

EC-L Lubricator



DESCRIPTION

The EC-L Lubricator is a multi-purpose all electrical oiler system, which is capable of depositing a measured volume of oil from each nozzle (in solid drop form) directly onto a moving part such as the link pin of a roller chain.

The volume of oil is dependent upon the size of metering elements which are available for the following output volumes per shot:-

0.1cc, 0.025cc, 0.05cc, 0.1cc and 0.2cc

The system comprises a 3-phase motor driven gear pump and reservoir assembly. (*Note: The reservoir is available with capacities of 6 or 18 litres*). The gear pump feeds remote metering elements fitted with outlet nozzles. These nozzles discharge oil when a metal part influences the field of the proximity switch.

Principle of operation is such that, when the system is switched on, the gear pump circulates oil at low pressure via the open part of the solenoid (diverting) valve, back to the reservoir. Immediately the proximity switch field is influenced by a metal part, the solenoid valve is energised and the flow of oil is directed into the main line. This diverting of flow produces a pressure wave. This pressure wave, on reaching 30 bar, operates the metering elements, which inject a measured volume of oil at high speed through each nozzle.

TECHNICAL DATA

Gear Pump Assembly

The gear pump/moor unit consists of a gear pump bolted directly to the 3-phase AC motor.

The pump is fitted with a relief valve to relieve the pressure in the delivery line when the motor is switched off.

A safety valve opens when the set pressure is reached and so prevents damage to the pump by excess pressure.

A vent valve prevents the pumping of air in the delivery line, and so enables rapid venting of the gear pump when the system is started up.

The unit with a pumping rate of 1000 cm³/min. is suitable for use with either ZE-D or ZE-E type distributors.

Note: Premature wear of moving parts and seals can be caused by dirty lubricant.

Pump Specification

| | | |
|---------------------|---|--|
| Delivery pressure | : | Continuous 25 bar. For a short period 40 bar |
| Relief pressure | : | 0.8 bar |
| Pumping rate | : | 1000 cm ³ /min. |
| Suction head | : | 450mm |
| Oil viscosity range | : | 21 to 1800 mm ² /s (cSt) |
| Temperature range | : | -20 to +80°C |

Motor Specification

| | | |
|--------------|---|------------------------|
| Flange size | : | C90 to DIN 42948 |
| Voltage | : | 220-240 / 380-415v 3ph |
| Frequency | : | 50 Hz |
| Power rating | : | 0.18kW |
| Current | : | 0.64 A |

Solenoid

| | | |
|-------------------|---|--|
| Coil voltage | : | 110 or 240v AC, 50Hz (60Hz & DC coils also available) |
| Power consumption | : | AC - 16VA – 18 watts holding - 26VA – 13 watts inrush |

Reservoir

| | | |
|----------------------|---|---------------|
| Capacities available | : | 6 or 18 litre |
|----------------------|---|---------------|

TECHNICAL DATA (Contd/)

Low Oil Level Switch

| | | |
|----------------|---|--|
| Type of switch | : | MRR2 Reed Switch |
| Contacts | : | Make on Fall |
| Rating | : | 15 W |
| Max. Voltage | : | 220v at 68 mA |
| Max. Currant | : | 1A at 15v |
| Float | : | D300 PVC Foam suitable for use in liquids of 0.85 SG |

Proximity Switch

Standard:

| | | |
|---|---|----------------------|
| Body Dia. | : | M18 |
| Voltage Range | : | 20-250v AC, 50/60 Hz |
| Voltage Drop | : | ≤ 5v |
| Max. Load Current | : | 500 mA |
| Min. Load Current | : | 2mA |
| Max. Leakage Current when load de-energised | : | 2mA |
| Temperature Range | : | - 25°C to + 70°C |
| Protection | : | IP67 |

PC Compatible:

| | | |
|---|---|---------------------------|
| Body Dia. | : | M18 |
| Voltage Range | : | 90-250v AC, 50/60 Hz |
| Voltage Drop | : | ≤ 11.9v |
| Max. Load Current | : | 180 mA |
| Min. Load Current | : | 5mA |
| Max. Leakage Current when load de-energised | : | 1.5mA at 110v 3mA at 220v |
| Temperature Range | : | - 25°C to + 70°C |
| Protection | : | IP67 |

Nozzles

| | |
|--------|-------|
| Length | 150mm |
| Length | 250mm |

Clearance to lubrication points between 20 and 50mm

LUBRICANT METERING ELEMENT ZE-E

The ZE-E lubricant metering elements are designed for single line centralised lubrication systems where the quantity of lubricant to be metered is delivered after each pressure stroke.

