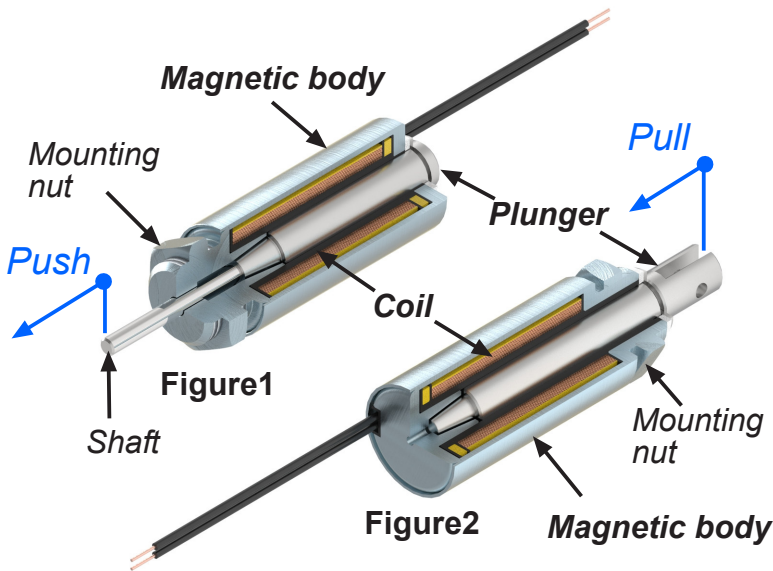


● ECM SERIES

ECM serie electromangets 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). Its desing makes it perfect to be mounted on panels.



Structure, basic elements:

Magnetic body:

The metal piece containing the coil, the core and the fixation.

Coil:

It receives the electrical energy to create the magnetic field.

Plunger:

It is the piece that moves inside along the coil, it can have a non-magnetic shaft fixed to it. To pull (fig.2), the element to activate must be fixed to the plunger. To push (fig.1), the element to activate must be fixed to the shaft.

Mounting nut:

To fix the solenoid in the unit, a hole on the panel where the solenoid is mounted must be done, the hole must be lightly bigger than the mounting metric. To complete the mounting of the solenoid, tighten the nut.

● 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:

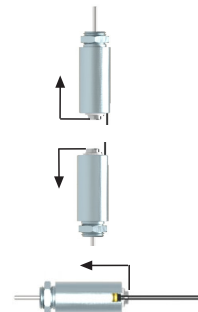
$Effective\ force = Magnetic\ force + Plunger\ weight$

-When the solenoid pulls in horizontal position:

$Effective\ force = Magnetic\ force$

-For the units with incorporated return spring:

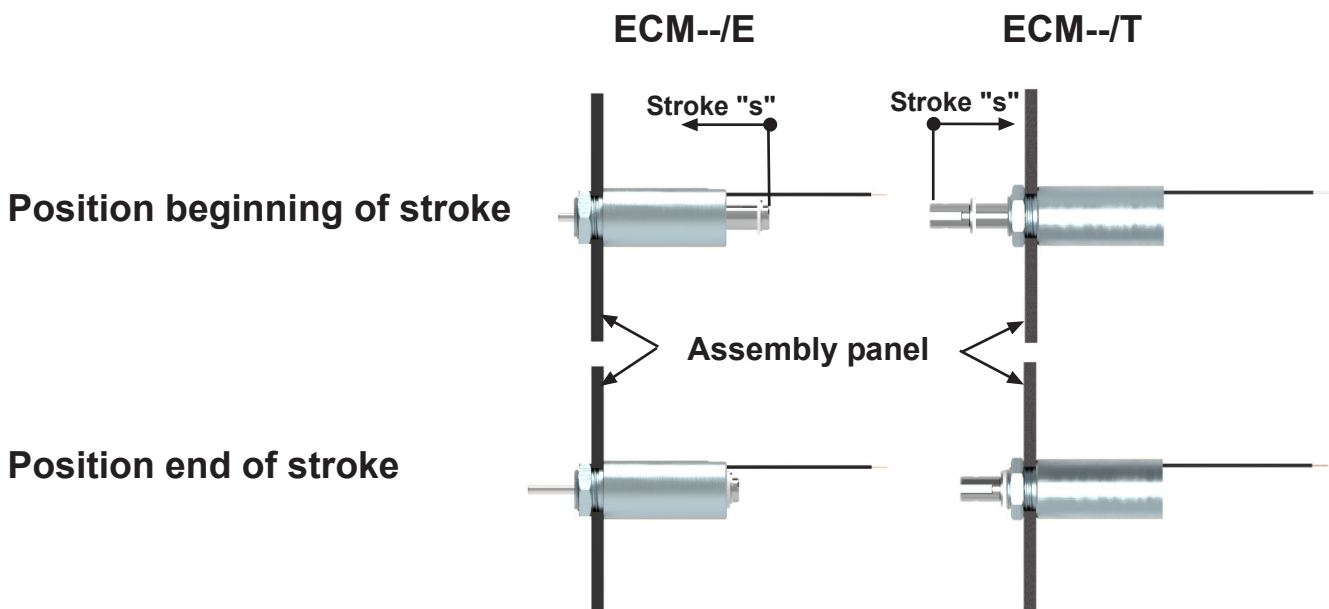
$Effective\ force = Magnetic\ force - Spring\ force \pm Plunger\ weight$



