



Versione senza e con pannello touch screen

Fig. 1



Fig. 2

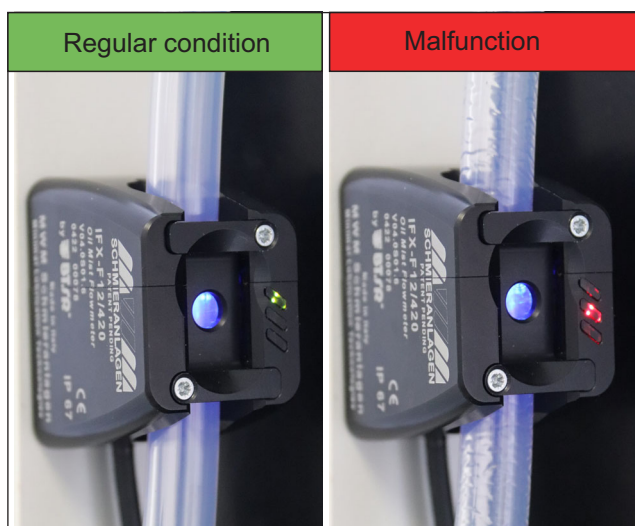


Fig. 3

LS35-PRO-SM system

LS series with electronic control

For tool lubrication with MQL (Minimal Quantity Lubrication) technology

- MQL System ready for use
- Fully assembled on plate, with optional cabinet
- Integrated PLC for programming and monitoring
- Check of the aerosol mixture through IFX-F optical sensors (*Patented*)
- Optional 7 inch touch screen panel
- Electric monitoring of minimum lubricant level
- Optional automatic refilling system
- Optional pressure booster

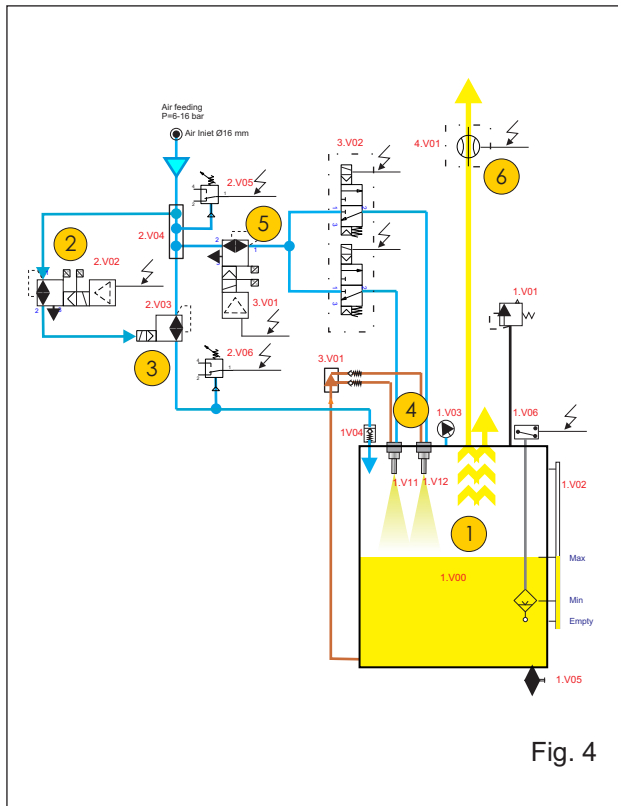
Use:

Single-channel MQL system for automatic minimal lubrication of cutting tools used on NC machines. The LS35-PRO-SM system can deliver a large and controlled aerosol flow, via the use of the patented sensor IFX-F (Fig.3). It is recommended for use on modern CNC machine tools, for single-spindle with HSK attachment and for multi-spindle machines when several tools in operation need to be lubricated simultaneously under the same lubrication conditions. The machine tool must be prepared for MQL lubrication: through the spindle (or revolver) axis and tool, or from outside using a special single phase nozzle.

The touch screen panel version (fig. 2 and 5) offers the possibility to control every working parameter on a detailed synoptic interface.

