

electric chain hoist

DLK

serie



 **donati**

ELECTRIC CHAIN HOISTS

SERIES DLK

Compact and inexpensive, they represent the modern and convenient answer to world market requirements to lift up to 2000 kg loads with one single chain fall.

DONATI SOLLEVAMENTI S.r.l. designs and manufactures its range of electric hoists through industrialised processes based on a certified quality system in compliance with UNI ISO 9001 standards: 2008.



RIGOROUS

DONATI SOLLEVAMENTI S.r.l. engineers and designs technically innovative, thoroughly reliable, lifting machinery and components, making use of advanced industrialized production processes which ensure low costs for end-users.

Continuous attention to quality allows DONATI SOLLEVAMENTI S.r.l. to consistently manufacture highly engineered, meticulously designed products, using quality control measures on materials throughout the production process, right down to the finished product, involving the compa-

ny's entire organization, through its **certified quality assurance system** in accordance with **UNI ISO 9001:2008** norms (Certified ICIM N° 0114), regulating and controlling the company's management and production organization since 1993.



THE ELECTRIC CHAIN HOIST

SERIES DLK

- **Top quality product for capacities of up to 2000 kg.**

The DLK electric chain hoists respond to the needs of the international market which require products of guaranteed quality with a wide range of uses, long-term reliability, safety guarantees in all phases of operation, and convenient value for money.

- **Innovative concept, safe and reliable technical solutions, compact and modern design.**

The DLK hoist, one chain fall for up to 2000 kg, is safe because it eliminates any cause of danger, thanks to the absence of any return. The single chain fall eliminates one of the major wear causes, increasing the durability of the mechanisms, reducing interventions and maintenance costs, and guaranteeing reliable operation.

- **The warranty lasts 2 years from the delivery date.**

The DLK hoists stand out for their careful and modern design putting them at the top of their category. The quality of the components, the high technology used in the production of the mechanical parts, in the finishes and in the surface treatments, the constant and checked quality system UNI EN ISO 9001 which covers the company's entire production, allow **DONATI SOLLEVAMENTI** to offer a product in line with the latest international standards. The special water-repellent paintwork is obtained with an electrostatic process in complete isolation which guarantees its durability and a constant high performance, also in particularly hostile environments. The DLK electric chain hoists are part of the lifting products range manufactured by **DONATI SOLLEVAMENTI**, a leading company in its field in Italy, and one of the leading companies in the world in the lifting equipment sector.

IN HARMONY

WITH EUROPE

The rigorous attention placed on all phases of the engineering and design process for all products at **DONATI** is entirely in line with our diligent consideration for international norms and regulations, a guarantee for our many Customers and end-users, serving as a gateway for the internationalization and diffusion of our products worldwide.

The Electric chain hoists series **DLK**, are designed and manufactured in conformity with legislation in Italy and the following **European Community Directives**:

- **Machinery Directive 2006/42/CE**
- **Low Voltage Directive 2006/95/CE**
- **Electromagnetic Compatibility Directive 2004/108/CE**





THE RANGE

The standard range of DLK electric chain hoists

- manufactured in 4 sizes, DLK 1 - 2 - 3 - 4; for capacities between 125 and 2000 kg; FEM classification 2m; two hoisting speeds:
 - Main speed between 4 and 8 m/min
 - Auxiliary speed between 1 and 2.5 m/min

See table at page 10.

Standard configurations

The flexibility of utilization of DLK hoists allows 3 standard configurations:

1. **fixed execution:** eyebolt suspension as a standard, or hook suspension on request
2. **hand-pushed trolley configuration:** horizontal movement pushing the load. It is recommended for light duty and short load travel only
3. **electrically-operated trolley configurations:** this version is recommended when manual load pushing is not feasible, and for heavy duty. The load is moved by the trolley which is controlled by the hoist pushbutton panel.

