Documentation

The following information sheets illustrate the description below:

32-XF08-4G-E	Sectional view of the lance with main dimensions
32-W101-6H-E	Sectional view of the head of the lance with atomiser discs
00-XF01-8G-E	Diagram of hydraulic system inside the lance

General

The burnerlance 32-H-BMS-…-H is especially suitable for use in or on an oil burner and is designed to operate spill back atomisers consisting of 3 discs with shut-off needle. An electrical heater is built-in along almost the full length of the lance, making it particularly suitable for heavy fuel operation. The strong spring on the actuating rod pushes the needle in closed position. This ensures a reliable shut-off under all circumstances.

Fuel, branched off from the supply line actuates the piston for opening, either controlled by two external solenoid valves or by one 3/2 solenoid valve (see 00-XF01-8G-E). The piston has a fixed travel, pulling the needle in the correct position when it opens.

The electrical heater is being switched on before pre-purging. During the pre-purge period of the burner, the needle is keeping the orifice closed and the fuel circulates through the lance at pre-set supply and return pressures. This way, when firing heavy fuel, the entire burnerlance heats up before igniting. On energising both solenoid valves or the 3/2 solenoid valve, even after long idle intervals, there is immediate atomisation guaranteeing perfect ignition.

The burnerlance is suitable for supply pressures from 20 up to 40 bar and fuel temperatures up to 140°C.

Mounting the atomiser discs

Often a lance is delivered with the discs mounted. This is just to avoid loss of parts during transportation. The capnut then is screwed on by hand, not tightened. In this case, you should also mount the atomiser discs as described below.

The orifice, controlet and the swirler are to be build in according to information sheet 32-W101-6H-E.

To ensure adequate sealing, the sealing surfaces at the adaptor, at both sides of the swirler, at both sides of the controlet and at the orifice should not be damaged. Never use any additional sealant on these surfaces.

Remove the capnut from the lance. Make sure all parts involved are clean and free from any dust or other particles. Slide the swirler over the needle. It should glide smoothly. Place the orifice, the controlet and the swirler, in the right order and position, straight inside the capnut as shown in sheet 32-W101-6H-E.

It is advised to apply a little "Molykote HSC" or equivalent compound, on the thread of the adaptor only, to prevent problems when dismounting the capnut after a longer period. The sealing surface of the adaptor, the inside of the lance, the needle and the atomiser discs are to be kept absolutely clean.

Now carefully slide the capnut containing the discs over the needle and screw on the nut by hand as tight as possible. Tighten the capnut firmly with a spanner. The adaptor has flat sides to hold the lance while screwing or unscrewing the capnut. These flats exclusively serve this one purpose!

Electrical heater

Under a cap, held by just one screw at the connection block of the burnerlance, there is a double terminal to connect electrical power to the Thermo-Coax-heater. The operating voltage and power consumption of the heater are shown on the cap.

Take special care not to damage or bend either end of the Thermo-Coax to prevent failure of the heater.

Connections

The connections (see 00-XF01-8G-E) on the block of the lance are marked as follows:

S Fuel supply to the atomiser. The pressure only depends on the desired behaviour for the atomiser.

R Fuel return from the atomiser. Fuel output control is achieved by connecting either a pressure or a volume regulator.

C Fuel supply and return for needle actuation. A filter having meshes smaller than 50 µm should be present. The needle opens correctly at a pressure between 20 and 40 bar. In principle, the returning fuel should be allowed to flow freely without counterpressure. If the discharge is connected to a circulation system with slight overpressure, it is absolutely necessary to make sure that the pressure in the circulation system never exceeds 2 bar. Only then reliable closing of the needle is ensured.

To prevent malfunction, be careful when removing the plastic plugs from the connection ports and make sure no material stays behind.

When choosing fittings, make sure that the channels inside the connection block remain fully open. Even a partial blockage at one of the channels inside will inevitably lead to malfunctioning of the burnerlance.

Never use any additional sealant on the thread. The remains getting inside the lance could lead to failures. There are no objections against the use of flat gasket rings to seal the fittings.

Function

The integrated electrical heater could work permanently, but it should at least be switched on in time before fuel is supplied to port "S" for heating up the standing fuel and to enable correct operation of the hydraulic system inside the lance.

