Operating instructions

Ignition system high energy ZSH

(Representation of different versions)

High energy ignition unit ZSH-PP-16-INT

High energy ignition unit ZSH-KIT

High energy ignition unit ZSH-KIT-QD, ignition tip ZS-K

The operating instructions must be read carefully before assembly, commissioning and maintenance. The instructions must be observed and the operating instructions must be kept for later use!

Operating Instructions High Energy Ignition System ZSH		
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The d.s.f. GmbH, as manufacturer of the described high-energy ignition system, reserves the right to change the equipment and design of the device modules or individual assemblies at any time - even without prior notice. The actual availability results from the respective individual offer.

There is no notification when content is changed.

Illustrations may differ due to the representation of customer-based special solutions or further developments; no claim to the delivery of identical products can be derived from this.

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Description

The high-energy ignition system ZSH is used as direct spark ignition for most gaseous and liquid fuels of oil, gas pilot burners or main burners. The high energy ignition system is available in various designs. To ensure optimum function, the start of the ignition tip must always be in the ignitable fuel-air mixture under all operating conditions.
The high-energy ignition device is only used for commercial applications.
After successful ignition, the ignition tip must be de-energized and pulled out of the flame. If required, a pneumatic retraction device and systems for hazardous areas are optionally available for automation.

All versions are offered with the required and pre-tested individual parts as kit variants, the quick assembly is carried out by the customer on site. The standard length of the complete ignition electrode including ignition tip is 1m. If a different length is required, this is made possible by using extension tubes ZSH-VR in various lengths. The advantage is the lower shipping and packaging costs of the components. Upon customer request, d.s.f. GmbH can pre-assemble the ignition device and test it for overall function.

The cable for the supply voltage is provided by the customer and is not part of the delivery, but can be offered as an option.

ZSH-KIT-INT: The standard version consists of a high-energy ignition unit with tube receptacle, the ignition tip adapter and an exchangeable ignition tip if a compact design is required. The electrical connection of the ignition electrode is made directly in the high-energy ignition unit.

ZSH-KIT: The remote version consists of a high-energy ignition unit, an ignition cable guided through a flexible metal protection hose between the high-energy ignition unit and the ignition electrode (consisting of ignition tip adapter and replaceable ignition tip). The electrical connection of the ignition electrode is made in a junction box and directly in the high-energy ignition unit.

ZSH-KIT-QD: The remote, plug-in version consists of a high-energy ignition unit, an ignition cable routed through a flexible metal protective hose between the high-energy ignition unit and the ignition electrode (consisting of ignition tip adapter and replaceable ignition tip). The electrical connection is made with pre-assembled high-voltage connectors on both sides of the metal protection hose and the corresponding pre-assembled mating connectors on the ignition unit and the junction box with the ignition electrode. The electrical connection of the ignition electrode is made in the junction box.

Special features

- Switchable supply voltage of the ignition unit between 115V AC and 230V AC
- Visual indication of the ignition spark through the viewing window
- Spark detection with potential-free relay output
- Thermal overload protection of the transformer
- Safe opening of the housing after 120 sec
- Ignition electrode total lengths between 545 mm and 3000 mm available (other lengths on request)

Typical application examples

- Petrochemical and refinery (often explosion-proof versions): heaters and reformers
- Metal industry: Furnaces
- Rotary kilns
- Steam generating plants: pilot and direct burners
- Paper industry: Black liquor boilers

Safety instructions and protective measures

Safety during operation and use:
Improper handling can lead to considerable personal injury and damage to property.
Work on the high-energy ignition system may only be carried out by appropriately trained operating personnel or a qualified electrician.

Operator is a person who is responsible for the installation, operation, set-up, maintenance, cleaning, repair or transport of equipment and machinery so that they can identify and avoid hazards.

A **skilled electrician** is a person with suitable technical training, knowledge and experience so that he or she can recognise and avoid hazards that can be caused by electricity.

The ZSH High Energy Ignition System (or parts thereof) is not intended for climbing or standing on.

The ZSH high-energy ignition system may only be operated in conjunction with an additional flame monitor.

Electromagnetic interference may occur during the ignition period.

Safety during storage, assembly, installation and maintenance
Faultless and safe operation of the device requires proper transport, professional storage, installation and assembly as well as careful operation.

There is a danger to life when touching live components, therefore a regular visual inspection by the user must be specified. The visual inspection is limited to the integrity of the connected cables, mechanical connections and the tight fit of the screws. A check for compliance with the permissible ambient temperatures is required.

The ignition electrode of the high-energy ignition system ZSH may only be operated with the cover of the ignition unit closed (and, depending on the version, with an undamaged protective hose) in the installed state by using a pneumatic traversing device (optionally available) in the combustion chamber.