One single chain fall for capacities up to 2000 kg: the safest way to lift

The single chain fall solution is better than the two chain falls for many reasons:

- **increased safety:** the operator can touch the hook and chain without dragging or crushing risks.
- **increased reliability and reduced maintenance:** the absence of return eliminates the main causes of wear and jamming.
- **reduced overall dimensions and increased hook run:** by eliminating the return, the hoist and chain box overall dimensions are reduced, while, on the other hand, the hook run is increased.
- **reduced operating costs:** chains and pulleys with return are among the most expensive spare parts of the electric hoist.
- **increased use flexibility:** the hoist becomes more versatile, with the chain outlet in any direction and control of the hook run levels.

CONFORMITY TO NORMS

AND REGULATIONS

- DLK electric chain hoists and trolleys are designed and produced following the “**Essential Safety Requirements**” of **Enclosure I of the Community Directive 2006/42/CE**.

Regarding what was stated in Enclosure II of the Directive 2006/42/CE, the hoist can be put on the market having the CE Marque and the EC Declaration of Conformity - Enclosure II A.

Reference frame

The design and manufacture of DLK electric chain hoists conform to the following rules and technical regulations:

- EN ISO 12100 parts: 1a - 2a/2005 “Safety of the machinery”
- EN ISO 13849-1/2008 “General principles for design”
- EN 12077-2/2008 “Limiting and indication device”
- EN 60204-32/98 “Safety of machinery electrical equipment of machines”
- EN 60529/92 “Degrees of protection provided by enclosures (IP code)”
- ISO 4301-1/86 “Lifting equipment classification”
- DIN 15401 “Lifting hooks for lifting appliances; Single hooks”
- FEM 1.001/98 “Rules for the design of hosting appliances”
- FEM 9.511/86 “Classification of mechanisms”
- FEM 9.671/88 “Chain qualities, selection criteria and requirements (for chain hoists DLK series)”
- FEM 9.683/95 “Selection of lifting and travel motors”
- FEM 9.755/93 “Measures for achieving safe working periods for serial hoists units”(S.W.P)
- FEM 9.941/95 “Graphical symbols for control devices”

Protection and insulation of electrical parts

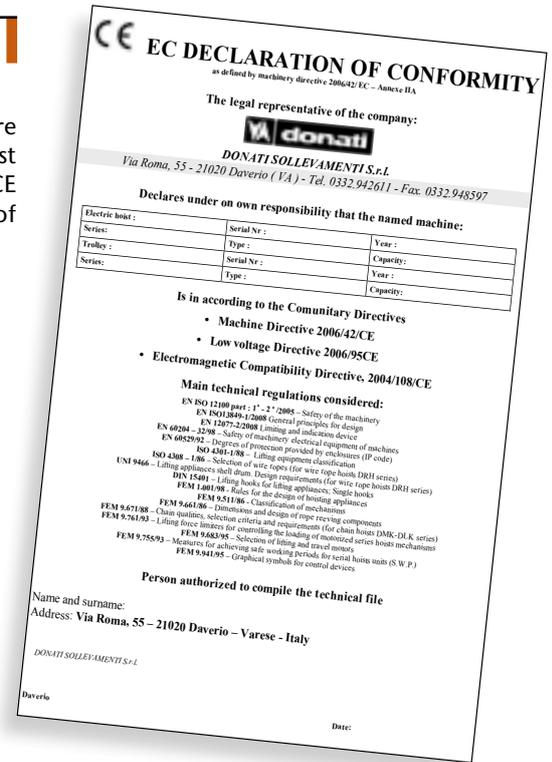
Standard supply:

- Electric-braking hoist and self-braking translation motor: Protection IP55 – Insulation class “F”
- Limit switch: Minimum protection IP65 – Maximum insulation voltage 500 V
- Cables: CEI 20/22 II - Maximum insulation voltage 450-750 V

Electrical power supply

The DLK electric chain hoists are designed to be powered with alternate current with:

- three-phase voltage of 400V–50 Hz / on request 415V–50 Hz according to IEC 38-1.



Nominal conditions of use in standard execution

- Temperature of use: minimum -10°C ; maximum $+40^{\circ}\text{C}$
- Maximum relative humidity: 80%
- Maximum altitude 1000 m above sea level.
- The machine must be placed indoors, in a well-ventilated place free of corrosive vapours (acid vapours, saline mist, etc).