• ECM series: Force-stroke Chart

Type	Stroke (mm)	Duty-cycle					Return Spring force (N)
		100%	40%	25%	15%	5%	
ECM13-03/E	Beginning of stroke $s_1=3$	0.02	0.08	0.12	0.2	0.5	
	End of stroke $s_0=0$	0.15	0.43	0.69	1	2.29	
ECM13-03/T	Beginning of stroke $s_1=3$	0.02	0.08	0.12	0.2	0.5	
	End of stroke $s_0=0$	0.15	0.43	0.69	1	2.29	
ECM13-10/E	Beginning of stroke $s_1=10$	0.15	0.3	0.4	0.7	1.7	
	End of stroke $s_0=0$	1.85	2.5	2.75	2.94	4.22	
ECM13-10/T	Beginning of stroke $s_1=10$	0.15	0.3	0.4	0.7	1.7	
	End of stroke $s_0=0$	1.85	2.5	2.75	2.94	4.22	
ECM19/E	Beginning of stroke $s_1=10$	0.5	1.2	2	3.2	6.6	0.1
	End of stroke $s_0=0$	7	12	14.4	16.7	24	
ECM19/T	Beginning of stroke $s_1=10$	0.5	1.2	2	3.2	6.6	
	End of stroke $s_0=0$	7	12	14.4	16.7	24	
ECM25/E	Beginning of stroke $s_1=12$	0.6	1.5	2.3	3.4	8.4	0.8
	End of stroke $s_0=0$	10.5	16.7	19.5	22.5	32	
ECM25/T	Beginning of stroke $s_1=12$	0.6	1.5	2.3	3.4	8.4	
	End of stroke $s_0=0$	10.5	16.7	19.5	22.5	32	

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



● CUSTOMIZATION ECM SERIES

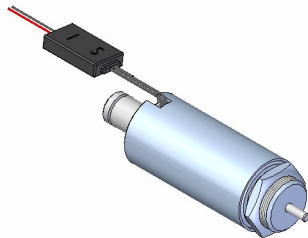
The products described in the catalogue are standard and minimum manufacturing batches are not required. However, there is the possibility of customizing them to suit better customer's needs. See below some of the most common customizations.
If any modification is needed, please ask NAFSA about the possibility and the minimum manufacturing batch required.

1. ELECTRICAL CUSTOMIZATION

a) PWM electronics integration:

It consists on feeding the electromagnet through an electronic PWM (Pulse width modulation). This device will initially provide the solenoid with it's nominal voltage / intensity 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 / intensity is reduced it will be maintained in this last 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 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 and with the force of a 25% duty cycle, then when the voltage is reduced to 12VDC the duty cycle will be 100%.



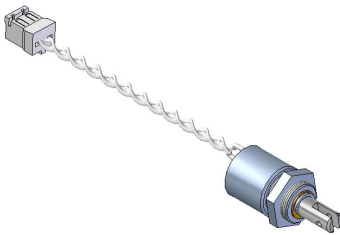
*PWD over cables

**NOTE: In the ECM serie the PWD can not be integrated in the coil

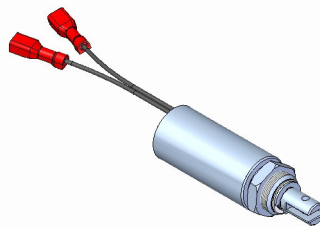
b) Cable length modification and terminal or connector mounted over cables:

All ECM models have supply cables, this length can be modified to customer requirement. Likewise, many kind of terminals or connectors can be added to the cables.

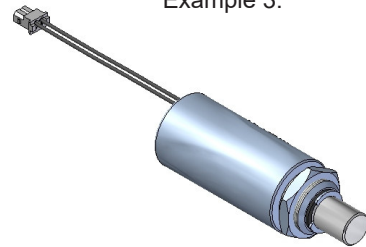
Example 1:



Example 2:



Example 3:



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:

For the ECM series, the standard manufacturing insulation class is B (130°C), the maximum we can customize this ECM series is to F (155°C).

3. PROTECTI3N RATE IP (EN60529) CUSTOMIZATION:

Standard models are IP30, after overmolding the coils, IP34 can be obtained.

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

• CUSTOMIZATION ECM SERIES

The products 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.



a) Flat



b) Spherical



c) Threaded



d) Transverse hole



e) Grooved

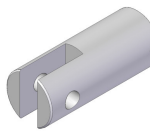
4.2) Plunger modifications: Length and shape can be modified.



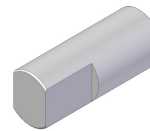
a) Flat



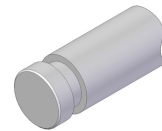
b) Threaded hole



c) Fork joint



d) Flat faces



e) Grooved

4.3) Return spring force modification:

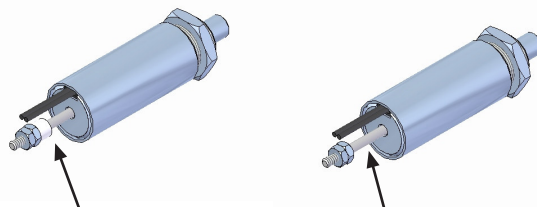
ECM serie electromagnets are linear simple effect solenoids, where the stroke movement from initial to the final position is made by electromagnetic forces, and the return to initial position takes place because of external forces or an incorporated spring (depending on the type). The force of the spring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

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

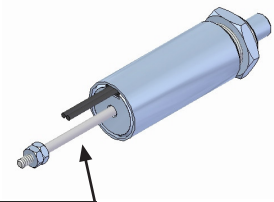
4.4) Stroke modifications:

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.



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

● ECM 13-03/E TYPE



Protection rate: **IP30**
 Insulation class: **B (130°C)**
 Reference cycle: **2 minutes**
 Standard stroke (s): **3 mm**
 Temperature rise " ΔV_{31} ": **70°C**
 Working temperature: **-10 to 45°C**
 Work: **Push**

Release spring NOT
incorporated in standard
product.

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	1	2.5	4	6.6	20
(Fm) Solenoid force (N) 1)	0.02	0.08	0.12	0.2	0.5
Max time under voltage(s)	Inf	48	30	18	6
Opening time (ms) 2)	29	20	19	17	15
Release time (ms) 3)	15	14	14	14	13
Plunger weight (Kg)	0.004				
Solenoid weight (Kg)	0.025				

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	x	x	x	x	x	x	1.5	24	x	x
40	o	o	o	o	x	x	x	x	x	1.5	48	x	x
25	o	o	o	o	x	x	x	x	x	1.5	48	x	x
15	o	o	o	o	x	x	x	x	x	1.5	48	x	x
5	o	o	o	o	o	x	x	x	x	3	110	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.

