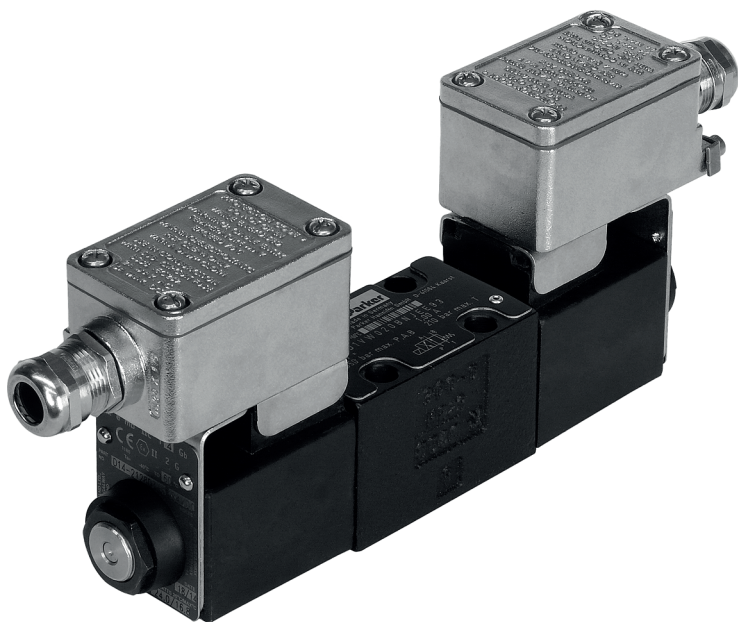




# DIRECTIONAL CONTROL VALVE OPERATING INSTRUCTIONS

Series D1VW\*EE Design series 93  
II 2 G c T4 Gb;  $-20\text{ }^{\circ}\text{C} < T_a < +60\text{ }^{\circ}\text{C}$





## **WARNING — USER RESPONSIBILITY**

### **FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**

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#### **Parker Hannifin**

#### **Manufacturing Germany GmbH & Co. KG**

Hydraulic Valve Systems Division Europe

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| <b>Contents</b>                                   | <b>Page</b> |
|---------------------------------------------------|-------------|
| <b>0. EC declaration of conformity</b>            | <b>4</b>    |
| <b>1. Introduction</b>                            | <b>6</b>    |
| Technical data                                    | 6           |
| Ordering code                                     | 7           |
| Characteristic curves                             | 8           |
| Dimensions                                        | 10          |
| Name plate                                        | 11          |
| <b>2. Safety instructions</b>                     | <b>11</b>   |
| Symbols                                           | 11          |
| Marking, name plates                              | 11          |
| Work on the valve                                 | 11          |
| <b>3. Important information</b>                   | <b>12</b>   |
| Correct use                                       | 12          |
| Common instructions                               | 12          |
| Liability                                         | 12          |
| Storage                                           | 12          |
| <b>4. Installation</b>                            | <b>12</b>   |
| Scope of delivery                                 | 12          |
| Installation                                      | 12          |
| Electrical connection                             | 13          |
| Operation limits                                  | 13          |
| Pressure fluids                                   | 13          |
| <b>5. Operating instructions</b>                  | <b>14</b>   |
| Air bleeding of hydraulic system                  | 14          |
| Filter                                            | 14          |
| Flushing                                          | 14          |
| <b>6. Maintenance</b>                             | <b>14</b>   |
| Replacement of a coil                             | 14          |
| <b>7. Troubleshooting</b>                         | <b>16</b>   |
| <b>A1 Extract from standards/directives</b>       | <b>17</b>   |
| <b>A2 User guide – solenoid</b>                   | <b>18</b>   |
| <b>A3 Type-examination certificate – solenoid</b> | <b>22</b>   |
| <b>A4 Declaration of conformity - solenoid</b>    | <b>44</b>   |
| <b>A5 Mounting instruction cable gland</b>        | <b>45</b>   |

## 0. EC declaration of conformity

### EG-Konformitätserklärung / EC-Declaration of Conformity 2014/34/EU (ATEX)



**Parker Hannifin Manufacturing Germany GmbH & Co. KG**  
Hydraulic Controls Division Europe  
Gutenbergstrasse 38  
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Parker Hannifin erklärt, dass die nachstehenden Produkte auf Seite 2 explosionsgeschützt ausgeführte Geräte im Sinne des Artikels 1 (3) der Richtlinie 2014/34/EU sind und die grundlegenden Sicherheits- und Gesundheitsanforderungen gemäß Anhang II dieser Richtlinie erfüllen.

Parker Hannifin declares, that series on page 2 are explosion-proofed components according to article 1 (3) of directive 2014/34/EU and they fulfill the basic health and safety requirements specified in Annex II of this directive.

Folgende harmonisierte Normen wurden angewandt – weitere Hinweise zur Konformitätsaussage enthält die technische Dokumentation:

Below harmonised standards used – the technical documentation covers additional information regarding declaration of conformity:

|                         |                                                                                                                                                                                                                                                                     |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EN 1127-1:2011</b>   | Explosionsfähige Atmosphären – Explosionsschutz<br>Teil 1: Grundlagen und Methodik<br>Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology                                                                          |
| <b>EN ISO 4413:2010</b> | Fluidtechnik – Allgemeine Regeln und sicherheitstechnische Anforderungen an Hydraulikanlagen und deren Bauteile<br>Hydraulic fluid power - General rules and safety requirements for systems and their components                                                   |
| <b>EN 13463-1:2009</b>  | Nicht-elektrische Geräte für den Einsatz in explosionsgefährdeten Bereichen<br>Teil 1: Grundlagen und Anforderungen<br>Non-electrical equipment for use in potentially explosive atmospheres - Part 1: Basic method and requirements                                |
| <b>EN 13463-5:2011</b>  | Nicht-elektrische Geräte für den Einsatz in explosionsgefährdeten Bereichen<br>Teil 5: Schutz durch konstruktive Sicherheit "c"<br>Non-electrical equipment intended for use in potentially explosive atmospheres - Part 5: Protection by constructional safety "c" |

Die Geräte erfüllen die Anforderungen entsprechend der Kategorie / Angaben zur Kennzeichnung (Typenschild):  
The components fulfill the requirements of category / Identification marking (on nameplate):



**II 2 G c T4**  
-20°C ≤ Ta ≤ +60°C

Der korrekte Gebrauch der Geräte bei Installation und Betrieb wird vorausgesetzt. Details zum korrekten Gebrauch (einschließlich Explosionsschutz) sind in der Betriebsanleitung hinterlegt.  
It is mandatory, that the installation and the operation of the components are according to their designated usage. Information to the designated use are given in installation manual and product documentation.

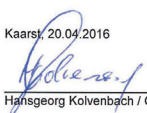
Die beschriebenen Produkte sind in Übereinstimmung mit den einschlägigen EU-Harmonisierungsvorschriften: Richtlinie 94/9/EG (bis 19. April 2016) und Richtlinie 2014/34/EU (ab 20. April 2016).  
The products of the declaration described are in conformity with the relevant Union harmonisation legislation: Directive 94/9/EC (until 19 April 2016) and Directive 2014/34/EU (from 20 April 2016).

Ort, Datum / Place, date:

Kaarst, 20.04.2016

Unterschrift / Signature:

Angaben zum Unterzeichner / Name and position:

  
Hansgeorg Kolvenbach / General Manager

2014-34-eu\_Wege-G-60\_20-04-16\_Fu

EG-Konformitätserklärung / EC-Declaration of Conformity  
2014/34/EU (ATEX)

Nachstehend alle Produkte, die den Anforderungen der Richtlinie entsprechen:  
Products that correspond fulfill to the requirements of directive:

1. **Vorgesteuerte Proportional-Wegeventile / pilot operated proportional DC valves**  
D31FB\*EE-XG371  
D41FB\*EE-XG371  
D91FB\*EE-XG371  
D111FB\*EE-XG371
2. **Direktgesteuerte Proportional-Wegeventile / direct operated proportional DC valves**  
D1FB\*0EE-XG371  
D1FB\*3EE-XG371
3. **Vorgesteuerte Wegeventile / pilot operated DC valves**  
D31DW\*EE  
D31NW\*EE  
D41VW\*EE  
D81/91VW\*EE  
D111VW\*EE
4. **Direktgesteuerte Wegeventile / direct operated DC valves**  
D1VW\*EE
5. **Proportional Druckreduzierventile / proportional pressure reducing valves**  
D1FV\*EE-XG371

## 1. Introduction

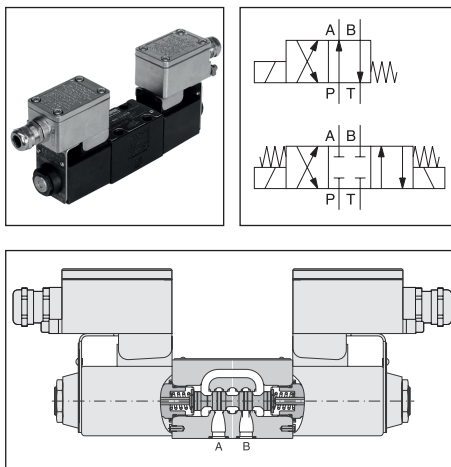
The D1VW with explosion proof solenoids is based on the standard D1VW series. The specific solenoid design allows the usage in hazardous environments.

The explosion proof class is

CE  II 2 G

Ex e mb IIC T4 Gb

for use in zone 1 and 2 (according to ATEX). Additionally the solenoids are IECEx compliant. All explosion proof solenoids are DC design. The valves for AC operate with integrated rectifier.



## Technical data

| General                    |                 |                                                                                   |
|----------------------------|-----------------|-----------------------------------------------------------------------------------|
| Design                     |                 | Directional spool valve                                                           |
| Actuation                  |                 | Solenoid                                                                          |
| Size                       |                 | DIN NG06 / CETOP 03 / NFPA D03                                                    |
| Mounting interface         |                 | DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03                               |
| Mounting position          |                 | unrestricted, preferably horizontal                                               |
| Ambient temperature        | [°C]            | -20...+60                                                                         |
| MTTF <sub>D</sub>          | [years]         | 150                                                                               |
| Weight                     | [kg]            | 1.8 (1 solenoid), 2.7 (2 solenoids)                                               |
| Hydraulic                  |                 |                                                                                   |
| Max. operating pressure    | [bar]           | P, A B: 350; T: 210                                                               |
| Fluid                      |                 | Hydraulic oil according to DIN 51524                                              |
| Fluid temperature          | [°C]            | -20 ... +60                                                                       |
| Viscosity permitted        | [cSt] / [mm²/s] | 2.8...400                                                                         |
| Viscosity recommended      | [cSt] / [mm²/s] | 30...80                                                                           |
| Filtration                 |                 | ISO 4406 (1999); 18/16/13                                                         |
| Flow max.                  | [l/min]         | 60 (see shift limits)                                                             |
| Leakage at 50 bar          | [ml/min]        | Up to 10 per flow path, depending on spool                                        |
| Static / Dynamic           |                 |                                                                                   |
| Step response at 95 %      | [ms]            | Energized: 32 (DC), 40 (AC)<br>De-energized: 40 (DC), 75 (AC)                     |
| Electrical characteristics |                 |                                                                                   |
| Duty ratio                 |                 | 100 % ED; CAUTION: coil temperature up to 135 °C possible                         |
| Max. switching frequency   | [1/h]           | 15000 (DC), 7200 (AC)                                                             |
| Protection class           |                 | c ⚡ II 2 G , Ex e mb IIC T4 Gb, IP66 (plugged and mounted correctly)              |
|                            | Code            | JN P                                                                              |
| Supply voltage / ripple    | [V]             | 24 V = 230/50 Hz 110/50 Hz                                                        |
| Tolerance supply voltage   | [%]             | ±10 ±10 ±10                                                                       |
| Current consumption        | [A]             | 1.0 0.12 0.25                                                                     |
| Power consumption          | [W]             | 24 24 24                                                                          |
| Solenoid connection        |                 | Box with M20x1.5 entry for cable glands. Solenoid identification as per ISO 9461. |
| Wiring min.                | [mm²]           | 3 x 1.5 recommended                                                               |
| Wiring length max.         | [m]             | 50 recommended                                                                    |

With electrical connections the protective conductor (PE W) must be connected according to the relevant regulations.

