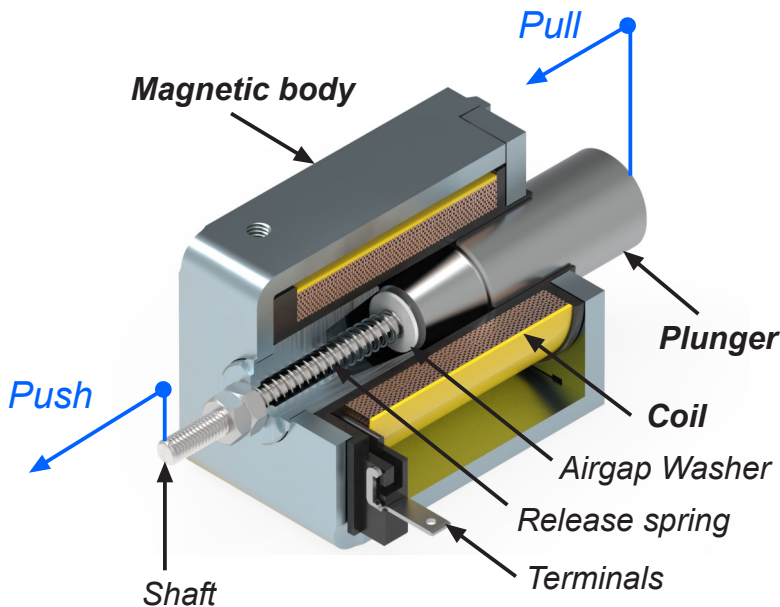


### • ER SERIES

ER serie electromagnets are simple effect linear solenoids where the stroke movement from initial to final position is made by electromagnetic forces, the return to initial position is made by external force or by a spring incorporated to the solenoid.



#### Structure, main basic elements:

##### **Magnetic body:**

It is the metal **carcase** containing the **coil**, the core and the fixing holes of the solenoid.

##### **Coil:**

It receives the electric energy to create the magnetic field.

##### **Plunger:**

It is the piece that moves inside the **coil**, and it has a non-magnetic **shaft** fixed to it.

To work pulling, the element to activate must be fixed to the **plunger**. To work pushing, the element to activate must be fixed to the **shaft**.

#### • Datasheet rated values conditions (According to DIN VDE 0580):

The values of the magnetic force ( $F_m$ ) depending on the stroke, are obtained in the following conditions:

Room temperature = 35°C

Coil stabilized at its working temperature.

Rated voltage equal to 90% of the standard one.

Solenoid working in horizontal position.

Effective force ( $F_h$ ) is obtained from magnetic force ( $F_m$ ).

##### -When the solenoid pulls upwards:

$Effective\ force = Magnetic\ force - Plunger\ weight$

##### -When the solenoid pulls downwards:

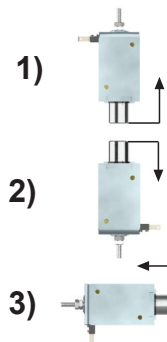
$Effective\ force = Magnetic\ force + Plunger\ weight$

##### -When the solenoid pulls in horizontal position:

$Effective\ force = Magnetic\ force$

##### -For the units with incorporated return spring:

$Effective\ force = Magnetic\ force - Spring\ force \pm Plunger\ weight$



• **Important:**  
The fixation screws do not have to exceed the wall of the magnetic body not to damage the coil



#### • Terminals placement with fixing holes as reference:



The mounting of the specification sheets is the standard one, under demand they can be mounted in the different positions shown above. It must be specified in the order. Under demand, terminals can be replaced by flying leads.

## • ER series: Force-stroke Chart

Type	Stroke (mm)		Duty-cycle					Return Spring force (N)
			100%	40%	25%	15%	5%	
ER15/C	Beginning of stroke $s_1=5$	Magnetic force "F <sub>m</sub> " (N)	0.3	0.5	0.8	1	2.5	-
	End of stroke $s_0=0$		4.9	7.9	9.8	12.2	16.5	-
ER20/C	Beginning of stroke $s_1=5$		0.8	2.1	2.8	4.1	6.8	0.25
	End of stroke $s_0=0$		2.6	4.9	6.2	7.7	11.2	0.44
ER21/C	Beginning of stroke $s_1=10$		1.3	2.3	3.1	4.1	6.2	0.2
	End of stroke $s_0=0$		1.8	2.9	3.8	5	7.4	0.4
ER25/C	Beginning of stroke $s_1=5$		2.5	5.4	7.5	10	17	0.29
	End of stroke $s_0=0$		7.1	17.3	21.3	24.4	31.9	0.65
ER30/C	Beginning of stroke $s_1=8$		2.9	5.6	7.8	11.4	19.7	0.59
	End of stroke $s_0=0$		7.7	12	13.8	21.5	35	1.57
ER30/CT	Beginning of stroke $s_1=8$		2.8	5.5	7.7	11.3	19.6	0.59
	End of stroke $s_0=0$		7.6	11.9	13.7	21.4	34.9	1.57
ER35/C	Beginning of stroke $s_1=12$		1.5	4,3	7.5	10.6	17.3	0.39
	End of strokes $s_0=0$		4.5	10.9	14.7	16.6	31	1.57
ER40/CT	Beginning of stroke $s_1=5$		2.9	6.5	13	16.5	43	-
	End of stroke $s_0=0$		26.1	41.5	68.4	74.5	121.8	-
ER45-05/C	Beginning of stroke $s_1=5$		0.1	6.3	10.6	14.4	35	3
	End of stroke $s_0=0$		59.9	113.3	160.6	192.5	234.5	3.62
ER45-15/C	Beginning of stroke $s_1=15$		3.3	7,3	10	15.5	27	1.76
	End of stroke $s_0=0$		9.3	20.8	31.9	45.3	71.3	3.62
ER48/T	Beginning of stroke $s_1=8$		9.1	19.5	26.7	32.5	45.1	-
	End of stroke $s_0=0$		36.2	42.8	48.4	50.4	65.4	-
ER50-15/C	Beginning of stroke $s_1=15$		6.7	13	16	23	37	1.76
	End of stroke $s_0=0$		22.5	41	52.7	67.9	99.3	3.62
ER50-15/CT	Beginning of stroke $s_1=15$		6.5	12.8	15.8	22.8	36.8	1.76
	End of stroke $s_0=0$		22.3	40.8	52.5	67.7	99.1	3.62
ER60-05/C	Beginning of stroke $s_1=5$		7	18	28	47	96	3.76
	End of stroke $s_0=0$		155	192	296	346	382	4.3
ER60-10/C	Beginning of stroke $s_1=10$		12	24	32	44	80	3.21
	End of stroke $s_0=0$		55.6	95.5	121.7	152.5	200.8	4.3
ER60-10/CT	Beginning of stroke $s_1=10$		11.6	23.6	31.6	43.6	79.6	3.21
	End of stroke $s_0=0$		55.1	95.1	121.3	152.1	200.4	4.3
ER60-20/C	Beginning of stroke $s_1=20$		9.2	16.7	21.5	28.5	50	2.12
	End of stroke $s_0=0$		27.2	60.5	87.7	103.6	150.2	4.3

The values of force-stroke and the return spring are in Newton (N), solenoid in horizontal position and without return spring.

## • CUSTOMIZATION ER SERIES

The models described in the catalogue are standard and minimum manufacturing batches are not required. However, there is the possibility of customizing them to suit better customer's needs. See below some of the most common customizations.

If any modification is needed, please ask NAFSA about the possibility and the minimum manufacturing batch required.

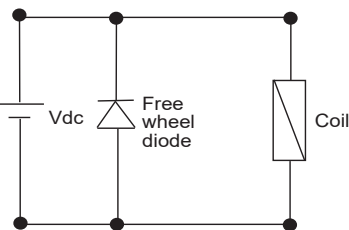
### 1. ELECTRICAL CUSTOMIZATION:

#### a) Integrated electronics over the coil:

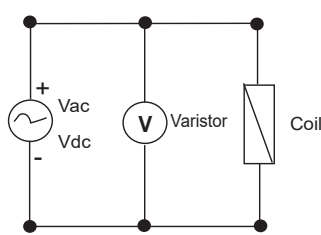
##### a.1) For peak suppression

Examples:

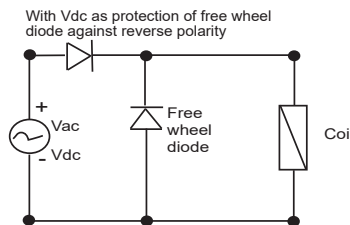
\*Free wheel diode



\*Varistor



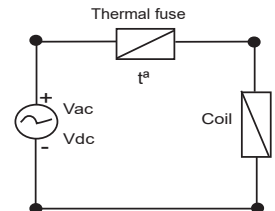
\*Free wheel diode+second diode to protect the free wheel diode against reverse polarity



##### a.2) Thermal protection

Examples:

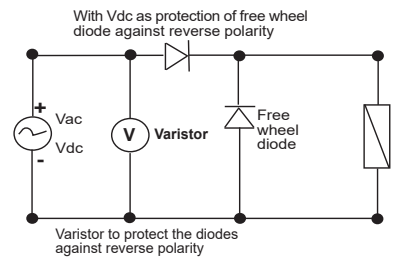
\*The thermic resettable polyswitches are used in coils with low duty cycles against overheating, caused by long time under voltage and not respected the duty cycle times. It can be used also as timer.



##### a.3) For rectification

Examples:

\*Half wave rectification, with free wheel diode and varistor input protection.



#### a.4) PWM electronics integration:

It consists on feeding the electromagnet through an electronic PWM (Pulse width modulation). This device will initially provide the solenoid with its nominal voltage and after a while, which will be higher than the one needed to complete it's stroke, the voltage entering to the solenoid will be reduced by the PWD to the selected ratio. For instance, the most common reduction ratio values are 1:2 or 1:3. Once the voltage is reduced it will be maintained in it's value until the supply to the solenoid is off, once off, the system resets and when the solenoid works again, the cycle is repeated.

The idea is to make the solenoid to be 100% duty-cycle, but with a big force when the stroke has to be done, the force of a reduced duty cycle, as per example 25%, so it can be feeded long as required but without the risk of burning.

The solution is used when the initial stroke force in a 100% duty-cycle solenoid isn't enough or in those cases where a lower heating of the solenoid is required. For example, a 12Vdc and ED100% solenoid can be feeded at 24VDC throught an PWM electronic and if it has 1:2 ratio, the solenoid will first see the 24VDC so it will complete the stroke with 4 times more power, so with the force of a 25% duty cycle, then when the voltage is reduced to 12VDC the duty cycle will be 100%.

#### b) Cable length modification and terminal or connector mounted over cables:

In all ER models terminals can be replaced by supply cables. The standard length of cables is 250mm, this dimension can be modified to customer requirement.