Advantages:-

- precise metering
- no dripping

Specification

| | | |
|------------------------------|---|---------------------------------|
| Suitable oil viscosity range | : | 30-2000mm ² /s (cSt) |
| Operation pressure | : | 10 – 30 bar |
| Max. relief compression | : | 0.8 bar |
| Installation | : | Vertical |
| Ambient temperature | : | -20°C to +80°C |
| Material | : | Steel (surface protected) |

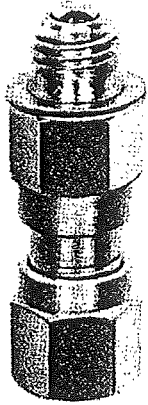


Fig.1

Layout

The lubricant dividers consists of a manifold(s) as well as one or several metering elements (see Fig.2)

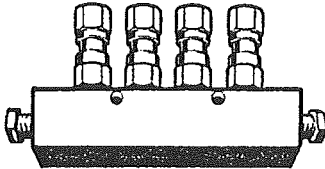


Fig.2

The manifolds are made of rectangular steel section 20 x 16mm provided with threaded holes M10 x 1 DIN 3862 to accommodate the metering elements and tube nuts and olives suitable for 6mm o.d. tube, each metering element outlet being suitable for 4mm o.d. nozzles

Principle of Operation (Fig. 3)

During the pressure stroke (30 bar) the ball is lifted from its seat in the housing (3) and pushed up to the top against the spring force (7) and at the same time the pressure relief valve (5 and 6) is lifted against the spring pressure (4) thus discharging the metered volume of lubricant.

When the main line is depressurised (to approx. 0.8 bar) the ball (9) re-seats and the relief valve (5 and 6) closes, cavity (D) remaining charged with a volume of lubricant for discharging during the next cycle.

Time for recharging the lubricant is determined by its operational viscosity, output volume and other factors.

The interval necessary for allowing the divider to make two cycles ranges between 0.13 and 30 seconds.

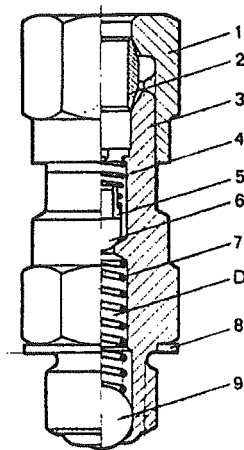


Fig.3

INSTALLATION

To ensure the correct operation of the EC-L lubrication system, the following points must be observed:-

- a) The maximum pipe length between the lubricator and the furthest ZE-E metering element manifold must **not** exceed 5m.
- b) The maximum number of metering elements is 12 per system.
- c) The pipework must be run to enable access to metering elements and pipe for bleeding.
- d) Pipework should, where possible, be run on plant framework to give protection and be correctly clipped.
- e) The proximity switch is to be positioned in a suitable position so as to be influenced only by the metal part required to initiate the oil shots.
- f) The ZE-E metering elements must be mounted vertically, as shown on Drawing No. A240 (with outlet uppermost).
- g) Cleanliness of the system is absolutely essential. Pipes must be clean in bore, any swarf particles created by cutting the nozzles or pipe must be removed before fitting.
- h) Always use clean lubricant in the lubricator container.

COMMISSIONING

Having installed the system and filled the EC-L lubricator with clean lubricant, start the pump with the proximity switch de-energised. Bleed the main line by loosening a suitable connector.

When air-free oil is discharged, re-connect line.

Now gradually increase the pressure in the main line (by closing the throttle valve). This gradual increase in pressure should bleed manifolds, metering valves and nozzles.