## Ordering code

|                           |                                         |                 |                  |            |                |      |                  |                                                     |                                                                        |                                              |
|---------------------------|-----------------------------------------|-----------------|------------------|------------|----------------|------|------------------|-----------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|
| <b>D</b>                  | <b>1</b>                                | <b>V</b>        | <b>W</b>         |            |                |      |                  | <b>E</b>                                            | <b>E</b>                                                               |                                              |
| Directional control valve | Size<br>DIN NG06<br>CETOP 03<br>NFA D03 | 3-chamber valve | Wet pin solenoid | Spool type | Spool position | Seal | Solenoid voltage | Connection:<br>Explosion proof<br>with cable glands | Solenoid options:<br>Explosion proof<br>Ex e mb IIC + IECEx conformity | Design series<br>(not required for ordering) |

| Code              | Spool type |
|-------------------|------------|
| 001               |            |
| 002               |            |
| 003               |            |
| 004               |            |
| 005               |            |
| 006               |            |
| 007               |            |
| 008 <sup>1)</sup> |            |
| 009 <sup>1)</sup> |            |
| 010               |            |
| 011               |            |
| 014               |            |
| 015               |            |
| 016               |            |
| 021               |            |
| 022               |            |
| 081               |            |
| 082               |            |
| 102               |            |

| 3 position spools |                                                |                                                                                    |
|-------------------|------------------------------------------------|------------------------------------------------------------------------------------|
| Code              | all 3 position spools                          |                                                                                    |
| C                 |                                                | 3 positions.<br>Spring offset in position "0".<br>Operated in position "a" or "b". |
|                   | Standard                                       | Spool type 008, 009                                                                |
| E                 | <br>Operated in position "a".                  | <br>Operated in position "b".                                                      |
|                   | 2 positions.<br>Spring offset in position "0". |                                                                                    |
| K                 | <br>Operated in position "b".                  | <br>Operated in position "a".                                                      |
|                   | 2 positions.<br>Spring offset in position "0". |                                                                                    |

| 2 position spools |                                                                       |                                                                                   |
|-------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Code              | Spool position                                                        |                                                                                   |
| B                 | <br>Spring offset in position "b".<br>Operated in position "a".       | 2 positions.<br>Spring offset in position "b".<br>Operated in position "a".       |
| D                 | <br>Operated in position "a" or "b".<br>No center or offset position. | 2 positions.<br>Operated in position "a" or "b".<br>No center or offset position. |
| H                 | <br>Spring offset in position "a".<br>Operated in position "b".       | 2 positions.<br>Spring offset in position "a".<br>Operated in position "b".       |

| Code | Spool type |
|------|------------|
| 020  |            |
| 026  |            |
| 030  |            |
| 101  |            |

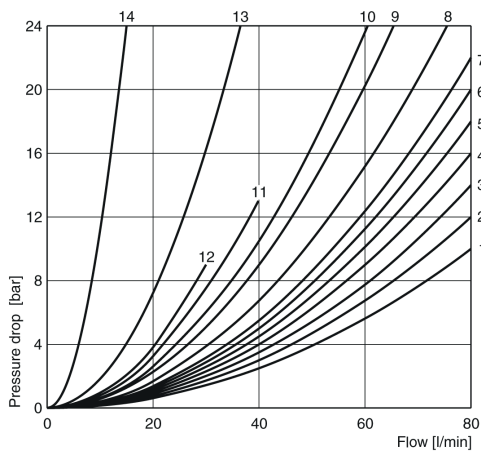
<sup>1)</sup> Consider specific spool position

The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

| Spool | Position "b" |     |     | Position "a" |     |     | Position "0" |     |     |     |     |
|-------|--------------|-----|-----|--------------|-----|-----|--------------|-----|-----|-----|-----|
|       | P-A          | B-T | P-B | P-B          | A-T | P-A | P-A          | P-B | A-T | B-T | P-T |
| 001   | 2            | 2   |     | 2            | 2   |     |              |     |     |     |     |
| 002   | 1            | 4   |     | 1            | 4   |     | 1            | 1   | 5   | 5   | 2   |
| 003   | 3            | 4   |     | 3            | 6   |     |              |     | 7   |     |     |
| 004   | 2            | 3   |     | 2            | 3   |     |              |     | 7   | 7   |     |
| 005   | 2            | 2   |     | 2            | 2   |     | 12           |     |     |     |     |
| 006   | 1            | 4   |     | 1            | 4   |     | 7            | 7   |     |     |     |
| 007   | 3            | 2   |     | 2            | 2   |     |              | 3   |     | 2   | 7   |
| 010   | 3            |     |     | 3            |     |     |              |     |     |     |     |
| 011   | 2            | 2   |     | 2            | 2   |     |              |     | 14  | 14  |     |
| 014   | 3            | 2   |     | 2            | 2   |     | 3            |     | 2   |     | 7   |
| 015   | 3            | 6   |     | 3            | 4   |     |              |     |     | 7   |     |
| 016   | 2            | 2   |     | 2            | 2   |     |              | 12  |     |     |     |
| 020B  | 4            | 4   |     | 2            | 3   |     |              |     |     |     |     |
| 026B  | 4            |     |     | 4            |     |     |              |     |     |     |     |
| 030B  | 2            | 3   |     | 1            | 2   |     |              |     |     |     |     |
| 081   | 13           | 13  |     | 13           | 13  |     |              |     |     |     |     |
| 082   | 13           | 13  |     | 13           | 13  |     |              |     | 1)  | 1)  |     |
| 101B  | 11           | 10  |     | 10           | 9   |     |              |     |     |     |     |
| 102   | 1            | 4   |     | 1            | 4   |     | 5            | 5   | 8   | 8   | 6   |
|       | P-B          | A-T |     | P-A          | B-T |     | P-A          | P-B | A-T | B-T | P-T |
| 008   | 4            | 5   |     | 4            | 5   |     |              |     |     |     | 9   |
| 009   | 5            | 5   |     | 6            | 7   |     |              |     |     |     | 7   |

| Spool | Position "b" |     |     | Position "a" |     |     |
|-------|--------------|-----|-----|--------------|-----|-----|
|       | P-A          | P-B | A-B | P-B          | A-T |     |
| 021   | 2            | 4   |     | 4            | 2   |     |
|       | P-A          | B-T |     | P-A          | P-B | A-B |
| 022   | 6            | 2   |     | 5            | 2   |     |

### Flow curve diagram



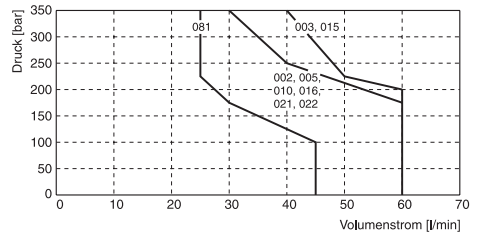
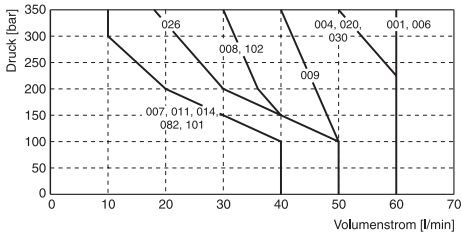
All characteristic curves measured with HLP46 at 50 °C.

<sup>1)</sup> Only for pressure compensation, no high flow possible.

## Shift limits

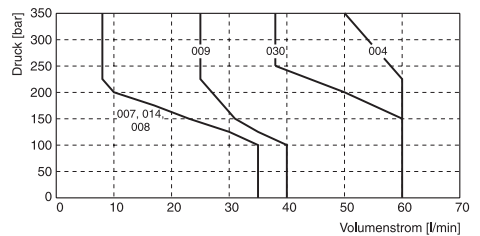
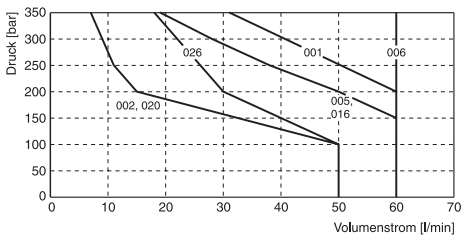
The diagram below specifies the shift limits for valves with AC and DC solenoids. The specifications apply to a viscosity of  $40 \text{ mm}^2/\text{s}$  and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

### Shift limit diagram with DC solenoid



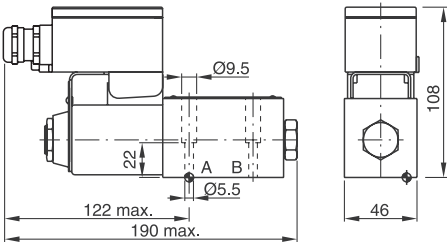
Measured with HLP46 at  $50^\circ\text{C}$ , 90 %  $U_{\text{nom}}$  and warm solenoids

### Shift limit diagram with AC solenoid

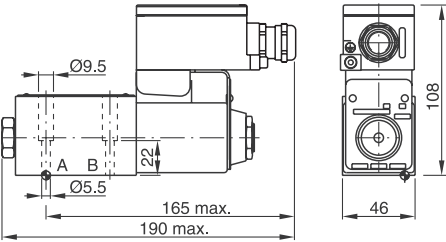


Measured with HLP46 at  $50^\circ\text{C}$ , 95 %  $U_{\text{nom}}$  and warm solenoids

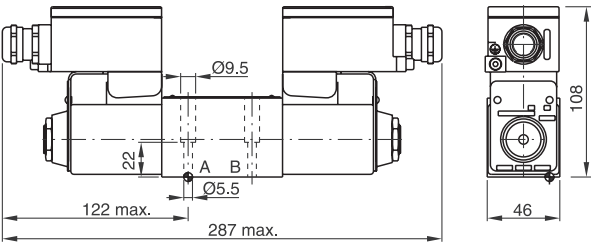
Dimensions  
B, E -style

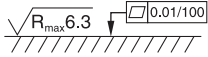


H, K -style

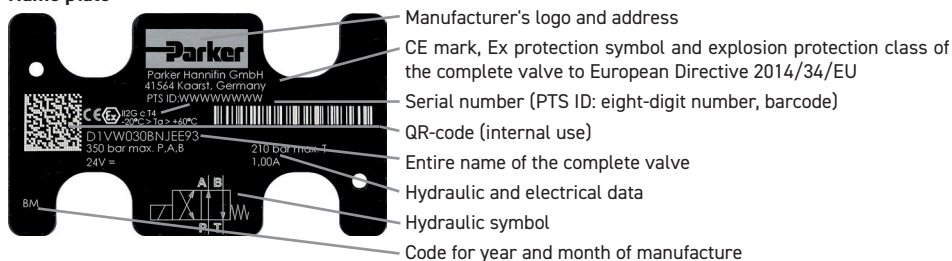


C, D -style



| Surface finish                                                                    |  Kit |  |  |  Kit<br>NBR |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
|  | BK375                                                                                 | 4x M5x30<br>ISO 4762-12.9                                                         | 7.6 Nm<br>±15 %                                                                   | NBR: SK-D1VW-N-91<br>FPM: SK-D1VW-V-91                                                       |

## Name plate



## 2. Safety instructions

Read the operating instructions thoroughly before installation, commissioning, maintenance, repair and storage, and observe them. Failure to observe the operating instructions may result in damage to the valve or the parts of the system connected to it.

