

# Universal motor operated drives UM

for indoor and outdoor switching devices



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ISO 9001  
BUREAU VERITAS  
Certification



## Universal motor operated drives UM

Motor operated drives 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.

The high nominal torque of 250 Nm (max. 300 Nm) guarantees reliable actuation, even if the switch is stiff.

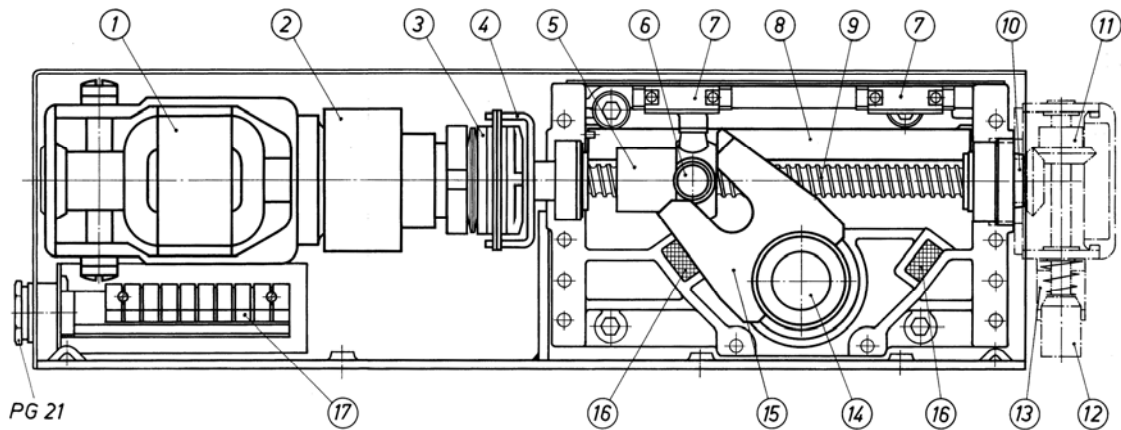
Despite having large reserves of power, they are small enough to be used in compact switch panels.

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 form-threaded spindles etc. while still guaranteeing that the actuators reach their end positions reliably under all operating conditions. A signal 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 with 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 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 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.

Signalling contacts mounted on brackets can also be screwed in the 4 threaded holes on the narrow side.

## Manual emergency switching

Actuators located on the front of the switch panel 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, 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.

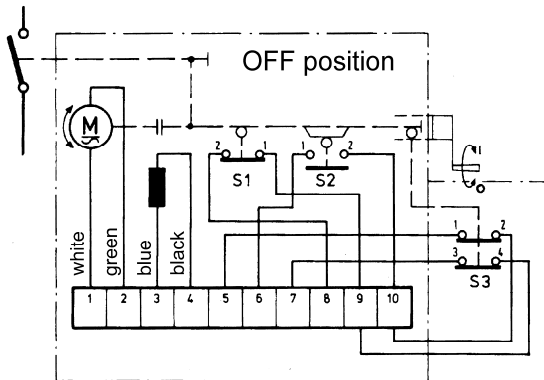
Wall-mounted switchgear is switched manually in an emergency by means of an operating lever via a manual emergency-pulling eye. This special pulling eye which forms a mechanical coupling between motor-operated actuator and switchgear forcibly disengages the coupling during manual emergency operation 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).

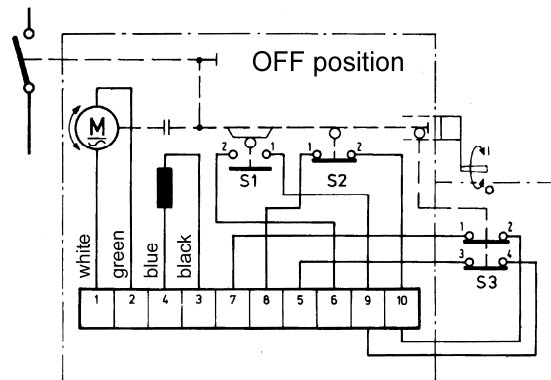
## Direction of rotation

**Direction of rotation A**



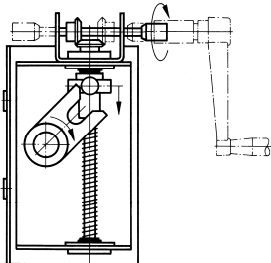
With emergency switching with manual pulling eye, S3 is omitted; S1-1 is wired to terminal 7 and S2-2 to terminal 5.

