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- Производство воздуховодов и систем вентиляции
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Соленоидные клапаны Parker Lucifer типа NAMUR 19

УралТрейдИнжиниринг

Официальный представитель в России ООО "УРАЛТРЕЙДИНЖИНИРИНГ"
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Parker Lucifer - the experts in fluid control

Welcome to the Parker Lucifer catalogue. It's your entry point to an entire programme of solenoid valves based on the unique Lucifer modular concept. This gives you the widest choice of specifications and options to match your requirements exactly.

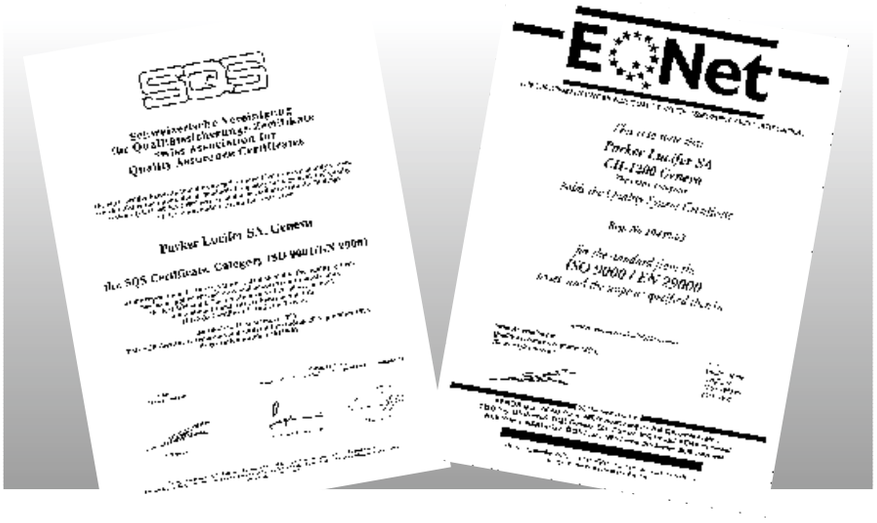
Making business as simple as possible

The catalogue is just one part of a very special kind of supplier-specifier relationship. In short, we want to make doing business as simple as possible. It begins with organising ***products by application*** for the quickest selection of a product for a specified application. It extends to ease of ordering, fast delivery, and additional customer services. All backed by highly qualified support engineers willing and able to discuss your needs and suggest solutions. Work with us, for example, to create customised products; we have a proud record of customer partnership projects resulting in innovative products - and satisfied customers.

The Parker Lucifer

The Parker Lucifer Series products have been designed to offer customers the ultimate in performance. Every valve is engineered for optimal operation, is constructed with modern machinery that use stringent processes, and provides standard features not necessarily offered in any competitive line.

The Parker Lucifer Series portfolio offers a broad range of solenoid valves. Sizes range from G1/8 to G3, with K_V as high as 1385 L/min. Pressure capabilities range up to 100 bar; the whole range is available with various seal materials, such as NBR, FKM, EPDM, PTFE, PCTFE, PUR and Ruby. Brass, stainless steel and plastic valves are available to control a wide variety of air, neutral gases and liquids, water, oils, process fluids and steam.



Availability

With over 750 product listings, the valve you need is probably available from our standard range. What's more, the same valves are ***available from our distributors anywhere in the world.*** So wherever you are you can order with complete confidence.

Thanks to the breadth of our product offering, the flexibility of the modular architecture, and the use of automated manufacturing processes, you can count on the ready availability of the valve you require.

Modular construction ensures that even unusual configurations can be assembled from stock components. It provides a high degree of "mix & match" flexibility with a minimum number of parts, giving Parker Lucifer the ability to quickly deliver a great variety of valves.

Quality assured

Certification by SQS (the Swiss Association for Quality Certification), Category ISO 9001/14001, is formal recognition of Parker Lucifer's commitment to total Quality. It is the outward sign of a company dedicated to customer satisfaction at every level of the organisation. It was first achieved back in 1987, long before Quality certification became an everyday business issue, and Parker Lucifer was one of the first to qualify in Switzerland.

All the approvals you need

A wide range of valves and electrical parts are approved by recognised organisations (BASEEFA in UK, PTB in Germany, LCIE in France, CESI in Italy etc.) and meet CENELEC, IEC, and ISO standards. Lucifer valves are also certified by organisations such as TÜV, VDE, SEV/ASE, UL, CSA, etc.

How to select your valve

This catalogue has been designed to make selection as easy as possible. The structure allows you to find your valve step by step, beginning with the most basic features and gradually focusing on more and more precise details.

First, decide what kind of valve you want: 2-way, 3-way, pneumatic or special. Then check the contents page and turn to the beginning of the relevant section.

For ease of use, each valve section is divided by application. At the front of the application sub-section you choose, you will find an overview table of the products featured (see sample below).

Using the table as a guide, decide what kind of actuation you want, then go across the columns, choosing the body material, function, connection, orifice size and maximum pressure: this process takes you to the specific page number with your product,

Further technical information to help with specification is given in the final section of the catalogue.

General application valves for dry or lubricated air, neutral gases and liquids 2/2

ACTUATION	BODY MATERIAL	FUNCTION	CONNECTION	ORIFICE (MM)	MAX. PRESSURE (BAR)	PAGE
Direct operated	Brass body	Normally closed	1/8	1.5 to 3	70.0	8
			1/4	1.2 to 5	100.0	8
			3/8	4 to 6	10.0	12
			1/2	8.5 to 11	4.0	12
			SB	1.5 to 3	100.0	14

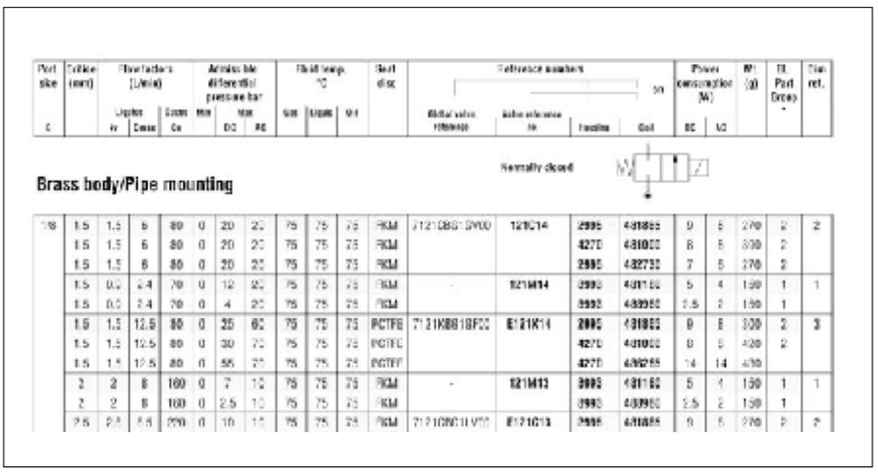
How to order a valve

Normally a complete valve is composed of 3 elements: the valve itself (body + pilot), the coil and the housing. For integrated coil/housings, the housing reference indicates the fixing nut and nameplate.

Two valve body references are indicated in the tables:

- the Lucifer reference
- the global reference

Either reference can be used when ordering. The Global valve reference permits a common numbering system between Lucifer and Skinner products. A complete cross-reference list of valve reference numbers can be found at the end of this catalogue. In both cases, it is necessary to order the coil and housing reference as well.


Brass body/Pipe mounting

Therefore please specify:

I. Valve reference **or** Global valve reference
II. Housing
III. Coil
IV. Voltage or voltage code (see tables in the Electrical parts section).

Ordering example:

121K0756-2995-481865-220/50
or
7121KBG2LVMO-2995-481865-220/50

Important : valve, housing or coil can be ordered separately for use as a replacement or spare part.

Electropneumatic pressure regulator EPP3 Series

The product
A range of electropneumatic pressure regulators (G 1/8, G 1/4 and G 1/2) which, by means of an integrated electronic control system and pulse width modulated solenoid valve, controls the output pressure proportional to an analogue or digital electrical signal. A high precision is achieved by means of internal feedback through an integrated pressure sensor.

Applications
Pressure control independent of flow in electropneumatic control systems, in particular for the following industries:
-Robotics: welding, painting lines etc.
-Paper and printing: tension regulations, speed and brake control for rolls
-Machine Tools: Plastic moulding, laser welding, presses, polishing etc.
-Trucks and Trains: control of adaptive suspensions.

Benefits
-More flexibility of the controls
-Very fast response times
-Excellent linearity and hysteresis
-No air consumption in rest position
-Increase of productivity (performance, Quality, reliability)
-Direct interface to programmable controllers.

Electropneumatic pressure regulator

EPP3 Series

TECHNICAL DATA

Fluid
Lubricated or non lubricated air and neutral gases recommended filtration : 25-50 µ

Temperature range:
Ambient 0 to 50°C.
Fluid 0 to 50°C.

Inlet pressure range:
1 to 12 bar (the inlet pressure must always be at least 1 bar above the regulated pressure value).

Outlet pressure range:
0.2 to 10 bar

Hysteresis:
~100 mbar. (Factory set up)

Linearity:
1% f.s.o.

Air consumption at constant control signal:
0.

Supply voltage:
24 V DC ± 15% (Max. ripple 1 V)

Power consumption:
Max. 6 W with 24 V DC and constant changes of the control signal ; < 1W without change of control signal

Control signal:
Analog 0 - 10 V Impedance: 10 k Ω
Analog 4 - 20 mA Impedance: 0.5 k Ω

Outlet sensor signal:
A) proportional pressure outlet signal 0-10 V from integrated sensor (recomended load resistance 10 k Ω)
B) proportional pressure outlet signal 4-20 mA from integrated sensor (recommended load resistance 0.5 k Ω)
C) 'Alarm' output signal 0/24 V with adjustable triggering level. (Difference between control signal and sensor pressure signal) (Imax. = 40 mA)
- factory set up: diff. signal = ± 0.8 V to + 1 V
- possible set up: diff. signal = ± 0.1 V to ± 5 V
To neutralize the alarm output signal during the control signal changes, the use of a synchronized time lag relay is required.

Indicative response time:
With a volume of 330 cm^3 at the outlet of the regulator.

Filling :	2 to 4 bar	-	2 to 8 bar
Step response:	~60 ms	-	~120 ms
Emptying:	4 to 2 bar	-	8 to 2 bar
Step response:	~70 ms	-	~130 ms

Safety position:
In case of control failure or if it is less than 1% of its full scale value, the regulated pressure drops automatically to 0 bar (atmospheric pressure). In case of voltage suply failure, the regulated pressure will be kept constant (with eventual discrepancy due to loss of pressure in the servo-chamber).

Electrical connection:
4 screw terminals under the protection cover with Pg 13.5 cable gland or through DIN 43651 connector (6 P + E).

Life expectancy:
> 50 Mio changes of control signal steps.
Attention: It is compulsory to set the control signal at 0 V or 4 mA each time the air pressure supply is turned off (during the night or the weekend). When the air pressure supply cannot be fully exhausted, it is necessary to assure that the deviation between the control value and the inlet pressure remains smaller than 1 bar.

Mounting position:
Indifferent (recommended position: upright; electronic part on top).

Resistance to vibrations:
30 g in all directions

Degree of protection:
IP 65.

External sensors:
All pressure sensors with following characteristics are compatible with the EP-transducer
Sensitivity: 0.5 V/bar up to 10 V/bar
Zero offset: -3 V/bar to 10 V/bar

Assembly:
Silicone free

Electromagnetic compatibility:
in accordance with IEC 801-4 part 4 standards.

Installation and setting instructions:
see publication MI-9202 and appendix supplied with the product.

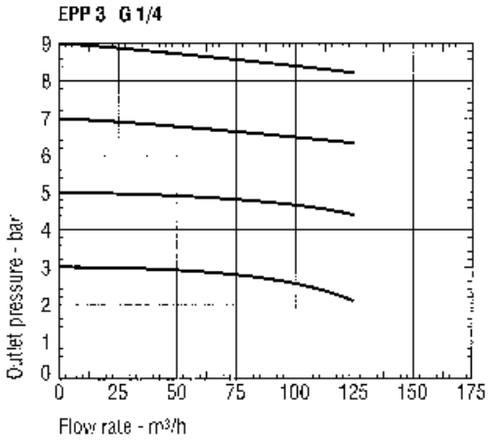
Please ask for the special technical specification sheet No. 8677 for more details.

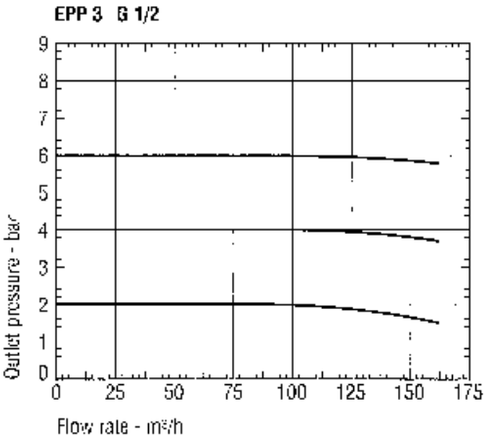
SUMMARY OF TYPES

				Entry options for external sensor signal		Outlet signal options			Electrical connection	
		Connection G	With integrated pressure sensor	Feedback signal 0-10 V	Feedback signal 4-20 mA	without	0 - 10 V 4 - 20 mA	0 - 10 V 0/24 alarm	DIN 43651 connector	Cable gland Pg. 13.5
EPP3JC	21 U/I 100 10	1/4	•			•				•
	21 U/I 600 10	1/4	•				•		•	
	21 U/I 700 10	1/4	•					•		
EPP3JC	23 U/I 130 10	1/4	•	•		•			•	
	24 U/I 130 10	1/4	•		•	•			•	
EPP3JC	41 U/I 100 10	1/2	•			•				•
	41 U/I 600 10	1/2	•				•		•	
	41 U/I 700 10	1/2	•					•		
EPP3JC	43 U/I 130 10	1/2	•	•		•			•	
	44 U/I 130 10	1/2	•		•	•			•	

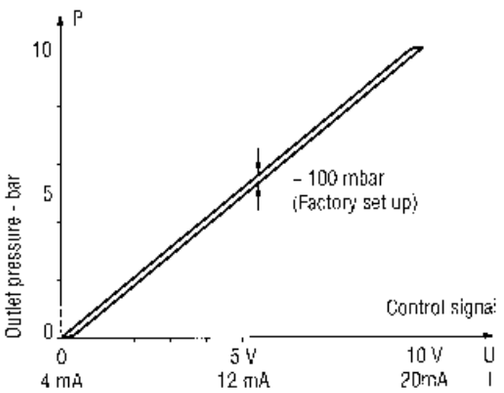
FLOW DATA

Outlet Pressure in Function of Flow at Constant Control Signal (P1 = 10 bar)

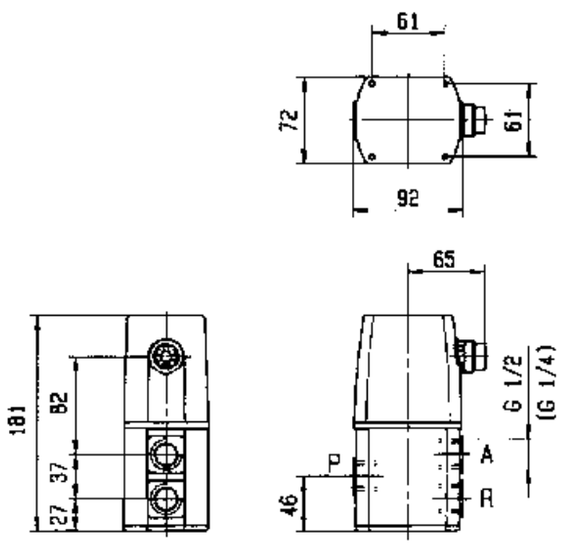




HYSTERESIS DIAGRAM



EPP3JC...130/600/700... with
DIN circular plug-in connection
6 P + E (connector included)



EP-Transducer

EPP3 Series

TECHNICAL DATA

Fluid:
Lubricated or non lubricated air and neutral gases recommended filtration : 25-50 µ

Temperature range:
Ambient 0 to 50°C
Fluid 0 to 50°C

Inlet pressure range:
G 1/8 - 1 to 10 bar
G 1/4 - 1 to 7 bar

Outlet pressure range:
G 1/8 - 0.2 to 10 bar
G 1/4 - 0.2 to 7 bar

Hysteresis:
~ 50 mbar (Factory set up)

Linearity:
1% f.s.o.

Air consumption at constant control signal:
0

Supply voltage:
24 V DC ± 15% (Max. ripple 1 V)

Power consumption:
G 1/8 - max. 6 W } with 24 V DC and constant
G 1/4 - max. 7 W } changes of the control signal
<1 W without change of control signal

Control signal:
Analog 0 - 10 V Impedance: 10 k Ω
Analog 4 - 20 mA Impedance: 0.5 k Ω

Outlet sensor signal:
For types with output signal module.
Proportional pressure output signal supplied by the pressure sensor.
A) 0-10 V, voltage signal (recomended load resistance 10 k Ω)
B) 4-20 mA, current signal (recommended load resistance 0.5 k Ω)
Voltage and current signal can be received simultaneously. Both are protected against short-circuits
C) "Alarm" output signal 0/24 V (Imax. = 40 mA) with adjustable triggering level. (Difference between control signal and sensor pressure signal)
- factory set up: diff. signal = ± 0.8 V to ⊥ 1 V
- possible set up: diff. signal= ⊥ 0.1 V to ⊥ 5 V
To neutralize the alarm output signal during the control signal changes, the use of a synchronized time lag relay is required.

Indicative response time:
With a volume of 30 cm^3 at the outlet of the EP-transducer

Filling :		2 to 4 bar	-
Emptying :		-	4 to 2 bar
Step response:	G 1/8	~ 100 ms	~120 ms
	G 1/4	~ 70 ms	~100 ms

Conductance C (dm^3/s.bar):
G 1/8 - 0.1
G 1/4 - 0.2

Outlet pressure/Flow rate:
G 1/8 - pressure drop 0.5 bar at 1.0 Nm^3/h (P_1 = 7 bar, P_{out} = 6 bar)
G 1/4 - pressure drop 0.5 bar at 2.1 Nm^3/h (P_1 = 7 bar. P_{out} = 6 bar)

Safety position:
In case of control failure or if it is less than 1% of its full scale value, the regulated pressure drops automatically to 0 bar (atmospheric pressure). In case of voltage supply failure, the regulated pressure will be kept constant

Electrical connection:
4 screw terminals under the protection cover with Pg 13.5 cable gland or through DIN 43651 connector (6 P + E)

Life expectancy:
> 50 Mio changes of control signal steps
Attention: It is compulsory to set the control signal at 0 V or 4 mA each time the air pressure supply is turned off (during the night or the weekend). When the air pressure supply cannot be fully exhausted, it is necessary to assure that the deviation between the control value and the inlet pressure remains smaller than 1 bar.

Mounting position:
Indifferent (recommended position: upright; electronic part on top).

Resistance to vibrations:
30 g in all directions

External sensors:
All pressure sensors with following characteristics are compatible with the EP-transducer
Sensitivity: 0.5 V/bar up to 10 V/bar
Zero offset: -3 V/bar to 10 V/bar

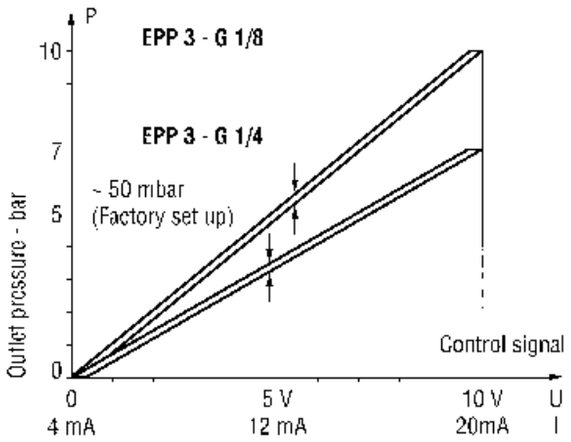
Degree of protection:
IP 65

Electromagnetic compatibility:
In accordance with IEC 801-4 part 4 standards

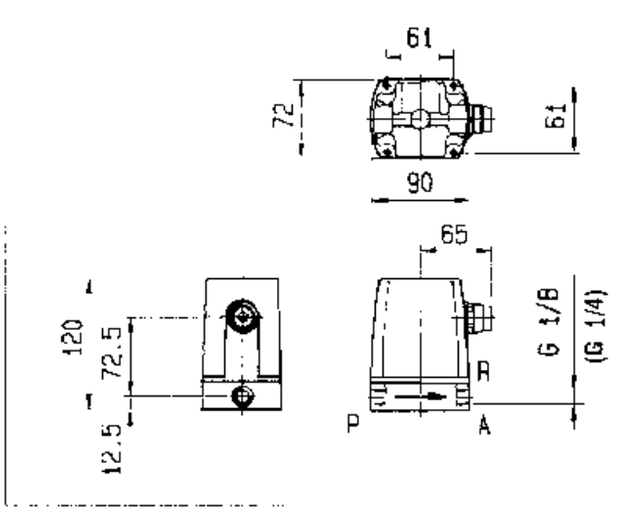
Installation and setting instructions:
See publication MI-9202 and appendix supplied with the product.

Please ask for the special technical specification sheet No. 8678 for more details.

HYSTERESIS DIAGRAM



EPP3PC ... 130/600/700



SUMMARY OF TYPES

	Connection G	With integrated pressure sensor	Entry options for external sensor signal: Feedback signal 0-10 V	Entry options for external sensor signal: Feedback signal 4-20 mA	Outlet signal options: Without	Outlet signal options: 0 - 10 V 4 - 20 mA	Outlet signal options: 0 - 10 V 0/24 alarm	Electrical connection: DIN 43651 connector	Electrical connection: Cable gland Pg. 13.5
EPP3PC 11 U/I 100 10	1/8	•			•				•
11 U/I 600 10	1/8	•				•		•	
11 U/I 700 10	1/8	•					•	•	
EPP3PC 13 U/I 130 10	1/8		•		•			•	
14 U/I 130 10	1/8			•	•			•	
EPP3PC 21 U/I 100 07	1/4	•			•				•
21 U/I 600 07	1/4	•				•		•	
21 U/I 700 07	1/4	•					•	•	
EPP3PC 23 U/I 130 07	1/4		•		•			•	
24 U/I 130 07	1/4			•	•			•	

Electropneumatic Pressure Regulator - High Flow

EPP3 Series

TECHNICAL DATA

Fluid:
Lubricated or non lubricated air and neutral gases recommended filtration : 25-50 µ

Temperature range:
Ambient 0 to 50°C
Fluid 0 to 50°C

Inlet pressure range:
1 to 12 bar (the inlet pressure must always be at least 1 bar above the regulated pressure)

Outlet pressure range:
0.2 to 10 bar

Hysteresis:
~ 100 mbar (Factory set up)

Linearity:
1% f.s.o.

