ECON HYDRAULIC LINEAR ACTUATOR

Fig. 21401 Spring Return Actuator, type ESL

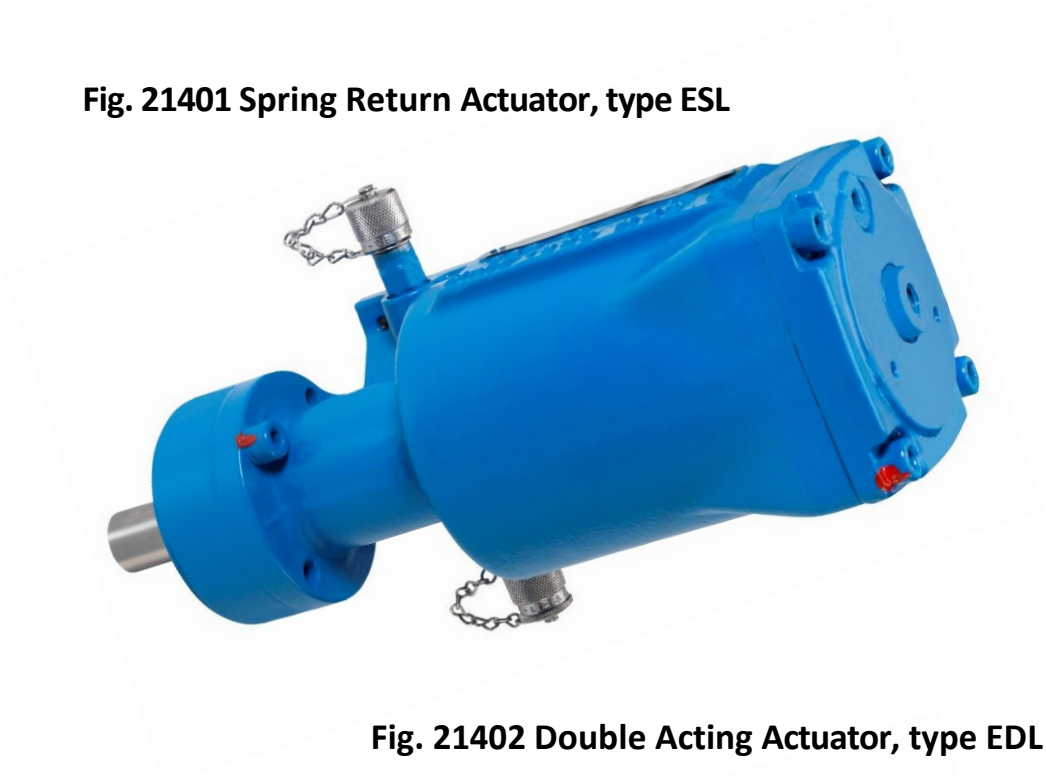


Fig. 21402 Double Acting Actuator, type EDL

Installation & Operation Manual for Hydraulic Actuator:
Fig. 21401, 21402

Contents

1 INTRODUCTION

1.1 Purpose

The purpose of this manual is to introduce and explain the installation, operation and maintenance of the ESL / EDL Hydraulic Linear Actuators.

1.2 Safety Notices

This manual contains safety notices and precautions the user must take to reduce the risk of personal injury and damage to the equipment. The user(s) must read these instructions before the installation, operation or maintenance of the ESL / EDL Hydraulic Linear Actuators.

DANGER: ***Refers to personal safety and alerts the user for danger and/or injury.***

Hazardous or unsafe practice may result in severe injury or death.

WARNING: ***Refers to personal safety. Alerts the user for potential danger.***

Not following warning notices could result in personal injury or death.

CAUTION: ***Directs the user's attention to general precautions that, if not followed, could result in personal injury and/or equipment damage.***

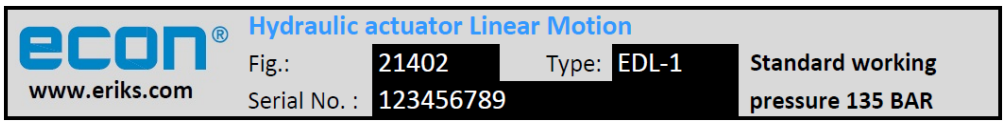
Note: Information in this manual is critical to the user's understanding of the actuator's installation and operation.

