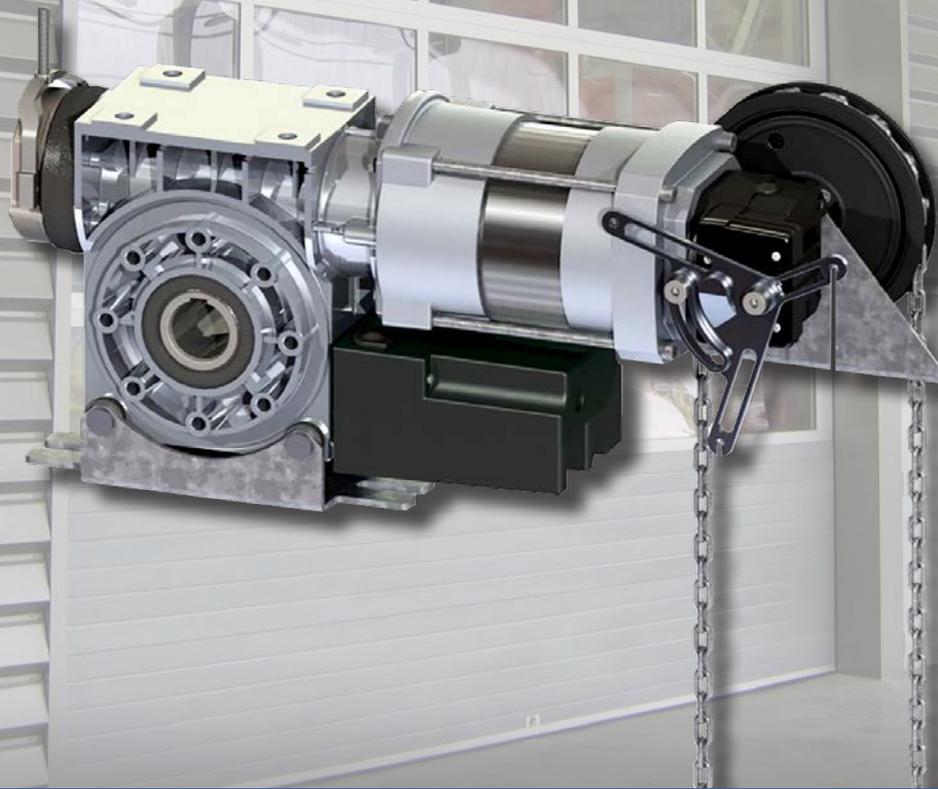


## Operators for Non-Balanced Doors



### SDA series

-  QUICK AND EASY INSTALLATION
-  FITTED FOR ALL TYPES OF NON-BALANCED ROLLING DOORS, GRILLES AND SECTIONAL DOORS
-  COMES WITH INTEGRATED MAINTENANCE-FREE ANTI-DROP SAFEGUARD.

## **Non-balanced door Operators**

- SDA operators are designed to operate non counterbalanced rolling doors, grilles and sectional doors
- SDA is slid on the barrel shaft and may serve directly as a bearing for the door shaft
- Can be installed horizontally or vertically and provide with four gearbox sizes (2,3,4,6)
- Mounted quickly and securely using the supplied pendular foot
- Output torque from 140 Nm to 1000 Nm
- Output speed from 18 -24 rpm with four gearbox sizes (2,3,4, 6) in 400 V, 3-phase, 230 V, 3-phase
- The maintenance-free safety catch device, which is independent of position and speed, is integrated in the gearbox

## **Special configurations**

On demand it is possible to adjust our operators to meet higher requirements (i.e. UL/CSA- or IEC- Certification, higher duty ratio) with the mounting of special motors. We also offer increased protection for the operators for harsh and corrosive environment (i.e. outdoor, coastal, cold storage)

## **Limit switch**

The door position is monitored by a separate directly integrated camshaft, with an internal limit ratio of 10:1, 15:1, 20:1 or 40:1. All drives can be supplied with two different limit switch systems:

- Cam Switch
- Digital Encoder (single-turn, multi-turn)

## **Emergency Operation**

In order to maneuver the door even in case of a power failure, all operators come with an emergency hand system.