Air consumption at constant control signal:
0

Supply voltage:
24 V DC ± 15% (Max. ripple 1 V)

Power consumption:
Max. 6 W with 24 V DC and constant changes of the control signal
<1 W without change of control signal

Control signal:
Analog 0 - 10 V Impedance: 10 k Ω
Analog 4 - 20 mA Impedance: 0.5 k Ω

Outlet sensor signal:
A) proportional pressure outlet signal 0-10 V from integrated sensor (recomended load resistance 10 k Ω)
B) proportional pressure outlet signal 4-20 mA from integrated sensor (recommended load resistance 0.5 k Ω)
C) "Alarm" output signal 0/24 V with adjustable triggering level. (Difference between control signal and sensor pressure signal) (Imax. = 40 mA)
- factory set up: diff. signal = = 0.8 V to ± 1 V
- possible set up: diff. signal = ± 0.1 V to ± 5 V
To neutralize the alarm output signal during the control signal changes, the use of a synchronized time lag relay is required

Safety position:
In case of control failure or if it is less than 1% of its full scale value, the regulated pressure drops automatically to 0 bar (atmospheric pressure). In case of voltage supply failure, the regulated pressure will be kept constant

Electrical connection:
Through DIN 43651 circular plug-in connector (6 P + E)

Life expectancy:
> 20 Mio changes of control signal steps
Attention: It is compulsory to set the control signal at 0 V or 4 mA each time the air pressure supply is turned off (during the night or the weekend). When the air pressure supply cannot be fully exhausted, it is necessary to assure that the deviation between the control value and the inlet pressure remains smaller than 1 bar.

Mounting position:
Indifferent (recommended position: upright; electronic part on top)

Resistance to vibrations:
30 g in all directions

Degree of protection:
IP 65

Assembly:
Silicone free

Electromagnetic compatibility:
In accordance with IEC 801-4 part 4 standards.

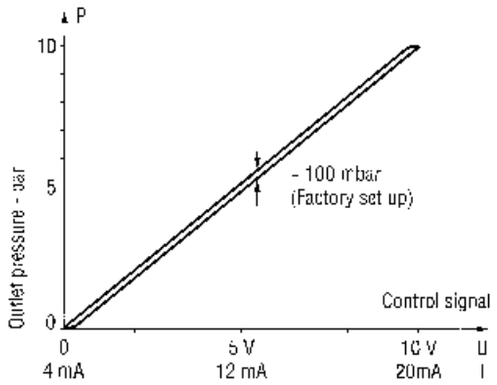
Installation and setting instructions:
See publication MI-9202 and appendix supplied with the product.

Please ask for the special technical specification sheet No. 8679 for more details.

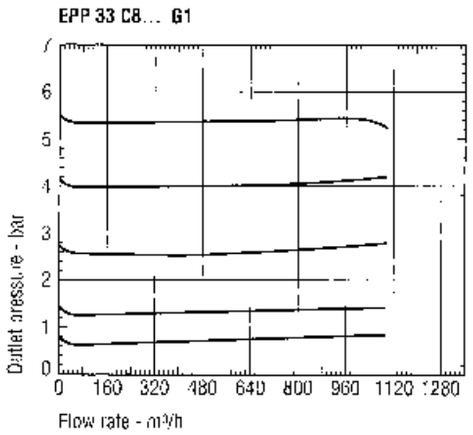
SUMMARY OF TYPES

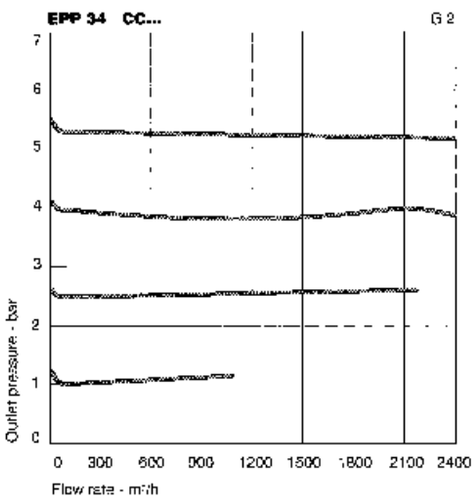
	Connection G	With integrated pressure sensor	Outlet signal options		Electrical connection
			0 - 10 V 4 - 20 mA	0 - 10 V 0/24 alarm	DIN 43651 connector
EPP3C8 1 U/I 600 10	1	•	•		•
1 U/I 700 10	1	•		•	•
EPP34CC 1 U/I 600 10	2	•	•		•
1 U/I 700 10	2	•		•	•

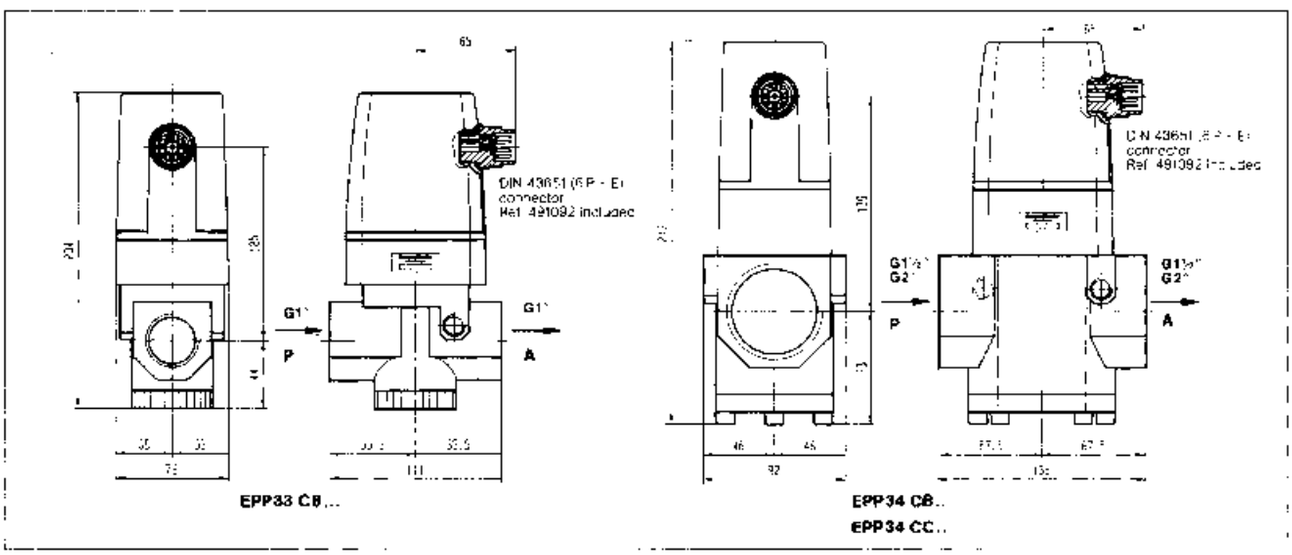
HYSTERESIS DIAGRAM



FLOW DATA
Outlet Pressure in Function of Flow at Constant Control Signal (P1 = 7 BAR)







Electrical Parts

Index

Pages

Part 1: Housings / Coil assembly kit

Part 2: Coils

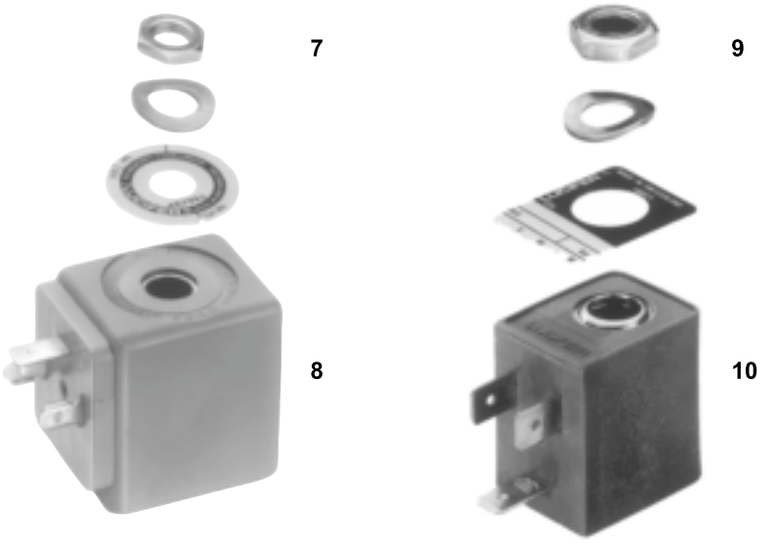
Part 3: Explosion-proof electrical parts

Part 4: Explosive environments

For complete information please refer to publication No. 8700/GB

8700/GB

Housings or coil assembly kits, coils and electrical parts



Definitions:

Housing:
We define a **housing** as the combination of the fixing elements including the nameplate **(1)**, the cover **(2)** or the subplate **(6)** and the envelope itself **(4 or 5)** which protects the coil and its electrical components. The housings may be made of metal or plastic material.

Coil assembly kit:
The coil assembly kit **(7 or 9)** is the set comprising a plate, washer and nut. Sometimes coil assembly kits consist only of a nut or a special fixing device.

Coil:
This consists of the winding and its plastic moulding. There are three different types of coils distinguished by their shape and dimensions: 40 mm **(3)**, 32 mm **(8)** and 22 mm **(10)**.

Electrical part:
The electrical part is the set comprising the housing, the assembly kit and the coil.

Warning:

Any Lucifer coil or electrical part may be energized **only when mounted on a valve**.
Otherwise there is a risk of damaging the product and its surroundings (overheating, explosion, fire, etc.).

The data supplied in the Parker Lucifer Catalogs are to be consulted, and pertinent accident prevention regulations are to be followed during product installation and use. Any unauthorized work performed on the product by the purchaser or by third parties can impair its function, and relieves us of all warranty claims and liability for any resulting damage.

Part 1: Housings or coil assembly kits

1.1 Coil housing with screw terminals

1.1.1 Standard housing

Reference: 4270 or **E0**

Material: epoxy-coated steel

Degree of protection: **IP** according to IEC/EN 60529
IP 10 with armoured conduit
IP 44 with cable gland

Electrical connection:

Can be made with armoured conduit or cable gland M12x1.5, Parts No. 495740 and 495741 to be ordered separately.

Grounding connection by screw M3 on the inside of housing base plate.

Weight: 120 g.

Benefits:

This metal housing offers the ideal protection against shocks and corrosion – rotatable 360° – easy mounting in confined spaces – single-nut mounting – light weight – simplifies conversion of existing equipment to other requirements.

Application:

The majority of the Lucifer valves can be fitted with this standard housing, and can be mounted with several compatible Lucifer coils.

Compatible coils:

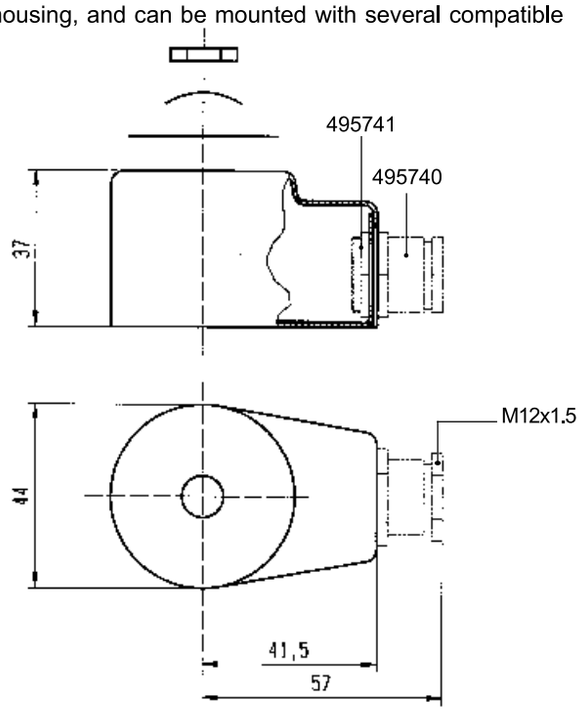
481000 or **EZ01**
Standard coil,
8 W, class F (155°C), page 12

483520 or **EZ90**
Double-frequency coil,
9 W, class F (155°C), page 12

481044 or **EZ91**
Standard high-power coil,
14 W, class F (155°C), page 12

485100 or **EZ02**
Standard high-temperature coil,
8 W, class H (180°C), page 12

486265 or **EZ92**
High-temperature and high-power coil,
14 W, class H (180°C), page 12



8700/GB

1.1.2 Housing for bistable (impulse) coils

Reference: 4269 or **E1**

Material: epoxy-coated steel

Degree of protection: **IP** according to IEC/EN 60529
IP 10 with armoured conduit
IP 44 with cable gland

Electrical connection:

Can be made with armoured conduit or cable gland M12x1.5, Parts No. 495740 and 495741 to be ordered separately.

Grounding connection by screw M3 on the inside of housing base plate.

Weight: 120 g.

Benefits:

This metal housing offers the ideal protection against shocks and corrosion – rotatable 360° – easy mounting in confined spaces – single-nut mounting – light weight – simplifies conversion of existing equipment to other requirements.

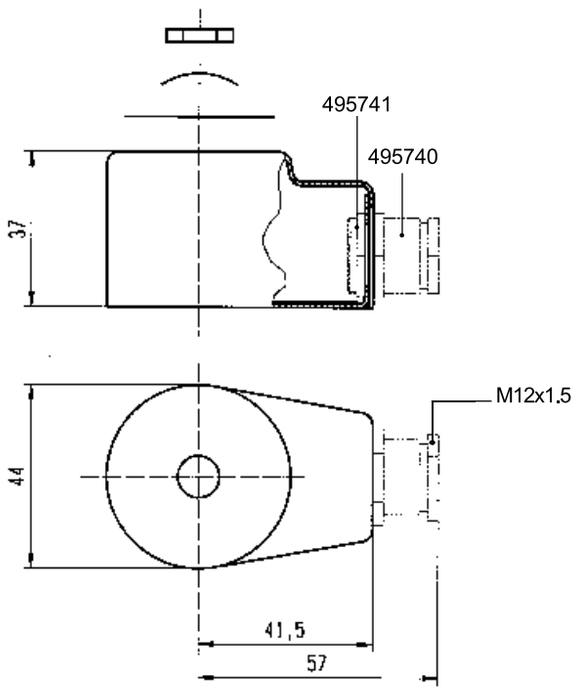
Application:

This housing is specially designed for group 4 coils and can be mounted only with valves controlled by electrical impulses.

Compatible coils: Gr. 4

484990 or **MZ01**
Impulse coil for AC,
11 W, class F (155°C), page 13

485400 or **MZ02**
Impulse coil for DC,
13 W, class F (155°C), page 13



1.2 Waterproof and dustproof housing

1.2.1 Waterproof housing

Reference: 4538 or **G1** **M20 x 1.5**

Material: Galvanized passivated steel

Degree of protection: **IP 67** according to IEC/EN 60529

Electrical connection:

Cable connection by cable gland according to DIN 46320. Cable with outer diameter 6.5 -13.5 mm (M20 x 1.5) can be simply sealed using a rubber gland with resilient sealing rings.

The enclosure is internally and externally fitted with grounding and earthing screw terminals.

Weight: 180 g.

Benefits:

This enclosure is dust- and waterproof. It corresponds to the degree of "International Protection" **IP 67** according to IEC / EN 60529. Corrosion resistant, the metal housing offers good protection for the coil against shocks and other outside influences – rotatable 360° – easy mounting in confined spaces – easy access to the screw terminals – single-nut mounting – light weight – simple conversion of existing electrical equipment to other requirements without interruption of fluid passage in the valve.

Application:

This housing can be equipped with several coils of our programme, like the standard, double-frequency and magnetic latch coils

Compatible coils:

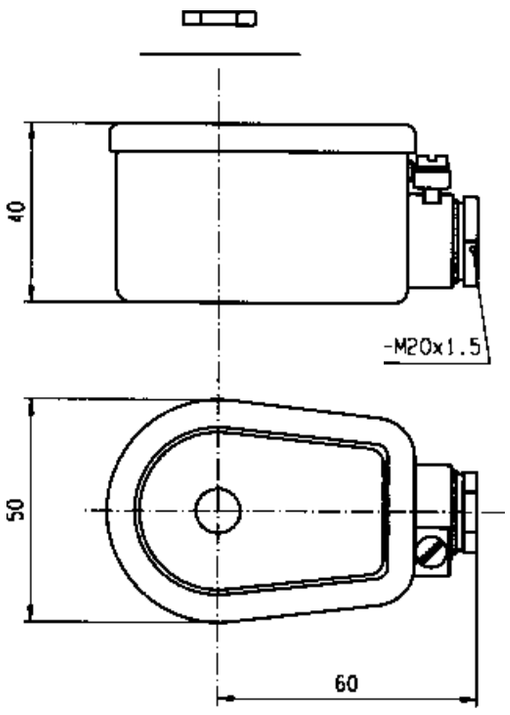
481000 or **EZ01**
Standard coil,
8 W, Class F (155°C), page 12

483520 or **EZ90**
Double-frequency coil,
9 W, class F (155°C), page 12

485100 or **EZ02**
Coil for high temperature,
8 W, class H (180°C), page 12

484990 or **MZ01**
Impulse coil for AC,
11 W, class F (155°C), page 13

485400 or **MZ02**
Impulse coil for DC,
13 W, class F (155°C), page 13



8700/GB

1.2.2 Waterproof housing for high-temperature coils

Reference: 8520 or **G5** **M20 x 1.5**

Degree of protection: **IP 67** according to IEC/EN 60529

Electrical connection:

Cable connection by cable gland according to DIN 46320. Cable with outer diameter 6.5 - 13.5 mm can be simply sealed using a rubber gland with resilient sealing rings.

The enclosure is internally and externally fitted with grounding and earthing screw terminals.

Weight: 180 g.

Benefits:

This enclosure is dust- and waterproof. It corresponds to the degree of "International Protection" **IP 67** according to IEC / EN 60529. Corrosion resistant, the metal housing offers good protection for the coil against shocks and other outside influences – rotatable 360° – easy mounting in confined spaces – easy access to the screw terminals – single-nut mounting – light weight – simple conversion of existing electrical equipment to other requirements without interruption of fluid passage in the valve.

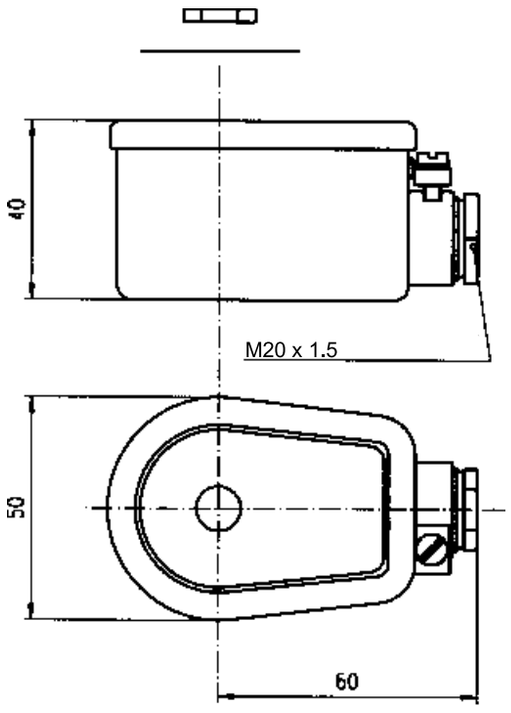
Application:

The majority of the Lucifer valves can be fitted with this housing and can be mounted with several compatible Lucifer coils for high temperature (14W, class F).

Compatible coils:

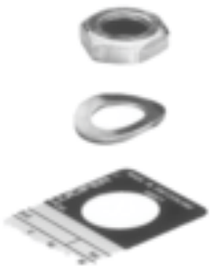
481044 or **EZ91**
High power coil,
14 W, Class F (155°C), page 12

486265 or **EZ92**
High power coil,
14 W, class H (180°C), page 12



1.3 Coil assembly kits

1.3.1 Coil assembly kit for 22 mm coil



The coil assembly kit corresponds to the numbering system for Lucifer valve housings (Valve-housing - coil - voltage).

It is composed of a nameplate with the details of the valve type, a washer and a nut to secure the 22 mm coil to the valve.

Reference	Code	Specification	Application
8993	**A4**	Standard - aluminium nameplate - passivated washer and nut - pressure indication in [bar]	Standard valves
8993.03	**A1**	Standard - aluminium nameplate - passivated washer and nut - pressure indication in [psi]	Standard valves
8122	**A2**	Special - aluminium nameplate - stainless steel washer and nut - pressure indication in [kPa]	316L St. Steel Valves

1.3.2 Coil assembly kit for 32 mm coil

The coil assembly kit corresponds to the ‘‘housing’’ of Lucifer valve numbering system (Valve - housing - coil - voltage).

It is composed of a nameplate giving details of the valve type, a round washer and a nut to ensure the fixing between 32 mm coil and the valve.

Reference	Code	Specification	Application
2995	**N1**	Standard - aluminium nameplate - passivated iron washer and nut - pressure indication in [bar]	Standards valves
2995.03	**N3**	Standard - aluminium nameplate - passivated iron washer and nut - pressure indication in [psi]	UL / CSA valves
8132	**NL**	Special - aluminium nameplate - stainless steel washer and nut - pressure indication in [kPa]	316L St. Steel valves

1.3.3 Coil assembly kit for CPR coils

It is composed of a plastic nut with a metal insert to secure the CPR coils to the valves, e.g. 133x.../432300C2.

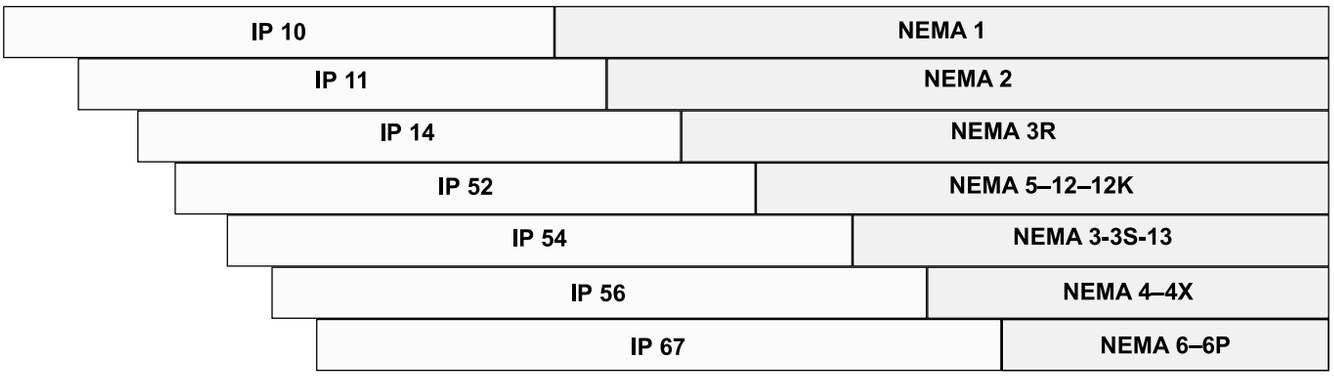
Reference	Code	Specification	Application
8886	**NT**	Plastic nut with metal insert	CPR valves

1.4 Degrees of protection "IP" – IEC/EN 60529

Full-enclosure protection is often required, either in the standards concerning ''potentially explosive environments'' or for other specific needs.

First figure indicates protection against dangerous access and foreign objects	Index	IP	Index	Second figure indicates protection against water penetration
Non-protected	0		0	Non protected
Protected against solid objects Ø 50 mm or more	1		1	Protected against vertically falling water drops
Protected against solid objects Ø 12.5 mm or more	2		2	Protected against vertically falling water drops when enclosure tilted 15°
Protected against solid objects Ø 2.5 mm or more	3		3	Protected against spraying water up to 60° from vertical
Protected against solid objects Ø 1 mm or more	4	5 4	4	Protected against splashing water from any direction
Dust-protected	5		5	Protected against jets of water from any direction
Dust-tight	6		6	Protected against powerful jets of water from any direction
			7	Protected against immersion
			8	Protected against continuous immersion

Correlation between IP (IEC) and NEMA* 250 standards



* NEMA: National Electrical Manufacturers Association (USA)

The enclosures to NEMA standards 7 to 10 concern equipment for hazardous areas.

