy  
Valve seal – NBR, FPM (depending on valve type)

The materials used are not included in the lists of prohibited and mandatorily documented substances of Directive 2011/65/EU (RoHS) and EU Regulation No. 1907/2006 (REACH).

#### 3.2 Surface corrosion protection:

In the standard version, the valve body is phosphated, the outer surface of the steel parts is galvanized with 240 h corrosion protection in NSS according to ISO 9227. Phosphating is recommended as a base layer for spraying the body with paint.

In the version with reinforced corrosion protection, the body and the outer surface of the steel parts are galvanized with 520 h corrosion protection in NSS according to ISO 9227.

The surface protection layer does not contain hexavalent chromium Cr6+.

### 3.3 Basic technical parameters

| Parameter                                                                        | Unit                                | Value                     |              |
|----------------------------------------------------------------------------------|-------------------------------------|---------------------------|--------------|
| Maximum pressure in channels P, A, B                                             | bar (PSI)                           | 350 (5080)                |              |
| Maximum pressure in output channel T                                             | bar (PSI)                           | 210 (3050)                |              |
| Maximum volumetric flow rate through the valve                                   | l/min (GPM)                         | 140 (37)                  |              |
| Working fluid temperature range for NBR seal material                            | °C (°F)                             | -30 to +80 (-22 ... +176) |              |
| Working fluid temperature range for FPM seal material                            | °C (°F)                             | - 20 to +80 (-4 ... +176) |              |
| Ambient temperature range                                                        | °C (°F)                             | -30 to +50 (-22 ... +122) |              |
| Working fluid kinematic viscosity range                                          | mm²s <sup>-1</sup>                  | 10 to 400                 |              |
| Required minimum working fluid purity                                            | Class                               | 21/18/15 ISO 4406         |              |
| Electromagnet coil supply voltage tolerance                                      | % of U <sub>NOM</sub>               | ± 10                      |              |
| Maximum switching frequency                                                      | number/h                            | 15,000                    |              |
| Lifetime                                                                         | cycles                              | 10 <sup>7</sup>           |              |
| Approximate switching time ON at a kinematic viscosity of 32 mm²s <sup>-1</sup>  | ms                                  | AC: 30-40                 | DC 30-40     |
| Approximate switching time OFF at a kinematic viscosity of 32 mm²s <sup>-1</sup> | ms                                  | AC: 30-70                 | DC 10-50     |
| Valve weight                                                                     | with one electromagnet              | kg (lbs)                  | 3,91 (8.62)  |
|                                                                                  | with two electromagnets             |                           | 5,39 (11.88) |
| Valve weight                                                                     | with one electromagnet and sensor   | kg (lbs)                  | 4,82 (10.63) |
|                                                                                  | with two electromagnets and sensors |                           | 7,21 (15.90) |

### 3.4 Working fluid

The valve is designed for common hydraulic working fluids:

- mineral oils of performance classes HM and HV according to ISO 6734-4
- non-flammable and difficult to ignite hydraulic fluids according to ISO 12922
- environmentally acceptable hydraulic fluids according to ISO 15380

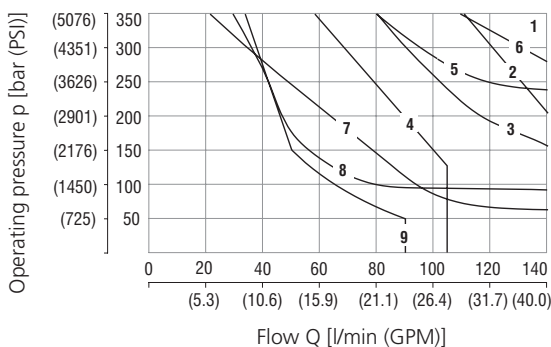
**NOTICE:** NBR seal material is not suitable for some working fluid groups, such as the HFD group.

In case of uncertainty, we recommend to perform a test of the mutual tolerance of the seal material and the working fluid.

### 3.5 Performance characteristics, measured at viscosity $\nu = 32 \text{ mm}^2/\text{s}$ (156 SUS)

Limit performance curves are determined under the least favourable operating conditions, i.e. the maximum permitted temperature of the fluid and the surroundings, and minimum control voltage (0.9 U<sub>NOM</sub>).

Operating limits for maximum hydraulic power at rated temperature and supply voltage equal to 90% nominal.



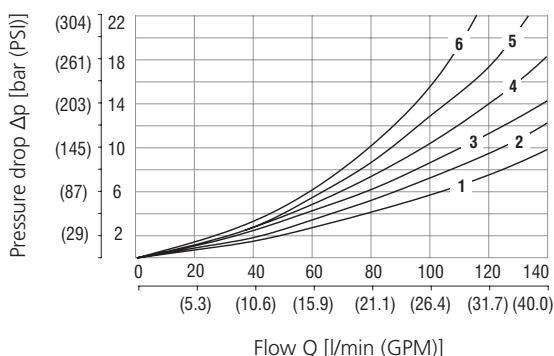
| Spool symbol                 |   |
|------------------------------|---|
| Z11, Z51, H11, H51, P11, P51 | 1 |
| R11, X11, R21                | 2 |
| C11, C51                     | 3 |
| B11, B51                     | 4 |
| Y11, Y51                     | 5 |
| J15, J75                     | 6 |
| L21                          | 7 |
| A51                          | 8 |
| C21                          | 9 |



**CAUTION**

Consult the manufacturer's technical department for performance characteristics in flow directions other than those listed. When the liquid flows through only one channel (A or B), when the other remains closed or is only loaded with static pressure, a significant reduction in the limiting performance characteristics can occur.