Noise

- The level of acoustic pressure emitted by the hoist at full load is always less than a level of 85dB(A). The incidence of environmental characteristics such as sound transmission from the ground through metallic structures, reflections caused by combined machines and walls is not included in the level indicated.
- The vibrations produced by the hoist are not hazardous to the health of the personnel operating it.

Service unit classification

- The DLK electric chain hoists and the associated electric trolleys are sized to operate according to the service unit classification 2m (according to FEM 9.511/86); corresponding to ISO-M5 (according to ISO 4301/88); motor sizing: FEM 9.683/95.

Service group FEM (ISO)		2 m (M 5)	
Ratio of intermittence RI %		40 %	
N° Start-ups per hour (A/h)		240	
N° Cycles per hour (C/h)		40	
Temporary use	Running time at main speed (min)	30	
	Running time at low speed (min)	3.5	
	Maximum N° of start-ups per hour (A/h)	10	
Two-speed double-polarity motors	N° Start-ups per hour (A/h)	Main speed	1/3 (33.3 % of total N° of start-ups per hour)
		Low speed	2/3 (66.7 % of total N° of start-ups per hour)
	Tm = Daily running time	Main speed	2/3 (66.7 % of the average daily running time)
		Low speed	1/3 (33.3 % of the average daily running time)

PARTS

OF THE ELECTRIC HOIST



Reduction gear:

epicyclic crown wheel with heat-treated high-strength steel gearing supported by oil-bath lubricated ball bearings. Noise level at full load is less than 85 db. The aluminium casing is finned externally for more effective heat dissipation by radiation.

Electric motor:

three-phase asynchronous two-pole motor with cylindrical rotor.

Electromagnetic brake:

electric brake installed on the end of the motor shaft, with braking surface acting simultaneously onto two steel discs, thereby allowing a quick, immediate and safe brake.

Chain:

the chain is gauged and made of high-strength steel rod having an ultimate tensile strength of 80 kg/mm², and ultimate elongation higher than 10%. The applicable safety coefficient is always better than 5 [RES. 4.1.2.4 - Machinery Directive]. The heat and galvanising treatments applied to the chain ensure high resistance to wear, aging and corrosion.

Load sprocket:

the load sprocket is heat treated, and has five pockets. The pockets are machined by use of precision machinery. The sprocket drives the chain, and ensures optimized chain motion.

Chain guide (inserter/extractor):

this component provides for insertion and extraction of the chain links into and from the pockets of the load sprocket, both in ascent and descent [RES. 4.1.2.4 - Machinery Directive].

Load hook:

the hook, made of high strength forged steel, is fitted with a safety device [RES. 4.1.2.6 e - Machinery Directive], and rotates on a thrust bearing.

Bottom block:

it connects the hook to the revolving chain, made of light alloy, sizes 1-2-3, and steel, size 4; it is equipped with a highly-resistant steel chain locking pin.

Chain stops:

the stop is fitted on the dead end of the chain to ensure the chain does not drive through the hoist.

Chain box:

the chain box is available in several sizes as a function of hook travel. It is made of shock-resistant plastics and is fitted with suspensions which ensure freedom of movement.

Clutch device:

the clutch is an emergency device that replaces the traditional electrical limit switches as chain full up and down stops. It also operates as an overload protection [RES. 4.2.2. - Machinery Directive]. The clutch discs are asbestos-free, and are pre-loaded through a set of Belleville washers.

Balancer:

the balancer is connected to the clutch joint, and provides for correct hoist balancing. It absorbs the heat generated during clutch operation.

Suspension:

it is produced with an eyebolt suspension; are available on request, the executions with hook suspension or with eyebolt 90° version for longitudinal positioning of the hoist.

Lifting limit switches:

available on request, limit the hook's ascent and descent run [RES. 4.1.2.6 a) - Enclosure 1 Machinery Directive]. They are made of two precision microswitches which function according to the principle of "slow positive opening" and work on the auxiliary circuit of the control device of the lifting motor.

ELECTRICAL CONTROLS

Low Ac voltage 48V - 50Hz electrical equipment, made with a PCB (Printed Circuit Board), which includes a up/down remote contactor, double speed remote contactor, general line contactor, transformer for the control circuit low voltage power supply, transformer protection fuse, terminal block for the auxiliary and power circuit connections, and electromagnetic brake power supply/rectifier.