2 PRODUCT IDENTIFICATION

2.1 Product Identification

The product name plate is located on top of the connection flange. The name plate contains the following:

2.1.1 Marking



- ECON logo (trademark)
- Figure number
- Serial number
- Actuator type
- Standard Hydraulic working pressure

2.1.2 Certification

LRS Type Approval Certificate

2.2 Initial Inspection

Upon the receipt of the actuator, the user should inspect the condition of the product and ensure that the product specification stated on the name plate matches with the order sheet.

- Remove the packing wrap or wooden box carefully. Inspect the product for any physical damage that may have occurred during shipment.
- Check the product specification of the received product. If a wrong product has been supplied, please immediately report this to the distributing company.

2.3 Storage

Actuators must be stored in a clean, cool and dry area. The unit should be stored with the top cover installed and the connection ports plugged. Storage must be off the floor, covered with a sealed dust protector.

3 GENERAL INFORMATION AND FEATURES

3.1 General Information

ECON Linear actuators are equipped with a standardised connecting flange for direct mounting of Hydraulic Accessories and with ¼ inch threaded connection ports for BSP Hydraulic couplers.

- Fig. 21401 – Single acting Hydraulic actuator
- Fig. 21402 – Double acting Hydraulic actuator

3.1.1 Standard Technical Data

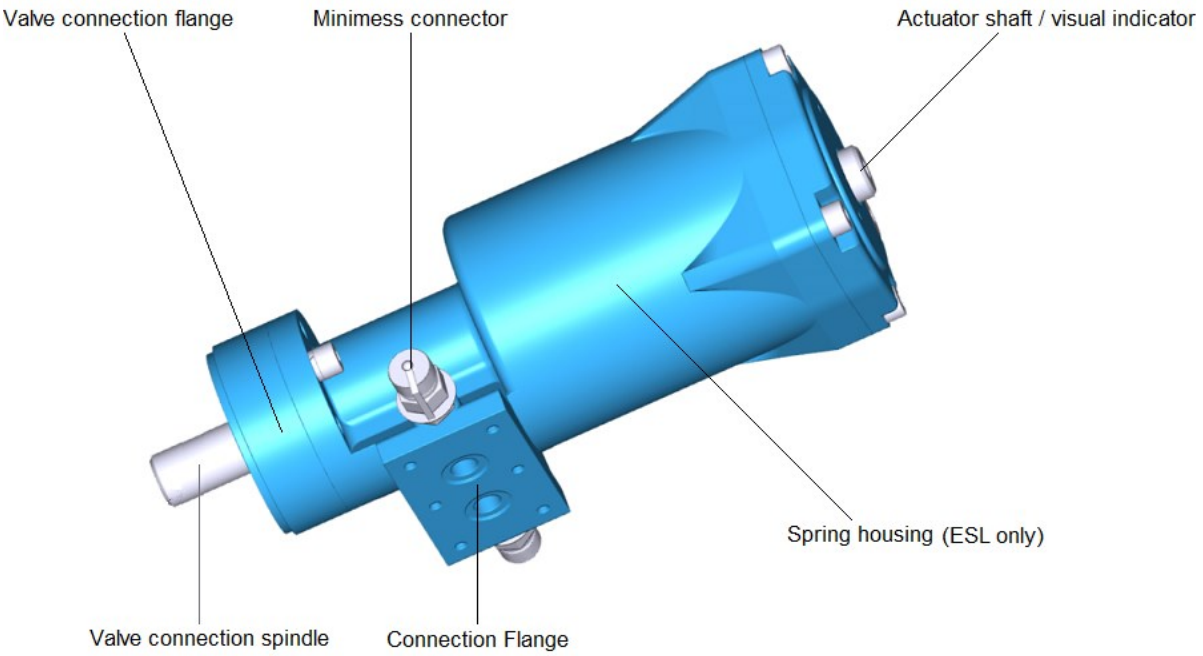
Standard working pressure	135 bar
Test pressure	240 bar
Force output	3150 N up to 17550 N
Valve connection	Eriks standard, based on Mounting set
Indication	Standard visual indicator for open/closed position indication, optional limit switches available
Local Control	Minimess quick connection couplers, type SMK20 M16x2
Hydraulic connections	¼ inch BSP
Ambient Temperature	-20°C (-4°F) up to +80°C (176°F)
External Coating	Acryl 2K AC (Lechler), RAL5015

