Instructions
42/68-273 EN

Electrical Linear Actuators for Continuous Modulating Control LME620AI / LME620AN (Contrac)

Rated Force 4 kN

Content

Legend

Danger

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury

Warning

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury or serious property damage.

Caution

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or property damage.

Important

Indicates useful hints or other special information which, if not observed, could lead to a decline in operating convenience or affect the functionality.

1. Device Identification

1.1 Actuator ID Label

1	**Antrieb / Actuator: CONTRAC ....**			
2	F-Nr./No	NL		Made in Germany
3	F =	Jahr/Year	CE	
4	t =	IP 66		
5	min.....max.	max.		
6	Fett / Grease:			
7	Mit / With Elektronik/Electronics			
8	U= 230 V (190 ... 260 V) F = 50/60 Hz, ± 5%			
9	P= max. ..... W Ext. Sicherung / Fuse 16 A träge/slow			
10				
	Automation D-32425 Minden			

1. Actuator type
2. Device number / No. of non-standard version
3. Rated torque / Year of manufacture
4. Permissible ambient temperature
5. Min./max. positioning travel / Min./max. speed
6. Grease type
7. Associated electronics
8. Permissible voltage range / Mains frequency
9. Power consumption / Fus
10. Available for customer-specific information

1.2 ID Label of Electronics

The ID labels of the power electronics are located on the electronics cover.

1.2.1 ID Label for Hardware Description

1	**Elektronik / Electronics Type: ....**			
2	B-Nr./No.	NL		Made in Germany
3		Jahr / Year		
4	t = ...°C	IP 66	CE	
5				
	Automation D-32425 Minden			

1. Electronics type
2. Device no. / No. of non-standard version
3. / year of manufacture
4. Premissible ambient temperature / protection
5. No used

1.2.2 ID Label for Software Description

1	Für Antrieb / For Actuator Contrac . . . . .
2	Mit / NL. Nr./No. . . . .
3	SW Version . . . . .
4	Eingestellt / adjusted auf/for M=..... .....°/s
5	

1 Associated actuator
2 No. (if required)
3 Downloaded software version
4 Configured force (torque)/configured speed
5 Available for customer-specific information

2. General

2.1 Proper use

Control actuators are intended to be used exclusively for actuating final control elements (valves, vanes, etc.). Do not use these actuators for any other purpose. Otherwise, a hazard of personal injury or of damage to or impairment of the operational reliability of the device may arise.

2.2 Safety and precautions

When mounting the actuator in areas which may be accessed by unauthorized persons, take the required protective measures.

- Control actuators perform movements for positioning vanes and valves. Handle properly and with care. Otherwise, a hazard of bruise injuries may arise.
- When changing the oil of the actuator, thoroughly remove any oil that may have run down on the floor during the procedure to avoid accidents.
- Dispose of the waste oil in compliance with the respective local regulations. Make sure that no waste oil reaches the water cycle.
- Only qualified specialists who have been trained for these tasks are authorized to mount and adjust the control actuator, and to make the electrical connection.
- When working on the actuator itself or its electronics always observe the locally valid accident prevention regulations and the regulations concerning the construction of technical installations.

3. Storage

Contrac actuators may be stored under moist and aggressive condition for a short time. The equipment is protected against external corrosive influences. However, direct exposure to rain, snow, etc. must be avoided.
Actuators, equipped with an anti condensation heater, are additionally protected by desiccant placed in the connector (and in the terminal box of the separate electronics, if present). The desiccant guarantees sufficient protection for approximately 150 days. It can be regenerated at a temperature of 90° C within 4 h.
The desiccant must be removed prior to commissioning the actuator or the electronics.

3.1 Long-time storage

If you intend to store or transport the device for a longer time, we recommend to wrap it in plastic foil and add desiccant. Regularly check if the desiccant is still active.

4. Delivery State

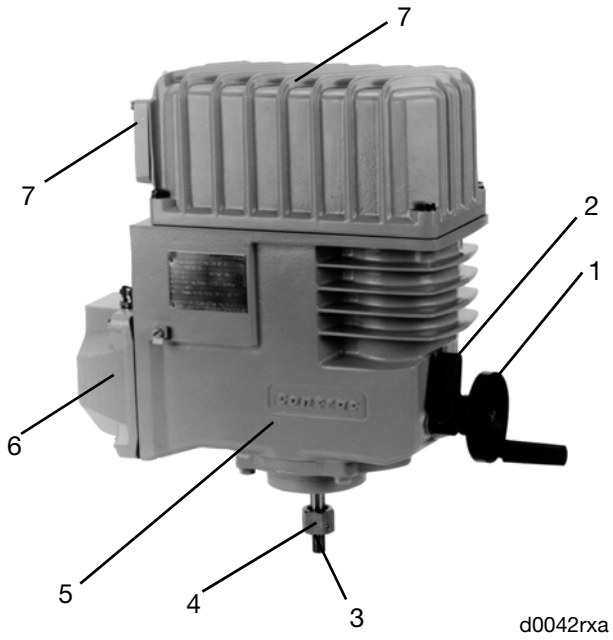
If not otherwise specified by the customer, Contrac actuators are delivered with the following standard configuration:

Behavior in 0/100% position:	Shut-off with rated torque / force
Setpoint function:	Linear; setpoint = positioning value
Input (setpoint):	4 ... 20 mA [1)]
Function:	Positioner, parameter: setpoint
Output (actual value):	4 ... 20 mA [1)]
Digital inputs : [1)]	DI 1 switch-over manual/automatic and v.v.
	DI 2 / DI 3 manual control +/-
Digital outputs: [1)]	DO 1 ready to operate, DO 2/3 end position signalling
Range:	Not adjusted

The configuration of your actuator may differ from the standard configuration specified above. It can be called up for display using the configuration program.

