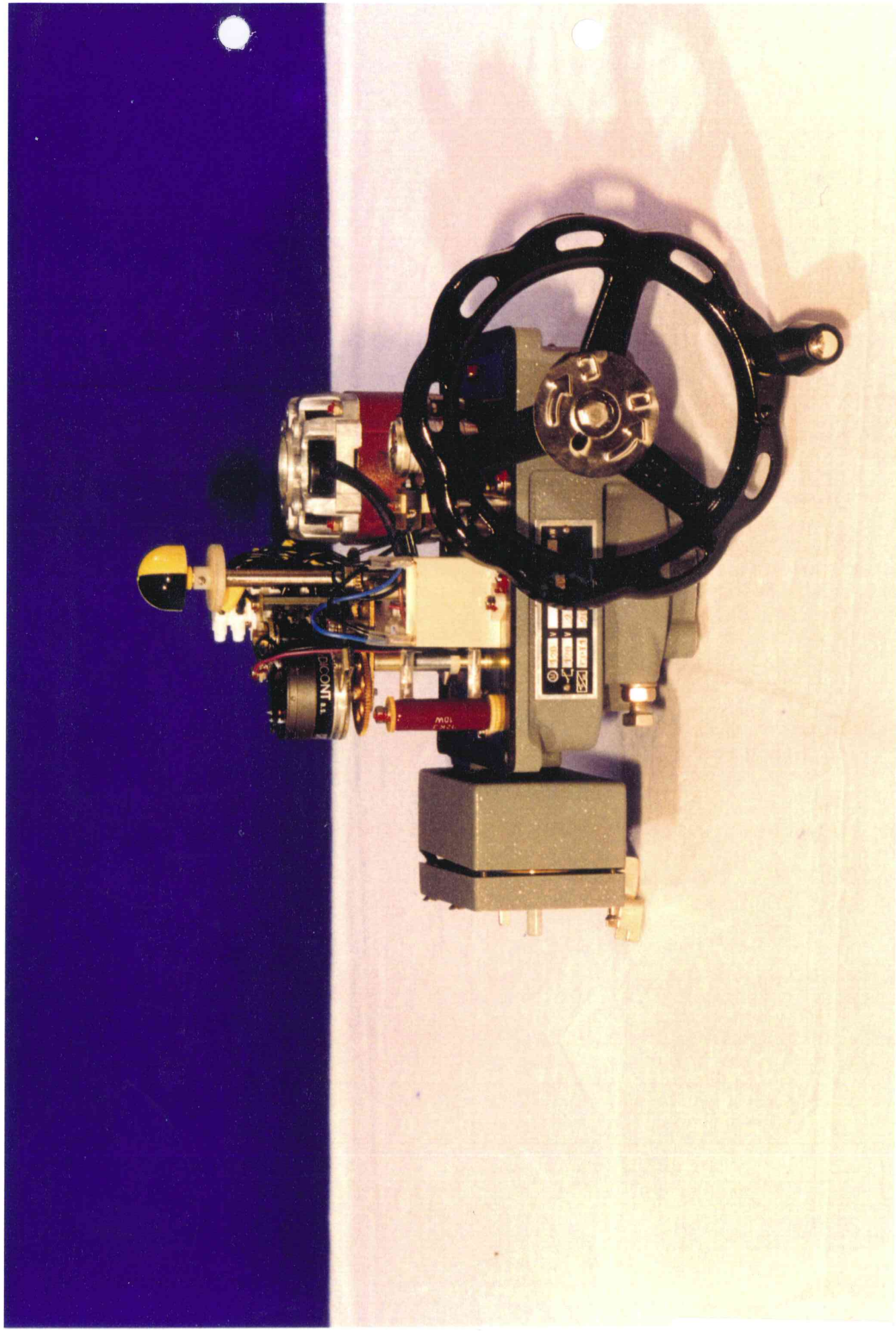
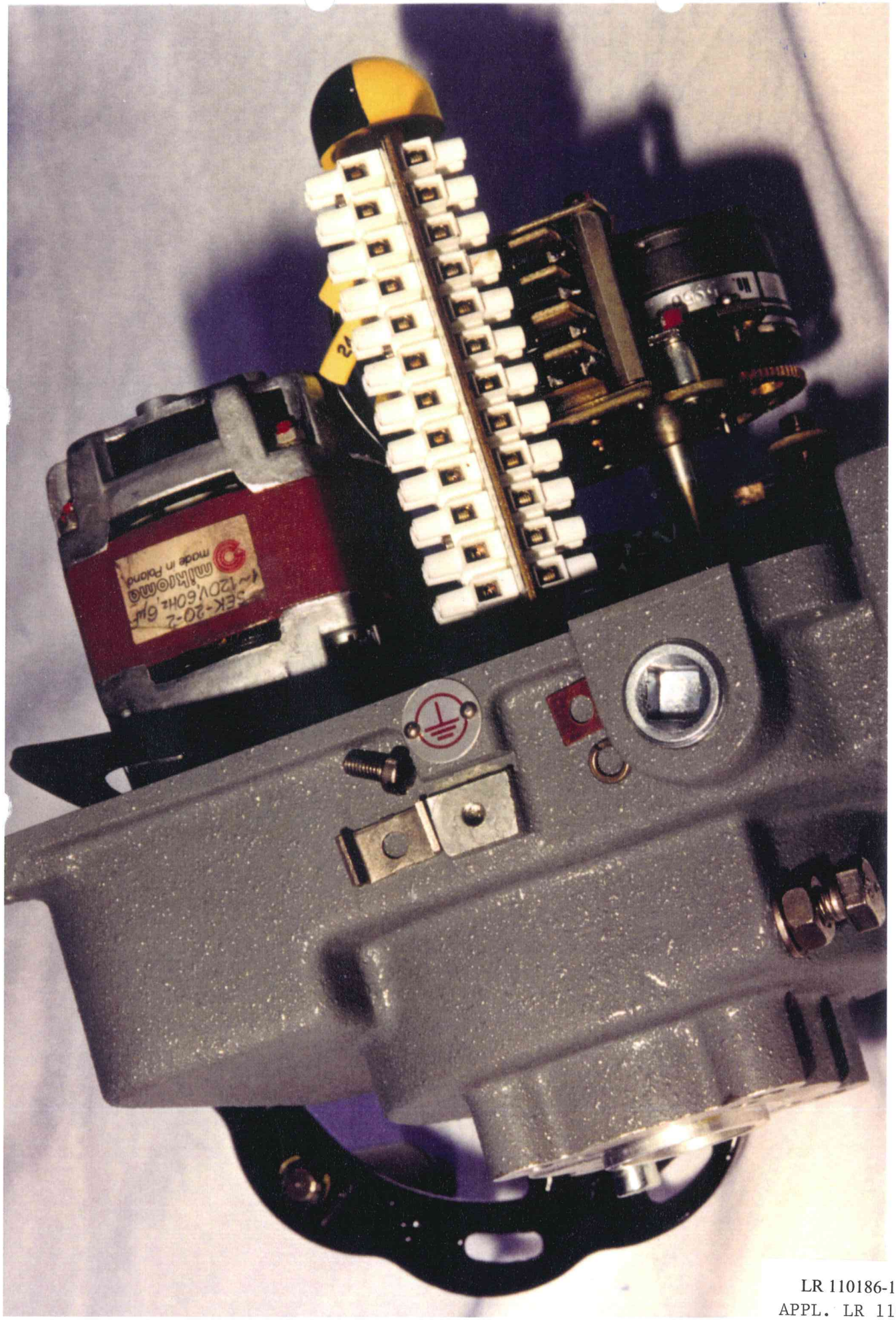
LR 110186-1 FIG.1
APPL. LR 110186-4