During the pre-purge period, both the external solenoid valve in the supply line and the external volume or pressure regulator are open. The solenoid valves operating the needle are currentless. Thus, the spring loaded actuating rod pushes the needle against the seat of the orifice up front, keeping it closed, preventing fuel from reaching the furnace prematurely. The pressure at the ports "C" is 0 bar or equals the pressure in the circulation system if the discharge is connected to such a system. The fuel circulates from port "S" via the swirler and the controlet in the atomiser through the lance toward port "R", keeping the whole at operating temperature.

Before opening the needle, make sure the IGNITION IS TURNED ON. In addition, the external regulator and the combustion airflow are to be adjusted beforehand in such a way that the burner will START ON LOW FLAME.

As soon as one switches on the solenoid valves operating the needle, the pressure at the ports "C" increases to 20 bar or more; the rod retracts, the needle opens and the ignition causes a flame immediately.

An external volume or pressure regulator in the return line controls the output flow of the atomiser.

Interruption of the power supply to the solenoid valves at the ports "C" leads to immediate closing of the needle, handled by the spring inside the lance. The fuel flow from the atomiser stops abruptly. The pressure at the ports "C" drops to 0 bar or to the pressure in the circulation system if the discharge is connected to such a system. The fuel circulation from port "S" via the swirler and the controlet toward port "R" maintains the temperature of the lance.

If firing heavy fuel in applications where the fuel supply to port "S" often stops during longer intervals, it is sufficient to switch on the electrical heater in time to preheat the lance. Only under extreme cold conditions we advise to apply an additional electrical heating plate just to preheat the connection block at the lance. Four threaded bores in the connection block allow mounting such a heating plate.

Maintenance

The burnerlance normally does not require any maintenance. Wear or damage of the orifice, the controlet, the swirler and the needle highly depend on fuel quality. These parts are easy to exchange. The only moving part is the actuating rod with the piston. After a while some wear may occur on the o-rings. Complete seal sets are available for replacement.

Before taking one of the following steps, remove the orifice, the controlet and the swirler from the lance and put the capnut back on as protection for the needle and the adaptor. Always pay attention not to damage the sealing surfaces at the adaptor and the atomiser discs. Before re-assembly, make sure all parts involved are undamaged and perfectly clean.

To exchange the quad-ring 12,42x1,78 on the piston, remove the cover, held by 4 screws. Pull out the bearing together with the o-ring 18,72x2,62. Exchange the quad-ring 12,42x1,78 and put the bearing with o-ring back in place. Now we can mount the cover.

To exchange the inner o-ring 6,02x2,62, remove the cover, held by 4 screws. Pull out the bearing together with the o-ring 18,72x2,62. Use a wooden or plastic stick to push back the needle head. WARNING FOR INJURY: The actuating rod comes out suddenly. After that, you can pull it out easily. Do not damage the head of the needle.

The actuating rod has to be taken apart to exchange the o-ring 6,02x2,62. Remove the pin that connects the holder to the rod and take the holder off. The rod in lances longer than 800 mm is – for extra guidance – provided with triangles. Each triangle is secured with a pin. Remove these pins and triangles. Clamp the free end of the rod in a bench vice with soft yaws placing the stop against the yaws. Remove the pin holding the stop and release the spring pressure by slowly opening the vice. Take off the stop, the spring, the spring disc and the disc. Polish any sharp edges on the rod and exchange the o-ring 6,02x2,62. Near the o-ring, the rod should be absolutely free of damages. Re-assemble the actuating rod in reverse order.

To exchange the needle, just remove the pin that holds it. Secure the new needle with the same pin.

To test, put the actuating rod into the burnerlance without the quad-ring 12,42x1,78 and without the o-ring 18,72x2,62 on the disc. The rod should move freely. Pull it back a little, mount the o-ring 18,72x2,62 on the disc and push the rod in place. Slide the bearing over the piston in the connection block and turn it to check the fit. If fitting correctly, mount the quad-ring 12,42x1,78 on the piston and push the bearing with the o-ring 18,72x2,62 back in place. Now we can mount the cover.

Finally, mount the orifice, the controlet and the swirler as described under "Mounting the atomiser discs".