### 3.6 Pressure drop related to flow rate, measured at viscosity $\nu = 32 \text{ mm}^2/\text{s}$ (156 SUS)



| Spool symbol                 | Direction of flow |     |     |     |     | Direction of flow |     |     |     |     |
|------------------------------|-------------------|-----|-----|-----|-----|-------------------|-----|-----|-----|-----|
|                              | P-A               | P-B | A-T | B-T | P-T | P-A               | P-B | A-T | B-T | P-T |
| Z11, P11, Y11, R11, X11, B11 | 1                 | 1   | 2   | 2   |     | C11               | 4   | 3   | 4   | 5   |
| Z51, Y51, B51                |                   | 1   | 2   |     |     | C51               | 4   |     | 5   | 1   |
| H11                          | 1                 | 1   | 2   | 2   | 1   | L21               | 1   | 1   | 1   | 2   |
| H51                          |                   | 1   | 2   |     | 1   | R21               | 1   | 1   | 1   | 3   |
| P51                          |                   | 1   | 2   |     |     | J15               | 1   | 1   | 2   | 3   |
| J75, A51                     | 1                 | 1   |     |     |     | C21               | 6   | 6   | 6   | 4   |

### 3.7 Spool Position Sensor

#### Technical parameters

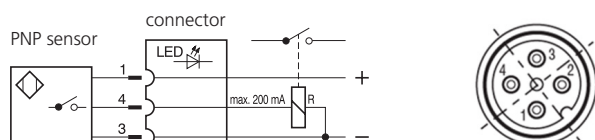
| Technical Data of the Sensor         |           | S1 (NO - switching) / S4 (NC - switching off) |
|--------------------------------------|-----------|-----------------------------------------------|
| Rated power supply voltage           | V DC      | 24                                            |
| Power supply voltage range           | V DC      | 10 to 30                                      |
| Rated current                        | mA        | 200                                           |
| Sensor enclosure protection EN 60529 |           | IP67                                          |
| Max. operating pressure              | bar (PSI) | 210 (3046)                                    |
| Switching frequency                  | Hz        | 1000                                          |
| Ambient temperature range            | °C (°F)   | -25 ... +80 (-13 ... +176)                    |
| Technical Data of the Connector      |           |                                               |
| Power supply voltage range           | V         | 10 ... 30 DC                                  |
| Ambient temperature range            | °C (°F)   | -25 ... +80 (-13 ... +176)                    |
| Indicator                            |           | yellow LED (connector plug)                   |

#### Description of function

The non-contact induction sensor is mounted in the body perpendicular to the distributor spool and its position after adjustment is marked in red. The sensor is supplied in two versions, with closing (NO) or opening (NC) contacts. When the spool is in the basic position, secured by springs, the sensor core firmly connected to the spool is located under the front surface of the sensor and the sensor is activated. After moving the spool with the core to the working position by the force of the closed electromagnet, the core is moved out of the sensor's reach and the sensor is deactivated (see switching table). The electrical connection of the sensor is ensured by means of a four-pin connector with M12x1 thread.

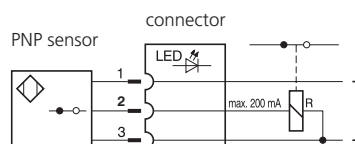
#### S1 - Sensor wiring diagram

With **closing** contacts (**normally open**)

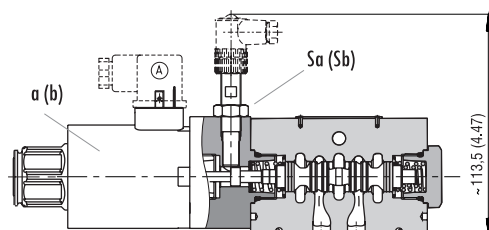


#### S4 - Sensor wiring diagram

With **opening** contacts (**normally close**)

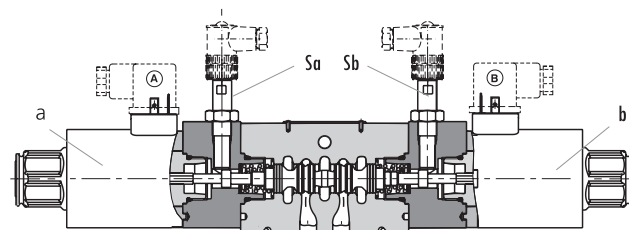


#### Switching table



4/2 distributor with one sensor - two-position

| Two-Position Directional Control Valve |    |    |
|----------------------------------------|----|----|
| Solenoid                               | S1 | S4 |
| 0                                      | 1  | 0  |
| 1                                      | 0  | 1  |



4/3 distributor with two sensors - three-position

| Three-Position Directional Control Valve |   |        |      |      |      |
|------------------------------------------|---|--------|------|------|------|
| Solenoid                                 |   | Sensor |      |      |      |
| a                                        | b | S1 a   | S1 b | S4 a | S4 b |
| 0                                        | 0 | 1      | 1    | 0    | 0    |
| 1                                        | 0 | 0      | 1    | 1    | 0    |
| 0                                        | 1 | 1      | 0    | 0    | 1    |

**Solenoid:** 0 - OFF / 1 - ON

**Spool Position Sensor (S1 / S4):** 0 - normally-open contact / 1 - normally-closed contact



### 3.8 Legal regulations and standards:

The valve meets the relevant requirements of legal regulations and standards as amended:

**Directive 2006/42/EU** On machinery / chapters used: 1.7.4 Instructions for use, Annex I Basic safety requirements

**ČSN EN ISO 4413:2011** - Hydraulics – General rules and safety requirements for hydraulic systems and their components

**ČSN EN ISO 13849-1:2017** – Safety of machinery – Safety of parts of control systems – Part 1: General principles for construction

**Directive 2014/35/EU** (LVD) On the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits

**Directive 2014/30/EU** (EMC) On the harmonisation of the laws of the Member States relating to electromagnetic compatibility

**Directive 2011/65/EU** (RoHS) On the restriction of the use of certain hazardous substances in electrical and electronic equipment

**Directive 2015/863/EU** (RoHS) amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances

**Regulation (EC) 1907/2006** (REACH) On Registration, evaluation, authorisation and restriction of chemicals

**Other regulations and standards used:**

**ČSN EN ISO 12100: 2011** Safety of machinery / risk analysis

**ISO 4401:2005** Hydraulic fluid power – Four-port directional control valves – Mounting surfaces

**ČSN EN ISO 9227:2017** Corrosion tests in artificial atmospheres – Salt spray tests / Paragraph 5.2.2 Neutral salt spray test (NSS)

**ISO 20653:2013** Road vehicles — Degrees of protection (IP code) — Protection of electrical equipment against foreign objects, water and access

**ČSN ISO 4406:2006** Hydraulic fluid power – Fluids – Method for coding the level of contamination by solid particles

**ČSN EN IEC 60664-1 ED.3** Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests

**ČSN EN 61000-6-1:2007** Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments.

**ČSN EN 61000-6-2:2006** Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments

**ČSN EN 61000-6-3:2006** Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test.

**ČSN EN 61000-6-4:2002** Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments

**ČSN EN ISO 9001:2015** Quality management systems

**ČSN EN 82079-1:2013** Preparation of instructions for use - Structuring, content and presentation / Part 1: General principles and detailed requirements

## 4. Product modification

An overview of possible valve modifications is described in the ordering key.

### Coil control voltage and coil power connector

The coil type can be changed by the customer if he observes the safety principles during replacement and adapts the electrical parameters of the source and the type of connector plug to the new type of coil.

**The seal material** cannot be changed by the user, as part of the seal is located between the valve body and the control system, respectively the sensor body. The user must not disassemble the valve.

**Other parameters**, such as the type of slide, can only be selected when ordering, as they cannot be changed without disassembling the valve. If the slider position sensor setting, indicated in red, is unintentionally lost, have the sensor readjusted by the manufacturer.

### NOTICE:

Valve repairs and sensor adjustments may only be performed by the manufacturer. If the valve is disassembled by the user, the manufacturer disclaims liability for its correct operation and sensor adjustment.

### 4.1 Ordering Code

#### Ordering code

|                                                                 |  |                  |  |             |             |   |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |         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**CAUTION**

An E5 connector with a built-in rectifier must be used for AC supply voltage to the coils.

**Note:**

The following items must be ordered separately, they are not part of the valve delivery:

- › High-strength clamping screws M6x45 DIN 912 10.9 (see catalogue SP 8010), possibly bolts for vertical grouping (see catalogue 0020)
- › Coil connector socket type EN 175301-803-A (see catalogue SP 8010)
- › K02 position sensor connector socket with LED (see catalogue SP 8010)
- › Inlet nozzle with a diameter of 0.5 to 4 mm into the inlet P channel (see catalogue SP 8010)

**Spool Symbols**

| Type | Symbol | Interposition | Type | Symbol | Interposition |
|------|--------|---------------|------|--------|---------------|
| Z11  |        |               | P51  |        |               |
| C11  |        |               | Y51  |        |               |
| H11  |        |               | C51  |        |               |
| P11  |        |               | Z51  |        |               |
| Y11  |        |               | B51  |        |               |
| L21  |        |               | H51  |        |               |
| B11  |        |               | X11  |        |               |
| C21  |        |               | C11  |        |               |
| R11  |        |               | H11  |        |               |
| R21  |        |               | J15  |        |               |
| A51  |        |               | J75  |        |               |

**4.2 Types of coil electrical connection connectors**

**Type of Solenoid Coil** in millimeters (inches)

| E1, E2<br>Protection degree IP65 | E3, E4<br>Protection degree IP67 | E5<br>Protection degree IP65 | E12A, E13A<br>Protection IP67 / IP69K |
|----------------------------------|----------------------------------|------------------------------|---------------------------------------|
|                                  |                                  |                              |                                       |

The indicated IP protection level is only achieved if the connector is properly mounted.

Possible and preferred combinations of connector type and control voltage are listed in the HC 8007 Product Catalogue:

Coils for valve control electromagnets

### 4.3 Manual emergency valve control

In the event of a failure of the electromagnet coil or a failure of the coil's electrical supply, the slide can be repositioned, e.g. in order to reach a safe position of the device, using a manual emergency control. However, the valve can only be operated manually up to a pressure of 20-25 bar in the T channel.