LR 110186-1 FIG.2

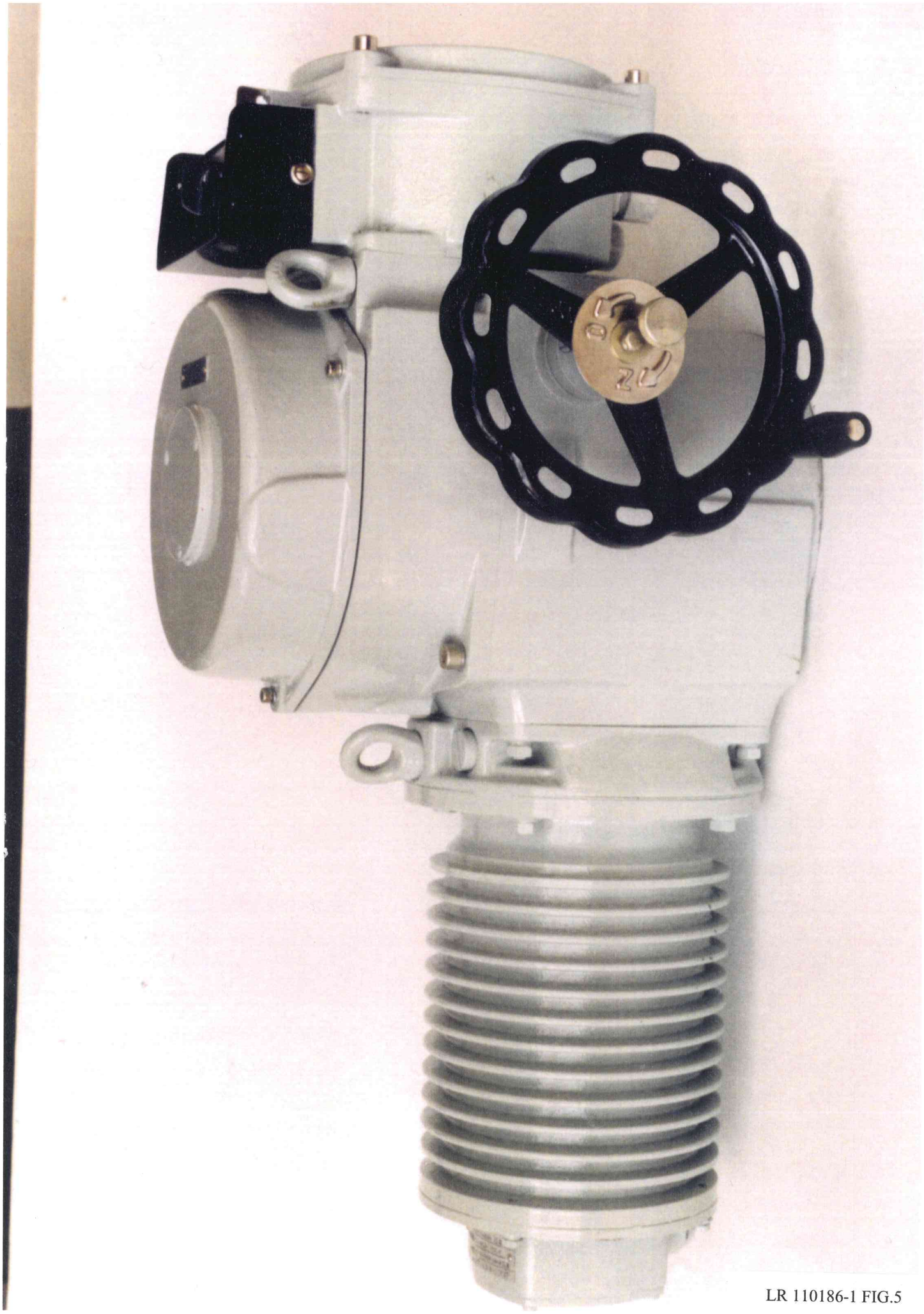
APPL. LR 110186-4



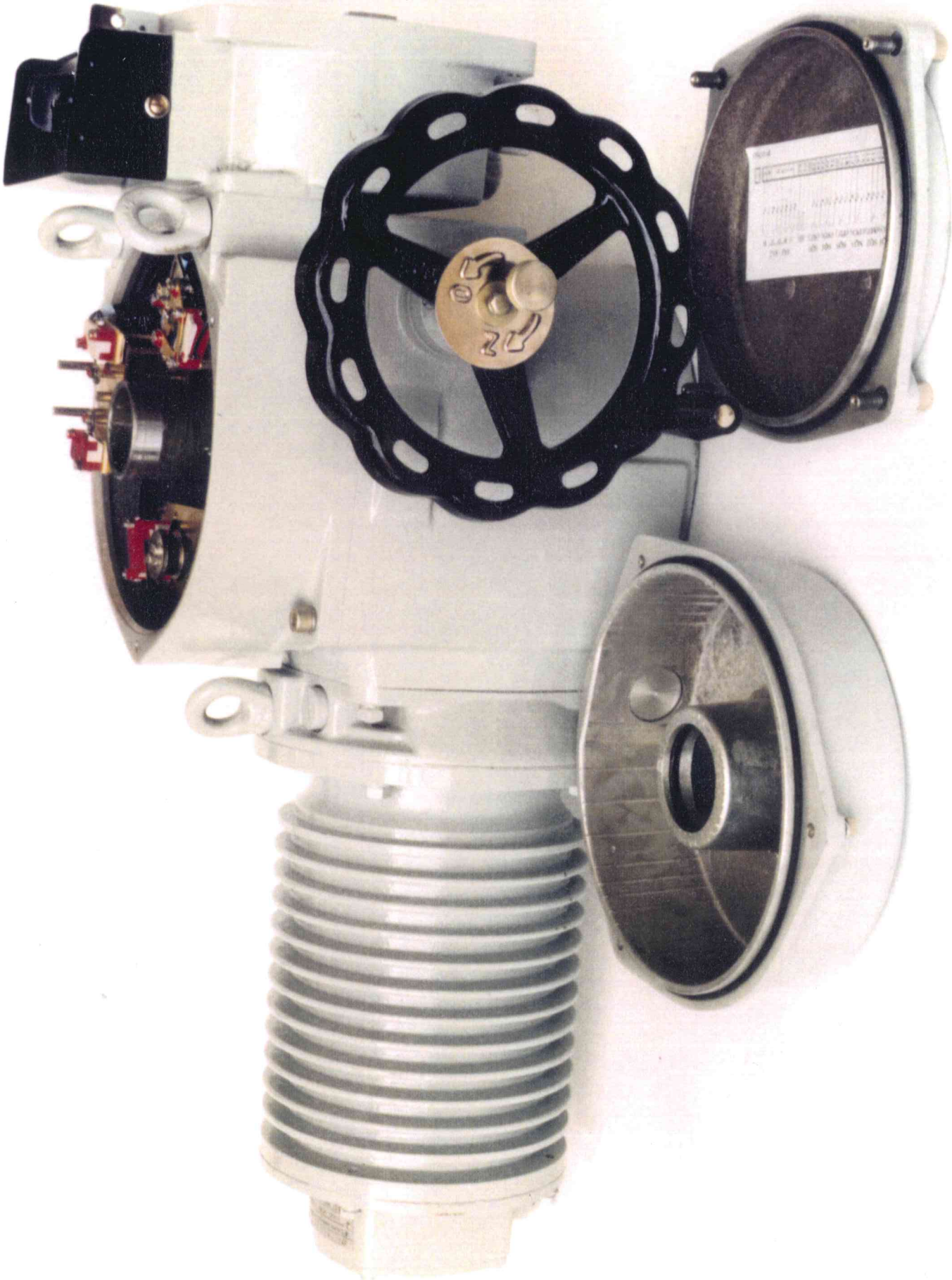
LR 110186-1 FIG.3
APPL. LR 110186-4



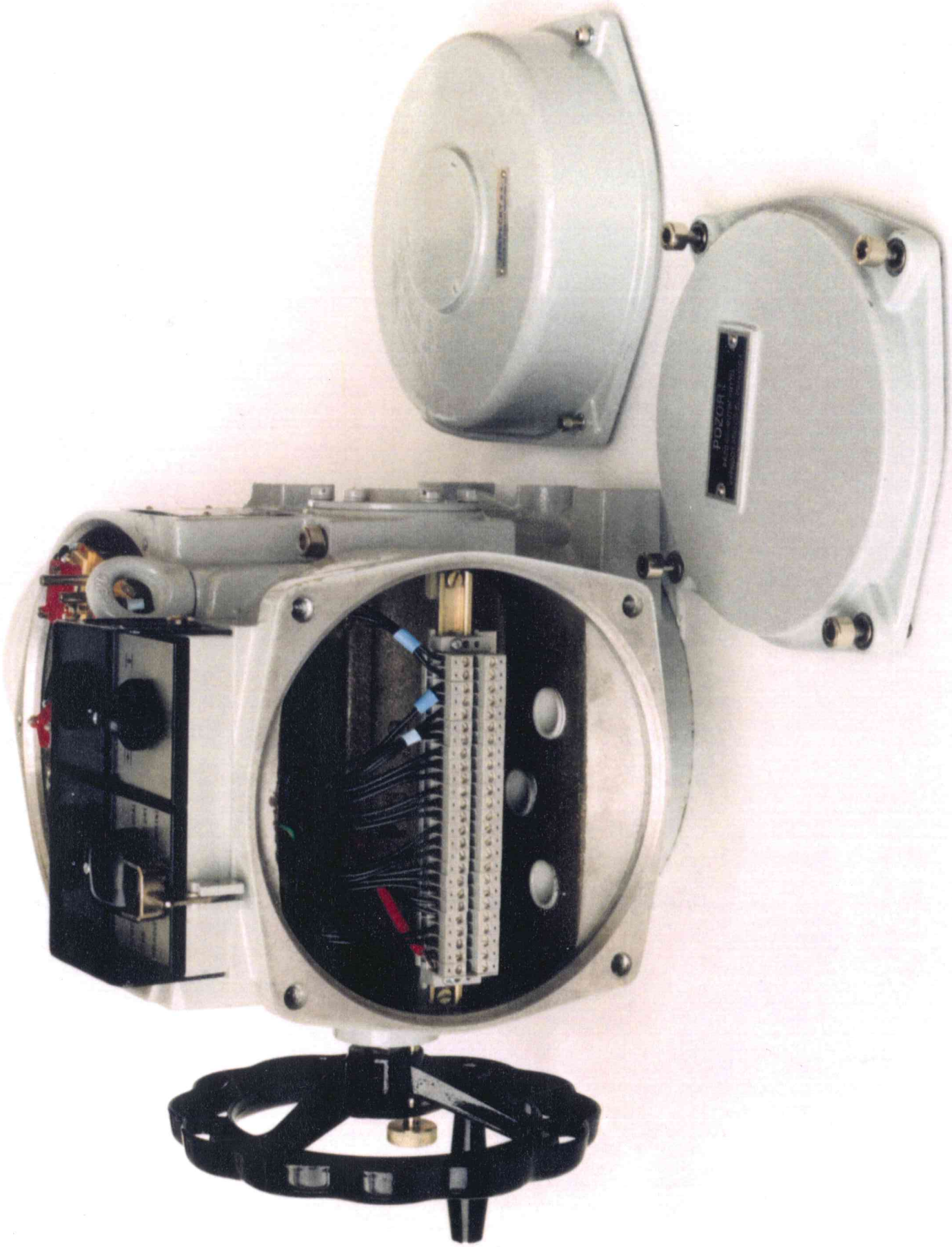
LR 110186-1 FIG.4
APPL. LR 110186-4



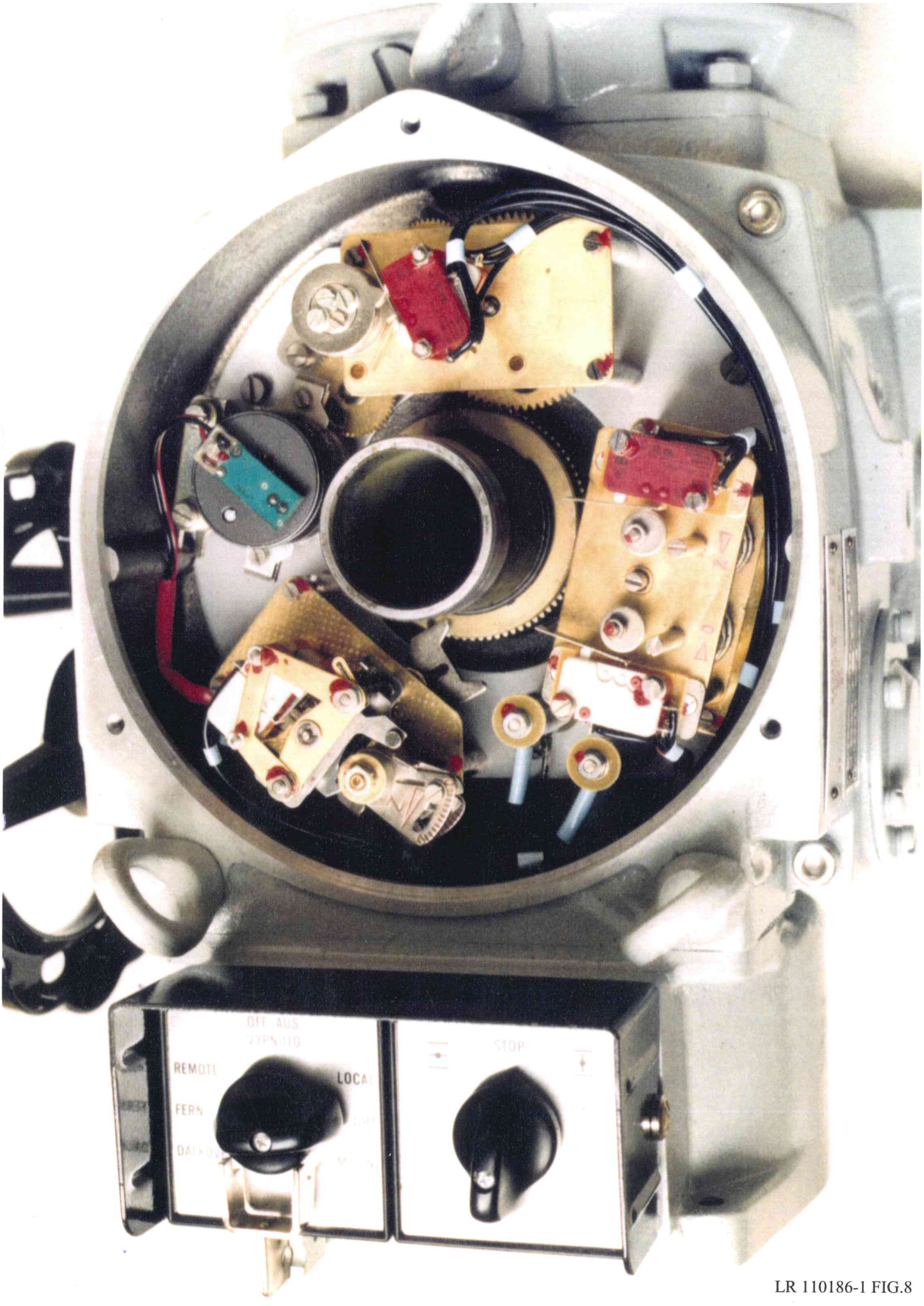