In particular, in the case of explosive atmospheres, any failure to observe the operating instructions may result in an explosion.

The system operator must make these operating instructions visible and easily accessible to operating and maintenance personnel.

Compliance with applicable standards/legal requirements must be enforced. This particularly applies to plant safety and environmental protection.

A list of such standards, etc. appears in the annex by way of example.

Before starting commissioning, installation, maintenance and repair work, the hydraulic system must be depressurised and power must be disconnected from the electrical installation.

In addition, the electrical installation must be secured so that power cannot be restored unexpectedly.

The valve may become hot during operation. To avoid risk of burns, do not touch the valve surface.

The system operator must monitor the temperature and cool the oil if necessary in order to keep within the maximum temperatures set out in these operating instructions (see technical data). In this connection, observe the relevant directions in the operating instructions of the supplier (solenoid system).

Any leaks occurring at the valve must be rectified immediately.

## Symbols

These instructions use symbols that must be noted according to their importance:



Notes relating to the warranty



Notes relating to potential damage to the valve or connected system components



Notes relating to potential hazards



Useful additional information

## Marking, name plates

Information attached directly to the valve such as circuit plans and name plates must be observed and kept in a legible state.

## Work on the valve

Work relating to the installation, commissioning, maintenance and repair of the valve may only be carried out by qualified persons. Qualified persons are defined as persons who, on the basis of education, experience and instruction, have sufficient knowledge of applicable requirements and accepted rules of the technology.

Throughout any installation, commissioning, maintenance and repair work, it is the responsibility of the operator to ensure that there is no risk of explosion.

Before starting such work, the operator has to ensure that tools and equipment are only used if they do not damage the valve and they do not leave behind residues that are inflammable.

In addition, clean the valve before starting such work, in particular removing dust, liquids and other deposits. Cleaning should be done using a lint-free cloth.

Tools may not be used if they might cause a static charge on use.

### 3. Important information

#### Correct use



These operating instructions apply to DC valves of series D1VW\*EE, which are intended solely for use in mineral oil based hydraulic systems (DIN 51524).

Compliance with the operating instructions must be ensured.

It is the responsibility of the operator to ensure that the information in the technical data is followed.

Any different or modified use is not classed as correct use. The manufacturer's warranty will not cover any resulting damage.

#### Common instructions

We reserve the right to make technical changes as a result of further development of the product described in these operating instructions. Figures and drawings in these instructions are simplified depictions. As a result of further development, improvements and changes to the product, it is possible that the figures are not fully consistent with the described valve.

The technical details and dimensions are non-binding. They may not form the basis of any claims. Copyright reserved.

#### Liability

The manufacturer cannot accept liability for loss or damage resulting from the following faults:

- incorrect installation
- unqualified operation
- inadequate maintenance
- use beyond specification



Do not dismantle the valve. If you suspect a defect, return the valve to Parker.

#### Storage

If the valve needs to be temporarily stored, it must be protected from dirt, the weather, and mechanical damage. Each valve is tested with hydraulic oil in the factory, so that the internal components are protected from corrosion. However, this protection can only be guaranteed under the following conditions:

| Storage time | Storage requirements                                         |
|--------------|--------------------------------------------------------------|
| 12 months    | constant air humidity < 60 %<br>constant temperature < 25 °C |
| 6 months     | varying air humidity,<br>varying temperature < 35 °C         |



Storage outside or in maritime or tropical climates leads to corrosion and may make the valve unusable.

### 4. Installation

#### Scope of delivery

As soon as you receive the valve you should check if the package has the specified contents. In particular, check whether the type of protection indicated on the valve is as described in these operating instructions.

The scope of delivery includes:

- Valve
- Operating instructions (including operating instructions of the valve as well as of the solenoid and the declarations of conformity of the manufactures)



As soon as you receive the shipment, please check for any obvious signs of damage caused by careless transport. Document the transport damage and immediately notify the carrier, the insurance company and the supplier.

#### Installation

- Compare the valve type as stated on the Name plate with the parts list/circuit diagram.
  - The valve can be installed in any position, either fixed or movable.
-  Check the fixing surface and the cavity for the valve. Permitted values: unevenness 0.01 mm/100 mm, roughness  $R_{max} = 6.3 \mu m$ . Keep the valve mounting surface and the area clean.
- Before installation, remove the protective cover from the valve ports.
  - Check that the valve ports and the O-rings are in the correct position.
  - Use fastening screws as indicated in the catalogue, property class 12.9 to ISO 4762.

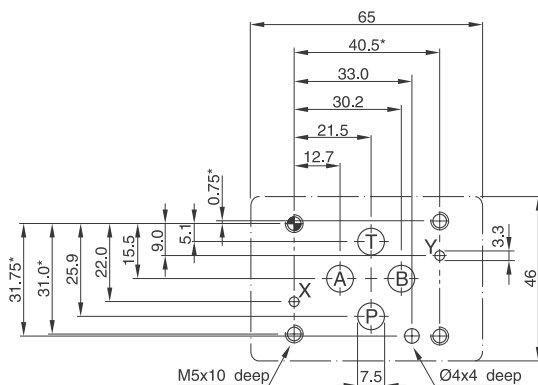


Parker can supply the correct screw sets, see the catalogue for order numbers.

- Tighten the screws diagonally, torque as specified in the catalogue.
- Any deficiencies of the valve mounting surface may result in operating disruptions. Faulty fixing and incorrect screw tightening torques may lead to the sudden escape of hydraulic fluid at the ports.

The valve must be connected to the equipotential bonding system of the hydraulic system.

## Size 6, mounting pattern ISO 4401-03-03-0-05



### Electrical connection

Observe operating instructions D14-2128D3-\* and K14-2074D3-\* in the annex.

### Operation limits

The valve may only be deployed with the specified limits of use. The relevant details can be found in the catalogue sheet under "Technical data" and "Characteristic curves".



Observe the ambient conditions. Unauthorised temperatures, shocks, the effects of aggressive chemicals, radiation, unauthorised electromagnetic emissions may result in disruptions and failures. Observe the limits of operation set out in "Technical data".



Excessive temperatures may cause the solenoid to overheat, creating the risk of explosion. To permit adequate heat dissipation, the solenoid coil should not be painted.

### Pressure fluids

The following rules apply for the operation with various pressure fluids:



This information serves for orientation and does not substitute user tests among the particular operating conditions. Particularly no liability for media compatibility may be derived out of it.

Mineral oil: usable without restriction.

For operation with the following pressure fluids please consult Parker:

|     |                                   |
|-----|-----------------------------------|
| HFA | oil-in-water emulsion             |
| HFB | water-in-oil emulsion             |
| HFC | aqueous solution (glycols)        |
| HFD | anhydrous fluids (Phosphor-Ester) |



For detailed information concerning pressure fluids note VDMA-document 24317 as well as DIN 51524 & 51502.

Special gaskets may be available depending on the utilized fluid.

In case of insecurity please consult Parker.

The pressure fluid must have an ignition temperature of at least 50 K above the maximum surface temperature of the valve (see EN 13463-5 and IEC 60079-4).

## 5. Operating instructions

### Air bleeding of hydraulic system

During initial startup, after an oil change as well as after the opening of lines or valves the hydraulic system must be air bled.

### Filter

The function and lifetime of the valve are strongly affected by the cleanliness of the fluid.

Purity level class of 18/16/13 acc. ISO4406 is required.

 Pay attention to maintenance details!

### Flushing

It is recommended to flush the pipelines by short circuiting the pressure and return lines. This prevents the installation dirt from entering the valve.

## 6. Maintenance



Maintenance procedures may only be carried out by specialist personnel. A detailed knowledge is required of how the machine is switched on and off and also of the necessary safety measures.

Regular maintenance is essential in prolonging the service life of the systems, and safeguards plant safety and operational availability. The following items must be checked at regular and short intervals:

- Oil level in tank
- Max. medium temperature
- Max. surface temperature
- Condition of the pressure fluid (sight check, colour and smell of hydraulic fluid)
- Operating pressures
- Preload pressure of pressure vessel (if present)
- No leaks at any system components
- Condition of the filter elements
- Condition of the hose lines
- Cleanliness of components

After a certain period of service, the hydraulic fluid must be replaced. The frequency of the change depends on the following circumstances:

- Type and grade of pressure fluid (ageing)
- Filtration
- Operating temperature and ambient conditions

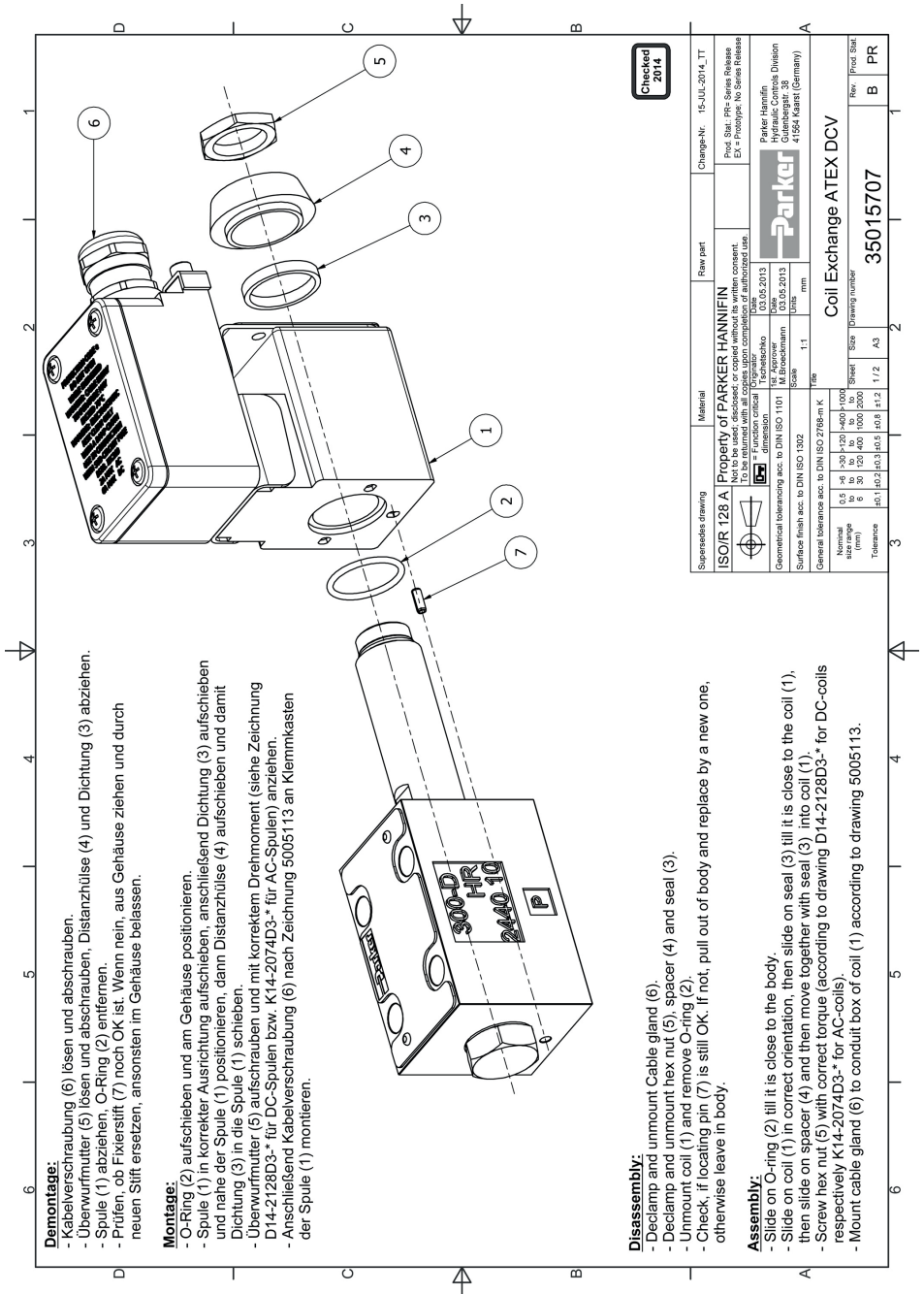
### Replacement of a coil

In case of a necessary replacement of a coil the disassembly and assembly instructions on drawing 35015707 (see next page) have to be observed. Before exchanging a coil the name plates of old and new coil have to be checked. It must be ensured that only coils with identical voltages are used.

