

## DRIESCHER Universal Motor-Operated Actuator UM

- for indoor and outdoor switching devices



# UM

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## Universal Motor-Operated Actuator UM

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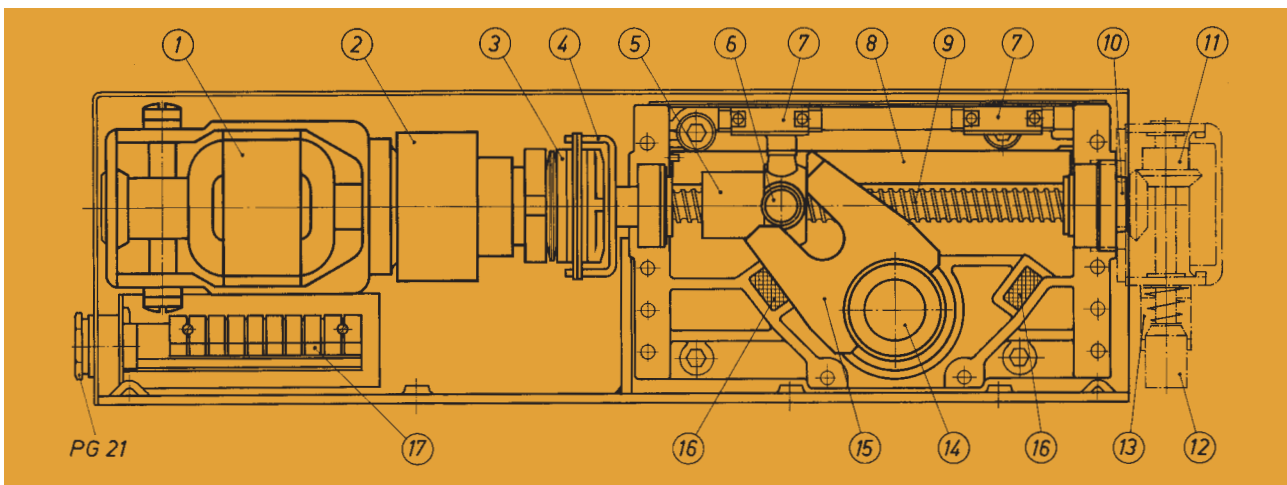
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## Indoor and outdoor motor-operated actuator UM

are used for the remote operation of switchgear, primarily medium-voltage disconnecting switches and load-break switches.

- The large number of mounting and installation options and the variable manual emergency operation enable these actuators to be used universally. They can also be retrofitted on switching devices which are already installed (see last page).
- The high nominal torque of 250 Nm (max. 300 Nm) guarantees reliable actuation, even if the switch is stiff.
- Despite having large reserves of power, they are small enough to be used in compact switch panels.
- Thanks to their high efficiency, current drain and hence loading of the auxiliary voltage source is kept low.
- Uncomplicated construction and the use of proven elements ensure reliable operation and low maintenance.
- The use of a generously proportioned friction clutch makes it possible to omit susceptible features such as movable spindles and screws, nuts unscrewing from threaded spindles etc. while still guaranteeing that the actuators reach their end positions reliably under all operating conditions. A signal (e.g. for switching error protection) is given before the switchgear drive shaft starts rotating and after it finishes.

### Design and mode of operation



The series-wound motor **1** (high torque at starting) turns the friction clutch **3** via the reduction gearing **2**. The driver fork **4** engages in the carrier plate of the friction clutch forming a cardan joint which also allows adjustment for length. The driver fork is permanently connected to spindle **9** which runs on tapered roller bearings.

The spindle is designed as a spiral ball raceway along which an orbital ball nut **5** travels. This ensures a very high mechanical efficiency of about 0.8.

As spindle **9** rotates, the travelling nut **5** which is guided along rail **8** moves with its driver pin **6** equipped with sliding and guide rollers into the forked link **15** which is tightly connected to the power take-off shaft. When the UM actuator is mounted directly on the switchgear, shaft **14** is the switchgear drive shaft onto which the UM actuator is pushed and secured with a pin.

Before forked link **15** starts to rotate, turning shaft **14** with it, travelling nut **5** actuates one of the contacts **7** and if necessary further signalling contacts for interlocking purposes and for acquiring intermediate positions.

After rotating through 90° (or 108° in a special version) the forked link reaches a spring-loaded stop **16** and comes to a standstill. The travelling nut then moves out of the forked part of the link and interrupts the motor circuit by actuating contact **7**. The kinetic energy still present when the travelling nut reaches the end positions is absorbed by friction clutch **3**. The wiring as shown in wiring diagram SP4-36827 (see page 10) is connected at terminals **17**. The control lines are fed via PG 21 screw connections.

International protection of the housing of the motor-operated actuator IP 20.

## Fixing

There are 2 different methods of fixing the indoor version on the switch or switch panel frame. For this purpose 4 M10 threaded holes are provided on each of 2 long sides of the actuator box at right angles to each other (see dimensional drawing *page 5*).

Signalling contacts mounted on brackets can also be screwed in the 4 threaded holes on the narrow side (gauge 40 and 100).

Outdoor version (dimensional drawing *page 6* and photos *page 12*).

## Manual emergency switching

Actuators located on the front of the switchpanel can be operated manually in an emergency via the bevel gear **11** (approx. 27 turns per switching operation) by means of the emergency crank handle (see *page 10*), with the built-in friction clutch providing overload protection.