**Direction of rotation B**



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

**OFF position 1  
(direction of rotation A)**

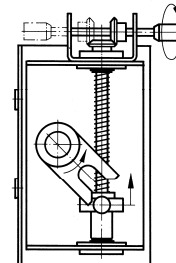


Depending on the installation or mounting situation, either OFF position 1 with direction of rotation A or OFF Position 2 with direction of rotation B.

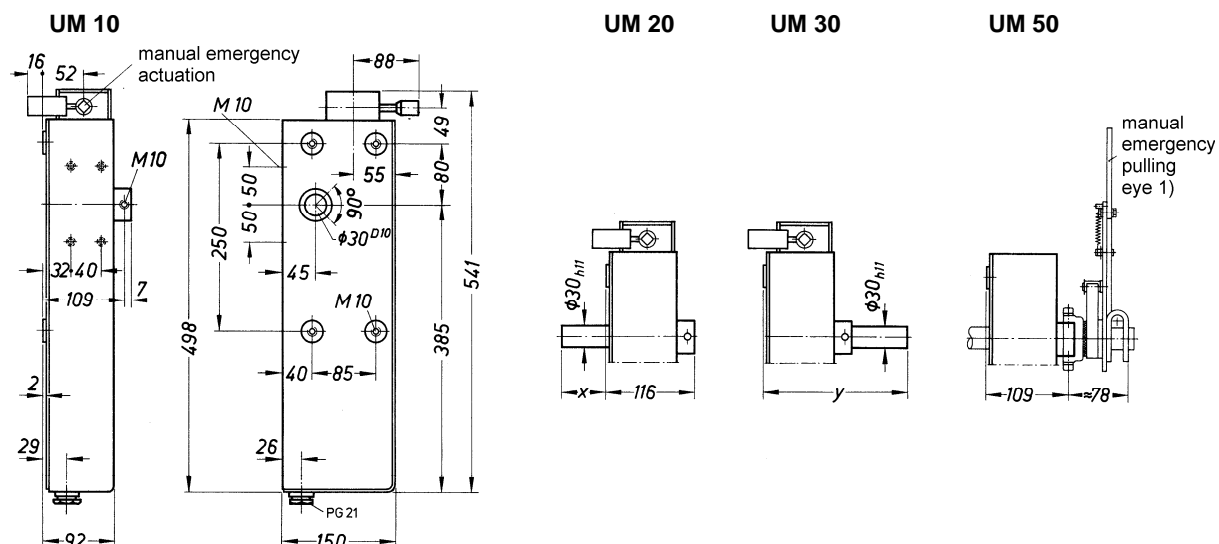
**Please specify the direction of rotation on ordering. If it is not specified, direction of rotation A is generally supplied.**

The direction of rotation can be altered later by reversing the terminal connections of the cable.

**OFF position 2  
(direction of rotation B)**



## Universal motor operated drives UM for indoor use



Type	Direction of rotation	Part nr.				AC voltage		x <sup>2)</sup>	y <sup>2)</sup>	Weight kg
		24 V	DC voltage		220 V	110 V	230 V			
UM 10	A	776 11500	776 13500	776 14500	776 15500	776 17500	776 19500	-	-	14,1
	B	776 11600	776 13600	776 14600	776 15600	776 17600	776 19600	-	-	
UM 20	A	776 21500	776 23500	776 24500	776 25500	776 27500	776 29500	59	-	15,1
	B	776 21600	776 23600	776 24600	776 25600	776 27600	776 29600	59	-	
UM 30	A	776 31500	776 33500	776 34500	776 35500	776 37500	776 39500	-	191	15,1
	B	776 31600	776 33600	776 34600	776 35600	776 37600	776 39600	-	191	
UM 50	A	776 51100	776 53100	776 55100	776 55100	776 57100	776 59100	-	-	14,1
	B	776 51200	776 53200	776 55200	776 55200	776 57200	776 59200	-	-	

- 1) the lever for emergency control of the drive does not constitute the part of delivery of the system  
 2) other dimensions at extra costs

## Universal motor operated drives UM for indoor use – SL design

Universal motor operated drives UM in SL design are used where highest nominal torque (up to max. 360 Nm) is necessary.