The components are contained in a watertight box made with shock-resistant thermoplastic material with an IP 55 protection class. The control equipment is fastened on the motor side of the hoist.

The controls are activated by the watertight ergonomic pushbutton panel made of self-extinguishing shock-resistant thermoplastic material with an IP 65 protection class.

The emergency stop function [RES. 1.2.4 - Machinery Directive Annex I] is activated by a mushroom push-button, which puts the control circuit in forward position by means of an intentional release action [RES. 1.2.4.3 - Machinery Directive Annex I].

The pushbutton panel is connected to the hoist by means of a multicore electric cable equipped with built in strainer wires.

DMT TROLLEYS

The trolleys are used when loads are to be moved horizontally. They are identified with code DMT, and are available in the following versions:

- type **SM**, hand-pushed
- type **EM**, electrically-operated.

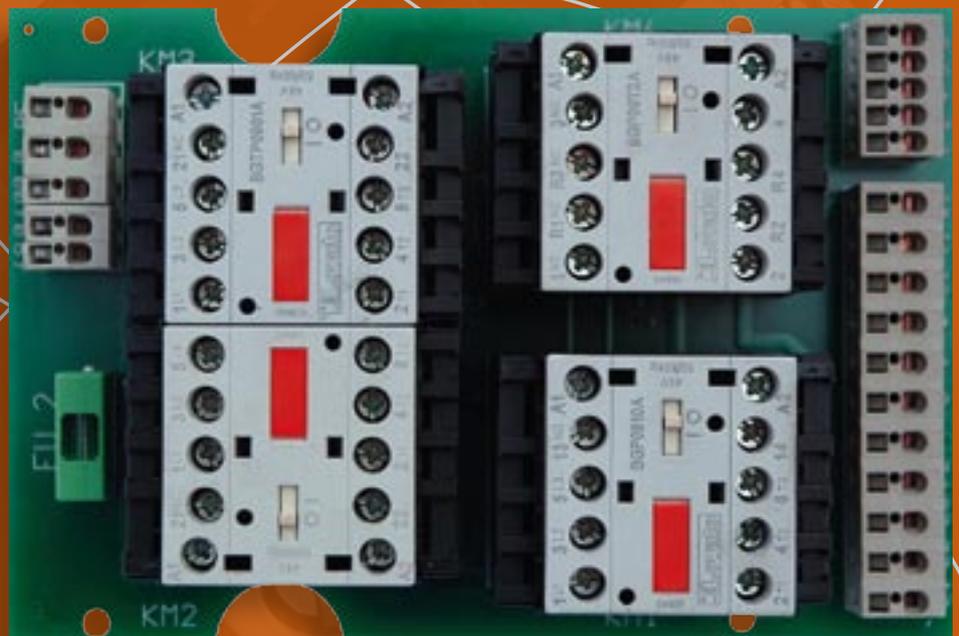
They run on the lower flange of the beam and are adjustable for flange width. They are made of pressed steel fitted with stirrups to prevent drop or derailling [RES. 4.1.2.2 - Machinery Directive], and equipped with shock absorbing buffers. The trolleys are fitted with pressed steel machined wheels rotating on permanently lubricated ball bearings.

Geared motor with self-braking motor: it drives the trolley geared wheels in the EM electric version [RES. 4.1.2.6. c - Machinery Directive Annex I].

Limit switches: these switches limit the horizontal travel of the electrically-operated trolley on the beam [RES.4.1.2.6 a - Machinery Directive].

Towing arm: the towing arm, which is the connecting element between the trolley and the power supply is available for all types of trolleys of the DMT series. It is adjustable in all directions and provides for power supply cable towing as needed to ensure that the cable is not torn (when supplied).

DMT trolley electric controls: are fitted in a IP 55 container integrated in the translation motor, which includes a remote left/right pole changing contactor and is pre-set for a translation limit switch.



CRITERIA OF USE

AND OPERATING LIMITS

It is necessary to check the parameters which characterize operating limits of the DLK electric chain hoists to be able to have a complete correspondance between the DLK electric chain hoists and the service they were designed for. The operating limits are: **actual lifting capacity**, **state of stress** and **average duration of daily use**.