Available coil kits are:

|               |               |
|---------------|---------------|
| AK-D1VWCJEE93 | 24 V DC       |
| AK-D1VWCPEE93 | 110 V / 50 Hz |
| AK-D1VWCNEE93 | 230 V / 50 Hz |

The coils of series 93 are suitable for valves of series 91 as well as 92 and 93.



## 7. Troubleshooting

A systematic approach must always be used in the troubleshooting process. Begin by answering the following questions:

- Does anyone have practical experience of similar faults?
- Have any of the settings been changed in the system?

Now try to identify the fault using a prioritised list of the most likely causes.

- If you suspect that the valve is not moving freely, you should flush the valve with clean pressure fluid.
- A systematic approach should always be adopted when troubleshooting a hydraulic system.

The work must only be carried out by specialist personnel because detailed knowledge of the function and structure of the system is required. Always think carefully about changing settings or removing components. Before starting work, check that the system was working correctly before the fault occurred.

Following any repair, commissioning must be carried out as instructed.

| malfunction at hydraulic load runtime                         |   |   |   |   |   |   |                                      |                                                             |  |
|---------------------------------------------------------------|---|---|---|---|---|---|--------------------------------------|-------------------------------------------------------------|--|
| - not working in general                                      |   |   |   |   |   |   |                                      |                                                             |  |
| - high frequency vibrations                                   |   |   |   |   |   |   |                                      |                                                             |  |
| - low frequency vibrations                                    |   |   |   |   |   |   |                                      |                                                             |  |
| - moves only in one direction                                 |   |   |   |   |   |   |                                      |                                                             |  |
| - the speed fluctuates when the command value stays unchanged |   |   |   |   |   |   |                                      |                                                             |  |
| - the speed is different for each stroke direction            |   |   |   |   |   |   |                                      |                                                             |  |
| - speed too low                                               |   |   |   |   |   |   |                                      |                                                             |  |
| - drifts without command value signal                         |   |   |   |   |   |   |                                      |                                                             |  |
|                                                               |   |   |   |   |   |   | Possible causes                      | Remedy                                                      |  |
| X                                                             |   |   |   |   |   |   | Hydraulic pump/motor defective       | Replace hydraulic pump/motor                                |  |
| X                                                             |   | X | X | X | X | X | Drive overloaded                     | Reduce pressure/speed, increase valve size                  |  |
|                                                               |   |   |   |   | X | X | Hydraulic fluid too viscous/cold     | Change fluid quality, bring system to operating temperature |  |
| X                                                             |   | X | X |   |   |   | Oil level in tank too low            | Top up pressure fluid                                       |  |
|                                                               |   |   |   |   | X | X | Filter contaminated                  | Clean/replace filter                                        |  |
| X                                                             |   | X |   |   |   | X | Supply voltage too low               | Observe supply voltage range                                |  |
|                                                               | X |   |   |   |   |   | Supply voltage has too much ripple   | Reduce ripple                                               |  |
| X                                                             |   |   | X |   |   | X | Command signal too low               | Increase command signal                                     |  |
|                                                               | X |   |   |   |   |   | Command signal has too much ripple   | Reduce ripple                                               |  |
| X                                                             |   |   |   |   |   |   | Electrical supply line broken        | Fix supply line                                             |  |
| X                                                             | X | X | X | X |   | X | Connection sequence incorrect        | Correct connection sequence                                 |  |
| X                                                             | X |   |   |   |   | X | Electrical supply line not shielding | Change to shielded wiring                                   |  |

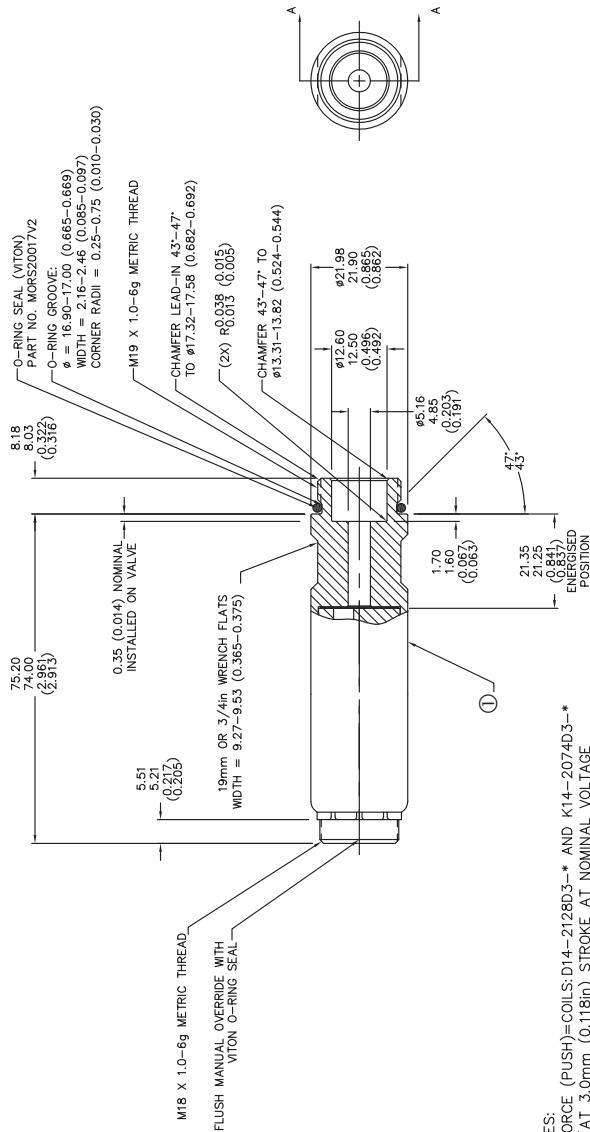
**A1.****Standards, directives and provisions relating to the operation of systems in potentially explosive areas (extract)**

|                   |                                                                                                                                  |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------|
| 1999/92/EC        | Minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres    |
| 2004/108/EC       | Electromagnetic compatibility directive (EMC)                                                                                    |
| EN ISO 12100:2010 | Safety of machinery – General principles for design risk assessment and risk reduction                                           |
| EN 15198:2007     | Methodology for risk assessment of non-electrical equipment and components for intended use in potentially explosive atmospheres |
| EN 60079-0:2009   | Explosive atmospheres –<br>Part 0: Equipment – General requirements                                                              |
| EN 60079-7:2007   | Explosive atmospheres –<br>Part 7: Equipment protection by increased safety “e”                                                  |
| EN 60079-14:2009  | Explosive atmospheres –<br>Part 14: Electrical installations design, selection and erection<br>(IEC 60079-14:2013)               |
| EN 60079-17:2014  | Explosive atmospheres –<br>Part 17: Electrical installations inspection and maintenance<br>(IEC 60079-17:2013)                   |
| EN 60529:2014     | Degrees of protection provided by enclosures (IP code)<br>(IEC 60529:1989 + A1:1999 + A2:2013)                                   |
| BetrSichV         | Ordinance on industrial safety and health                                                                                        |
| TRBS 2153:2009    | Technical rules for operating safety<br>Avoiding ignition hazards as a result of electrostatic charges                           |

D1VW EE 5715-690-UK 31.07.25



| REVISIONS |                     |
|-----------|---------------------|
| REV       | DESCRIPTION         |
| A         | SEE ECND14-2084REVA |
| B         | SEE ECND14-2084REVB |
| C         | SEE ECND14-2084REVC |

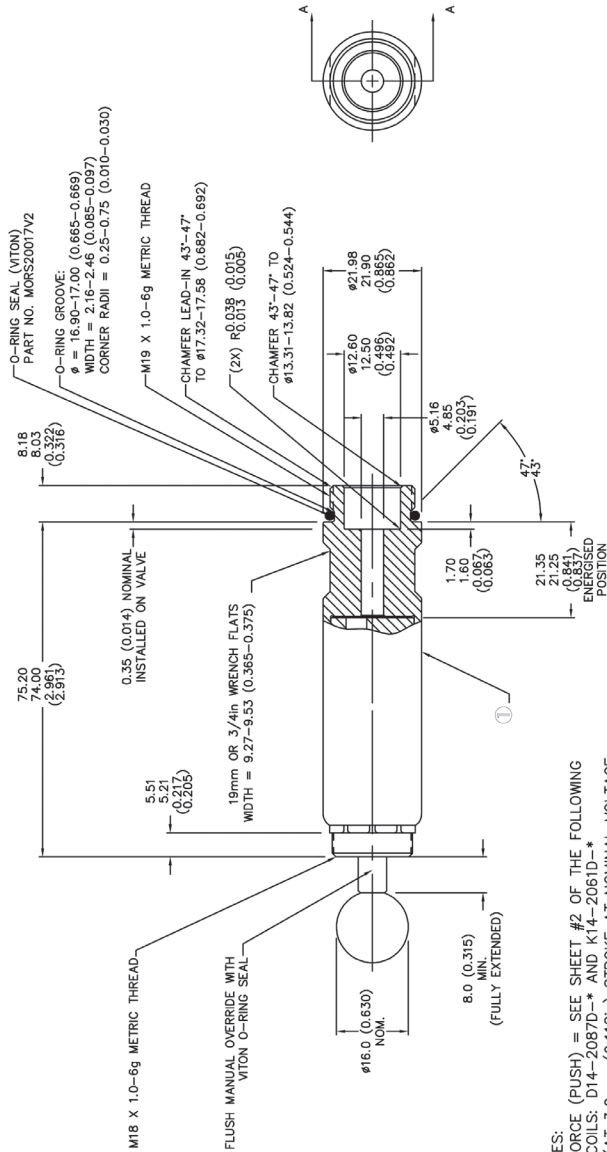


1. FORCE (PUSH)=COILS:D14-2128D3-\* AND K14-2074D3-  
(AT 3.0mm (0.118in) STROKE AT NOMINAL VOLTAGE  
AT +25°C (+77°F))

2. INTERNAL PRESSURE = 210 BAR (3000 PSI) OPERATING  
= 210 BAR (3000 PSI) STATIC  
\*OPERATING PRESSURE IS PULSING PRESSURE INCLUDING SPIKES AND/OR SURGES.
3. PLUNGER TRAVEL 6.1mm (0.240in) MIN.
4. PROTECTIVE CAPS FOR INTERFACE  
THREAD SUPPLIED BY LISS IRISH.

| UNLESS OTHERWISE SPECIFIED                    | 3/4" ANGLE PROJ. | DRAWN           | DATE | ITEM | PART NUMBER | TUBE ASSEMBLY | QTY |
|-----------------------------------------------|------------------|-----------------|------|------|-------------|---------------|-----|
| 1. 90° FINISH ALL OVER                        |                  | A. T. 12-APR-07 |      | 1    | H-22669     | TUBE ASSEMBLY | 1   |
| 2. 90° FINISH ALL OVER                        |                  | CHECK           |      |      |             |               |     |
| 3. SMOOTH FINISH FOR $f$ -SPEACIFICATION ONLY |                  | ENGINEER        |      |      |             |               |     |
| 4. 90° FINISH ALL OVER                        |                  |                 |      |      |             |               |     |
| 5. 90° FINISH ALL OVER                        |                  |                 |      |      |             |               |     |
| 6. 90° FINISH ALL OVER                        |                  |                 |      |      |             |               |     |
| 7. 90° FINISH ALL OVER                        |                  |                 |      |      |             |               |     |
| 8. 90° FINISH ALL OVER                        |                  |                 |      |      |             |               |     |
| 9. 90° FINISH ALL OVER                        |                  |                 |      |      |             |               |     |
| 10. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 11. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 12. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 13. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 14. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 15. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 16. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 17. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 18. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 19. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 20. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 21. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 22. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 23. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 24. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 25. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 26. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 27. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 28. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 29. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 30. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 31. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 32. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 33. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 34. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 35. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 36. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 37. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 38. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 39. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 40. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 41. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 42. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 43. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 44. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |
| 45. 90° FINISH ALL OVER                       |                  |                 |      |      |             |               |     |

| REVISIONS |                     |
|-----------|---------------------|
| REV       | DESCRIPTION         |
| A         | SEE ECN014-2085REVA |
| B         | SEE ECN014-2085REVB |



NOTES:  
1. FORCE (PUSH) = SEE SHEET #2 OF THE FOLLOWING  
COILS: D14-2087D-\* AND K14-2061D-\*  
(AT 3.0mm (0.118in) STROKE AT NOMINAL VOLTAGE  
AT +25°C (+77°F))

2. INTERNAL PRESSURE = 210 BAR (3000 PSI) OPERATING \*  
= 210 BAR (3000 PSI) STATIC  
\*OPERATING PRESSURE IS PULSING PRESSURE INCLUDING  
SPIKES AND/OR SURGES.