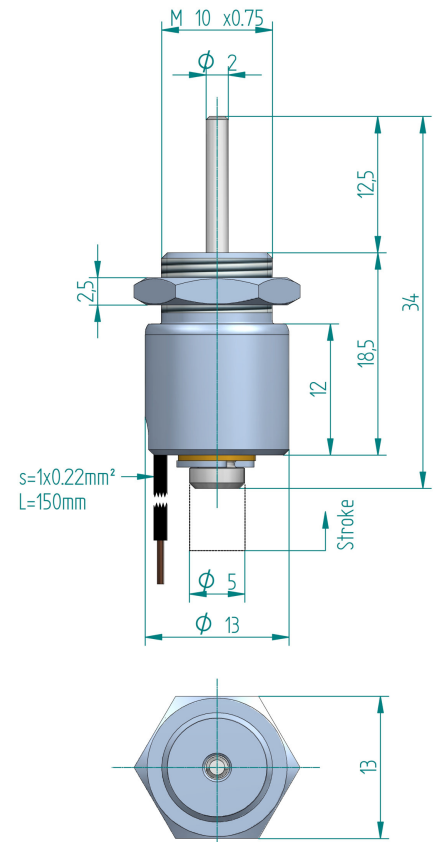
- Earthing is recommended if the metallic parts are accessible.

Ordering code: ECM13-03/E --V ED--%

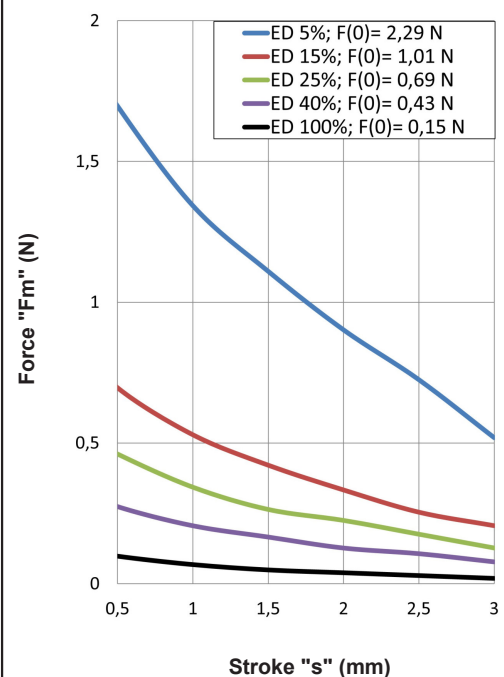
Voltage: 24Vdc; Duty cycle: ED100%:
ECM13-03/E 24Vdc ED100%

Voltage: 12Vdc; Duty cycle: ED15%:
ECM13-03/E 12Vdc ED15%

Solenoid under voltage (s=0mm position)



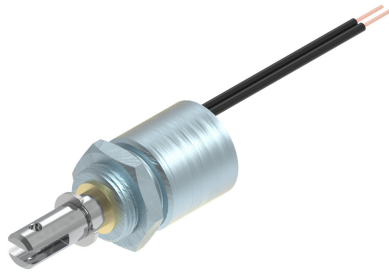
Force-stroke curve



Calculation of the effective force:
see pages 1 and 59

For fixation and mounting positions: see page 59

• ECM 13-03/T TYPE



Protection rate: **IP30**
 Insulation class: **B (130°C)**
 Reference cycle: **2 minutes**
 Standard stroke (s): **3 mm**
 Temperature rise " ΔV_{31} ": **70°C**
 Working temperature: **-10 to 45°C**
 Work: **Pull**

Release spring NOT incorporated in standard product.

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	1	2.5	4	6.6	20
(Fm) Solenoid force (N) 1)	0.02	0.08	0.12	0.2	0.5
Max time under voltage(s)	Inf	48	30	18	6
Opening time (ms) 2)	29	20	19	17	15
Release time (ms) 3)	15	14	14	14	13
Plunger weight (Kg)	0.004				
Solenoid weight (Kg)	0.025				

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	x	x	x	x	x	x	1.5	24	x	x
40	o	o	o	o	x	x	x	x	x	1.5	48	x	x
25	o	o	o	o	x	x	x	x	x	1.5	48	x	x
15	o	o	o	o	x	x	x	x	x	1.5	48	x	x
5	o	o	o	o	o	x	x	x	x	3	110	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.

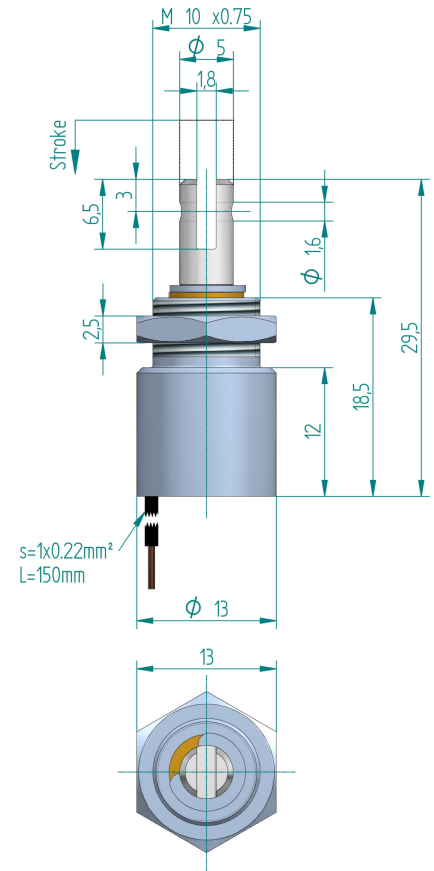
- Earthing is recommended if the metallic parts are accessible.