#### Manual Override in millimeters (inches)

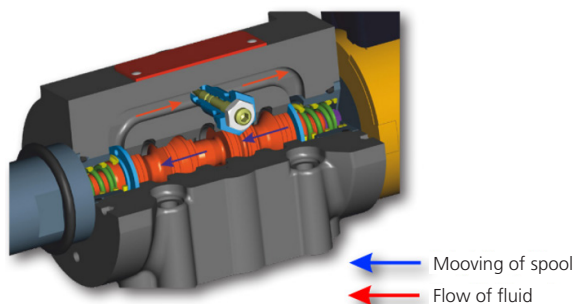
| No designation<br>- standard | Designation N1<br>- cap nut covered | Designation N2<br>- rubber boot<br>protected | Designation N4<br>- hand screw | Designation N5<br>- socket head screw<br>size 3 | Designation N9<br>- without manual<br>override |
|------------------------------|-------------------------------------|----------------------------------------------|--------------------------------|-------------------------------------------------|------------------------------------------------|
|                              |                                     |                                              |                                |                                                 |                                                |

### 4.4 Spool adjusting speed control

By reducing the speed of adjustment of the slide, it is possible to slow down transient events in the hydraulic circuit and prevent the occurrence of pressure peaks.

When adjusting the slide, the working fluid is passed through the connecting channel between the spaces in front of the slide faces. The slide adjustment speed is reduced by incorporating a nozzle (version T2) or a simple throttle valve (version T3) into the connecting channel. Throttle valve allows smooth adjustment of movement speed. The nozzle / valve must be bled after installing the valve in the circuit.

(See manual "Instructions for bleeding the hydraulic damping system")



#### Spool Speed Control in millimeters (inches)

| Designation T0 - Plug VSTI M10x1 | Designation T2 - Orifice Ø 0.6 (0.02) | Designation T3 - Needle valve |
|----------------------------------|---------------------------------------|-------------------------------|
|                                  |                                       |                               |

|                                                                              |                              |                                              |                                                                     |
|------------------------------------------------------------------------------|------------------------------|----------------------------------------------|---------------------------------------------------------------------|
| Plugged cavity for optional soft-shift control devices installation (T2, T3) | Switching time<br>ON and OFF | The orifice extends the valve shifting time. | The needle valve allows continuous adjustment of the shifting time. |
|                                                                              |                              | 120 ... 350 ms                               | 30 ... 2000 ms                                                      |

The switching times shown are valid for viscosity  $\nu = 32 \text{ mm}^2/\text{s}$  (156 SUS) and nominal voltage. They depend on working pressure and flow rate of the directional control valve.

## 5. Target group of users

All the activities relate to the valve, especially the installation and adjustment of cracking pressure, require technical expertise and experience in the field of hydraulics. The minimum required level of professional competence is CETOP level 2. This level is generally defined as the performance of various activities that require an understanding of technical factors and contexts. This may lead to the need of correct interpretation (e.g. tolerances, operating methods) or to the application of various non-repetitive procedures. This may require the performance of instructions, simple analyses and diagnostics, the ability to respond operationally to changes. Teamwork is often necessary.

The electrical connection of the electromagnet and the position sensor can only be performed by a person with the appropriate electrotechnical qualification.

**It is forbidden for the following to carry out any activities related to this product:**

- › Minors (the exception being practical training of students under the professional supervision of a teacher)
- › Without the specified professional competence
- › Under the influence of alcohol and/or drugs
- › Patients whose health condition could affect safety (reduced attention span and ability to react in a timely manner, excessive fatigue)
- › Under the influence of drugs that have a demonstratable effect on attention and the ability to react in a timely manner
- › Those with an allergy to hydraulic working fluids

## 6. Instructions for use broken down by product life stages

## 6.1 Product transportation and storage

As standard, the valve is packed in a vacuum shrinkable PE film and protected against moisture and dust. An identification plate is affixed to the package. Products should only be stored for the necessary time at a temperature of 0 to +30 °C in a dry place with a relative humidity of up to 65%. After a longer period of storage, we recommend checking that the product is not damaged by corrosion, replacing the external seals and flushing the product with clean oil before connecting it to the hydraulic circuit.

## 6.2 Product Installation

### 6.2.1 Valve assembly

- › Check the correctness of the valve type on the identification plate.
- › Open the packaging with scissors and carefully remove the valve from the package.
- › Unpack the valve in a clean place and prevent contamination of the valve.
- › The packaging is made of PE and may be slightly contaminated with residual hydraulic oil from the valve. Dispose of the packaging in accordance with applicable environmental regulations.
- › Just before mounting the valve, remove the plastic shipping plate from the connection pattern at the base of the body, check the five sealing rings for completeness and integrity, and check the connection surface for cleanliness. Replace damaged rings with new ones (see spare parts). You can return an undamaged shipping plate to the manufacturer.



### CAUTION

### Slippery valve surface

The valve contains a small amount of residual oil after the hydraulic function test performed by the manufacturer. A slippery valve surface can lead to dropping when handling, causing minor injury or damage to the valve.

The valve is designed for mounting on a connection plate that has the required flatness and surface roughness, is provided with a DN 10 nominal diameter mounting pattern according to ISO 4401 (ISO 4401-05-04-0-05), is undamaged and clean. The mounting position of the valve is arbitrary. If vibrations and minor shocks are applied to the valve during operation, they must not be applied in the direction of the valve axis to avoid unintentional repositioning and increased internal volume losses.

|                                                                                        |                                                                                                  |
|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Mounting pattern for DN 10, ISO 4401-05-04-0-05                                        | Requirements for flatness and surface roughness of the connection plate                          |
| <p><b>ISO 4401-05-04-0-05</b></p> <p>Channels P, A, B, T - max. Ø11,2 mm (0.44 in)</p> | <p>Connection surface free from mechanical damage (indentations, etc.)<br/>and free of dirt.</p> |

- › Orient the distributor correctly.
- › Carefully place the valve on the connection plate so that the channels in the valve and in the plate are correctly aligned. Make sure that when the valve is laid down, none of the sealing rings fall out of the recess in the body.
- › Insert the four fastening screws with cylindrical head and hexagon socket M6x45 DIN 912-10.9 into the holes in the valve body.
- › Gradually tighten the screws crosswise to a torque of 14+1 Nm using a size 5 inbus wrench.