Likewise, many different kind of terminals or connectors may be added to the cables.

#### c) Intermediate duty-cycle manufacturing:

NAFSA can manufacture any intermediate duty-cycle from 0 to 100, but the viability depends on the model and the voltage associated with it. For any special requeriment, please ask NAFSA .

### 2. INSULATION CLASS CUSTOMIZATION:

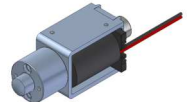
In the ER serie maximum insulation class can be obtained is F (155°C),

### 3. PROTECTION RATE IP (EN60529) CUSTOMIZATION:

Standard models are IP00, but IP40 can be obtained to the mechanical part and IP65 to the electrical part by coil overmolding process.

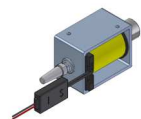
#### \*PWD over coil

Example 1:  
ER30CCREC

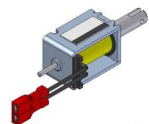


#### \*PWD over the cables

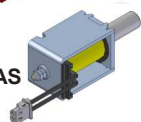
Example 2:



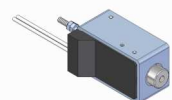
Example 3:  
ER20CCF



Example 4:  
ER20-07.01.CCSAS



Example 5:



NOTE: All this customizations cannot be applied to all models, ask NAFSA for each case.

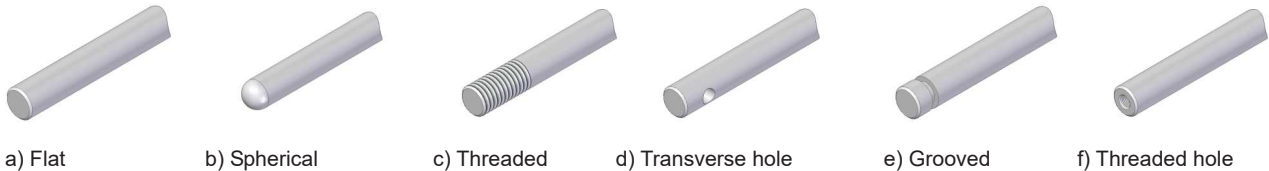
## • CUSTOMIZATION ER SERIES

The models described in the catalogue are standard and minimum manufacturing batches are not required. However, there is the possibility of customizing them to suit better customer's needs. See below some of the most common customizations.

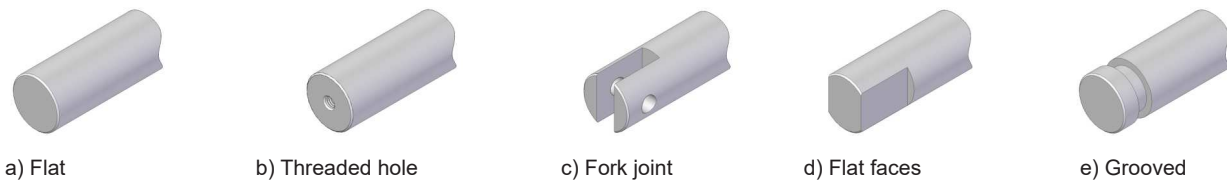
If any modification is needed, please ask NAFSA about the possibility and the minimum manufacturing batch required.

### 4. MECHANICAL CUSTOMIZATION:

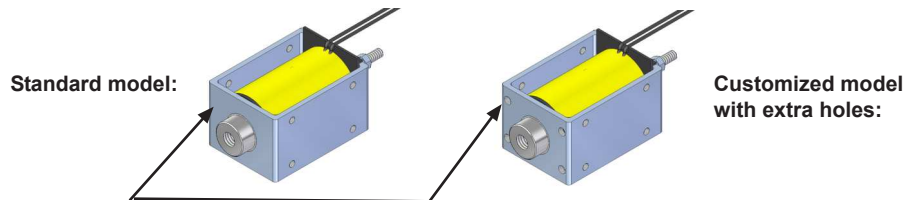
**4.1) Shaft modifications:** Length and shape can be modified. If it has not any function, it can be removed depending on the model, this would mean use exterior springs instead of internal ones.



**4.2) Plunger modifications:** Length and shape can be modified



**4.3) Fixing holes modification:**



**4.4) Return spring force modification:**

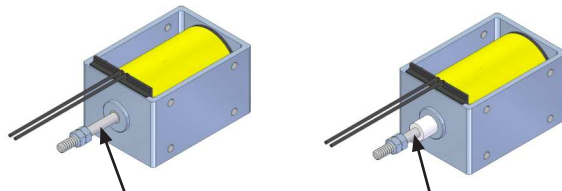
ER series electromagnets are linear simple effect solenoids, where the stroke movement from initial to the final position is made by electromagnetic forces, and the return to initial position takes place because of external forces or an incorporated spring (depending on the type). The force of the spring is limited to returning the plunger to the initial position. If more force is required, spring can be modified but we will have to take in mind the duty-cycle. Each duty-cycle has a limitation to increase the spring force, as this force will be deducted to the solenoid push/pull force.

In the cases that spring is not required, solenoid can be ordered without spring or it can be removed manually.

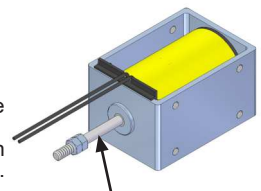
**4.5) Stroke modifications:**

The standard stroke is limited by the usefull length of shaft, in some cases the stroke can be modified: decreasing or increasing it in case that solenoid has enough ativation force. These modifications can be made by customer or NAFSA.

Example:  
**Stroke decrease:**  
Inserting a plastic bearing, this can be made by NAFSA or the customer

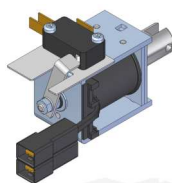


Example:  
**Stroke increase:**  
Shaft has been enlarged to increase the stroke, This modification only can be made by NAFSA.



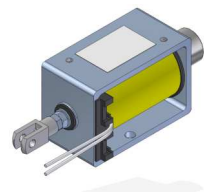
**4.6) Position detection system integration:**

Example:  
ER45-10/BT1



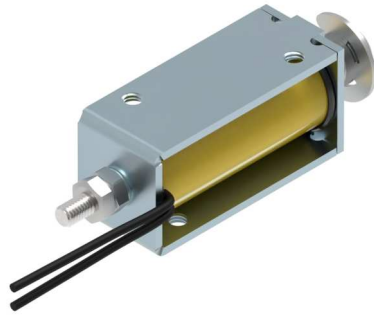
**4.7) Fastening element added as Fork joints DIN71752:**

Example:  
ER45-10/E



NOTE: All this customizations cannot be applied to all models, ask NAFSA for each case.

### ER 15/C TYPE



Protection rate: **IP00**  
 Insulation class: **B (130°C)**  
 Reference cycle: **2 minutes**  
 Standard stroke (s): **5 mm**  
 Temperature rise " $\Delta V_{31}$ ": **70°C**  
 Working temperature: **-10 to 45°C**  
 Work: **Push / Pull**

**Release spring NOT**  
 incorporated on standard  
 product

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	3	7.5	12	20	60
(Fm) Solenoid force (N) 1)	0.3	0.5	0.8	1	2.5
Max time under voltage(s)	Inf	48	30	18	6
Opening time (ms) 2)	30	28	26	26	25
Release time (ms) 3)	31	26	25	25	25
Plunger weight (Kg)	0.011				
Solenoid weight (Kg)	0.039				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in it's working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position; 20°C ambient temperature.

3) Time is given on these conditions: without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle ED%	Standard voltages										Under demand			
	VDC								VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230		Min	Max	Min	Max
100	o	o	o	o	x	x	x	x	x		3	55	x	x
40	o	o	o	o	x	x	x	x	x		3	85	x	x
25	o	o	o	o	o	x	x	x	x		3	105	x	x
15	o	o	o	o	o	o	x	x	x		6	135	x	x
5	o	o	o	o	o	o	o	x	x		6	230	x	x

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
 They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

**Ordering code:** ER15/C --V ED---% - Mounting position

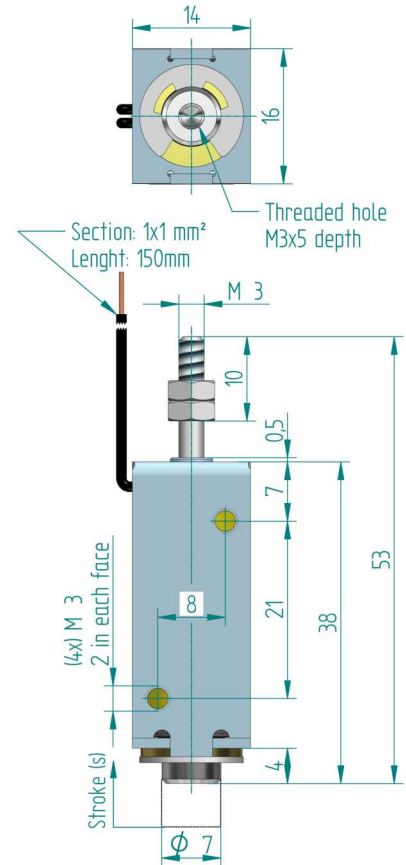


**A** Voltage: 24Vdc; Duty cycle: ED100%; Mounting position A:  
 ER15/C 24Vdc ED100% A

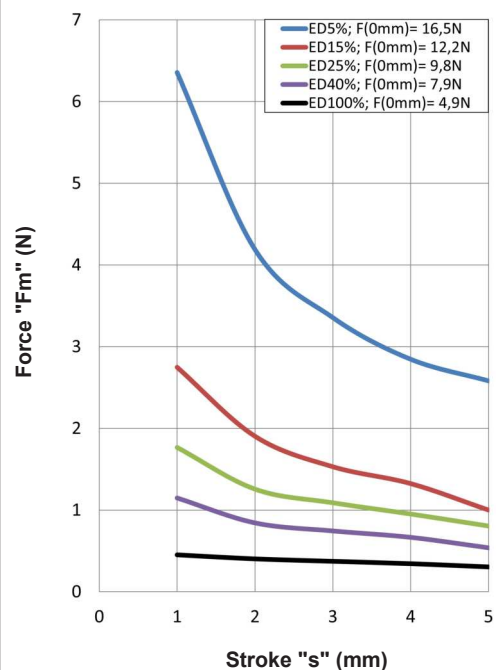


**B** Voltage: 48Vdc; Duty cycle: ED15%; Mounting position B:  
 ER15/C 48Vdc ED15% B

**Solenoid under voltage (s=0mm position)**



**Force-stroke curve**



Calculation of the effective force:  
 see pages 1 and 10.