Part 2: Coils

Groups:

Lucifer coils and electrical parts are classified by groups determining their compatibility with Lucifer solenoid valves.

In this catalogue you will find the global reference of these groups which is given in most Lucifer catalogues.

The global reference of these groups is composed of one number (principal reference from 1 to 12) defined as follows:

1 Application on valves of 2000 series with 22 mm pilot

2 Application on standard valves or on 7000 series with M20 x 1 pilot

3 Specific application

4 Application on standard valves or on 7000 series with magnetic latch pilot

5 Application on special valves for flameproof electrical parts

6 Application on standard valves or on 7000 series, for coils and low-power electrical parts

7 Application on standard valves or on 7000 series, for intrinsically safe coils and electrical parts

8 Application on special valves, for intrinsically safe coils and electrical parts with booster

9 Application on special valves, for CPR or Offshore coils and electrical parts

10 Application on valves for Offshore coils and electrical parts

11 Application flameproof "d" for Offshore coils and electrical parts

12 Application on Offshore valves with manual reset.

How to order:

1. Valve reference or global reference
2. Housing reference or global reference
3. Coil / electrical part or global reference
4. Voltage or voltage code (see table on page 64)

Ordering example:

121K0756-2995-481865- 3D 220-230/50 3D **or**
7121KBG2LVM0-N1-DZ02 3D

Important: valve, housing or coil can be ordered separately for use as a replacement or spare part.

2.1 Coils with screw terminals:

2.1.1 Standard coils

2

These coils can be mounted with the majority of the Lucifer solenoid valves. They can be mounted with all Lucifer metal housings. The coil winding is completely encapsulated in synthetic material. Easy mounting in confined spaces. Electrical connection with screw terminals for wire up to 1.5 mm˝.

CE

This coil conforms to the IEC/CENELEC safety standards and complies with European low-voltage directive 73/23/EC.

2 / 3

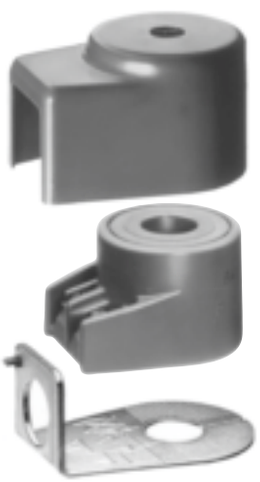
Coil / specification			**Standard**	**Double frequency**	**High power**	**High temperature**	**High temp. + high power**
Reference			481000 or **EZ01**	483520 or **EZ90**	481044 or **EZ91**	485100 or **EZ02**	486265 or **EZ92**
Class of insulation			F 155°C	F 155°C	F 155°C	H 180°C	H 180°C
Ambient temperature			-40°C to +50°C	-40°C to +50°C	-40°C to +50°C	-40°C to +50°C	-40°C to +50°C
			The application is limited also by the temperature range of the valve				
Elect. Power	**DC**	**Pn** (hot)	8 W	-	-	8 W	14 W
		P (cold) 20°C	9 W	-	-	9 W	21 W
	AC	**Pn** (holding)	8 W	9 W	14 W	8 W	14 W
		Attraction cold	32 VA (9 W)	36 VA (10 W)	56 VA (20 W)	32 VA (9 W)	56 VA (20 W)
Weight			130 g	130 g	130 g	140 g	140 g

Voltage tolerance: -10% to +10% of Un (-15% to +5% for double-frequency coil with voltage code S6 if 240 V/50/Hz is used).

Duty: Continuous duty coil (ED 100%)

Voltages: see voltage code table

Mounting: examples



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Coils

2.1.2 Bistable (impulse) coils

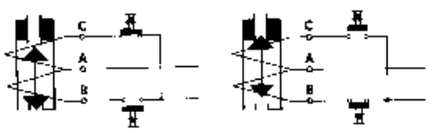
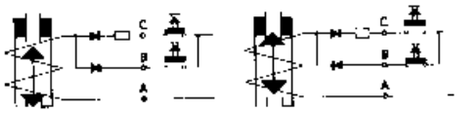
4

These coils are specially designed for Lucifer bistable (or impulse or magnetic latch) solenoid valves.

They can be mounted only with Lucifer metallic housings 4269 or 4538. The coil winding is completely encapsulated in synthetic material. Easy mounting in confined spaces. Electrical connection with screw terminals for wire up to 1.5 mm˝.

CE

This coil conforms to the IEC/CENELEC safety standards and complies with European low-voltage directive 73/23/EC.

Coil / Specification			Direct Current		Alternating Current
Diagram					
			Only an electrical impulse given to terminals A-C reverses the magnetic field. This magnetic field demagnetises the reversible magnet enough to allow the return spring to bring the plunger back to its initial position and close the valve.		
Length of impulses			Switch on (terminals A-B): minimum 50 ms, (maximum 1s) Switch off (terminals A-C): minimum 35 ms, (maximum 1s)		
Reference			485400 or **MZ02**	* 482245 or **MZ90**	484990 or **MZ01**
Electr. Power consuption	**DC**	Attraction (hot)	13 W	13 W	-
		Attraction (cold)	19 W	19 W	-
		Release (hot)	8 W	8 W	-
		Release (cold)	10 W	10 W	-
	AC	Attraction (hot)	-	-	11 W
		Attraction (cold)	-	-	17 W
		Release (hot)	-	-	4 W
		Release (cold)	-	-	7 W

* Electrical part IP67; contact your distributor for details.

Class of insulation material: F 155°C

Ambient temperature: -40°C to +50°C

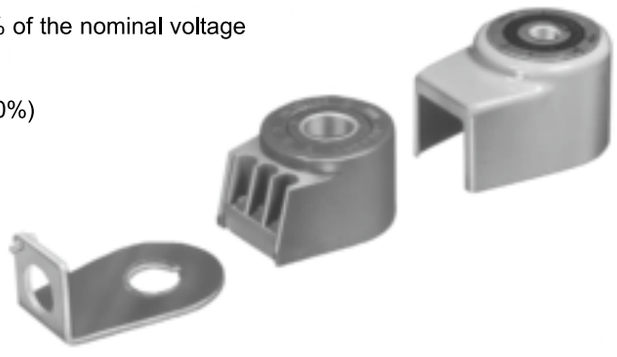
Voltage tolerances: -10% to +10% of the nominal voltage

Voltages: See voltage code table

Duty: Continuous duty coil (ED 100%)

Weight: 150 g

Mounting: example



2.2 Coils for DIN plug connection:

2.2.1 32 mm Coils

2

These coils can be mounted with the majority of the Lucifer solenoid valves. This is an encapsulated assembly comprising a coil, integral magnetic iron path and snap-on plug connection. The synthetic material encapsulation provides an effective compact housing, offering full protection against dust, oil, water, etc. Ease of mounting in confined space - offers shock and corrosion protection - simplifies conversion of existing equipment to other requirements, etc.

CE

This coil conforms to the IEC/CENELEC safety standards and complies with European low-voltage directive 73/23/EC.

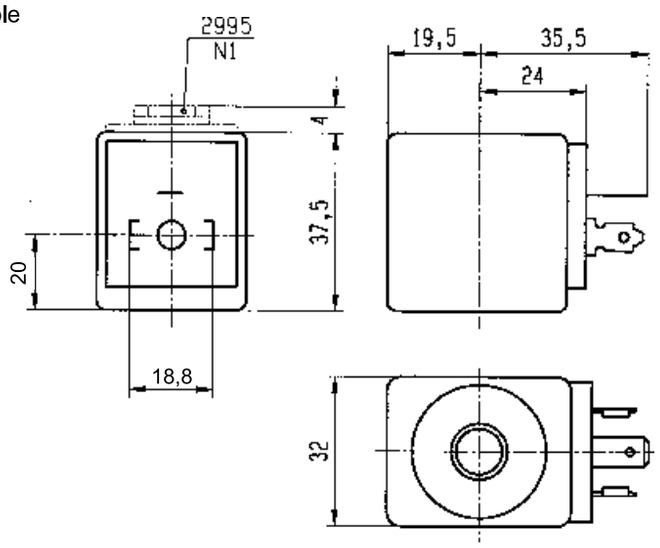
Specification			**Standard**	**Double frequency**	**Reduced power**	**High temperature**	**High temp. + High power**
Ref. (without plug) **Ref.** (with plug)			481865 or **DZ02** 482725 or **DZ03**	483510 or **DZ06** 482635 or **DZ07**	482730 or **DZ90** 482735 or **DZ91**	492453 or **DZ04** 492726 or **DZ05**	492425 or **DZ08** 492727 or **DZ09**
Degree of protection			IP65 according to IEC / EN 60529 standards (with plug connection)				
Class of insulation			F 155°C	F 155°C	F 155°C	H 180°C	H 180°C
Electrical connection			Through a 2 P + E plug according to DIN 43650 type A				
Ambient temperature			-40°C to +50°C The application is limited also by the temperature range of the valve	-40°C to +50°C	-40°C to +50°C	-40°C to +50°C	-40°C to +50°C
Elect. Power	**DC**	**Pn** (hot)	9 W	-	7 W	9 W	14 W
		P (cold) 20°C	12 W	-	9 W	12 W	21 W
	AC	**Pn** (holding)	8 W	9 W	6 W	8 W	14 W
		Attraction cold	26 VA (9 W)	32 VA (10 W)	20 VA (7 W)	26 VA (9 W)	55 VA (18 W)

Voltage tolerances: -10% to +10% of the nominal voltage

Duty: Continuous duty coil (ED 100%)

Voltages: see voltage code table

Weight: 130 g (without plug)



2.2.1.1 32 mm UL-recognized Coil

2

These coils can be mounted with the majority of the Lucifer solenoid valves. This is an encapsulated assembly comprising a coil, integral magnetic-iron path and snap-on plug connection. The synthetic material encapsulation provides an effective compact housing, offering full protection against dust, oil, water, etc. Ease of mounting in confined space - offers shock and corrosion protection - simplifies conversion of existing equipment to other requirements, etc.

This coil is UL-approved as a recognized component for the insulation class F, conforms to the IEC/CENELEC safety standards and complies with European low-voltage directive 73/23/EC.

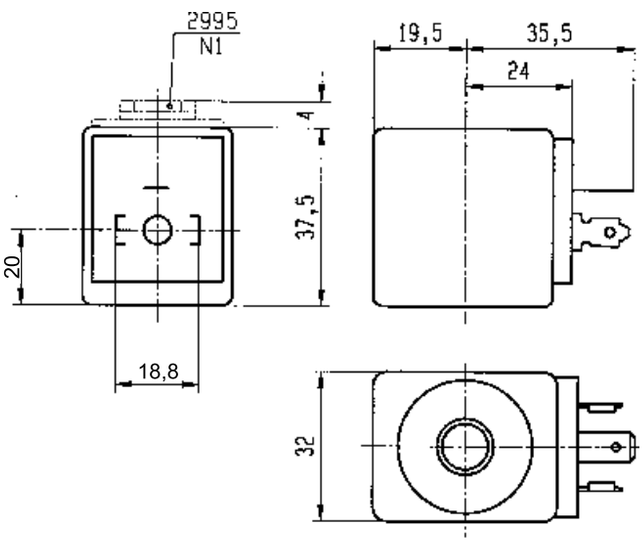
Specification			**UL-recognized coil - UL File E125678 - designation AMIF**	
Reference (without plug)			491514 or **D400**	491514 or **D500**
Degree of protection			**IP65** according to IEC / EN 60529 standards (with plug connection)	
Class of insulation			F 155°C	F 155°C
Electrical connection			Through a 2 P + E plug according to DIN 43650 type A	
Ambient temperature			-40°C to 50°C The application is limited also by the temperature range of the valve	- 40°C to 50°C The application is limited also by the temperature range of the valve
Elect. Power	**DC**	**Pn** (hot)	-	12 W
		P (cold) 20°C	-	16 W
	AC	**Pn** (holding)	11 W	-
		Attraction cold	40 VA (13 W)	-

Voltage tolerances: -15% to +10% of the nominal voltage

Duty: Continuous duty coil (ED 100%)

Voltages: see voltage code table

Weight: 130 g (without plug)



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2.2.1.2 32 mm Miniwatt Coil

6

This reduced power coil is compatible with certain types of Lucifer solenoid valves only. This is an encapsulated assembly comprising a coil, integral magnetic iron path and snap-on plug connection. The synthetic material encapsulation provides an effective compact housing, offering full protection against dust, oil, water, etc. Ease of mounting in confined space - offers shock and corrosion protection - simplifies conversion of existing equipment to other requirements, etc.

CE

This coil conforms to the IEC/CENELEC safety standards and complies with European low-voltage directive 73/23/EC.

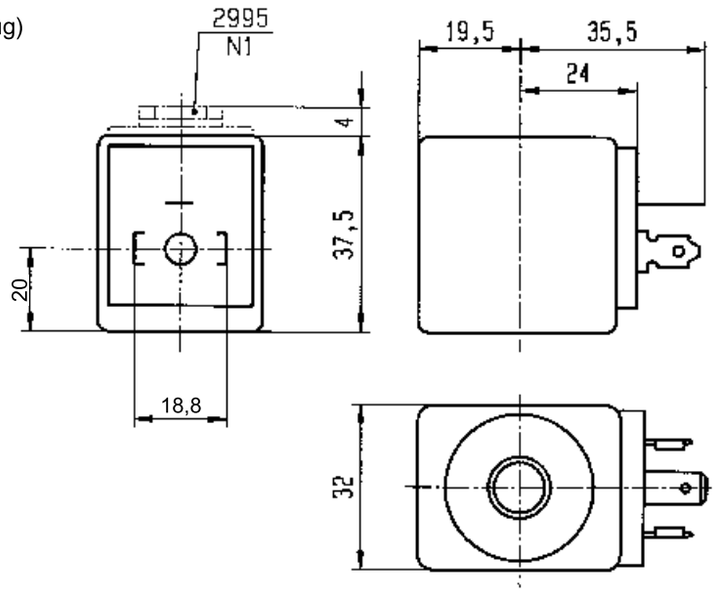
Specification			Miniwatt
Reference (without plug) **Reference** (with plug)			482740 or **DZ10** 482745 or **DZ11**
Degree of protection			**IP65** according to IEC / EN 60529 standards (with plug connection)
Class of insulation			F 155°C
Electrical connection			Through a 2 P + E plug according to DIN 43650 type A
Ambient temperature			-40°C to +50°C The application is limited also by the temperature range of the valve
Elect. Power	**DC**	**Pn** (hot)	1.6 W
		P (cold) 20°C	2.1 W
	AC	**Pn** (holding)	-
		Attraction cold	-

Voltage tolerance: -10% to +10% of the nominal voltage

Duty: continuous duty coil (ED 100%)

Voltages: see voltage code table

Weight: 130 g (without plug)



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Coils

2.2.1.2 32 mm CPR Coil

9

This coil is compatible only with the Offshore and CPR* types of Lucifer solenoid valves. This is an encapsulated assembly comprising a coil, integral magnetic iron path and snap-on plug connection. The synthetic material encapsulation provides an effective compact housing, offering full protection against dust, oil, water, etc. Ease of mounting in confined space - offers shock and corrosion protection - simplifies conversion of existing equipment to other requirements, etc.
(* CPR = Chemical, Petrochemical and Refinery application)

CE

This coil conforms to the IEC/CENELEC safety standards and complies with European low-voltage directive 73/23/EC.

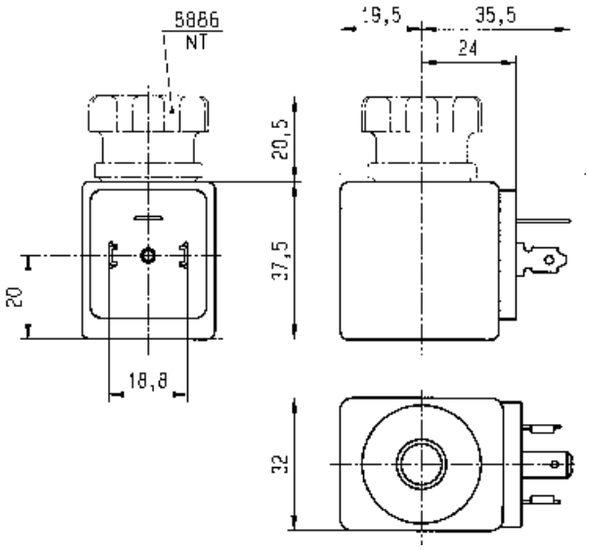
Specification			CPR
Reference (without plug) **Reference** (with plug)			492385 or **DZ92** 492387 or **DZ93**
Degree of protection			**IP65** according to IEC / EN 60529 standards (with plug connection)
Class of insulation			F 155°C
Electrical connection			Through a 2 P + E plug according to DIN 43650 type A
Ambient temperature			-40°C to +50°C The application is limited also by the temperature range of the valve
Elect. Power	**DC**	**Pn** (hot)	9 W
		P (cold) 20°C	12 W
	AC	**Pn** (holding)	9 W
		Attraction cold	12 W

Voltage tolerance: -10% to +10% of the nominal voltage

Duty: continuous duty coil (ED 100%)

Voltages: see voltage code table

Weight: 130 g (without plug)



Important:

For AC voltage, this coil must be mounted with a connector (DIN plug) including a rectifier-bridge.

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2.2.2 22 mm Coil

1

This miniature coil is designed for valves equipped with a miniature tube assembly. This is an encapsulated assembly comprising a coil, integral magnetic iron path and snap-on plug connection. The synthetic material encapsulation provides an effective compact housing, offering full protection against dust, oil, water, etc. Ease of mounting in confined space - offers shock and corrosion protection - simplifies conversion of existing equipment to other requirements, etc.

CE

This coil conforms to the IEC/CENELEC safety standards and complies with European low-voltage directive 73/23/EC.

Specification			Low power	High power	Standard UL / CSA*	Double frequency
Ref. (without plug) **Ref.** (with plug)			488980 or **DA01** 481045 or **DA02**	481180 or **DA03** 481530 or **DA04**	492912 or **DA05** 492919 or **DA06**	483590 or **DA07**
Degree of protection			IP65 according to IEC / EN 60529 standards (with plug connection)			
Classe of insulation			F 155°C	F 155°C	A 105°C for UL/CSA	F 155°C
Electrical connection			Through a 2 P + E plug according to DIN 43650 type B			
Ambient temperature			-40°C to +50°C The application is limited also by the temperature range of the valve	-40°C to +50°C	-40°C to +50°C	-40°C to +50°C
Elect. Power	**DC**	**Pn** (hot)	2.5 W DC	5 W DC	4 W	-
		P (cold) 20°C	3 W	6.5 W	4.5 W	-
	AC	**Pn** (holding)	2 W	4 W	3 W	3 W
		Attraction cold	5.7 VA (2.5 W)	8.9 VA (5 W)	7.5 VA (4 W)	7.5 VA (4 W)

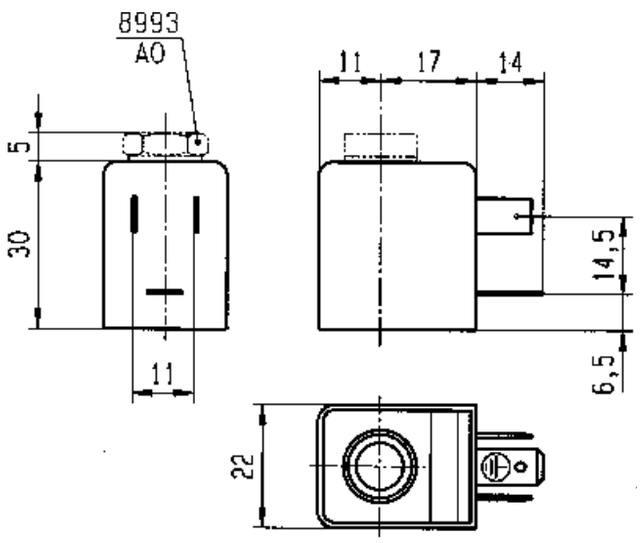
* This coil is UL/CSA accepted with corresponding approved valves only.

Voltage tolerance: -10 to +10% of the nominal (for coil 492912 and 492919 : - 15% to + 10% of the nominal voltage)

Duty: continuous duty coil (ED 100%)

Voltages: see voltage code table

Weight: 100 g with plug



Part 3: Explosion proof electrical parts

3.1 Encapsulated electrical parts for zone 22:

3.1.1 22 mm electrical part with connector

Application: Control of solenoid valves in explosive atmospheres where dust dangerous area (zone 22) is required.

Benefits: This is an encapsulated assembly comprising a coil, integral magnetic iron path and snap-on plug connection. The synthetic material encapsulation provides an effective compact housing, offering full protection against dust, oil, water, etc.

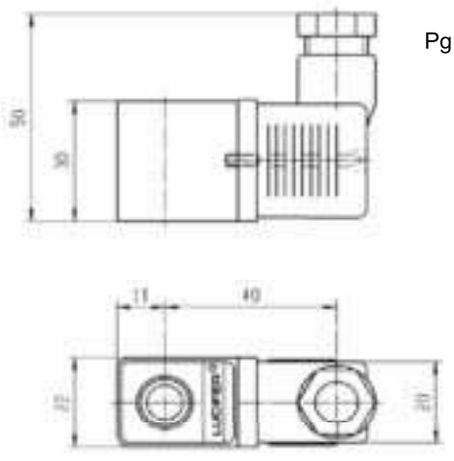
Small size for ease of mounting in confined spaces.

All Lucifer valves which are suitable for standard 22 mm coils can be fitted with those electrical parts.

These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC « ATEX ».

Reference			**495865**
Specification			Standard 22 mm
Type of protection	**Dust**		**II 3 D (zone 22)**
Degree of protection			**IP65** according to IEC / EN 60529 standards (with plug connection)
Ambient temperature			- 40 °C to + 50 °C The application is limited also by the temperature range of the valve
Dust temperature class (D)			**95 °C**
Class of insulation			F (155 °)
Electrical connection			Through a 2 P + E plug according to EN 175301-803 type B
Elect. Power	**DC**	**Pn** (hot)	2.5 W
		P (cold) 20°C	3 W
	AC	**Pn** (holding)	2 W
		Attraction cold	5.7 VA (2.5W)
Voltage			24 VDC, 220-230/50
Voltage tolerance			± 10% of the nominal voltage
Solenoid duty			Continuous duty solenoid (ED 100%)

Weight: 120 g.



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3.1.2 32 mm electrical parts with connector

2

Application: Control of solenoid valves in explosive atmospheres where dust dangerous area (zone 22) is required.

Benefits: This is an encapsulated assembly comprising a coil, integral magnetic iron path and snap-on plug connection. The synthetic material encapsulation provides an effective compact housing, offering full protection against dust, oil, water, etc.

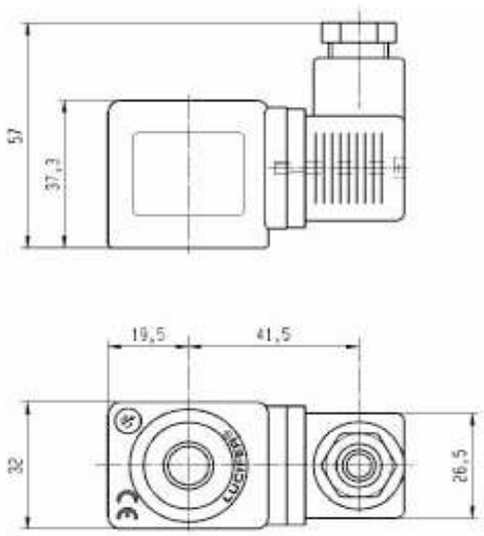
Small size for ease of mounting in confined spaces.