LR 110186-1 FIG.5



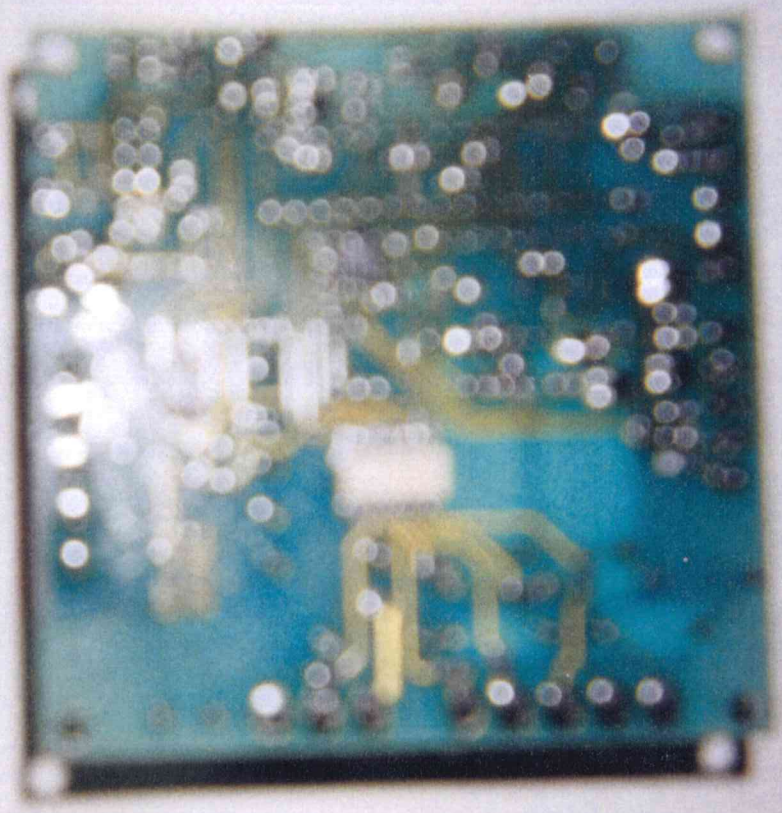
LR 110186-1 FIG.6



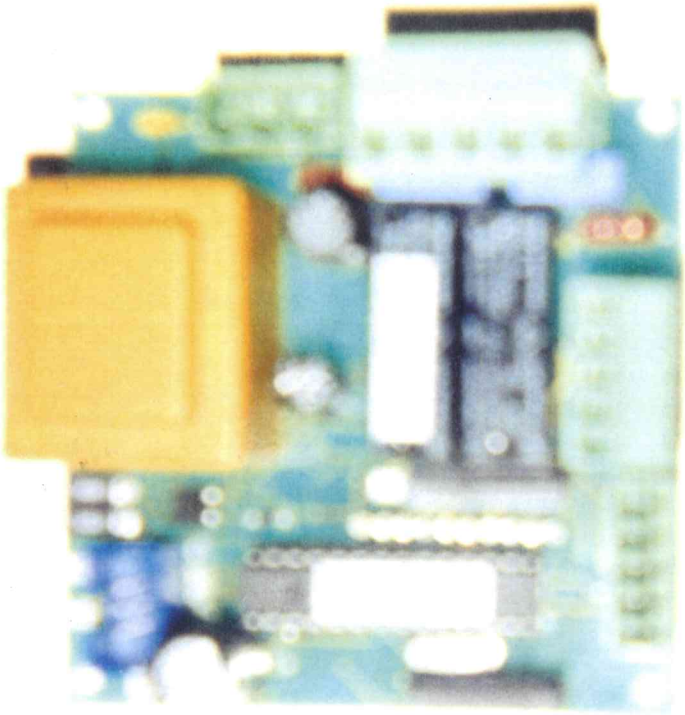
LR 110186-1 FIG.7



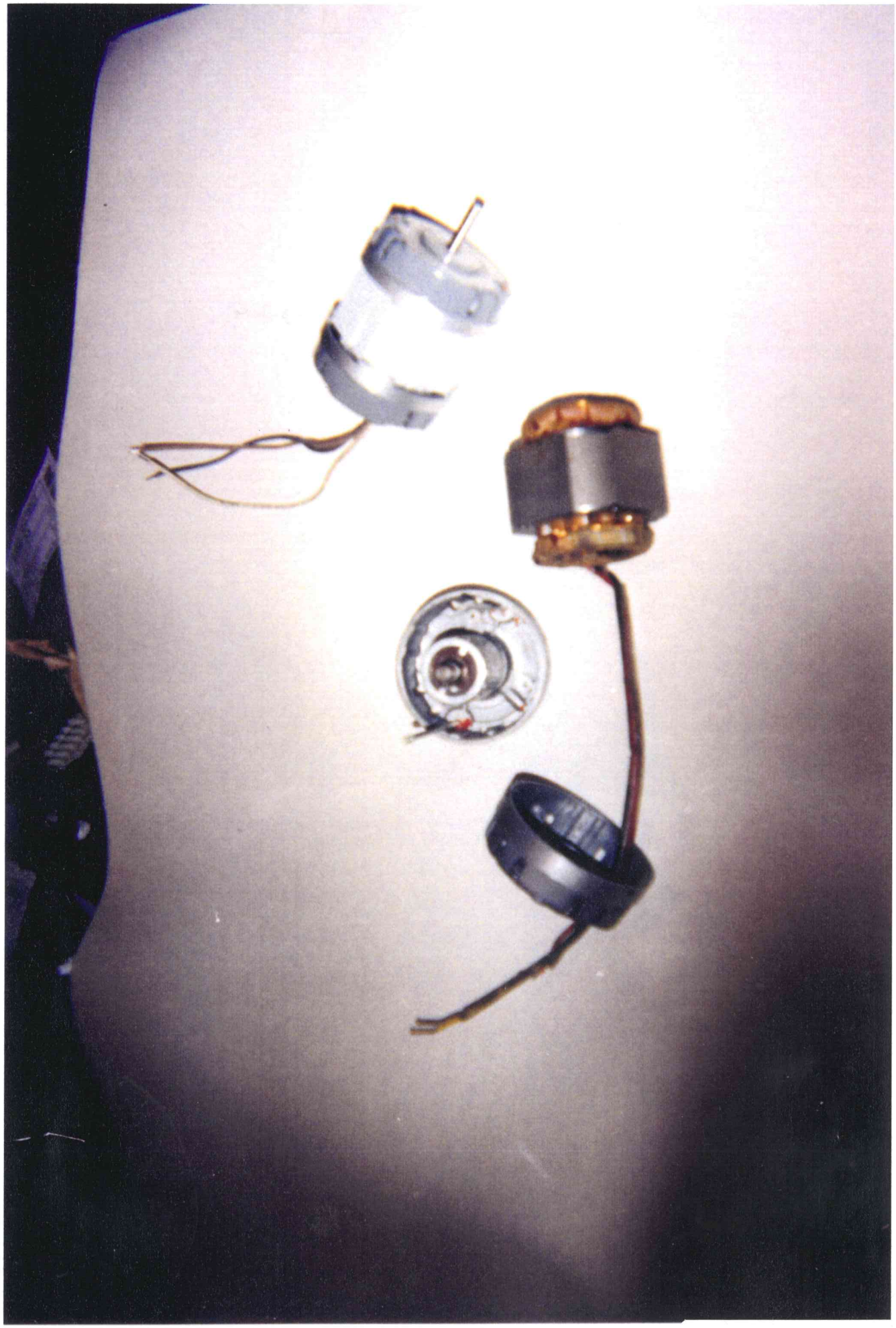
LR 110186-1 FIG.8



LR 110186-1 FIG.9



LR 110186-1 FIG.10



LR 110186-1 FIG.11