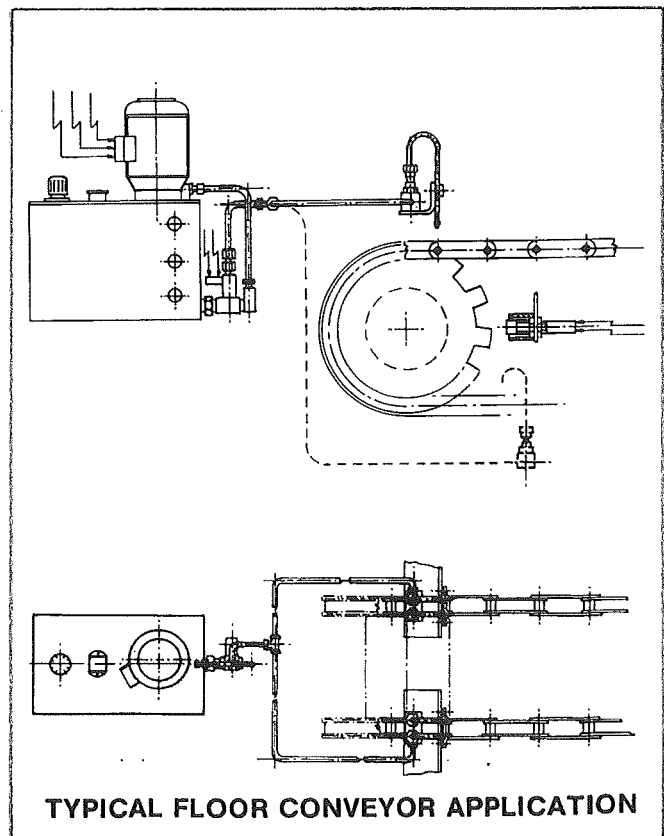
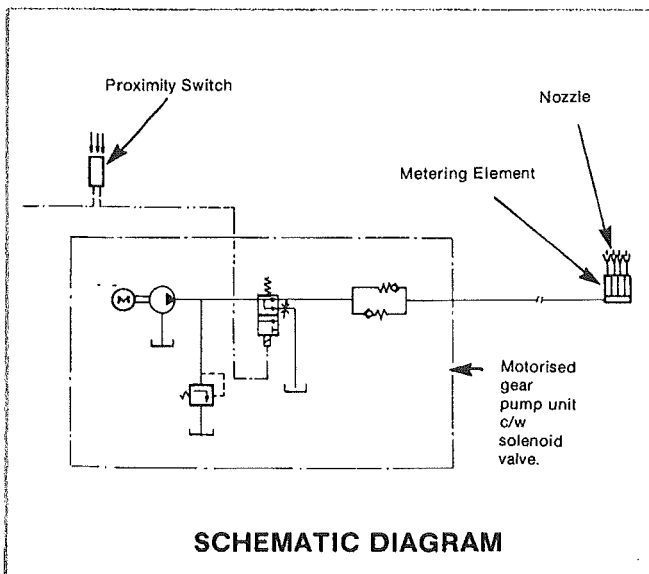
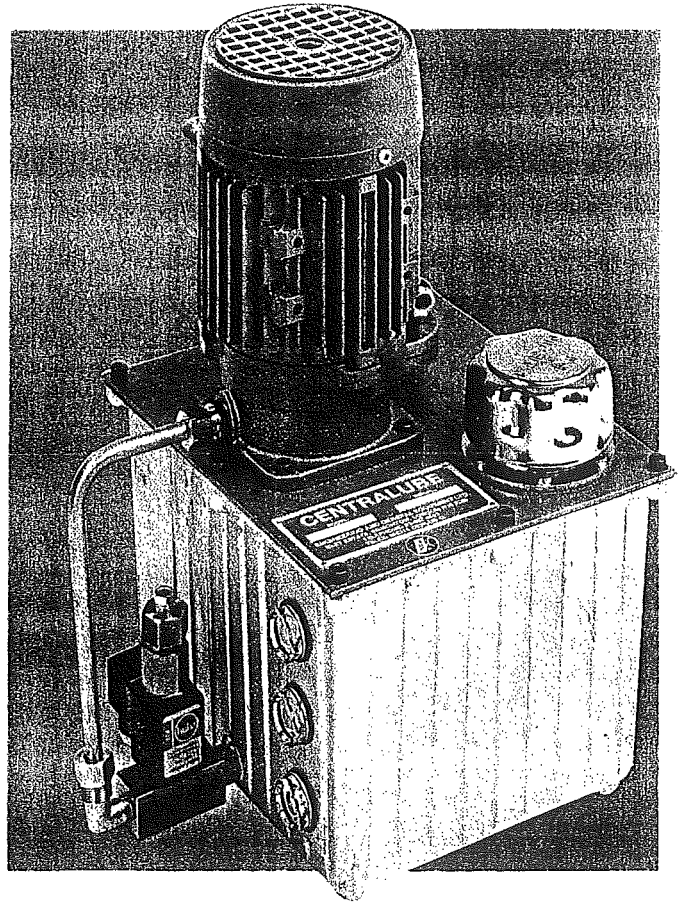
Carry on operating the pump until a fine, uninterrupted jet of lubricant is squirting from the nozzles.