For fixation and mounting positions: see page 10



### • ER 20/C TYPE



Cables version:  
● ER20/CC



s = 1x0.22mm<sup>2</sup>  
L = 250mm

Protection rate: **IP00**  
Insulation class: **B (130°C)**  
Reference cycle: **2 minutes**  
Standard stroke (s): **5 mm**  
Temperature rise "ΔV<sub>31</sub>": **70°C**  
Working temperature: **-10 to 45°C**  
Work: **Push / Pull**

**Release spring** will be incorporated by defect

Standard spring force:  
Fs(s=0mm) = 0.44N  
Fs(s=5mm) = 0.25N

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	5.5	11	16	24	60
(Fm) Solenoid force (N) 1)	0.8	2.1	2.8	4.1	6.8
Max time under voltage(s)	Inf	48	30	18	6
Opening time (ms) 2)	36	30	27	27	25
Release time (ms) 3)	25	22	21	21	19
Plunger weight (Kg)	0.012				
Solenoid weight (Kg)	0.045				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in it's working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position ; 20°C ambient temperature.

3) Time is given on these conditions: Standard spring ; without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle ED%	Standard voltages										Under demand			
	VDC								VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230		Min	Max	Min	Max
100	o	o	o	o	x	x	x	x	x		3	85	x	x
40	o	o	o	o	o	o	x	x	x		3	125	x	x
25	o	o	o	o	o	o	x	x	x		3	150	x	x
15	o	o	o	o	o	o	x	x	x		4	180	x	x
5	o	o	o	o	o	o	o	x	x		6	230	x	x

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

**Ordering code:** ER20/C --V ED---% - Mounting position - Spring



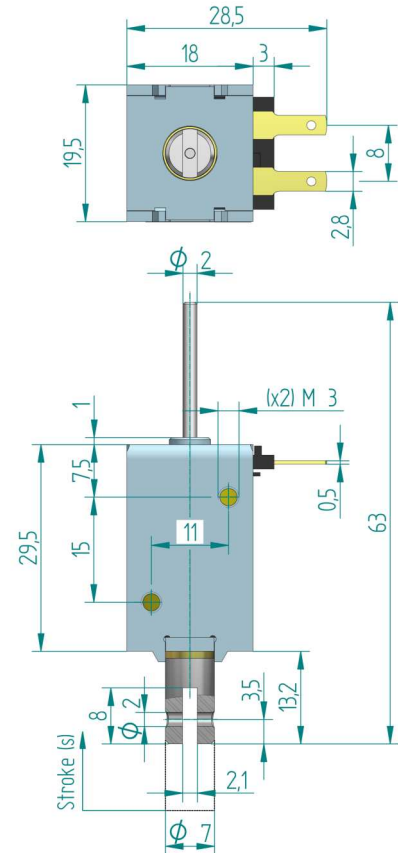
**A** Voltage: 24Vdc; Duty cycle: ED100%; Position A; With spring:  
ER20/C 24Vdc ED100% A RS



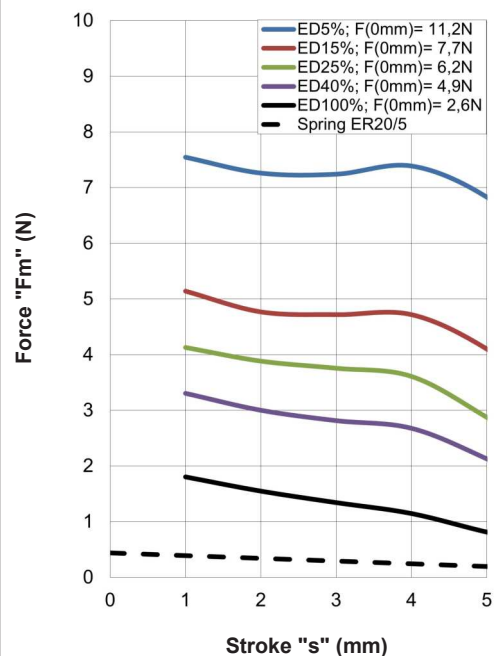
**B** Voltage: 12Vdc; Duty cycle: ED15%; Position B; Without spring:  
ER20/C 12Vdc ED15% B RN

Spring yes: **RS** ; Spring no: **RN**

**Solenoid under voltage (s=0mm position)**



### Force-stroke curve



Calculation of the effective force:  
see pages 1 and 10

For fixation and mounting positions: see page 10

### ER 21/C TYPE



Cables version:  
● ER21/CC



s = 1x0.22mm<sup>2</sup>  
L = 250mm

Protection rate: **IP00**  
Insulation class: **B (130°C)**  
Reference cycle: **2 minutes**  
Standard stroke (s): **10 mm**  
Temperature rise "ΔV<sub>31</sub>": **70°C**  
Working temperature: **-10 to 45°C**  
Work: **Push / Pull**

Release spring will be incorporated by defect

Standard spring force:  
Fs(s=0mm) = 0.4N  
Fs(s=10mm) = 0.2N

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	6	14	24	35	100
(Fm) Solenoid force (N) 1)	1.3	2.3	3.1	4.1	6.2
Max time under voltage(s)	Inf	48	30	18	6
Opening time (ms) 2)	47	39	39	36	36
Release time (ms) 3)	35	31	31	29	29
Plunger weight (Kg)	0.012				
Solenoid weight (Kg)	0.062				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in its working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position ; 20°C ambient temperature.

3) Time is given on these conditions: Standard spring ; without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle ED%	Standard voltages										Under demand			
	VDC								VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230		Min	Max	Min	Max
100	o	o	o	o	o	x	x	x	x		3	110	x	x
40	o	o	o	o	o	o	x	x	x		4	165	x	x
25	o	o	o	o	o	o	o	x	x		5	220	x	x
15	o	o	o	o	o	o	o	x	x		6	230	x	x
5	x	o	o	o	o	o	o	x	x		9	230	x	x

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

Ordering code: ER21/C --V ED---% - Mounting position - Spring



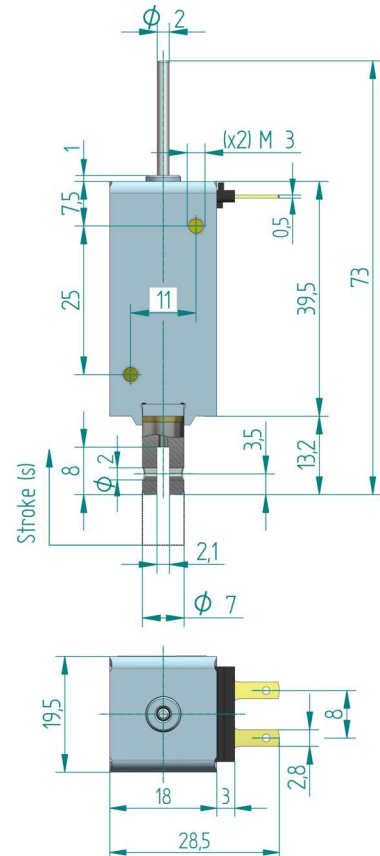
Voltage: 24Vdc; Duty cycle: ED100%; Position A; With spring:  
ER21/C 24Vdc ED100% A RS



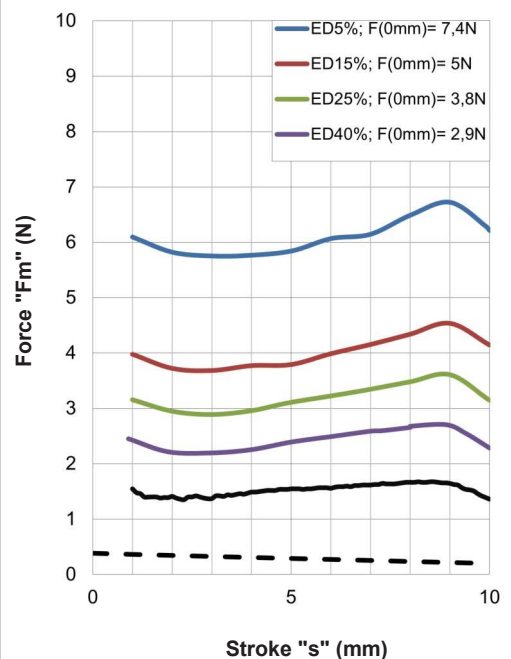
Voltage: 12Vdc; Duty cycle: ED15%; Position B; Without spring:  
ER21/C 12Vdc ED15% B RN

Spring yes: RS ; Spring no: RN

Solenoid under voltage (s=0mm position)



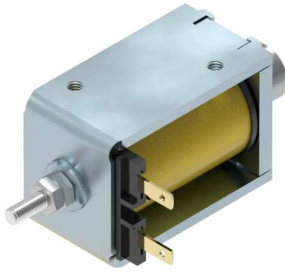
#### Force-stroke curve



Calculation of the effective force:  
see pages 1 and 10

For fixation and mounting positions: see page 10

### • ER 25/C TYPE



Cables version:  
• ER25/CC



s = 1x0.22mm<sup>2</sup>  
L = 250mm

Protection rate: **IP00**  
Insulation class: **B (130°C)**  
Reference cycle: **3 minutes**  
Standard stroke (s): **5 mm**  
Temperature rise "ΔV<sub>31</sub>": **70°C**  
Working temperature: **-10 to 45°C**  
Work: **Push / Pull**

**Release spring** will be incorporated by defect

Standard spring force:  
Fs(s=0mm) = 0.65N  
Fs(s=5mm) = 0.29N

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	7.5	17	25	38	95
(Fm) Solenoid force (N) 1)	2.5	5.4	7.5	10	17
Max time under voltage(s)	Inf	72	45	27	9
Opening time (ms) 2)	50	40	37	37	35
Release time (ms) 3)	34	28	26	26	25
Plunger weight (Kg)	0.015				
Solenoid weight (Kg)	0.085				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in its working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position ; 20°C ambient temperature.