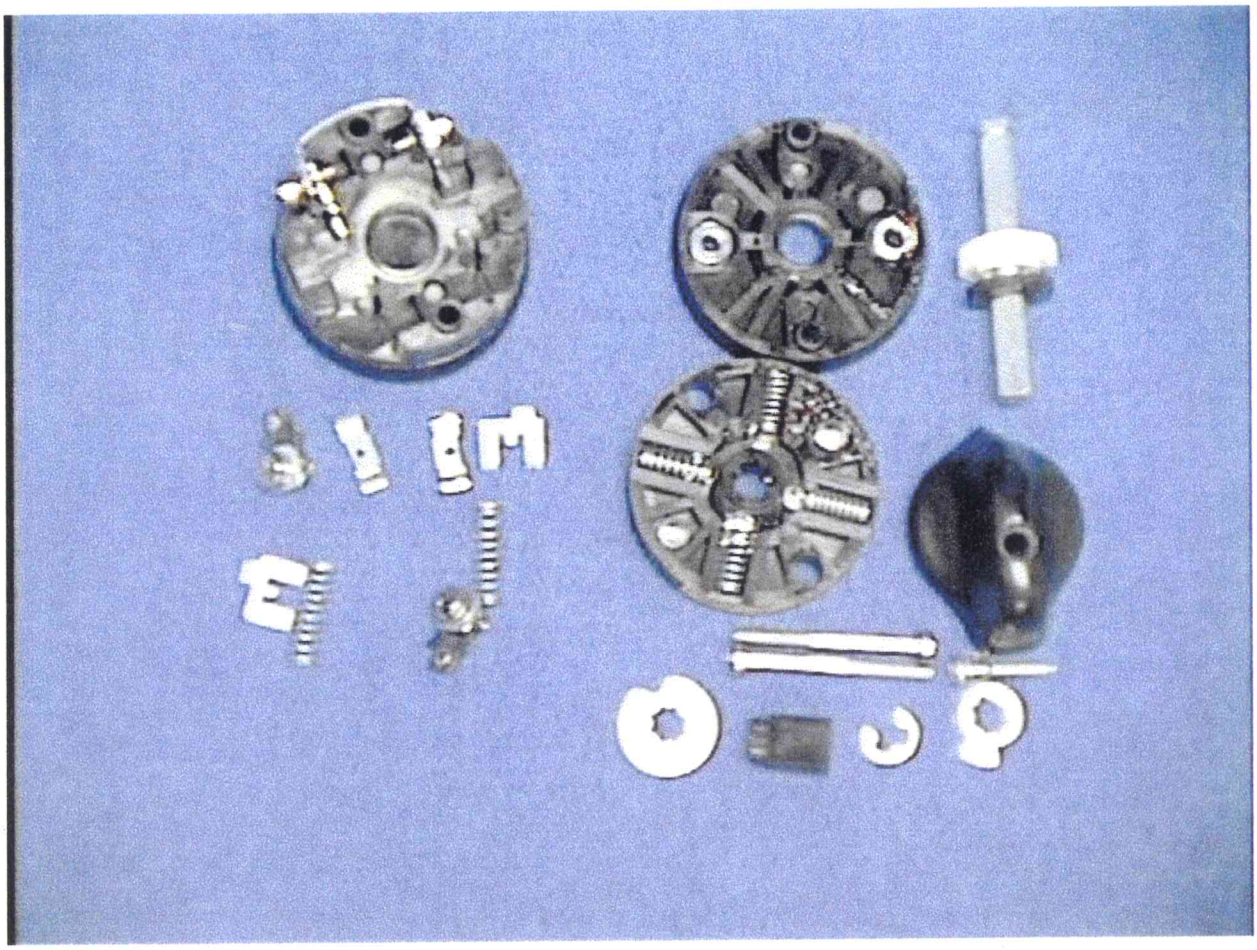
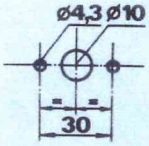


Figure 12
Report No. LR 110186-1

VS 10 - VS 16

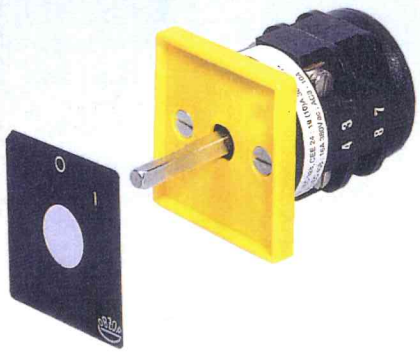
Spínače VS 10 a VS 16 mají stejné rozměry a možnosti použití. Vyrábějí se v následujících provedeních.
VS 10 and VS 16 switches are of the same dimensions and have the same application. They are produced in the following execution.
Die Schlater VS 10 und VS 16 haben die gleichen Dimensionen und Gebrauch. Sie werden in den folgenden Ausführungen hergestellt.