### CAUTION

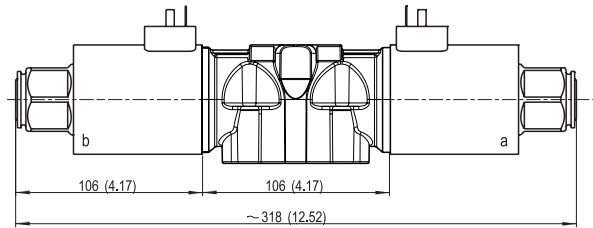
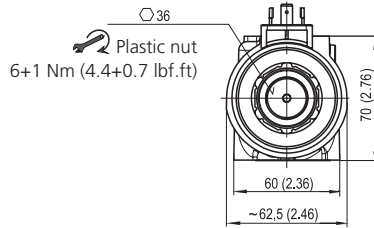
### Correct valve mounting

Failure to comply with connection plate requirements, fallen out or damaged sealing rings, contaminating particles in the dividing plane, incorrectly tightened bolts lead to leakage of working fluid in the dividing plane. Use original screws with defined length and increased material tensile strength.

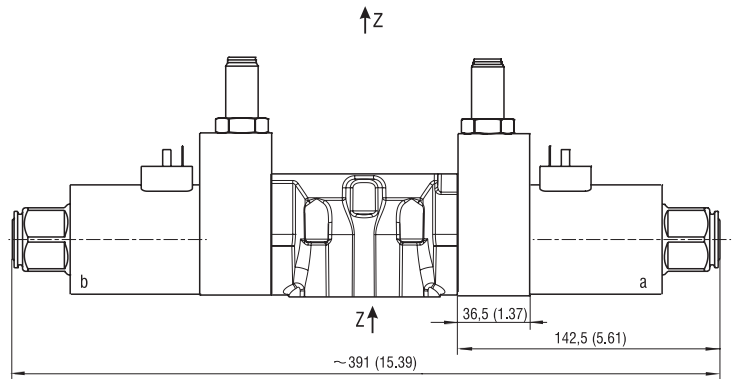
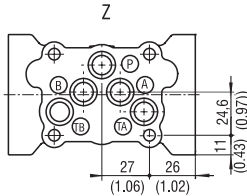
**Dimensions** in millimeters (inches)

**Valve with two solenoids**

**RPE4-103\*/\*E1**

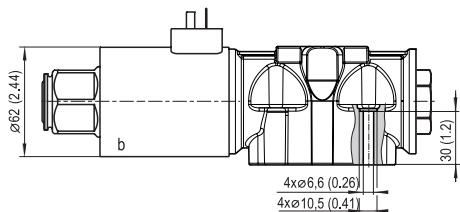


**RPE4-103\*/\*E1\*S**



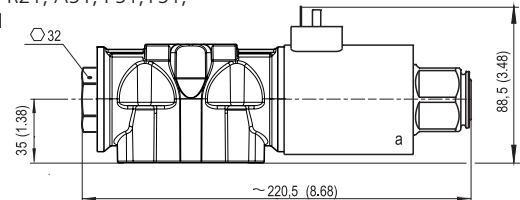
**Valve with one solenoid „b“**

Spool symbols X11, C11, H11

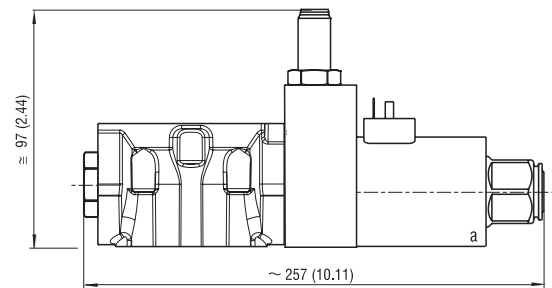
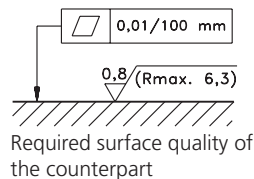
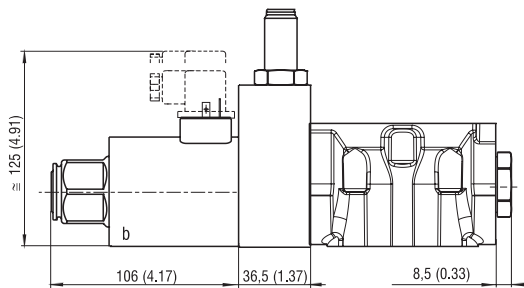


**Valve with one solenoid „a“**

Spool symbols R11, R21, A51, P51, Y51, C51, B51, Z51, H51



**RPE4-102\*/\*E1\*S**



Mounting screws 14+1 Nm (10.3+0.7 lbf.ft)  
M6 x 45 DIN 912-10.9

**6.2.2 Coil connector positioning**

The design of the electromagnet allows rotation of the electromagnet coil in the range of 360° to 90° so that the coil connector points the power supply cable or respects the space for installation on the machine. Use the following procedure to rotate the coil:

- › Loosen the coil clamping nut on the end of the control system.
- › Rotate the electromagnet coil so that the coil connector points in the desired direction.
- › Secure the coil position by re-tightening the nut to a torque of 6+1 Nm using a size 36 wrench.