[1)] Not available for bus communication

5. Assemblies



1: Handwheel
2: Handwheel lock
3: Thrust rod
4: Ext. stop
5. Gearbox
6. Connector plug
7. CSF
8. Cover
(for LME 620 AI incl. electronics

Figure 1: LME 120 ...

5.1 Operation

5.2 Normal mode

The motor triggered by the electronics drives the axially fixed drive sleeve/nut assembly via greased spur gears. A ball bearing screw radially fixed by an anti-twist arrester converts the rotary to a linear motion.
The brake built in the motor acts as a retainer when the power is off.

The friction clutch is designed such that a handwheel force of around 11 N suffices to create the rated torque on the actuator. If you should feel a considerable counter-force when moving the actuator by hand, do not increase the force you apply to the handwheel. Otherwise, you might damage the actuator or valve

5.3 Handwheel mode

- Allows you to move the actuator manually when the electrical power is off.
- Turn the handwheel lock lever clockwise to unlock the handwheel.
- Turn the handwheel to move the thrust rod to the desired position.
- Release the locking lever to lock the handwheel again.

6. Technical data

	LME 620 AI	LME 620 AN
Rated force [kN]	4 ... 2	
Starting force [Nm]	approx. 1.2 x rated force (break-away force in end positions 2 x rated force for a short time)	
Handwheel force required to achieve the rated	11 N	
Rated speed [mm(s]	2.0 ... 0.5	
Ambient temperature	(-30)1) -10°C ... + 55°C	(-30)[1] -10°C ... + 65°C
Weight	approx. 24 kg	approx. 10 kg
Associated electronics	Integrated in actuator	For field mounting: EAN 820 For rack mounting: EAS 822
Power supply (on electronics)	115 V AC (94 V ... 130 V) or 230 V AC (190 V ... 260 V); 47.5 ... 63 Hz	
Current (115 V / 230 V) [A] max: during positioning:	1.0 / 0.5 approx 40% ... 50% of max.	

Table 1:

[1] actuators for this temperature range are equipped with an additional electrical heater

6.1 Lubricants

	Grease types filled in factory prior to delivery [1]
spindle	Optimol Optipit
gearwheels, ball bearings, motor bearings	ESSO Beacon 325

Table 2:

[1] (labeled in accordance with DIN 51502)

7. Mounting

7.1 Checking the Actuator Type

- Check if you have an actuator with integrated or with separate electronics

7.2 Mounting Orientation

Any mounting orientation is permissible. To facilitate mounting and maintenance, however, it is recommended to use orientation IMV 1 (thrust rod downwards).
In all mounting orientations the actuator must not be exposed directly to rain, snow or other environmental influences.

7.3 Mounting Instructions

- Make sure that the actuator is accessible from all sides to ensure convenient use of the handwheel, electrical connection and replacement of assemblies.
- Avoid direct exposure to rain, snow, and other environmental influences. Select the mounting site accordingly.
- When mounting the actuator close to heat sources use an insluating layer or shielding.

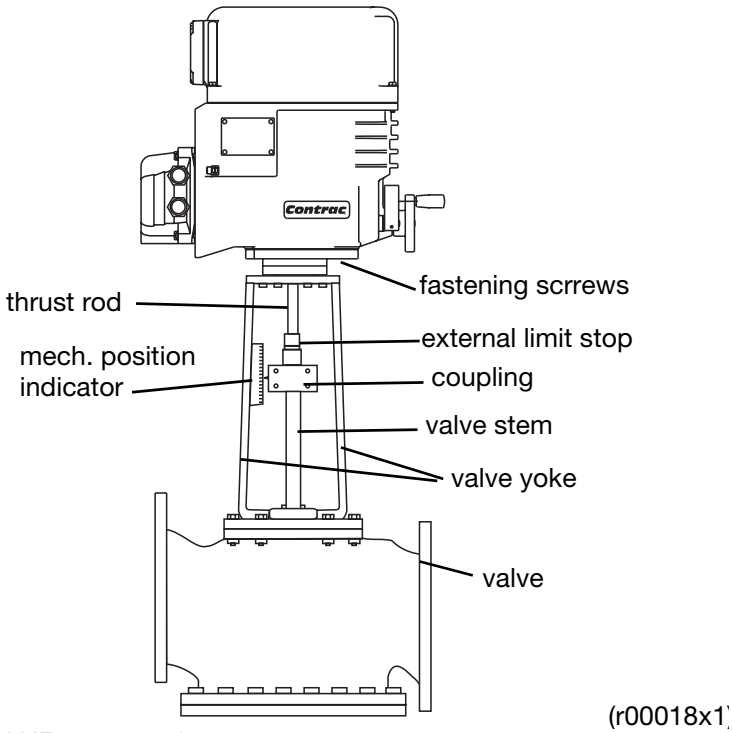


Figure 2: Mounting LME 620, example

7.3.1 Valve Design Requirements

- Consider the end position forces (up to 2.5 x rated force) when designing the valve.