When the crank handle is pushed onto the square end of the manual emergency actuating shaft, sliding sleeve **12** operates switch **13** which interrupts the motor circuit. This rules out the risk of injury to the operator, e.g. on restoral of the control voltage after failure.

The bevel gearing **11** can be shifted by  $4 \times 90^\circ$  to adapt to the particular installation situation. It is also possible by changing a bevel wheel to ensure that power is always switched on when the emergency crank handle is turned in the clockwise direction (see *direction of rotation page 10*).

Wall-mounted switchgear is switched manually in an emergency by means of an operating lever via a manual emergency pulling eye (see *page 10*). This special pulling eye which forms a mechanical coupling between motor-operated actuator and switchgear forcibly disengages the coupling during manual emergency operation so that the operator is not at risk if the motor starts due to the sudden restoral of power.

If motor-operated actuator and switchgear are in opposition after manual emergency operation, they are automatically recoupled when the switching positions coincide again.

There is no bevel gearing in the version (UM-50) previously described and the end of the spindle is covered with a protection cap 10.

## Current consumption and travel time

Since only series-wound motors are used in type UM motor-operated actuators, current consumption and travel time are dependent on the torque which has to be developed by the actuator for operating the switchgear.

The diagrams on *pages 8 and 9* provide the relevant information.

For applications (e.g. control via a process computer) in which a longer time span is required for intermediate position interrogation or reciprocal control, motors with a travel time approx. 3 times as long and correspondingly smaller current consumption can be used. Subsequent exchange is also possible.

## Control unit

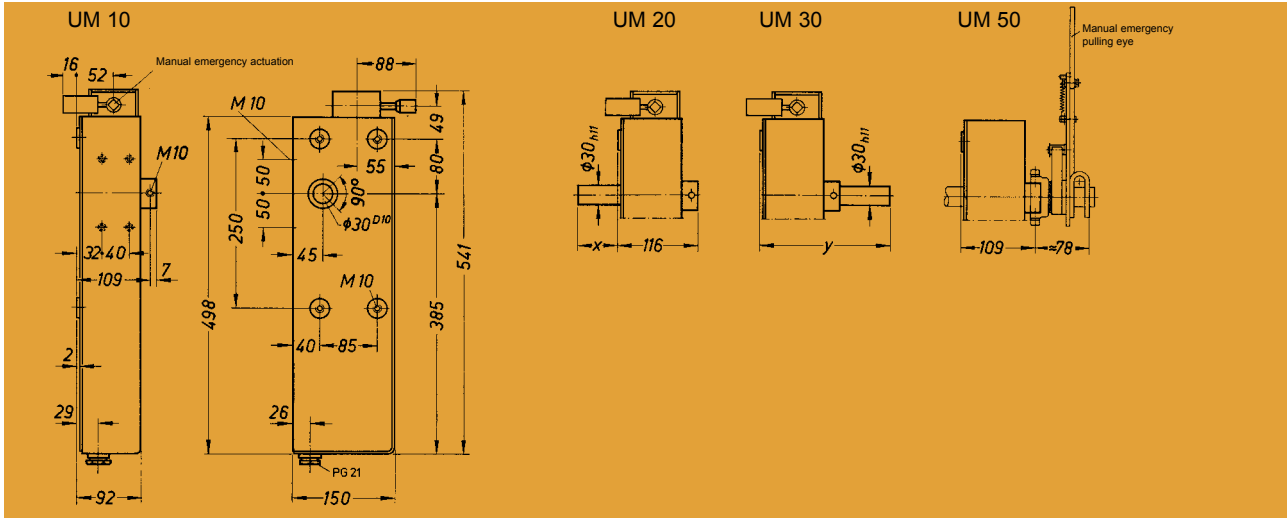
The type UMS control unit is available for systems without central control or those in which only certain individual switching devices are remote-controlled.

A plastic case with transparent cover contains all the control elements shown in the circuit diagrams on *page 11*:

control contactors, motor protection switch and the electrically interlocked command control switches as well as the necessary terminals (photo and dimensional drawing see *page 11*).

An electrical counter can also be fitted at extra cost.

## Universal motor-operated actuator UM for indoor use



Design	Direction of rotation	DC voltage part no.				AC voltage part no.		x <sup>2)</sup>	y <sup>2)</sup>	Weight in kg	Drawing no.
		24 V	60 V	110 V	220 V	100 V	230 V				
UM 10	A	776 11500	776 13500	776 14500	776 15500	776 17500	776 19500	-	-	14	AZ 4-31824
UM 10	B	776 11600	776 13600	776 14600	776 15600	776 17600	776 19600	-	-	14	AZ 4-31824
UM 20	A	776 21500	776 23500	776 24500	776 25500	776 27500	776 29500	59	-	15	AZ 4-31824
UM 20	B	776 21600	776 23600	776 24600	776 25600	776 27600	776 29600	59	-	15	AZ 4-31824
UM 30	A	776 31500	776 33500	776 34500	776 35500	776 37500	776 39500	-	191	15	AZ 4-31824
UM 30	B	776 31600	776 33600	776 34600	776 35600	776 37600	776 39600	-	191	15	AZ 4-31824
UM 50	A	776 51100	776 53100	776 54100	776 55100	776 57100	776 59100	-	-	14	AZ 4-31824
UM 50	B	776 51200	776 53200	776 54200	776 55200	776 57200	776 59200	-	-	14	AZ 4-31824

2) Other dimensions at extra cost

## Universal motor-operated actuator UM for indoor use • Type "SL"

are used where highest nominal torque (up to max. 360 Nm) is necessary.