**6.2.3 Electrical connection of valve and sensor**

Remove the plastic cover of the coil connector (if used according to the connector type) and the plastic cover of the position sensor connector. For the electrical connection, use a socket compatible with the type of the connector used. Observe the correct connection of the sensor connector pins according to the function of your control unit. (see the wiring diagram of the sensor).



**CAUTION**

**Wiring**

The electrical connection of the electromagnet to the power source and the connection of the position sensor to the control unit may only be carried out by persons with appropriate electrical engineering qualifications. It is forbidden to use damaged connectors or cables for electrical connection. There is a risk of electric shock and short circuit of electrical equipment.

## Electromagnet coils (type C 31)

The control electromagnet coils are designed for continuous operation (100% ED). The coils have been assessed for compliance with Directive 2014/35/EU (LVD) if the rated voltage is higher than 50 V AC or 75 V DC, Directive 2014/30/EU (EMC) and Directive 2011/65/EU + 2015/863 /EU (RoHS). The coils are marked with the CE conformity mark on the casing. The nominal voltage values for the coil supply are indicated on the coil casing. Fluctuations in the supply voltage are allowed within  $\pm 10\%$  of  $U_N$ .

Overview of C31 size coil types according to power supply values (see also the ordering key and catalogue HC 8007)

| Type designation in the key | Nominal voltage $U_N$ (at coil terminals) | Nominal current $I_N$ |
|-----------------------------|-------------------------------------------|-----------------------|
| 01200                       | 12V DC                                    | 3.17 A                |
| 02400                       | 24V DC                                    | 1.73 A                |
| 02700                       | 27 V DC                                   | 1.52 A                |
| 20500                       | 205 V DC                                  | 0.20 A                |
| 12060                       | 120 V AC                                  | 0.38 A / 60 Hz        |
| 23050                       | 230 V AC                                  | 0.20 A / 50 (60) Hz   |

To power the coils with alternating current (marked in the key 12060 and 23050), the construction type of the coil E5 with a built-in rectifier in the connector base must be selected. Coils with a supply voltage of 205 V DC (marked in the key 20500) are intended for power supply with an alternating current of 230 V AC / 50(60) Hz, when the rectifier is built into the socket of the connector. A lower coil voltage corresponds to a voltage drop on the rectifier.

The **position sensor** is equipped with a four-pin connector with M12x1 thread. The connection of the S1 and S4 type sensor pins is indicated in the description of the sensor (see chapter 3.7).



**CAUTION**

### Voltage and current values

Observe the specified values of the electrical parameters for controlling the electromagnet coil and power supply of the position sensor. Observe the sensor output parameters when designing the control unit. If the limit parameters are exceeded, there is a risk of damage to the electrical parts of the valve and damage to the control unit.

## 6.3 Commissioning

Before putting the hydraulic circuit into operation, check:

- › correct tightening of the valve fastening screws
- › integrity of electrical wiring and connectors
- › correct fixing of the coil and sensor connector
- › correct connection of the valve to the control unit
- › setting the correct values of the electrical parameters on the power supply

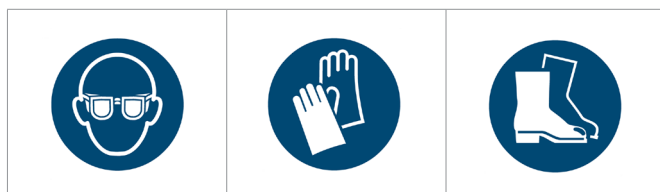
## 6.4 Normal Operation

Normal operation of the system does not require any manipulation of the valve. The valve slide is adjusted by means of the control electromagnet by a signal from the control unit. The position sensor checks that the set position has been reached and sends a feedback signal to the control unit.

**DO NOT exceed the MAXIMUM PARAMETERS**, shown in table 3.3.

**OBSERVE THE OPERATIONAL RESTRICTIONS AND AVOID THE RISKS**, referred to in paragraph 2.

## USE PROTECTIVE EQUIPMENT



When working with hydraulic fluid, it is recommended to wear safety goggles, protective rubber gloves and sturdy shoes with non-slip soles.

## 6.5 Extraordinary and emergency situations

**In the event of a power failure of the hydraulic system and a drop in pressure**, the slide position will not change.

**In the event of a power failure**, the slide is automatically reset to the initial position by the force of the centring springs. If you need to reset the distributor slide in an emergency, e.g. to reach a safe position of the mechanism, use the emergency control (see paragraph 4.3).