Ordering code: ECM13-03/T --V ED---%

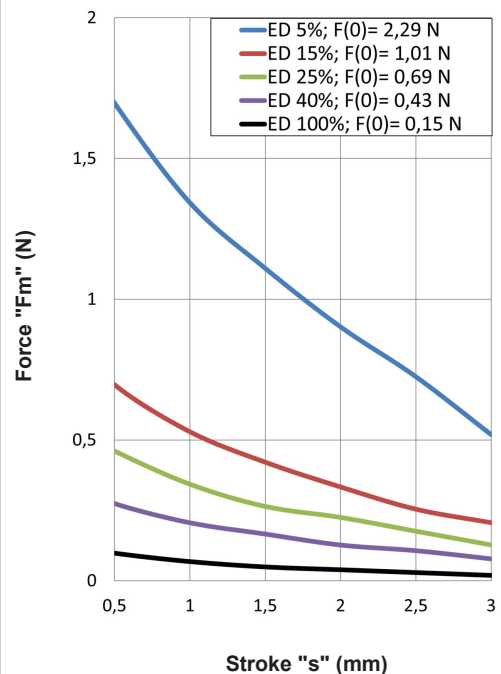
Voltage: 24Vdc; Duty cycle: ED100%:
ECM13-03/T 24Vdc ED100%

Voltage: 12Vdc; Duty cycle: ED15%:
ECM13-03/T 12Vdc ED15%

Solenoid under voltage (s=0mm position)



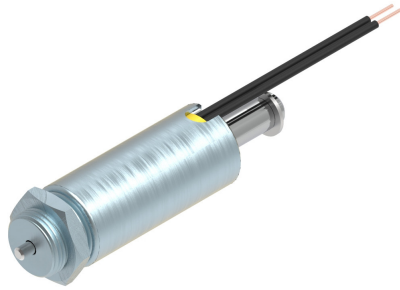
Force-stroke curve



Calculation of the effective force:
see pages 1 and 59

For fixation and mounting positions: see page 59

• ECM 13-10/E TYPE



Protection rate: **IP30**
 Insulation class: **B (130°C)**
 Reference cycle: **2 minutes**
 Standard stroke (s): **10 mm**
 Temperature rise " ΔV_{31} ": **70°C**
 Working temperature: **-10 to 45°C**
 Work: **Push**

Release spring NOT
 incorporated in standard
 product.

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	3.3	10	16	26	80
(Fm) Solenoid force (N) 1)	0.15	0.3	0.4	0.7	1.7
Max time under voltage(s)	Inf	48	30	18	6
Opening time (ms) 2)	40	34	32	29	27
Release time (ms) 3)	29	28	27	26	26
Plunger weight (Kg)	0.010				
Solenoid weight (Kg)	0.040				

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	1.5	48	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	125	x	x
15	o	o	o	o	o	o	o	x	x	5	205	x	x
5	o	o	o	o	o	o	o	x	x	6	250	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.

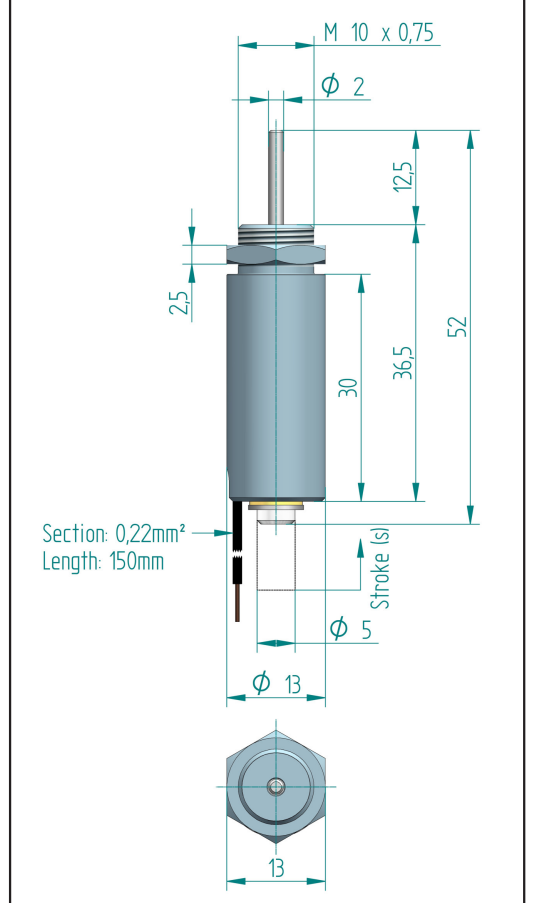
- Earthing is recommended if the metallic parts are accessible.

Ordering code: ECM13-10/E --V ED--%

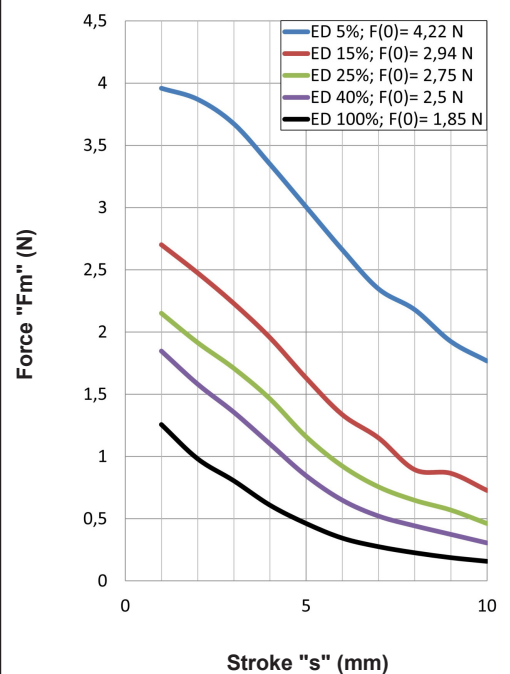
Voltage: 24Vdc; Duty cycle: ED100%:
 ECM13-10/E 24Vdc ED100%

Voltage: 12Vdc; Duty cycle: ED15%:
 ECM13-10/E 12Vdc ED15%

Solenoid under voltage (s=0mm position)



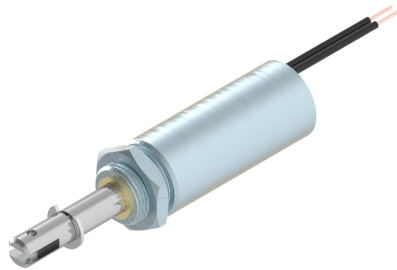
Force-stroke curve



Calculation of the effective force:
 see pages 1 and 59

For fixation and mounting positions: see page 59

• ECM 13-10/T TYPE



Protection rate: **IP30**
 Insulation class: **B (130°C)**
 Reference cycle: **2 minutes**
 Standard stroke (s): **10 mm**
 Temperature rise " ΔV_{31} ": **70°C**
 Working temperature: **-10 to 45°C**
 Work: **Pull**

Release spring NOT incorporated in standard product.