**Attention: All other actuating elements like clamping cranks, linkage rods etc. have to be designed for the higher load. In case of need we would ask for consultation.**

Design	Direction of rotation	DC voltage part no.				AC voltage part no.		x <sup>2)</sup>	y <sup>2)</sup>	Weight in kg
		24 V	60 V	110 V	220 V	100 V	230 V			
UM 10 SL	A	776 11570	776 13570	776 14570	776 15570	776 17570	776 19570	-	-	14
UM 10 SL	B	776 11670	776 13670	776 14670	776 15670	776 17670	776 19670	-	-	14
UM 20 SL	A	776 21570	776 23570	776 24570	776 25570	776 27570	776 29570	59	-	15
UM 20 SL	B	776 21670	776 23670	776 24670	776 25670	776 27670	776 29670	59	-	15
UM 30 SL	A	776 31570	776 33570	776 34570	776 35570	776 37570	776 39570	-	191	15
UM 30 SL	B	776 31670	776 33670	776 34670	776 35670	776 37670	776 39670	-	191	15

2) Other dimensions at extra cost

• Information about current consumption and travel time as a function of the torque see page 8 and 9 •

## Universal motor-operated actuator UM 90 for outdoor switching devices

The outdoor version of the UM motor-operated actuator is accommodated in a chilled cast aluminium housing, international protection IP 53/DIN 40050. The housing cover is screwed on with A2 screws.

The housing also contains all control elements such as control contactors, motor protection switch,

control and signaling switches and the wiring routed to terminal blocks (see photo).

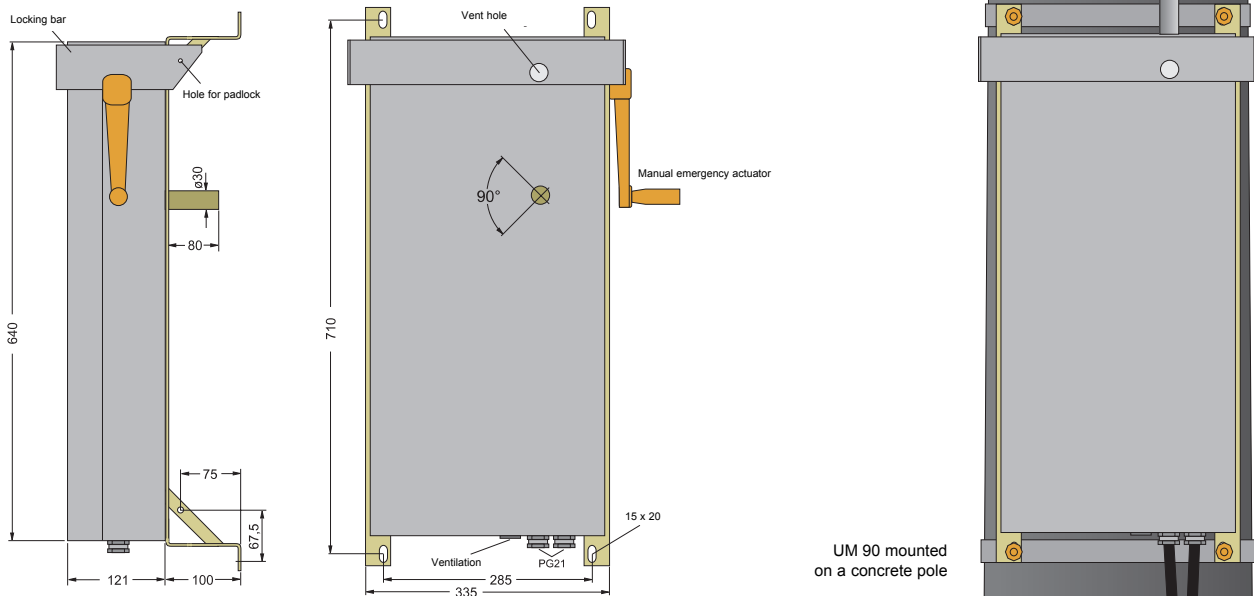
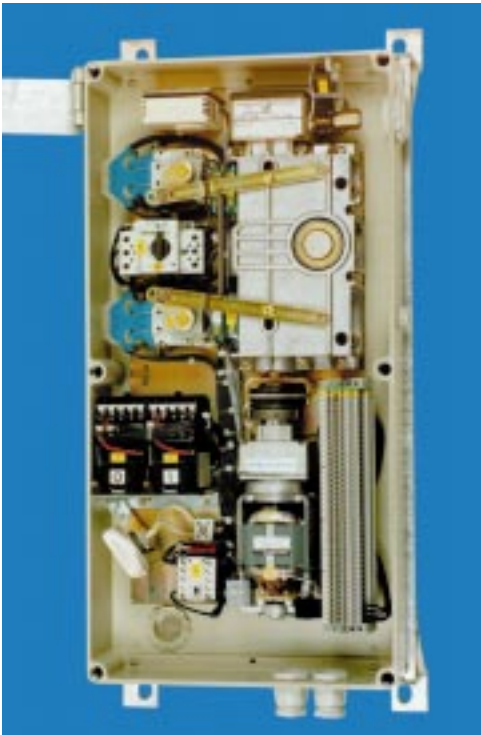
Two PG 21 screw connections are provided for leading in the control and signaling lines.