3) Time is given on these conditions: Standard spring ; without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle  ED%	Standard voltages									Under demand			
	VDC							VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230	Min	Max	Min	Max
100	o	o	o	o	o	o	x	x	x	3	140	x	x
40	o	o	o	o	o	o	o	x	x	5	220	x	x
25	o	o	o	o	o	o	o	x	x	5	230	x	x
15	o	o	o	o	o	o	o	x	x	6	230	x	x
5	x	o	o	o	o	o	o	x	x	9	230	x	x

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

**Ordering code:** ER25/C --V ED---% - Mounting position - Spring



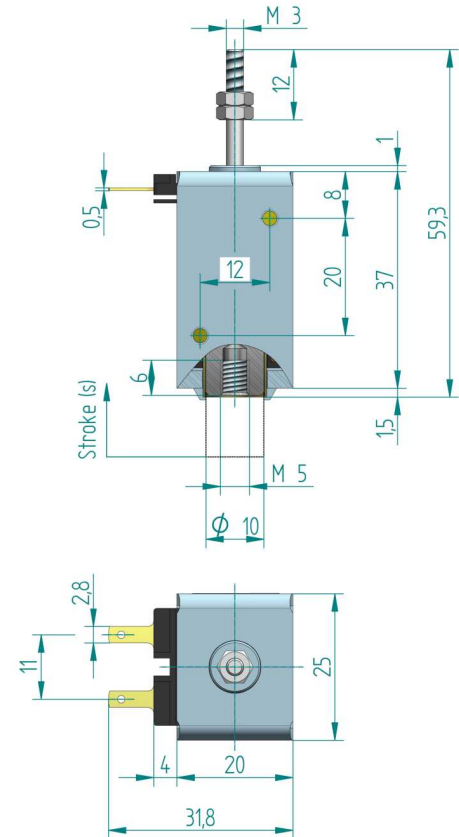
**A** Voltage: 24Vdc; Duty cycle: ED100%; Position A; With spring:  
ER25/C 24Vdc ED100% A RS



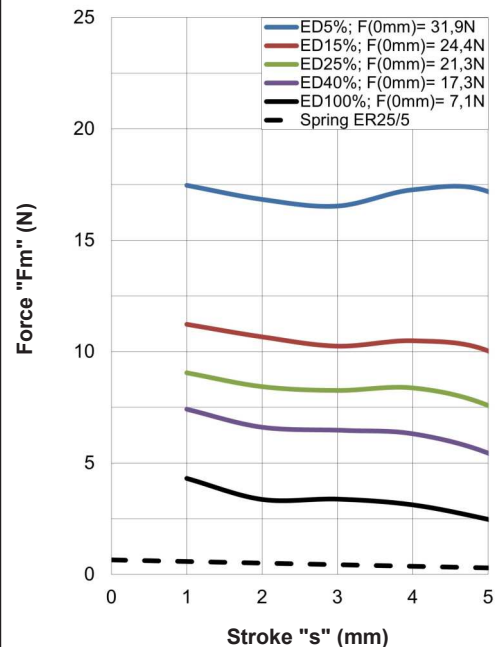
**B** Voltage: 48Vdc; Duty cycle: ED15%; Position B; Without spring:  
ER25/C 48Vdc ED15% B RN

Spring yes: **RS** ; Spring no: **RN**

Solenoid under voltage (s=0mm position)



Force-stroke curve



Calculation of the effective force:  
see pages 1 and 10

For fixation and mounting positions: see page 10



### ER 30/C TYPE



Cables version:  
● ER30/CC



s = 1x0.5mm<sup>2</sup>  
L = 250mm

Protection rate: **IP00**  
Insulation class: **B (130°C)**  
Reference cycle: **3 minutes**  
Standard stroke (s): **8 mm**  
Temperature rise "ΔV<sub>31</sub>": **70°C**  
Working temperature: **-10 to 45°C**  
Work: **Push / Pull**

Release spring will be incorporated by defect

Standard spring force:  
Fs(s=0mm) = 1.6N  
Fs(s=8mm) = 0.6N

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	8	20	30	50	120
(Fm) Solenoid force (N) 1)	2.9	5.6	7.8	11.4	19.7
Max time under voltage(s)	Inf	72	45	27	9
Opening time (ms) 2)	64	51	49	46	46
Release time (ms) 3)	41	33	32	30	30
Plunger weight (Kg)	0.025				
Solenoid weight (Kg)	0.140				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in it's working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position; 20°C ambient temperature.

3) Time is given on these conditions: Standard spring ; without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle ED%	Standard voltages										Under demand			
	VDC								VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230		Min	Max	Min	Max
100	o	o	o	o	o	o	x	o	o		3	230	24	230
40	o	o	o	o	o	o	o	o	o		5	230	50	230
25	o	o	o	o	o	o	o	o	o		6	230	75	230
15	o	o	o	o	o	o	o	x	o		6	230	125	230
5	x	o	o	o	o	o	o	x	x		9	230	x	x

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- To feed in alternating current the solenoid will have a rectifier incorporated in the coil.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

Ordering code: ER30/C --V ED---% - Mounting position - Spring



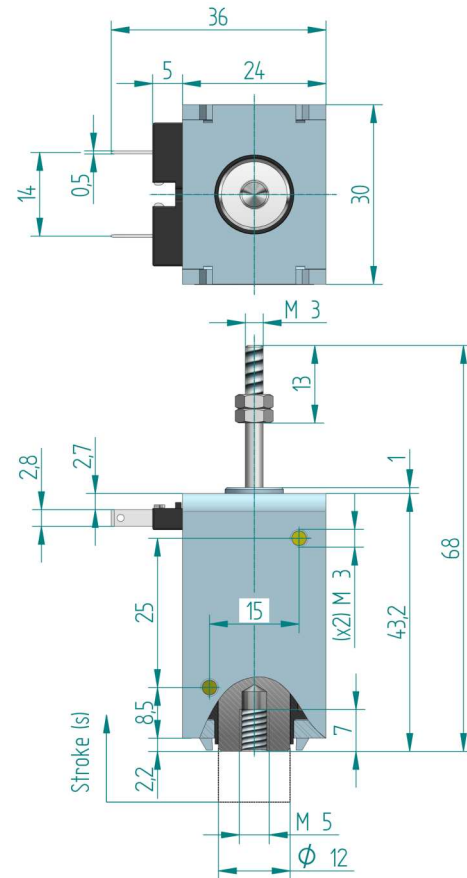
Voltage: 24Vdc; Duty cycle: ED100%; Position A; With spring:  
ER30/C 24Vdc ED100% A RS



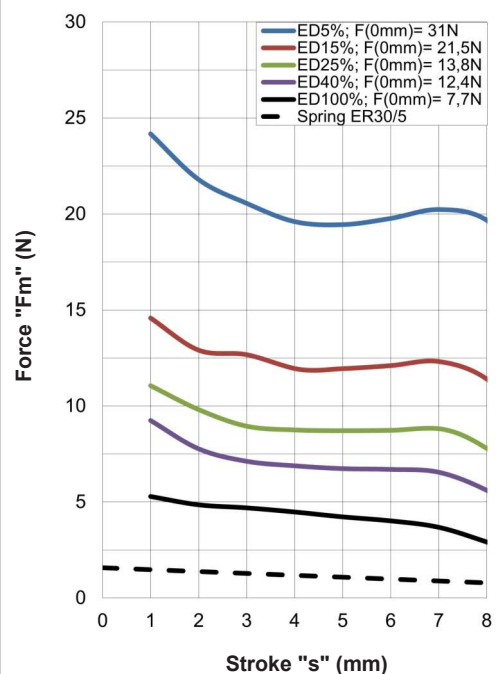
Voltage: 48Vdc; Duty cycle: ED15%; Position B; Without spring:  
ER30/C 48Vdc ED15% B RN

Spring yes: RS ; Spring no: RN

Solenoid under voltage (s=0mm position)



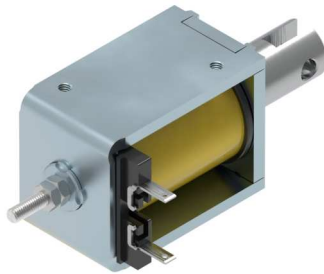
Force-stroke curve



Calculation of the effective force:  
see pages 1 and 10

For fixation and mounting positions: see page 10

### • ER 30/CT TYPE



Cables version:  
• ER30/CTC



s = 1x0.5mm<sup>2</sup>  
L = 250mm

Protection rate: **IP00**  
Insulation class: **B (130°C)**  
Reference cycle: **3 minutes**  
Standard stroke (s): **8 mm**  
Temperature rise "ΔV<sub>31</sub>": **70°C**  
Working temperature: **-10 to 45°C**  
Work: **Push / Pull**

**Release spring** will be incorporated by defect

Standard spring force:  
Fs(s=0mm) = 1.6N  
Fs(s=8mm) = 0.6N

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	8	20	30	50	120
(Fm) Solenoid force (N) 1)	2.8	5.5	7.7	11.3	19.6
Max time under voltage(s)	Inf	72	45	27	9
Opening time (ms) 2)	65	52	49	46	46
Release time (ms) 3)	42	35	33	32	32
Plunger weight (Kg)	0.032				
Solenoid weight (Kg)	0.147				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in its working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position ; 20°C ambient temperature.

3) Time is given on these conditions: Standard spring ; without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle ED%	Standard voltages										Under demand			
	VDC								VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230		Min	Max	Min	Max
100	o	o	o	o	o	o	x	o	o		3	230	24	230
40	o	o	o	o	o	o	o	o	o		5	230	50	230
25	o	o	o	o	o	o	o	o	o		6	230	75	230
15	o	o	o	o	o	o	o	x	o		6	230	125	230
5	x	o	o	o	o	o	o	x	o		9	230	x	x

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- To feed in alternating current the solenoid will have a rectifier incorporated in the coil.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

**Ordering code:** ER30/CT --V ED---% - Mounting position - Spring



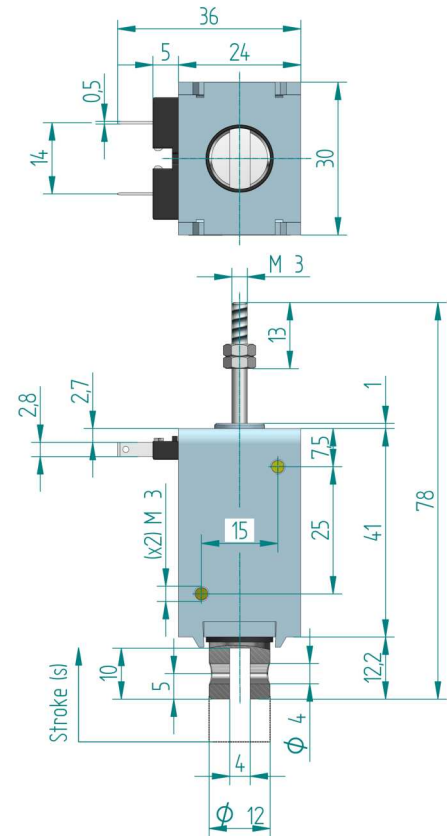
**A** Voltage: 24Vdc; Duty cycle: ED100%; Position A; With spring:  
ER30/CT 24Vdc ED100% A RS



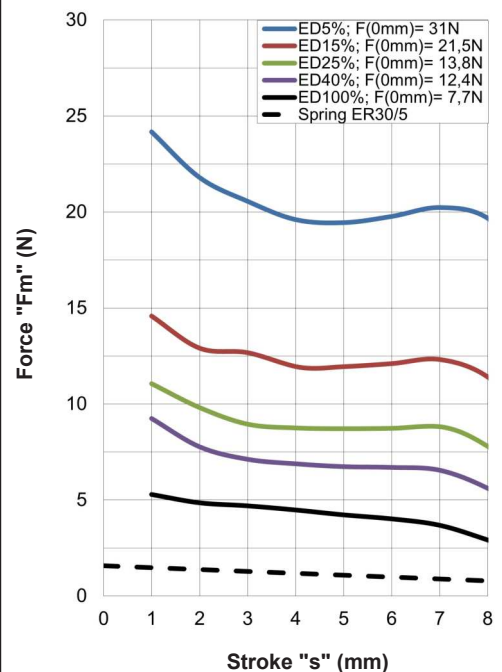
**B** Voltage: 48Vdc; Duty cycle: ED15%; Position B; Without spring:  
ER30/CT 48Vdc ED15% B RN