A voltage of 2000 V is generated in the ignition unit, therefore if damage is detected, the ignition system must be taken out of operation and sent in for repair. Before any work is carried out, the power supply must be switched off, secured against being switched on again and the absence of voltage must be checked.

The ZSH high-energy ignition device requires at least 120 seconds to discharge capacitors. After this time, work can be carried out on the high-energy ignition system.

There is a risk of burns if the ZSH high-energy ignition system has to be removed. All components such as internal parts and the ignition electrode and tip must be cooled down to ambient temperature before removal. The use of protective gloves and protective clothing is required.

With the ZSH-Kit variant, protective gloves must be used during assembly. In addition, attention is drawn to the risk of crushing due to the use of pliers or when screwing in the ignition tip.

From an ignition electrode total length of 700 mm, the use of a guide tube (by the customer) is necessary.

Limitations of liability

The manufacturer accepts no liability for damage due to:

1. Non-observance of the operating instructions
2. Non-proper use
3. Use by unqualified or appropriately trained personnel
4. Unauthorized technical and mechanical modifications
5. Use of unauthorized spare parts
6. Use of defective and/or improperly repaired equipment
7. Carrying out repairs by outside companies

Overview of the device components

ZSH-C-3	High energy cable in metal protection hose (with PE cable) between ignition unit and electrode, length 3 m
ZSH-C-3-QD	High energy cable in metal protection hose (with PE line) between ignition unit and electrode with high voltage connectors, length 3 m
ZSH-C-5	High energy cable in metal protection hose (with PE cable) between ignition unit and electrode, length 5 m
ZSH-C-5-QD	High energy cable in metal protection hose (with PE line) between ignition unit and electrode with high voltage connectors, length 5 m
ZSH-C-10	High energy cable in metal protection hose (with PE cable) between ignition unit and electrode, length 10 m
ZSH-KIT	Kit consisting of: ZSH-PP-16, ZSH-C-3, ZSH-SSR-0.0, ZS-L, ZSH-AD, connection terminal block
ZSH-KIT-INT	Kit consisting of: ZSH-PP-16-INT, ZSH-SSR-0.0, ZS-L
ZSH-KIT-QD	Kit (variant: connection cable plugged) consisting of: ZSH-PP-16-QD, ZSH-C-3-QD, ZSH-SSR-0.0, ZS-AD-QD, ZS-L, rotary connector
ZSH-PP-16	High energy ignition unit ZSH (for connection of connecting cable ZSH-C-X [1])
ZSH-PP-16-INT	High-energy ignition unit ZSH (for direct connection of the ignition lance) with tube receptacle
ZSH-PP-16-QD	High energy ignition unit ZSH (for connection of connecting cable ZSH-C- **X** [1]-QD)
ZSH-SSR-0.0	Ignition tip adapter incl. 3m high voltage cable, length 325mm
ZS-L	Replaceable ignition tip (long version), length: 675mm (when screwed in)
ZS-K	Replaceable ignition tip (short version), length: 200mm (when screwed in)
ZSH-VR-0.3	Extension tube made of stainless steel, each with internal and external thread, length 0.3m
ZSH-VR-0.5	Extension tube made of stainless steel, each with internal and external thread, length 0.5m
ZSH-VR-0.8	Extension tube made of stainless steel, each with internal and external thread, length 0.8m
ZSH-VR-1.0	Extension tube made of stainless steel, each with internal and external thread, length 1.0m

Annotation:
X [1] corresponds to the total length of the connecting cable between the high-energy ignition unit and the ignition electrode.
in lengths of 3 m, 5 m or 10 m (not QD variant) and must be specified when ordering.
Example of 5 m connection cable with high voltage connectors: ZSH-C-5-QD

Overview of spare parts

ZSH-AD	Junction box (for use with ZSH-KIT)
ZSH-AD-QD	Junction box (for use with ZSH-KIT-QD)
ZSH-CRD	Assembled printed circuit board for all high energy ignition devices
ZSH-GDT	Replaceable gas discharge diode
ZSH-KCT-3	Ceramic, spring and a 3m long, permanently connected high-voltage line (mounted in ZSH-SSR-0.0)
ZSH-SF	Inspection window for installation in the housing cover of the high-energy ignition unit

ZSH-KIT-INT (kit) with manual retraction option consisting of:

High energy ignition unit ZSH-PP-16-INT, ignition tip adapter ZSH-SSR-0.0, ignition tip long ZS-L

Figure 1: Individual components of the ZSH-KIT-INT kit

OPTIONAL: Adjustment of the total ignition tip length by using the extension tubes ZSH-VR or the short ignition tip ZS-K.