The outdoor actuator housing has insect-proof ventilation inlet and outlet and a thermostatically-controlled heater in the form of a 60-W mushroom-type radiator with E 27 base (an incandescent light bulb can be used in an emergency).

Manual operation in an emergency is via a bevel gearing which has already been described for the indoor version. Changing the bevel wheel to reverse the direction of rotation is not required in this case since the direction of rotation can be altered very easily on the actuating mechanism leading to the switch device. The electrical connection is also standard for the same reason. The emergency crank handle is inserted through an aperture which is covered by a PG 36 sealing plug in normal operation. Naturally in this case too the motor circuit is forcibly interrupted before the crank engages with the square mating end.

A locking bar in which a padlock can be inserted prevents the manual emergency actuator being operated and the cover being opened by unauthorized persons. The housing can also be supplied at additional cost in a seawater-resistant alloy with special lacquering.

Dimensional drawing with circuit diagrams on page 7.



**Universal motor-operated actuator UM 90 for outdoor use**

Design	DC voltage part no.				AC voltage part no.		Weight in kg	Drawing no.
	24 V	60 V	110 V	220 V	100 V	230 V		
UM 90	776 91500	776 93500	776 94500	776 95500	776 97500	776 99500	35	AZ 4-68454

**Universal motor-operated actuator UM 90 SL for outdoor use**

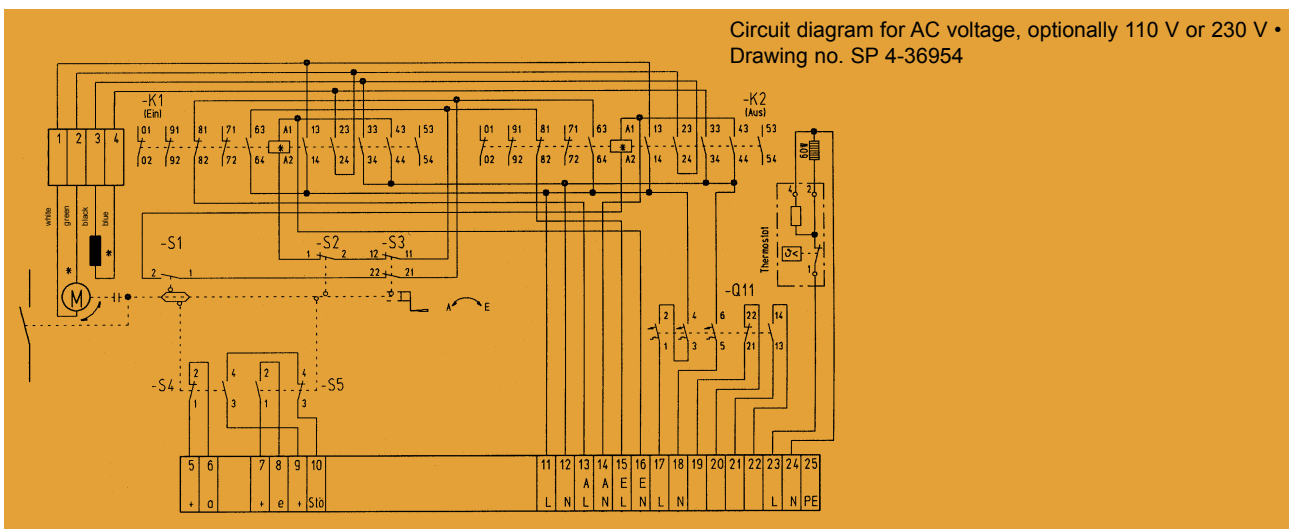
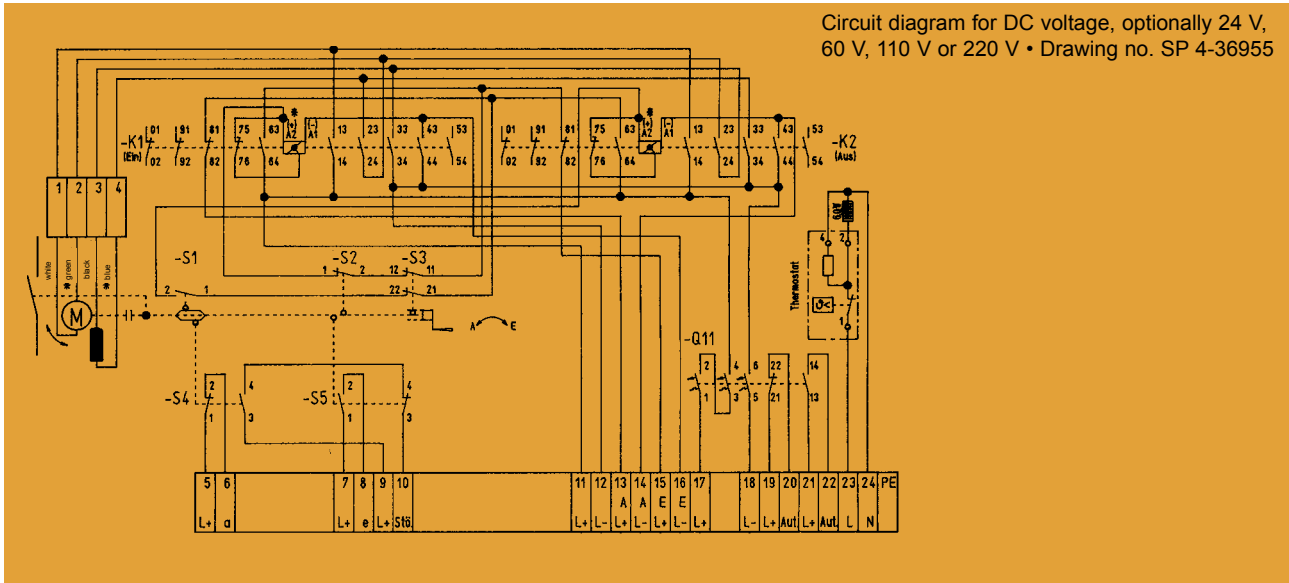
Design	DC voltage part no.				AC voltage part no.		Weight in kg	Drawing no.
	24 V	60 V	110 V	220 V	100 V	230 V		
UM 90 SL	776 91570	776 93570	776 94570	776 95570	776 97570	776 99570	35	AZ 4-68454