Based on the results of the risk analysis, three potential defects were determined:

- › External valve leakage due to seal damage associated with leakage of working fluid. If a leak is detected in the parting plane between the valve and the connection plate, the defect can be eliminated by replacing the sealing rings. Replace the leaking valve between the body and the control system / sensor extension with a new valve and send the defective one to the manufacturer for repair.
- › Do not readjust the slide due to the defective coil. First, check that the coil is actually powered (there is no damage to the cable, control unit, or connector). You can replace the defective coil with a new functional one after loosening the clamping nut.
- › The position sensor does not give the control unit any signal about the position of the slide. First, check if the position sensor is properly connected (there is no damage to the cable, control unit or connector). The valve with the non-functioning position sensor must be replaced.

|                                                                                   |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>CAUTION</b> | <b>Switching off the pressure source and relieving the circuit</b><br>In the event of an emergency, switch the power source off (pump) and relieve all parts of the hydraulic circuit, including the hydraulic accumulators, by connecting them to the tank. Before any work on the circuit, such as removing a valve ensure that the circuit is depressurized. Otherwise there is a risk of leakage of the working fluid and contamination of personnel. |
|  | <b>CAUTION</b> | <b>Disconnecting the electrical supply</b><br>Disconnect the electrical parts of the valve from the power supply. On the one hand, there is a risk of electric shock, and on the other hand, unintended activation of the valve can lead to serious situations.                                                                                                                                                                                           |

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>ENVIRONMENTAL PROTECTION</b><br>Spilled working fluid must be removed immediately, e.g. with suitable absorbents, contaminated parts of the perimeter cleaned, contaminated objects in the vicinity cleaned or disposed of. Contaminated objects and residues of leaked working fluid must be disposed of in accordance with the applicable environmental regulations.                                                                                                                                                                                                                                                                                                                                                                                          |
|  | <b>FIRST AID</b><br><b>Contamination by hydraulic working fluid</b><br>If contamination of persons occurs, contaminated parts of clothing must be removed immediately and the skin thoroughly washed with soap or treated with a suitable cream.<br>If the eyes are contaminated, flush them with clean water and seek medical attention. Seek medical attention also in case of accidental ingestion of working fluid or skin allergic reaction to splashes of working fluid.<br><br><b>Electric shock</b><br>In the event of an electric shock, immediately turn off the power source, call emergency medical help and, if possible, start resuscitation of the victim if they are unconscious and not breathing (cardiac massage, use of a defibrillator, etc.) |

## 6.6 Repairs carried out by skilled persons

The user is entitled to replace the defective valve with a new one, replace the seal on the valve base and replace the electromagnet coil. A set of seals and coils is supplied as spare parts.

### 6.6.1 Dismantling the valve and replacing the seal on the valve connection surface

- › Make sure the circuit is depressurized and the power supply to the electrical parts is turned off.
- › If the equipment has been in operation, it is necessary to let the circuit cool down to avoid burning from the circuit parts.
- › Disconnect the coil connector socket and, for a valve with a sensor, also the position sensor connector socket. Make sure that particularly the inner space of the sockets with contacts are not dirty and contaminated with working fluid.
- › Using a size 5 inbus wrench, loosen all four M6x45 valve fastening screws one by one and remove the valve from the connection plate. Take into account that the inside of the valve contains a residual amount of working fluid which will start to leak out after removal. We recommend that you immediately place the valve in a prepared suitable container, e.g. a smaller plastic box, to avoid contamination of the machine and the floor.
- › For example, use a small screwdriver to remove the five sealing rings from the recesses at the base of the valve body. Clean the valve connection surface and the plate, check for damage to the surfaces and insert new, undamaged sealing rings. Reinstall the valve and connect the electrical connectors (see chapter 6.2 Product installation).
- › Verify the correct operation of the valve and its tightness in the safe mode of operation of the device. It is recommended to start the test at low circuit pressure.

### 6.6.2 Replacing the electromagnet coil

If the function of the electromagnet coil is lost, or if the coil type (connector type, control voltage) needs to be changed, remove the coil and replace it with a new one.

- › Make sure the circuit is depressurized and the power supply to the electrical parts is turned off.
- › If the equipment has been in operation, it is necessary to let the circuit cool down to avoid burning from the circuit parts.
- › Disconnect the coil connector socket. Make sure that particularly the inner space of the socket with the contacts is not dirty and contaminated with the working fluid.
- › Remove the plastic / aluminium clamping nut at the end of the control system.
- › Remove the coil.
- › Take a new coil and verify that it is the correct type according to the description on the casing.
- › Place the new coil on the control system with the connector closer to the valve body.
- › Rotate the coil so that the connector is in the desired position and secure the coil position by tightening the nut with a torque of 6+1 Nm using a size 36 wrench.
- › Check that the connector socket is clean and undamaged and insert it into the connector on the coil.  
An insufficiently fastened connector can cause unreliable operation of the electromagnet, especially when subjected to vibrations.
- › Check the function of the electromagnet in a safe mode of operation of the device, for example, at low pressure in the circuit.

Repairs to a defective valve are carried out only by the manufacturer. Remove the residual working fluid from the disassembled defective valve and pack it in such a way that there is no mechanical damage and contamination outside the packaging during transportation. Send the packaged valve with a description of the defect to the manufacturer's address. The manufacturer provides a 1-year warranty for the new valve. However, the claim may not be recognized by the manufacturer if the valve is mechanically damaged, the seal material is damaged by an aggressive fluid, or the valve has been used improperly, which is not in accordance with these instructions for use.