3. PLUNGER TRAVEL 6.1mm (0.240in) MIN.

4. PROTECTIVE CAPS FOR INTERFACE.

THREAD SUPPLIED BY LISK IRELAND.

[illegible]

## A3. Type-examination certificate – Solenoid

Certificate Number  
Baseefa02ATEX0199X



Issued 6 February 2003  
Page 1 of 3

## EC - TYPE EXAMINATION CERTIFICATE

Equipment or Protective System Intended for use in Potentially Explosive Atmospheres  
Directive 94/9/EC

- 1
- 2
- 3 EC – Type Examination Certificate Number : **Baseefa02ATEX0199X**
- 4 Equipment or protective system: **The Type D/K XX-XD-XD Solenoids**
- 5 Manufacturer : **G.W. Lisk Company Incorporated**
- 6 Address : **2 South Street, Clifton Springs, New York, 14432, USA**
- 7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
- 8 Baseefa (2001) Ltd. Notified body number 1180 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.
- The examination and test results are recorded in confidential Report No. **02(C)0465**
- 9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
- EN 50014 (1997) + Amendments 1 & 2;      EN 50019 (2000);      EN 50028 (1987)**
- except in respect of those requirements listed at item 18 of the Schedule.
- 10 If the sign “X” is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions of safe use specified in the schedule to this certificate.
- 11 This EC - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified equipment or protective system. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment or protective system.
- 12 The marking of the equipment or protective system shall include the following :
- Ex II 2G EEx me II T( See Schedule)       $-54^{\circ}\text{C} \leq T_{\text{amb}} \leq +40^{\circ}\text{C}$  or  $-54^{\circ}\text{C} \leq T_{\text{amb}} \leq +60^{\circ}\text{C}$**
- This certificate may only be reproduced in its entirety, without any change, schedule included.

Baseefa (2001) Ltd. Customer Reference No. 0435

Project File No.02/0465

This certificate is granted subject to the general terms and conditions of Baseefa (2001) Ltd. It does not necessarily indicate that the equipment may be used in particular industries or circumstances.

**R S SINCLAIR**  
DIRECTOR  
On behalf of  
Baseefa (2001) Ltd.

**Baseefa (2001) Ltd.**  
Health and Safety Laboratory Site, Harpur Hill,  
Buxton, Derbyshire SK17 9JN  
Telephone +44 (0) 1298 28255 Fax +44 (0) 1298 28216  
e-mail [info@baseefa2001.biz](mailto:info@baseefa2001.biz) web site [www.baseefa2001.biz](http://www.baseefa2001.biz)  
Registered in England No. 4305578 at 13 Dovedale Crescent, Buxton,  
Derbyshire, SK17 9BJ

Certificate Number  
Baseefa02ATEX0199X



Issued 6 February 2003  
Page 2 of 3

## Schedule

### 15 Description of Equipment or Protective System

The Type D/K XX-XD-XD Solenoids comprise an encapsulated coil solenoid fitted with an increased safety terminal enclosure. Additionally the Type K solenoids are fitted with a bridge rectifier and a shunt varistor. The coil and components are encapsulated in a glass fibre filled polyester resin.

The solenoid is fitted to a core tube, which contains the solenoid armature. The core tube is provided with a mounting thread to customer specification. The solenoid is retained on the core tube by a spacer and nut.

Internal and external earth facilities are provided.

An M20 cable entry is provided for connection of the users cabling.

The solenoid is designed and rated for mounting on a specified valve body (see sheet 8 of drawing number H17423).

The Type designation represents the following information;

- i) The first character is either D for d.c. input or K for a.c. input.
- ii) The first two digits (10, 12, 13, 14, 15, 16, 17, 18 or 19) identify the diameter of the core tube in 1/16 inches.
- iii) The subsequent 1, 2, 3, or 4 digits identify information specific to the customer. Associated with these digits is the character D which indicates that the coil is an explosion protection design (EEx me).
- iv) The final group of 3 numbers signify the voltage and wattage ratings.

Both d.c. and a.c. versions are fitted with a thermal fuse rated with an operating temperature according to the applicable temperature classification as follows;

For T6 versions a 75°C rated thermal fuse is fitted.

For T5 versions a 90°C rated thermal fuse is fitted.

For T4 versions a 125°C rated thermal fuse is fitted.

The solenoid coil may be wound for use with supplies of up to 250V d.c. (Type D) or 250V a.c. 50Hz or 60Hz (Type K). The maximum stabilized power dissipation for a given maximum ambient temperature and temperature classification for the solenoid mounted on a specified valve body are given in the table below.

### MAXIMUM PERMITTED STABILIZED POWER (Watts)

| Solenoid Type                             | Ambient Temperature (°C) | Power (Watts) |    |    |
|-------------------------------------------|--------------------------|---------------|----|----|
|                                           |                          | T6            | T5 | T4 |
| D10, K10                                  | 40                       | 12            | 18 | 30 |
|                                           | 60                       | 6             | 11 | 25 |
| D12, K12, D13, K13,<br>D14, K14, D15, K15 | 40                       | 13            | 22 | 36 |
|                                           | 60                       | 4             | 11 | 30 |
| D14, K14, D15, K15                        | 40                       | 16            | 23 | 39 |
|                                           | 60                       | 7             | 13 | 30 |
| D16, K16, D17, K17,<br>D18, K18, D19, K19 | 40                       | 25            | 37 | 50 |
|                                           | 60                       | 10            | 22 | 42 |

**Certificate Number**  
**Baseefa02ATEX0199X**



**Issued 6 February 2003**  
**Page 3 of 3**

**16** Report No. 02(C)0465

**17 Special Conditions for Safe Use**

1. The solenoid must only be mounted on a valve body which has a heat dissipation equal to or greater than the valve body shown on sheet 8 of drawing number H17423. The solenoid valve must be complete before the coil is energised.
2. The solenoid and the valve body on which it is mounted must not be thermally lagged.
3. The fluid flowing through the valve must not exceed the specified ambient temperature of 40°C or 60°C.
4. The solenoid shall be protected by fuses rated for a prospective short circuit current of at least 4000A.

**18 Essential Health and Safety Requirements**

None additional to those covered by the standards listed at item 9

**19 Drawings and Documents**

| <u>Number</u>  | <u>Issue</u> | <u>Date</u> | <u>Description</u>             |
|----------------|--------------|-------------|--------------------------------|
| H17423 sheet 1 | A            | 05 Jun 01   | General Arrangement            |
| H17423 sheet 2 | A            | 05 Jun 01   | Dimensional Details            |
| H17423 sheet 3 | A            | 05 Jun 01   | Terminal Box                   |
| H17423 sheet 4 | A            | 05 Jun 01   | Circuit Details                |
| H17423 sheet 5 | A            | 05 Jun 01   | Coil Details                   |
| H17423 sheet 6 | A            | 05 Jun 01   | Certification Label            |
| H17423 sheet 7 | A            | 05 Jun 01   | Voltage & Power Ratings        |
| H17423 sheet 8 | A            | 05 Jun 01   | Heat Sink (Valve Body) Details |
| H17423 sheet 9 | A            | 05 Jun 01   | Encapsulant Details            |

Certificate Number  
Baseefa02ATEX0199X/1



Issued 8<sup>th</sup> April 2009  
Page 1 of 2

- 1 **SUPPLEMENTARY EC - TYPE EXAMINATION CERTIFICATE**
- 2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres**  
**Directive 94/9/EC**
- 3 Supplementary EC - Type Examination Certificate Number: **Baseefa02ATEX0199X/1**
- 4 Equipment or Protective System: **The Type D/K XX-XD-XD Solenoids**
- 5 Manufacturer: **G.W. Lisk Company Incorporated**
- 6 Address: **2 South Street, Clifton Springs, New York 14432, USA**
- 7 This supplementary certificate extends EC – Type Examination Certificate No. Baseefa02ATEX0199X to apply to equipment or protective systems designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

This supplementary certificate shall be held with the original certificate.

This certificate may only be reproduced in its entirety, without any change, schedule included.

Baseefa Customer Reference No. 0435

Project File No. 09/0188

This certificate is granted subject to the general terms and conditions of Baseefa. It does not necessarily indicate that the equipment may be used in particular industries or circumstances.

### Baseefa

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Buxton, Derbyshire SK17 9RZ  
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e-mail [info@baseefa.com](mailto:info@baseefa.com) web site [www.baseefa.com](http://www.baseefa.com)  
Baseefa is a trading name of Baseefa Ltd  
Registered in England No. 4305578. Registered address as above.

  
R S SINCLAIR  
DIRECTOR  
On behalf of  
Baseefa

**Certificate Number**  
Baseefa02ATEX0199X/1



**Issued 8<sup>th</sup> April 2009**  
**Page 2 of 2**

13

### **Schedule**

14

**Certificate Number Baseefa02ATEX0199X/1**

### **15 Description of the variation to the Equipment or Protective System**

#### **Variation 1.1**

To confirm that the equipment covered by this certificate has been reviewed against the requirements of EN 60079-0: 2006, EN 60079-7: 2007 and EN 60079-18: 2004 in respect of the differences from EN 50014: 1997 + amd. 1 & 2, EN 50019: 2000 and EN 50028: 1987 and that none of these differences in the Standard affects this equipment.

#### **Variation 1.2**

To permit minor design and drawing changes.

### **16 Report Number**

None

### **17 Special Conditions for Safe Use**

None additional to those listed previously

### **18 Essential Health and Safety Requirements**

Compliance with the Essential Health and Safety Requirements is not affected by this variation.