Universal motor-operated actuators UM 90 SL are used where highest nominal torque (up to max. 360 Nm) is necessary e.g. for outdoor high-current disconnectors.

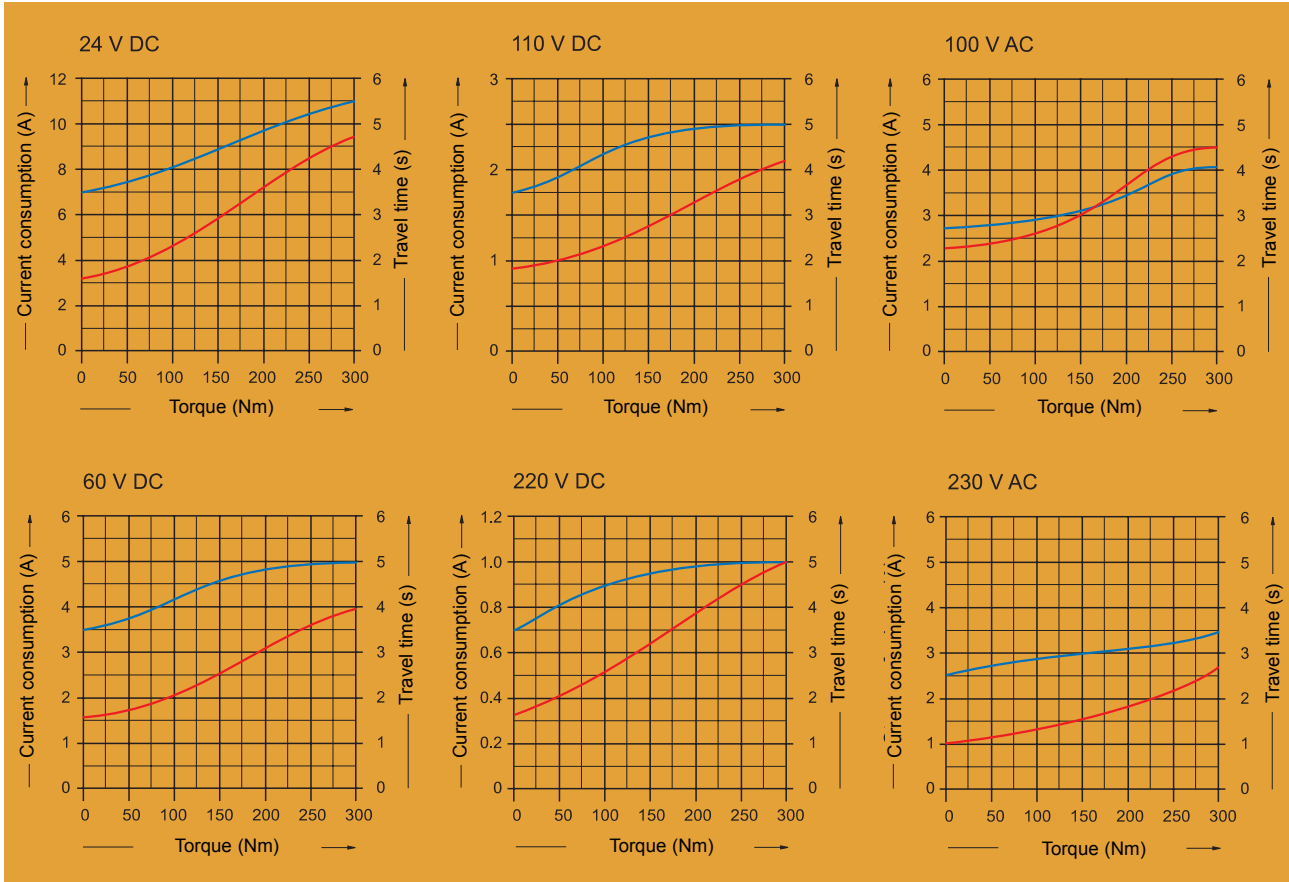
**Attention: All other actuating elements like clamping cranks, linkage rods etc. have to be designed for the higher load. In case of need we would ask for consultation.**

- Current consumption and travel time as a function of the torque see page 8 and 9 •