Finally, open the throttle valve and then, with the conveyor running, adjust the nozzles and/or proximity switch in order to ensure that the oil shots hit the desired points precisely.

Note:

If no lubricant is discharged from nozzles, the fault is air in the system. To correct this, the air must be bled from system pipework. This is achieved by removing manifold blanking plug(s) (on each branch line) and operate the lubricator until air-free lubricant is discharged. Re-fit plugs and re-commission system as described above.

- The ECL lubricator is a multi-purpose all electric lubricator system for all types of moving lubrication points and assembly operations e.g. link pins on chains, guide rollers and component assembly.
- Solid shot of lubricant from nozzle can be aimed directly at point of application without overfeeding onto parts which must remain free of lubricant.
- Oil shot volume is governed by fixed output metering elements available in various sizes and can be chosen to suit the application.
- Particularly suitable for lubricants with dispersions of solids, e.g. Molybdenum Disulphide. Built in recirculation feature agitates the lubricant and retains solids in suspension.



ECL Electric 'Solid Shot' Lubricator

TECHNICAL SPECIFICATIONS

Reservoir capacities available 6 or 18 litre
 Delivery pressure 25 bar (continuous)
 40 bar for short periods
 Residual pressure during relief period 0.8 bar
 Lubricant outlet 6 mm o.d.
 Serves upto 12 points.
 Metering element sizes available:

| CODE NO. | OUTPUT PER CYCLE |
|--------------|------------------|
| 35691 - 1111 | 0.01 cc |
| 35691 - 1121 | 0.025 cc |
| 35691 - 1131 | 0.05 cc |
| 35691 - 1141 | 0.1 cc |
| 35691 - 1151 | 0.2 cc |

Cycle rate: Upto 2 cycles per sec.
 (depends on lubricant characteristics).