3.1.2 Actuator Versions

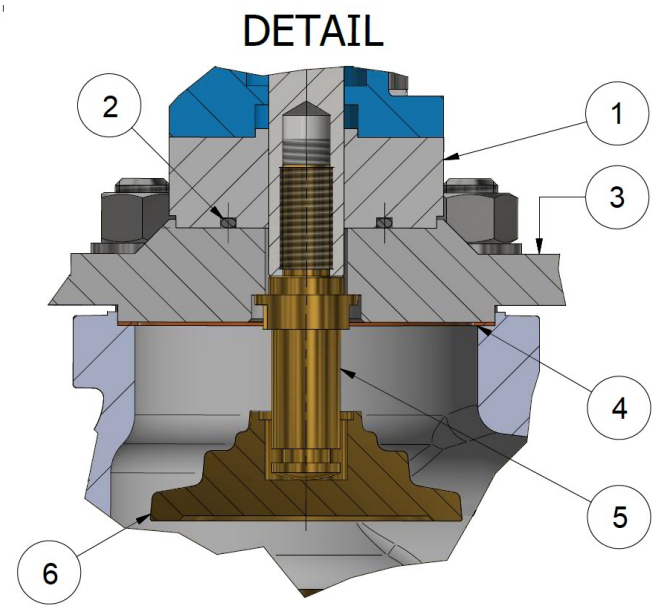
Fig. 21402 Double acting	Nominal force in Newton	Maximum stroke in mm	Displacement in cc (max. stroke)	Weight in KG
EDL-1	6075	40	23	7
EDL-2	17550	80	138	15
EDL-3	on request	on request	on request	on request
EDL-4	on request	on request	on request	on request

Fig. 21401 Single acting	Hydraulic opening force in Newton	Spring closing force in Newton	Maximum stroke in mm	Displacement in cc (max. stroke)	Weight in KG
ESL-1	3150	2925	35	20	18
ESL-2	9100	8450	53	88	40
ESR-3	on request	on request	on request	on request	on request
ESR-4	on request	on request	on request	on request	on request

3.2 External Parts for Double & Single acting actuator



3.3 Globe Valve mounting



Position	Item	delivery
1	Actuator bottom flange	actuator
2	O-Ring	mounting set
3	Valve mounting flange (bonnet)	mounting set
4	Gasket	mounting set
5	Valve spindle	mounting set
6	Valve	globe valve

4 INSTALLATION & HYDRAULIC REQUIREMENTS

4.1 Pre-installation

Note: Prior to mounting, actuator assembly must be checked for any damage. Damaged parts must be replaced by original spare parts.

Verify the actuator's nameplate to ensure that actuator type, model number, force output are correct before installation or use.

Check if the hydraulic control pressure corresponds with your system specification and the information on the actuator type plate.

4.1.1 Actuator application

ECON hydraulic actuators are used for operation of Globe valves and Valve Chests. The actuators are designed for severe operating conditions. For use in extreme conditions e.g. aggressive, corrosive environments it is recommended to mention this at the ordering stage, in order to verify if the actuator is suitable. The installation designer is responsible for the hydraulic actuator selection and must determine if the actuator is suitable for the working conditions.

ECON hydraulic actuators are also available for submerged application up to 50 mt depth.
For submerged application a shaft cover should always be placed on top of the actuator to avoid water from penetrating the assembly through the actuator shaft.

4.1.2 Actuator orientation

The actuator can be installed in any position on to the valve, however it can be that the complete valve assembly is not allowed to be mounted in vertical position because of valve specifics. Check the valve specifications before installing.