**Circuit diagram for motor-operated actuator UM for outdoor use**



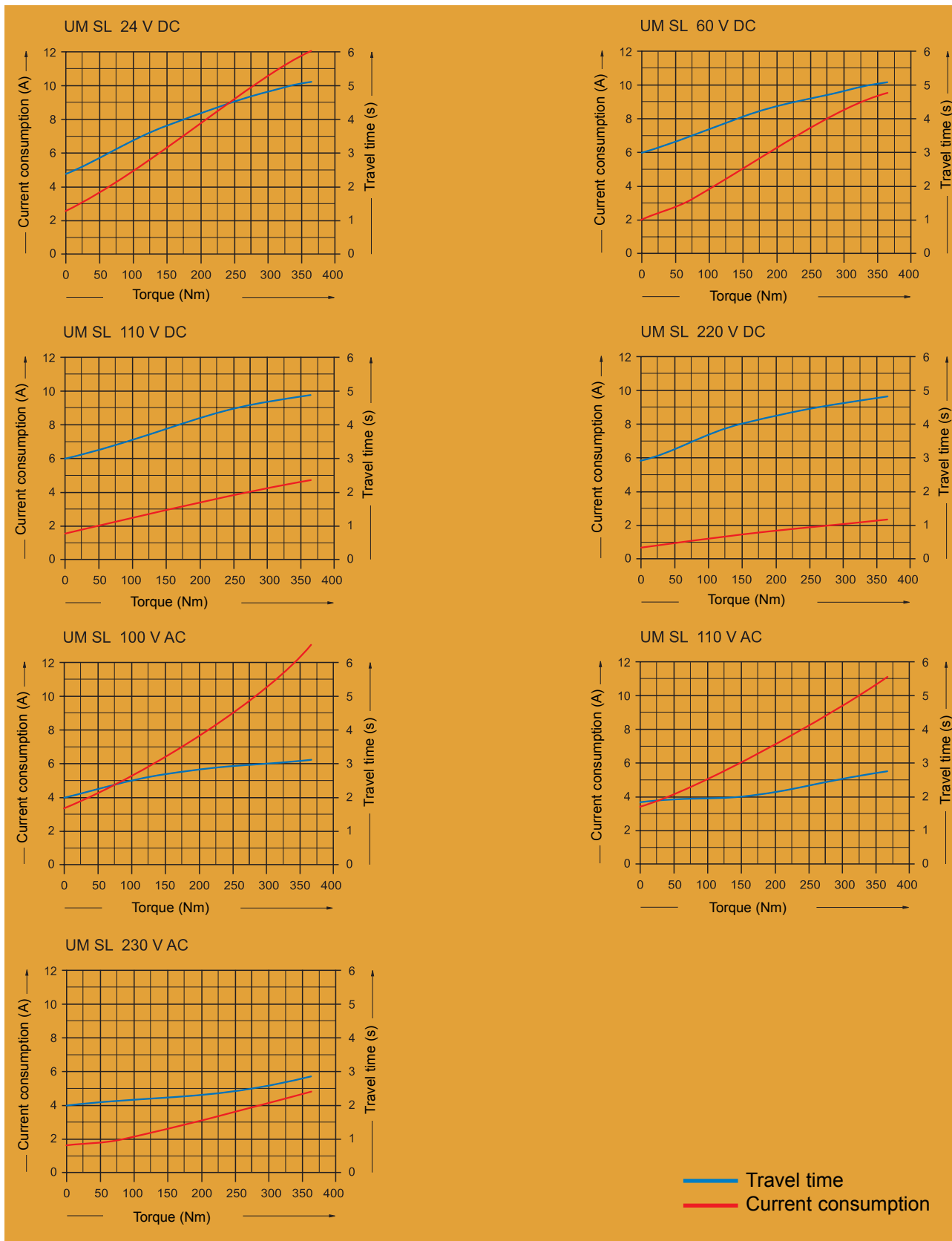
Current consumption and travel time as a function of the torque



— Travel time  
— Current consumption

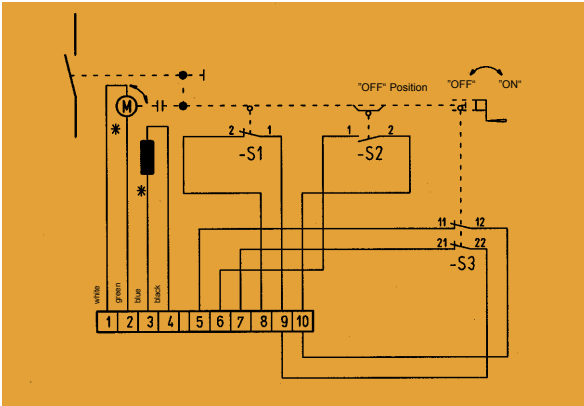


## Current consumption and travel time as a function of the torque • type "SL"



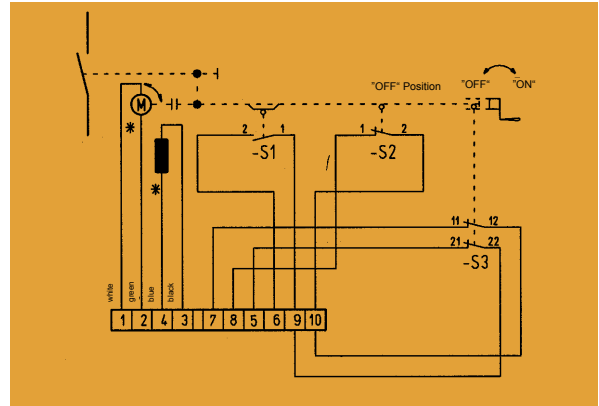
Direction of rotation

Direction of rotation "A" (SP 4-36827/A)



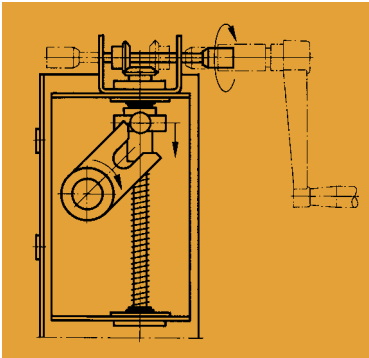
With emergency switching with manual pulling eye, S3 is omitted; S1-1 is wired to terminal 5 and S2-2 to terminal 7.