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	3.3	10	16	26	80
(Fm) Solenoid force (N) 1)	0.15	0.3	0.4	0.7	1.7
Max time under voltage(s)	Inf	48	30	18	6
Opening time (ms) 2)	40	34	32	29	27
Release time (ms) 3)	29	28	27	26	26
Plunger weight (Kg)	0.010				
Solenoid weight (Kg)	0.040				

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	1.5	48	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	125	x	x
15	o	o	o	o	o	o	o	x	x	5	205	x	x
5	o	o	o	o	o	o	o	x	x	6	250	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.

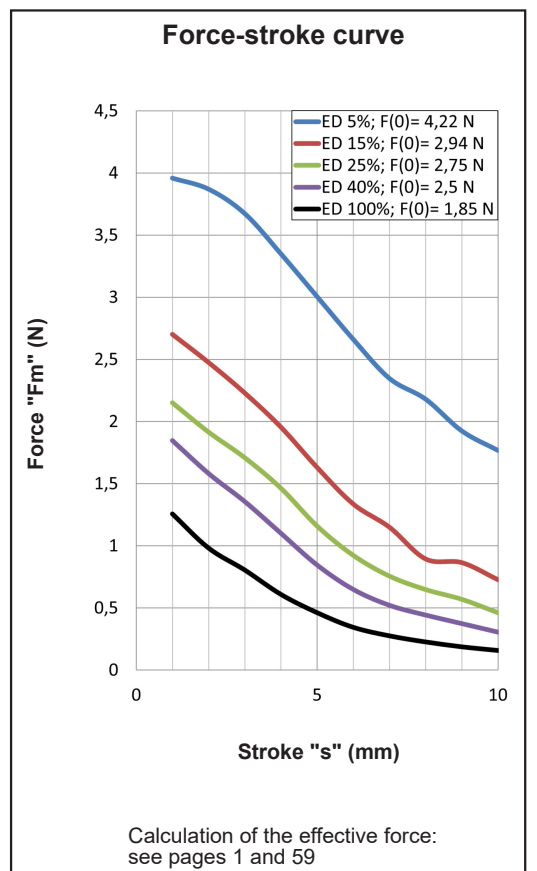
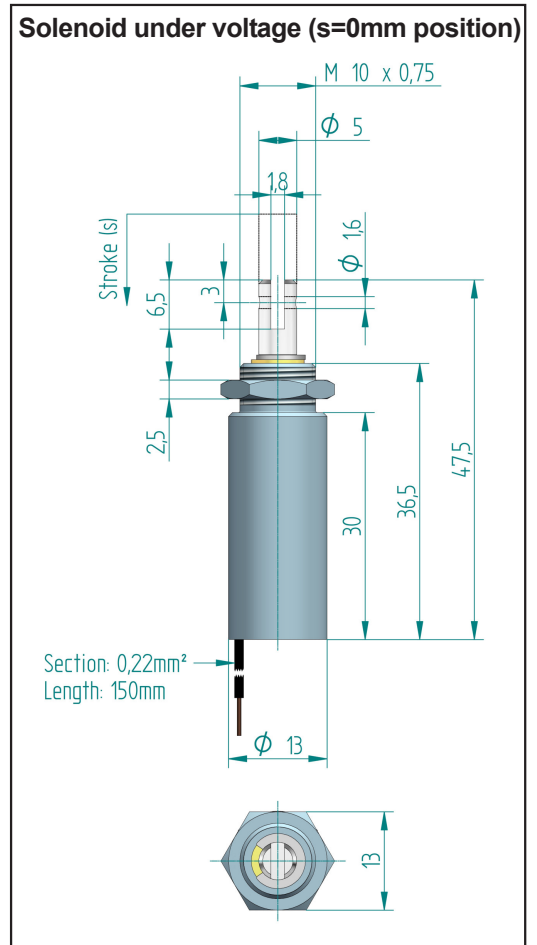
- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

Ordering code: ECM13-10/T --V ED---%

Voltage: 24Vdc; Duty cycle: ED100%:
 ECM13-10/T 24Vdc ED100%

Voltage: 12Vdc; Duty cycle: ED15%:
 ECM13-10/T 12Vdc ED15%



For fixation and mounting positions: see page 59

● **ECM 19/E TYPE**



Protection rate: **IP30**
 Insulation class: **B (130°C)**
 Reference cycle: **2 minutes**
 Standard stroke (s): **10 mm**
 Temperature rise "ΔV₃₁": **70°C**
 Working temperature: **-10 to 45°C**
 Work: **Push**

Release spring NOT incorporated in standard product. Available under demand.

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	7	17	28	45	140
(Fm) Solenoid force (N) 1)	0.5	1.2	2	3.2	6.6
Max time under voltage(s)	Inf	48	30	18	6
Opening time (ms) 2)	44	40	38	37	34
Release time (ms) 3)	39	39	38	38	36
Plunger weight (Kg)	0.020				
Solenoid weight (Kg)	0.080				

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								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	125	x	x
40	o	o	o	o	o	o	o	x	x	3	230	x	x
25	o	o	o	o	o	o	o	x	x	5	250	x	x
15	o	o	o	o	o	o	o	x	x	5	250	x	x
5	x	o	o	o	o	o	o	x	x	9	250	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.