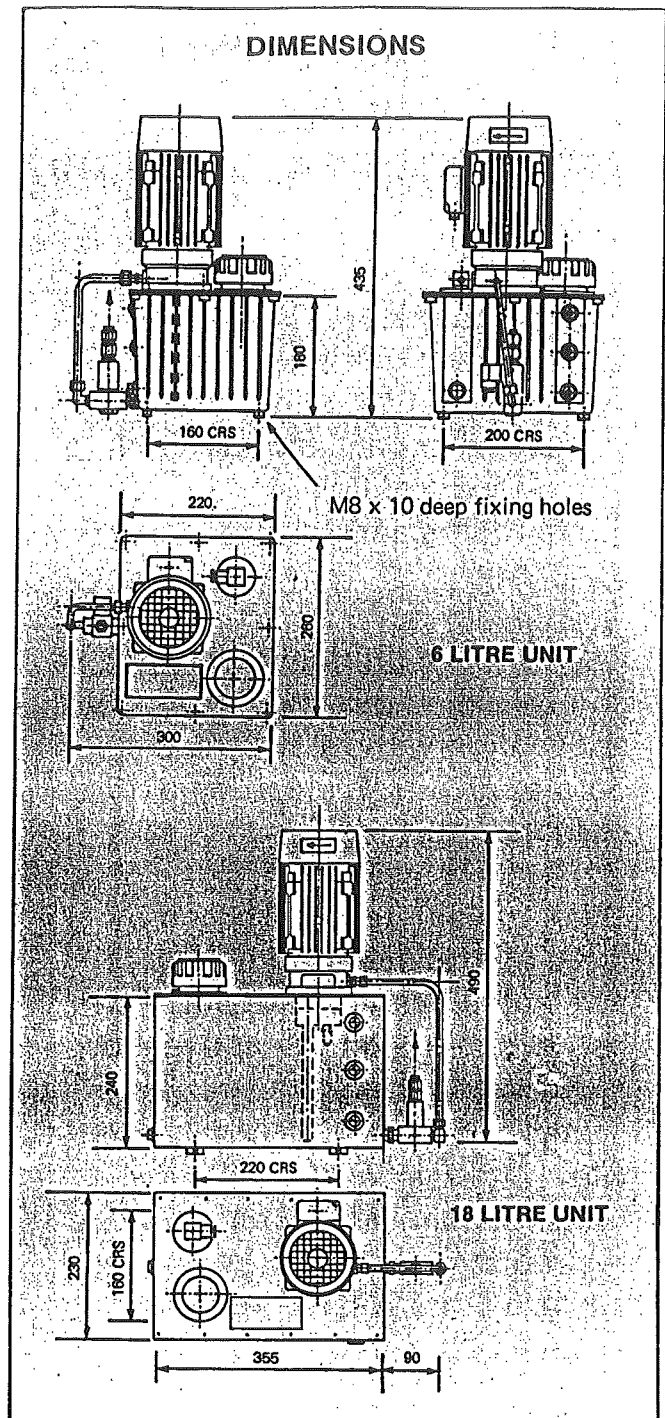
ELECTRICAL DATA

Motor: 0.18 kW, 0.64A, 415V AC, 3pH, 50Hz
 Solenoid: Voltage — 110V AC, 220V AC or 24V DC
 Power AC — 16VA — 8 watts holding
 Consumption: 26VA — 13 watts inrush
 DC — 10 watts

(Other voltages available on application.)

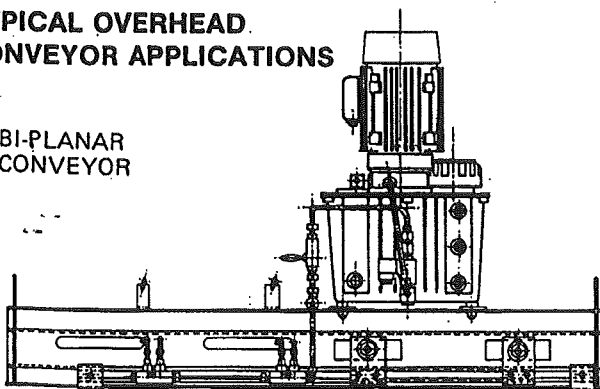
PRINCIPLE OF OPERATION

When the system is switched on, the gear pump circulates lubricant at low pressure through the normally open part of the solenoid valve and back to tank. When the solenoid valve is energised the full flow of lubricant is diverted to the main line and delivered to the metering elements situated close to the points of application. The pressure rises and at 30 bar the metering elements operate and metered volumes of lubricant are discharged from the nozzles at high velocity onto the points of application.