If the operator is equipped with a DC-brake, ensure that the release lever is not pushed manually during the manual operation.

Choose between the following manual overrides:

- Haul Chain Mechanism (KE )
- Haul Chain Mechanism (KM) for Heavy duty doors
- Short Hand Crank (KU)

## **Plug-in connections**

All connections are pluggable and reverse polarity protected. Using push-in fittings, we guarantee a quick and easy mounting



## Brake

---

All Tornado gearboxes can be equipped with a spring-applied brake (holding brake) or an electromagnetic brake (working current brake). The brake can be fitted on the gearbox or motor side, depending on requirements.

- Spring-applied brake:
  - Braking torque from 2Nm to 40Nm
  - Brake voltage 24V/DC or 205V/DC
  - Designed for 100% duty cycle
  - Protection class IP54 or IP65
  - With or without manual release
  - Brake rectifier (on request)
  - Preset air gap (on request)
  - UL/CSA version (on request)
  - Noise-damped versions (on request)
  
- Electromagnetic brake:
  - Braking torque 7.5Nm or 15Nm
  - Brake voltage 24V/DC or 205V/DC
  - Designed for 100% duty cycle
  - Protection class IP44
  - Brake rectifier (on request).



## Control Panel

---

To increase lifetime and safety of the operators, we recommend the use of a frequency converter control panel. Thus the load on the gear components is reduced. Further it enables better speed control and regulation of the operator for starting and stopping