Spring yes: RS ; Spring no: RN

Solenoid under voltage (s=0mm position)



Force-stroke curve



Calculation of the effective force:  
see pages 1 and 10

For fixation and mounting positions: see page 10

### ER 35/C TYPE



Cables version:  
● ER35/CC



s = 1x0.5mm<sup>2</sup>  
L = 250mm

Protection rate: **IP00**  
Insulation class: **B (130°C)**  
Reference cycle: **3 minutes**  
Standard stroke (s): **12 mm**  
Temperature rise "ΔV<sub>31</sub>": **70°C**  
Working temperature: **-10 to 45°C**  
Work: **Push / Pull**

Release spring will be incorporated by defect

Standard spring force:  
Fs(s=0mm) = 1.6N  
Fs(s=12mm) = 0.4N

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	9	20	35	60	150
(Fm) Solenoid force (N) 1)	1.5	4.3	7.5	10.6	17.3
Max time under voltage(s)	Inf	72	45	27	9
Opening time (ms) 2)	71	56	55	50	48
Release time (ms) 3)	48	40	40	37	36
Plunger weight (Kg)	0.034				
Solenoid weight (Kg)	0.170				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in its working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position ; 20°C ambient temperature.

3) Time is given on these conditions: Standard spring ; without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle ED%	Standard voltages										Under demand			
	VDC								VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230		Min	Max	Min	Max
100	o	o	o	o	o	o	o	o	o		4	230	36	230
40	o	o	o	o	o	o	o	o	o		5	230	75	230
25	o	o	o	o	o	o	o	o	o		6	230	105	230
15	x	o	o	o	o	o	o	x	o		8	230	180	230
5	x	o	o	o	o	o	o	x	o		12	230	x	x

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- To feed in alternating current the solenoid will have a rectifier incorporated in the coil.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

Ordering code: ER35/C --V ED---% - Mounting position - Spring



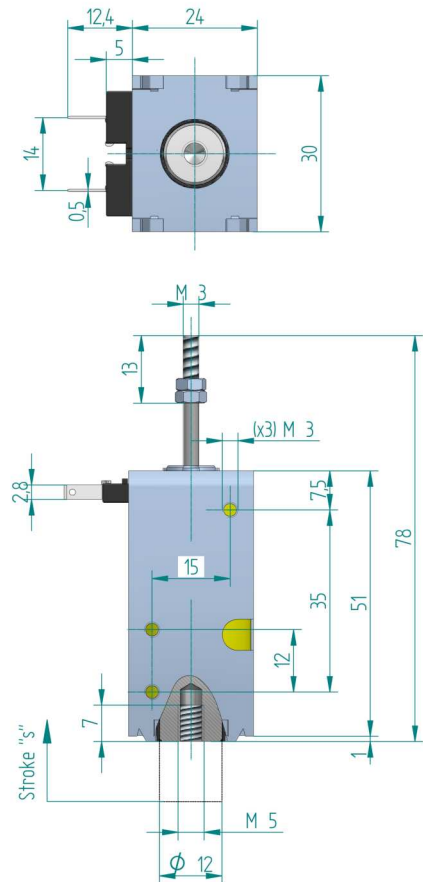
Voltage: 24Vdc; Duty cycle: ED100%; Position A; With spring:  
ER35/C 24Vdc ED100% A RS



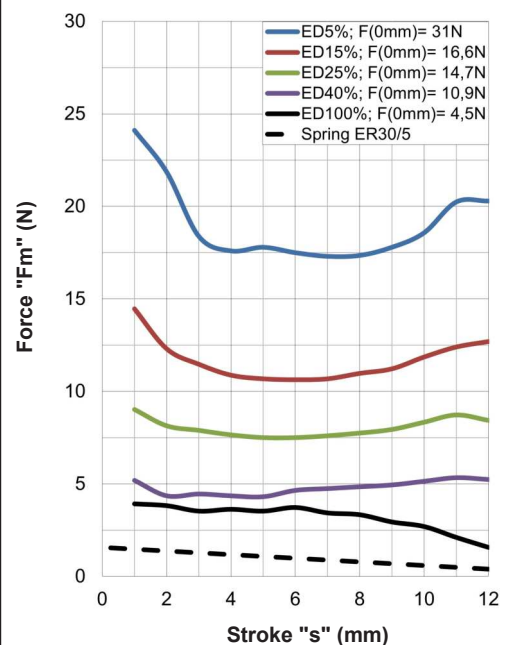
Voltage: 48Vdc; Duty cycle: ED15%; Position B; Without spring:  
ER35/C 48Vdc ED15% B RN

Spring yes: RS ; Spring no: RN

Solenoid under voltage (s=0mm position)



#### Force-stroke curve



Calculation of the effective force:  
see pages 1 and 10

For fixation and mounting positions: see page 10

### ER 40/CT TYPE



Protection rate: **IP00**  
 Insulation class: **B (130°C)**  
 Reference cycle: **3 minutes**  
 Standard stroke (s): **15 mm**  
 Temperature rise " $\Delta V_{31}$ ": **70°C**  
 Working temperature: **-10 to 45°C**  
 Work: **Pull**

**Release spring NOT**  
 incorporated on standard  
 product

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	13	27	44	76	218
(Fm) Solenoid force (N) 1)	2.9	6.5	13	16.5	43
Max time under voltage(s)	Inf	72	45	27	9
Opening time (ms) 2)	156	117	109	106	101
Release time (ms) 3)	103	81	76	75	72
Plunger weight (Kg)	0.065				
Solenoid weight (Kg)	0.368				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in it's working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position; 20°C ambient temperature.

3) Time is given on these conditions: without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle ED%	Standard voltages										Under demand			
	VDC								VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230		Min	Max	Min	Max
100	o	o	o	o	o	o	o	o	o		6	230	31	230
40	x	o	o	o	o	o	o	o	o		8	230	64	230
25	x	o	o	o	o	o	o	o	o		9	230	104	230
15	x	o	o	o	o	o	o	x	o		11	230	180	230
5	x	x	o	o	o	o	o	x	x		24	230	x	x

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
 They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- To feed in alternating current the solenoid will have a rectifier incorporated in the coil.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

**Ordering code:** ER40/CT --V ED---%

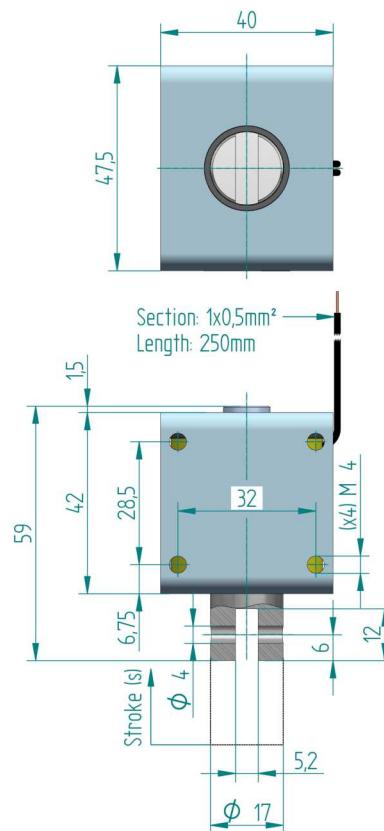


**A** Voltage: 24Vdc; Duty cycle: ED100%:  
 ER40/CT 24Vdc ED100%

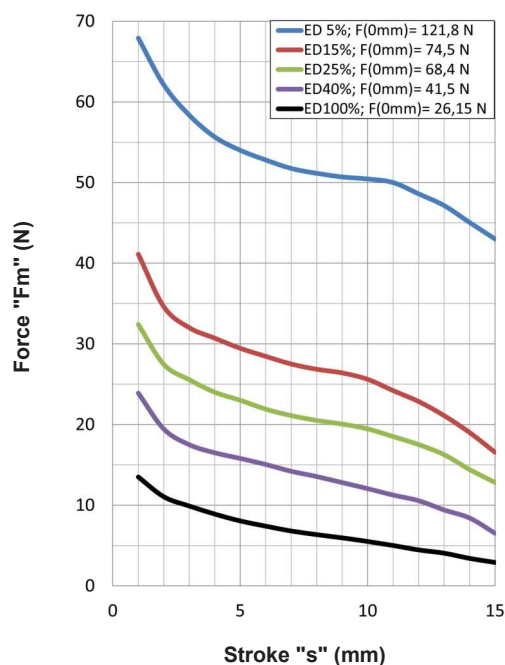


**B** Voltage: 48Vdc; Duty cycle: ED15%:  
 ER40/CT 48Vdc ED15%

Solenoid under voltage (s=0mm position)



Force-stroke curve



Calculation of the effective force:  
 see pages 1 and 10

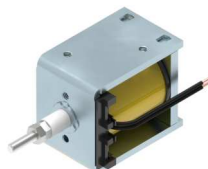
For fixation and mounting positions: see page 10



### • ER 45-05/C TYPE



Cables version:  
• ER45-05/CC



s = 1x0.5mm<sup>2</sup>  
L = 250mm

Protection rate: **IP00**  
Insulation class: **B (130°C)**  
Reference cycle: **3 minutes**  
Standard stroke (s): **5 mm**  
Temperature rise "ΔV<sub>31</sub>": **70°C**  
Working temperature: **-10 to 45°C**  
Work: **Push / Pull**

**Release spring** will be incorporated by defect

Standard spring force:  
Fs(s=0mm) = 3.6N  
Fs(s=5mm) = 3N

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	12	30	48	80	240
(Fm) Solenoid force (N) 1)	0.1	6.3	10.6	14.4	35
Max time under voltage(s)	Inf	72	45	27	9
Opening time (ms) 2)	127	75	72	70	70
Release time (ms) 3)	59	45	44	42	42
Plunger weight (Kg)	0.059				
Solenoid weight (Kg)	0.285				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in its working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position ; 20°C ambient temperature.