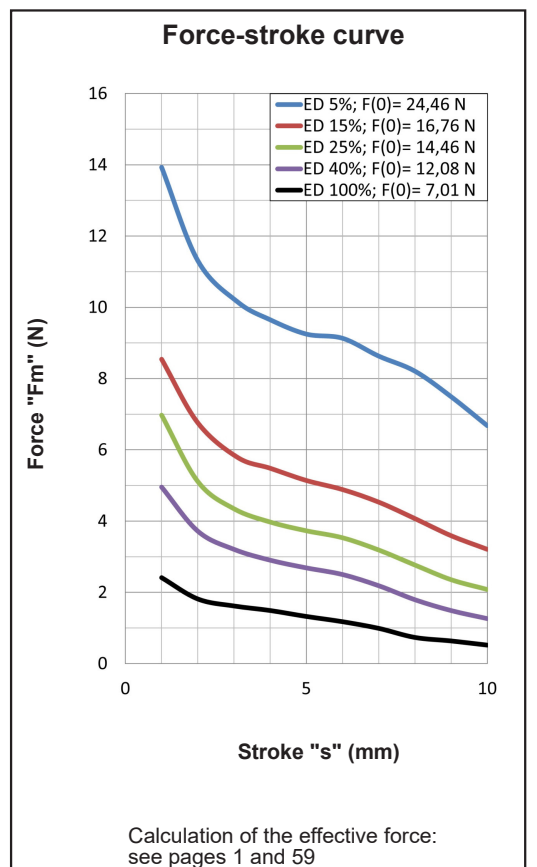
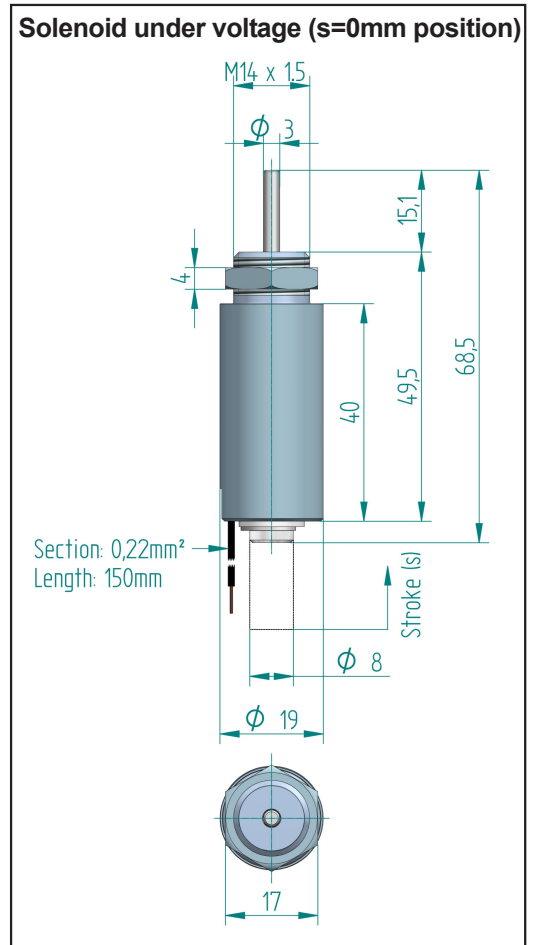
- The duty cycles described in the chart are standard, they can be manufactured in any intermediate value.

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

- Earthing is recommended if the metallic parts are accessible.

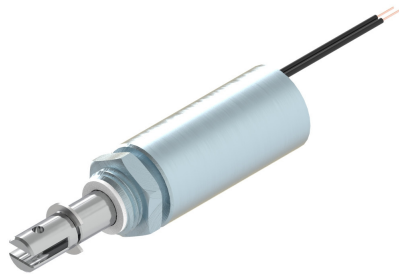
Ordering code: ECM19/E --V ED---% - Spring
 Voltage: 24Vdc; Duty cycle: ED100%: With spring:
 ECM19/E 24Vdc ED100% RS
 Voltage: 12Vdc; Duty cycle: ED15%: Without spring:
 ECM19/E 12Vdc ED15% RN

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



For fixation and mounting positions: see page 59

● **ECM 19/T TYPE**



Protection rate: **IP30**
 Insulation class: **B (130°C)**
 Reference cycle: **2 minutes**
 Standard stroke (s): **10 mm**
 Temperature rise "ΔV₃₁": **70°C**
 Working temperature: **-10 to 45°C**
 Work: **Pull**

Release spring NOT
 incorporated in standard
 product.

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	7	17	28	45	140
(Fm) Solenoid force (N) 1)	0.5	1.2	2	3.2	6.6
Max time under voltage(s)	Inf	48	30	18	6
Opening time (ms) 2)	44	40	38	37	34
Release time (ms) 3)	39	39	38	38	36
Plunger weight (Kg)	0.020				
Solenoid weight (Kg)	0.080				

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								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	125	x	x
40	o	o	o	o	o	o	o	x	x	3	230	x	x
25	o	o	o	o	o	o	o	x	x	5	250	x	x
15	o	o	o	o	o	o	o	x	x	5	250	x	x
5	x	o	o	o	o	o	o	x	x	9	250	x	x