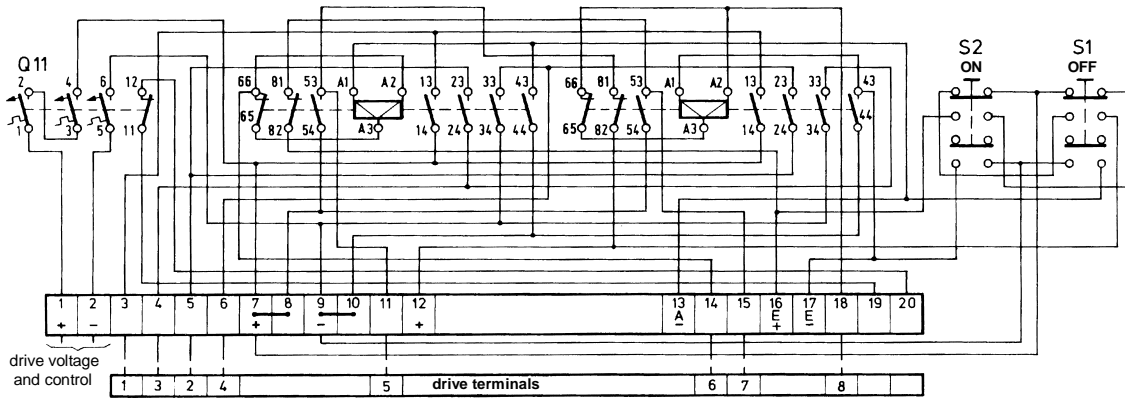
**Attention:** All other actuating elements like clamping cranks, linkage rods etc. have to be designed for the higher load. In case of need we would ask for consultation.

Type	Direction of rotation	Part nr.				AC voltage		x <sup>2)</sup>	y <sup>2)</sup>	Weight kg
		24 V	DC voltage		220 V	110 V	230 V			
UM 10	A	776 11570	776 13570	776 14570	776 15570	776 17570	776 19570	-	-	14,1
	B	776 11670	776 13670	776 14670	776 15670	776 17670	776 19670	-	-	
UM 20	A	776 21570	776 23570	776 24570	776 25570	776 27570	776 29570	59	-	15,1
	B	776 21670	776 23670	776 24670	776 25670	776 27670	776 29670	59	-	
UM 30	A	776 31570	776 33570	776 34570	776 35570	776 37570	776 39570	-	191	15,1
	B	776 31670	776 33670	776 34670	776 35670	776 37670	776 39670	-	191	