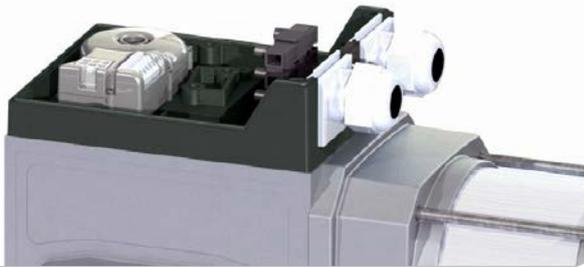
**Gearbox size 2**



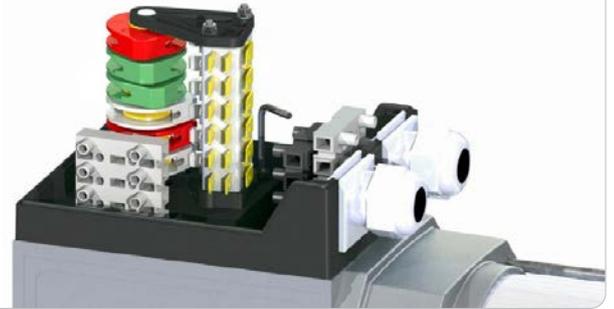
**Gearbox size 4**



**Digital Encoder**



**Cam Switch**



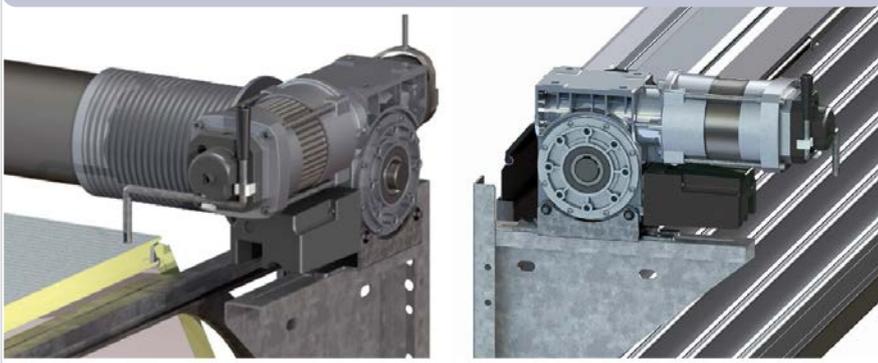
**Short Hand Crank (KU)**



**Robust Chain (KE)**



**Bracket Type WK**

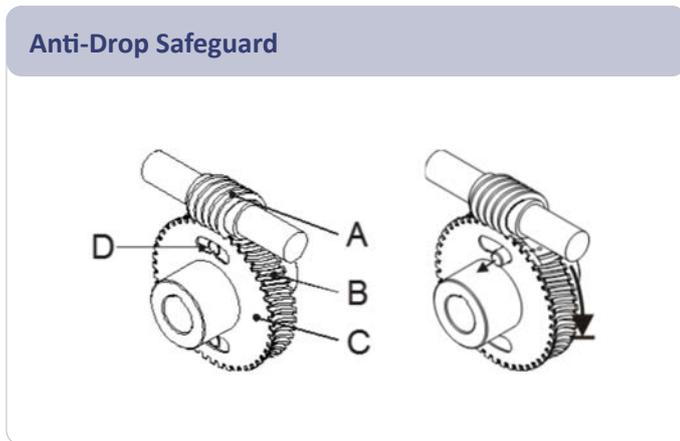




## Anti-Drop Safeguard

In accordance with the EN 12604 all SDA operators are equipped with an integrated locking device, which works independent of position and speed.

In case of exceeding wear, the teeth of the brass worm wheel (B) may collapse and allow the wheel to turn underneath the steel worm shaft (A). The pilot wheel (C) remains unaffected. Due to the relative rotation of the two wheels a set of hardened lock-bolts (D) are released and will immediately and permanently block the gearbox.



The values in this table may not be exceeded even in frequency controlled operation	max. Operating Speed	max. Torque
TOR-FV 5/083 (Size 2)	100 min <sup>-1</sup>	200 Nm
	200 min <sup>-1</sup>	100 Nm
TOR-FV 18/186 (Size 3)	150 min <sup>-1</sup>	300 Nm
TOR-FV 7/119 (Size 4)	95 min <sup>-1</sup>	750 Nm
	210 min <sup>-1</sup>	300 Nm
TOR-FV 6/111 (Size 6)	30 min <sup>-1</sup>	1 554 Nm
	120 min <sup>-1</sup>	1 118 Nm

The permissible loads of walls, brackets and fasteners must not be exceeded even at maximum interception moment.



## Selecting the right operator for unbalanced sectional doors

To select the right operator following parameters are necessary: the diameter of the cable drum and the weight of the door leaf. Using this data the appropriate operator could be determined from the following tables:

### Table Lifting Force

Operator Type		Cable drum Diameter [mm]	
		160	200
SDA-140.18	[kg]	124	99
SDA-160.20	[kg]	142	114
SDA-300.24	[kg]	267	214
SDA-350.23	[kg]	312	249
SDA-550.23	[kg]	490	392
SDA-750.22	[kg]	668	535
SDA-1000.22	[kg]	891	713

### Table Curtain Speed (v)

		Cable drum Diameter [mm]	
		160	200
v @ n2=18min-1	[cm/s]	15.1	18.8
v @ n2=20min-1	[cm/s]	16.8	20.9
v @ n2=22min-1	[cm/s]	18.4	23
v @ n2=23min-1	[cm/s]	19.3	24.1
v @ n2=24min-1	[cm/s]	20.1	25.1

The values in the table take into account 20% safety reserve. With stacking doors or unfavourable winding conditions (e.g. door height greater than width of the door, unfavourable inlet, extra gaskets, double-profiles) are indicated to reduce the lifting forces by about another 20%.



## Selecting the right operator for rolling shutters

To select the right operator following parameters are necessary: the diameter of the winding shaft, the weight and the thickness of the door leaf. The median coil-diameter is required because the coil-diameter increases due to the rolling-up of the gate and hence the speed is not constant. The values from the table are therefore only for guidance.

Using this data the appropriate operator could be determined from the following tables:

### Table Curtain Speed (v)

	Tube-Diameter / Median Coil-Diameter <sup>1)</sup> [mm]								
	130	160	190	220	250	270	300	350	400
v @ n <sub>2</sub> =18 min <sup>-1</sup> [cm/s]	12	15	18	21	24	25	28	33	38
v @ n <sub>2</sub> =20 min <sup>-1</sup> [cm/s]	14	17	20	23	26	28	31	37	42
v @ n <sub>2</sub> =22 min <sup>-1</sup> [cm/s]	15	18	22	25	29	31	35	40	46
v @ n <sub>2</sub> =23 min <sup>-1</sup> [cm/s]	16	19	23	26	30	33	36	42	48
v @ n <sub>2</sub> =24 min <sup>-1</sup> [cm/s]	16	20	24	28	32	34	38	44	50