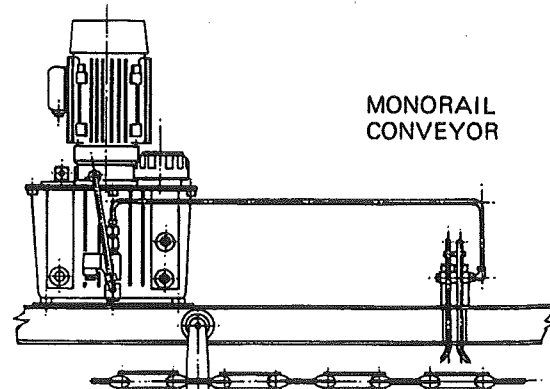


TYPICAL OVERHEAD CONVEYOR APPLICATIONS

BI-PLANAR CONVEYOR



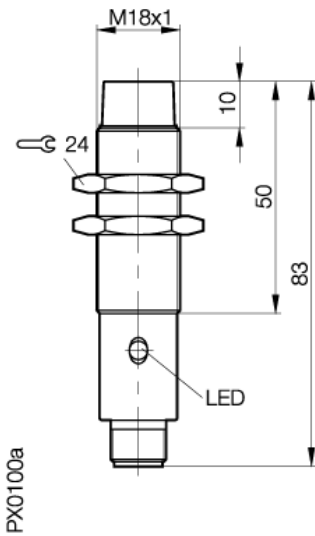
MONORAIL CONVEYOR



BES 516-360-S 4-C

Inductive Sensors

PNP
NO
non flush mountable



Electrical data:

| | |
|--------------------------------|-----------|
| Connection | connector |
| Rated operational voltage (Ue) | 24 DC V |
| Load current capacity (Ie) | 200 mA |
| Time delay before availability | 10 ms |
| Electrical type | DC |
| Utilization category | DC 13 |
| Hysteresis max (H) | 15 % |
| No-load supply current damped | = 12 mA |
| Off-state current max (Ir) | 10 µA |
| Ripple max. of Ue | = 15 % |
| Switching output | PNP |
| Switching element function | NO |
| Operating frequency (f) | 600 Hz |
| Voltage drop max. static | 1,5 V |
| Supply voltage max. (Ub) | 30 V |
| Supply voltage min. (Ub) | 10 V |

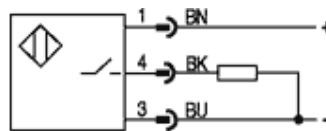
Mechanical data:

| | |
|-------------------------------|---------------------|
| Number of Wires | 3-wire |
| Rated operating distance (sn) | 8 mm |
| Diameter | M18x1 mm |
| Assured operating distance | 0...6,5 mm |
| Mounting | non flush mountable |
| Ambient temperature max | +70 °C |
| Ambient temperature min | -25 °C |
| Degree of pollution | 3 |
| Sensing face material | PA 12 |
| Housing material | CuZn, nickel plated |
| Repeat accuracy max. (R) | = 5 % |

General data:

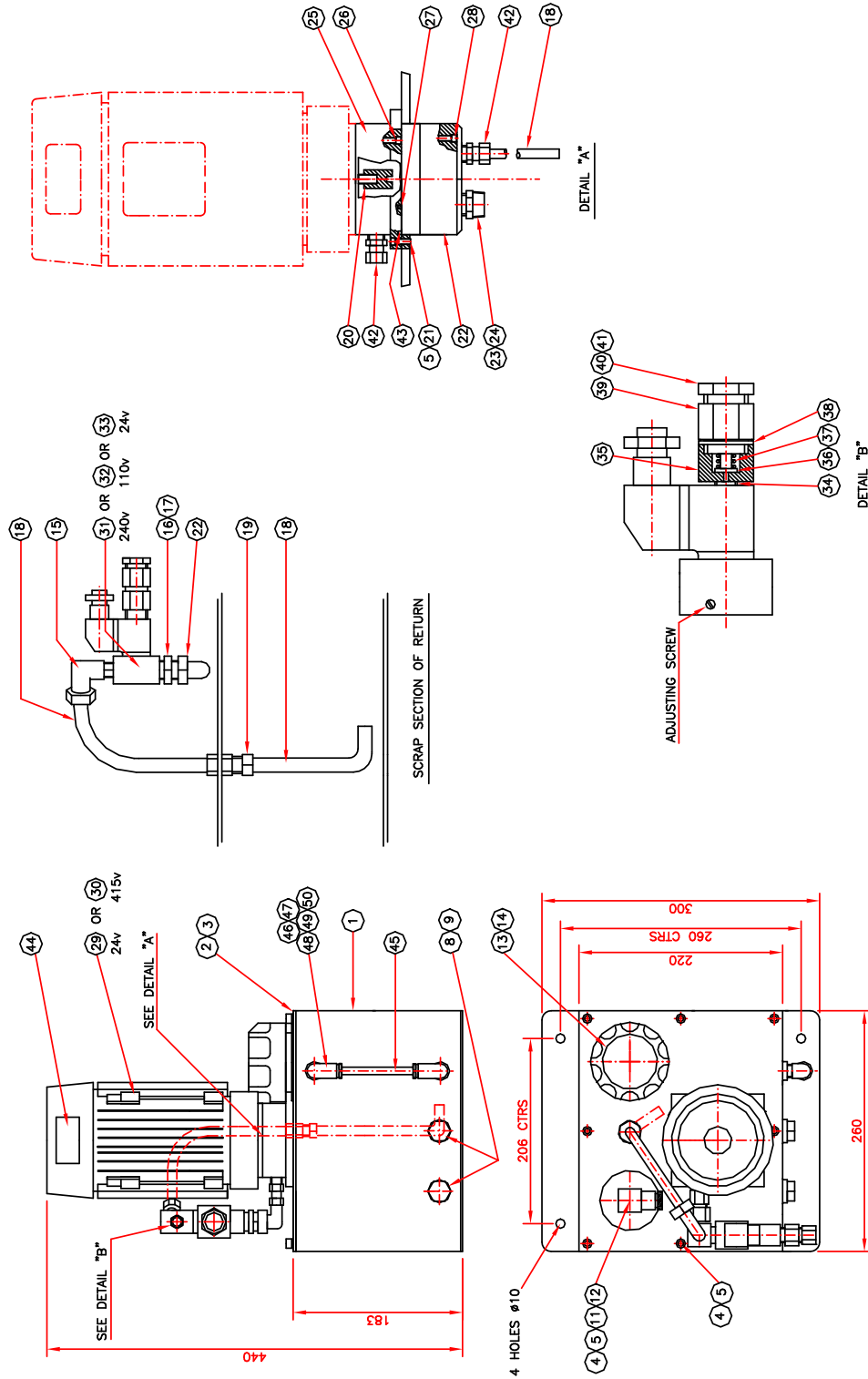
| | |
|-------------------------------------|--------------------|
| Output indication | yes |
| Short circuit protected | yes |
| Degree of protection IP | IP68 per BWN Pr 20 |
| Insulation class | 2 |
| Protected against polarity reversal | yes |
| Approval | CE,ULZ1 |

wiring



Pinout





| | | | |
|---|-------------------------|----------|----------|
| E | Redrawn On Denco Border | LH | 17/11/08 |
| ISSUE REVISION | | INTLS. | Date |
| The following callouts apply unless otherwise stated: General Fabrications: tanks, skirts etc. millimetre Pipework/Assembly millimetre Hole centres: <1 mm to 5mm 0.05mm >5 mm to 10mm 0.1mm Press Tool Work ± 0.25mm Drilled Holes <10mm dia 0.10mm >10mm dia 0.15mm Machined Faces ± 0.1mm Angular Dimensions ± 1° Remove all burrs and sharp edges | | | |
| Projection | 1:5 | Scale | 1:5 |
| This drawing is private and confidential and is the property of Denco Lubrication Ltd and must not be copied or lent without the consent of Denco Lubrication Ltd with tender and/or on completion of order. | | DRAWN | CHECKED |
| | | APPROVED | TRACED |

| | | | |
|---|--|----------|--------|
| TITLE GENERAL ARRANGEMENT OF ECL/6 MKII ELECTRO-HYDRAULIC LUBRICATOR. | | Revision | E |
| | | Sheet | 1 of 1 |
| | | Dwg. No. | B 2368 |