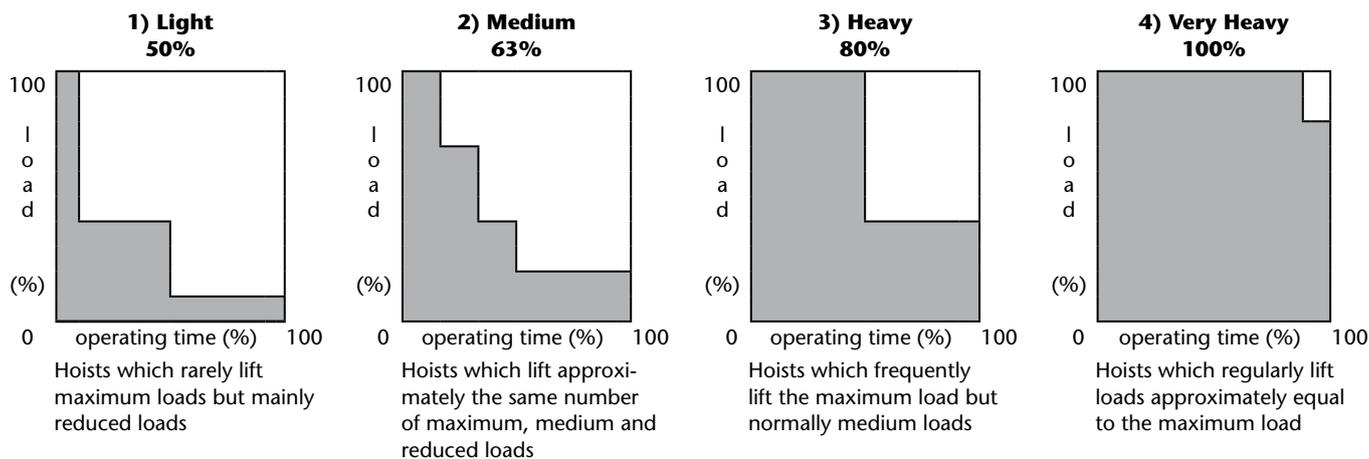
1) Actual lifting capacity

This is determined by the heaviest load to be lifted.

$$\text{Lifting capacity} = \text{kg}$$

2) State of stress

The state of stress is evaluated considering the actual entity of the loads to be lifted and it is attributable to one of the four spectrums of load shown below which determine the type of service.



3) Average duration of daily use - Tm = Hours

For lifting operations the average duration of use is decided in the following way:

$$T_m \text{ (hours)} = \frac{C_e \times C/h \times T_i}{30 \times V}$$

Actual hook run
 $C_e = m$

$C_e = m$

It is the average of the actual runs of the load

Operative cycles
 $C/h = N^\circ \text{ cycles per hour}$

$C/h = N^\circ \text{ cycles per hour}$

It is the number of complete ascents and descents carried out in an hour

Running time
 $T_i = \text{hours}$

$T_i = \text{hours}$

Hoist running time in a whole day

Lifting speed
 $V = m/\text{min.}$

$V = m/\text{min.}$

It is the distance covered by the load in a minute

Check that the **State of stress** and the **average duration of daily use** verified are not in contrast with the data in the following table; and, according to the capacity, choose the hoist.