Layout: o = Available ; x = Unavailable

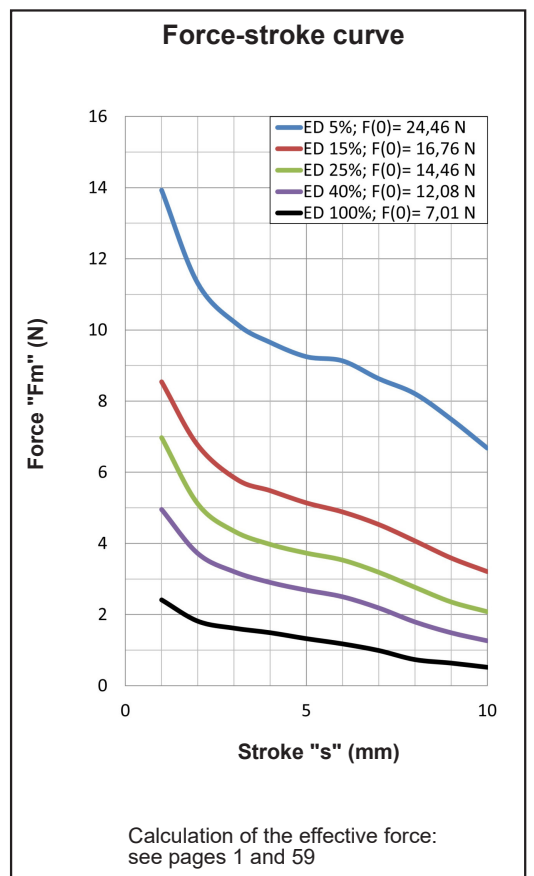
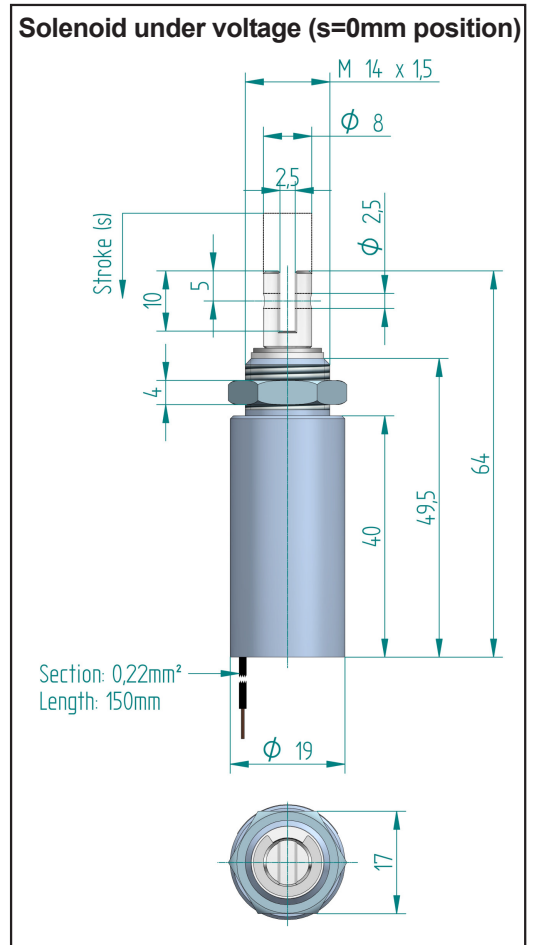
- Voltage under demand:
 They can be manufactured at voltages between the maximum and minimum voltage values shown in the chart.

- 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: ECM19/T --V ED---%
 Voltage: 24Vdc; Duty cycle: ED100%
 ECM19/T 24Vdc ED100%
 Voltage: 12Vdc; Duty cycle: ED15%
 ECM19/T 12Vdc ED15%



For fixation and mounting positions: see page 59

● **ECM 25/E TYPE**



Protection rate: **IP30**
 Insulation class: **B (130°C)**
 Reference cycle: **2 minutes**
 Standard stroke (s): **12 mm**
 Temperature rise "ΔV₃₁": **70°C**
 Working temperature: **-10 to 45°C**
 Work: **Push**

Release spring NOT incorporated in standard product. Available under demand.

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	10	25	40	65	200
(Fm) Solenoid force (N) 1)	0.6	1.5	2.3	3.4	8.4
Max time under voltage(s)	Inf	48	30	18	6
Opening time (ms) 2)	67	57	51	47	41
Release time (ms) 3)	65	63	60	58	55
Plunger weight (Kg)	0.050				
Solenoid weight (Kg)	0.190				

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								VDC		VAC		
	6	12	24	48	100	125	205	110	230	Min	Max	Min	Max
100	o	o	o	o	o	o	o	x	x	5	250	x	x
40	o	o	o	o	o	o	o	x	x	6	250	x	x
25	x	o	o	o	o	o	o	x	x	9	250	x	x
15	x	o	o	o	o	o	o	x	x	9	250	x	x
5	x	x	o	o	o	o	o	x	x	16	250	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.

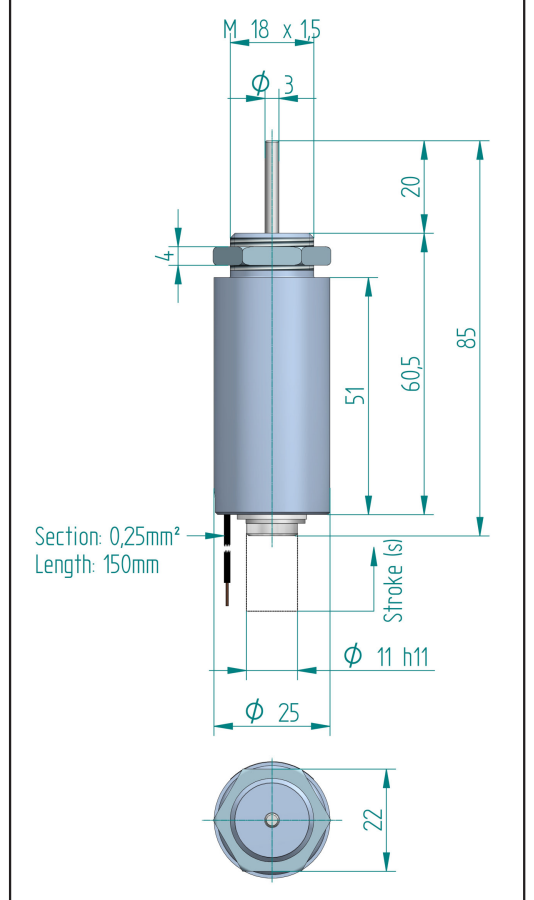
- If any customization from the original is needed, please ask us.

- Earthing is recommended if the metallic parts are accessible.