1) The median coil-diameter results from the initial roll diameter + slat thick-ness and the diameter of the fully rolled-up door (to be taken from the coil- diameter table of the profile supplier), e.g. roll diameter Ø 160 mm, slat thick- ness 20 mm, coil-diameter upper end position Ø 400 mm -> median coil- diameter (160 + 20 + 400) : 2 = 290 mm

### Table Lifting Force

	Tube-Diameter / Median Coil-Diameter <sup>1)</sup> [mm]								
	130	160	190	220	250	270	300	350	400
SDA-140 [kg]	175	142	120	130	91	84	76	65	57
SDA-160 [kg]	200	163	137	118	104	96	86	74	65
SDA-300 [kg]	376	305	257	222	195	181	163	139	122
SDA-350 [kg]	439	356	300	259	228	211	190	163	142
SDA-550 [kg]	690	560	472	407	358	332	299	256	224
SDA-750 [kg]	940	764	643	556	589	453	407	349	305
SDA-1000 [kg]	1254	1019	858	741	652	604	543	465	407

The values in the table take into account 20% safety reserve. With stacking doors or unfavourable winding conditions (e.g. door height greater than width of the door, unfavourable inlet, extra gaskets, double- profiles) are indicated to reduce the lifting forces by about another 20%. A assumed door slat thickness of 20 mm was already considered.



## Technical data

	Gearbox Size	Starting Torque	Nominal Torque	Output Speed	Approval N° TOR-FV	Limit capacity <sup>2)</sup>	Hollowshaft Diameter <sup>3)</sup>	Operating Voltage (50 Hz)	Motor Output	Motor Duty Cycle <sup>4)</sup>	Nominal Current 230 / 400 V	See Drawing / Length L <sub>1</sub>	Type of manual operation	Protection Category	Weight
Operator Type		M <sub>A</sub> [Nm]	M <sub>N</sub> [Nm]	n <sub>2</sub> [min <sup>-1</sup> ]	TOR-FV	i <sub>stw</sub>	D [mm]	U [V]	P [kW]		I <sub>N</sub> [A]	L <sub>1</sub> [mm]		IP	m [kg]
<b>SDA-140.18</b>	2	140	115	18	5/083	15	30	3~230 3~400	0,55	MD	3,45 2,0	264	KU KE	54	14
<b>SDA-160.20</b>	2	160	130	20	5/083	15	30	3~230 3~400	0.8	MD	4,1 2,4	264	KU KE	54	15
<b>SDA-300.23</b> <sup>1)</sup>	3	300	230	24	18/186	20	30	3~230 3~400	1.5	MD	6,9 4,0	320	KU KE	54	23
<b>SDA-350.23</b> <sup>1)</sup>	4	350	310	23	7/119	40	40	3~230 3~400	1.5	MD	6,6 3,8	391	KU KE	54	35
<b>SDA-550.23</b> <sup>1)</sup>	4	550	500	23	7/119	40	40	3~230 3~400	2.2	MD	9,2 5,3	396	KU KM	54	37
<b>SDA-750.22</b> <sup>1)</sup>	6	750	620	22	6/111	40	55	3~230 3~400	2.2	MD	9,2 5,3	437	KU KM	54	63
<b>SDA-1000.22</b> <sup>1)</sup>	6	1000	866	22	6/111	40	55	3~230 3~400	3.0	MD	9,2 5,3	437	KU KM	54	65

1) Operator is equipped with DC-brake, neutral connection is required.

2) Limit ratio can be changed on request

3) Hollow shaft diameter can be changed on request

4) Duty Ratio HD available on request.