Construction: The high energy ignition unit has a 20mm long tube socket with internal thread on the right side. The total ignition electrode length of the kit is designed for 1020 mm. If a shorter length is required, the long ignition tip can be exchanged for the short version ZS-K (length screwed in 200 mm), thus the shortest ignition rod length including ignition tip is 545 mm (tube receptacle 20 mm + ignition tip adapter 325 mm + short ignition tip 200 mm). If a length exceeding 1020 mm is required, the total length can be achieved by using extension tubes ZSH-VR (300 mm, 500 mm, 800 mm or 1000 mm). The maximum total ignition electrode length is designed for 3 m due to the mounted high voltage cable of the ignition tip adapter and can be longer if requested by the customer. In this case, please contact d.s.f. GmbH. (The contact details can be found on the last page of this technical description.)

Assembly: The red high-voltage cable of the ignition tip adapter is pulled in through the screwed extension tubes, if any, and the tube receptacle of the high-energy ignition unit, then screw the ignition tip adapter tight. Pull the red high-voltage cable into the high-energy ignition unit after
Cut off 330 mm (measured from the inner edge of the housing on the pipe mounting side). The insulation of the high-voltage cable must be offset by 8 mm at the end. Here, the supplied yellow ring cable lug (4 mm²) is mounted with a crimping tool (model for insulated ferrules with positive lock). By engaging at the end point, the positive lock ensures that the maximum available contact pressure is used. This ensures a safe potential transfer, which is necessary for the proper functioning of the high-energy ignition system. The yellow ferrule is screwed to the high voltage supporter with the washers and the serrated washer with a Phillips screw. (Earlier versions have a hexagon nut with M4 thread for fastening).

A good conductor connection (minimum cross-section 4 mm²) to the earth potential of the burner (see installation instructions described below) must be connected to the external PE connection of the high-energy supply unit.
The insulation of the PE wire must be offset by approx. 8 mm at the end. Here, the supplied yellow ring cable lug (4 mm²) is mounted using crimping pliers (model for insulated ferrules with positive lock). By engaging at the end point, the positive lock ensures that the maximum available contact pressure is used. This ensures a safe potential transfer, which is necessary for the proper functioning of the high-energy ignition system. The yellow wire end sleeve is placed on the external earthing bolt on the housing and screwed tight with the washer and serrated lock washer using a nut.

Insert the high-energy ignition unit into the guide tube, or the retraction device into the combustion chamber.
Insert the customer's connection cable (after checking that there is no voltage and that it cannot be switched on again) into the high-energy ignition unit, connect the wires for the ignition monitoring and the supply voltage (see also Figure 6, ZSH-PP-16 connection assignment).
Only when the supply voltage is applied, 4-5 ignition sparks per second are generated immediately. The ignition spark transition can be detected through the built-in viewing window in the housing cover. At the same time the ignition monitoring relay switches.

In addition, at least the safety instructions on page 5 must be observed.

ZSH-KIT (kit) as remote version consisting of:

High-energy ignition unit ZSH-PP-16, high-voltage cable and PE cable in protective hose ZSH-C-3, ignition tip adapter ZSH-SSR-0.0, ignition tip long ZS-L, junction box ZSH-AD and the rotary connector

Figure 2: Individual components of the ZSH-KIT kit

ZS-L

ZSH-PP-16
(Example illustration with a hose fitting already installed)

Rotary connector

ZSH-AD

ZSH-C-3

ZSH-SSR-0.0

OPTIONAL: Adjustment of the total ignition tip length by using the extension tubes ZSH-VR or the short ignition tip ZS-K.

Construction: The flexible metal protection hose ZSH-C-3 (with prepared high voltage and PE cable) is supplied with 3 m standard length (optional 5 m or 10 m available). The ends are inserted into the high-energy ignition unit ZSH-PP-16 and the junction box ZSH-AD respectively and fixed in the housings with the locknut. Here it is important to tighten the retaining ring to the last turn. The electrical connection is described below.

The total ignition electrode length of the kit is designed for 1000 mm.

If a shorter length is required, the long ignition tip can be exchanged for the short version ZS-K (length screwed in 200 mm), thus the shortest total ignition rod length incl. ignition tip is 525 mm (ignition tip adapter 325 mm + short ignition tip 200 mm).

If a length greater than 1000 mm is required, the total length can be achieved by using extension tubes ZSH-VR (300 mm, 500mm, 800 mm or 1000 mm). The maximum total ignition electrode length is designed for 3 m due to the mounted high voltage cable of the ignition tip adapter and can also be longer on customer request. In this case, please contact d.s.f. GmbH. (The contact details can be found on the last page of this technical description).

Mounting side junction box ZSH-AD:

The opposite side of the flexible protective conduit is screwed directly into the junction box and tightened with pliers. The insulation of the PE wire must be offset by approx. 8mm at the end. Here the yellow ring cable lug (4 mm²) (supplied on the PE core) is fitted using crimping pliers (model for insulated wire end ferrules with positive locking). By engaging at the end point, the positive lock ensures that the maximum available contact pressure is used. Thus, a safe potential transfer takes place, which is necessary for the proper function of the high-energy ignition system.