7.4 Mounting the Actuator to the Valve

- Completely retract the actuator thrust rod and put the actuator on the valve yoke.
- Make sure the valve stem is centrically aligned with the bore and at right angles to the actuator seat (permissible parallel deviation < 0.1 mm referred to total stroke).
- Fasten the actuator to the yoke with screws of property class 8.8 (tensile strength 800 N|mm^2; yield strength 640 N/mm^2)
- Use the handhweel to extend the thrust rod, link the rod with the valve stem via the clutch.
- Manually retract the thrust rod to check whether or not the external stop of the actuator is on the housing flange before the valve cone gets in touch with the cover.
- If required, adjust with the clutch (only possible within certain limits!)

8. Electrical Connection

Each actuator requires a Contrac electronic unit. Proper actuator operation requires an actuator specific software loaded in this associated electronic unit. See electronic unit instructions for details. Compare the data labels on both, electronic unit and actuator, in order to ensure a correct hardware and software assignment.
The electrical connection is done with a combined plug on the actuator and with screw terminals on the electronic unit.

8.1 Integrated electronic unit (standard)

The electrical connection is done with a combined plug on the actuator and with screw terminals on the electronics.

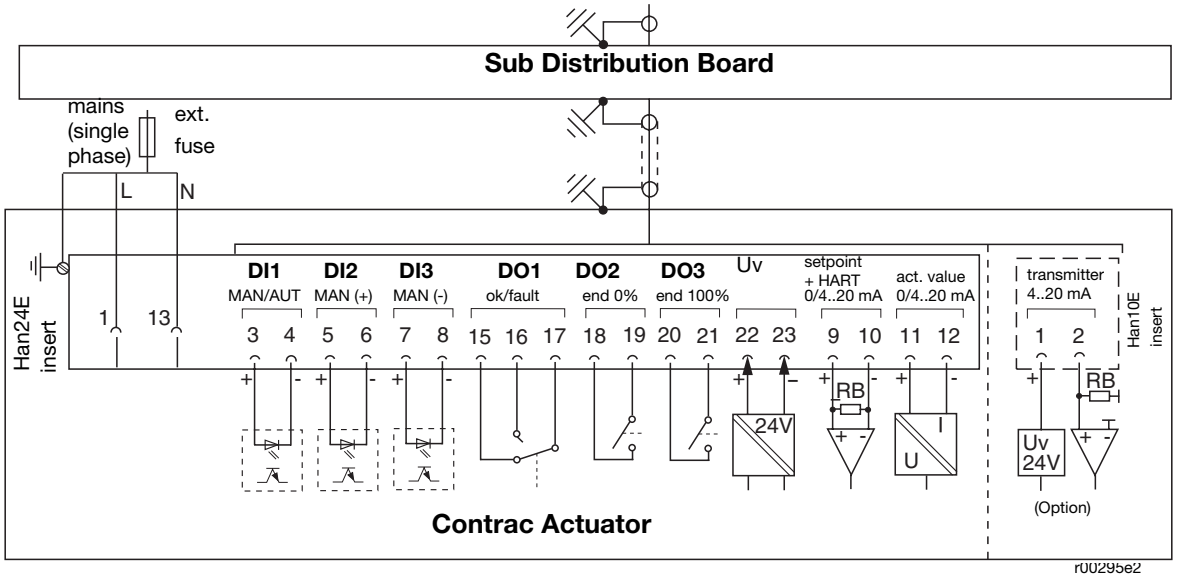


Fig. 3: Electrical connection, standard

The following steps must be performed to switch the actuator to automatic mode (AUT):
- Activate digital inputs DI 1, DI 2 and DI 3 via the configuration program.
- Make sure that the supply voltage is present on digital input 1 (DI 1).
- Activate AUT mode via the configuration program.