PARTS LIST

| Item | Part Number | Description | QTY |
|------|-------------|--|------|
| 1 | 1/000/126 | 6 Litre Tank Drg B1976 | 1 |
| 2 | 1/000/124 | 6 Litre Tank Lid Drg A318 | 1 |
| 3 | 1/000/121 | 6 Litre Tank Gasket Drg B2441 (C81902) | 1 |
| 4 | 60455 | Cap Head Screw M6 X 16 | 12 |
| 5 | 60733 | M 06 Spring Washers | 12 |
| 6 | | Denco Label | 1 |
| 7 | | | |
| 8 | 1/000/307 | 3/8" Bsp Brass Plug With Seal | 2 |
| 9 | | | |
| 10 | | | |
| 11 | 1/000/123 | Low Level Switch 30/148/C A=130 Drg B580 | 1 |
| 12 | 1/000/120 | Level Switch Gasket A1749 (C81902) | 1 |
| 13 | 1/000/130 | Filler Breather Filter Ta-4080-C80 | 1 |
| 14 | 60861 | M5X10 Long Pozi Head Screws (Stl) | 6 |
| 15a | 5600502 | 1/4 Bspt 10Mm Od Male Stud Elbow | 1 |
| 15b | 1003005 | 10mm DE | 1 |
| 16 | 1/000/168 | Nippled Adaptor | 1 |
| 17 | 1/000/172 | Stem Elbow | 1 |
| 18 | 12851 | Mtrs10 Mm O/D Bundy | 0.6 |
| 19a | 1/000/337 | 10 Mm O/D Bulkhed Coupling Body | 1 |
| 19b | 1/000/338 | Lock Nut For 10mm Bulkhead M20 × 1.5 | 1 |
| 19c | 1/000/339 | 10mm OD Norgren Tube Nut M15 × 1 | 2 |
| 19d | 1/000/340 | 10mm OD Norgren Olive | 2 |
| 20 | 1/000/131 | Coupling 180 W Motor Type 317 | 1 |
| 21 | 60457 | Cap Head Screw M6 X 25 | 4 |
| 22 | 1/000/114 | Pump Pr1000 / Ecl | 1 |
| 23 | 1/000/165 | 1/8 Bsp Relief Vve(Set 35 Bar) | 1 |
| 24 | 1/000/312 | M10 Copper Washers (1/8Bsp) | 1 |
| 25 | 1/000/115 | Adaptor Flange 180 W Motor | 1 |
| 26 | 60410 | Cap Screw M5 X 40 | 4 |
| 27 | 1/000/157 | Sealing Ring | 1 |
| 28 | 60462 | M6X 50 Long Cap Head Screw | 2 |
| 29 | | | |
| 30 | 1/000/284 | Motor D63-Gc 415-3-50 180W C90Z11M5 1500Rpm With Key | 1 |
| 31 | | | |
| 32 | | | |
| 33 | 1/000/167 | Solenoid Vve 24 V 23 Watt Huba | 1 |
| 34 | 1/000/158 | Sealing Ring | 1 |
| 35 | 1/000/155 | Valve Body | 1 |
| 36 | 1/000/164 | Valve | 1 |
| 37 | 1/000/159 | Pressure Spring | 1 |
| 38 | 1/000/156 | Copper Washer | 1 |
| 39 | 1/000/154 | Connector | 1 |
| 40a | 1/000/169 | 6mm OD Male Connector × 1/8" BSP Male | 1 |
| 40b | 47125 | 1/8" BSP Socket | 1 |
| 41 | 00726 | 1/8" BSP × 6mm OD Male Stud Elbow | 1 |
| 42 | 5100502 | 1/4 Bspt X 10 Mm Od Msc | 2 |
| 43 | 1/000/342 | Sealing Ring | 1 |
| 44 | | | |
| 45 | 12961 | Mtrs X 8Mm O/D Nylon Tube | 0.15 |
| 46 | 1/000/303 | 1/4 Bsp X8Mm O/D Hobbs Elbow | 2 |
| 47 | 00030 | 8Mm O/D Tube Nut | 2 |
| 48 | 00151 | 8Mm O/D Olive | 2 |
| 49 | 1/000/305 | 1/4 Bsp Hobbs Locknut | 2 |
| 50 | 1/000/304 | Hobbs Seal | 2 |