If the total length of the ignition electrode is 1 m, the red high-voltage cable of the ignition tip adapter ZSH-SSR-0.0 is fed directly into the thread of the free opening of the junction box. Now the ignition tip adapter ZSH-SSR-0.0 is screwed into the junction box ZSH-AD and tightened with pliers.
If the total length of the ignition electrode exceeds 1 m, the corresponding number of stainless-steel extension tubes ZSH-VR must be screwed to the junction box ZSH-AD and tightened with pliers. The red high voltage ignition cable of the ignition tip adapter ZSH-SSR-0.0 is then laid through the ignition electrode tube into the junction box ZSH-AD and is designed for a maximum ignition electrode length of 3 m. (Lengths over 3 m are possible on request). Now the ignition tip adapter ZSH-SSR-0.0 is screwed on and tightened with pliers.

Shorten the red high-voltage cable in the junction box so that approximately 80 mm (measured from the bottom of the junction box) remain. Set down the insulation at the respective end of the red and blue cable to approx. 10 mm, insert the wires without twisting them into the rotary connector supplied in the junction box as far as they will go and make contact by turning the connector clockwise. Now screw on the ignition tip. Push the ignition electrode into the combustion chamber and fasten it.

Mounting side high energy ignition unit ZSH-PP-16:
Here, the flexible metal protection hose (with the integrated 3 m long blue high-voltage cable incl. the prepared ring cable lug with shrink sleeve and the PE core with crimped-on yellow ring cable lug) is guided into the high-energy ignition unit and screwed tight from the inside with the union nut and tightened with pliers. The pre-terminated blue high-voltage cable is screwed to the high-voltage supporter with the yellow ferrule using the washers and serrated washer with a Phillips screw. (Earlier versions have a hexagon nut with M4 thread for fastening). The PE wire with the yellow wire end sleeve is placed on the earthing bolt located in the housing and screwed tight with the washers and the serrated lock washer with a nut. A safe potential transfer is important for the proper function of the high-energy ignition system. An equipotential bonding to the earth potential of the burner with a good conductor connection (minimum cross-section 4mm²) must be connected to the external earthing bolt by the customer.

Insert the customer's connection cable (after checking that no voltage is present and that it cannot be switched on again) through the cable gland into the high-energy ignition unit. Connect the wires for the supply voltage and ignition monitoring. Only when the supply voltage is applied, 4-5 ignition sparks per second are generated immediately. The ignition spark transition can be detected through the built-in viewing window. At the same time the ignition monitoring relay switches.

In addition, at least the safety instructions on page 5 must be observed.

ZSH-KIT-QD (kit) as remote connector version consisting of:

High-energy ignition unit ZSH-PP-16-QD, high-voltage cable and PE cable in protective conduit ZSH-C-3-QD, ignition tip adapter ZSH-SSR-0.0, ignition tip long ZS-L, junction box ZSH-AD-QD, rotary connector

Figure 3: Ignition electrode with high-energy ignition unit and plug-in connection cable

OPTIONAL: Adjustment of the total ignition tip length by using the extension tubes ZSH-VR or the short ignition tip ZS-K.

Construction: The flexible metal protection hose ZSH-C-3-QD (with integrated high voltage and PE cable) is supplied with 3 m standard length (5 m optionally available) and high voltage plugs on both sides. These are plugged onto the high-voltage sockets of the high-energy ignition unit ZSH-PP-16-QD and the junction box ZSH-AD-QD and fixed with the retaining ring.

The total ignition electrode length of the kit is designed for 1000 mm.

If a shorter length is required, the long ignition tip can be exchanged for the short version ZS-K (length screwed in 200 mm), thus the shortest ignition electrode total length incl. ignition tip is 525 mm (ignition tip adapter 325 mm + short ignition tip 200 mm).

If a length greater than 1000 mm is required, the total length can be achieved by using extension tubes ZSH-VR (300 mm, 500mm, 800 mm or 1000 mm). The maximum total ignition electrode length is designed for 3 m due to the mounted high voltage cable of the ignition tip adapter and can also be longer on customer request. In this case, please contact d.s.f. GmbH. (The contact details can be found on the last page of this technical description).

