GE
Oil & Gas

Cylinder and Packing Lubrication System with Condition Monitoring

Benefits

□□□ Increased production
■■□ **Higher efficiency**
■□□ **Compliance with environmental regulations**
■■□ **Availability and Reliability**
■■■ **Life extension**

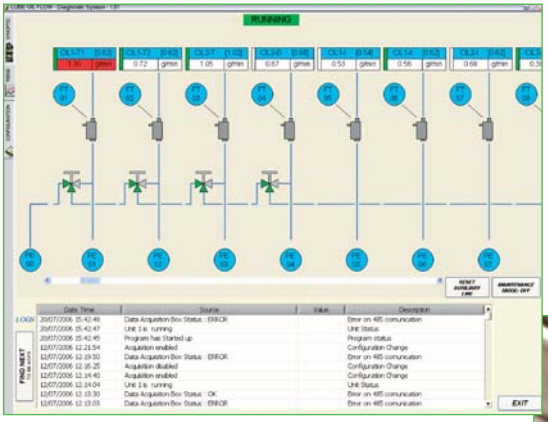
Customer benefits include:

- Reduction of oil consumption by 50%
- Simple system monitoring and tooning
- Simplified system maintenance including replacement of pumping element without compressor shutdown
- Reduction in number of spare parts required
- Lubrication monitoring from remote location (typically control room)
- Recording oil consumption for each point
- Generates data / event files for remote post-analysis

What it is

The new lubrication system feeds oil to the cylinder and packing injection points at oil flow ratios optimized by divider block technology (*Figure 1*).
The progressive series system is equipped with a traditional force feed lubricator box with a pumping element for each compression stage, plus a spare.
A safety valve, filter and manometer are installed on each lubrication line upstream the deliver valve (*see Figure 3* for a typical P&ID and *Figure 2* for a typical box lubricator assembly).

Condition monitoring of the cylinder and packing lubrication is equipped with flow sensors on each line, a local data acquisition system and a control system PC for data check, recording and trend analysis.
The control system gives a single common alarm for low or high oil flow.
Each lube channel can be equipped with a 3-way solenoid valve, to automatically connect the spare pumping element in case of low flow alarm and avoid compressor trip.