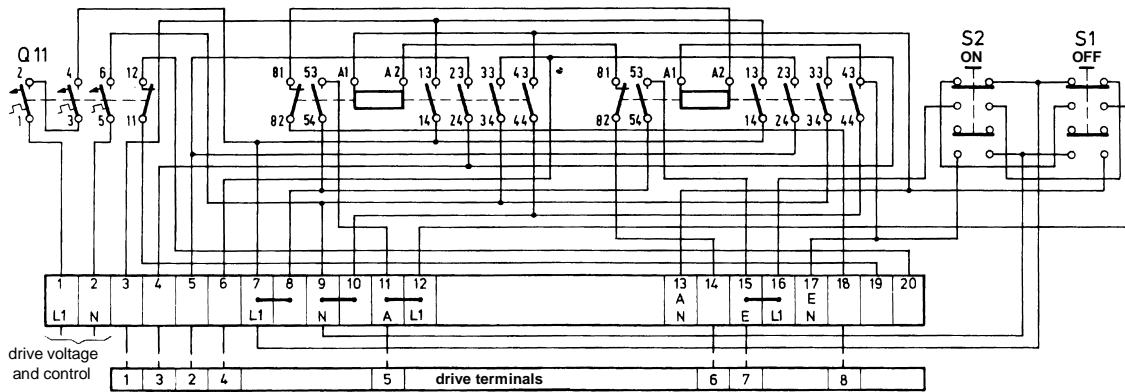
- 2) other dimensions at extra costs

## Circuit diagrams for motor operated drives UM for indoor use

Circuit diagram for **DC voltages** of 24 V, 60 V, 110V or 220 V

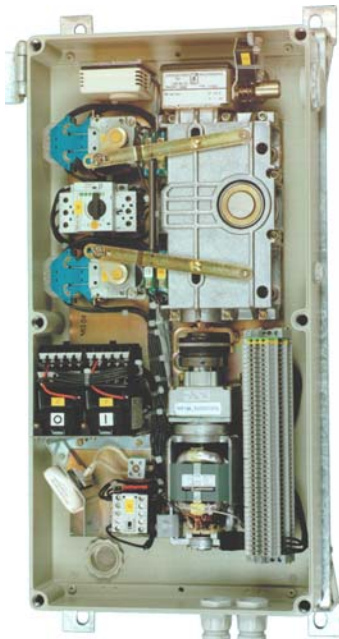


Circuit diagram for **AC voltages** of 110 V or 230 V



## Universal motor operated drives UM for outdoor use

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



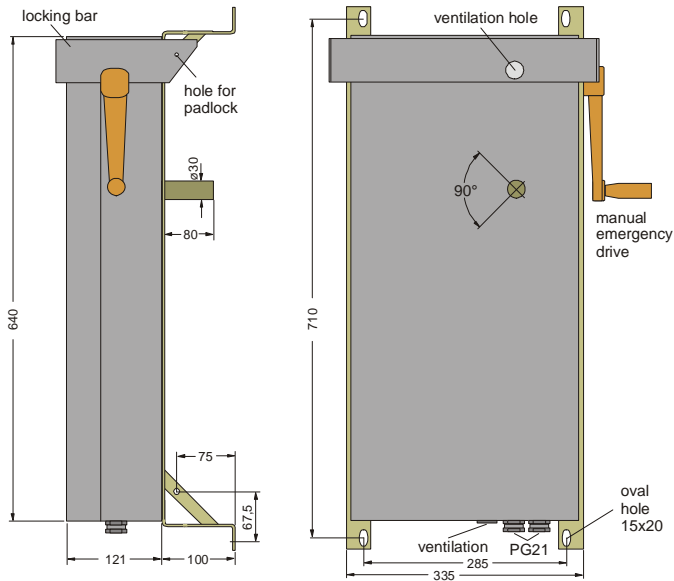
The housing also contains all control and protection elements. Two PG 21 screw connections are provided for leading in the control and signalling lines. The outdoor actuator housing has insect-proof ventilation inlet and outlet and a thermostatically controlled heater in the form of a 60-W mushroom-type 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.

## Universal motor operated drives UM 90 for outdoor use



Voltage	Part nr.	Weight in kg
24 V DC	776 91500	35,0
60 V DC	776 93500	35,0
110 V DC	776 94500	35,0
220 V DC	776 95500	35,0
110 V AC	776 97500	35,0
230 V AC	776 99500	35,0

### UM 90 – SL design

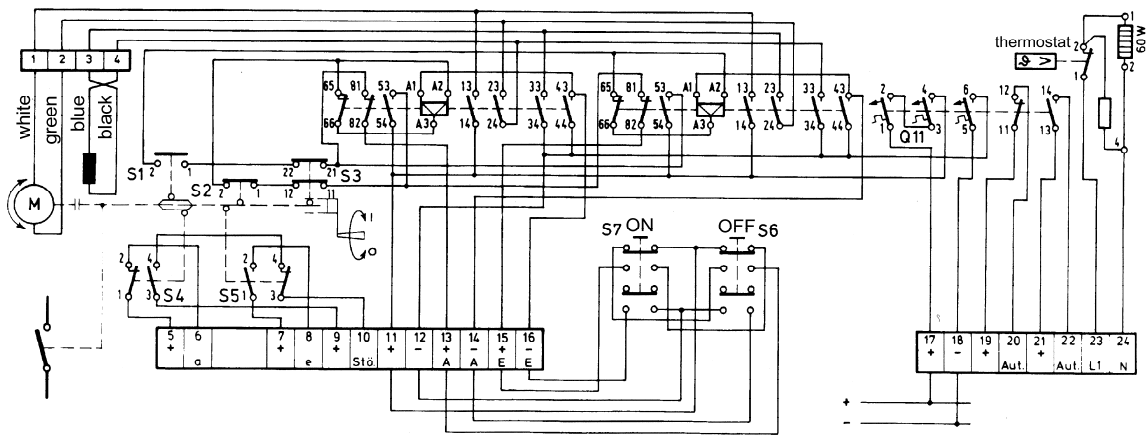
Voltage	Part nr.	Weight in kg
24 V DC	776 91570	35,0
60 V DC	776 93570	35,0
110 V DC	776 94570	35,0
220 V DC	776 95570	35,0
110 V AC	776 97570	35,0
230 V AC	776 99570	35,0