3) Time is given on these conditions: Standard spring ; without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle ED%	Standard voltages										Under demand			
	VDC										VDC		VAC	
	6	12	24	48	100	125	205	110	230		Min	Max	Min	Max
100	o	o	o	o	o	o	o	o	o	o	5	230	34	230
40	x	o	o	o	o	o	o	o	o	o	7	230	86	230
25	x	o	o	o	o	o	o	x	o	o	9	230	136	230
15	x	o	o	o	o	o	o	x	o	o	11	230	230	230
5	x	x	o	o	o	o	o	x	x	o	16	230	x	x

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- To feed in alternating current the solenoid will have a rectifier incorporated in the coil.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

**Ordering code:** ER45-05/C --V ED---% - Mounting position - Spring



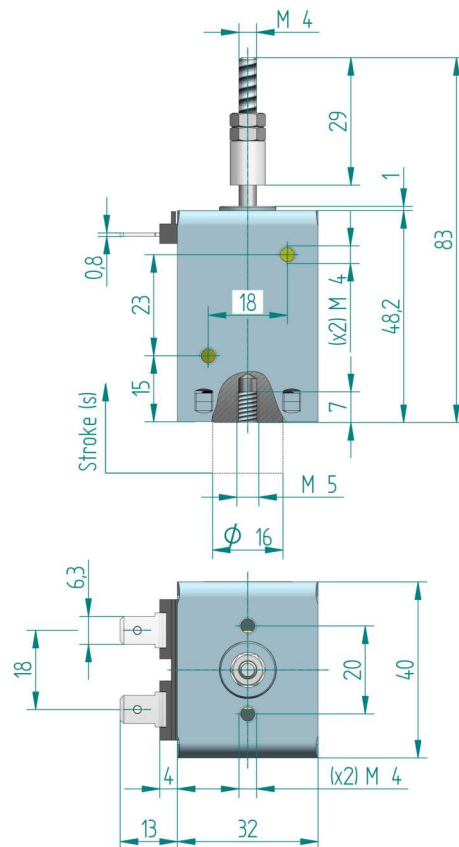
**A** Voltage: 24Vdc; Duty cycle: ED100%; Position A; With spring:  
ER45-05/C 24Vdc ED100% A RS



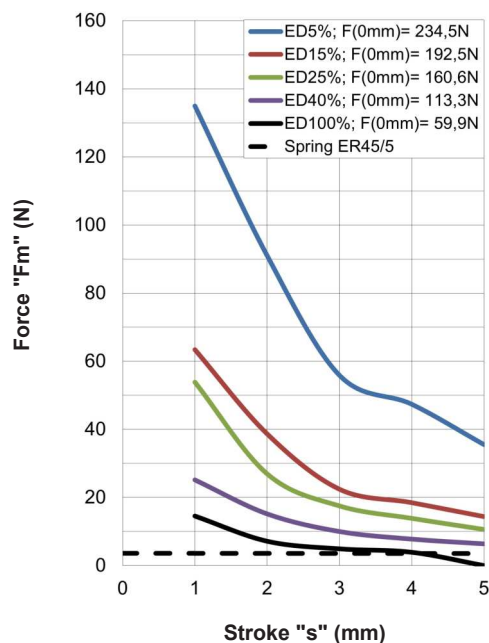
**B** Voltage: 48Vdc; Duty cycle: ED15%; Position B; Without spring:  
ER45-05/C 48Vdc ED15% B RN

Spring yes: **RS** ; Spring no: **RN**

Solenoid under voltage (s=0mm position)



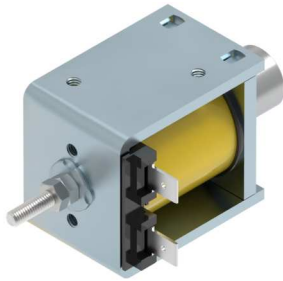
Force-stroke curve



Calculation of the effective force:  
see pages 1 and 10

For fixation and mounting positions: see page 10

### • ER 45-15/C TYPE



Cables version:  
● ER45-15/CC



s = 1x0.5mm<sup>2</sup>  
L = 250mm

Protection rate: **IP00**  
Insulation class: **B (130°C)**  
Reference cycle: **3 minutes**  
Standard stroke (s): **15 mm**  
Temperature rise "ΔV<sub>31</sub>": **70°C**  
Working temperature: **-10 to 45°C**  
Work: **Push / Pull**

**Release spring** will be incorporated by defect

Standard spring force:  
Fs(s=0mm) = 3.6N  
Fs(s=15mm) = 1.7N

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	12	30	48	80	240
(Fm) Solenoid force (N) 1)	3.3	7.3	10	15.5	27
Max time under voltage(s)	Inf	72	45	27	9
Opening time (ms) 2)	111	87	83	81	81
Release time (ms) 3)	68	54	53	51	51
Plunger weight (Kg)	0.059				
Solenoid weight (Kg)	0.285				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in it's working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position; 20°C ambient temperature.

3) Time is given on these conditions: Standard spring ; without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle ED%	Standard voltages										Under demand			
	VDC								VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230		Min	Max	Min	Max
100	o	o	o	o	o	o	o	o	o		5	230	34	230
40	x	o	o	o	o	o	o	o	o		7	230	86	230
25	x	o	o	o	o	o	o	x	o		9	230	136	230
15	x	o	o	o	o	o	o	x	o		11	230	230	230
5	x	x	o	o	o	o	o	x	x		16	230	x	x

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- To feed in alternating current the solenoid will have a rectifier incorporated in the coil.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

**Ordering code:** ER45-15/C --V ED---% - Mounting position - Spring



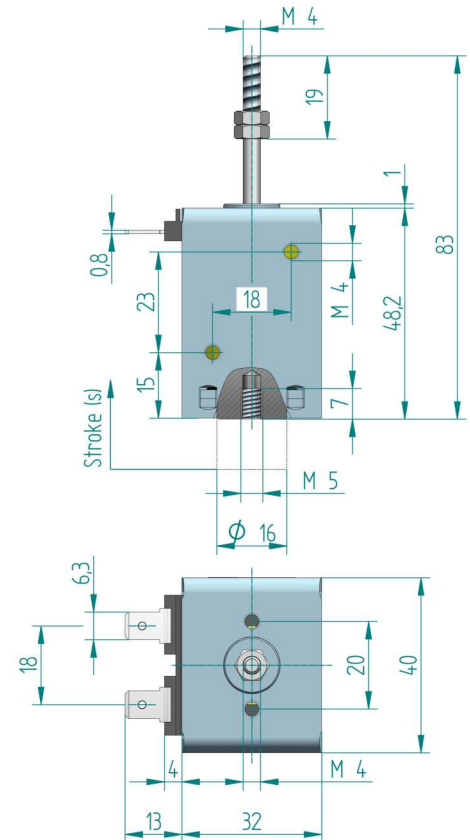
**A** Voltage: 24Vdc; Duty cycle: ED100%; Position A; With spring:  
ER45-15/C 24Vdc ED100% A RS



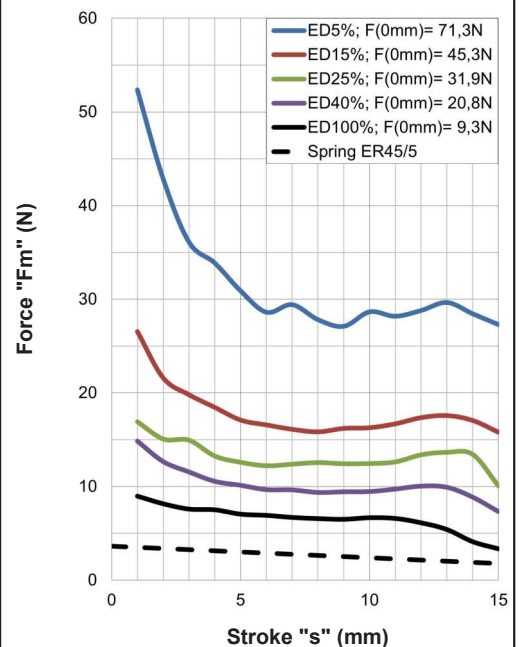
**B** Voltage: 48Vdc; Duty cycle: ED15%; Position B; Without spring:  
ER45-15/C 48Vdc ED15% B RN

Spring yes: **RS** ; Spring no: **RN**

Solenoid under voltage (s=0mm position)



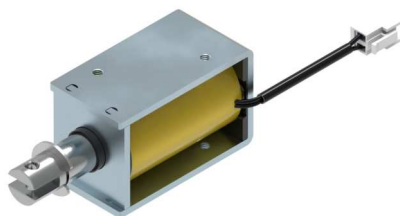
Force-stroke curve



Calculation of the effective force:  
see pages 1 and 10

For fixation and mounting positions: see page 10

### • ER 48/T TYPE



Protection rate: **IP00**  
 Insulation class: **B (130°C)**  
 Reference cycle: **3 minutes**  
 Standard stroke (s): **8 mm**  
 Temperature rise " $\Delta V_{31}$ ": **70°C**  
 Working temperature: **-10 to 45°C**  
 Work: **Pull**

**Release spring NOT**  
 incorporated on standard  
 product

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	15	35	54	89	271
(Fm) Solenoid force (N) 1)	9.1	19.5	26.7	32.5	45.1
Max time under voltage(s)	Inf	72	45	27	9
Opening time (ms) 2)	125	102	90	82	76
Release time (ms) 3)	83	69	62	57	53
Plunger weight (Kg)	0.066				
Solenoid weight (Kg)	0.292				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in it's working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position; 20°C ambient temperature.

3) Time is given on these conditions: without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle ED%	Standard voltages										Under demand			
	VDC								VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230		Min	Max	Min	Max
100	o	o	o	o	o	o	o	o	o		5	230	34	230
40	x	o	o	o	o	o	o	o	o		7	230	86	230
25	x	o	o	o	o	o	o	x	o		9	230	136	230
15	x	o	o	o	o	o	o	x	o		11	230	230	230
5	x	x	o	o	o	o	o	x	x		16	230	x	x

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
 They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- To feed in alternating current the solenoid will have a rectifier incorporated in the coil.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

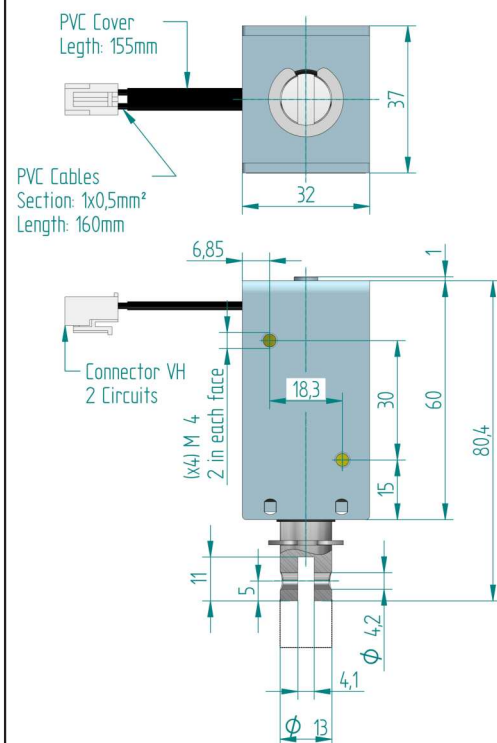
- Earthing is recommended if the metallic parts are accessible.