Mounting side junction box ZSH-AD-QD:

If the total length of the ignition electrode is 1 m, the red high-voltage cable of the ignition tip adapter ZSH-SSR-0.0 is fed directly into the thread of the free opening of the junction box. Now the ignition tip adapter ZSH-SSR-0.0 is screwed into the junction box ZSH-AD-QD and tightened with pliers.
If the total length of the ignition electrode exceeds 1 m, the corresponding number of stainless-steel extension tubes ZSH-VR must be screwed to the junction box ZSH-AD-QD and tightened with pliers. The red high-voltage ignition cable of the ignition tip adapter ZSH-SSR-0.0 is then laid through the ignition electrode tube into the junction box ZSH-AD-QD and is designed for a maximum ignition electrode length of 3 m. (Lengths over 3 m are possible on request). Now the ignition tip adapter ZSH-SSR-0.0 is screwed on and tightened with pliers.

Shorten the red high-voltage cable in the junction box so that approximately 80 mm (measured from the bottom of the junction box) remain. Set down the insulation at the respective end of the red high-voltage cable and the loose core of the high-voltage socket to approx. 10 mm, insert the cores without twisting into the rotary connector as far as they will go and make contact by turning the connector clockwise. Now screw on the ignition tip. Push the ignition electrode into the combustion chamber and fasten it.

Mounting side high energy ignition unit ZSH-PP-16-QD:
The high-energy ignition unit ZSH-PP-16-QD is already pre-wired and connected by the manufacturer by using the high-voltage plug. A safe potential transfer is important for the proper functioning of the high-energy ignition system. A potential equalisation to the earth potential of the burner with a good conductor connection (minimum cross-section 4mm²) must be connected to the external earthing bolt by the customer. The insulation of the wire used must be offset by approx. 8 mm at the end. Here the supplied yellow ring cable lug (4 mm²) is mounted with a crimping tool (model for insulated wire end ferrules with positive lock). The positive lock ensures that the maximum available contact pressure is used by engaging at the end point. This ensures a safe potential transfer, which is necessary for the proper functioning of the high-energy ignition system. The yellow wire end sleeve is placed on the external earthing bolt on the housing and screwed tight with the washers and serrated lock washer with a nut.

Connect the high voltage cable ZSH-C-3-QD first on the side of the ignition box ZSH-AD-QD and tighten it, then on the opposite side to the high energy ignition unit ZSH-PP-16-QD.

Insert the customer's connection cable (after checking that no voltage is present and that it cannot be switched on again) through the cable gland into the high-energy ignition unit. Connect the wires for the supply voltage and ignition monitoring.

Only when the supply voltage is applied, 4-5 ignition sparks per second are generated immediately. The ignition spark transition can be detected through the built-in viewing window. At the same time the ignition monitoring relay switches.

In addition, at least the safety instructions on page 5 must be observed.

Technical data

High energy ignition unit

Housing material:	Die-cast aluminum
Dimensions (LxWxH):	220x120x95 mm
Weight:	3,25 kg
Protection class:	IP 65
Ambient temperature:	- 40°C to + 60°C
Temperature monitoring (mains transformer):	+ 120°C
Power supply (ignition on):	115V AC or 230V AC (switchable), 50/60 Hz
Rated current:	approx. 1300 mA at 115 V or approx. 650 mA at 230 V
External fuse protection:	4A / characteristic D
Power consumption:	approx. 150 VA
Output voltage:	2000V DC
Firing pulses:	approx. 4-5 pulses / second
Ignition energy:	12 joules / pulse (48 to 60 joules / second)
Duty cycle:	50% ED
Maximum switch-on time:	300 sec
Integrated ignition monitoring:	Switching capacity relay contact (250VAC / 10 A or 30VDC / 8 A)

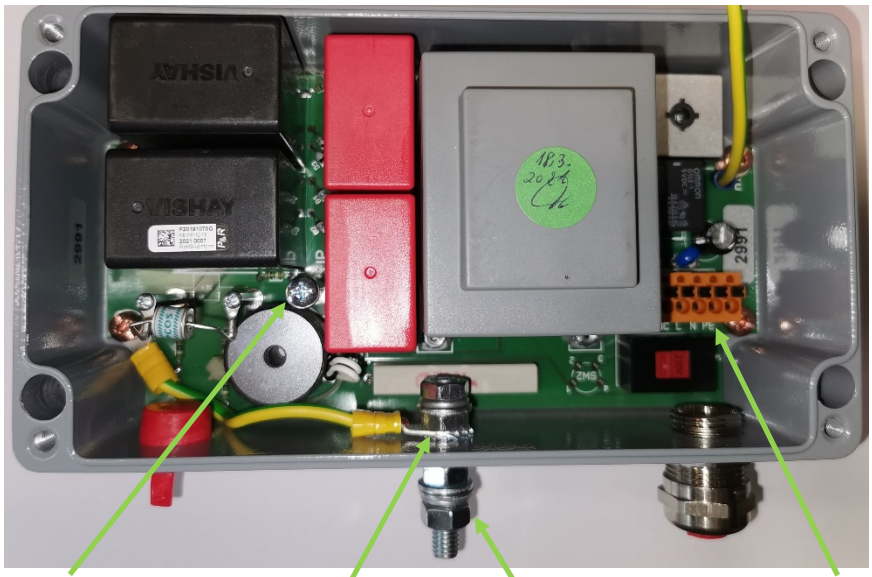
High energy ignition electrode

Material:	Stainless steel (1.4571)
Diameter:	16 mm
Standard length ignition electrode complete:	1000 mm to 3000 mm
Length interchangeable ignition tip:	ZS-K: 200mm or ZS-L: 675 mm
Maximum temperature ignition tip:	800°C (1000°C for max. 10 sec)
Service life of the ignition tip:	at least 400,000 ignitions