Divider valve blocks

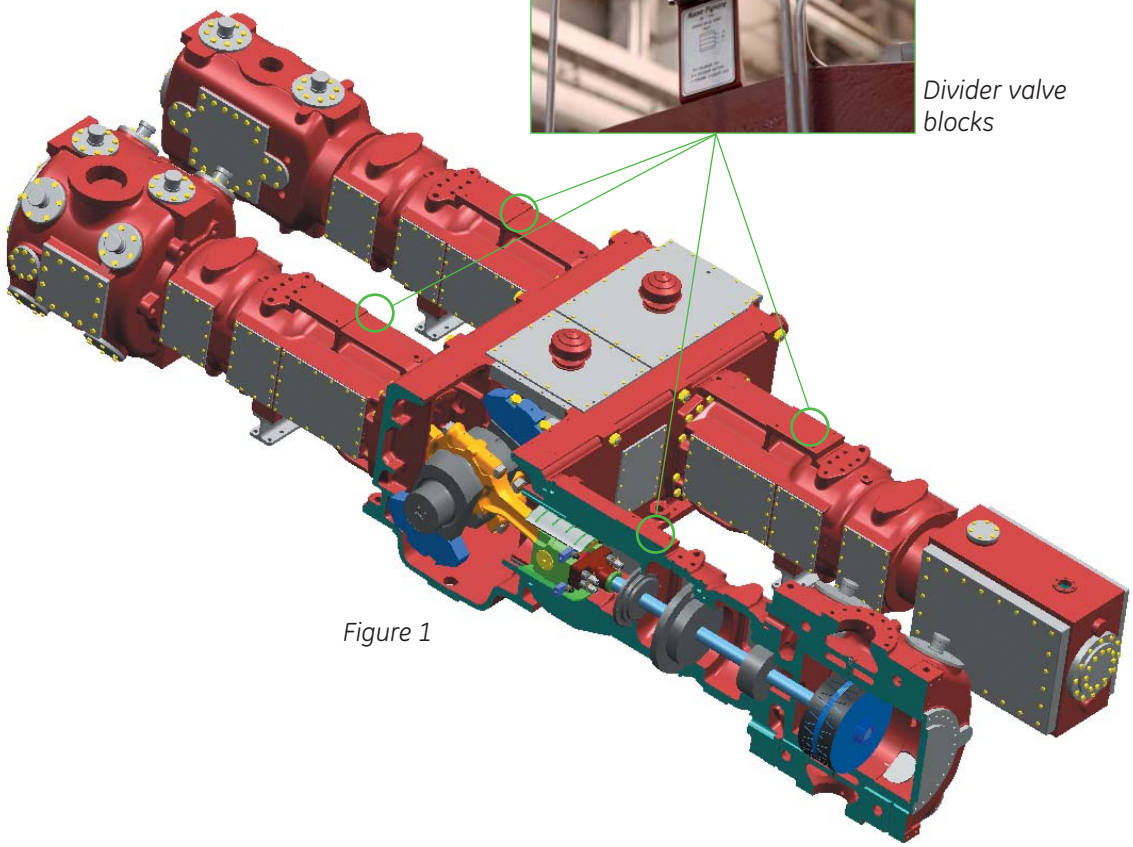


Figure 1

How it works

Each individual injection point operation is monitored. If a lubrication point is not receiving lubricant, its divider block stops and a dedicated proximity probe located on the block case sends an alarm or shutdown signal to the control panel. In addition, each divider block outlet is equipped with a pressure indicator with a memory that identifies and displays the plugged line. In the event of a pumping element failure the system automatically connects the spare by using a 3-way valve (*see Figure 3*). In case of damaged pumping or any maintenance is needed, component may be replaced without shutting down the compressor, thereby increasing the availability of the system.
A single pump feeds the entire oil flow required by one compression stage, rather than a single injection point (as done early system designs). This approach provides more stable operating conditions and allows the oil flow to be adjusted without changing the oil flow ratio between injection points since it is regulated by the divider block. This feature eliminates the need for a balancing valve to feed all points at a uniform pressure level.
Pumping units are reduced from one per injection point to one per stage. This reduces the maintenance and spare parts required, reduces the amount of tubing and associated fittings and increases the overall system reliability.

Scope of Supply

Each system is engineered to address the actual configuration and operating conditions of the compressor.
The scope of supply for a typical modification includes:

Engineering:
- Part number list
- Assembly drawings
- New lube oil flow rate table
- P & ID

Materials:
- External reservoir
- Box lubricator with safety valve, filter and manometer for each lubrication line
- Driving system for lubricator box
- Divider valves blocks
- Tubing
- Wiring

The scope of supply for typical monitoring system includes:
- Flow sensors for each line complete of safety valve and metering device.
- No-contact proximity probe for each sensor
- Local data acquisition system suitable for hazardous area complete of power supply, CPU, I/O modules and terminals.
- Control system software & hardware complete of 19" rack, industrial PC, LCD monitor and keyboard