8.2 Integrated electronic unit (bus comunication)

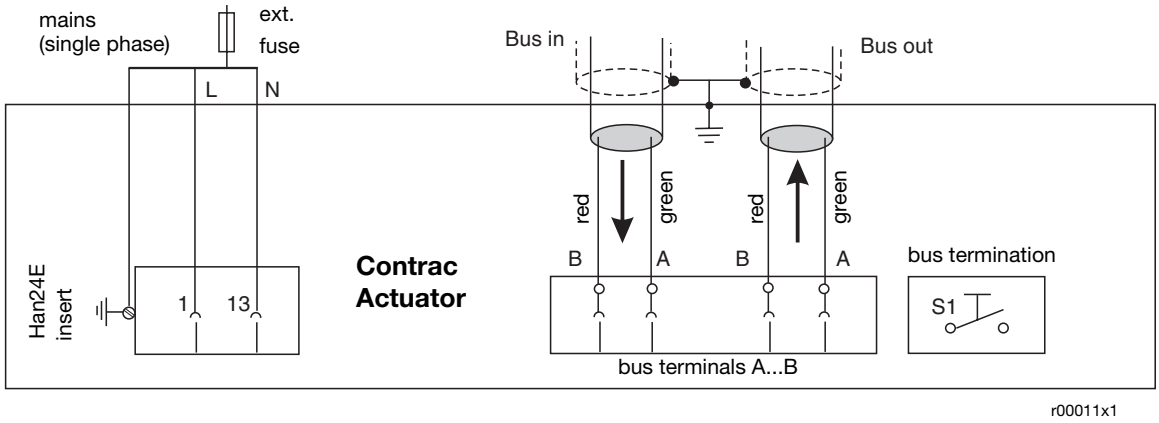


Fig. 4: Electrical connection, PROFIBUS DP

8.3 Separate electronic unit EAN823 (standard)

The electrical connection is done with a combined plug on the actuator and with screw terminals on the electronics.

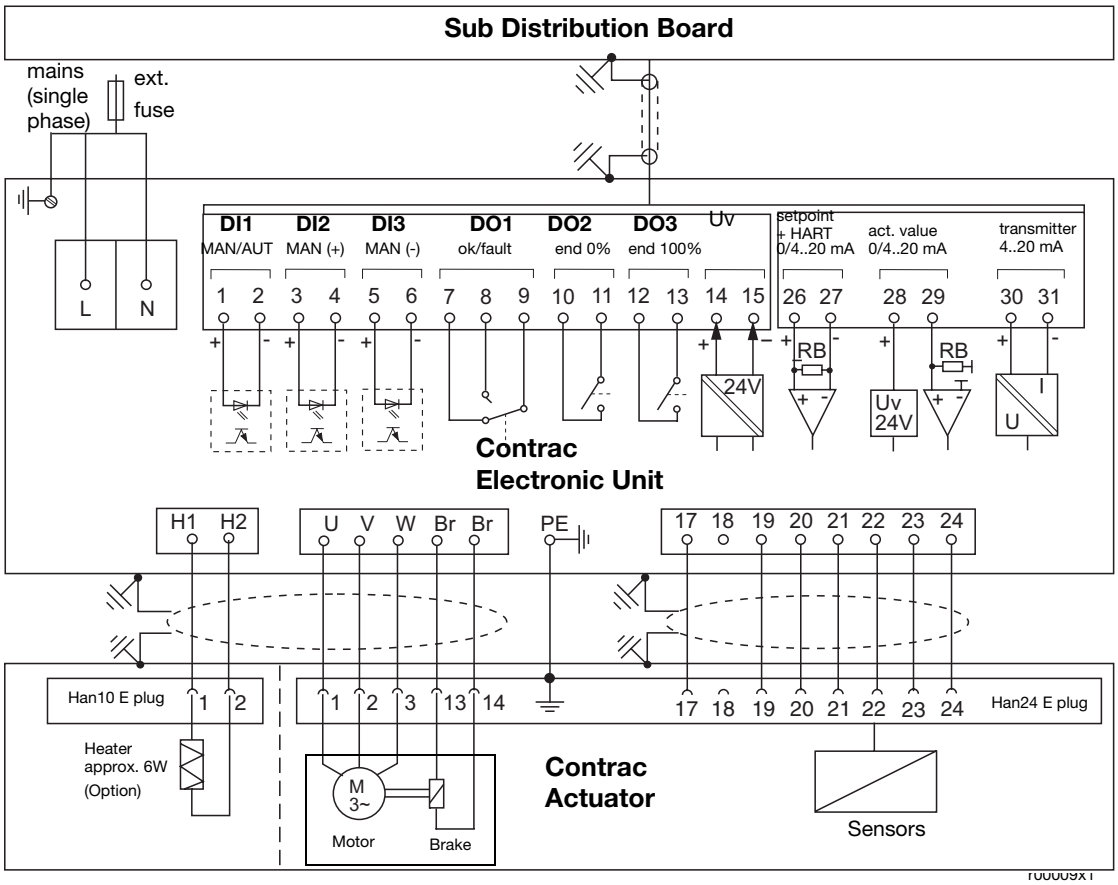


Fig. 5: Electrical connection EAN 823, standard

- The following steps must be performed to switch the actuator to automatic mode (AUT):
- Activate digital inputs DI 1, DI 2 and DI 3 via the configuration program.
- Make sure that the supply voltage is available on digital input 1 (DI 1).
- Activate AUT mode via the configuration program.