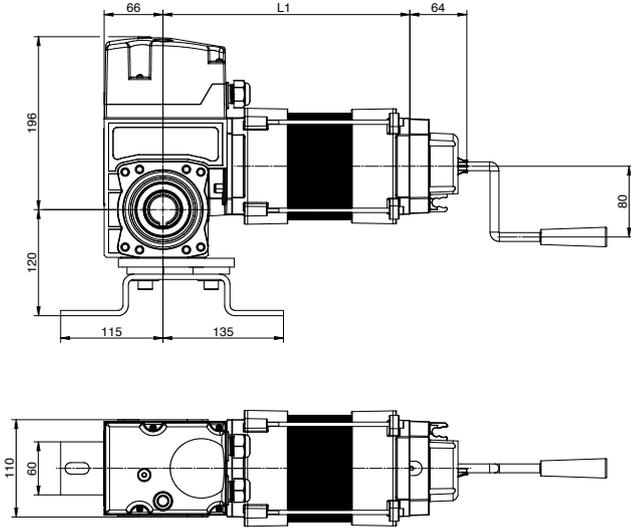
\*) Temperature range: -5°C ... 40°C



## Dimensions

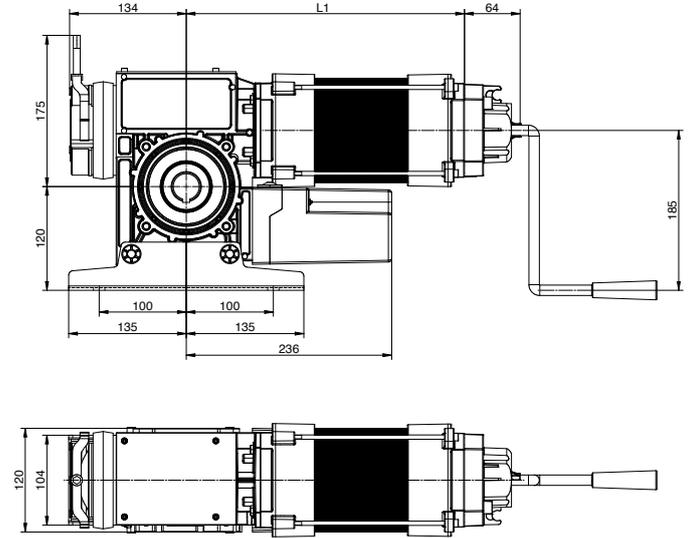
The following illustrations show all relevant dimensions of our operator series. Refer to the table of technical data for the assignment of the sketches and for dimension L1.