Universal motor operated drives UM in SL design are used where highest nominal torque (up to max. 360 Nm) is necessary.

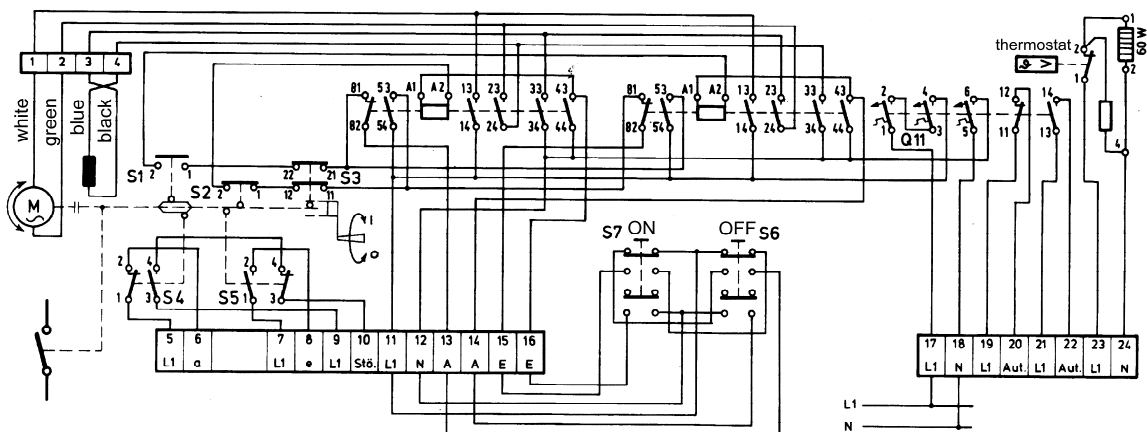
**Attention:** All other actuating elements like clamping cranks, linkage rods etc. have to be designed for the higher load. In case of need we would ask for consultation.