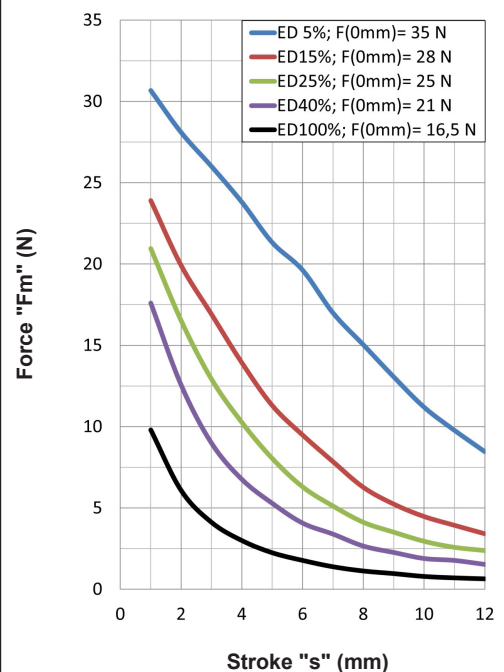
Ordering code: ECM25/E --V ED---% - Spring
 Voltage: 24Vdc; Duty cycle: ED100%: With spring
 ECM25/E 24Vdc ED100% RS
 Voltage: 12Vdc; Duty cycle: ED15%: Without spring
 ECM25/E 12Vdc ED15% RN

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

Solenoid under voltage (s=0mm position)



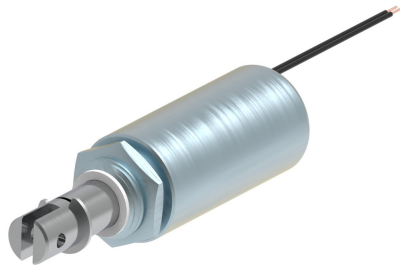
Force-stroke curve



Calculation of the effective force: see pages 1 and 59

For fixation and mounting positions: see page 59

● ECM 25/T TYPE



Protection rate: **IP30**
 Insulation class: **B (130°C)**
 Reference cycle: **2 minutes**
 Standard stroke (s): **12 mm**
 Temperature rise " ΔV_{31} ": **70°C**
 Working temperature: **-10 to 45°C**
 Work: **Pull**

Release spring NOT
incorporated in standard
product.

(ED) Duty-cycle ED(%)	100	40	25	15	5
(P20) Power at 20°C (W)	10	25	40	65	200
(Fm) Solenoid force (N) 1)	0.6	1.5	2.3	3.4	8.4
Max time under voltage(s)	Inf	48	30	18	6
Opening time (ms) 2)	67	57	51	47	41
Release time (ms) 3)	65	63	60	58	55
Plunger weight (Kg)	0.050				
Solenoid weight (Kg)	0.190				

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	x	x	5	250	x	x
40	o	o	o	o	o	o	o	x	x	6	250	x	x
25	x	o	o	o	o	o	o	x	x	9	250	x	x
15	x	o	o	o	o	o	o	x	x	9	250	x	x
5	x	x	o	o	o	o	o	x	x	16	250	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.

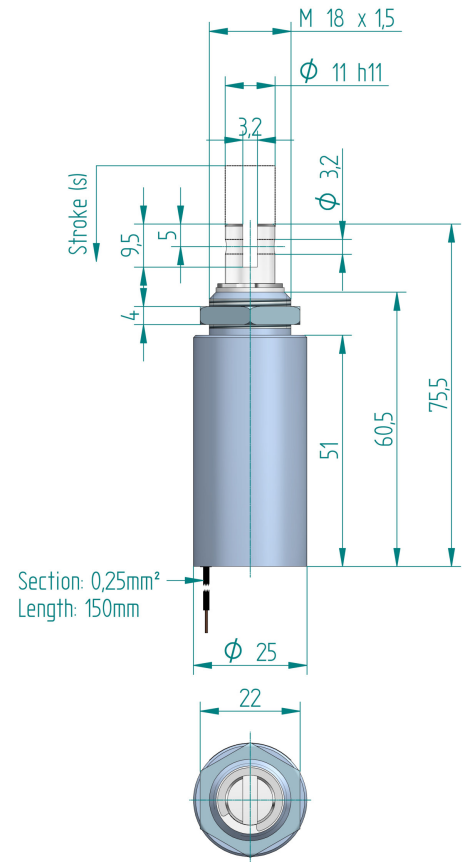
- Earthing is recommended if the metallic parts are accessible.

Ordering code: ECM25/T --V ED---%

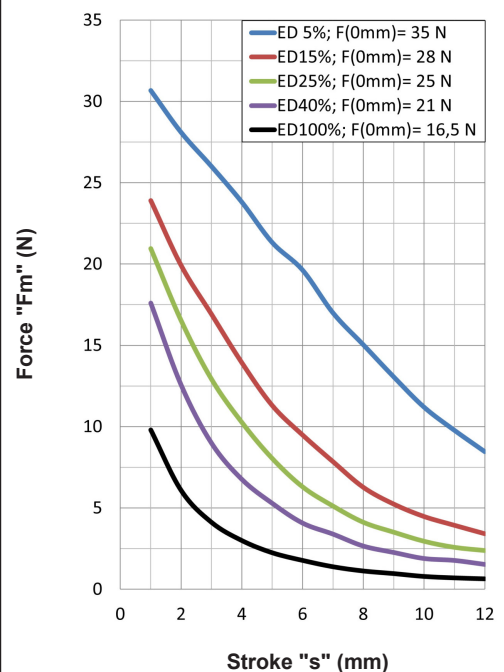
Voltage: 24Vdc; Duty cycle: ED100%:
ECM25/T 24Vdc ED100%

Voltage: 12Vdc; Duty cycle: ED15%:
ECM25/T 12Vdc ED15%

Solenoid under voltage (s=0mm position)



Force-stroke curve



Calculation of the effective force:
see pages 1 and 59

For fixation and mounting positions: see page 59