### Gearbox Size 2



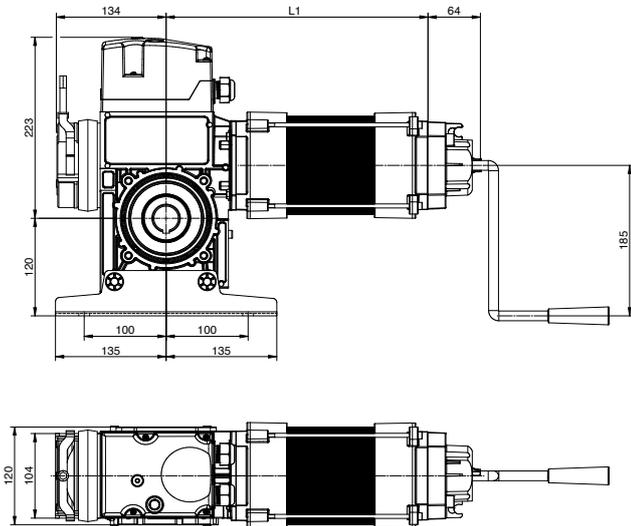
### Gearbox Size 3

#### Bottom encoder case

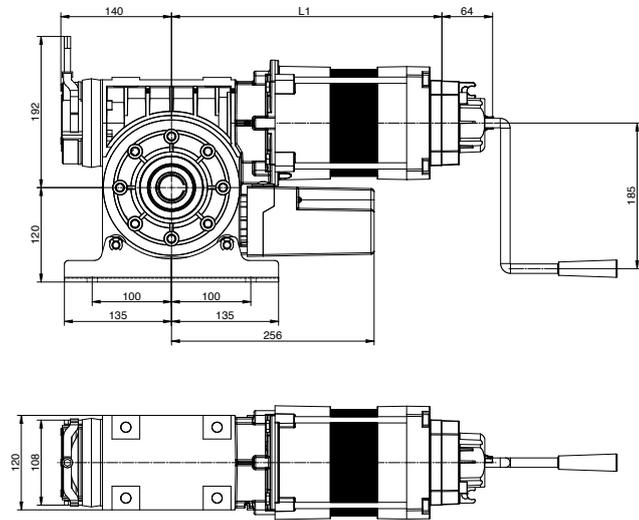


### Gearbox Size 3

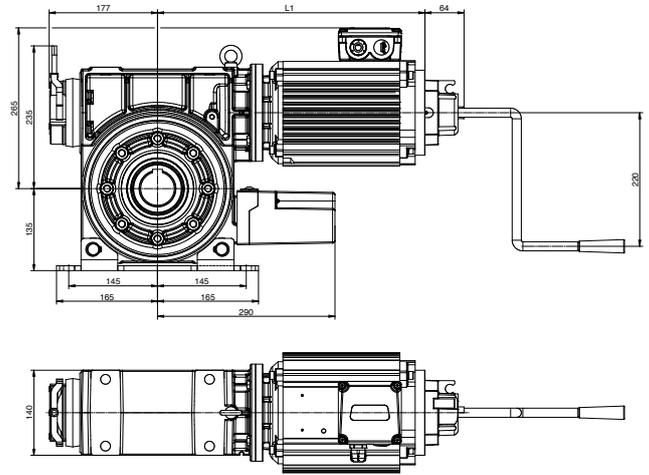
#### Top encoder case



### Gearbox Size 4



### Gearbox Size 6



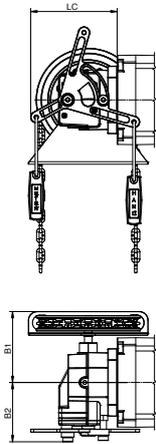


## Dimensions of Manual Override

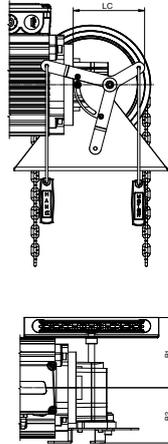
Gearbox Size	Crank Length	Crank-Radius	Length Chain drive	Width Chain-Side	Width Clutch-Side
	$L_k$ [mm]	$R_k$ [mm]	$L_c$ [mm]	$B_1$ [mm]	$B_2$ [mm]
2	230	80	137	114	95
3	230	185	137	114	95
4	230	185	137	114	95
6	340	220	122	138	108

### Manual Override

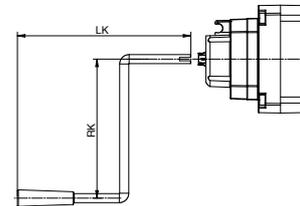
#### Manual operation KE



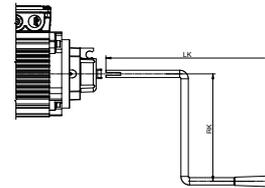
#### Manual operation KM



#### Manual operation KU Size 4



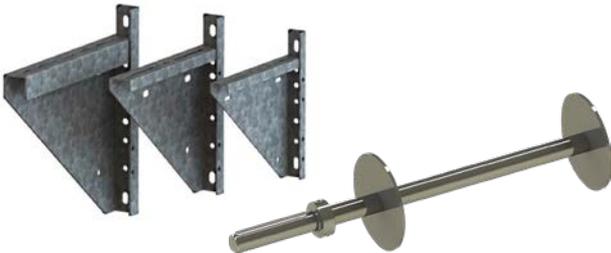
#### Size 6



## Accessories

Complete your non-balanced door operator with our wide range of accessories and control panels to a customized automation package. Find more information in our special catalogs

### Mechanical Accessories



### Electronic Accessories



### Control Panels (Relay)



### Control Panels (VFD)





## **TORNADO PRODUCTS**

- Rolling Door Operators
- Sectional Door Operators
- High-Speed Door Operators
- Chain Wheel Operators
- Sliding Gate Operators
- Control Panels
- Safety Systems
- Accessories

Tornado Antriebstechnik GmbH | Subject to Modifications  
[www.tornado-drives.com](http://www.tornado-drives.com)