## Circuit diagrams for motor operated drives UM for outdoor use

Circuit diagram for **DC voltages** of 24 V, 60 V, 110 V or 220 V



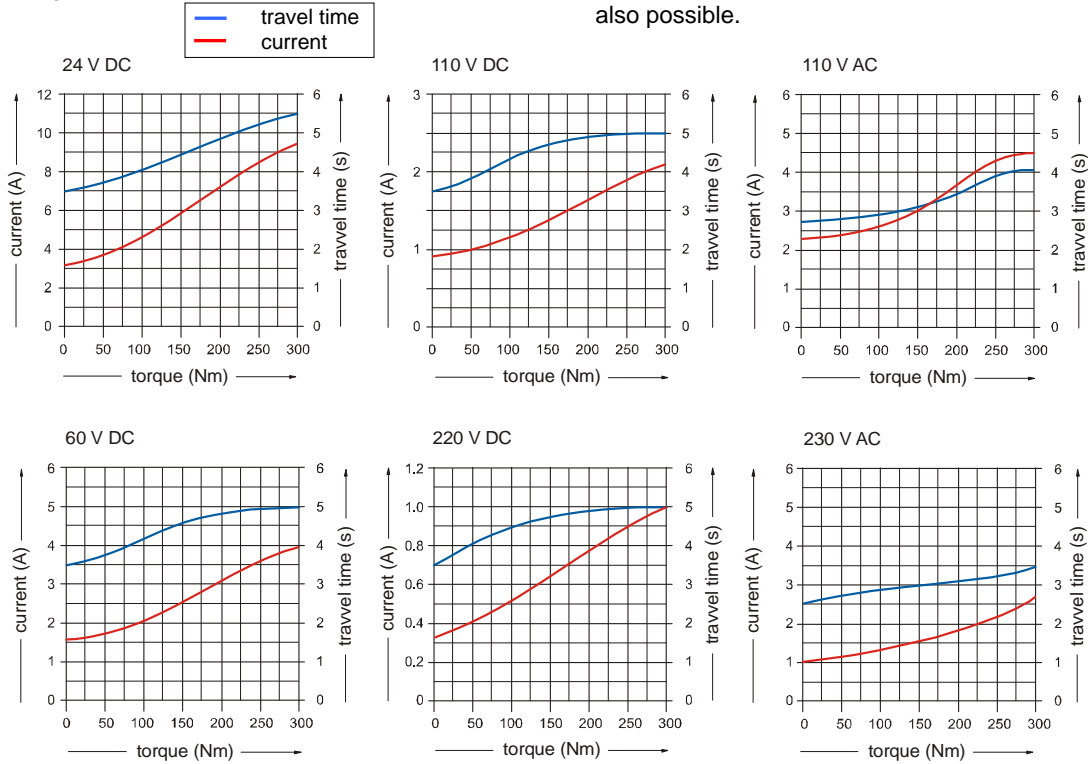
Circuit diagram for **AC voltages** of 110 V or 230 V



## Current consumption and travel time as a function of the torque

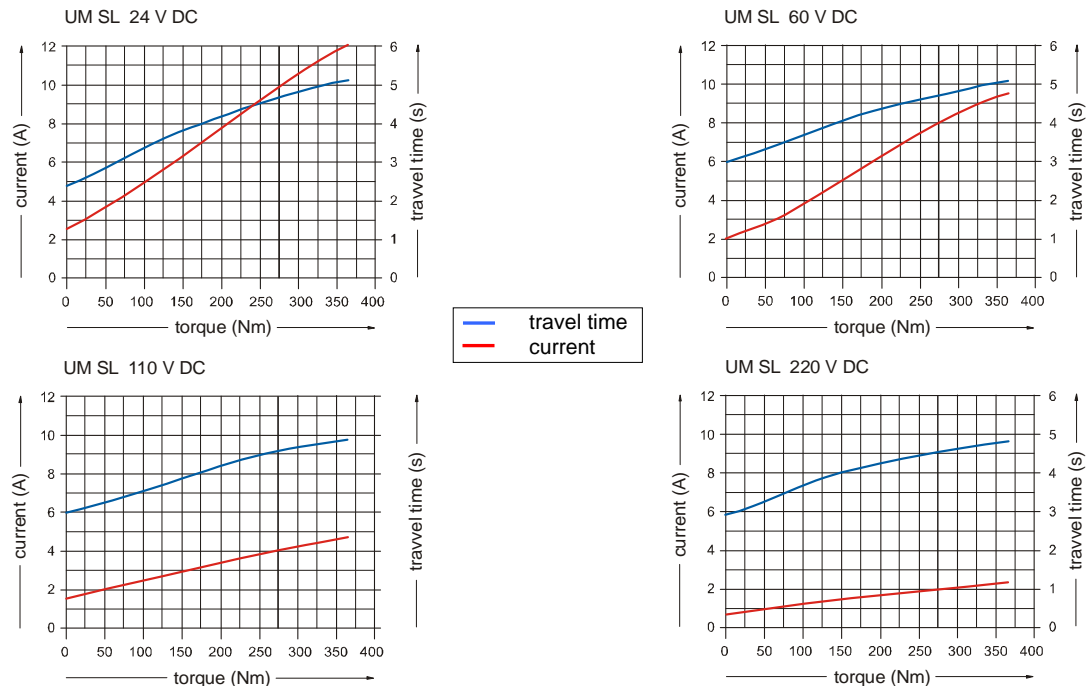
Since only series-wound motors are used in type UM motor-operated actuators, current consumption and travel time are dependent on the torque, which has to be developed by the actuator for operating the switchgear.