Direction of rotation "B" (SP 4-36827/B)



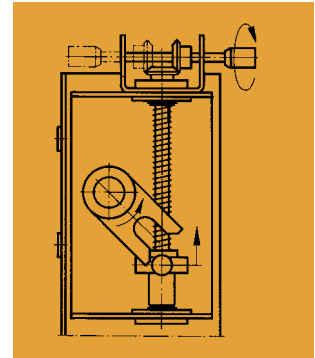
With emergency switching with manual pulling eye, S3 is omitted; S1-1 is wired to terminal 7 and S2-2 to terminal 5.

"OFF" Position I (Direction of rotation A)

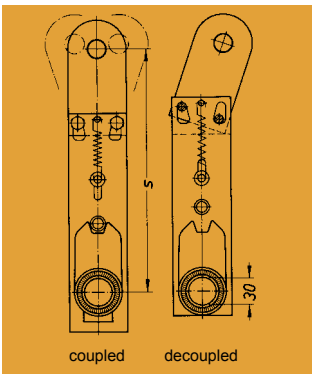


Depending on the installation or mounting situation, either "OFF" Position I with direction of rotation A and terminal designation as shown in circuit diagram SP 4-36827/A or "OFF" Position II with direction of rotation B and terminal designation as shown in circuit diagram SP 4-36827/B may be necessary. Please specify the direction of rotation on ordering. If it is not specified, direction of rotation A is generally supplied. The direction of rotation can be altered later by reversing the terminal connections of the cable.

"OFF" Position II (Direction of rotation B)

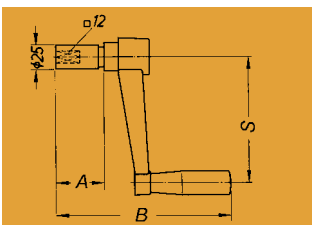


Manual emergency pulling ring with moving eye link



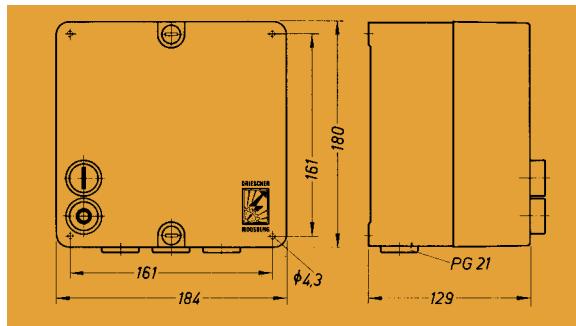
Part no.	s	Weight in kg	Eye link	Drawing no.
776 03001	250	2.5	Steel	AZ 2-33790
776 03002	350	2.2	Steel	AZ 2-33790
776 03003	250	2.2	GRP	AZ 2-33790
776 03004	350	2.3	GRP	AZ 2-33790