### **19 Drawings and Documents**

| <b>Number</b> | <b>Sheet</b> | <b>Issue</b> | <b>Date</b> | <b>Description</b>             |
|---------------|--------------|--------------|-------------|--------------------------------|
| H17423        | 1            | B            | 20 Feb 09   | General arrangement            |
| H17423        | 2            | B            | 20 Feb 09   | Dimensional detail             |
| H17423        | 3            | B            | 20 Feb 09   | Terminal box                   |
| H17423        | 4            | B            | 20 Feb 09   | Circuit details                |
| H17423        | 5            | B            | 20 Feb 09   | Coil details                   |
| H17423        | 6            | B            | 20 Feb 09   | Certification label            |
| H17423        | 7            | B            | 20 Feb 09   | Voltage and power ratings      |
| H17423        | 8            | B            | 20 Feb 09   | Heat sink (valve body) details |
| H17423        | 9            | B            | 20 Feb 09   | Encapsulant details            |

Certificate Number  
Baseefa02ATEX0199X/2



Issued 26 October 2012  
Page 1 of 3

1 **SUPPLEMENTARY EC - TYPE EXAMINATION CERTIFICATE**

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres  
Directive 94/9/EC**

- 3 Supplementary EC - Type Examination Certificate Number: **Baseefa02ATEX0199X/2**
- 4 Equipment or Protective System: **The Type D/K XX-XD-XD Solenoids**
- 5 Manufacturer: **G.W. Lisk Company Incorporated**
- 6 Address: **2 South Street, Clifton Springs, New York 14432, USA**
- 7 This supplementary certificate extends EC - Type Examination Certificate No. **Baseefa02ATEX0199X** to apply to equipment or protective systems designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.
- 8 Item 9 of the original Certificate is replaced by "Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
- EN60079-0: 2012      EN60079-7: 2007      EN60079-18: 2009**
- except in respect of those requirements listed at item 18 of the Schedule."
- 9 The marking of the equipment has changed from the original Certificate and shall include the following:
- Ⓔ II 2 G Ex e mb T\* Gb Ta -40°C to + \*\*°C \* See schedule

This certificate shall be held with the original certificate and may only be reproduced in its entirety, without any change, schedule included.

Baseefa Customer Reference No. **0435**

Project File No. **10/0568**

This certificate is granted subject to the general terms and conditions of Baseefa. It does not necessarily indicate that the equipment may be used in particular industries or circumstances.

**Baseefa**

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e-mail [info@baseefa.com](mailto:info@baseefa.com) web site [www.baseefa.com](http://www.baseefa.com)  
Baseefa is a trading name of Baseefa Ltd  
Registered in England No. 4305578. Registered address as above.

R S SINCLAIR

DIRECTOR  
On behalf of  
Baseefa

**Certificate Number**  
**Baseefa02ATEX0199X/2**



**Issued 26 October 2012**  
**Page 2 of 3**

13

### **Schedule**

14

**Certificate Number Baseefa02ATEX0199X/2**

**15 Description of the variation to the Equipment or Protective System**

#### **Variation 2.1**

To confirm that the equipment covered by this certificate has been reviewed against the requirements of EN 60079-0: 2012, and EN 60079-18: 2009.

#### **Variation 2.2**

To permit alternative ratings at 50°C ambient temperature. The maximum stabilised power for the temperature classification and ambient temperature range for each size of solenoid is indicated below.

| Coil size | Ambient temperature (°C) | Maximum Stabilised Power (W) |      |      |
|-----------|--------------------------|------------------------------|------|------|
|           |                          | T4                           | T5   | T6   |
| 1         | -40°C to +40°C           | 18                           | 14   | 9    |
|           | -40°C to +60°C           | 14                           | 8    | 3    |
| 2         | -40°C to +40°C           | 21.5                         | 15.4 | 10.8 |
|           | -40°C to +50°C           | 18.9                         | 12.3 | 7.9  |
|           | -40°C to +60°C           | 16.4                         | 9.3  | 5.1  |
| 3         | -40°C to +40°C           | 22.2                         | 16.4 | 11.4 |
|           | -40°C to +50°C           | 19.5                         | 13.0 | 8.4  |
|           | -40°C to +60°C           | 16.8                         | 9.9  | 5.5  |
| 4         | -40°C to +40°C           | 34.1                         | 21.3 | 15.1 |
|           | -40°C to +50°C           | 29.8                         | 17.1 | 11.1 |
|           | -40°C to +60°C           | 25.6                         | 13.1 | 7.3  |

The table above supersedes the previously permitted wattages.

#### **Variation 2.3**

Deletion of the use of a varistor.

#### **Variation 2.4**

The use of thermal fuses to be optional.

**16 Report Number**

Baseefa certification report 10(C)0568.

**17 Specific Conditions of Use**

The solenoids shall be protected by fuses rated for a prospective short circuit current of at least 1500A.

**18 Essential Health and Safety Requirements**

Compliance with the Essential Health and Safety Requirements is not affected by this variation.

Certificate Number  
Baseefa02ATEX0199X/2



Issued 26 October 2012  
Page 3 of 3

**19 Drawings and Documents**

| Number | Sheet | Issue | Date         | Description                            |
|--------|-------|-------|--------------|----------------------------------------|
| H17423 | 1     | C     | 14 Sept 2012 | General Assembly                       |
| H17423 | 2     | C     | 14 Sept 2012 | General Assembly and sizes             |
| H17423 | 3     | C     | 14 Sept 2012 | Terminal Box Details                   |
| H17423 | 4     | C     | 14 Sept 2012 | Internal Components and Wiring Details |
| H17423 | 5     | C     | 14 Sept 2012 | Winding Details                        |
| H17423 | 6     | C     | 14 Sept 2012 | Marking Details                        |
| H17423 | 7     | C     | 14 Sept 2012 | Power Details                          |
| H17423 | 8     | C     | 14 Sept 2012 | Valve and Subplate details             |
| H17423 | 9     | C     | 14 Sept 2012 | Compound Details                       |

**Certificate Number**  
**Baseefa02ATEX0199X/3**

**SGS**



**Issued 16 May 2014**  
**Page 1 of 2**

**1 SUPPLEMENTARY EC - TYPE EXAMINATION CERTIFICATE**

**2 Equipment or Protective System Intended for use in Potentially Explosive Atmospheres  
 Directive 94/9/EC**

- 3** Supplementary EC - Type Examination Certificate Number: **Baseefa02ATEX0199X/3**
- 4** Equipment or Protective System: **Type D/KXX-XXXX-XX Solenoids**
- 5** Manufacturer: **G.W. Lisk Company Incorporated**
- 6** Address: **2 South Street, Clifton Springs, New York 14432, USA**
- 7** This supplementary certificate extends EC – Type Examination Certificate No. **Baseefa02ATEX0199X** to apply to equipment or protective systems designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

This supplementary certificate shall be held with the original certificate.

Baseefa Customer Reference No. **0435**

Project File No. **13/0686**

This document is issued by the Company subject to its General Conditions for Certification Services accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and the Supplementary Terms and Conditions accessible at <http://www.baseefa.com/terms-and-conditions.asp>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. It does not necessarily indicate that the equipment may be used in particular industries or circumstances. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, schedule included, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

**SGS Baseefa Limited**

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Registered in England No. 4305578.

Registered address: Rossmore Business Park, Ellesmere Port, Cheshire, CH65 3EN

**R S SINCLAIR**  
**GENERAL MANAGER**

On behalf of SGS Baseefa Limited

Certificate Number  
Baseefa02ATEX0199X/3



Issued 16 May 2014  
Page 2 of 2

13

## Schedule

14

**Certificate Number Baseefa02ATEX0199X/3**

**15 Description of the variation to the Equipment or Protective System**

### Variation 3.1

To permit the option of an alternative terminal enclosure with two cable entries.

### Variation 3.2

To note minor modifications and rewording of the Specific Conditions of Use.

**16 Report Number**

GB/BAS/ExTR13.0206/00.

**17 Specific Conditions of Use**

- 1 The solenoid must only be used on valve sizes with heat dissipation specified by the manufacturer of the solenoid in the instructions. The solenoid must be completely assembled with the valve before the solenoid is energised.
- 2 The solenoid and the valve on which it is mounted must not be thermally lagged.
- 3 The fluid flowing through the valve must not exceed the specified ambient temperature.
- 4 The solenoid shall be protected by a fuse rated for a prospective short circuit current of at least 1500A.

**18 Essential Health and Safety Requirements**

Compliance with the Essential Health and Safety Requirements is not affected by this variation.

**19 Drawings and Documents**

| Number | Sheet | Issue | Date      | Description                            |
|--------|-------|-------|-----------|----------------------------------------|
| H17423 | 1     | D     | 23.Apr.14 | General Assembly                       |
| H17423 | 2     | D     | 23.Apr.14 | General Assembly and Sizes             |
| H17423 | 3     | D     | 23.Apr.14 | Terminal Box Details                   |
| H17423 | 4     | D     | 23.Apr.14 | Internal Components and Wiring Details |
| H17423 | 5     | D     | 23.Apr.14 | Winding Details                        |
| H17423 | 6     | D     | 23.Apr.14 | Marking Details                        |
| H17423 | 7     | D     | 23.Apr.14 | Power Details                          |
| H17423 | 8     | D     | 23.Apr.14 | Valve and Subplate Details             |
| H17423 | 9     | D     | 23.Apr.14 | Compound Details                       |
| H17423 | 10    | D     | 23.Apr.14 | Alternative Terminal Enclosure         |

**Certificate Number**  
**Baseefa02ATEX0199X**  
**Issue 4**



**Issued 11 February 2025**  
**Page 1 of 4**

**1 EU - TYPE EXAMINATION CERTIFICATE**  
**2 Equipment or Protective System Intended for use in Potentially Explosive Atmospheres**  
**Directive 2014/34/EU**

**3 EU - Type Examination Certificate Baseefa02ATEX0199X – Issue 4**  
**Number:**

**3.1** In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Supplementary Certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016.

**4 Product: Type D / KXX-XXXX-XX Solenoids**

**5 Manufacturer: G.W. Lisk Company Incorporated**

**6 Address: 2 South Street, Clifton Springs, New York 14432, USA**

**7** This re-issued certificate extends EC Type Examination Certificate No. Baseefa02ATEX0199X to apply to product designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

**8** SGS Fimko Oy, Notified Body number 0598, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

**8.1** The original certificate was issued by SGS Baseefa Ltd (UK Notified Body 1180). It, and any supplements previously issued by SGS Baseefa Ltd have been transferred to the supervision of SGS Fimko Oy (EU Notified Body 0598). The original certificate number is retained.

The examination and test results are recorded in confidential Report No. **See Certificate History**

**9** Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

**EN IEC 60079-0:2018 EN IEC 60079-7:2015+A1:2018 EN 60079-18:2015+A1:2017**

except in respect of those requirements listed at item 18 of the Schedule.

**10** If the sign “X” is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

**11** This EU - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

**12** The marking of the product shall include the following:

**Ⓔ II 2 G Ex eb mb IIC T4...T6 Gb (-40°C < Ta ≤ +40°C/+50°C/+60°C) - See Schedule**

SGS Fimko Oy Customer Reference No. **0435**

Project File No. **23/0263**

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**SGS Fimko Oy**

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Business ID 0634247-4 Member of the SGS  
 Group (SGS SA)



Mikko Välimäki  
 SGS Fimko Oy

13

## Schedule

14

### Certificate Number Baseefa02ATEX0199X – Issue 4

#### 15 Description of Product

The Type D/KXX-XXXX-XX solenoids comprise an encapsulated solenoid coil and an increased safety terminal enclosure. The solenoid is fitted to a core tube which contains the solenoid armature. The core tube is provided with a mounting thread to customer specification. The solenoid is retained on the core tube by a spacer and nut. A bridge rectifier or four diodes and a thermal cut-out may optionally be provided within the encapsulation.

The stainless steel terminal enclosure contains a type MK 6/2E 2 way terminal block to TUV18ATEX8209U, and an internal earth facility. The enclosure has a cover with a gasket and up to two M20 cable entries.