8.4 Separate electronic unit EAN823 (bus communication)

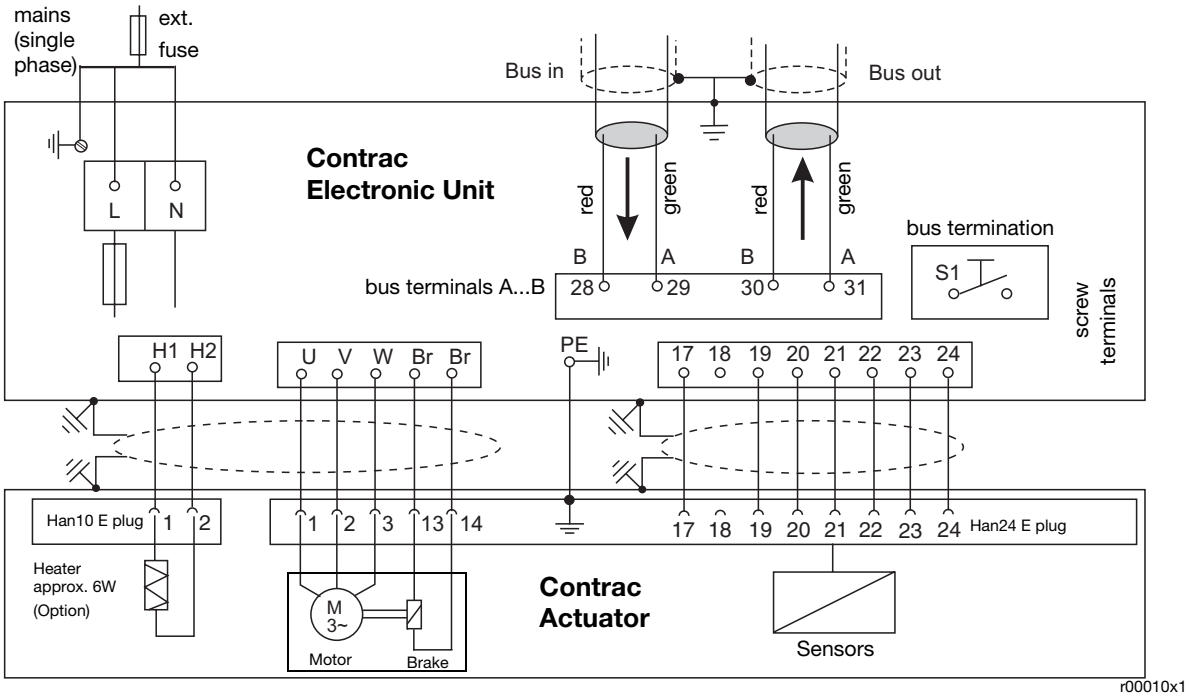


Fig. 6: Electrical connection: EAN 823, PROFIBUS DP

8.5 Signal input and output (conventional triggering)

8.5.1 Standard

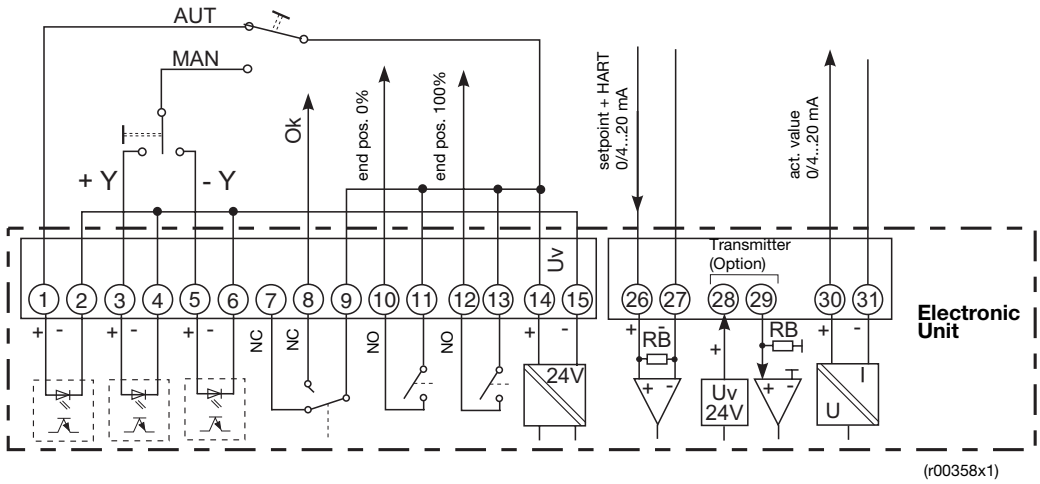


Fig. 7:

** Write-protected when applying +24 V DC to DI 1.

8.5.2 Behind a step controller

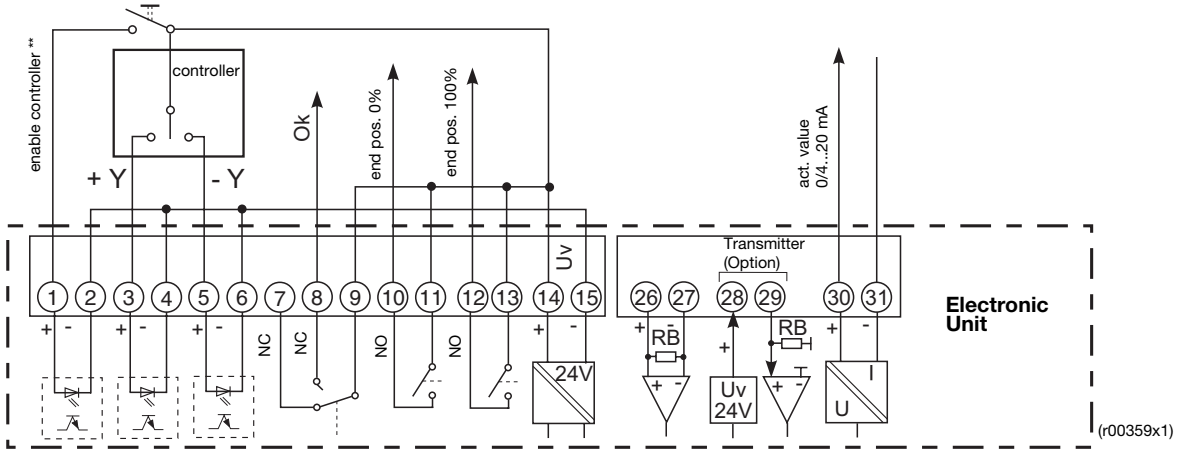


Fig. 8:

** Write-protected when applying +24 V DC to DI 1.

8.6 Wiring for ectronic units in a mounting rack

Refer to operating instructions 42/68-821 for installation details.

8.7 Fuses at actuator with integrated electronic unit

Fuse type	U = 115 V	U = 230 V
External fuse(extern)	16 A, slow	
Mains fuse	6.3 A slow	3.15 A slow
Low temperature heater (only for low temperature version)	2 A	2 A
Fuse for protection against active 20 mA current feed at set-point input	0.04 A (fast)	0.04 A (fast)
Relay fuse for DO 1, DO 2, DO3 (not changeable)	3 x 0.5 A; medium	

Table 3:

8.7.1 Fuse arrangement

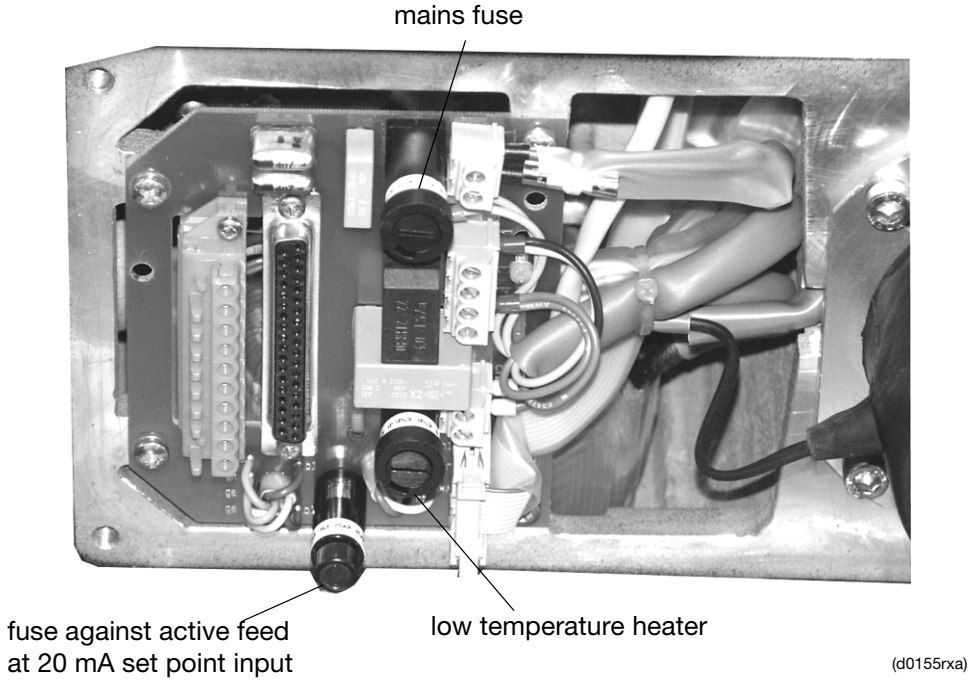


Fig. 9: Fuse arrangement

9. Setup

The actuator only requires the basic settings (adaptation to the operating range) in order to be operated with the standard or custumer specific configuration. Use the **L**ocal **C**ontrol **P**anel (LCP) for these settings. Use the appropriate configuration software for more detailed parameter changes or diagnosis functions.