Technical features:

Dimensions with cabinet	
(Height x Width x Depth):	600 x 600 x 260mm
Standard cabinet painting :	RAL 9002
Compressed air :	quality class 5 (ISO 8573-1)
Power air pressure range:	4,5 ÷ 16 bar
Max air flow with 1 spindle:	4.500 NI/min
Ideal air flow:	1.200 NI/min
Miniumum air flow:	250 NI/min
Inlet compressed air:	pipe Ø est.16mm (DN12)
Vessel capacity:	6 litres (max filling 4 l)
Oil filling:	manual, with screw tap
optional:	automatic filling
Level switch:	with 3 thresholds (max, min, empty)
Usable oils :	exclusively synthetic, without additives
	EMFLUID lubricants are recommended
Aerosol outlets:	2x, for each pipe Ø est.12mm (Dn10)
Power supply:	24V DC, max 5A
Data exchange:	I/O; PROFINET
Weight :	30 Kg
Operating temperature:	+10 /+50 °C



Function description :

The LS series MQL systems are complete systems able to produce aerosol with an optimized percentage of lubricant, pressure and air flow for the lubrication of multiple types of tools.

The LS system uses Venturi nozzles and proportional valves with high reaction rates for the generation of high quality aerosol for different operating conditions.

For each phase of the process the control unit of the system automatically and dynamically regulates in an optimal way the quantities of oil and compressed air: a very fine pressurized lubricating aerosol is generated which, through one or more flexible pipes, is channelled up to the cutting edge of the tool.

The aerosol generation takes place inside the mist generator (1). The air flow is managed through an electropneumatic proportional valve (2) and a high precision air flow regulator (3), which regulates flow and pressure.

The Venturi nozzles (4) that generate aerosols are fed with a separate circuit, which is also managed automatically and dynamically by another electropneumatic proportional valve (5). The process is controlled with an oil-mist sensor (optional), type IFX-F (6), also see fig.6 and 7

The main lubrication parameters (air pressure, oil concentration), as well as the level in the tank and the automatic filling function, if provided, are managed automatically and constantly monitored by an integrated electronic control (6).

The LS35-PRO-SM system makes available different MQL lubrication parameters that can be activated directly from the numerical control of the machine tool and corresponding to different values of air pressure and oil concentration.

When programming the work cycle, the operator matches each tool with the optimal lubrication parameter chosen from the available ones.

The control unit mounted on each LS system autonomously carries out an internal monitoring process and provides continuous feedback to the numerical control of the machine tool, communicating with it in data exchange mode with I/O or PROFINET protocol.

In case of anomalies, the system generates specific alarm signals which are automatically shown on the display of the numerical control of the machine tool.

All functional informations are available on the functional synoptic, which can be made available on a touch screen display (optional) mounted on the cabinet door (Fig 2 and 5).

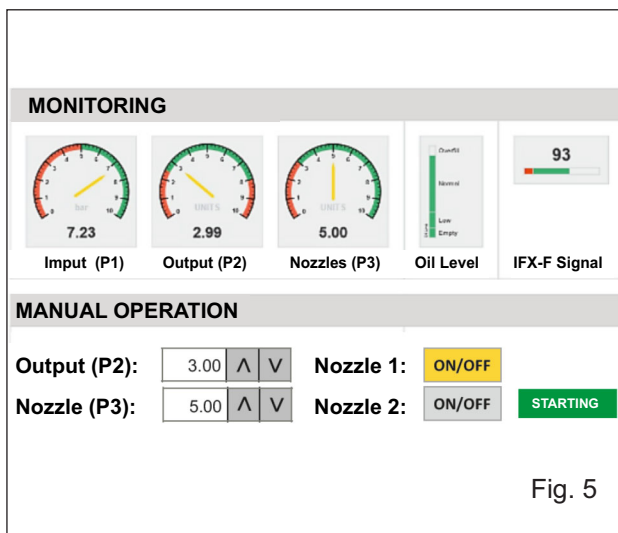




Fig. 6

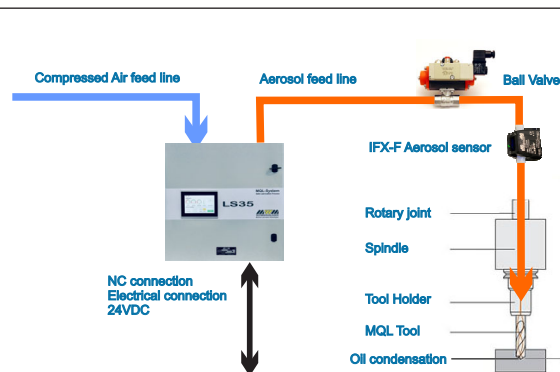


Fig. 7

IFX-F Oil Mist Sensor

A peculiar feature of the system is the control of the generated oil-mist through the IFX-F sensor (MWM patent).