Customer-side mains connection cable incl. ignition spark detection:

Cable type (standard or similar):	Silicone hose cable 145 Multi (with 6 single wires 1.5 mm² incl. PE wire)
Temperature range:	- 35 °C to at least + 145°C
Jacket:	Polyolefin copolymer, good abrasion and core resistance, good oil resistance, halogen free, flame retardant, self - extinguishing

Figure 4: Electrical connection of the high-energy ignition unit ZSH-PP-16



Connection
High voltage cable
(to the ignition
electrode)

Connection Ground
connection
(to the ignition
electrode)

Connection
Equipotential bonding
(ground connection
attached)

Cable connection for voltage supply
(ignition on control)
and ignition spark monitoring

Pin assignment

NO:	Ignition monitoring / NO contact
C:	Ignition monitoring / root
NC:	Ignition monitoring / NC contact
L:	Phase L1 (black or brown)
N:	Neutral conductor (blue)
PE:	Protective conductor (green/yellow)

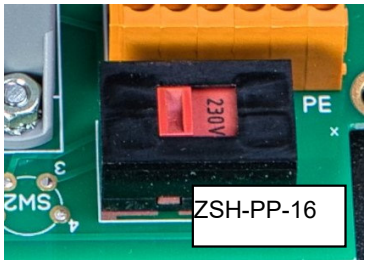
Electrical connection (115 or 230VAC) (in conjunction with Figs. 4 to 6):

The electrical work during installation and initial commissioning may only be carried out by qualified electricians. For all work on the high-energy ignition system, qualified personnel is always required.

Before the electrical connection, the ignition lance must be inserted into the combustion chamber and fastened. The general safety instructions on page 5 must be observed, then open the housing cover. Check the individual wires of the mains connection cable for de-energisation and secure against reconnection.

1. Set the supply voltage used at the latching switch (see Fig. 5) to 115VAC or 230VAC.
2. Use of silicone hose line 145 Multi (or similar) as mains connection cable
3. Insertion of the cable into the right cable gland (marking 115/230VAC)
4. Wire connection for:
    a. Phase L1 to terminal L
    b. Neutral conductor to terminal N
    c. Protective conductor at terminal PE
    d. Supply voltage Ignition monitoring at terminal C
    e. Ignition ON feedback at terminal NO
    f. Ignition OFF feedback at terminal NC
5. Pull back the cable so that the connected wires are not under tension, tighten the cable gland.
6. Close the housing cover and carry out the function test.

Figure 5: Snap-action switch for switching the supply voltage



Check the setting before switching on the supply voltage

Figure 6: Electrical connection of the ignition electrode in the junction box

Blue high voltage cable from ignition unit

Green-yellow ground connection to ignition unit

Red high voltage cable from the ignition electrode

Strip approx. 8mm of the red and blue wires, lay them straight next to each other and insert them into the rotary connector. Turn the rotary connector clockwise until it can no longer be turned without considerable force. Make sure that no wires protrude from the rotary connector and that there may be contact with the junction box.

Replaceable ignition tips

Figure 7: ZS-K ignition tip short: screwed in 200mm

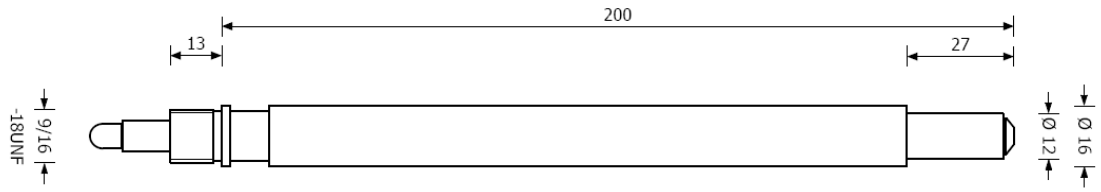
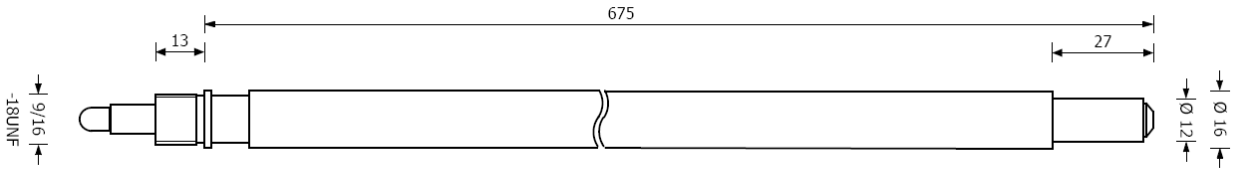


Figure 8: ZS-L ignition tip long: screwed in 675mm



The ignition tips are available in the two specified lengths. Due to the external thread, these can be quickly and easily screwed into the existing connection adapters or replaced in the event of malfunction or caused by wear.