When the actuator has an Electric Hydraulic Powerpack there can also be restrictions in installing the assembly. Check the Powerpack specifications before installing.

4.1.3 Actuator Installation

The handling and transportation of actuators must be carried out with extreme precaution and using the necessary and adequate means depending on their size and weight in order to avoid risks to the operators handling them.

All ESL/EDL actuators will be delivered in combination with a globe valve or valve chest. This because of specialized mounting and adjusting procedure of the valve.

Actuators should be installed in such a way that they are easy to access in order to do the periodic inspections and corresponding maintenance operations necessary to guarantee the performance qualities that they have been designed for.

4.2 Recommended Oil Quality

The use of clean oil increases the lifetime of the actuators, as well as the lifetime of their accessories, solenoids and other hydraulic accessories

Any type of mineral oil can be used, the HLP type (DIN 51524-2) is recommended.
Also many fire-resistant fluids (as HFC) or polyglycole can be used.
Viscosity Range: 15 ¸ 200 mm2/sec (Oil ISO VG 46 mm2/sec DIN 51519 is recommended)

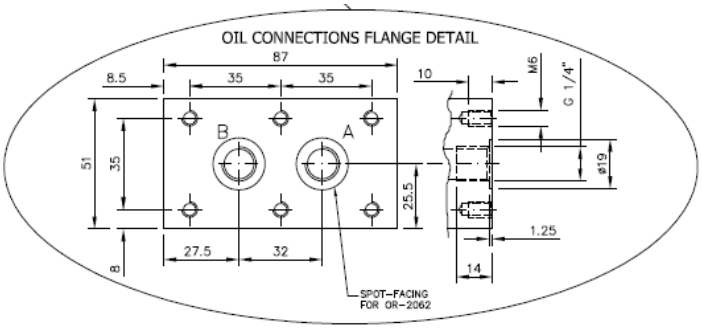
4.2.1 Hydraulic System flushing

The actuators are supplied cleaned and plugged; **before to start up, the connection piping and the hydraulic system have to be flushed according to ISO 4406 16/13 (NAS 1638/7) or better.**

5 OPERATION

5.1 General Operation

The ESL/EDL standard connection flange includes two hydraulic ports, threaded for 1/4“ BSP couplings. When hydraulic pressure is supplied to these ports the piston moves and slides through the housing The actuator piston connects to the valve spindle and when operated results into an opening or closing of the valve.



5.1.1 Double Acting actuator

When oil is supplied to port A the actuator piston will make a downwards movement(closing), when oil is supplied to port B it will make upwards movement (opening).

5.1.2 Single Acting actuator

On a single acting actuator the opening movement is done by hydraulic pressure and the closing movement is done by a spring.
The spring in ESL single acting actuators is of a mechanical type, the spring housing contains a set of disc springs, whenever a spring breaks the remaining springs take over and the valve is kept close with a slightly lower force.