The high sensitivity of the optoelectronic type IFX-F sensor (Fig 3 and 6) allows instant retroactive control of the generated aerosol mixture and is directly connected to the LS system control unit.

The IFX-F sensor must be positioned at the exterior of the MQL unit along the aerosol feeding line, ideally after the ball valve and before the rotary joint (fig.7).

With this configuration, the IFX-F sensor is capable of monitoring both the concentration of oil in the mist and the functionality of the ball valve.

The IFX-F oil-mist sensor is designed to report the presence of a flow in the liquid state instead of the mist state as a system failure (Fig. 3).

An M12 connector with cable is available to connect the sensor to the PLC of the LS35 system.

MQL System order example

- **LS35** with single proportional valve, cabinet and touch screen panel mounted on the cabinet door.

Order code:

LS35-A/1/1

Optional accessories: see pag. 4

- IFX-F oil-mist sensor
- External display for IFX-F sensor
- Ball valve
- Automatic refill system
- Air pressure booster system

Supply conditions:

All components are installed on a metal plate and are supplied as a complete system. Each control unit is equipped with the relative instruction manual. Each single unit has been subjected to functional testing and supplied with a certificate of testing. The lubrication unit must be used as a component; therefore it is not equipped with devices for isolation from energy sources. An air interception solenoid valve is provided. On request a general power supply switch can be provided.

For more details on the used components, consult the specific detailed technical brochures: request ours complete catalogue or visit the MWM Schmieranlagen website (www.mql.it).

Order code:

LS 35 - (X)/(X)/(X)		
Proportional valve	Cabinet	Touch screen panel on cabinet door
(A) single valve	(0) without	(0) without
(B) double valve PRO version	(1) with	(0) without (1) with

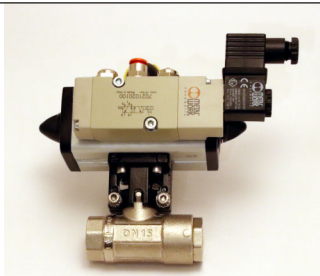
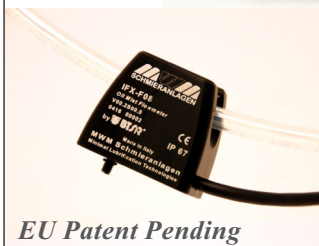


Fig. 8



EU Patent Pending



Fig. 9



Fig. 10



Fig. 11

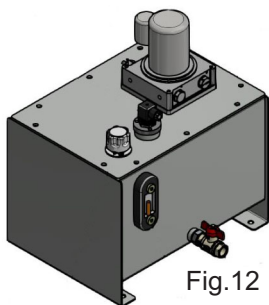


Fig. 12

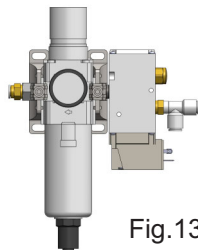


Fig. 13

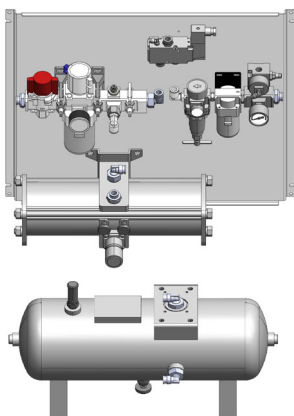


Fig. 14



Fig. 15

Accessories codification:

Ball valve 2/2 PN210 1/2" (fig.8)	N660730
Ball valve 2/2 PN40 1/2"	N660710
Ball valve 2/2 PN16 1/2"	N660715

IFX-F oil mist sensor (fig.9)

IFX - F08 (for tubes Ø6 or Ø8)	N8811100
IFX - F12 (for tubes Ø10 or Ø12)	N8821100
IFX - F08 (for tubes Ø6 or Ø8) 4 - 20 mA	N8813100
IFX - F12 (for tubes Ø10 or Ø12) 4 - 20 mA	N8823100

Display for IFX-F sensor 4-20 mA PFG3 10-XY-LA2	N8870021
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Display connector ZS-28-CA-4	N8870022
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Aerosol distributor with 3 nozzles Ø1,5 mm (fig.10)
for oil mist condensation and external MQL lubrication.