The solenoids are available in three sizes. The coils are rated 6-250Vdc, 24-250Vac, and have a maximum stabilised wattage for the temperature classification and ambient temperature range for each size of solenoid as indicated below.

| Solenoid size | Ambient range  | Maximum power (W) |      |      |
|---------------|----------------|-------------------|------|------|
|               |                | T4                | T5   | T6   |
| 1             | -40°C to +40°C | 18                | 14   | 9    |
|               | -40°C to +60°C | 14                | 8    | 3    |
| 2             | -40°C to +40°C | 21.5              | 15.4 | 10.8 |
|               | -40°C to +50°C | 18.9              | 12.3 | 7.9  |
|               | -40°C to +60°C | 16.4              | 9.3  | 5.1  |
| 3             | -40°C to +40°C | 22.2              | 16.4 | 11.4 |
|               | -40°C to +50°C | 19.5              | 13.0 | 8.4  |
|               | -40°C to +60°C | 16.8              | 9.9  | 5.5  |
| 4             | -40°C to +40°C | 34.1              | 21.3 | 15.1 |
|               | -40°C to +50°C | 29.8              | 17.1 | 11.1 |
|               | -40°C to +60°C | 25.6              | 13.1 | 7.3  |

A cable entry hole is provided as specified on the certified drawings for the accommodation of a cable entry device, with or without the interposition of a thread adapter.

The cable entry device and thread adapter shall be suitable for the equipment, the cable and the conditions of use and shall be certified as Equipment (not a Component) under an EU-Type Examination Certificate to Directive 2014/34/EU. The cable entry device shall maintain the ingress protection (IP54) of the enclosure

#### 16 Report Number

See Certificate History

#### 17 Specific Conditions of Use

- The solenoid must only be used on valve sizes with heat dissipation specified by the manufacturer of the solenoid in the instructions. The solenoid must be completely assembled with the valve before the solenoid is energised.
- The solenoid and the valve on which it is mounted must not be thermally lagged.
- The fluid flowing through the valve must not exceed the specified ambient temperature.
- The solenoid shall be protected by a fuse rated for a prospective short circuit current of at least 1500A.

**Certificate Number**  
**Baseefa02ATEX0199X**  
**Issue 4**



**Issued 11 February 2025**  
**Page 3 of 4**

## 18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product, and conformity is demonstrated in the report:

| Clause | Subject                                           |
|--------|---------------------------------------------------|
| 1.2.7  | LVD type requirements                             |
| 1.2.8  | Overloading of equipment (protection relays, etc) |
| 1.4.1  | External effects                                  |
| 1.4.2  | Aggressive substances, etc                        |

## 19 Drawings and Documents

New drawings submitted for this issue of certificate:

| Number | Sheet | Issue | Date     | Description                    |
|--------|-------|-------|----------|--------------------------------|
| H17423 | 1     | E     | 22.02.24 | Materials                      |
| H17423 | 2     | E     | 22.02.24 | Dimensions                     |
| H17423 | 3     | E     | 22.02.24 | Terminal Enclosure             |
| H17423 | 4     | E     | 22.02.24 | Circuit Board                  |
| H17423 | 5     | E     | 22.02.24 | Winding Assembly               |
| H17423 | 6     | E     | 22.02.24 | Nameplate                      |
| H17423 | 7     | E     | 22.02.24 | Ratings                        |
| H17423 | 8     | E     | 22.02.24 | Heatsink                       |
| H17423 | 9     | E     | 22.02.24 | Encapsulant & Material Data    |
| H17423 | 10    | E     | 22.02.24 | Alternative Terminal Enclosure |

Current drawings which remain unaffected by this issue:

None.

All drawings are common to, and held with, IECEx BAS 13.0093X.

## 20 Certificate History

| Certificate No.      | Date                                            | Comments                                                                                                                                                                                                                                                                                                                                                               |
|----------------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Baseefa02ATEX0199X   | 6 February 2003                                 | The release of the prime certificate. The associated test and assessment against the requirements of EN 50014:1997 + Amnds 1 & 2, EN 50019:2000 & EN 50028:1987 is documented in Test Report No. 02(C)0465. Project File No. 02/0465.                                                                                                                                  |
| Baseefa02ATEX0199X/1 | 8 April 2009                                    | To permit minor drawing and design changes and to confirm that the equipment covered by this certificate has been reviewed against the requirements of EN 60079-0: 2006, EN 60079-7: 2007 and EN 60079-18: 2004. Project File No 09/0188.                                                                                                                              |
| Baseefa02ATEX0199X/2 | 26 October 2012<br>Reissued<br>30 November 2012 | To permit alternative ratings at +50°C, removal of the use of a varistor, optional use of thermal fuses, changing the name of the equipment to Type D/KXX-XXXXD-XX and to confirm that the equipment covered by this certificate has been reviewed against the requirements of EN 60079-0: 2012 and EN 60079-18: 2009. Report No. 10(C)0568. Project File No. 10/0568. |

Certificate Number  
Baseefa02ATEX0199X  
Issue 4



Issued 11 February 2025  
Page 4 of 4

| Certificate No.                                                    | Date             | Comments                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Baseefa02ATEX0199X/3                                               | 16 May 2014      | To permit the option of an alternative terminal enclosure with two cable entries and to additionally note minor modifications and rewording of the Specific Conditions of Use.                                                                                                                                                                                                                                         |
| Baseefa02ATEX0199X<br>Issue 4                                      | 11 February 2025 | This issue of the certificate incorporates previously issued primary & supplementary certificates into one certificate and confirms the current design meets the requirements of EN IEC 60079-0:2018, EN IEC 60079-7:2015+A1:2018 & EN 60079-18:2015+A1:2017. The equipment is already marked in accordance with the requirements of these Standards. Test Report No. GB/SGS/ExTR23.0133/00. Project File No. 23/0263. |
| For drawings applicable to each issue, see original of that issue. |                  |                                                                                                                                                                                                                                                                                                                                                                                                                        |



# IECEx Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit [www.iecex.com](http://www.iecex.com)

|                       |                                                                                                                   |             |                                                  |
|-----------------------|-------------------------------------------------------------------------------------------------------------------|-------------|--------------------------------------------------|
| Certificate No.:      | IECEx BAS 13.0093X                                                                                                | Issue No: 0 | Certificate history:<br>Issue No. 0 (2014-05-16) |
| Status:               | Current                                                                                                           | Page 1 of 3 |                                                  |
| Date of Issue:        | 2014-05-16                                                                                                        |             |                                                  |
| Applicant:            | G.W. Lisk Company Incorporated<br>2 South Street<br>Clifton Springs<br>New York 14432<br>United States of America |             |                                                  |
| Electrical Apparatus: | Type D/KXX-XXXXD-XX solenoids                                                                                     |             |                                                  |
| Optional accessory:   |                                                                                                                   |             |                                                  |
| Type of Protection:   | Increased safety and Encapsulation                                                                                |             |                                                  |
| Marking:              | Ex e mb IIC T* Gb Ta -40°C to + **°C                                                                              |             |                                                  |

Approved for issue on behalf of the IECEx  
Certification Body:

R S Sinclair

Position:

General Manager

Signature:  
(for printed version)

Date:

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Certificate issued by:

SGS Baseefa Limited  
Rockhead Business Park  
Staden Lane  
Buxton  
Derbyshire  
SK17 9RZ  
United Kingdom





# IECEx Certificate of Conformity

Certificate No: IECEx BAS 13.0093X Issue No: 0

Date of Issue: 2014-05-16 Page 2 of 3

Manufacturer: G.W. Lisk Company Incorporated  
2 South Street  
Clifton Springs  
New York 14432  
United States of America

## Additional Manufacturing

location(s):

Lisk Ireland Manufacturing Limited  
Ennis Road  
Gort  
County Galway  
Ireland

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

## STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

|                                    |                                                                              |
|------------------------------------|------------------------------------------------------------------------------|
| IEC 60079-0 : 2011<br>Edition:6.0  | Explosive atmospheres - Part 0: General requirements                         |
| IEC 60079-18 : 2009<br>Edition:3   | Explosive atmospheres Part 18: Equipment protection by encapsulation "m"     |
| IEC 60079-7 : 2006-07<br>Edition:4 | Explosive atmospheres - Part 7: Equipment protection by increased safety "e" |

*This Certificate does not indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.*

## TEST & ASSESSMENT REPORTS:

*A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in*

### Test Report:

GB/BAS/ExTR13.0206/00

### Quality Assessment Report:

GB/BAS/QAR11.0009/02 GB/BAS/QAR14.0006/00



# IECEx Certificate of Conformity

Certificate No: IECEx BAS 13.0093X

Issue No: 0

Date of Issue: 2014-05-16

Page 3 of 3

## Schedule

### EQUIPMENT:

*Equipment and systems covered by this certificate are as follows:*

The Type D/KXX-XXXX-XX solenoids comprise an encapsulated solenoid coil and an increased safety terminal enclosure. The solenoid is fitted to a core tube which contains the solenoid armature. The core tube is provided with a mounting thread to customer specification. The solenoid is retained on the core tube by a spacer and nut. A bridge rectifier or four diodes and a thermal cut-out may optionally be provided within the encapsulation.

The stainless steel terminal enclosure contains a type MK 6/2 2 way terminal block to IECEx 05.0037U, and an internal earth facility. The enclosure has a cover with a gasket and up to two M20 cable entries.

The solenoids are available in three sizes. The coils are rated 6-250Vdc, 24-250Vac, and have a maximum stabilised wattage for the temperature classification and ambient temperature range for each size of solenoid as indicated below.

| Solenoid size | Ambient temperature range | Maximum Power (W) |      |      |
|---------------|---------------------------|-------------------|------|------|
|               |                           | T4                | T5   | T6   |
| 2             | -40°C to + 40°C           | 21.5              | 15.4 | 10.8 |
|               | -40°C to + 50°C           | 18.9              | 12.3 | 7.9  |
|               | -40°C to + 60°C           | 16.4              | 9.3  | 5.1  |
| 3             | -40°C to + 40°C           | 22.2              | 16.4 | 11.4 |
|               | -40°C to + 50°C           | 19.5              | 13.0 | 8.4  |
|               | -40°C to + 60°C           | 16.8              | 9.9  | 5.5  |
| 4             | -40°C to + 40°C           | 34.1              | 21.3 | 15.1 |
|               | -40°C to + 50°C           | 29.8              | 17.1 | 11.1 |
|               | -40°C to + 60°C           | 25.6              | 13.1 | 7.3  |

CONDITIONS OF CERTIFICATION: YES as shown below:

1 The solenoid must only be used on valve sizes with heat dissipation specified by the manufacturer of the solenoid in the instructions. The solenoid must be completely assembled with the valve before the solenoid is energised.