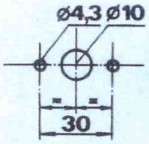
V



Vestavný spínač bez čelní desky
The built-in switch without the face plate
Der Einbauschalter ohne die Planplatte

VA
VP
VAV

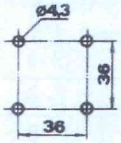




Upevňovací deska z umělé hmoty
Plastic fixing plate
Die Plastbefestigungsplatte
48 × 48 mm – VA
65 × 65 mm – VP
82 × 82 mm – VAV

Hliníkový štítek
Aluminium label
Der Aluminium Schield

Z



Zadní upevnění
back fixing
die hintere Befestigung

V + upevňovací deska Z
V + fixing plate Z
V + Befestigunsplatte Z
VA + upevňovací deska ZA
VA + fixing plate ZA
VA + Befestigungsplatte ZA
48 × 48 mm
VP + upevňovací deska ZP
VP + fixing plate ZP
VP + Befestigunsplatte ZP
65 × 65 mm

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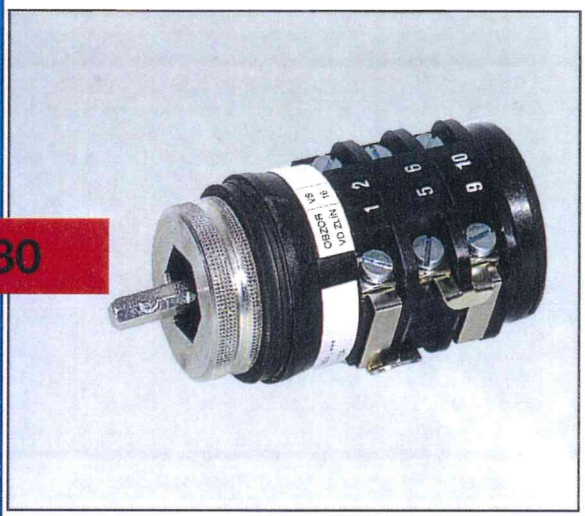
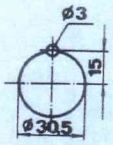
VS 10 - VS 16

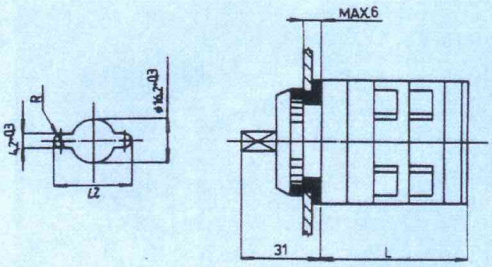
V-30

Centrální upevnění
central fixing
die Zentralbefestigung





Hlavice se závitem M 30 × 1 nebo M 16 × 1
Head with thread M 30 × 1
Der Kopf mit dem Gewinde M 30 × 1
Upevňovací závěrná vroubkovaná matice
Fixing dosing knurled nut
die Befestigungsverschlussrändelmutte
Vymezovací pryžové kroužky
Take up rubber rings
die behebende Gummiringe



Délky vačkových spínačů ● Lengths of cam switches ● Die Nockenschalterlänge

Počet pater Number of levels Die Anzahl der Ebenen	Počet kontaktů Number of contacts Die Anzahl der Kontakte	Délka L v mm Length (mm) die Länge (mm) VS 10 – 16	Délka L v mm Length (mm) die Länge (mm) VS 161
1	1–2	34,5	30,5
2	3–4	46,5	42,5
3	5–6	58,5	54,5
4	7–8	70,5	66,5
5	9–10	82,5	78,5
6	11–12	94,5	90,5
7	13–14	106,5	102,5
8	15–16	118,5	114,5
9	17–18	130,5	126,5
10	19–20	142,5	138,5
11	21–22	154,5	150,5
12	23–24	165,5	162,5

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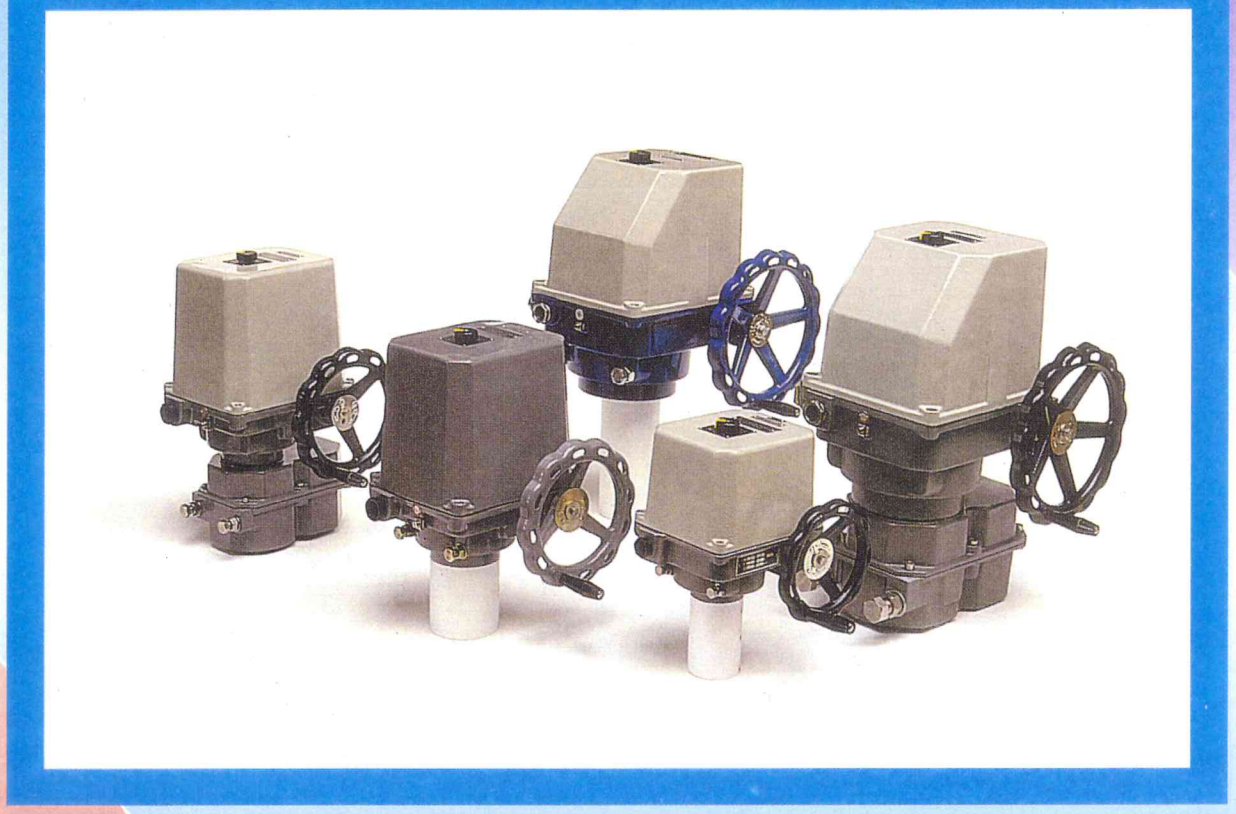
tel.: 067/616 92. fax: 067/621 37. 625 89

ZPA PEČKY, a.s.



Electric part-turn (90°) actuators

MODACT MOK
MODACT CONTROL MOK

Type No. 52 325 - 52 329

APPLICATION

The MODACT MOK actuators have been designed for remote control of flaps, ball valves and other actuating devices which require up to 90°rotary action and tight closure in end positons. A typical example of application is control of ball valves, flaps and similar devices in the remote and automatic control mode. The actuators are attached directly to the control device.