**Ordering code:** ER48/T --V ED---%

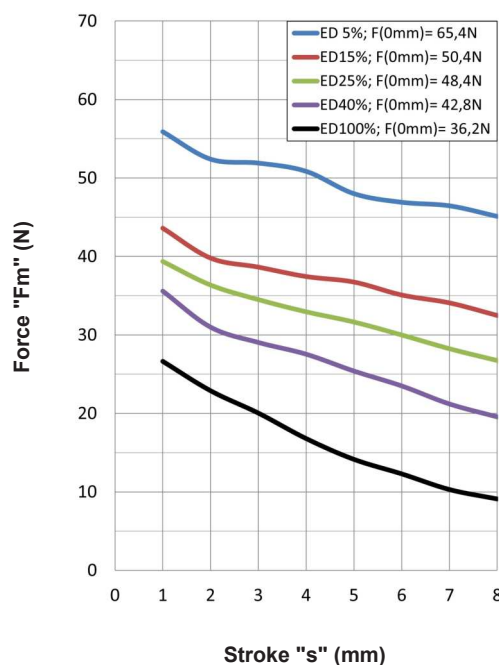
Voltage: 24Vdc; Duty cycle: ED100%:  
 ER48/T 24Vdc ED100%

Voltage: 48Vdc; Duty cycle: ED15%:  
 ER48/T 48Vdc ED15%

**Solenoid under voltage (s=0mm position)**



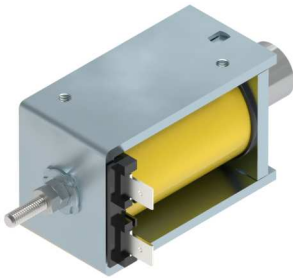
**Force-stroke curve**



Calculation of the effective force:  
 see pages 1 and 10

For fixation and mounting positions: see page 10

### • ER 50-15/C TYPE



Cables version:  
● ER50-15/CC



s = 1x0.5mm<sup>2</sup>  
L = 250mm

Protection rate: **IP00**  
Insulation class: **B (130°C)**  
Reference cycle: **3 minutes**  
Standard stroke (s): **15 mm**  
Temperature rise "ΔV<sub>31</sub>": **70°C**  
Working temperature: **-10 to 45°C**  
Work: **Push / Pull**

**Release spring** will be incorporated by defect

Standard spring force:  
Fs(s=0mm) = 3.6N  
Fs(s=15mm) = 1.7N

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	14	35	56	93	280
(Fm) Solenoid force (N) 1)	6.7	13	16	23	37
Max time under voltage(s)	Inf	72	45	27	9
Opening time (ms) 2)	127	96	81	81	80
Release time (ms) 3)	82	62	53	53	53
Plunger weight (Kg)	0.071				
Solenoid weight (Kg)	0.365				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in it's working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position; 20°C ambient temperature.

3) Time is given on these conditions: Standard spring ; without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle ED%	Standard voltages										Under demand			
	VDC								VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230		Min	Max	Min	Max
100	o	o	o	o	o	o	o	o	o		6	230	41	230
40	x	o	o	o	o	o	o	o	o		9	230	100	230
25	x	o	o	o	o	o	o	x	o		11	230	160	230
15	x	x	o	o	o	o	o	x	o		15	230	230	230
5	x	x	o	o	o	o	o	x	x		24	230	x	x

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- To feed in alternating current the solenoid will have a rectifier incorporated in the coil.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

**Ordering code:** ER50-15/C --V ED---% - Mounting position - Spring



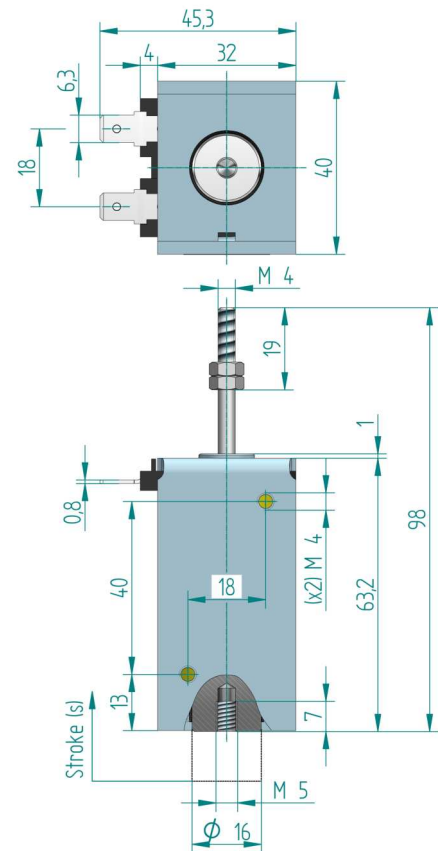
**A** Voltage: 24Vdc; Duty cycle: ED100%; Position A; With spring:  
ER50-15/C 24Vdc ED100% A RS



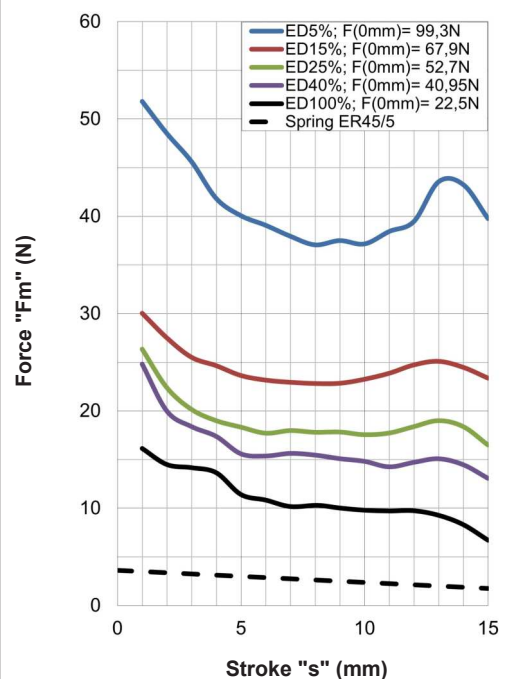
**B** Voltage: 48Vdc; Duty cycle: ED15%; Position B; Without spring:  
ER50-15/C 48Vdc ED15% B RN

Spring yes: **RS** ; Spring no: **RN**

Solenoid under voltage (s=0mm position)



### Force-stroke curve



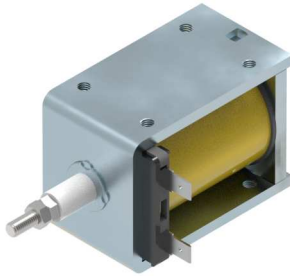
Calculation of the effective force:  
see pages 1 and 10

For fixation and mounting positions: see page 10

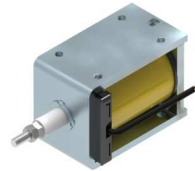




### • ER 60-05/C TYPE



Cables version:  
● ER60-05/CC



s = 1x1mm<sup>2</sup>  
L = 250mm

Protection rate: **IP00**  
Insulation class: **B (130°C)**  
Reference cycle: **5 minutes**  
Standard stroke (s): **5 mm**  
Temperature rise "ΔV<sub>31</sub>": **70°C**  
Working temperature: **-10 to 45°C**  
Work: **Push / Pull**

Release spring will be  
incorporated by defect

Standard spring force:  
Fs(s=0mm) = 4.3N  
Fs(s=5mm) = 3.7N

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	18	45	70	110	280
(Fm) Solenoid force (N) 1)	7	18	28	47	96
Max time under voltage(s)	Inf	120	75	45	15
Opening time (ms) 2)	181	128	120	105	102
Release time (ms) 3)	111	80	75	66	65
Plunger weight (Kg)	0.117				
Solenoid weight (Kg)	0.650				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in its working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position ; 20°C ambient temperature.

3) Time is given on these conditions: Standard spring ; without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle  ED%	Standard voltages										Under demand			
	VDC								VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230	Min	Max	Min	Max	
100	x	o	o	o	o	o	o	o	o	7	230	48	230	
40	x	o	o	o	o	o	o	x	o	11	230	125	230	
25	x	x	o	o	o	o	o	x	o	13	230	200	230	
15	x	x	o	o	o	o	o	x	x	16	230	x	x	
5	x	x	o	o	o	o	o	x	x	24	230	x	x	

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- To feed in alternating current the solenoid will have a rectifier incorporated in the coil.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

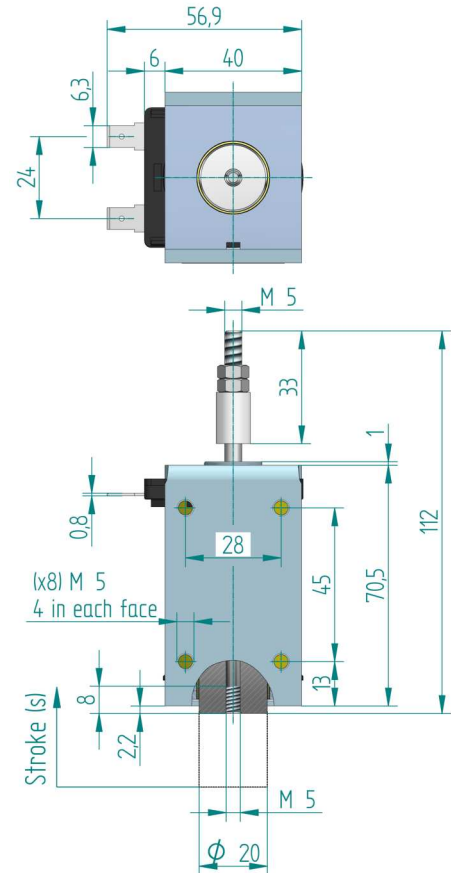
**Ordering code:** ER60-05/C --V ED---% - Spring

Voltage: 24Vdc; Duty cycle: ED100%; With spring:  
ER60-05/C 24Vdc ED100% RS

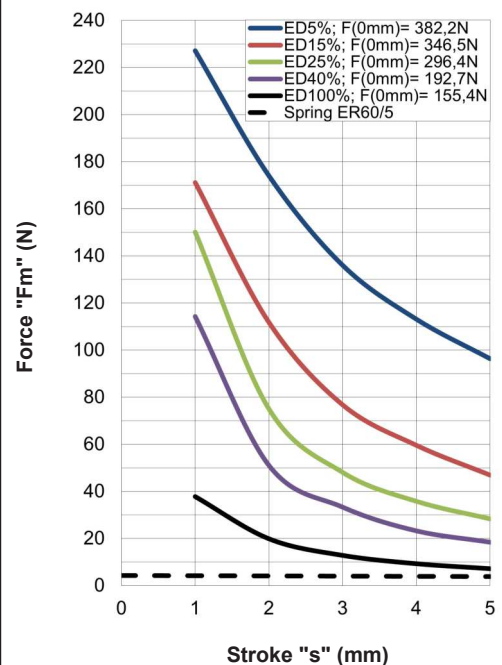
Voltage: 48Vdc; Duty cycle: ED15%; Without spring:  
ER60-05/C 48Vdc ED15% RN