## 6.7 Product Maintenance

### 6.7.1 Ongoing checks

The valve does not require maintenance during normal operation. At appropriate intervals depending on the environment and operating conditions, we recommend to check on the ongoing basis:

- › external tightness
- › electrical wiring and connectors are not damaged
- › fixing of the coil and sensor electrical supply connectors
- › clogging of the filter insert and contamination of the working fluid

### 6.7.2 Checking the function of the position sensor

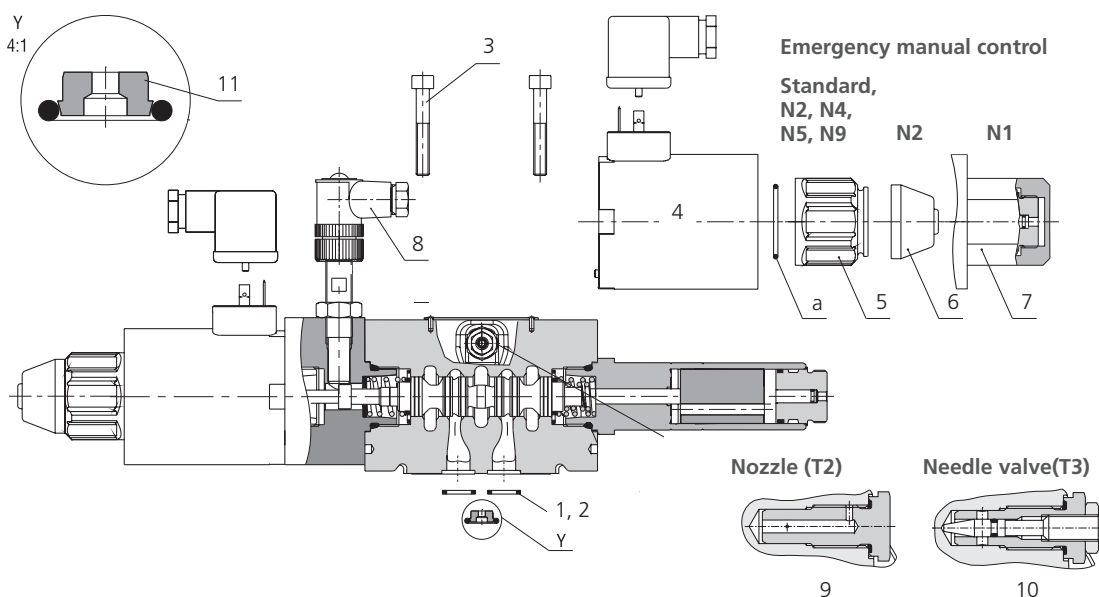
From the point of view of using the position sensor as an element that increases the functional safety of the valve, it is necessary to check the function of the slide position sensor at appropriate intervals, but no longer than after two years. The function check must also be carried out before starting the machine or system after repair or maintenance, or if a sensor malfunction is suspected. The relative position of the sensor, lock nut and body is colour-coded after setting at the manufacturer. Check that the settings have not been violated. Check that the sensor connector socket is secure and that the cable is not damaged. Check the correctness of the switching and opening functions of the contacts. (see switching table, paragraph 3.7).



**DANGER**

**If you detect a defect in the sensor or a change in the sensor settings, turn off the device immediately. There is a risk of accident and/or serious injury. Do not repair or adjust the position sensor!**

### 6.8 Supplied spare parts (catalogue SP 8010)



As spare parts the following can be ordered: see catalogue SP 8010

| Item | Description of the spare part | Designation                      | Order number          |
|------|-------------------------------|----------------------------------|-----------------------|
| 1    | Sealing rings on the base     | 5x square ring 12,42x1,68 (NBR)  | 15901000              |
| 2    | Sealing rings on the base     | 5x square ring 12,42x1,68 (FPM)  | 15901100              |
| 3    | Clamping screws               | 4x SCREW M6x45 DIN 912 10.9      | 20239000              |
| 4    | Electromagnet coil            | C31 ... (according to coil type) | See catalogue HC 8007 |
| 5    | Set of nut (N2, N4, N5, N9)   | + O-ring 30x2 (a)                | 15900800              |
| 6    | Set of emergency control N2   | Rubber cap and control pin       | 15900900              |
| 7    | Closed nut N1                 | + O-ring 30x2 (a)                | 45332300              |
| 8    | Sensor connector with LED     | K02                              | 17364800              |
| 9    | Damping T2                    | Nozzle D 0.3 + seal              | 15901200              |
| 10   | Damping T3                    | Throttle valve + seal            | 15901300              |
| 11   | Nozzle to channel P           | + seal:                          | See catalogue SP 8010 |

**Seal storage conditions** are specified in ISO 2230 – Rubber products – Storage conditions:

The seals should be stored:

- › In covered, dry and temperate areas at temperatures of +15 ... +25 °C (+59 ... +77 °F), away from direct heat sources
- › Protected from the weather, from direct sunlight and ultraviolet radiation
- › Undeformed, on a clean flat surface in the original packaging
- › Out of reach of oil and chemicals

| Rubber groups | Abbreviation of chemical name according to ISO 1629 | Chemical composition           | Length of storage |
|---------------|-----------------------------------------------------|--------------------------------|-------------------|
| A             | Polyurethane AU                                     | Polyester urethane rubber      | 5 year            |
| B             | NBR                                                 | Butadiene acrylonitrile rubber | 7 year            |
| C             | FKM / FPM (Viton)                                   | Fluor elastomer                | 10 year           |



## 6.9 Product disposal



Remove the valve from the hydraulic circuit (see chapter 6.6 Repairs carried out by skilled persons).  
 Remove as much residual working fluid from the valve as possible.  
 Dispose of the valve in an environmentally friendly manner in accordance with the applicable regulations.  
 The valve is mainly made of recyclable materials (see chapter 3.1 Materials used).

## 7. Manufacturer contact



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