Functional description

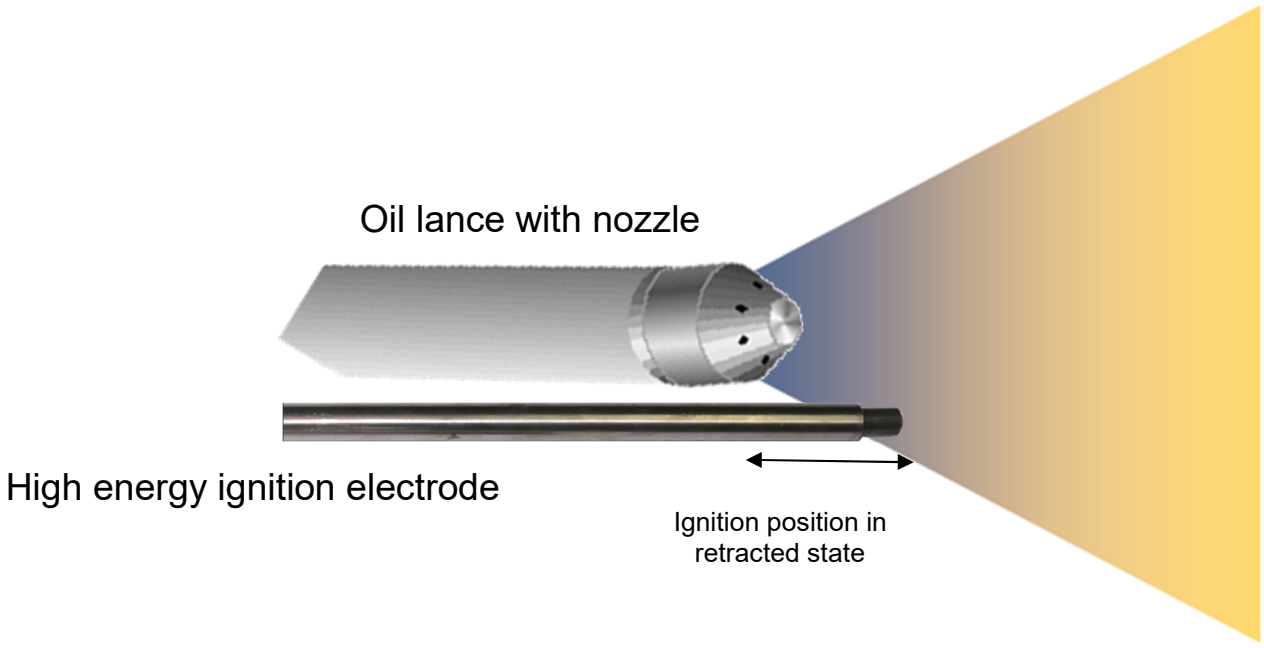
With the high-energy ignition system ZSH, the ignition spark is switched on and off by applying or removing the supply voltage. After starting the ignition process and subsequent positioning of the ignition electrode tip (see next page), an ignitable fuel / air mixture must be present at the ignition spark.
After 3 seconds at the latest, the ignition of the fuel should take place. We recommend monitoring the presence of this flame with a flame monitor. After the total ignition time has elapsed, the ignition electrode must be pulled out of the hot flame area (to protect the ignition tip) and the ignition switched off. If no flame is produced, refer to troubleshooting on page 18.

To prevent damage to the high-energy ignition unit ZSH due to frequent ignition attempts or when ignition times are too long (e.g., during commissioning), a bimetal switch has been integrated into the ignition transformer. If the ignition transformer reaches an operating temperature above 120°C, ignition is automatically interrupted. After the response temperature of the bimetal switch has cooled down, the contact closes again automatically. This case should not occur during specified normal operation.
Basically, it is pointed out that the ignition unit may only be operated with the duty cycle (and the resulting pause time) specified in the technical data.
Shorter ignition times extend the life of the ignition tip.