All Lucifer valves which are suitable for standard 32 mm coils can be fitted with those electrical parts.

These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC « ATEX ».

Reference			**495870**	**495875**	**495880**
Specification			Standard 32 mm	Low power 32 mm	High power 32 mm
Type of protection		**Dust**	**II 3 D (zone 22)**		
Degree of protection			**IP65** according to IEC / EN 60529 standards (with plug connection)		
Ambient temperature			- 40 °C to + 50 °C The application is limited also by the temperature range of the valve		
Dust temperature class (D)			**130 °C**	**130 °C**	**170 °C**
Class of insulation			F (155 °C)	F (155 °C)	H (180 °C °)
Electrical connection			Through a 2 P + E plug according to EN 175301-803 type A		
Elect. Power	**DC**	**Pn** (hot)	9 W	7 W	14 W
		P (cold) 20°C	12 W	9 W	21 W
	AC	**Pn** (holding)	8 W	6 W	14 W
		Attraction cold	26 VA (9W)	20 VA (7W)	55 VA (18W)
Voltage			24 VDC, 48/50, 110/50, 220-230/50	24 VDC, 220-230/50	24 VDC, 230/50
Voltage tolerance			± 10% of the nominal voltage		
Solenoid duty			Continuous duty solenoid (ED 100%)		

Weight: 150 g.



Pg9

3.2 Increased safety electrical parts for zone 22

3.2.1 Electrical parts 495915

4

Application: Control of solenoid valves in explosive atmospheres where dust dangerous area (zone 22) is required.

Benefits: Rotatable housing 360°, galvanized steel with internal and external screw terminals for earth connection.

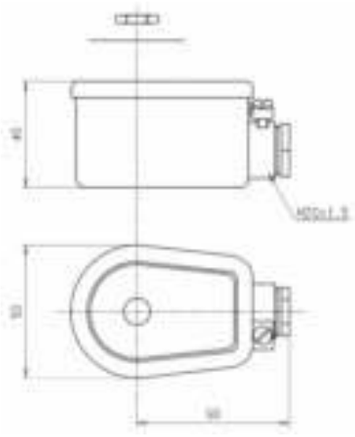
Small size for ease of mounting in confined space. Simplifies conversion of existing equipment to hazardous area requirements.

These electrical parts are specially designed for Lucifer bistable (or impulse or magnetic latch) solenoid valves.

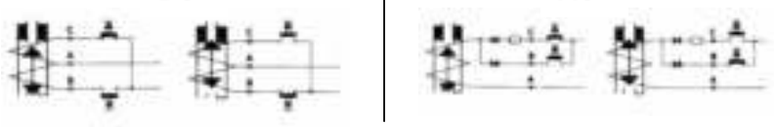
These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC « ATEX ».

Reference			**495915 DC**	**495915 AC**
Type of protection	Dust		**II 3 D (zone 22)**	
Dust temperature class (D)			**130 °C**	
Insulation Class			F (155 °C)	
Ambiant temperature			- 40 °C ÷ + 50 °C The application is limited also by the temperature range of the valve	
Electr. Power consption	**DC**	Attraction (hot)	13 W	-
		Attraction (cold)	19 W	-
		Release (hot)	8 W	-
		Release (cold)	10 W	-
	AC	Attraction (hot)	-	11 W
		Attraction (cold)	-	17 W
		Release (hot)	-	4 W
		Release (cold)	-	7 W
Voltages, (voltage tolerance)			24 VDC (± 10%)	110-115 VAC; 220-230 VAC, (± 10%)
Duty cycle			100%	

Weight: 320 g



DC **AC**



As soon as an electrical impulse is given to the terminals A-B, the electromagnetical force attracts the plunger and simultaneously magnetizes a reversible permanent magnet ring. This magnet retains the plunger in place. Repeated or extended impulses or continuous current do not alter the position of the movable core. It stays in position even without current.
Only an electrical impulse given to terminals A-C reverses the magnetic field. This magnetic field demagnetises the reversible magnet enough to allow the return spring to bring the plunger back to its initial position and close the valve

Switch on (terminals A-B): minimum 50 ms, maximum 1 s
Switch off (terminals A-C): minimum 35 ms, maximum 1 s

8700/GB

3.3 Encapsulated electrical parts “m”:

3.3.1 22 mm electrical part

1

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx m II T4 or T5 is required.

Benefits: coil and magnetic circuit encapsulated in synthetic material - offering shock and corrosion protection. AC coils with integrated thermal fuse.

Small size for ease of mounting in confined spaces.

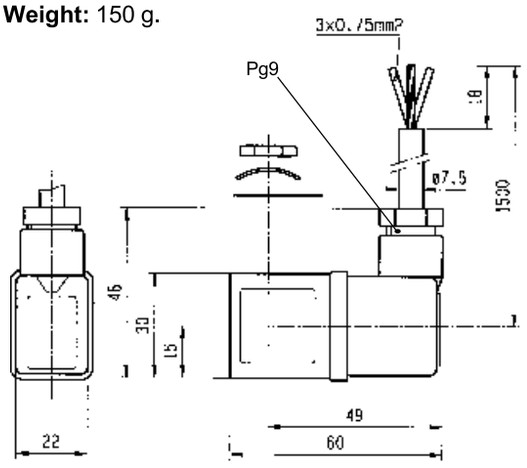
All Lucifer valves which are suitable for standard 22 mm coils can be fitted with those electric parts.

These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC «ATEX».

Reference			482605 or **VA01**	482606 or **VA02** * 482606.10 or **VA12** ° 482606.160 or **VA07**
Approval			**LCIE 02 ATEX 6014 X**	
Type of protection		**Gas**	II 2 G - EEx m II T4	II 2 G - EEx m II T5
		Dust	II 2 D - 130°C	II 2 D - 95°C
Degree of protection			**IP65** according to IEC / EN 60529 standards	
Ambient temperature			-40°C to +50°C	-40°C to +50°C
			The application is limited also by the temperature range of the valve	
Class of insulation			F (155°C)	F (155°C)
Electrical connection			Cable connection (3 x 0.75 mm˝) encapsulated with coil	
Elect. Power	**DC**	**Pn** (hot)	5 W	2.5 W
		P (cold) 20°C	6.5 W	3 W
	AC	**Pn** (holding)	4 W	2 W
		Attraction cold	8.9 VA (5 W)	5.7 VA (2.5 W)
Voltage / Voltage tolerance			see voltage code table / tolerance ± 10% of the nominal voltage	
Solenoid duty			Continuous duty solenoid (ED 100%)	

* 482606.10 for stainless steel application - 1.5 m cable length.
° 482606.160 - 6 m cable length.

Weight: 150 g.



Fuses:

Both electrical parts VA01 and VA02 have to be connected in series with a safety fuse according to CEI 60127-3.

VA01:

DC: 12V, 1000mA - 24V, 500mA - 48V, 200mA - 110V, 100mA

AC 50 Hz: 24V, 500mA - 48V, 250mA - 110/115V, 100mA - 220/230V, 63mA

AC 60 Hz: 24V, 630mA - 110/115V, 125mA - 220/230V, 63mA

VA02:

DC: 12V, 400mA - 24V, 200mA - 48V, 100mA - 110V, 50mA

AC 50 Hz: 24V, 250mA - 48V, 125mA - 110/115V, 63mA - 220/230V, 32mA

AC 60Hz: 24V, 315mA - 110/115V, 63mA - 220/230V, 32mA

8700/GB

Explosion-proff electrical parts

3.3.2 32 mm electrical part

2

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx m II T4 is required.

Benefits: Coil and magnetic circuit encapsulated in synthetic material - offering shock and corrosion protection. AC/DC coils with integrated thermal fuse. DC coils with integrated surge suppression diode.

Small size for ease of mounting in confined spaces.

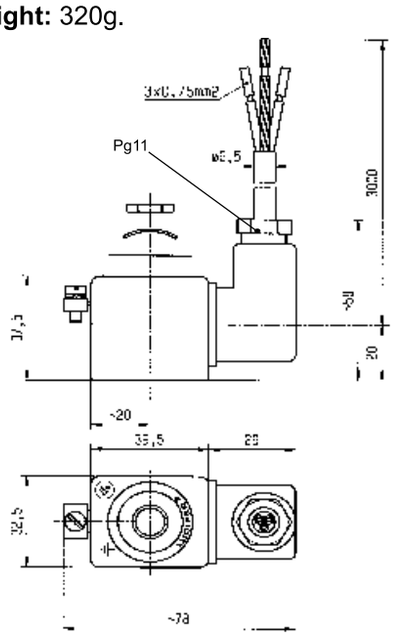
All Lucifer valves which are suitable for standards coils (9W DC or 8W AC) can be fitted with this electrical part.

These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC «ATEX».

Reference			492670 or **HZ05** * 492670.10 or **HZ90** ° 492670.160 or **HZ91**
Approval			**LCIE 02 ATEX 6015 X**
Type of protection		**Gas**	II 2 G - EEx m II T4
		Dust	II 2 D - 130°C
Degree of protection			IP65
Ambient temperature			-40°C to +40°C The application is limited also by the temperature range of the valve
Class of insulation			F (155°C)
Electrical connection			Cable connection (3 x 1.5 mm˝) encapsulated with coil
Elect. Power	**DC**	**Pn** (hot)	9 W
		P (cold) 20°C	12 W
	AC	**Pn** (holding)	8 W
		Attraction cold	26 VA (9 W)
Voltage / Voltage tolerance			see voltage code table / tolerance ±10% of the nominal voltage
Solenoid duty			Continuous duty solenoid (ED 100%)

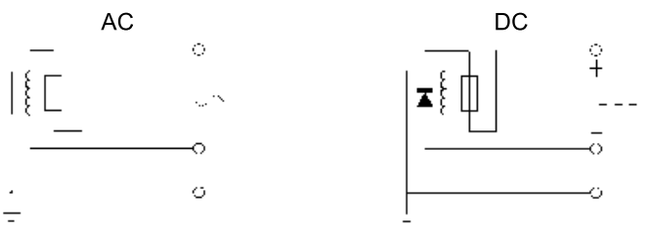
Weight: 320g.

* 492670.10 for stainless steel application - 3 m cable length.
° 492670.160 - 6 m cable length



Special conditions:

The supply connection lines have to be fixed and positioned in such a way that they are protected against mechanical damages.



It is necessary to use a safety fuse with a nominal current corresponding to the coil current (max. 3 x nominal according to IEC 60127 and IEC 60269) against short-circuits.

Recommended values:

DC: 12V, 1250mA - 24V, 630mA - 48V, 315mA - 110V, 125mA
AC 50 Hz: 24V, 1000mA - 48V, 500mA - 110, 250mA - 230V, 100mA
AC 60 Hz: 240V, 100mA

8700/GB

3.3.3 Standard electrical parts with waterproof metal housing:

2 / 6

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx m II T4 or T5 is required.

Benefits: Epoxy-coated steel housing - solenoid coil, rectifier (silicium diodes), fuse and varistor protection element are completely encapsulated in the coil housing by means of epoxy resin.

Small size for ease of mounting in confined space. Simplifies conversion of existing equipment to hazardous area requirements.

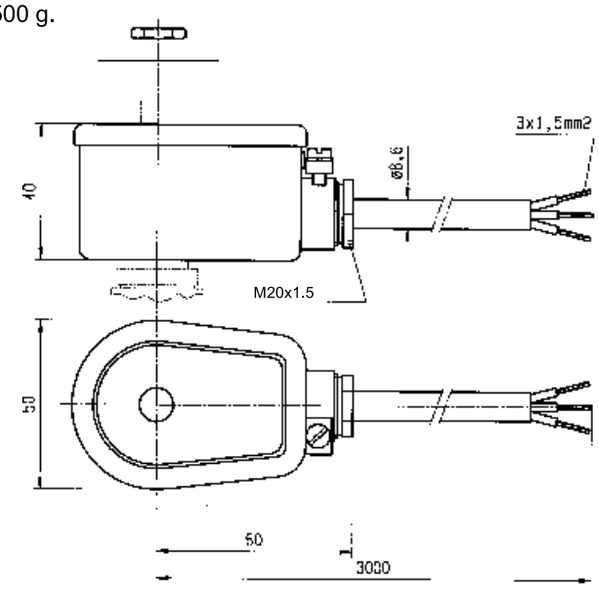
All Lucifer valves which are suitable for standards coils (8 W or 2.5 W DC) can be fitted with these electrical parts.

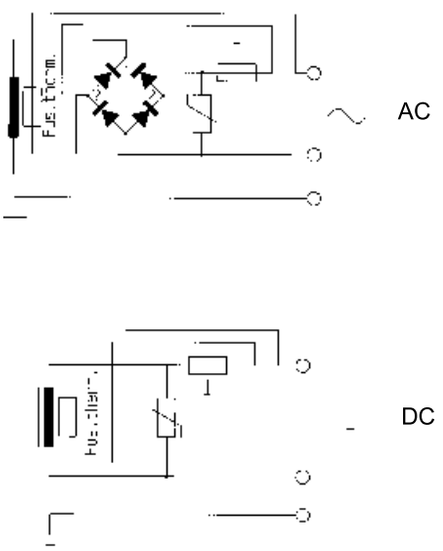
These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC «ATEX».

			2		**6**
Reference			492070 or **VZ01** *492070.60 or **VZ96**	492370 or **VZ05**	492070.03 or **VZ21**
Approval			**LCIE 02 ATEX 6017 X**		**AUS Ex. 321**
Type of protection		**Gas**	II 2 G - EEx m II T4	II 2 G - EEx m II T5	Ex m IIC T4 / T5 Classe I - Zone 1
		Dust	II 2 D - 130°C	II 2 D - 95°C	
Degree of protection			IP67		IP67
Ambient temperature			-40°C to +65°C	-40°C to +40°C	-40 to +65°C / +40 °C
			The application is limited also by the temperature range of the valve		
Class of insulation			F (155°C)		F (155°C)
Electrical connection			Cable connection (3 x 1.5mm˝) with cable gland M20x1.5, external earth screw connection		
Elect. Power	**DC**	**Pn** (hot)	8 W	2.5 W	8 W
		P (cold) 20°C	10 W	3 W	10 W
	AC	**Pn** (holding)	9 W	2.5 W	9 W
		Attraction cold	11 W	3 W	11 W
Voltage / Voltage tolerance			see voltage code table / tolerance ± 10% of the nominal voltage		
Solenoid duty			Continuous duty solenoid (ED 100%)		

Weight: 500 g.

* 492070.60 - 6 m cable length





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Explosion-proof electrical parts

3.3.4 CPR electrical parts with waterproof metal housing:

9

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx m II T4 or T5 is required.

Benefits: Epoxy-coated steel housing - solenoid coil, rectifier (silicium diodes), fuse and varistor protection completely encapsulated in the coil housing by means of epoxy resin.

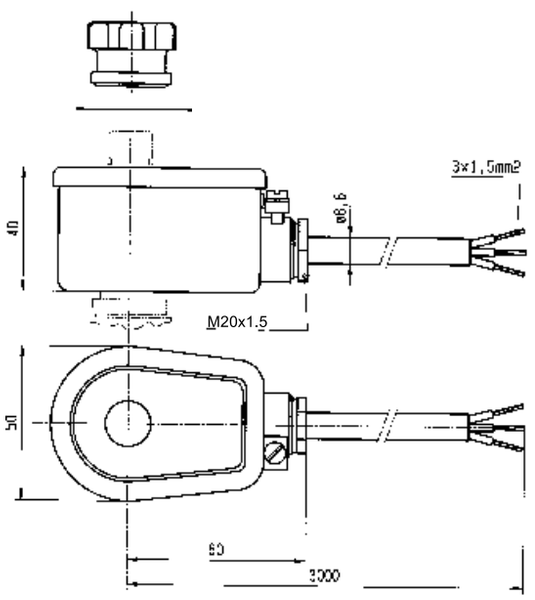
Small size for ease of mounting in confined space. Simplifies conversion of existing equipment to hazardous area requirements.

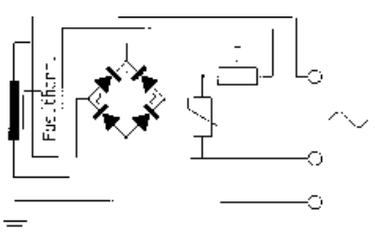
All Lucifer valves equipped with the specific CPR* upper parts, can be fitted with this electrical part.
(* **CPR** = Chemical, Petrochemical and Refinery application)

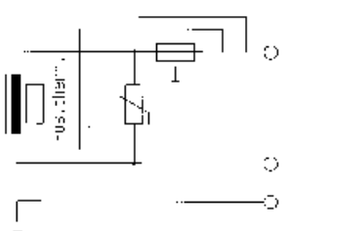
These electrical parts conform to the IEC/CENELEC safety standards and complies with European explosive atmosphere directive 94/9/EC «ATEX».

Reference			492270 or **VZ02**	
Approval			**LCIE 02 ATEX 6017 X**	
Type of protection		**Gas**	II 2 G - EEx m II T4	II 2 G - EEx m II T5
		Dust	II 2 D - 130°C	II 2 D - 95°C
Degree of protection			IP67	
Ambient temperature			-40°C to +65°C The application is limited also by the temperature range of the valve	-40°C to +40°C
Class of insulation			F (155°C)	
Electrical connection			Cable connection (3 X 1.5mm²) with cable gland M20 x 1.5, external earth screw connection	
Elect. Power	**DC**	**Pn** (hot)	5 W	
		P (cold) 20°C	6 W	
	AC	**Pn** (holding)	5 W	
		Attraction cold	6 W	
Voltage / Voltage tolerance			see voltage code table / tolerance ±10% of the nominal voltage	
Solenoid duty			Continuous duty solenoid (ED 100%)	

Weight: 500 g.







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3.4 Increased safety electrical parts “me”:

3.4.1 Electrical parts 483371 or HZ06 and 494040 or HZ23

2

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx me II T3 or T4 is required.

Benefits: Rotatable housing 360°, galvanized steel with internal and external screw terminals for earth connection.

Small size for ease of mounting in confined space. Simplifies conversion of existing equipment to hazardous area requirements.

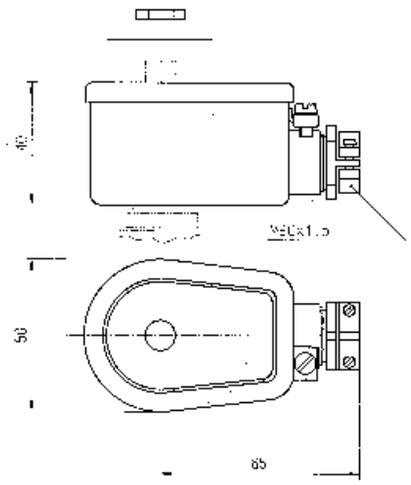
All Lucifer valves suitable for standard 8 W DC or AC coils can be fitted with these electrical parts.

These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC «ATEX».

Reference			483371 or **HZ06** * 483371.01 or **HZ14**	494040 or **HZ23**	
Approval			**LCIE 02 ATEX 6011 X**	**LCIE 02 ATEX 6013 X**	
Type of protection		**Gas**	II 2 G - EEx me II T4	II 2 G - EEx me II T3	II 2 G - EEx me II T4
		Dust	II 2 D - 130°C	II 2 D - 195°C	II 2 D - 130°C
Degree of protection			IP67	IP67	
Ambient temperature			-40°C to +65°C	-40°C to +90°C	-40°C to +65°C
			The application is limited also by the temperature range of the valve		
Class of insulation			F (155°C)	H (180°C)	
Electrical connection			By special cable gland M20 x 1.5 EExe on screw terminals for wires up to 1.5 mm². Cables with outside diameter 6.5 to 13.5 mm can be simply sealed using the rubber gland with resilient sealing rings supplied.		
Elect. Power	**DC**	**Pn** (hot)	8 W	8 W	
		P (cold) 20°C	9 W	9 W	
	AC	**Pn** (holding)	8 W	8 W	
		Attraction cold	32 VA (9 W)	32 VA (9 W)	
Voltage / Voltage tolerance			see voltage code table / tolerance -10/ +10% of the nominal voltage		
Solenoid duty			Continuous duty solenoid (ED 100%)		

Weight: 320 g.

*483371.01 for CPR valves



Fuses:

Both electrical parts HZ06 and HZ23 have to be connected in series with a safety fuse according to IEC 60127-3.

HZ06:

DC: 12V, 1000mA, 24V, 400mA - 48V, 250mA - 110V, 100mA

AC 50 Hz: 24V, 630mA - 48V, 315mA - 110V, 160mA - 220/230V, 80mA
AC 60 H2: 24V, 750mA - 110V, 160mA - 240V, 80mA

HZ23:

DC: 24V, 400mA - 48V, 250mA - 110V, 100mA, 220V, 63mA

AC 50 Hz: 24V, 630mA - 48V, 315mA - 110/115V, 160mA - 220/230V, 80mA

3.4.2 Low power electrical part 491117 or VZ04

6

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx me II T5 is required.

Benefits: Rotatable housing 360°, galvanized steel with internal and external screw terminals for earth connection.

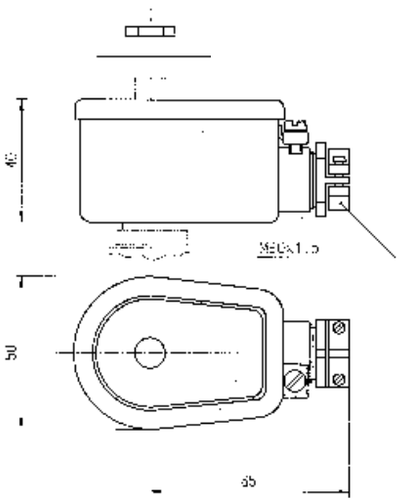
Small size for ease of mounting in confined space. Simplifies conversion of existing equipment to hazardous area requirements.

All Lucifer valves which are suitable for standard coils 2.5 WDC only can be fitted with this electrical part.

This electrical part conforms to the IEC/CENELEC safety standards and complies with European explosive atmosphere directive 94/9/EC «ATEX».

Reference			491117 or **VZ04**
Approval			**LCIE 02 ATEX 6012 X**
Type of protection		**Gas**	II 2 G - EEx me II T5
		Dust	II 2 D - 95°C
Degree of protection			IP67
Ambient temperature			-40°C to +65°C The application is limited also by the temperature range of the valve
Class of insulation			F (155°C)
Electrical connection			By special cable gland M20 x 1.5 "EEx e" on screw terminals for wires up to 1.5 mm˝. Cables with outside diameter 6.5 mm to 13.5 mm can be simply sealed using the rubber gland with resilient sealing rings supplied.
Elect. Power	**DC**	**Pn** (hot)	2.5 W
		P (cold) 20°C	3 W
	AC	**Pn** (holding)	-
		Attraction cold	-
Voltage / Voltage tolerance			see voltage code table / tolerance -10/ +10% of the nominal voltage
Solenoid duty			Continuous duty solenoid (ED 100%)

Weight: 320 g.



Fuses:

The electrical part VZ04 has to be connected in series with a safety fuse according to IEC 60127-3

VZ04:
DC: 24V, 160mA

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3.5 Encapsulated and increased safety electrical parts “me”:

3.5.1 Electrical parts 492190 or VZ03 and 492390 or VZ06

2 / 6

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx me II T3 to T6 is required.

Benefits: Rotatable 360°, fibreglass-reinforced plastic housing. Solenoid coil, rectifier (silicium diodes), fuses and varistor protection are completely encapsulated into the coil housing by epoxy resin for shock and corrosion protection.

Small size for ease of mounting in confined space.