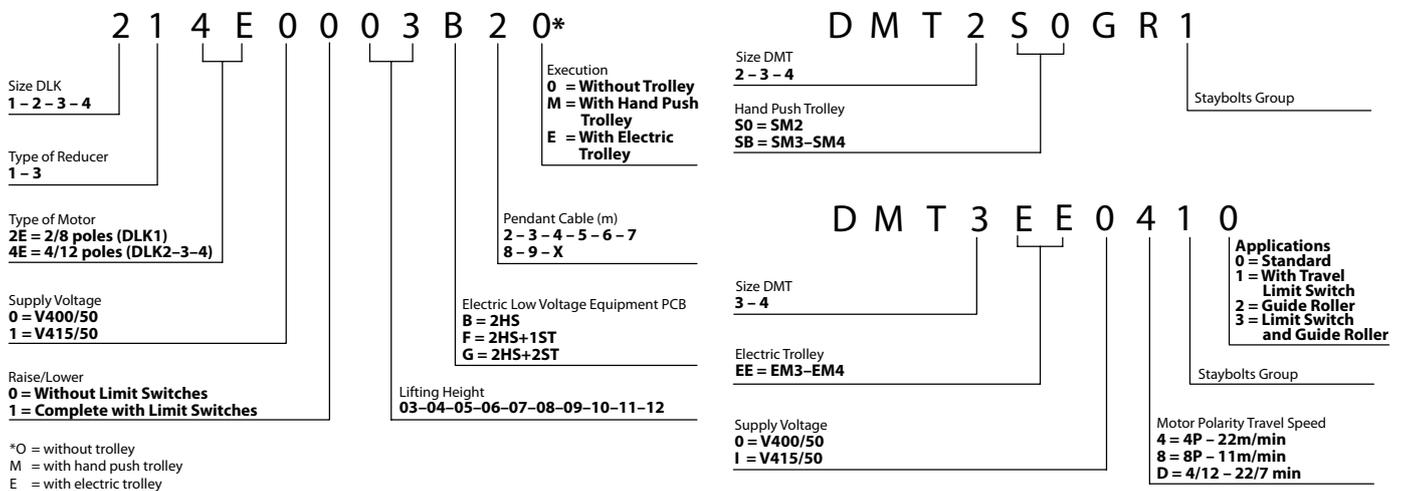
Operating limits of DLK hoists in relation with the service groups of the mechanisms, according to FEM 9.511/86 (ISO 4301/88)							
FEM (ISO) Group	Average duration of daily use - Tm = Hours; with load				Intermittance rapport %	N° of starts per hour	N° of cycles per hour
	1) Light	2) Medium	3) Heavy	4) Very heavy			
1 Bm (M 3)	≤ 2	≤ 1	≤ 0.5	≤ 0.25	RI = 25 %	A/h = 150	C/h = 25
1 Am (M 4)	≤ 4	≤ 2	≤ 1	≤ 0.5	RI = 30 %	A/h = 180	C/h = 30
2 m (M 5)	≤ 8	≤ 4	≤ 2	≤ 1	RI = 40 %	A/h = 240	C/h = 40

CHARACTERISTICS AND TECHNICAL DATA

FOR DLK CHAIN HOISTS AND DMT TROLLEYS

Capacity (Kg)	FEM Group	Type DLK	2 Lifting speed (m/min)	Lifting motor power (kW)	DMT trolley for hoist and related speed (m/min) E = electric trolley S = manual-push trolley				Trolley motor power (kW) Speed (m/min)			Chain type	Weight of 1 meter of chain (kg/m)
					S	11	22	22 / 7	11	22	22 / 7		
125	2m	132E	8 / 2	0.2 / 0.05	SM2	EM3	EM3	EM3	0.12	0.25	0.25 / 0.08	4x12	0.38
250	2m	112E	4 / 1	0.2 / 0.05	SM2	EM3	EM3	EM3	0.12	0.25	0.25 / 0.08	4x12	0.38
	2m	234E	8 / 2.5	0.4 / 0.12	SM2	EM3	EM3	EM3	0.12	0.25	0.25 / 0.08	5x15	0.58
500	2m	214E	4 / 1.2	0.4 / 0.12	SM2	EM3	EM3	EM3	0.12	0.25	0.25 / 0.08	5x15	0.58
	2m	334E	8 / 2.5	0.8 / 0.24	SM3	EM3	EM3	EM3	0.12	0.25	0.25 / 0.08	7x21	1.16
1000	2m	314E	4 / 1.2	0.8 / 0.24	SM3	EM3	EM3	EM3	0.12	0.25	0.25 / 0.08	7x21	1.16
	2m	434E	8 / 2.5	1.6 / 0.48	SM4	EM4	EM4	EM4	0.12	0.25	0.25 / 0.08	10x28	2.42
2000	2m	414E	4 / 1.2	1.6 / 0.48	SM4	EM4	EM4	EM4	0.12	0.25	0.25 / 0.08	10x28	2.42

Key and example of the identifying characteristics of the hoists and trolleys using codes