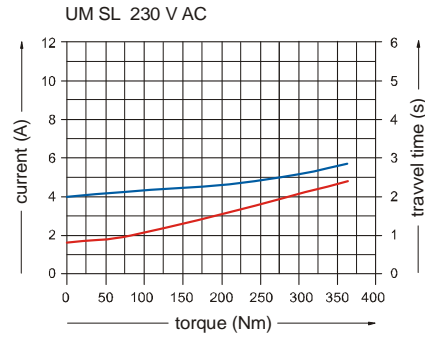
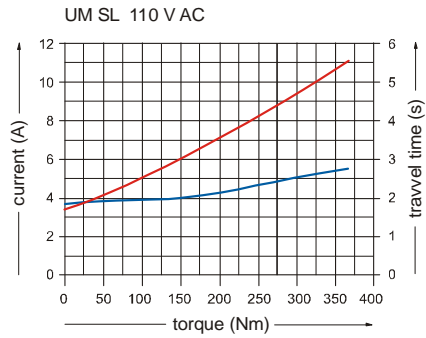
For applications in which a longer time span is required for intermediate position interrogation or reciprocal control, motors with a travel time approx. 3 times as long and correspondingly smaller current consumption can be used. Subsequent exchange is also possible.



Motor overcurrent circuit breakers matching					
DC voltage	Range	Alignment	AC voltage	Range	Alignment
24 V	6,3-10 A	9,2 A			
60 V	2,5-4 A	5,6 A	110 V	2,5-4 A	2,6 A
110 V	1,6-2,5 A	2,1 A	230 V	1,6-2,5 A	2 A
220 V	0,63-1 A	0,8 A			

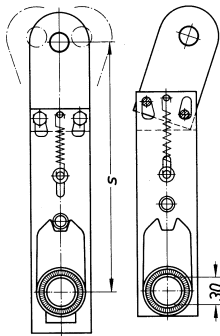
## Current consumption and travel time as a function of the torque – SL drives





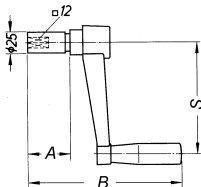
Motor overcurrent circuit breakers matching – SL drives					
DC voltage	Range	Alignment	AC voltage	Range	Alignment
24 V	10-16 A	12,4 A			
60 V	4-6,3 A	5,1 A	110 V	2,5-4 A	3,4 A
110 V	2,5-4 A	2,6 A	230 V	2,5-4 A	2,6 A
220 V	1-1,6 A	1,2 A			

## Drives accessories



**Manual emergency pulling ring**  
with moving eye link

Part nr.	s	Weight in kg	Eye link
776 03001	250	2,2	ocel
776 03002	350	2,5	ocel
776 03003	250	2,2	laminát
776 03004	350	2,3	laminát



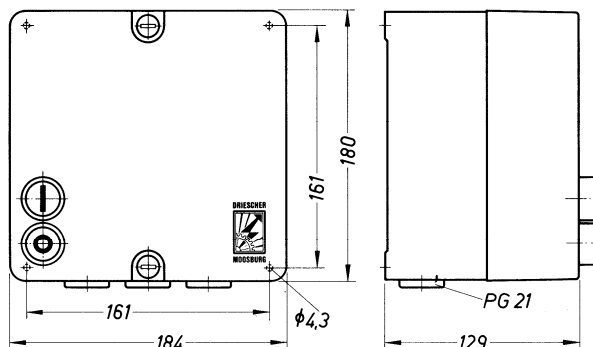
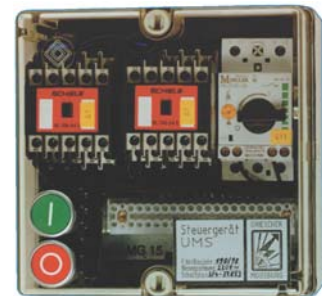
**Emergency crank handle**  
with friction clutch

Part nr. 776 01001  
Weight approx. 0,55kg

## Control unit UMS

for indoor use

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 in the circuit diagrams. An electrical counter can also be fitted at extra cost.



Voltage	Part nr.	Weight in kg
24V DC	776 0501	2,41
60V DC	776 0503	
110V DC	776 0504	
220V DC	776 0505	
100V AC	776 0507	
230V AC	776 0509	