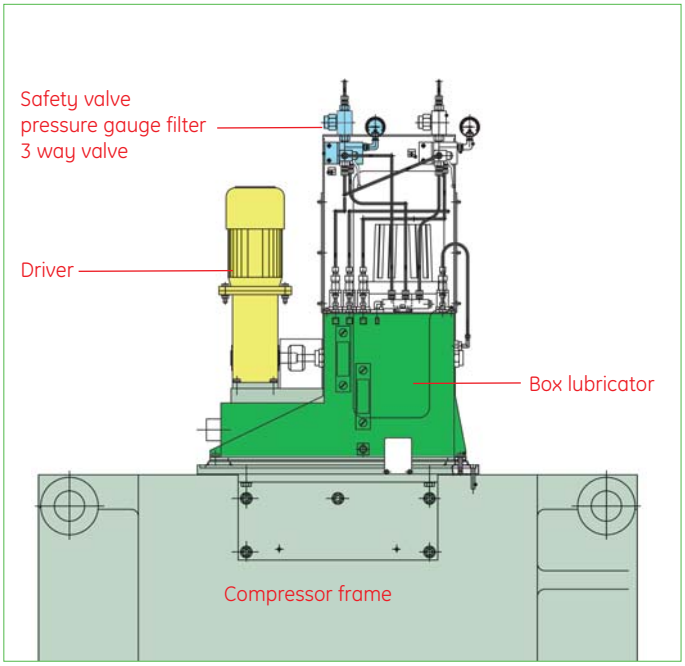


Figure 2: Progressive-series-system typical box lubricator arrangement

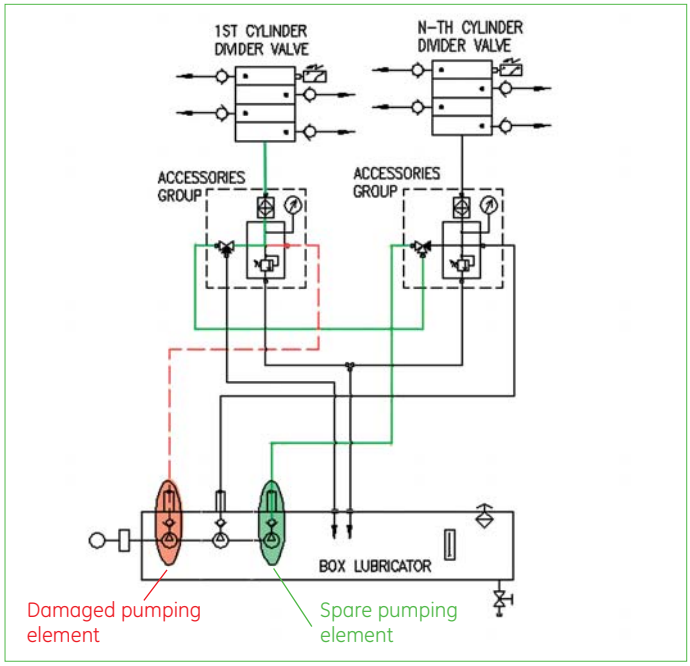


Figure 3: Spare pumping element schematic diagram

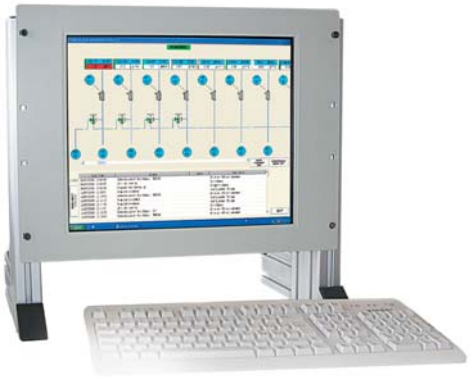
How it works

The monitoring system detects the oil temperature and flow. The flow sensors are divided in two parts: a mounting base with I/O and vent connections and a metering body complete with by-pass safety line to ensure oil supply in the event of sensor failure.
The control system SW acquires and processes data and automatically actuates the spare pumping element.
Remote HMI includes:

- Synoptic panel showing lubrication data and scheme
- Trend current or historical oil flow for each line
- Configuration section for tuning the system

Local data acquisition system

Control system PC



Trend display

GE imagination at work

GE Oil & Gas
via F. Matteucci, 2
50127 Florence - Italy
T +39 055 4272500
F +39 055 4232800

E customer.service.center@ge.com
www.ge.com/oilandgas

Nuovo Pignone S.p.A.

COMK/MARK 839/II - Designed by: Studio Tre Fasi
Printed by: Sagraf - 1-2008