5.2 Manual (emergency) operation

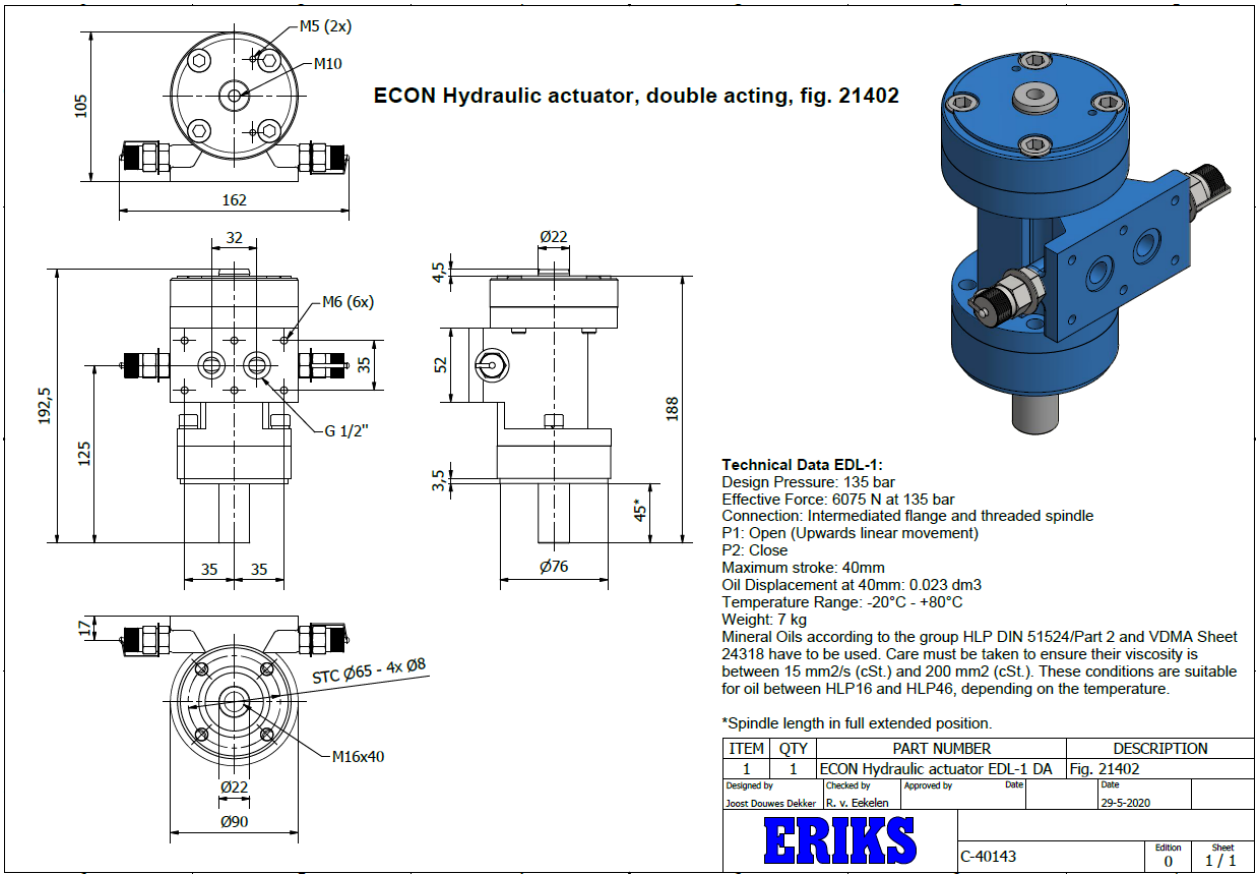
Besides operation through the main system, the actuator can also be operated through a handpump. Each actuator is equipped with two Handpump connectors. In order to use these connectors, the actuator must be isolated from the main system through pilot control valves, a ball valve, or a solenoid valve with a closed (mid) position.