All Lucifer valves suitable for standard 8WDC coils can be fitted with the VZ03, and all Lucifer valves with the suffix ‘‘80’’ can be fitted with VZ06 electrical parts.

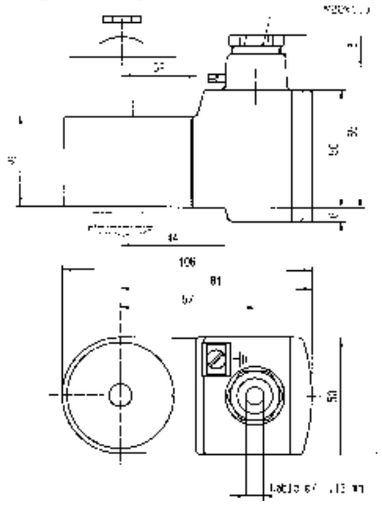
These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC «ATEX».

2 **6**

Reference			492190 or **VZ03** *492190.10 or **VZ90**		492390 or **VZ06**	492190.03 or **VZ34**
Approval			**LCIE 02 ATEX 6023 X**			**AUS Ex 321**
Type of protection		**Gas**	**II** 2 G - EEx me **II** T3	**II** 2 G - EEx me **II** T4	II 2 G - EEx me II T5/T6	Ex me **II**C T3 / T4 Classe **I** - Zone 1
		Dust	**II** 2 D - 195°C	**II** 2 D -95°C	**II** 2 D -130°C / 80°C	
Degree of protection			IP66	IP66	IP66	IP65
Ambient temperature			-40°C to +75°C	-40°C to +40°C	-40°C to 75/+40°C	-40°C to 75/+40°C
			The application is limited also by the temperature range of the valve			
Class of insulation			F (155°C)		F (155°C)	
Electrical connection			Screw terminals within terminal box. Cable connection through a cable gland M20 x 1.5 Additional earth connection on external screw terminal			
Elect. Power	**DC**	**Pn** (hot)	9 W		2.5 W	9W
		P (cold) 20°C	11 W		3 W	11 W
	AC	**Pn** (holding)	11 W		2.5 W	11 W
		Attraction cold	13 W		3 W	13 W
Voltage / Voltage tolerance			see voltage code table / tolerance ±10% of the nominal voltage			
Solenoid duty			Continuous duty solenoid (ED 100%)			

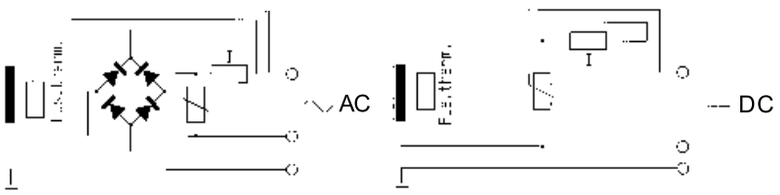
Weight: 500 g.

* 492190.10 for stainless steel valves applications.



Simplifies conversion of existing equipment to hazardous area requirements (according to CENELEC standards EN 50014, EN 50019 and EN 50028).

The electrical part **VZ06** can be used only with the low-power valves.



8700/GB

Explosion-proof electrical parts

3.5.2 Electrical parts 492200 or VZ13, 492210 or VZ26

9 / 10

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx me II T5 to T6 is required.

Benefits: Rotatable 360°, fibreglass-reinforced plastic housing. Solenoid coil and booster electronic are completely encapsulated into the coil housing by epoxy resin for shock and corrosion protection.

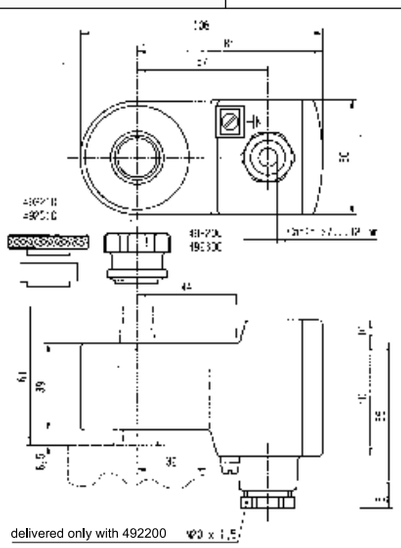
Small size for ease of mounting in confined space.

All Lucifer valves suitable for CPR/Offshore application can be fitted with these electrical parts (except type U033X).

These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC «ATEX».

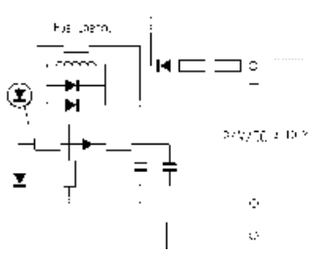
		9		10	
Reference		492200 or **VZ13**		492210 or **VZ26**	
Approval		**LCIE 02 ATEX 6023 X**			
Type of protection	**Gas**	II 2 G - EEx me II T5	II 2 G - EEx me II T6	II 2 G - EEx me II T5	II 2 G - EEx me II T6
	Dust	II 2 D -95°C	II 2 D -80°C	II 2 D -95°C	II 2 D -80°C
Degree of protection		IP66		IP66	
Ambient temperature		-40°C to +75°C	-40°C to +40°C	-40°C to +75°C	-40°C to +40°C
		The application is limited also by the temperature range of the valve			
Class of insulation		F (155°C)		F (155°C)	
Electrical connection		Screw terminals within terminal box. Cable connection through a cable gland M20X1.5 Additional earth connection on external screw terminal			
Power consumption DC		1 bis 1.8 W, depending on cable length		1 bis 1.8 W, depending on cable length	
Inrush current (attraction) min. required for holding		Provided by booster circuit during ~50 ms as soon as the Zener voltage of 21.6 V is reached I mini = 60 mA (I nominal = 75 mA)			
Voltage DC		U nominal = 24 VDC, Umini = 21.6 VDC			
Resistance/additional resistance		23 Ω + (R = 270 Ω)			
Inductance		0 mH			
Capacitance		0 µF			
Response time		2 - 4 s			
Voltage / Voltage tolerance		see voltage code table / tolerance ± 10% of the nominal voltage			
Solenoid duty		Continuous duty solenoid (ED 100%)			

Weight: 500 g.



Indications:

VZ13 = Booster for CPR valves
VZ26 = Booster for Offshore valves



These electrical parts need an external fuse of I = 100 mA

8700/GB

3.5.3 Electrical part 492300 or VZ14 and 492310 or VZ27

9/10/12

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx me II T5 to T6 is required.

Benefits: Rotatable 360° fibreglass-reinforced plastic housing. Solenoid coil, rectifier (silicium diodes), fuses and varistor protection are completely encapsulated into the coil housing by epoxy resin for shock and corrosion protection.

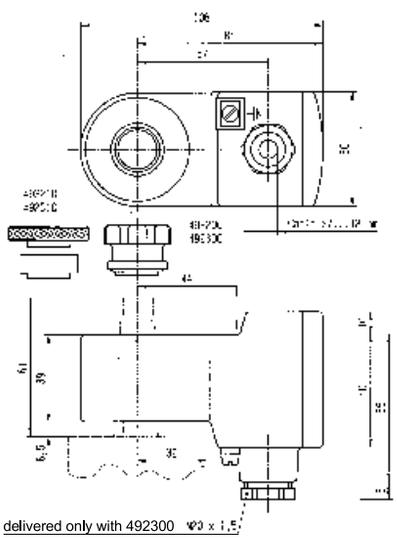
Small size for ease of mounting in confined space.

All Lucifer valves suitable for CPR/Offshore application can be fitted with these electrical parts.

These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC «ATEX».

			9		10/12
Reference			492300 or **VZ14**	492310 or **VZ27**	492310.03 or **VZ29**
Approval			**LCIE 02 ATEX 6023 X**		**AUS Ex 321**
Type of protection		**Gas**	II 2 G - EEx me II T4	II 2 G - EEx me II T5	Ex me IIC T4 / T5 Classe I - Zone 1
		Dust	II 2 D - 130°C	II 2 D - 95°C	
Degree of protection			IP66		IP65
Ambient temperature			-40°C to +75°C	-40°C to +40°C	-40 to +40 / + 75°C
			The application is limited also by the temperature range of the valve		
Class of insulation			F (155°C)		
Electrical connection			Screw terminals within terminal box. Cable connection through a cable gland M20 x 1.5 Additional earth connection on external screw terminal		
Elect. Power	**DC**	**Pn** (hot)	6 W		6 W
		P (cold) 20°C	7.5 W		7.5 W
	AC	**Pn** (holding)	6 W		6 W
		Attraction cold	7.5 W		7.5 W
Voltage / Voltage tolerance			see voltage code table / tolerance ±10% of the nominal voltage		
Solenoid duty			Continuous duty solenoid (ED 100%)		

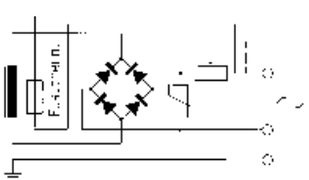
Weight: 500 g.



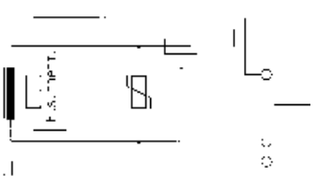
Indications:

VZ14 = for CPR valves
VZ27 = for Offshore valves

AC



DC



3.6 Flameproof electrical parts “d”:

3.6.1 Electrical part 483250 or HZ08

5

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx d IIC T4 to T6 is required.

Benefits: Rotatable 360°, housing made of cast iron with internal connection chamber: Cover made of aluminium alloy fixed with 4 screws. The electromagnetic control pilot is composed of three main elements: housing, coil and plunger tube including housing plate.

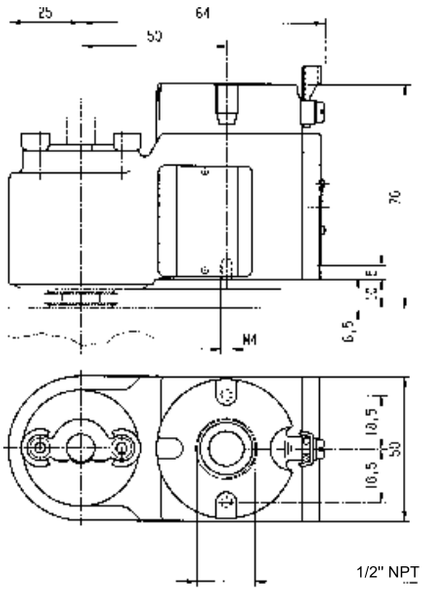
Small size for ease of mounting in confined space.

All Lucifer valves with the suffix “1D” (except CPR/Offshore valves 1D) can be fitted with these electrical parts.

These electrical parts conform to the IEC/CENELEC safety standards and

Reference			483250 or **HZ08**		
Approval			**LCIE 02 ATEX 6007**		
Type of protection	**Gas**		II 2 G - EEx d IIC T4	II 2 G - EEx d IIC T5	II 2 G - EEx d IIC T6
	Dust		II 2 D - 130°C	II 2 D - 95°C	II 2 D - 80°C
Degree of protection			IP64 with appropriate cable gland		
Ambient temperature			-40 to +80°C	-40 to +75°C	-40 to +60°C
			The application is limited also by the temperature range of the valve		
Class of insulation			F (155°C)		
Electrical connection			The electrical connection is made within the housing connection chamber on an accessible screw terminal. The cable entry to the connecting chamber is made through 1/2" NPT thread suitable for fitting an approved EEx d IIC cable gland (493426).		
Elect. Power	**DC**	**Pn** (hot)	8 W		
		P (cold) 20°C	9 W		
	AC	**Pn** (holding)	8 W		
		Attraction cold	32 VA (9 W)		
Voltage / Voltage tolerance			see voltage code table / tolerance -10/ +10% of the nominal voltage		
Solenoid duty			Continuous duty solenoid (ED 100%)		

Weight: 1100 g (with coil)



Plunger tube

The plunger tube is welded to the stainless steel plate and is therefore integrated into the housing, which is screwed on the valve body.

This electrical part is supplied only as complete unit mounted on a valve, as the “EEx d” protection depends on minimum gap between plunger tube, plate and housing.

8700/GB

3.4.2 Electrical parts 483270 or HZ19 and 483270.02 or HZ21

9

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx d IIC T4 to T6 is required.

Benefits: Rotatable 360°, housing made of cast iron with internal connection chamber: Cover made of aluminium alloy fixed with 4 screws. The electromagnetic control pilot is composed of three main elements: housing, coil and plunger tube including housing plate.

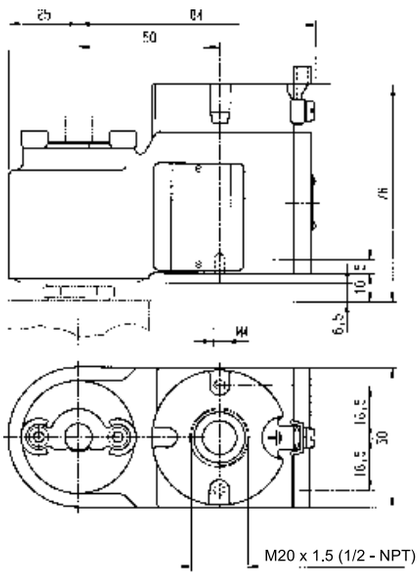
Small size for ease of mounting in confined space.

All Lucifer valves with suffix ''1D'' and suited for CPR/Offshore application can be fitted with these electrical parts

These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC «ATEX».

Reference			483270 or **HZ19** (M20 x 1.5)		483270.02 or **HZ21** (1/2 NPT)
Approval			**LCIE 02 ATEX 6008 X**		
Type of protection		**Gas**	II 2 G - EEx d IIC T4	II 2 G - EEx d IIC T5	II 2 G - EEx d IIC T6
		Dust	II 2 D - 130°C	II 2 D - 95°C	II 2 D - 80°C
Degree of protection			IP65 with appropriate cable gland		
Ambient temperature			-40 to +80°C	-40 to +75°C	-40 to +60°C The application is limited also by the temperature range of the valve
Class of insulation			F (155°C)		F (155°C)
Electrical connection			The electrical connection is made within the housing connection chamber on an accessible screw terminal. The cable entry to the connecting chamber is made through 1/2" NPT or M20 x 1.5 thread suitable for fitting an approved EEx d IIC cable gland.		
Elect. Power	**DC**	**Pn** (hot)	8 W		
		P (cold) 20°C	9 W		
	AC	**Pn** (holding)	8 W		
		Attraction cold	9 W		
Voltage / Voltage tolerance			see voltage code table / tolerance -10/ +10% of the nominal voltage		
Solenoid duty			Continuous duty solenoid (ED 100%)		

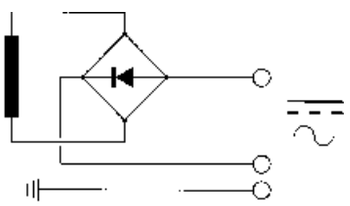
Weight: 1100 g (with coil)



Plunger tube

The plunger tube is welded to the stainless steel plate and is thus integrated to the housing which is screwed on the valve body.

This electrical part is supplied only as complete unit mounted on a valve, as the ''EEx d'' protection depends on minimum gap between plunger tube, plate and housing.



3.6.3 Electrical part HZ09

5

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx md IIC T4 to T5 is required.

Benefits: Metal armature encapsulated in synthetic material provides high shock and corrosion protection.

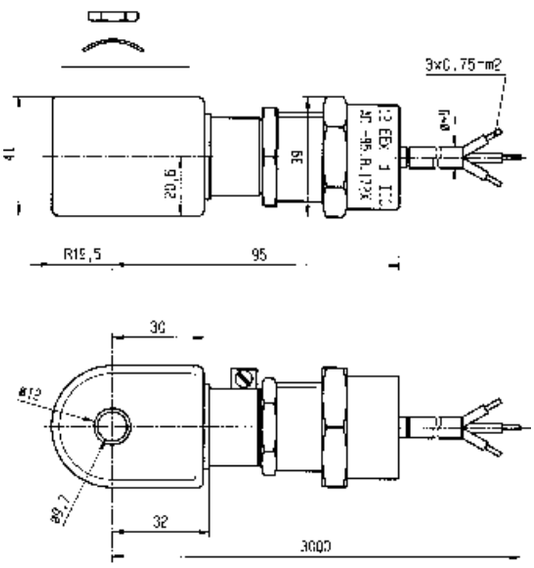
Small size for ease of mounting in confined space.

All Lucifer valves suitable for standard 8W coils can be fitted with this electrical part.

These electrical part conforms to the IEC/CENELEC safety standards and complies with European explosive atmosphere directive 94/9/EC «ATEX».

Reference			493640 or **HZ09**	
Approval			**LCIE 02 ATEX 6009 X**	
Type of protection		**Gas**	II 2 G - EEx md IIC T4	II 2 G - EEx md IIC T5
		Dust	II 2 D - 130°C	II 2 D - 95°C
Degree of protection			IP65	
Ambient temperature			-40°C to +75°C	-40°C to +40°C
			The application is limited also by the temperature range of the valve	
Class of insulation			F (155°C)	
Electrical connection			Special "EEx d" cable gland 1/2" NPT, galvanized steel, with EPDM sealing. (EPR) cable, outside diameter 7.3 ± 0.5 mm	
Elect. Power	**DC**	**Pn** (hot)	8 W	
		P (cold) 20°C	9 W	
	AC	**Pn** (holding)	8 W	
		Attraction cold	32 VA (9 W)	
Voltage / Voltage tolerance			see voltage code table / tolerance -15/ +10% of the nominal voltage	
Solenoid duty			Continuous duty solenoid (ED 100%)	

Weight: 500 g



Fuses

The HZ09 electrical part is equipped with a standard thermal cut-off fuse on all models and voltages

This electrical part HZ09 must be connected in series with a safety fuse according to IEC 60127-3.

DC: 24V, 630 mA
AC: 110/50-120/60, 250 mA - 220/50-240/60, 125mA
230/50, 125 mA

3.7 Intrinsically safe electrical parts “i”:

Intrinsic safety

A system or an element of a system in an hazardous area is intrinsically safe when in any circumstance no explosion can be caused by either a spark or other heat source. The power level of an intrinsically safe electrical system is therefore extremely low.

Application

Intrinsically safe valves are recommended or even compulsory where the highest safety level against explosions is required: chemical industry, refineries, mines, on-and off-shore platforms, etc. In addition to the «intrinsic safety» characteristic, a remarkable low power consumption is needed to control such valves. They can be triggered directly from an electronic circuit such as in a computerised system as they require neither relay nor amplifier.

Safety barriers

Each electrical apparatus, e.g. solenoid valves within the hazardous area must be further protected by safety barriers. Lucifer solenoid operators are compatible with commercially available safety barriers (see guidance chart page 39 to 44). In order to determine whether a barrier is compatible, one must be fully aware of its electrical characteristics.

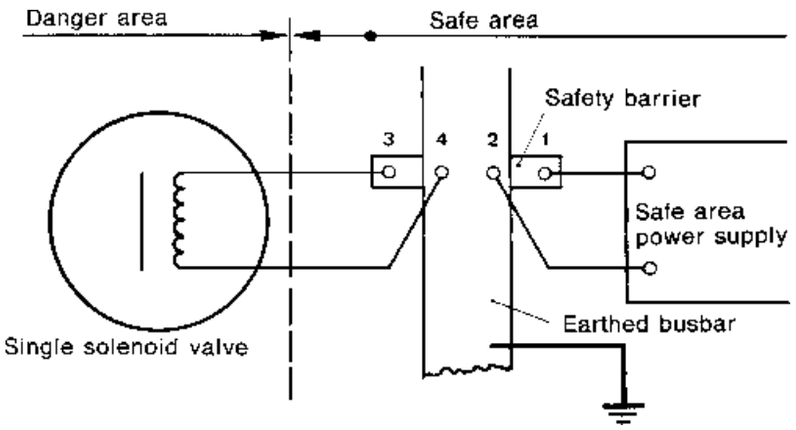
Minimum voltage calculations for proper valve functioning must be made with the total resistance value of barrier, coil (hot) and wiring (total length), and with the maximum ambient temperature.

Electrical suply

Parker Lucifer intrinsically electrical parts may only be fed from:

- **Certified I.S, power supplies or**
- **Through an adequate intrinsic safe safety barrier**
- **Through intrinsically safe Remote I/O**

Installation sketch



3.7.1 Electrical part 32 mm IS

7

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx ia or ib IIC T6 is required.

Benefits: Fully encapsulated assembly comprising a coil, metal armature, three diodes circuit and DIN plug connection.

The encapsulation provides an effective compact housing offering full protection against dust, oil, water, etc.

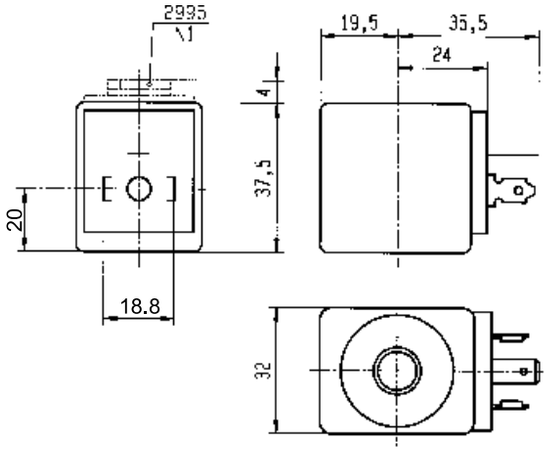
Small size for ease of mounting in confined space.

All Lucifer valves with the suffix ''90'' can be fitted with these electrical parts.

These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere 94/9/EC «ATEX» directive.

Reference (without plug) (with plug)		483580.01 or **DZ12** 483960.01 or **DZ13**	483580.03 or **DZ16** 483960.03 or **DZ17**	490880 or **DZ18** 493997 or **DZ19**
Zulassungsnummer		**LCIE 02 ATEX 6065 X**	**AUS 1146 X**	**LCIE/FM -** CSA (pending)
Type of protection	**Gas**	II 1 G - EEx ia IIC T6	Ex ia IIC T6 Classe I - Zone 0	Cl. I, Div. I, Gr. A, B, C, D Cl. II, Div. I, Gr. E, F, G
	Dust	II 1 D - 80°C		
Degree of protection		IP65 with plug connection		NEMA 4-4X
Ambient temperature		-40°C to +55°C The application is limited also by the temperature range of the valve		+60°C
Class of insulation		F (155°C)		
Electrical connection		The coil is connected with a 2P + E plug according to EN 175301-803 type A - contact 1 is marked as the positive pole +		
Maximum supply voltage		28 VDC – 110 mA		30 VDC – 100 mA
		The minimum operating voltage at maximum +60°C is 14 VDC		
Power	**DC** Minimum	500 mW		500 mW
	DC Maximum	3 W		3 W
	Depending on applied voltage, IS barrier type and resistance of connected cable			
Coil resistance at 20°C **Impedance** **Apparent inductance** **Apparent capacitance**		340 Ω 340 Ω 0 mH 0 µF		
Solenoid duty		Continuous duty solenoid (ED 100%)		

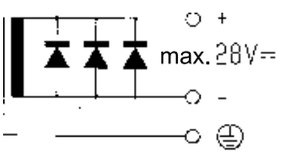
Weight: 160 g (with plug)



Important

The intrinsically safe supply circuit should have enough capacity in all environmental conditions to assure a **minimum operating current of 35 mA** through the coil.

The minimal holding current is 20 mA



For the barrier compatibility see the corresponding table on pages 39, 40 and 41.