Note for use with an oil burner

The optimum position of the ignition tip is in the edge area of the spray cone behind the baffle plate. The optimum position can be determined by moving the controlled high-energy ignition device axially.
For heavy oil operation, the oil must be heated to 90°C to 130°C to ensure reliable atomization. The finer the oil particles are atomized, the more ignition-friendly the fuel-air mixture is.

Figure 9: Note on the use of positioning in the combustion chamber



Note for use with a gas burner

With gas burners, the position of the ignition tip behind the swirl disc is not critical.
The ignition process must take place in low-load operation in order to keep the flow velocity of the ignitable fuel-air mixture low. Ignition only occurs after good mixing and atomisation of the gas-air mixture.

Maintenance

Read the safety instructions on page 5 before starting any maintenance.
The high-energy ignition system ZSH is basically maintenance-free, but it should be inspected at regular intervals for contamination and integrity (e.g., possible damage to the metal protective hose). The high-energy ignition tip can be cleaned with a wire brush.
The service life of the ignition tip is reached at approx. 400,000 ignitions and can be less if the load does not correspond to the specification.
The service life of the gas discharge diode (ZSH-GDT) is reached at approx. 200,000 ignitions.

Troubleshooting

The function of the high energy ignition unit includes a charging of capacitors up to a voltage of 2000V DC. This voltage can still be stored after the supply voltage is switched off. The capacitors are discharged within 120 seconds by discharge resistors. Only then may the cover of the high-energy ignition unit be opened.
The safety instructions on page 5 must be observed.

The ignition system must never be repaired on site. If a malfunction of the ignition system is detected, the fault can be localized as described below:

1. Checking the supply voltage
   When activating the ignition unit, a connection must be made between terminals L and N (for position see page 14, Figure 4) as well as L and PE the applied AC voltage must be present. No voltage must be measurable between N and PE.

2. Checking the ignition unit for overheating
   If the temperature exceeds 120°C, the voltage supply to the ignition transformer is automatically interrupted. Wait about 10 minutes to allow the ignition transformer to cool down and the bimetal switch to close again. The system is then ready for operation again.

3. Checking the function of the ignition tip

WARNING: ATTENTION HIGH VOLTAGE !!!

Before replacing the ignition tip or opening the ignition unit, it is absolutely necessary to switch off the supply voltage, secure it against being switched on again and thus prevent unintentional ignition.
Due to the discharge time of the capacitors, work on the ignition electrode, as well as opening the cover of the ignition unit, may be carried out at the earliest 120 seconds after switching off the supply voltage.

The reason for the non-function of the ignition tip can be normal wear, a short circuit or dirt.
Dirt on the ignition tip can be removed by using a wire brush.
Wear can be recognised by an excessively large air gap at the burnt ignition tip.

The easiest and fastest way to detect a defect is to replace the ignition tip.

Figure 10: ZSH-CRD: Completely assembled spare circuit board

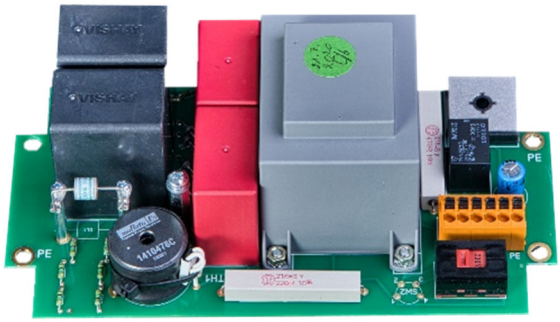


Figure 11: ZSH-GDT: Gas discharge diode

Figure 12: ZSH-KCT-3: Replacement ceramic with spring and 3m long high voltage cable

Figure 13: ZSH-SF: Inspection window for installation in the housing cover of the high-energy ignition unit

Warranty

For a period of 24 months from the date of delivery, we guarantee to rectify any faults that may occur or to replace the device. The prerequisite for this is that a fault that has occurred is due to defects in components or incorrect assembly of components.
The product warranty expires if modifications are made to the device by the user himself or by third parties that have not been expressly approved in writing by d.s.f. GmbH in writing.

Attention!

The warranty does not cover the wearing parts spark gap ZSH-GDT and ignition tips ZS-K and ZS-L, as the service life of these parts depends on the number of ignitions and the operating conditions.
depends.

Repairs are carried out exclusively in our workshop.
Reimbursement of costs for repairs carried out by other workshops is excluded.
The costs for shipping a defective device to d.s.f. GmbH shall be borne by the customer.

Liability

Liability for consequential damage caused by the defect of a device is not assumed by d.s.f.
Likewise, d.s.f. cannot be held liable in any way for any claims arising from non-compliance with these instructions for use.

d.s.f GmbH
Spessartstraße 11
D - 63263 Neu-Isenburg
Phone +49 6102 / 7890-0
Fax +49 6102 / 7890-40
E-mail: info@dsf-gmbh.de
www.dsf-gmbh.de