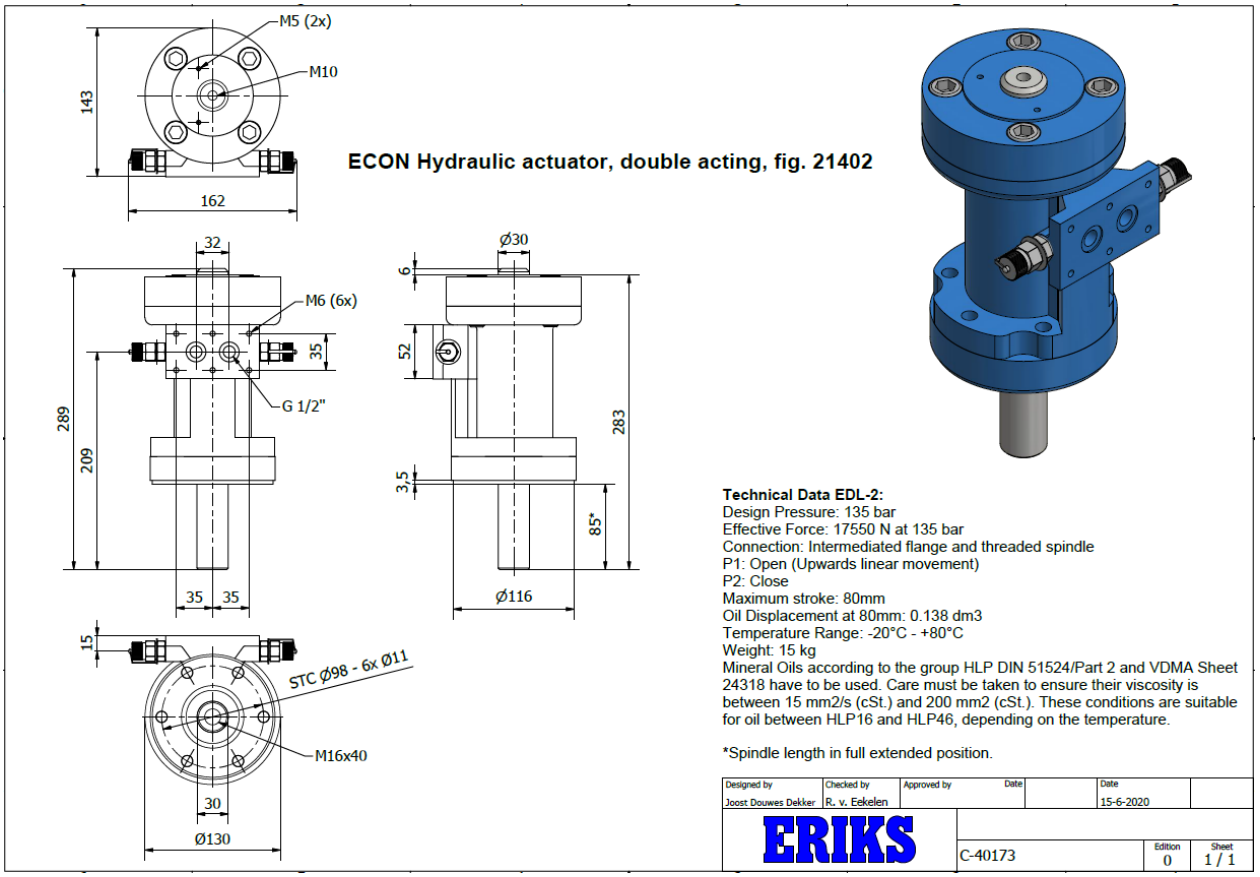
- Double acting actuators have two type QC3 connectors

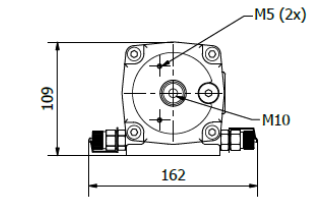
- Single acting actuators have one type QC3 for pressure side and a smaller type QC5 for spring side.

Operation is the same as described before; the connector on the side of port A will close the valve, when the connector on the side of port B will open the valve.
The QC5 connector on a single acting actuator is only used when the spring is defect.