8700/GB

3.7.2 Electrical part 488650.01 or VZ07 and 494035.10 or VZ93

7

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx ia or ib IIC T6 is required.

Benefits: Rotatable 360° housing, polyamid with fibreglass housing and cover. Coil, electronic circuits and other elements required for intrinsic safety are completely encapsulated in the housing with epoxy material for shock and corrosion protection.

Small size for ease of mounting in confined space.

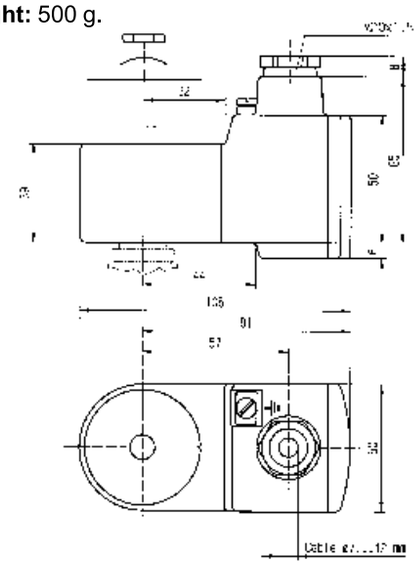
All Lucifer valves with the suffix ‘‘90’’ can be fitted with these electrical parts.

These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC «ATEX».

Reference			488650.01 or **VZ07**	* 494035.10 or **VZ93**	488650.03 or **VZ31**	490885 or **VZ33**
Approval			**LCIE 02 ATEX 6024 X**		**AUS Ex 137 X**	**LCIE / FM / CSA**
Type of protection	**Gas**		**II** 1 G - EEx ia **II**C T6		Ex ia **II**C T6	Cl. **I**, Div. **I**, Gr. A, B, C, D
	Dust		**II** 1 D - 80°C		Classe **I** - Zone 0	Cl. **II**, Div. **I**, Gr. E, F, G
Degree of protection			IP66		IP65	NEMA 4-4X
Ambiant temperature			-40°C to +65°C		-40°C to +65°C	+60°C
			The application is limited also by the temperature range of the valve			
Electrical connection			Cable entry through a cable gland M20 x 1.5. Screw terminals for leads 3 x 1.5 mm˝ max. Additional earth connection possible with external screw terminal			
Maximum supply voltage			28 VDC – 110 mA		28 VDC – 110 mA	30 VDC – 100 mA
			The minimum operating voltage at maximum +60°C is 11.5 VDC			
Power	**DC**	Minimum	300 mW		300 mW	300 mW
		Maximum	3 W		3 W	3 W
	Depending on applied voltage, IS barrier type and resistance of connected cable					
Coil resistance at 20°C			295 Ω			
Impedance			345 Ω			
Apparent inductance			0 mH			
Apparent capacitance			0 µF			
Solenoid duty			Continuous duty solenoid (ED 100%)			

* with stainless steel fixing kit.

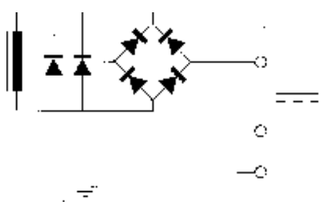
Weight: 500 g.



Important

The intrinsically safe supply circuit should have enough capacity in all environmental conditions to assure a minimum operating current of 29 mA through the coil.

The minimal holding current is 20 mA



For the barrier compatibility see the corresponding table in pages 39, 40 and 41.

3.7.3 Electrical part 488660.01 or VZ08

7

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx ia or ib IIC T6 is required.

Benefits: Rotatable 360° housing, epoxy-coated metal housing and cover. Coil, electronic circuits and other elements required for intrinsic safety are completely encapsulated in the housing with epoxy material for shock and corrosion protection.

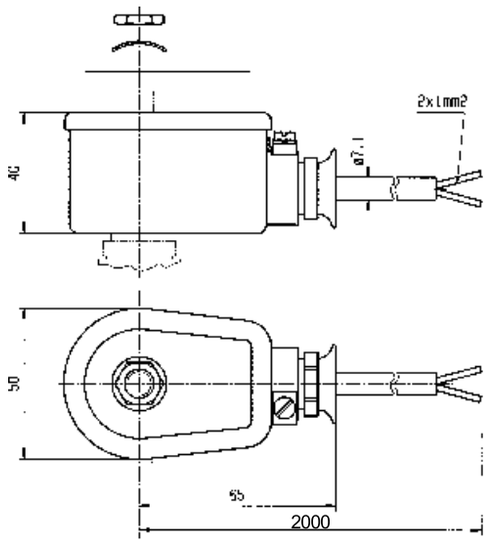
Small size for ease of mounting in confined space.

All Lucifer valves with the suffix ''90'' can be fitted with these electrical parts.

These electrical part conforms to the IEC/CENELEC safety standards and complies with European explosive atmosphere directive 94/9/EC «ATEX».

Reference			488660.01 or **VZ08**	488660.03 or **VZ17**	490890 or **VZ18**
Approval			**LCIE 02 ATEX 6024 X**	**AUS Ex 137 X**	**LCIE / FM / CSA**
Type of protection	**Gas**		II 1 G - EEx ia IIC T6	Ex ia IIC T6 Classe I - Zone 0	Cl. I, Div. I, Gr. A, B, C, D Cl. II, Div. I, Gr. E, F, G
	Dust		II 1 D - 80°C		
Degree of protection			IP67		NEMA 4-4X
Ambiant temperature			-40°C to +65°C The application is limited also by the temperature range of the valve		+60°C
Electrical connection			Fixed and potted dual-core (2 x 1mm˝), blue connection cable, entry cable gland M20 x 1.5. Additional earth connection possible with external screw terminal		
Maximum supply voltage			28 VDC – 110 mA The minimum operating voltage at maximum +60°C is 11.5 VDC		30 VDC – 100 mA
Power	**DC**	Minimum	300 mW		300 mW
		Maximum	3 W		3 W
	Depending on applied voltage, IS barrier type and length resistance of connected cable				
Coil resistance at 20°C **Impedance** **Apparent inductance** **Apparent capacitance**			295 Ω 345 Ω 0 mH 0 µF		
Solenoid duty			Continuous duty solenoid (ED 100%)		

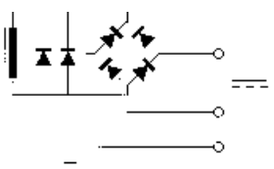
Weight: 500 g.



Important

The intrinsically safe supply circuit should have enough capacity in all environmental conditions to assure a **minimum operating current of 29 mA** through the coil.

The minimal holding current is 20 mA



For the barriers compatibility see the corresponding table in pages 39, 40 and 41.

3.7.4 Electrical part 488670.01 or VZ09

7

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx ia or ib IIC T6 is required.

Benefits: Rotatable 360° housing, epoxy-coated metal housing and cover. Coil, electronic circuits and other elements required for intrinsic safety are completely encapsulated in the housing with epoxy material for shock and corrosion protection.

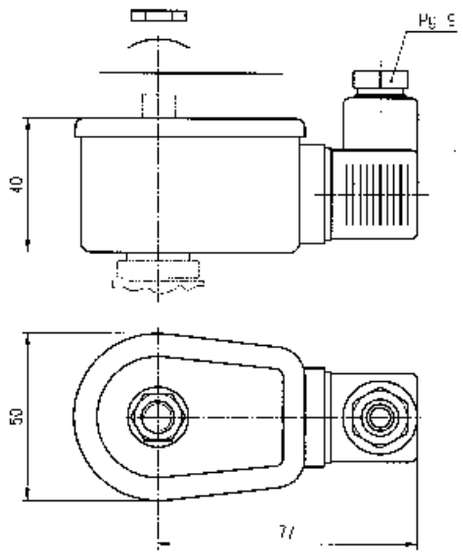
Small size for ease of mounting in confined space.

All Lucifer valves with the suffix ''90'' can be fitted with these electrical parts

These electrical part conforms to the IEC/CENELEC safety standards and complies with European explosive atmosphere directive 94/9/EC «ATEX».

Reference			488670.01 or **VZ09**	490895 or **VZ20**
Approval			**LCIE 02 ATEX 6024 X**	**LCIE / FM / CSA**
Type of protection		**Gas**	II 1 G - EEx ia IIC T6	Cl. I, Div. I, Gr. A, B, C, D
		Dust	II 1 D - 80°C	Cl. II, Div. I, Gr. E, F, G
Degree of protection			IP67	NEMA 4-4X
Ambiant temperature			-40°C to +65°C	+60°C
			The application is limited also by the temperature range of the valve	
Electrical connection			DIN standard plug interface 2P + T (DIN 43650 A) with Pg 9 cable gland.	
Maximum supply voltage			28 VDC – 110 mA	30 VDC – 100 mA
			The minimum operating voltage at maximum +60°C is 11.5 VDC	
Power	**DC**	Minimum	300 mW	300 mW
		Maximum	3 W	3 W
	Depending on applied voltage, IS barrier type and resistance of connected cable			
Coil resistance at 20°C **Impedance** **Apparent inductance** **Apparent capacitance**			295 Ω 345 Ω 0 mH 0 µF	
Solenoid duty			Continuous duty solenoid (ED 100%)	

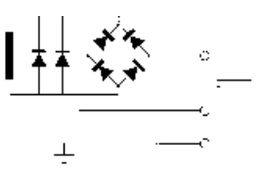
Weight: 500 g.



Important

The intrinsically safe supply circuit should have enough capacity in all environmental conditions to assure a **minimum operating current of 29 mA** through the coil.

The minimal holding current is 20 mA



For the barriers compatibility see the corresponding table in pages 39, 40 and 41.

3.7.5 Electrical parts 482160.01 or VZ95 and 482870.01 or VZ23

12

Application: Control of solenoid valves in dangerous areas where explosion-proof protection EEx ia IIB or IIC T6 is required.

Benefits: Rotatable 360° housing, polyamid with fibreglass housing and cover. Coil, electronic circuits and other elements required for intrinsic safety are completely encapsulated in the housing with epoxy material for shock and corrosion protection.

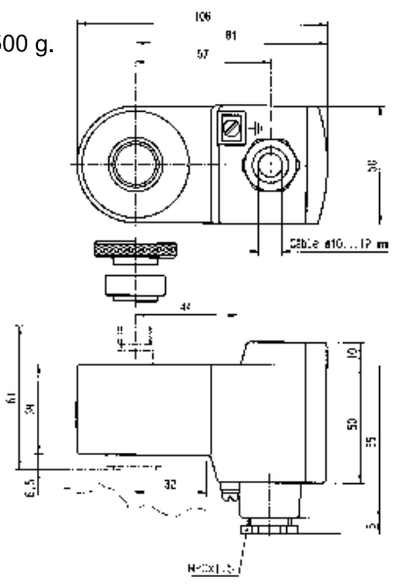
Small size for ease of mounting in confined space.

All Lucifer valves labelled "033X" with manual-reset can be fitted with these electrical parts.

These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC «ATEX».

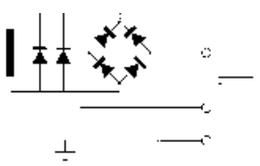
Reference			482160.01 or **VZ95**	482870.01 or **VZ23**	482870.03 or **VZ24**	492335 or **VZ30**
Approval			**LCIE 02 ATEX 6024 X**		**AUS Ex 137 X**	**LCIE / FM / CSA**
Type of protection		**Gas**	II 1 G - EEx ia IIB T6	II 1 G - EEx ia IIC T6	EEx ia IIC T6 Classe I - Zone 0	Cl. I, Div. I, Gr. A, B, C, D Cl. II, Div. I, Gr. E, F, G
		Dust	II 1 D - 80°C			
Degree of protection			IP66		IP65	NEMA 4-4X
Ambiant temperature			-40°C to +65°C The application is limited also by the temperature range of the valve			+60°C
Electrical connection			Cable connection through a stainless steel cable gland M20 x 1.5 allowing use of cable diameter from 10 to 12 mm. Additional earth connection possible with external screw terminal			
Maximum supply voltage			28 VDC – 280 mA	28 VDC – 110 mA	28 VDC – 110 mA	30 VDC – 100 mA
Power	**DC**	Minimum	300 mW			300 mW
		Maximum	3 W			3 W
	Depending on applied voltage, IS barrier type and resistance of connected cable					
Coil resistance at 20°C **Impedance** **Apparent inductance** **Apparent capacitance**			295 Ω 345 Ω 0 mH 0 µF			
Solenoid duty			Continuous duty solenoid (ED 100%)			

Weight: 500 g.



Important

The required minimal holding current is 25 mA



For the barriers compatibility see the corresponding table in pages 39, 40 and 41.

3.7.6 Electrical part 482660 or VZ11 with booster

9

Application: Control of solenoid valves in dangerous areas where an explosion-proof protection EEx ib IIB or IIC T6 is required.

Benefits: Rotatable 360° housing, polyamid with fibreglass housing and cover. Coil, electronic circuits and other elements required for intrinsic safety are completely encapsulated in the housing with epoxy material for shock and corrosion protection.

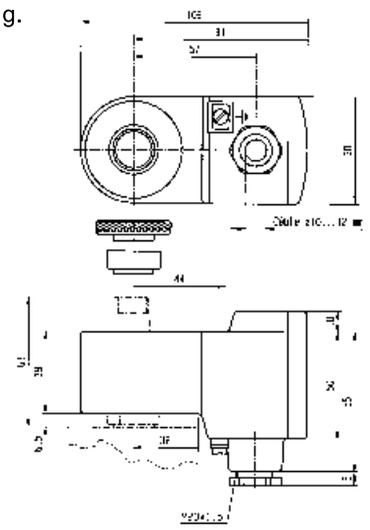
Small size for ease of mounting in confined space.

All Lucifer valves suitable for CPR/Offshore application can be fitted with these electrical parts (except type U033X).

These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC «ATEX».

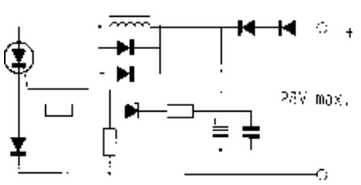
Reference			482660 or **VZ11**	483330.01 or **VZ12**	483330.03 or **VZ25**	490860 or **VZ28**
Approval			**LCIE 02 ATEX 6024 X**		**AUS Ex 137 X**	**LCIE / FM / CSA**
Type of protection	**Gas**		II 2 G - EEx ib IIB T6	II 2 G - EEx ib IIC T6	EEx ib IIC T6 Classe I - Zone 1	Cl. I, Div. I, Gr. A, B, C, D
	Dust		II 2 D - 80°C			Cl. II, Div. I, Gr. E, F, G
Degree of protection			IP66		IP65	NEMA 4-4X
Ambiant temperature			-40°C to +75°C The application is limited also by the temperature range of the valve			+60°C
Electrical connection			Cable connection through a stainless steel cable gland M20X1.5 allowing use of cable diameter from 10 to 12 mm. Additional earth connection possible with external screw terminal			
Maximum supply voltage			28 VDC – 280 mA The minimum operating voltage is 21.6 VDC		28 VDC – 110 mA	30 VDC – 100 mA
Power	**DC**	Minimum	300 mW			300 mW
		Maximum	3 W			3 W
	Depending on applied voltage, IS barrier type and resistance of connected cable					
Coil resistance at 20°C **Impedance** **Apparent inductance** **Apparent capacitance**			23 Ω 50 Ω 0 mH 0 µF			
Response time			2 – 4 s			
Solenoid duty			Continuous duty solenoid (ED 100%)			

Weight: 500 g.



Important

The intrinsically safe supply circuit should have enough capacity under all environmental conditions to assure a **minimum operating current of 45 mA** through the coil.



For the barriers compatibility see the corresponding table in pages 42, 43 and 44.

3.7.7 Electrical parts 492965.01 or VZ91 with "Booster".

9

Application: Control of solenoid valves in dangerous areas where an explosion-proof protection EEx ia IIC T6 is required.

Benefits: Rotatable 360° housing, polyamid with fibreglass housing and cover. Coil, electronic circuits and other elements required for intrinsic safety are completely encapsulated in the housing with epoxy material for shock and corrosion protection.

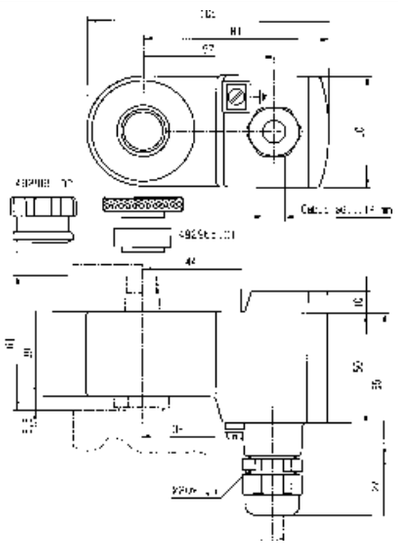
Small size for ease of mounting in confined space.

All Lucifer valves suitable for CPR/Offshore application can be fitted with these electrical parts (except type U033X).

These electrical parts conform to the IEC/CENELEC safety standards and comply with European explosive atmosphere directive 94/9/EC «ATEX».

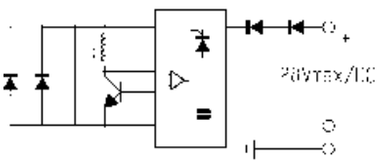
Reference			492965.01 or **VZ91 -** stainless steel fixation 492965.02 or **VZ92 -** plastic fixation
Approval			**LCIE 02 ATEX 6066 X**
Type of protection		**Gas**	II 1 G - EEx ia IIC T6
		Dust	II 1 D - 80°C
Degree of protection			IP66
Ambiant temperature			-40°C to +65°C The application is limited also by the temperature range of the valve
Electrical connection			Cable connection through a plastic cable gland M20 x 1.5 allowing use of cable diameter from 6 to 12 mm. Additional earth connection possible with external screw terminal
Maximum supply voltage			28 VDC – 110 mA
Power	**DC**	Minimum	0.3 W (with 13 VDC)
		Maximum	2.3 W (with 24 VDC)
	Depending on applied voltage, IS barrier type and resistance of connected cable		
Line check			4 mA or 5 VDC max
Coil resistance at 20°C **Impedance** **Apparent inductance** **Apparent capacitance**			85 Ω 275 Ω (with 13 VDC) – 260 Ω (with 24 VDC) 0 mH 0 µF
Response time			2 – 4 s
Solenoid durty			Continuous duty solenoid (ED 100%)

Weight: 500 g.



Important

The intrinsically safe supply circuit should have enough capacity under all environmental conditions to assure a **minimum operating current of 20 mA** through the coil.



For the barriers compatibility see the corresponding table in pages 42, 43 and 44.

IS Standard coils parameters

IS- STANDARD ELECTRICAL PARTS								
Type of IS-protectiom		EEx ia IICT6	EEx ia IICT6	EEx ia IIC T6	Ex ia	EEx ia IIB T6	EEx ia IIC T6	Ex ia
Order references		488650.01/03 488660.01/03 488670.01/03	490885 490890 490895	483580.01/03 483960.01/03	490880 493997	482160,01	482870,01	492335
Certified by		LCIE/AUS	LCIE/FM/CSA	PTB/AUS	LCIE/FM	LCIE	LCIE	LCIE/FM/CSA
Function parameters	Resistance of coil winding at 20°C (for information only)	295 Ohm	295 Ohm	340 Ohm	340 Ohm	295 Ohm	295 Ohm	295 Ohm
	Impedance of electrical part	345 Ohm	345 Ohm	340 Ohm	340 Ohm	345 Ohm	345 Ohm	345 Ohm
	Minimum voltage required for functionning at 60°C	11,5 V	11,5 V	14 V	14 V	manual reset	manual reset	manual reset
	Minimum current required for functionning (attraction)	**29 mA**	**29 mA**	**35 mA**	**35 mA**	**manual reset**	**manual reset**	**manual reset**
	Minimum current required for holding	20 mA	20 mA	20 mA	20 mA	25 mA	25 mA	25 mA
	Inductance [L] of coil (mH apparent)	0	0	0	0	0	0	0
	Capacitance [C] of coil (µF apparent)	0	0	0	0	0	0	0
	Ambient temperatures	(-40 à +65°C)	(-40 à +65°C)	(-40 à +55°C)	(-40 à +55°C)	(-40 à +65°C)	(-40 à +65°C)	(-40 à +65°C)
Security parameters	Maximum admissible voltage/current	28V / 110mA - 0.77 W 27V / 120mA - 0.81 W 26V / 135 mA - 0.88 W 25V / 150 mA - 0.94 W 24V / 170 mA - 1.2 W	30V/100mA 28V/330 Ohm -	28V / 110mA - 0.77 W 27V / 120mA - 0.81 W 26V / 135 mA - 0.88 W 25V / 150 mA - 0.94 W 24V / 170 mA - 1.2 W	30V / 100mA - -	28V / 280mA - 1.96 W 27V / 320mA - 2.16 W 26V / 350 mA - 2.27 W 25V / 390 mA - 2.43 W 24V / 430 mA - 2.58 W	28V / 110mA - 0.77 W 27V / 120mA - 0.81 W 26V / 135 mA - 0.88 W 25V / 150 mA - 0.94 W 24V / 170 mA - 1.2 W	30V / 100mA 28V/300Ohm -

Cable resistance (there and back): 0.6 mm_ - 59 Ohm/km; 1.0 mm_ - 35 Ohm/km: 1.5 mm_ - 24 Ohm/km . Assign approx. 30 Ohm for line-resistance.

Guidance chart for IS-barriers, Isolating interface units and Remote I/O for Standard IS -coils

TYPE	MANUFACTURER	REFERENCE	EEx..	RESIST. of barrier in Ohm	IS ELECTRICAL PARTS						
					EEx ia IIC T6 LCIE/AUS 488650.01/03 488660.01/03 488670.01/03	EEx ia IIC T6 LCIE/FM/CSA 490885 490890 490895	EEx ia IIC T6 LCIE/AUS 483580.01/03 483960,01	Exia LCIE/FM/CSA 490880 493997	EEx ia IIB T6 LCIE 482160,01	EEx ia IIC T6 LCIE 482870,01	Ex ia LCIE/FM/CSA 492335
Shunt Diode Safety barriers (passive)	**MTL**	7128P	ia	275							
		728,7028	ia	332	x	x	x	x	x	x	x
	Pepperl & Fuchs	Z 728	ia	300	x	x	x	x	x	x	x
		Z779	ia	300	x	x	x	x	x	x	x
	STAHL	9001/01-252-100-14	ia	252	x	x	27Vmin./LRmax 3	27Vmin./LRmax 3	x	x	x
		9001/01-280-100-10	ia	280	x	x	24Vmin./LRmax 3	24Vmin./LRmax 3	x	x	x
		9001/01-280-110-10	ia	255	x		24Vmin./LRmax 3		x	x	
		9002/13-280-100-04	ia	340	24Vmin./LRmax3	24Vmin./LR3	27Vmin./LRmax 3	27Vmin./LRmax 3	24Vmin./LRmax 3	24Vmin./LRmax 3	24Vmin./LRmax 3
Galvanic Isolated Interface Units (actives) and Remote I/O	**A puissance 3**	NAEV 22-140	ia		x		x		x	x	
		NAEV 26 -100	ia		x		x		x	x	
	ABB	V17132-54	ib		x		LRmax 5		x	x	
		V17132-55	ib		x				x	x	
		V17132-61	ia		x				x	x	
		DO 890	ib		x		x		x	x	
		S900- DO4-Ex	ib		x		x		x	x	
	BARTEC	07-7331-2301/1000	ia		x				x	x	
		07-7331-2301/1100	ia		x		x		x	x	
	BRADLEY	FEX-EX 24V	ia		x	x	x	x	x	x	
	COOPER	LB 2101	ia		x	x	LRmax15	LRmax15	x	x	x
		LB 2105	ia		x	x	x	x	x	x	x
		LB 2112	ia		x	x	x	x	x	x	x
	ELCON	1881 / 1882	ia		x	x	x	x	x	x	x
		471 / 472	ia		x	x	x	x	x	x	x
		2871/2872	ia		x	x	x	x	x	x	x
		2875/2876	ia		x	x	x	x	x	x	x
	GEORGIN	AVB 122	ia		x		x		x	x	
		AVB 125	ia		x		x		x	x	
		AVB 128	ia		x		x		x	x	
	HIMA	F3328A	ib		x		LRmax 5		x	x	
		F3335	ib		x				x	x	
		H4007	ib		x		x		x	x	

Conditions: ED 100%, Max. ambient temp. 60°C. Coils marked with **x**: Suitable for > 30 Ohm additional Line Resistance. LRmax = max.additional Line Resistance in Ohm with min. voltage if required.