Spring yes: RS ; Spring no: RN

Solenoid under voltage (s=0mm position)



Force-stroke curve

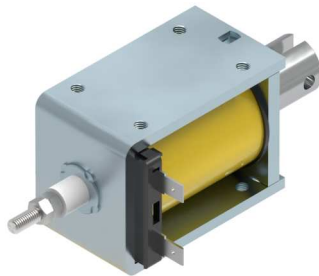


Calculation of the effective force:  
see pages 1 and 10

For fixation and mounting positions: see page 10



### • ER 60-10/CT TYPE



Cables version:  
● ER60-10/CTC



s = 1x1mm<sup>2</sup>  
L = 250mm

Protection rate: **IP00**  
Insulation class: **B (130°C)**  
Reference cycle: **5 minutes**  
Standard stroke (s): **10 mm**  
Temperature rise "ΔV<sub>31</sub>": **70°C**  
Working temperature: **-10 to 45°C**  
Work: **Push / Pull**

**Release spring** will be incorporated by defect

Standard spring force:  
Fs(s=0mm) = 4.3N  
Fs(s=10mm) = 3.2N

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	18	45	70	110	280
(Fm) Solenoid force (N) 1)	11.6	23.6	31.6	43.6	79.6
Max time under voltage(s)	Inf	120	75	45	15
Opening time (ms) 2)	187	134	126	111	108
Release time (ms) 3)	119	87	83	74	72
Plunger weight (Kg)	0.148				
Solenoid weight (Kg)	0.681				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in it's working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position; 20°C ambient temperature.

3) Time is given on these conditions: Standard spring ; without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle  ED%	Standard voltages										Under demand			
	VDC								VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230	Min	Max	Min	Max	
100	x	o	o	o	o	o	o	o	o	7	230	48	230	
40	x	o	o	o	o	o	o	x	o	11	230	125	230	
25	x	x	o	o	o	o	o	x	o	13	230	200	230	
15	x	x	o	o	o	o	o	x	x	16	230	x	x	
5	x	x	o	o	o	o	o	x	x	24	230	x	x	

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- To feed in alternating current the solenoid will have a rectifier incorporated in the coil.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

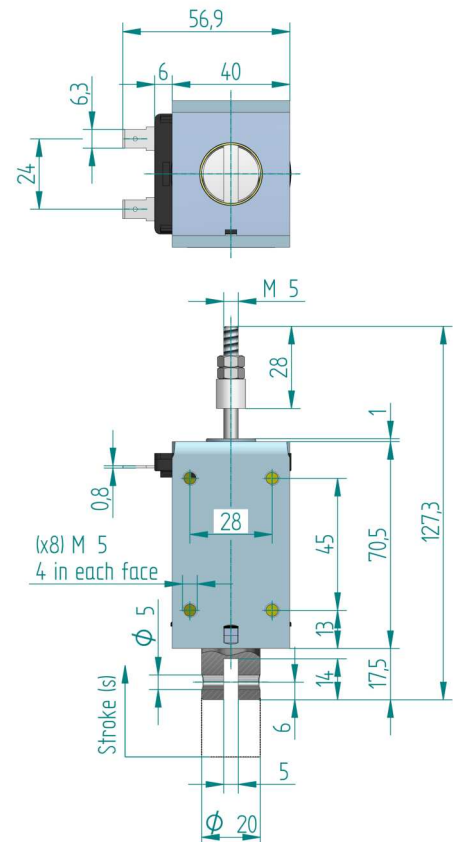
**Ordering code:** ER60-10/CT --V ED---% - Spring

Voltage: 24Vdc; Duty cycle: ED100%; With spring:  
ER60-10/CT 24Vdc ED100% RS

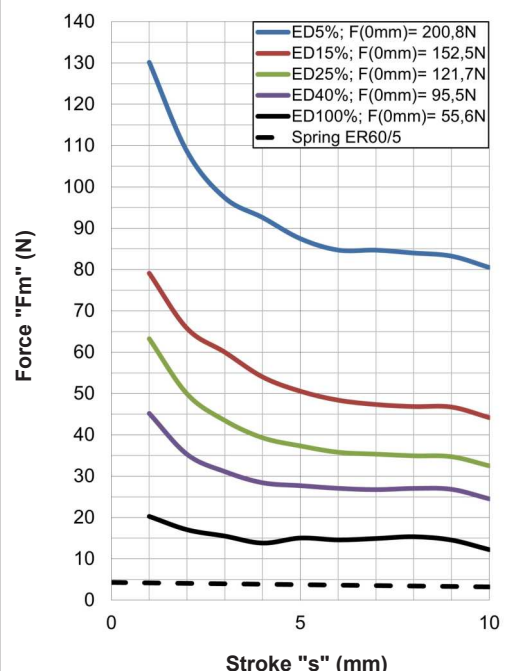
Voltage: 48Vdc; Duty cycle: ED15%; Without spring:  
ER60-10/CT 48Vdc ED15% RN

Spring yes: **RS** ; Spring no: **RN**

Solenoid under voltage (s=0mm position)



**Force-stroke curve**



Calculation of the effective force:  
see pages 1 and 10

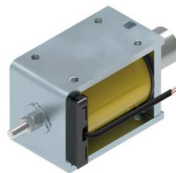
For fixation and mounting positions: see page 10



### • ER 60-20/C TYPE



Cables version:  
● ER60-20/CC



s = 1x1mm<sup>2</sup>  
L = 250mm

Protection rate: **IP00**  
Insulation class: **B (130°C)**  
Reference cycle: **5 minutes**  
Standard stroke (s): **20 mm**  
Temperature rise "ΔV<sub>31</sub>": **70°C**  
Working temperature: **-10 to 45°C**  
Work: **Push / Pull**

**Release spring** will be incorporated by defect

Standard spring force:  
Fs(s=0mm) = 4.3N  
Fs(s=20mm) = 2.1N

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	18	45	70	110	280
(Fm) Solenoid force (N) 1)	9.2	16.7	21.6	28.5	50
Max time under voltage(s)	Inf	120	75	45	15
Opening time (ms) 2)	196	143	135	120	117
Release time (ms) 3)	126	95	90	81	80
Plunger weight (Kg)	0.117				
Solenoid weight (Kg)	0.650				

1) Fm Solenoid force is given according to VDE0580 without deducting the spring force or the plunger weight if vertical mounting.

2) Time is given on these conditions: Coil supplied under nominal voltage ; Stabilized in its working temperature ; Load 70% of the solenoid force ; Horizontal assembly ; Standard stroke initial position ; 20°C ambient temperature.

3) Time is given on these conditions: Standard spring ; without load on shaft ; Horizontal assembly ; Standard stroke initial position.

Duty-cycle	Standard voltages										Under demand			
ED%	VDC								VAC		VDC		VAC	
	6	12	24	48	100	125	205	110	230	Min	Max	Min	Max	
100	x	o	o	o	o	o	o	o	o	7	230	48	230	
40	x	o	o	o	o	o	o	x	o	11	230	125	230	
25	x	x	o	o	o	o	o	x	o	13	230	200	230	
15	x	x	o	o	o	o	o	x	x	16	230	x	x	
5	x	x	o	o	o	o	o	x	x	24	230	x	x	

Layout: o = Available ; x = Unavailable

- Voltage under demand:  
They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- To feed in alternating current the solenoid will have a rectifier incorporated in the coil.

- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

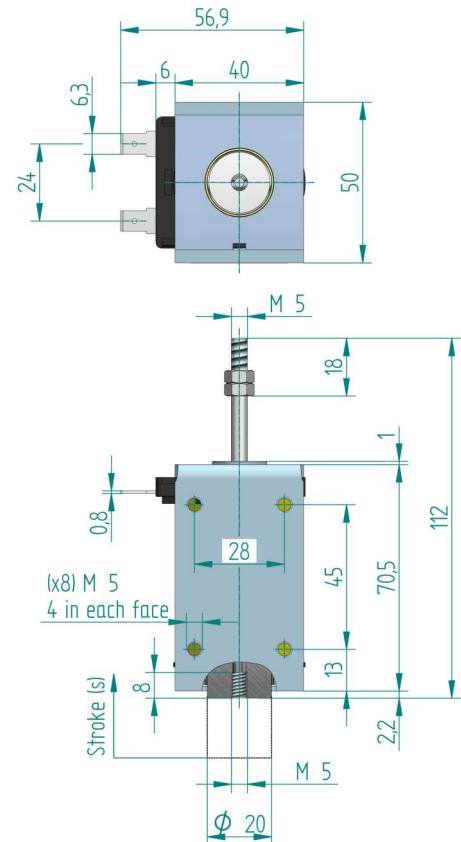
**Ordering code:** ER60-20/C --V ED---% - Spring

Voltage: 24Vdc; Duty cycle: ED100%; With spring:  
ER60-20/C 24Vdc ED100% RS

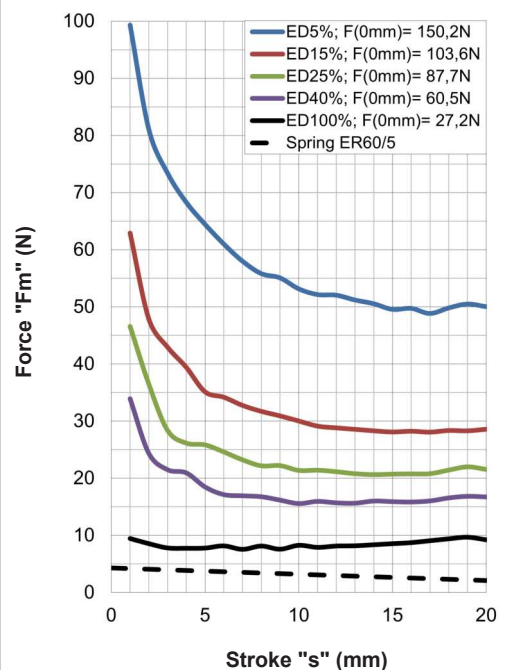
Voltage: 48Vdc; Duty cycle: ED15%; Without spring:  
ER60-20/C 48Vdc ED15% RN

Spring yes: RS ; Spring no: RN

Solenoid under voltage (s=0mm position)



Force-stroke curve



Calculation of the effective force:  
see pages 1 and 10

For fixation and mounting positions: see page 10