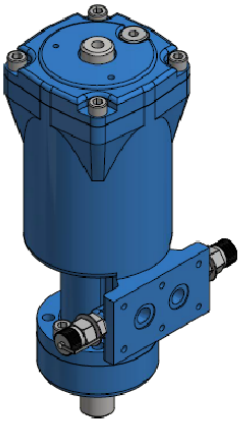
6 ACTUATOR DIMENSIONS

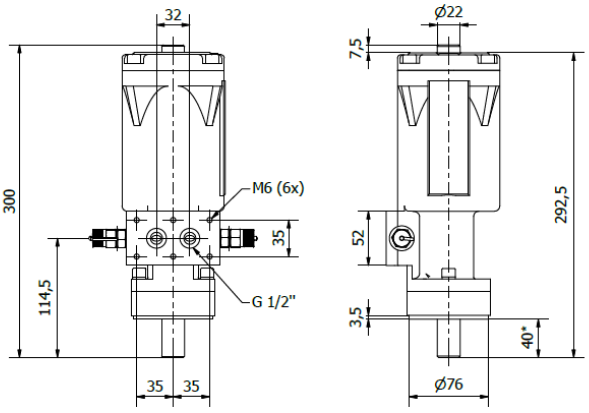


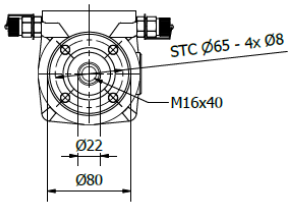




ECON Hydraulic actuator, single acting, fig. 21401







Technical Data ESL-1:
Design Pressure: 135 bar
Mechanical Spring Closing Force: 2925 N
Opening Force: 3150 Nm at 135 bar
Connection: Intermediated flange and threaded spindle
P1: Open (Upwards linear movement)
P2: Close (Spring closed)
Maximum stroke: 35mm
Oil Displacement at 35mm: 0.020 dm3
Temperature Range: -20°C - +80°C
Weight: 18 kg
Mineral Oils according to the group HLP DIN 51524/Part 2 and VDMA Sheet 24318 have to be used. Care must be taken to ensure their viscosity is between 15 mm2/s (cSt.) and 200 mm2 (cSt.). These conditions are suitable for oil between HLP16 and HLP46, depending on the temperature.

*Spindle length in full extended position.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	ECON Hydraulic actuator ESL-1 SA	Fig. 21401

Designed by	Checked by	Approved by	Date		Date
Joost Douwes Dekker	R. v. Eekelen				29-5-2020

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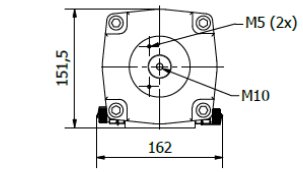
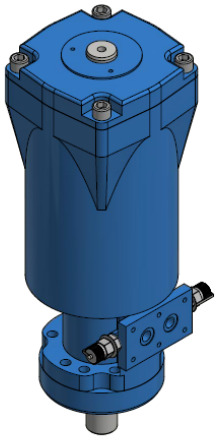
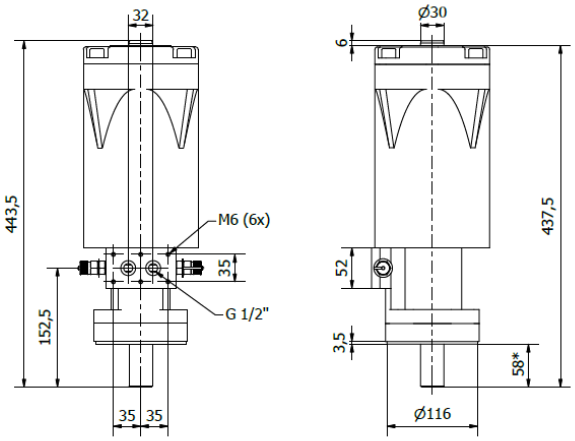
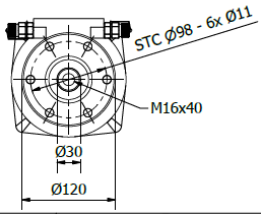


ECON Hydraulic actuator, single acting, fig. 21401







Technical Data ESL-2:
Design Pressure: 135 bar
Mechanical Spring Closing Force: 8450 N
Opening Force: 9100 N at 135 bar
Connection: Intermediated flange and threaded spindle
P1: Open (Upwards linear movement)
P2: Close (Spring closed)
Maximum stroke: 53mm
Oil Displacement at 53mm: 0.088 dm3
Temperature Range: -20°C - +80°C
Weight: 40 kg
Mineral Oils according to the group HLP DIN 51524/Part 2 and VDMA Sheet 24318 have to be used. Care must be taken to ensure their viscosity is between 15 mm2/s (cSt.) and 200 mm2 (cSt.). These conditions are suitable for oil between HLP16 and HLP46, depending on the temperature.