Guidance chart for IS-barriers, Isolating interface units and Remote I/O for Standard IS -coils

TYPE	MANUFACTURER	REFERENCE	EEx..	RESIST. of barrier in Ohm	IS ELECTRICAL PARTS						
					EEx ia IIC T6 LCIE/AUS 488650.01/03 488660.01/03 488670.01/03	EEx ia IIC T6 LCIE/FM/CSA 490885 490890 490895	EEx ia IIC T6 LCIE/AUS 483580.01/03 483960,01	Ex ia LCIE/FM/CSA 490880	EEx ia IIB T6 LCIE 482160,01	EEx ia IIC T6 LCIE 482870,01	Ex ia LCIE/FM/CSA 492335
Galvanic Isolated	**MTL**	3021, 4021, 4021S	ia		x		x		x	x	
Interface Units		3022	ia						x		
(actives)		4023	ia						x		
and Remote I/O		4024	ia		x		x		x	x	
		4025	ia		x	x	x	x	x	x	x
		5021, 5023, 5024	ia		x		x		x	x	
		5025	ia		x		x		x	x	x
	Pepperl & Fuchs	EGA-041-3	ia		x	x	x	x	x	x	x
		KFD2-SD-Ex1.36	ia						x		
		KFD2-SD-Ex1.48	ia		x		x		x	x	x
		KFD2-SL-Ex1.36	ia						x		
		KFD2-SL2-Ex1.LK	ia		x		x		x	x	
		KFD2-SL2-Ex2	ia		x		x		x	x	
		KFD2-SL-Ex1.48	ia		x		x		x	x	x
		KSD2-BO-Ex	ia		x	x	x	x	x	x	x
		RSD-BO-Ex4	ib		x		x		x	x	x
	STAHL	9311/52-11-10	ia		x	x	25Vmin/LRmax 3	25Vmin./LRmax 3	x	x	x
		9111/63-11-00	ia		x	x	25Vmin./LRmax3	25Vmin./LRmax 3	x	x	x
		9351/10-15-10	ia		x	x			x	x	x
		9351/10-16-10	ia		x		x		x	x	
		9351/10-17-10	ia						x		
		9381/10-187-050-10	ib		x	x	x	x	x	x	x
		9381/10-246-055-10	ib		x	x	x	x	x	x	x
		9381/10-246-070-10	ib		x	x	x	x	x	x	x
		9475/12-04-11	ia		x	x			x	x	x
		9475/12-04-21	ia/ib		x		x		x	x	
	TURCK	MK72-S01-Ex	ib						x	x	
		MK72-S02-Ex	ib						x	x	
		MK72-S04-Ex	ib		x		x		x	x	
		MK72-S05-Ex	ib		x				x	x	
		MK72-S06-Ex	ib		x		x		x	x	
		MK72-S07-Ex	ib		x				x	x	
		MK72-S12-Ex	ia		x		x		x	x	
		MC72-41	ia		x		x		x	x	
		MC72-43	ia		x		x		x	x	

Conditions: ED 100%, Max. ambient temp. 60°C. Coils marked with **x**: Suitable for > 30 Ohm addiditional Line Resistance. LRmax = max.additional Line Resistance in Ohm with min. voltage if required.

IS Booster coils parameters

IS - BOOSTER ELECTRICAL PARTS						
Type of IS-protection		**EEx ia IIB T6**	**EEx ia IIC T6**	**EEx ib IIB T6**	**EEx ib IIC T6**	**Ex ia**
Order reference		**492965.01/02**		**482660**	**483330,01**	**490860**
Certified by		**LCIE**		**LCIE**	**LCIE**	**LCIE/FM/CSA**
Function parameters	**Resistance of coil winding at 20°C** (for information only)	85 Ohm		23 Ohm	23 Ohm	23 Ohm
	Impedance of electrical part	275 Ohm/13V		50 Ohm *	50 Ohm *	50 Ohm *
	Minimum voltage required for functionning at 60°C	13 V		21.6 V	21.6 V	21.6 V
	Minimum current required for functionning (attraction)	-		-	-	-
	Minimum current required for functionning (holding)	**20 mA**		**45 mA**	**45 mA**	**45 mA**
	Inductance [L] of coil (mH apparent)	-		0	0	0
	Capacitance [C] of coil (µF apparent)	-		0	0	0
	Ambient temperatures	-40 °C to +65 °C		-40 °C to +65 °C	-40 °C to +65 °C	+65°C
	Maximum current for continuous line check	4 mA		0	0	0
Security parameters	**Maximum admissible voltages /current**	28V / 280mA - 1.96 W 27V / 320mA - 2.16 W 26V / 350 mA - 2.27 W 25V / 390 mA - 2.43 W 24V / 430 mA - 2.58 W	28V / 110mA - 0.77 W 27V / 120mA - 0.81 W 26V / 135 mA - 0.88 W 25V / 150 mA - 0.94 W 24V / 170 mA - 1.2 W	28V / 280mA - 1.96 W 27V / 320mA - 2.16 W 26V / 350 mA - 2.27 W 25V / 390 mA - 2.43 W 24V / 430 mA - 2.58 W	28V / 110mA - 0.77 W 27V / 120mA - 0.81 W 26V / 135 mA - 0.88 W 25V / 150 mA - 0.94 W 24V / 170 mA - 1.2 W	see certif. FM/CSA.

Cable resistance (there and back): 0.6 mm_ - 59 Ohm/km; 1.0 mm_ - 35 Ohm/km; 1.5 mm_ - 24 Ohm/km. Assign 30 Ohm for line-resistance.

*** Attention : For function tests without barrier, only with in series connected resistance of min. 170 Ohm.**
Assign approx. 30 Ohm for line - resistance.

8700/GB

Guidance chart for IS-barriers, Isolating Interface Units and Remote I/O for Booster IS -coils

TYPE	MANUFACTURER	REFERENCE	EEx..	RESIST. of barrier in Ohm	IS Booster coil			
					EEx ia IIC T6 492965.01/02	EEx ib IIB T6 482660	EEx ib IIC T6 483330,01	Ex ia 490860
					LCIE	LCIE	LCIE	LCIE/FM/CSA
Shunt Diode	**MTL**	728	ia		x			
Safety Barriers		728,7028	ia		x			
(passive)	**Pepperl & Fuchs**	Z 728	ia		x	x	x	
		Z 779	ia		x			
	STAHL	9001/01-252-100-14	ia	252	x	x	x	
		9001/01-280-100-10	ia	280	x	x	x	x
		9001/01-280-110-10	ia	255	x	x	x	
		9002/13-280-100-04	ia	340	17Vmin/LRmax30	26Vmin/LRmax3	26Vmin/LRmax3	26Vmin/LRmax3
Galvanic Isolated	**A puissance 3**	NAEV 26 - 1002-140	ia		x	x	x	
Interface Units	**ABB**	V171132-54	ib		x			
(active)		V171132-55	ib		x			
and Remotes I/O		V171132-61	ia		x			
		DO 890	ib		x	x	x	
		S900-DO4-Ex	ib		x			
	BARTEC	07-7331-2301/1000	ia		x			
		07-7331-2301/1100	ia		x			
	BRADLEY	FEX-EX 24V	ia		x	x	x	x
	COOPER	LB 2101	ia		x			
		LB 2105	ia		x	x	x	x
		LB 2112	ia		x	x	x	x
	ELCON	1881 / 1882	ia		x	x	x	x
		471 / 472	ia		x	x	x	x
		2871/2872	ia		x	x	x	x
		2875/2876	ia		x	x	x	x
	GEORGIN	AVB 122	ia		x	x	x	
		AVB 125	ia		x	x	x	
		AVB 128	ia		x	x	x	
	Hima	F3328A	ib		x	x	x	
		F3335	ib		x	x	x	
		H4007	ib		x	x	x	
	MTL	3021, 4021, 4021S	ia		x	x	x	x
		3022	ia			x		x
		4023	ia			x		
		4024	ia		x	x	x	x
		4025	ia		x	x	x	x
		5021, 5025	ia		x			

Conditions: ED 100%, Max. ambient temp. 60°C. Coils marked with x: Suitable for > 30 Ohm addiditional Line Resistance.
LRmax = max.additional Line Resistance in Ohm with min. voltage if required.

Guidance chart for IS-barriers, Isolating Interface Units and Remote I/O for Booster IS -coils

TYPE	MANUFACTURER	REFERENCE	EEx..	RESIST. of barrier in Ohm	IS Booster coil			
					EEx ia IIC T6 492965.01/02	EEx ib IIB T6 482660	EEx ib IIC T6 483330,01	Exia 490860
					LCIE	LCIE	LCIE	LCIE/FM/CSA
Galvanic Isolated	**Pepperl & Fuchs**	EGA-041-3	ia		x			
Interface Units		KFD2-SD-Ex1.36	ia			x		
(active)		KFD2-SL-Ex1.36	ia			x		
and Remotes I/O		KFD2-SD-Ex1.48	ia		x			
		KFD2-SL-Ex1.48	ia		x			
		KFD2-SL-Ex1.48.90A	ia		x	x	x	x
		KFD2-SL-Ex1.48.90A	ia		x	x	x	x
		KFD2-SL2-Ex1.LK	ia		x			
		KFD2-SL2-Ex2	ia		x			
		KSD2-BO-Ex	ia		x			
		RSD-BO-Ex4	ib		x			
		RSD-VO-Ex8	ib		x			
	PULS	5RD00-0AB0	ib					
	STAHL	9311/52-11-10	ia		15Vmin/LRmax30	x	x	
		9111/63-11-00	ia		15Vmin/LRmax30	x	x	
		9351/10-15-10	ia		x	x	x	
		9351/10-16-10	ia		x	x	x	
		9351/10-17-10	ia			x		
		9381/10-187-050-10	ib		x		x	
		9381/10-246-055-10	ib		x	x	x	
		9381/10-246-070-10	ib		x	x	x	
		9465/12-08-11	ib		x			
		9475/12-04-31	ib		x			
		9475/12-08-51	ib		x			
	Turck	MK72-S01-Ex	ib		x			
		MK72-S02-Ex	ib		x			
		MK72-S04-Ex	ib		x			
		MK72-S05-Ex	ib		x			
		MK72-S06-Ex	ib		x			
		MK72-S07-Ex	ib		x			
		MK72-S09-Ex	ia			x	x	
		MK72-S12-Ex	ia		x			
		MC72 - 41	ia		x			
		MC72 - 43	ia		x			
		MC72 - 44	ia		x			

Conditions: ED 100%, Max. ambient temp. 60°C. Coils marked with x: Suitable for > 30 Ohm addiditional Line Resistance.
LRmax = max.additional Line Resistance in Ohm with min. voltage if required.

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Accessories

	**DIN plug connector according to DIN 43650 AB Pg 9 2P+T** No. 481043 Electrical connection suitable for all 22 mm coils (e.g. 488980, 481180)
	**DIN plug connector according to DIN 43650 AA Pg 9 2P+T** No. 486586 for standard version No. 492645 for high temperature version Electrical connection suitable for all 32 mm coils (e.g. 481865, 492425)
	**Stainless steel assembly kit** Nut No. 482213 M14 x 1+ Ring No. 482214 + O-Ring No. 483917 Coil assembly kit for offshore electrical parts. (e.g. 482160.01, 482870.01, 483330.01, 492210, 492965.01)
	**Cable gland** No. 493841 - M20x1.5 - EEx ia IIC Electrical connection and mooring cable with 6 to 12 mm diameter, for electrical parts approved ‘‘me’’, ‘‘ia’’. (e.g. 492965...)
	**Cable gland** No. 493426 - 1/2"-14 NPT Electrical connection and mooring cable with 6 to 12 mm diameter, for flameproof approved electrical parts. (e.g. 493640)

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Voltage code		A1	A2	A4	A5	0A	A7	3D	F4	A9	B2	K8	6J	B7	J3	B8	7J	S2	4K	P0	S4	P2	P3	1P	S5	0P	R5	P9	3P	S6	S2	Q3	Q1	5P	C1	C2	N7	L8	C4	C5	C7
Coils / Electrical parts		12/50	24/50	48/50	110/50	110/50-115/50	220/50	220/50-230/50	230/50	380/50	24/60	115/60	110/60-115/60	220/60	230/60	240/60	220/60-230/60	200/60-230/60	220/60-240/60	24/50-24/60	48/50-48/60	110/50-60	110/50-120/60	110-115/50,	110-115/50,	100/50, 115/60	220/50-60	230/50-60	220-230/50-60	220-240/50-	220/50-230/60	220/50-240/60	240/50-60	380/50-440/60	12/DC	24/DC	28/DC	30/DC	48/DC	110/DC	220/DC
Ref.	Code																																								
Coils																																								
481000	EZ01		●	●		●		●			●		●						●															●	●	●			●	●	●
481044	EZ91		●		●		●		●	●	●			●												●				●										
481180	DA03		●			●		●																											●						
481865	DZ02		●	●	●			●		●	●	●			●																			●	●			●	●	
482730	DZ90		●			●		●				●																							●				●		
482740	DZ10																																		●						
483510	DZ06																			●	●				●				●												
483520	EZ90																			●									●												
483590	DA05																			●	●				●				●												
484990	MZ01																			●	●			●				●													
485100	EZ02		●			●		●																												●					
485400	MZ02																																		●	●			●	●	●
486265	EZ92		●		●		●		●	●				●				●								●				●				●	●			●		
488980	DA01		●	●		●		●			●		●				●																	●	●			●	●	
491514	D400										●												●								●			●	●					
492425	DZ08		●		●				●																										●						
492453	DZ04		●	●	●			●		●																									●	●					
Electrical parts																																									
482160.01	VZ22																																				●				
482605	VA01		●			●		●																												●				●	
482606	VA02		●	●		●		●			●		●				●																	●	●			●	●	
482606.10	VA12							●																												●					
482606.160	VA07							●																												●					
482660	VZ11																																				●				
482870.01	VZ23																																				●				
483250	HZ08		●	●	●		●																												●				●	●
483270	HZ19																			●	●			●				●							●	●			●	●	
483330.01	VZ12																																				●				
483371	HZ06	●	●	●	●		●		●										●																●	●			●	●	
483371.01	HZ14																																			●				●	●
483371.05	HZ15		●	●					●																										●	●			●	●	
483580.01	DZ12																																				●				
488650.01	VZ07																																				●				
488660.01	VZ08																																				●				
488670.01	VZ09																																				●				
490880	DZ18																																				●				
490885	VZ33																																				●				
490890	VZ18																																				●				
490895	VZ20																																				●				
491117	VZ04																																			●					
492070	VZ01																			●		●					●	●					●		●	●			●	●	
492070.60	VZ96																										●									●					
492190	VZ03																			●		●					●	●					●		●	●			●	●	●
492190.05	VZ95																										●									●					
492190.10	VZ90																										●									●					
492200	VZ13																																			●					
492210	VZ26																																			●					
492270	VZ02																			●							●						●		●	●			●	●	
492300	VZ14																			●		●					●						●		●	●			●	●	
492310	VZ27																			●							●								●	●			●	●	
492335	VZ30																																				●				
492370	VZ05																										●									●					
492390	VZ06																										●									●					
492670	HZ05		●	●	●				●							●																		●	●			●	●	
492670.10	HZ90								●																											●					
492670.160	HZ91								●																											●					
492965.01	VZ91																																				●				
492965.02	VZ92																																				●				
493640	HZ09								●																							●			●			●		
494035.10	VZ93																																				●				
494040	HZ23		●			●		●																												●					

Part 4: Explosive environments

4.1. Introduction

Current European regulations concerning electrical equipment for potentially explosive environments are based on optional and partial European directives which require regular modification in the form of application or adaptation directives in order to keep pace with technical developments.

The basic European text in this field, directive **76/117/EC**, which allow the free circulation of goods within the European Union, provides the general framework for the present regulations.

Electrical equipment for use in potentially explosive environments is certified by a government-approved body when it meets relevant European standards (EN 50014 and upwards) covering each type of protection (**d, i, e, m, p**, etc.). Such equipment is then issued with a **European certificate of conformity and control**, entitling it to carry the distinctive mark:

This mark opens the way for trading within the European Union and occasionally beyond.

This system has now been in operation for more than 15 years. Although largely beneficial, it has revealed certain drawbacks, notably a lack of flexibility and the absence of a global concept for safety. It has now been completely revised by the **new European directive 94/9/EC from March 23, 1994**.

The certificates of conformity to harmonised standards obtained in compliance with previous directives will remain valid until June 30, 2003, but their validity will cover only conformity to the harmonised standards specified in these directives.

European Commission mark for "Ex" equipment

European Community member states

Austria - A	**Belgium - B**	**Denmark - D**	**Germany - D**	**Finland - FIN**
France - F	**Great Britain - GB**	**Greece - GR**	**Ireland - IRL**	**Italy - I**
Luxembourg - L	**Netherlands - NL**	**Portugal - P**	**Spain - E**	**Sweden - S**

4.2 Definitions *(ref. IEC 60079-10)*

4.2.1 Explosive gas environments

Mixture with air, under atmospheric conditions, of flammable substances in the form of gases, vapour, mists or dusts in which, after combustion has occured, combustion spreads to the entire unburned mixture.

4.2.2 Hazardous areas

A hazardous area is an area in which an explosive gas environment is present, or may be expected to be present, in quantities such as to require special precautions for construction, installation and use of electrical apparatus.

4.2.3. Ingredients for an explosion

When combustible materials are mixed with air, an explosive mixture is produced. Danger of explosion therefore exists wherever these hazardous materials are handled: such a condition is to be found on the biggest chemical plant as well as at the smallest filling station.

Nowadays with the use of electronic and electrical instrumentation in process control, the risk of combustion by electrical energy has increased sharply.

To protect personnel and expensive equipment special precautions should be taken to prevent combustion of those dangerous substances. Conditions likely to ignite explosive mixtures are as follows:

- Electrical sparks and arcs produced when circuits are opened and closed (e.g. relay contacts)
- Conductors heated by passage of current or by faulty apparatus.
- Mechanical sparks; moving object hitting stationary object.
- Electrostatic sparks caused by charged components.
- Chemical action.
- Lightning strikes.
- Radio waves

4.2.4 Zones

The hazardous areas are classified in zones based on the frequency of the occurrence and the duration of an explosive gas environment as follows:

- **Zone 0**

An area in which an explosive gas environment is present continuously or is present for long periods
Type of protection: ia - intrinsic Safety

- **Zone 1**

An area in which an explosive gas environment is likely to occur in normal operations.
Type of protection: d - flameproof enclosure, e - increased safety, ib - intrinsic safety, m - encapsulation

- **Zone 2**

An area in which an explosive gas environment is not likely to occur and if it does occur it will exist for a short period only.
Type of protection: n - protection (IEC 60079-15)

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Classification of hazardous location

Explosive environment	**Continuous presence**	**Intermittent presence** (normal operation conditions)	**Occasional presence** (abnormal operation)
IEC	Zone 0 (gas) Zone 20 (dust)	Zone 1 (gas) Zone 21 (dust)	Zone 2 (gas) Zone 22 (dust)
Europe	Zone 0 (gas) Zone 20 (dust)	Zone 1 (gas) Zone 21 (dust)	Zone 2 (gas) Zone 22 (dust)
Canada (CEC)˙ **USA** (NEC) ˝	Cl. I Div.1 (gas) Cl. II Div.1 (dust) Cl.III Div.1 (fibres)	Cl. I Div.1 (gas) Cl. II Div.1 (dust) Cl.III Div.1 (fibres)	Cl. I Div.2 (gas) Cl. II Div.2 (dust) Cl.III Div.2 (fibres)

˙ **(CEC)**: Code Canadien d'Electricité / ˝ **(NEC)**: National Electrical Code

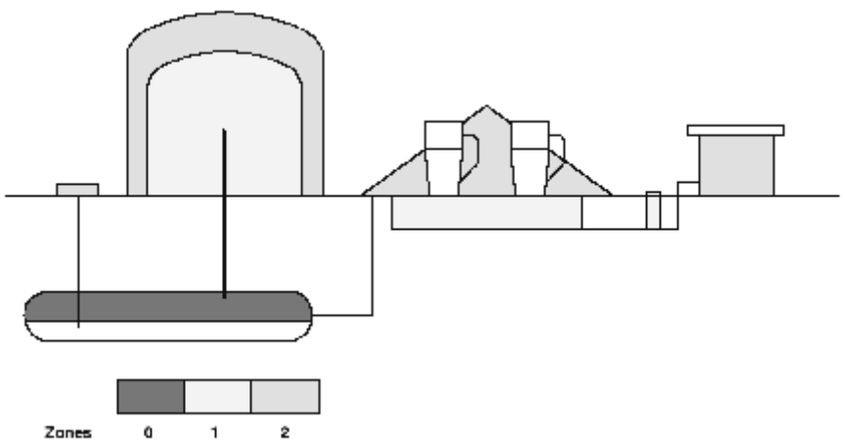
Zones and types of protection (gas applications)

Type of protection	**ia**	**ib**	**o, p, q, d, e, m,** or combination between 2 or more types
Suitable zones	**0**	**1**	1, 2

Some additional tests for gas and dust applications are applied to the product according to the new ATEX directive related to the EN 50281-1-1 and EN 50281-1-2 standards:

Type of protection	**ia**	**ib**	**o, p, q, d, e, m,** or a combination of 2 or more types
Suitable zones	**20**	**21**	21, 22

Example of classification:

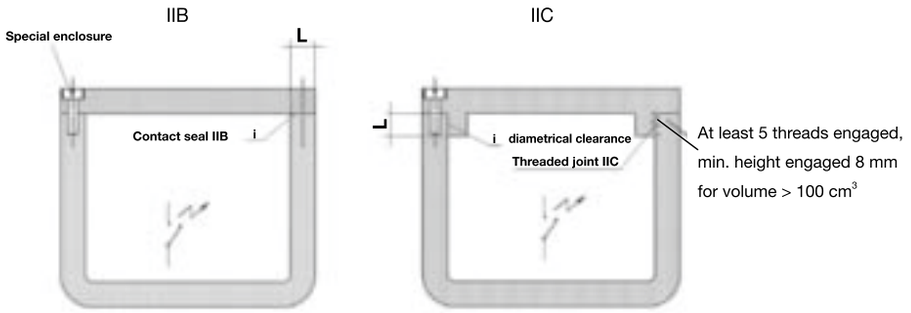


4.5. Types of protection used by Lucifer

4.5.1 Flameproof enclosure

"d"

A type of protection where the parts that can ignite an explosive environment are placed in an enclosure which can withstand the pressure developed during an internal explosion of an explosive mixture and which prevents the transmission of the explosion to the explosive environment surrounding the enclosure.