9.1 Set-up via local control panel (LCP)

9.1.1 Operating elements

1.	Write-protect switch	(Default setting: OFF)
2.	LED for 100% position	Indication if adjustment procedure, saved position, or fault by different flash frequencies.
3.	Drive buttons	Press to cause drive motion
4.	Reset button	Press to restart processor
5.	Power LED	Indicates available mains supply
6.	RS 232 socket	Connection socket to PC
7.	Potential toggle switch	Connection of reference potential to the system or protective earth (by default set to system) of electronic unit
8.	LED for 0% position	Indication if adjustment procedure, saved position, or fault by different flash frequencies..
9.	Accept button (0%)	Press to define current position as 0%; simultaneously press push button 9 + 10 to complete the adjustment procedure.
10.	Accept button (100%)	Press to define current position as 100%; simultaneously press push button 9 + 10 to complete the adjustment procedure

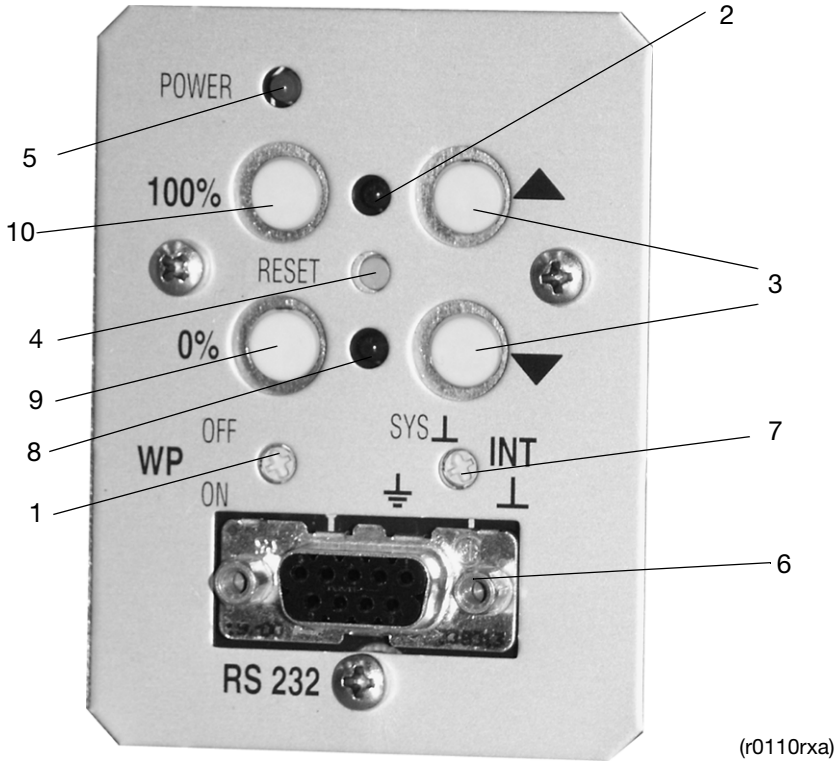


Figure 10: **L**ocal **C**ontrol **P**anel (LCP)

The actuator range is not preset in factory!

9.1.2 Setup procedure

- Undo the screws of the LCP cover
- Swing the cover to the side

9.1.3 Initial situation

- Electronics connected to power supply and actuator
- Write-protect switch (1) set to “OFF” position
- Electronics in operating mode “MAN” (no signal on DI 1)
- No fault (if a fault occurs, both LEDs flash alternately at 4 Hz)

9.1.4 Setting

9.1.4.1 “Setting” mode

- Set electronics to “setting” mode by pressing both push buttons (3) simultaneously for approx. 5 seconds, until both LEDs (2 + 8) are flashing synchronously at approx. 4 Hz. („setting mode“ is the standard electronic unit status after passing the final factory test)

9.1.4.2 Defining first position (0% or 100%)

(Higher precision in 2nd position)

- Move to desired position by pressing one of the push buttons (3).
- To accept the position for 0% or 100%, press push button (10) or (9); the associated LED flashes at approx. 2 Hz when value is correctly accepted, the other one continues to flash at approx. 4 Hz

9.1.4.3 Defining second position (0% or 100%)

- Move to second position by pressing tho other of the push buttons (3).
- To accept the position, press push button (10) or (9); both LEDs (2) and (8) are flashing at approx. 2 Hz when values are accepted correctly.

9.1.4.4 Saving the settings

- Save the settings by simultaneously and shortly pressing the push buttons (10 + 9); the LEDs (2 + 8) are „ON“ (without flashing) for approx. 5 sec before they extinguish and the setting procedure is completed.
- If the selected range is too small for the actuator, both LEDs will flash again at 4 Hz. Repeat the adjustment procedure with a wider range (min. positioning travel).
  (See positioning travel specification on actuator ID label)

9.1.4.5 Correction after setup

- If the setting is to be corrected after accepting the first value, first press the Reset button (4) and then repeat the setting.
- If the correction is to be re-done after saving the settings, the entire adjustment procedure must be repeated.

9.2 Adjustment using the configuration program

Context-sensitive help information is available in the configuration program at all times. For basic handling and installation instructions refer to the associated manual, number 41/68-001.

A conductive ground connection is established between the PC and the CONTRAC electronics with the RS 232 communication cable. If the PC is grounded, this may cause a ground loop in the installation.