*Spindle length in full extended position

Designed by	Checked by	Approved by	Date		Date
Joost Douwes Dekker	R. v. Eekelen				15-6-2020

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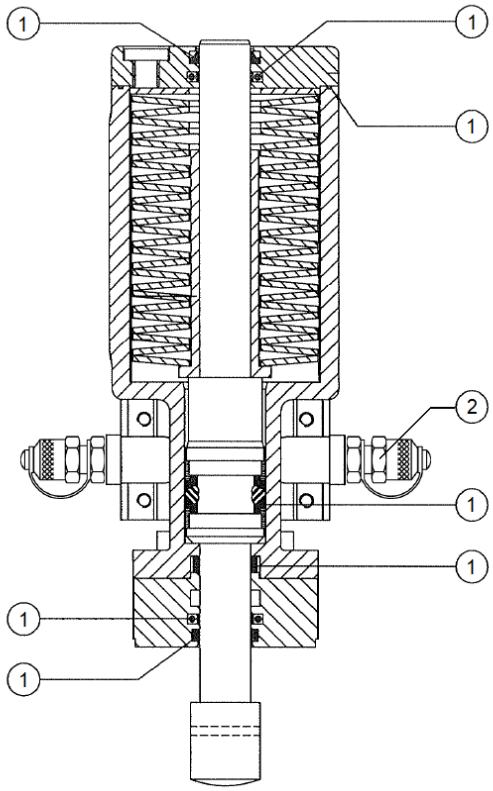
7 SPARE PARTS

7.1 Fig. 21401/21402 EDL/ESL Hydraulic Actuator



position	part description
1	Gasket & Soft seal kit actuator
2	Quick Connection Couplings (set)

8 MAINTENANCE

WARNING:

Turn off all power before performing maintenance on the actuator.

POTENTIALLY HIGH-PRESSURE VESSEL. Before removing or disassembling, ensure that the actuator or other actuated device is isolated and not under pressure.

The hydraulic linear actuators do not require periodic maintenance operations, but only of a visual check, and verification of the oil.

8.1 Visual check

Check list:
- Screws are tight
- Quick couplings are tight and closed with its cap
- Electrical (switch) box (if present) is correctly connected, screws tightened and the cable connected
- No external leakage of Hydraulic oil

8.2 Inspection of the oil

The oil in the system must be checked after about 1000 valve maneuvers but at least every 5 years.
The oil must be clear and of the same transparency and color as new oil
The oil must be HLP DIN 51524-2, standard viscosity class VG 46mm2/sec DIN 51519.
A spot oil test is suggested after 5 years: no sludge and oil contamination are tolerated by the system. The oil cleanness must be according NAS 3801 class 9.

8.3 Inspection of the spring housing and disc springs (ESL)

The top lid of the ESL actuator is under tension because of the springs, take extreme caution!
Before opening the top of the actuator, replace the mounting bolts for long bolts with nuts or use a (hydraulic) press to release the tension on the springs.

When using long bolts; screw in the bolts one at a time, place a washer and fasten the nut against the lid. After all bolts have been installed loosen the nuts a couple of rotations each time in a crosswise pattern till the tension on the lid is gone.
When using a hydraulic press; place the actuator in between the hydraulic press without putting too much force on the top lid. Support the actuator, loosen the mounting bolts of the lid and release the tension by unloading the press.

9 TROUBLESHOOTING

The main issues on this hydraulic actuator and the right actions are schematized in below trouble shooting table. The table helps the operator to detect the problem and how to solve it.

► Double acting actuator does not open or close

Check; Control pressure on the handpump connectors of the actuator
A pressure of between 100-135bar should be present to operate the actuator when installed on a valve.
- If a normal control pressure is present check if the valve is not blocked
- If the valve is not blocked check for external oil leakage on the actuator

► Single acting actuator does not open

Check; Control pressure on the (open side) handpump connector of the actuator
A pressure of between 100-135bar should be present to open the actuator when installed on a valve.
- If a normal control pressure is present check if the valve is not blocked
- If the valve is not blocked check for external oil leakage on the actuator

Check; if oil is trapped on the spring side of the actuator
Remove the handpump connector on the gas spring side and operate the actuator.

► Single acting actuator does not close

Check; if the valve is not blocked
- Inspection of the spring housing on broken disc springs.
- Check for external oil leakage on the actuator

If you have questions about this product,
Please contact the nearest ECON distributor.
You can find them on www.eriks.com

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