2 The solenoid and the valve on which it is mounted must not be thermally lagged.

3 The fluid flowing through the valve must not exceed the specified ambient temperature.

4 The solenoid shall be protected by a fuse rated for a prospective short circuit current of at least 1500A.



# IECEx Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit [www.iecex.com](http://www.iecex.com)

|                     |                                                                                                                          |             |                             |
|---------------------|--------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------------|
| Certificate No.:    | <b>IECEx BAS 13.0093X</b>                                                                                                | Page 1 of 4 | <u>Certificate history:</u> |
| Status:             | <b>Current</b>                                                                                                           | Issue No: 1 | Issue 0 (2014-05-16)        |
| Date of Issue:      | 2025-02-11                                                                                                               |             |                             |
| Applicant:          | <b>G.W. Lisk Company Incorporated</b><br>2 South Street<br>Clifton Springs<br>New York 14432<br>United States of America |             |                             |
| Equipment:          | <b>Type D/KXX-XXXXD-XX solenoids</b>                                                                                     |             |                             |
| Optional accessory: |                                                                                                                          |             |                             |
| Type of Protection: | <b>Increased safety and Encapsulation</b>                                                                                |             |                             |
| Marking:            | <b>Ex eb mb IIC T4...T6 Gb (-40°C &lt; Ta ≤+40°C/+50°C/+60°C) - See Schedule</b>                                         |             |                             |

Approved for issue on behalf of the IECEx  
Certification Body:

**D Brearley**

Position:

**Lead Certification Engineer**

Signature:  
(for printed version)

Date:  
(for printed version)

11/2/2025

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**SGS UK Limited**  
Rockhead Business Park  
Staden Lane  
Buxton, Derbyshire SK17 9RZ  
United Kingdom





# IECEx Certificate of Conformity

Certificate No.: **IECEx BAS 13.0093X**

Page 2 of 4

Date of issue: 2025-02-11

Issue No: 1

Manufacturer: **G.W. Lisk Company Incorporated**  
2 South Street  
Clifton Springs  
New York 14432  
**United States of America**

|                          |                                                                                                                                 |                                                                                                    |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Manufacturing locations: | <b>G.W. Lisk Company Incorporated</b><br>2 South Street<br>Clifton Springs<br>New York 14432<br><b>United States of America</b> | <b>Lisk Ireland Manufacturing Limited</b><br>Ennis Road<br>Gort<br>County Galway<br><b>Ireland</b> |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

## STANDARDS :

The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

**IEC 60079-0:2017** Explosive atmospheres - Part 0: Equipment - General requirements  
Edition:7.0

**IEC 60079-18:2017** Explosive atmospheres - Part 18: Protection by encapsulation "m"  
Edition:4.1

**IEC 60079-7:2017** Explosive atmospheres - Part 7: Equipment protection by increased safety "e"  
Edition:5.1

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

## TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

### Test Reports:

GB/BAS/ExTR13.0206/00

GB/SGS/ExTR23.0133/00

### Quality Assessment Reports:

GB/BAS/QAR11.0009/08

GB/BAS/QAR14.0006/06



# IECEx Certificate of Conformity

Certificate No.: **IECEx BAS 13.0093X**

Page 3 of 4

Date of issue: 2025-02-11

Issue No: 1

## EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

The Type D/KXX-XXXX-XX solenoids comprise an encapsulated solenoid coil and an increased safety terminal enclosure. The solenoid is fitted to a core tube which contains the solenoid armature. The core tube is provided with a mounting thread to customer specification. The solenoid is retained on the core tube by a spacer and nut. A bridge rectifier or four diodes and a thermal cut-out may optionally be provided within the encapsulation.

The stainless steel terminal enclosure contains a type MK 6/2E 2 way terminal block to IECEx TUR 18.0019U, and an internal earth facility. The enclosure has a cover with a gasket and up to two M20 cable entries.

The solenoids are available in three sizes. The coils are rated 6-250Vdc, 24-250Vac, and have a maximum stabilised wattage for the temperature classification and ambient temperature range for each size of solenoid as indicated below.

| Solenoid size | Ambient range  | Maximum power (W) |      |      |
|---------------|----------------|-------------------|------|------|
|               |                | T4                | T5   | T6   |
| 2             | -40°C to +40°C | 21.5              | 15.4 | 10.8 |
|               | -40°C to +50°C | 18.9              | 12.3 | 7.9  |
|               | -40°C to +60°C | 16.4              | 9.3  | 5.1  |
| 3             | -40°C to +40°C | 22.2              | 16.4 | 11.4 |
|               | -40°C to +50°C | 19.5              | 13.0 | 8.4  |
|               | -40°C to +60°C | 16.8              | 9.9  | 5.5  |
| 4             | -40°C to +40°C | 34.1              | 21.3 | 15.1 |
|               | -40°C to +50°C | 29.8              | 17.1 | 11.1 |
|               | -40°C to +60°C | 25.6              | 13.1 | 7.3  |

A cable entry hole is provided as specified on the certified drawings for the accommodation of a cable entry device, with or without the interposition of a thread adapter.

The cable entry device and thread adapter shall be suitable for the equipment, the cable and the conditions of use and shall be certified as Equipment (not a Component) under an IECEx Certificate of Conformity. The cable entry device shall maintain the ingress protection (IP54) of the enclosure

## SPECIFIC CONDITIONS OF USE: YES as shown below:

- 1 The solenoid must only be used on valve sizes with heat dissipation specified by the manufacturer of the solenoid in the instructions. The solenoid must be completely assembled with the valve before the solenoid is energised.
- 2 The solenoid and the valve on which it is mounted must not be thermally lagged.
- 3 The fluid flowing through the valve must not exceed the specified ambient temperature.
- 4 The solenoid shall be protected by a fuse rated for a prospective short circuit current of at least 1500A.



## IECEx Certificate of Conformity

Certificate No.: **IECEx BAS 13.0093X**

Page 4 of 4

Date of issue: 2025-02-11

Issue No: 1

### DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)

#### Variation 1.1

To permit minor changes to the equipment description and confirms the current design meets the requirements of IEC 60079-0:2017 Edition 7, IEC 60079-7:2015 Edition 5.1 & IEC 60079-18:2017 Edition 4.1. The equipment is already marked in accordance with the requirements of these Standards.

ExTR: **GB/SGS/ExTR23.0133/00**

File Reference: **23/0263**



Issued: 16<sup>th</sup> May 2014  
Page 1 of 1

**Schedule to ATEX Quality Assurance Notification / IECEx Quality Assessment Report**

**Number:** 3558

**Issued to:** Lisk Ireland Ltd

| Products for which the company manufactures the product, but for which the following company controls the design: |                                                      |                                        |
|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------|
| G.W. Lisk Company Inc - 0435                                                                                      |                                                      |                                        |
| Product Type Designation                                                                                          | Type Examination Certificate Number (Including ATEX) | IECEx Certificate of Conformity Number |
| Product category - Ex me                                                                                          |                                                      |                                        |
| The Type D/K XX-XD-XD Solenoids                                                                                   | Baseefa02ATEX0199X                                   | IECEx BAS 13.0093X                     |

**A4. Declaration of conformity - Solenoid****LISSK IRELAND LIMITED**

Ennis Road, Gort, Co. Galway, Ireland. Telephone: (353) 91-631711, 631101 Fax: (353) 91-633011

**MANUFACTURERS STATEMENT****In Relation to:****INGRESS PROTECTION (IP) RATING OF**
**SOLENOIDS RATED FOR USE IN HAZARDOUS LOCATIONS**

SOLENOIDS OF THE FOLLOWING DESIGNATION ARE CERTIFIED TO

HAVE AN

INGRESS PROTECTION RATING OF

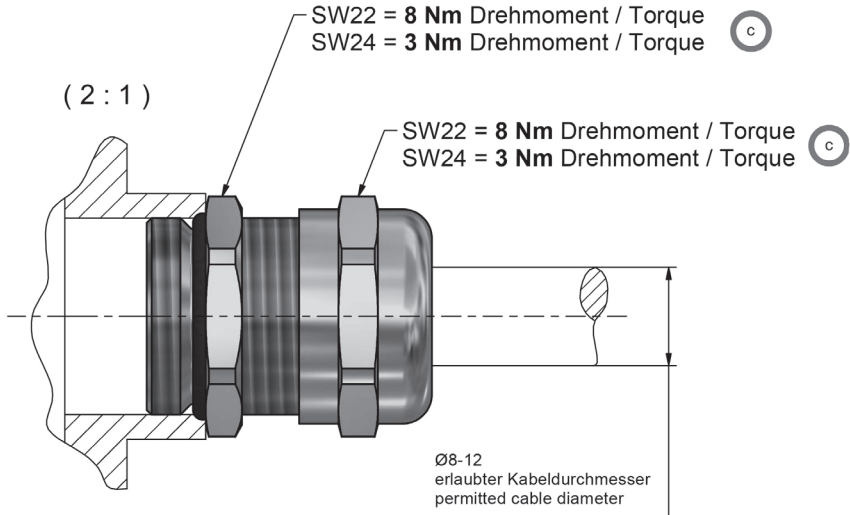
**IP66 in accordance with BS5490**

D10-\*\*\*\*D-\*, D12-\*\*\*\*D-\*, D14-\*\*\*\*D-\*, D15-\*\*\*\*D-\*,  
 D16-\*\*\*\*D-\*, D19-\*\*\*\*D-\*,  
 &  
 K10-\*\*\*\*D-\*, K12-\*\*\*\*D-\*, K14-\*\*\*\*D-\*, K15-\*\*\*\*D-\*,  
 K16-\*\*\*\*D-\*, K19-\*\*\*\*D-\*,

Engineering Manager.

March 2010.

## A5. Mounting instruction cable gland



Der Nutzer muss beim elektrischen Anschließen des Ventils sicherstellen, dass die oben aufgeführten Drehmomente eingehalten werden.

Auslieferungszustand der Kabeldurchführung:

entweder am Ventil handfest eingeschraubt oder in Tüte beigelegt.

Bei der Demontage der Hutmutter muss der eingeschraubte Zwischenstutzen, mit einem passendem Werkzeug, festgehalten werden.

When connecting the valve electrically, the user must ensure that the torques listed above are observed.

Delivery condition of the cable entry:

either screwed hand-tight on the valve or enclosed in a bag.

When dismantling the dome nut, the screwed-in gland body must be held in place with a suitable tool.

|                                                                                     |  |                                                                                                                                                                       |          |                          |                                                |                    |                                                                      |                                                                                                                                                                                         |                           |            |  |                           |  |           |  |                   |  |
|-------------------------------------------------------------------------------------|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------------|------------------------------------------------|--------------------|----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------|--|---------------------------|--|-----------|--|-------------------|--|
| Supersedes drawing                                                                  |  |                                                                                                                                                                       | Material |                          |                                                | Raw part           |                                                                      |                                                                                                                                                                                         | Change-Nr. 01-JUL-2021_BJ |            |  |                           |  |           |  |                   |  |
| ISO/R 128 A                                                                         |  | Property of PARKER HANNIFIN<br>Not to be used; disclosed; or copied without its written consent.<br>To be returned with all copies upon completion of authorized use. |          |                          |                                                |                    | Prod. Stat.: PR= Series Release<br>EX = Prototype; No Series Release |                                                                                                                                                                                         |                           |            |  |                           |  |           |  |                   |  |
|  |  |  = Function critical dimension                                                     |          | Originator<br>Broeckmann |                                                | Date<br>24.08.2010 |                                                                      |  Parker Hannifin<br>Industrial Systems Division Europe<br>Gutenbergstr. 38<br>41564 Kaarst (Germany) |                           |            |  |                           |  |           |  |                   |  |
| Geometrical tolerancing acc. to DIN ISO 1101                                        |  |                                                                                                                                                                       |          |                          | 1st. Approver<br>Tschetschko                   |                    | Date<br>24.08.2010                                                   |                                                                                                                                                                                         |                           |            |  |                           |  |           |  |                   |  |
| Surface finish acc. to DIN ISO 1302                                                 |  |                                                                                                                                                                       |          |                          | Scale<br>2:1                                   |                    | Units<br>mm                                                          |                                                                                                                                                                                         |                           |            |  |                           |  |           |  |                   |  |
| General tolerance acc. to DIN ISO 2768-m K                                          |  |                                                                                                                                                                       |          |                          | Title<br>ATEX Kabelverschraubung / Cable gland |                    |                                                                      |                                                                                                                                                                                         |                           |            |  |                           |  |           |  |                   |  |
| Nominal size range (mm)                                                             |  | 0,5 to 6                                                                                                                                                              | >6 to 30 | >30 to 120               | >120 to 400                                    | >400 to 1000       | >1000 to 2000                                                        |                                                                                                                                                                                         |                           |            |  |                           |  |           |  |                   |  |
| Tolerance                                                                           |  | ±0,1                                                                                                                                                                  | ±0,2     | ±0,3                     | ±0,5                                           | ±0,8               | ±1,2                                                                 | Sheet<br>1 / 2                                                                                                                                                                          |                           | Size<br>A4 |  | Drawing number<br>5005113 |  | Rev.<br>C |  | Prod. Stat.<br>PR |  |