DESCRIPTION AND FUNCTION

The actuators consist of a power section and a control section. The power section is formed by an epicyclic gear unit, a worm gear drive for manual control and an electric motor.

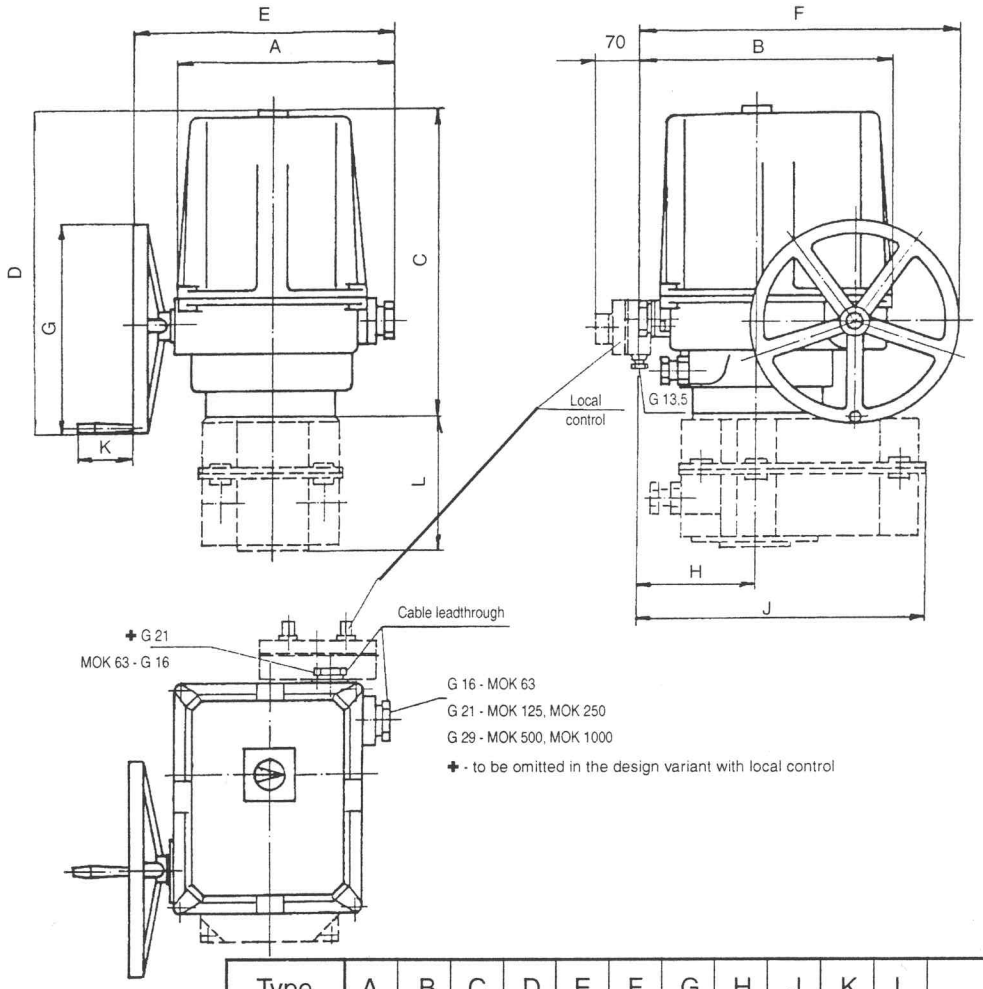
The control section consists of a position-limit switching and signalling unit with a position transmitter and a torque-switching unit.

For microclimate conditioning of the control compartment, a built-in anti-condensation heater is used. For connection of the actuator to external circuits, a terminal board is fitted. The movements of the actuator output shaft are transmitted to the position-limit and signalling switches as well as to the position transmitter.

Worm axial displacement, which depends on the load torque of the actuator, is transferred to the torque-limit switches.

The actuator can be equipped with a position controller, if required by the customer. In this case, the actuators are trade-named MODACT CONTROL MOK.

Dimensional sketch of MODACT MOK electric actuators



Type	A	B	C	D	E	F	G	H	J	K	L	Flange
MOK 63	173	203	227	224	213	245	160	98	-	72	-	F 05, F 04, F 7•
MOK 125	204	237	305	327	252	290	200	111	-	73	-	F 07, F 05, F 10•
MOK 250	204	237	305	327	252	290	200	111	263	73	128	F 10, F 07
MOK 500	250	290	366	378	325	262	250	128	-	78	-	F 12, F 10
MOK 1000	250	290	366	378	325	362	250	128	323	76	155	F 12

•) upon special request

APPL. LR 110186-4

OPERATING CONDITIONS

In standard design N, the actuators can be used under the following operating conditions:

- Outdoor environment
  Minimum air temperature - 25 °C
  Maximum air temperature + 40 °C
  Maximum relative humidity 95%

- Hot atmosphere
  Maximum air temperature + 55 °C

- Humid atmosphere
  Relative humidity up to 100 % with condensation
  Wet environment
  Degree 4 - splashing water

- Environment with vibrations
  - 10 to 150 Hz, diplacement amplitude 0.075 mm from 10 to 57.5 Hz, acceleration amplitude 9.8 $m.s^{-2}$ from 57.5 to 150 Hz

In design T for tropical applications, the actuators can be used under operating conditions prevailing in the outdoor macroclimatic region with a dry or humid atmosphere in addition to the environmental conditions in which the actuators in design N can operate.

Note: If the actuator is used in a location with a temperature above 35 °C the anti-condensation heater should not be connected. In other applications, it should be used.

TECHNICAL REQUIREMENTS

Supply voltages of the actuators

Supply voltages of the actuators are shown in Tab. 1.
If another supply voltage is to be used for the actuator this should be consulted beforehand with the manufacturer.

Operating position

The actuators can be used in any operating position.

Duty

The actuators can operate at the rated load torque corresponding to 50% of the maximum tripping torque, in duty S 2 for 10 minutes or S 4 with a load factor of 25 % and at a switching rate of 1,200 switching cycles per hour.

Self-locking

Self-locking facility of the actuators is provided by a mechanical or electromagnetic brake of the electric motor. The actuators are self-locking.

Manual control

The actuators are controlled by a handwheel providing for their direct control without clutch.

Switches

Each actuator is fitted with 6 quick-action one-chamber microswitches having the following parameters:

6 A	250 V AC	resistance load
2 A	250 V AC	inductive load, cos phi = 0.6
0.2 A	250 V DC	resistance load
0.1 A	220 V DC	inductive load, $\frac{L}{R}$ = 3 ms

Anti-condensation heater

To prevent water steam condensation, the actuators are fitted with an anti-condensation heater; the latter can be connected to the AC or DC voltage of 230 V.

POSITION POTENTIOMETER, LOCAL POSITION INDICATOR

A dual **Potentiometer** of 2 x 100 Ω + max. 12 Ω is used. In the „closed" position, the resistance between terminals should be at least 93 Ω, whereas in the „open" position it should not exceed 5 Ω. The transmitter can be used in circuits at a voltage up to 50 V DC with currents whose value should not exceed 100 mA.