Emergency crank handle with friction clutch



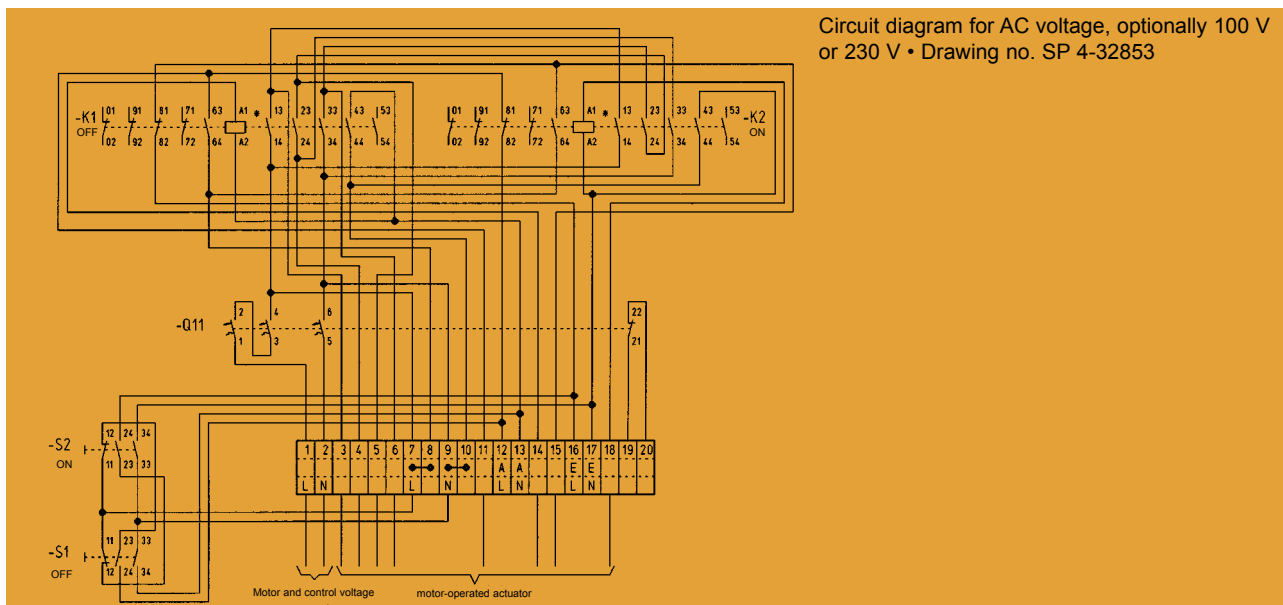
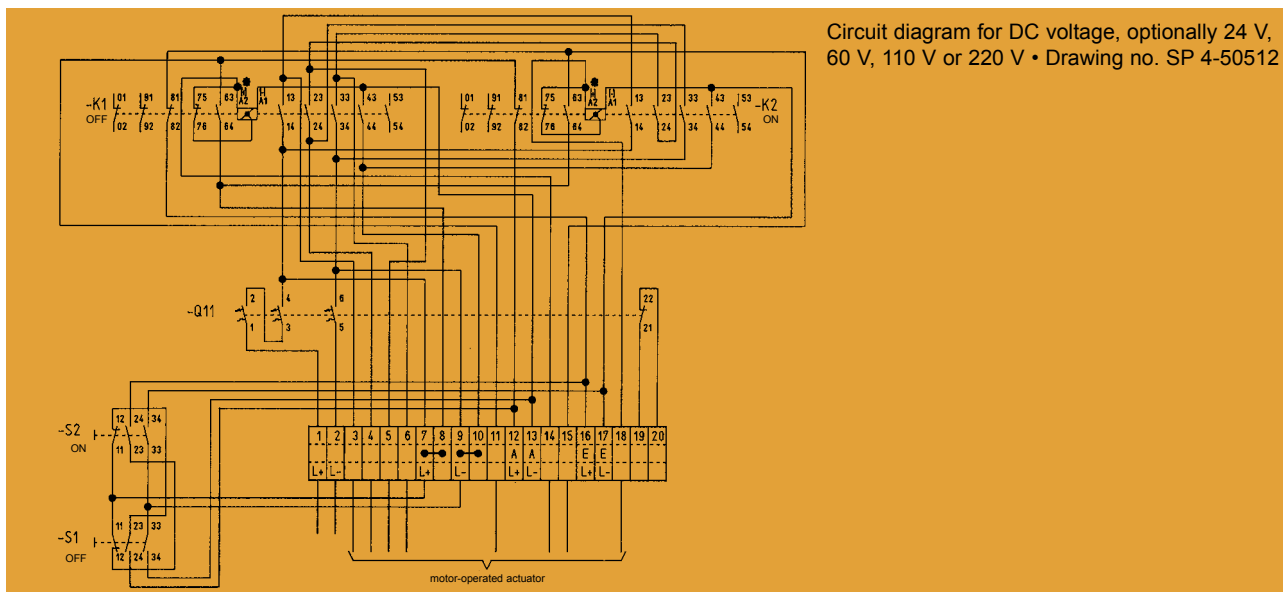
Part no.	A	B	S	Weight in kg	Drawing no.
776 01001	50	180	130	0,6	AZ 4-36348/1
776 01002	90	220	130	0,6	AZ 4-36348/2
776 01003	50	157	100	0,6	AZ 4-36348/3
776 01004	90	197	100	0,6	AZ 4-36348/4
776 01005	120	250	130	0,6	AZ 4-36348/5

Control unit UMS for indoor use

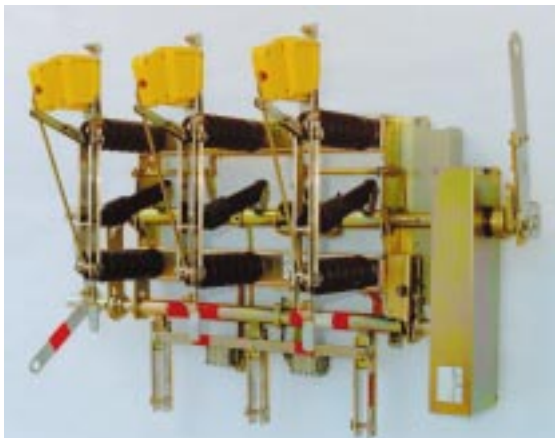


Operating voltage	24 V DC	60 V DC	110 V DC	220 V DC	100 V AC	230 V AC
Part no.	776 05001	776 05003	776 05004	776 05005	776 05007	776 05009
Weight in kg	2.4	2.4	2.4	2.4	2.4	2.4
Drawing no.	AZ 4-32843	AZ 4-32843	AZ 4-32843	AZ 4-32843	AZ 4-32843	AZ 4-32843

Circuit diagram for control unit UMS for indoor use



## Installation possibilities (some examples)



H22 EK with mounted motor-operated actuator UM 50



H29 EA with mounted motor-operated actuator UM 10



L163 with below mounted motor-operated actuator UM 10



Single-pole disconnecter with mounted motor-operated actuator UM 10

**Motor-operated actuator type UM 20 and UM 30 not figured**

• **Double-piston pneumatic actuators for indoor and outdoor switching devices on request** •

Dimensions, weights, diagrams and descriptions in the list are non-binding. Subject to change without notice.

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