9.3 Functions and signals at the LCP

Function	Indication
Adjustment	
Change-over to adjustment mode: Press and hold both drive buttons for approx. 5 seconds	Both LEDs flash synchronously at approx 4 Hz after time has expired.
Moving to an end position Use associated drive button on LCP	Both LEDs continue to flash at 4 Hz while driving.
Saving the first end position Press button 0% or 100%	The associated LED flashes at approx. 2 Hz, the other continues at 4 Hz.
Saving the second end position Press button 0% or 100%	The associated LED flashes at approx. 2 Hz synchronously to the first one.
Confirm settings Press 0% and 100% buttons simultaneously	Both LEDs are briefly „ON“ together and then extinguish.
Operation	
Normal operation: MAN / AUT	LED off
Driving with button on CSF Priority over control system	LED off
Bootstrap mode	
Electronic is in bootstrap mode during the data transfer of e. g. firmware, objects or motor charcteristics; use ECOM688 software for this procedure.	Both LED are „ON“; actuator is not available
Fault (both LEDs flash alternately at 4 Hz)	
Reset: Resets fault indications	If no „Failure“ conditions exist, both LEDs extinguish (if the actuator had been moved out of its operating range, drive it back prior to the reset).

Table 4:

10.Maintenance

Contrac actuators have a robust construction. As a result, they are highly reliable and require only little maintenance. The maintenance intervals depend upon the effective load and are therefore not specified here.
The built-in microprocessor evaluates the actual load factors (e.g. torques, temperatures, etc.) and derives the remaining operating time until the next routine maintenance is required. Use the configuration program for viewing this information.

10.1Motor and Gears

All maintenance work must be carried out by qualified specialists who have been trained for this task. As a rule, perform the following routine maintenance works:

- Check the shafts and gears
- Check the thrus rod surface
- Check the motor pinion gear and the respective mating gear.
- Replace the motor's rotary shaft seal and ball bearings.
- Check the position sensor.

The actuator position may be changed accidentally by the repelling power of the valve when the brake is released!

10.2Adjusting the Brake

In automatic mode the brake is permanently released. Therefore, it is not exposed to wear and does not require any re-adjustment.

10.3Replacing the Position Sensor

10.3.1 Dismounting

- drive actuator into 50% position (referred to rated actuator stroke)
- delete the current position setting by pressing the drive buttons on the LCP for at least 5 sec.
- switch-off the voltage supply
- undo the two fastening screws (1) of the position sensor and pull the sensor out of the gears
- disconnect the ribbon cable plug from the PCB

10.3.2 Mounting

The toothed gear pair of the position sensor is held in place by a tension spring (3), to ensure sufficient free motion when the direction of rotation is reversed.

- set the stop pin to the center position, as seen in Figure 11.
- align the sensor and its gears with the actuator; set the first toothed gear in 03.00 o'clock position (see Figure 12) onto the drive shaft gear (4).
- slightly move the sensor back and forth to pre-tension the toothed gears with the difference "z" until the second toothed gear snaps in.
- connect the plug (5) of the ribbon cable to the PCB.
- fasten the screws (1) tightly.

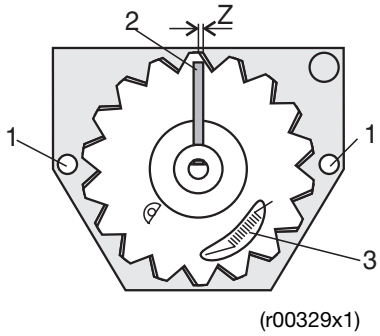


Fig. 11:Position sensor

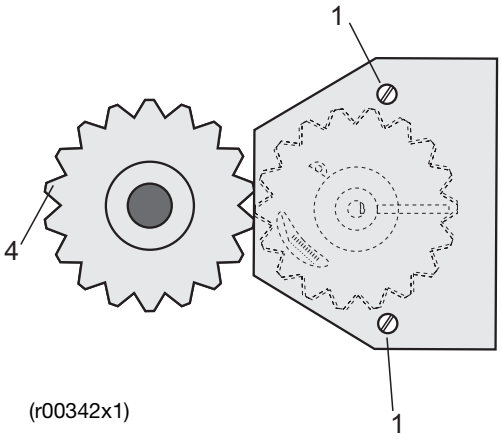


Fig. 12:Mounting position (actuator position: thrust rod downward)

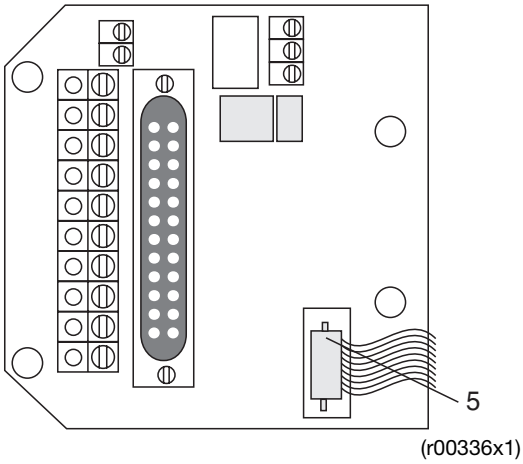


Fig. 13:Connecting the ribbon cable plug to the PCB

After mounting is completed readjust the actuator range as described in section 10 of this manual.

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