S75400000.031

Single nozzle for external MQL, U008-1103, exit hole ø1,2 mm
(Fig. 11), with orientable hose, G 1/8-M8x1 connector.

L=250 mm H010-125

L=450 mm H010-126

Other lengths, or with flexible metallic hose: on request

Automatic oil refill system (fig.12):
24VDC pump, with 25 liters reservoir.

A098100

Air treatment system for main air supply:

Filter and pressure regulator,
with electrovalve (Fig.13)
24VDC G3/8

N620XXX

Air pressure booster 16 bar, with tank and commutation electrovalve
BP/AP. (Fig. 14)

LS75307000.XXX

Metal stand with wheels for the LS35 unit (with or without cabinet)
(Fig.15)

LS75307000.XXX



Fig.16



Fig.17



Fig.18



Fig.19



Fig.20



Fig.21



Fig.22



Fig.23



Fig.24

Electrical cables for accessories connection:

- For connector X1 (power supply) (Fig.16)
M12-T 4P f. straight-free end, cable PUR not shielded (fig.15)
L= 10 m. N860304

- For connector X2 (I/O communication) (Fig. 17)
M12-A 12P f. straight-free end, cable PUR shielded (fig.16)
L= 10 m. N860306

- For connector X3 (automatic oil refill) (Fig. 18)
M12-T 4P m. straight-free end, cable PUR not shielded
L= 10 m. N860315
or
M12-T 4P m. straight-M12-T 4P f. straight, cable PUR not shielded
(fig.19)
L= 3 m. XXXXX
L= 10 m. XXXXX

- For connector X4 (IFX-F sensor) (Fig.20)
Extension cable M12-A 5P m. straight-M12-A 5P f. straight, cable
PUR shielded
L= 5 m. XXXXX
L= 10 m. XXXXX

- For connectors X5, X6 (pressure booster, ball valve) (Fig.21)
M12-A 4P m. straight-free end, cable PUR not shielded
L= 2 m. N860091
L= 10 m. XXXXX

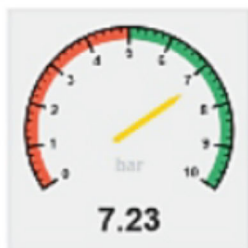
- For connector X10 (data) Fig. 23)
Ethernet CAT5-M12-D m. straight, cable PUR shielded (fig.22)
5 m. XXXXX
10 m. XXXXX

Suggested lubricants:

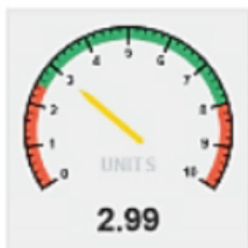
LUBRICANT EMFLUID BL-FA1 (aluminum, brass, cast iron)
25 liters tank LWBLFA1.025
208 liters barrel LWBLFA1.208
LUBRICANT EMFLUID BL-FA2 (universal)
25 liters tank LWBLFA2.025
208 liters barrel LWBLFA2.208
LUBRICANT EMFLUID BL-SE1 (steel and brass)
25 liters tank LWBLFSE1.025
208 liters barrel LWBLFSE1.208
LUBRICANT EMFLUID BL-SE3 (non ferrous metals)
25 liters tank LWBLFSE3.025
208 liters barrel LWBLFSE3.208
LUBRICANT EMFLUID BL-HD1 (tough steels)
25 liters tank LWBLFHD1.025
208 liters barrel LWBLFHD1.208



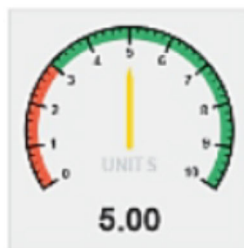
MONITORING



Input (P1)



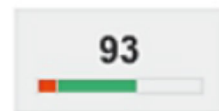
Output (P2)



Nozzles (P3)



Oil Level



IFX-F Signal

MANUAL OPERATION

Output (P2):

3.00	Λ	V
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Nozzle 1:

ON/OFF

Nozzle (P3):

5.00	Λ	V
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Nozzle 2:

ON/OFF

STARTING

Fig.25