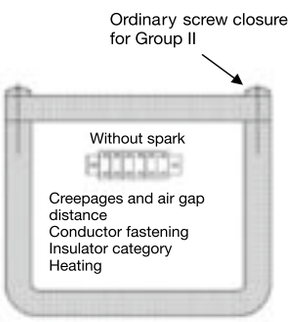
For volume > 2 dm^3
Mini length L = 12.5 mm
Max gap i = 0.15 mm

For volume > 2 dm^3
Mini length L = 25 mm
Max dia. clearance i = 0.15 mm

4.5.2 Increased safety

"e"

Type of protection applied to electrical apparatus that does not produce arcs or sparks in normal service, in which additional measures are applied so as to give increased security against the possibility of excessive temperatures and of the occurrence of arcs and sparks.

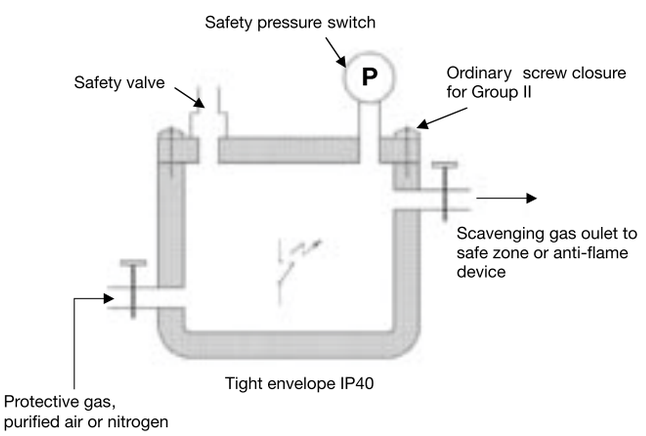


Tight envelope IP54

4.5.3 Pressurized apparatus

"p"

A type of protection by which the entry of a surrounding environment into the enclosure of the electrical appartus, is prevented by maintaining, inside the said enclosure, a protective gas at a higher pressure than that of the surrounding environment. The overpressure is maintained either with or without a continuous flow of the protective gas.

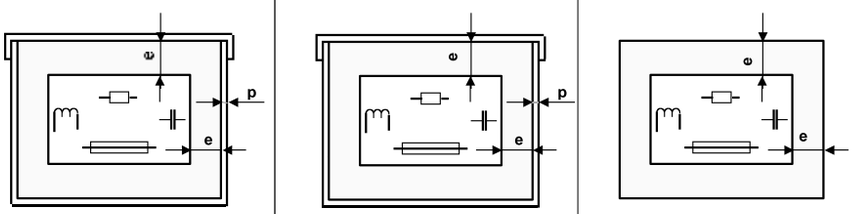


Tight envelope IP40

4.5.4 Encapsulation

“m”

A type of protection in which the parts which could ignite an explosive environment by either sparking or heating are enclosed in a compound in such a way that this explosive environment cannot be ignited



Potting
Metallic envelope
e > 1 mm

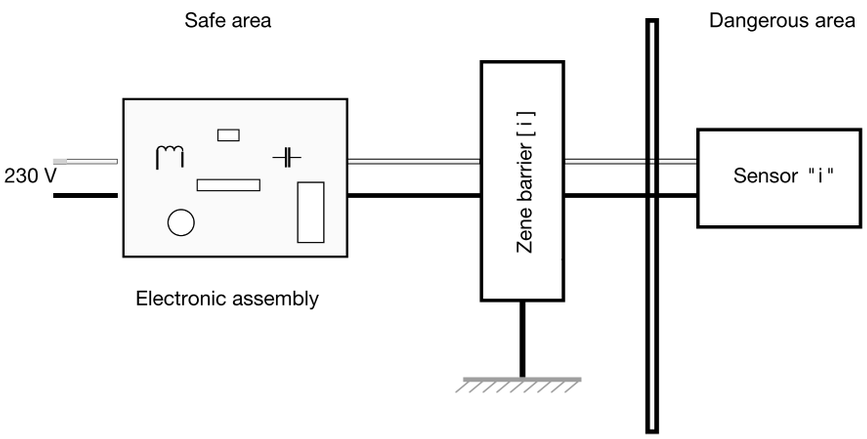
Potting
Insulating envelope
If p > 1 mm, e non-imposed
If p > 1 mm, e + p > 3 mm

Casing
without envelope
e > 3 mm

4.5.5 Intrinsic safety

“i”

A circuit in which no spark or any thermal effect produced in the test conditions prescribed in the standard EN 50020 (which include normal operation and specified fault conditions) is capable of causing combustion of a given explosive environment.



Principles of operation

Solenoid valves are electro-mechanical devices that control fluid flow. This is achieved by opening or closing one or several orifices in the solenoid valve. The (solenoid) coil is the electrical element that converts an electrical signal into a mechanical force which, in turn, shifts the mobile plunger that opens or closes an orifice (nozzle) by means of its seat disc(s).

Solenoid valves are usually constructed from 3 distinct components:
- the body (including the sleeve assembly)
- the coil (or coil housing)
- the housing (or nut/nameplate fixing elements).

These 3 modular components are in many cases interchangeable i.e. a valve body can be used with a number of coil/housing combinations. This catalogue presents the main recommended versions. Your distributor will be pleased to speak to you about other specific versions.

Direct operated valves (see fig. 1)
The magnetic force is used directly to open or close the passage of fluid at the plunger sealing. The performance is limited by the available performance of the coil (limits of pressure/orifice size.) The pressure rating of the valve starts from zero bar to the maximum value.

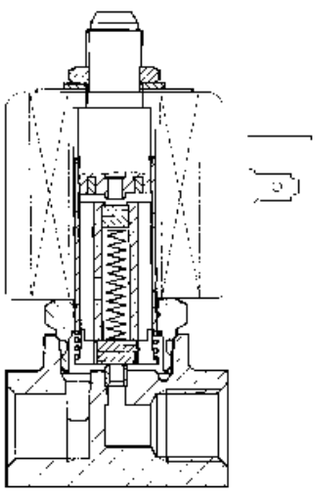


Fig. 1

Pilot operated valves (see fig. 2 and 3)
In cases where it is necessary to control higher flow/higher pressure it is necessary to use pilot operated valves. The supply pressure enters the direct operated "pilot stage" which directs the flow to a "pilot chamber" which, in turn, applies the pilot pressure over a large area (generally a diaphragm or a piston). Therefore, a large force is generated to move the main sealing elements against higher pressure or over a large orifice. One condition of operation is to have a minimum pressure (indicated in the catalogue table) available to shift the valve. In most applications this presents no particular problems (refer to "Magnalift valves" below). The pressure rating of the valve starts from a minimum value (0.3 or 0.5 bar) up to the maximum value.

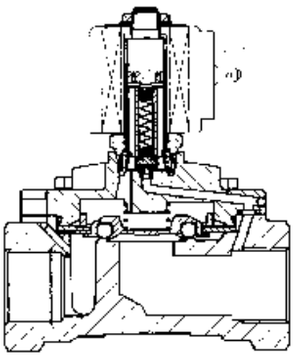


Fig. 2

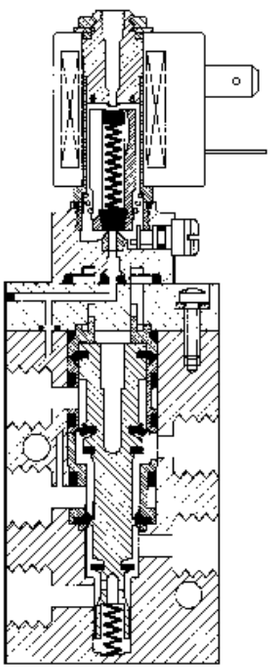


Fig. 3

Magnalift valves (see fig. 4)
The magnalift valves combine the features of a direct operated and a pilot operated valve. A mechanical link between the plunger and the diaphragm retainer allows the valve to operate as a direct operated valve at low pressures and as a pilot operated valve at higher pressures.

The advantage of this design is that the pressure rating of the valve starts from zero bar to the maximum value. Magnalift valves are specified when the valve controls the emptying/filling of a tank under gravity.

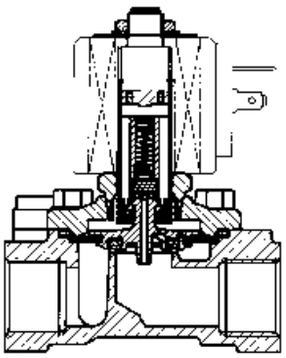


Fig. 4

Flow rate

Liquids

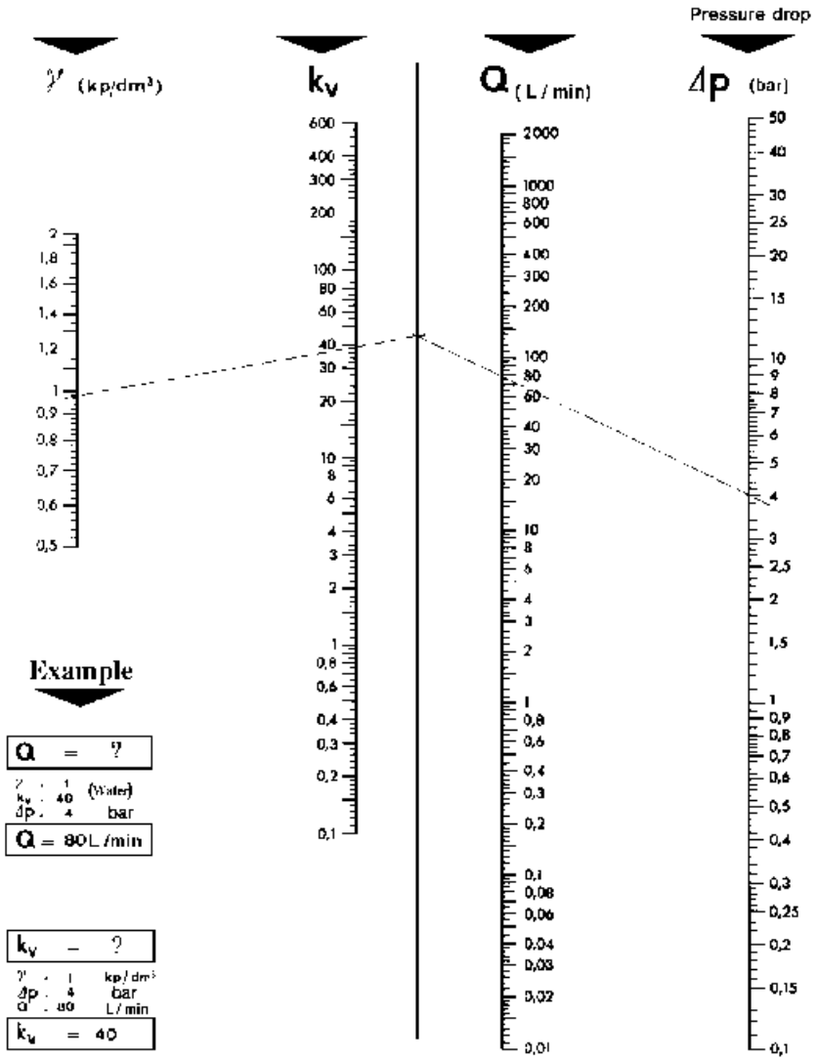
The flow through a pipe or a valve is given by:

$$Q = k_V\sqrt{(\Delta p/\gamma)}$$

where Q = flow (L/min)
Δ = pressure drop (bar)
γ = density of fluid (kg/dm³)
k_V = flow factor of the pipe or valve (L/min)
For water γ = 1 kg/dm³

Flow factor k_V
The kv flow factor of a valve is defined as the flow rate of water in litres per minute with a pressure drop of 1 bar across the valve. Valve manufacturers use different definitions for kv i.e. kv may be expressed in L/h or m³/h, etc. Care should therefore be taken when comparing values.

Maximum flow rate Qmax.
For particular 2-way valves the maximum flow must be limited for reasons of mechanical resistance and durability. A very high flow velocity may dislocate a poppet sealing or a diaphragm. Maximum flow rates are indicated in the catalogue.



Nomogram for liquid flow calculation

Gases

Nominal flow Q_n
Calculations can be made with specific flow factors based on the CETOP RP 50P standard. For practical purposes and ease of valve selection the catalogue shows the nominal flow Q_n. The nominal flow Q_n is defined as the flow rate (L/min) of air across the valve when the inlet pressure p_1 = 6 bar and the pressure drop Δp = 1 bar.

N.B. THE VALUES OF FLOW FACTORS AND FLOW RATES MENTIONED IN CATALOGUES ARE SUBJECT TO ±15% TOLERANCES.

For detailed technical information please ask for publication 1230/GB

Unit conversion tables/designation of sealing materials

Measures

1 inch = 25.4 mm
1 mm = 0.039 inch
1 U.S. gallon = 3.785 litres
1 imperial gallon= 4.546 litres

Pressure

1 bar = 1.02 kg/cm^2 = 0.98 atm
= 10^5 Pa = 100 kPa
1 bar = 14.51 psi
1 psi = 0.0689 bar = 0.0703 kg/cm^2

Flow rate

k_v in L/min/Δp = 1 bar
c_v in gpm/Δp = 1 psi
1 c_v = 0.07 k_v
1 k_v = 14.28 c_v

1 gpm (U.S. gallon) = 3.785 L/min
1 L/min = 0.0353 cfm

Temperature

°F = °C x 9/5 +32
°C = (°F -32) x 5/9

Torque

1 in. lb. = 0.113 Nm
1 Nm = 8.25 in. lb.

Designation of sealing materials

ASTM Designation	Commercial Designation
NBR	Nitrile rubber, Buna-N,, Perbunan
FKM	Fluoroelastomer
EPDM	Ethylene propylene
PCTFE	Kel-F
PTFE	
CR	Neoprene
PUR	Polyurethane
PFPM	Kalrez

Size

mm	inches	decimal inches
0.79	1/32	0.031
1.59	1/16	0.063
2.38	3/32	0.094
3.18	1/8	0.125
3.97	5/32	0.156
4.76	3/16	0.188
5.56	7/32	0.219
6.35	1/4	0.250
7.14	9/32	0.281
7.94	5/16	0.313
8.73	11/32	0.344
9.53	3/8	0.375
10.3	13/32	0.406
11.1	7/16	0.438
11.9	15/32	0.469
12.7	1/2	0.500
13.5	17/32	0.531
14.3	9/16	0.563
15.1	19/32	0.594
15.9	5/8	0.625
16.7	21/32	0.656
17.5	11/16	0.688
18.3	23/32	0.719
19.1	3/4	0.750
19.8	25/32	0.781
20.6	13/16	0.813
21.4	27/32	0.844
22.2	7/8	0.875
23.0	29/32	0.906
23.8	15/16	0.938
24.6	31/32	0.969
25.4	1	1.000

Fluid compatibility of LUCIFER valves

Key:
NBR = Buna N, Perbunan
FKM = Viton
EPDM = Ethylene - Propylene
PTFE = Teflon
PFPM = Kalrez
PCTFE = Kel F
CR = Neoprene
* Without phase shift ring only with DC coil

VALVE FUNCTIONS	2/2 DIRECT OPERATED																2/2 SERVO OPERATED						3/2 DIRECT OPERATED																				3/2 SERVO OPERATED				5/2 SERVO OPERATED			
VALVE TYPES	121F-K-M V0 122K-V8-V9 125K				121C1. 121C2.				121V5 122V5				Special valve on request				221G 222G 321F-G-H-K 322F-G-H-K 325K				221G5		131C-F-K-M-V0-V1-X0 132F-K-M-V0-V1 133F-K-V0-V1-X0 135K					131E				131T2.-T5. 132T2.-T5. 133T2.				131V5. 132V5 133V5				Special valve on request				331B-F-L 332B-F-L 335B-F-L 531L				341B-F-L 345B-F-L 347B-F-L 541L			
BODY MATERIALS	Brass				Brass				St. steel				St. steel				Brass/bronze				St. steel		Brass					Brass				Brass				St. steel				St. steel				Aluminium				Aluminium			
FLUIDS ▼ SEALING DISCS OR MEMBRANES ▶	FKM	PCTFE	Ruby	EPDM	FKM	Ruby			FKM	Ruby	PTFE	EPDM	PFPM	PCTFE	PTFE		NBR	FKM	EPDM		FKM	EPDM	FKM	PCTFE	Ruby	EPDM	NBR	FKM	PCTFE	Ruby	EPDM	FKM	Ruby	PFPM	CR	PCTFE	EPDM	NBR				NBR			
Acetone		•	•	•			•			•	•	•	•	•	•				•					•	•	•			•	•	•			•	•	•											
Acetylene, dry* +20°C	•				•					•	•	•			•		•	•	•				•				•				•				•												
Acid - Boric* +20°C									•	•	•	•	•		•																	•	•	•			•										
Acid - Chrome <40%, +20°C									•	•	•			•	•																	•	•			•										
Acid - Citric <10%, +20°C									•	•	•				•																	•	•													
Acid - Hydrochloric 1%, +20°C									•	•	•	•	•	•	•																	•	•	•		•	•									
Acid - Lactic +20°C									•	•																						•	•													
Acid - Nitric* <10%, +20°C									•	•	•		•		•																	•	•	•												
Acid - Phosphoric <10%, +20°C									•	•	•			•	•																	•	•			•										
Acid - Picric <10%, +20°C									•	•	•		•		•																	•	•	•												
Acid - Salicylic <10%									•	•	•				•																	•	•													
Acid - Sulphuric <20%															•																															
Acid - Sulphurous <5%, +20°C															•																															
Air, hot +120°C	•		•		•	•			•	•	•		•		•			•			•		•		•			•		•		•	•	•											
Air, unlubricated	•	•	•		•	•			•	•	•		•	•	•			•			•		•	•	•			•	•	•		•	•	•		•							•		
Alcohol - Amyl alcohol				•						•	•	•			•				•							•						•					•								
Alcohol - Butyl alcohol (Butanol)	•	•	•		•	•			•	•	•		•	•	•			•			•		•	•	•			•	•	•		•	•			•								
Alcohol - Ethyl alcohol (Ethanol)		•	•	•		•				•	•	•		•	•		•		•					•	•	•			•	•	•					•	•							
Alcohol - Methyl alcohol (Methanol)		•	•	•		•				•	•	•		•	•		•		•					•	•	•			•	•	•					•	•							
Alcohol - Propyl alcohol (Propanol)		•		•	•	•			•	•	•	•	•		•			•			•			•	•	•			•	•	•			•										
Ammonia, gas (anhydrous) +60°C										•	•	•		•	•																	•			•	•	•								
Aniline*										•	•				•																	•												
Argon		•				•				•	•	•			•			•											•			•	•												
Beer										•	•	•	•	•	•																	•	•	•			•								
Benzine - leaded and unleaded (motor)		•	•	•		•	•			•	•	•		•	•			•						•	•	•			•	•	•			•	•								
Chloroform +20°C		•				•				•	•	•		•	•			•						•					•			•	•	•										
Cider										•	•	•		•	•																	•	•	•		•									
Coffee										•	•	•	•	•	•							•										•	•	•			•								
Cream										•	•	•		•																		•	•	•											
Cyclohexane										•	•	•		•	•																	•	•	•											
Ethyl chloride																																															
Ethylene glycol (antifreeze)		•	•	•	•	•	•			•	•						•	•	•			•		•	•	•	•	•					•	•			•	•	•						
Exhaust gas																																															

Fire-resistant, non-aqueous hydraulic fluid	Fire-resistant, oil in water emulsions	Fire-resistant, water in oil emulsions	Fire-resistant, water/glycol solutions	Food products	Freon 12, gas	Freon 22	Helium	Kerosene JP-1 to JP-3	Lemon and orange juice	Mercury*	Milk	Naptha	Nitrogen	Oil - animal oil	Oil - ASTM oil, 1, 2, 3	Oil - diesel oil	Oil - estable oil	Oil - extra light, medium	Oil - fuel oil	Oil - greasing oil	Oil - heavy	Oil - silicone oil	Oil - transformer oil* on request	Oil - vegetable oil	Ozone gas/liquid* on request	Perchloroethylene +20°C	Phenol	Potassium sulfate	Soapy water	Sodium hydroxide	Toluene (Toluol)	Trichloroethylene	Turpentina	Water	Water - deionised/distilled	Water - demineralised	Water - drinkable	Water - hot and steam	Water - oxygenated* on request	Water - sea salt	Xylene
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322H73	7322HBG3TN00	32/92
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7131KBG2JV00	E 131K06	126/226
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7131KBG2LP00	E 131K0308	130/228
7131KBG2LP1D	E 131K03081D	130/228
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7131KBG2LRM0	E 131K6350	130
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7131KBG2LVM0	E 131K0350	128/228
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7131TBG2RV00	131T21	132
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7132KBG2JV00	132K06	132
7132KBG2LV00	132K03	132
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7133FBF4GVM0	E 133F4450	144
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7133FBF4JVM0	133F4650	144
7133FBF4LV00	E 133F43	146
7133FBF4LVM0	E 133F4350	144
7133KBG1GV00	E 133K14	134
7133KBG1JV00	E 133K16	134
7133KBG1LV00	E 133K13	134
7133KBG2BV00	E 133K05	176
7133KBG2GV00	E 133K04	134
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7322KBG3TVW0	322K4306	32
7322KBG4TVW0	322K4506	32
7322KBG51VW0	322K4606	32
7322KBG62VW0	322K4706	32
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7325KBG3TVW0	325K4306	34
7325KBG4TVW0	325K4506	34
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Parker Hannifin Corporation

About Parker Hannifin Corporation

Parker Hannifin is a leading global motion-control company dedicated to delivering premier customer service. A Fortune 500 corporation listed on the New York Stock Exchange (PH), our components and systems comprise over 1,400 product lines that control motion in some 1,000 industrial and aerospace markets. Parker is the only manufacturer to offer its customers a choice of hydraulic, pneumatic, and electromechanical motion-control solutions. Our Company has the largest distribution network in its field, with over 7,500 distributors serving more than 400,000 customers worldwide.

Parker's Charter

To be a leading worldwide manufacturer of components and systems for the builders and users of durable goods. More specifically, we will design, market and manufacture products controlling motion, flow and pressure. We will achieve profitable growth through premier customer service.

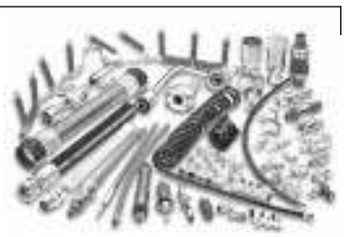
Product Information

North American customers seeking product information, the location of a nearby distributor, or repair services will receive prompt attention by calling the Parker Product Information Center at our toll-free number: 1-800-C-PARKER (1-800-272-7537). In the UK, a similar service is available by calling 0500-103-203.

The Aerospace Group is a leader in the development, design, manufacture and servicing of control systems and components for aerospace and related high-technology markets, while achieving growth through premier customer service.

The Climate & Industrial Controls Group designs, manufactures and sells system controls and protectors to refrigeration and air-conditioning customers worldwide. The Group also provides solenoid valves, process control valves, and gerotors for a multitude of industrial applications.

The Fluid Connectors Group designs, manufactures and markets rigid and flexible connectors, and associated products used in pneumatic and fluid systems.



The Seal Group designs, manufactures and distributes industrial and commercial sealing devices and related products by providing superior quality and total customer satisfaction.

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The Instrumentation Group is a global leader in the design, manufacture and distribution of high-quality critical flow components for worldwide process instrumentation, ultra-high-purity, medical and analytical applications.