The **CPT 1/A capacitance transmitter** is a current device in a two-wire arrangement with the following parameters:

Transmitter output signal	4 - 20 mA or 20 - 4 mA (±0.1 mA)
Transmitter working angle	0° - 60° to 0° - 90°
Maximum load resistance	500 Ω
Supply voltage	24 V DC
Maximum supply voltage	30 V DC

The actuator can have a built-in power supply except for the MODACT CONTROL MOK 63 design variant. The wiring instructions of the capacitance transmitter are given on the wiring diagrams. The actuators are fitted with a local position indicator that has been adapted for the full working stroke of the actuator, i.e., 90°.

Terminal board of the actuator

The terminal board of the actuator is fitted with terminals allowing one copper or aluminium conductor with a maximum cross-section of 2.5 mm^2 or two conductors with the same cross-sectional area up to 1 mm^2 to be connected.

Position controller

The built-in position controller permits automatic position adjustment of the actuator output shaft to be made, depending on the input signal value. The controller exhibits the P characteristic. The controller output is formed by two relays. In the actuators employing a one-phase motor, these relays provide for direct control of the electric motor whereas, in the actuators with a three-phase motor, two additional miniature contactors and current motor protection have been built. In addition to its basic function, the controller performs two auxiliary functions whose activation can be selected by rearranging the switches on the controller board. One of these functions can be used to bring the output shaft into the „open" or „closed" position when the input or feedback signal has been lost, or the output shaft remains in the position in which the loss of either signal occured. (This option is switch selectable on the controller board). The other function allows the same effect to be obtained by interconnecting terminals 11 and 13 of the controller (which are brought out to the actuator terminal board in some types of actuator) via an external contact.

When the external contact has been broken the actuator operates again in the normal way. If this function is not required no external contact should be connected.

Technical parameters of the controller

Input signal (switch selectable on the controller board):

	0 to 20 mA/R_{load} = 50 Ω
	4 to 20 mA/R_{load} = 50 Ω
	0 to 10 V/R_{load} = 20 $k\Omega_{load}$
Dead band:	max. 4% of the 10 V range, adjustable within 1 : 5 minimum limits

The two power contacts feature a small amount of fixedly adjustable switching hysteresis to avert system vibrations when the control error approaches a zero.

Protective enclosure

Protective enclosure of the actuator corresponds to Type IP 65, according to EN 60529:1991 idt IEC 529:1989.

Insulation resistance

The insulation resistance of electric control circuits with respect to the chassis and to each other should be at least 20 MΩ. The insulation resistance of the electric motor should be at least 1.9 MΩ. After a damp test, the insulation resistance of control circuits should be at least 2 MΩ. The insulation resistance of the CPT 1/A capacitance transmitter is 20 MΩ at 50 V DC (under dry condition).

Electric strength

Resistance position transmitter		500 V AC, 50 Hz
Capacitance position transmitter CPT 1/A		50 V DC
Circuits of microswitches and anti-condensation heaters		1,500 V AC, 50 Hz
Electric motor	Un = 1 x 220 V	1,500 V AC, 50 Hz
	Un = 3 x 380 V	1,760 V AC, 50 Hz

Noise

Acoustic pressure level A	85 dB (A) max.
Acoustic power level A	95 dB (A) max.

Clearance of the input part

Actuators, Type Nos 52 325, 52 326, 52 328	1.5° max.
Actuators, Type Nos 52 327, 52 329	2.5° max.

Working travel

The rated working travel of the actuator is	90°

Deviations of basic parameters

Tripping torque	± 15% of the maximum tripping torque
Operating time of the output shaft	- 10%, + 15% of the rated value
Hysteresis of position limit and signalling switches	≤ 4°
Adjustment of working travel	± 1°

APPL. LR 110186-4

Nonlinearity of position transmitter	± 2.5% of the rated output signal value of position transmitter
Hysteresis of position transmitter	± 2.5% of the rated output signal value of position transmitter

Ordering information

When ordering, please specify the following:
- Number of actuators required
- Actuator designation
- Complete Type Number, according to Tab.1 (9-digit)
- Adjustment of tripping torque (If no tripping torque adjustment has been specified the maximum tripping torque will be adjusted by the manufacturer).

The position-limit switches, the signalling switches and the position transmitter are not adjusted at the factory.

Right is reserved to change the dimensions and design without notice.

Tabelle 1 - Basic technical parameters

Type	Type Number	Operating time [s/90°]	Tripping torque range [Nm]	Electric motor				Weight [kg]
				Power [W]	Speed [1.min^{-1}]	Voltage [V]	Current [A]	
MOK 63	52 325 . x = 1 +	10	16 - 32	15	2780	1 x 230	0,37	7,4
	52 325 . x = 2 +	20	25 - 80**	15	2780	1 x 230	0,37	7,4
	52 325 . x = 3 +	40		15	2780	1 x 230	0,37	7,4
	52 325 . x = 4 +	80	25 - 45	4	1270	1 x 230	0,25	7,4
MOK 125	52 326 . x = 1 +	10	63 - 125	60	2770	1 x 230	0,53	12,7
	52 326 . x = 2 +	20		60	2770	1 x 230	0,53	12,7
	52 326 . x = 3 +	40		20	1350	1 x 230	0,4	12,3
	52 326 . x = 4 +	80		20	1350	1 x 230	0,4	12,3
MOK 250	52 327 . x = 2 +	20	125 - 250	60	2770	1 x 230	0,53	21
	52 327 . x = 3 +	40		60	2770	1 x 230	0,53	21
	52 327 . x = 4 +	80		20	1350	1 x 230	0,4	20,5
	52 327 . x = 5 +	160		20	1350	1 x 230	0,4	20,5
MOK 500	52 328 . x = 2 +	20	250 - 500	120	1380	3 x 400	0,47	27
	52 328 . x = 3 +	40		90	2770	3 x 400	0,35	26
	52 328 . x = 4 +	80		90	2770	3 x 400	0,35	26,3
MOK 1000	52 329 . x = 3 +	40	500 - 1000	120	1380	3 x 400	0,47	45
	52 329 . x = 4 +	80		90	2770	3 x 400	0,35	43
	52 329 . x = 5 +	160		90	2770	3 x 400	0,35	43,3

In the supplementary type number, the following numeric symbol should be inserted:

instead of x:

0 - standard design 6 - design for tropical atmosphere	with potentiometer 2 x 100 Ω
1 - standard design 7 - design for tropical atmosphere	with capacitance transmitter - 20 mA without built-in power supply
3 - standard design 9 - design for tropical atmosphere	with capacitance transmitter - 20 mA without built-in power supply
2 - standard design 8 - design for tropical atmosphere	without position transmitter

instead of =:
0 - design without built-in position controller and without local control
1 - design with built-in position controller without local control - MODACT CONTROL MOK
2 - design without built-in position controller with local control
3 - design with position controller and local control - MODACT CONTROL MOK

instead of +: Insert a number or letter, according to Tab. 2.

Notes: 1) Design variants with a greater tripping torque up to 80 Nm marked with two asterisks (**) can be used at an ambient temperature of -20°C to +55°C.

2) The MODACT CONTROL MOK design variant, Type No. 52 325, with a capacitance transmitter of 4 to 20 mA and a built-in power supply is not available. If in the MODACT CONTROL MOK design variant, Type No. 52 325, the signal of the transmitter is required to be brought out outside the actuator an external power supply should be used - see Wiring diagram (This applies only to the capacitance transmitter).