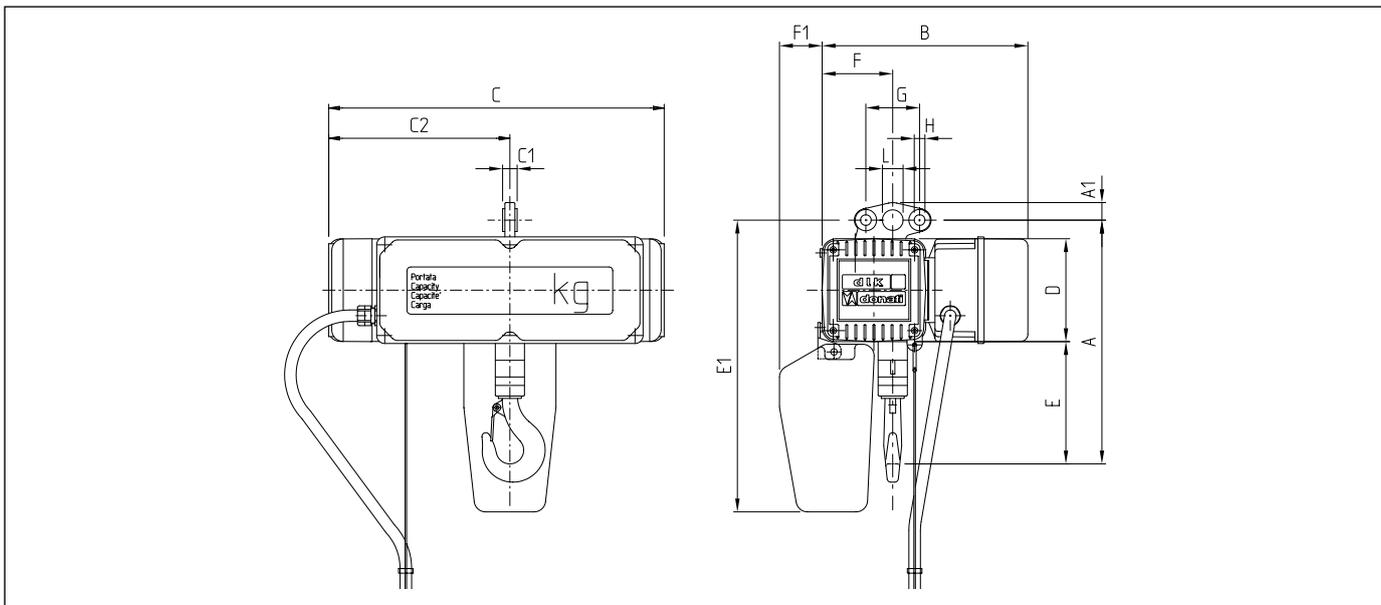


TYPES OF TENSION RODS ACCORDING TO MIN. AND MAX DIMENSIONS OF BEAMS

Trolley Type	Beam Type	Group 1	Group 2	Group 3	Group 4	*Minimum radius of internal curvature (mm)
SM2	INP	80 - 160	180 - 280	300 - 380	400	1000
	IPE	80 - 140	160 - 240	270 - 300	330 - 500	
	HEA	/	100 - 120	140	160 - 200	
	Wing min. - max.	42 - 82	83 - 121	122 - 156	157 - 202	
SM3	INP	120 - 240	260 - 450	500 - 600	/	1300
	IPE	120 - 220	240 - 360	400 - 600	/	
	HEA	/	140 - 160	180 - 220	/	
	Wing min. - max.	40 - 110	111 - 170	180 - 220	/	
SM4	INP	160 - 280	300 - 450	500 - 600	/	1500
	IPE	160 - 240	270 - 400	450 - 600	/	
	HEA	/	160 - 180	200 - 220	/	
	Wing min. - max.	48 - 120	125 - 180	185 - 220	/	
EM3	INP	120 - 240	260 - 450	500 - 600	/	1300
	IPE	120 - 220	240 - 360	400 - 600	/	
	HEA	/	140 - 160	180 - 220	/	
	Wing min. - max.	40 - 110	111 - 170	180 - 220	/	
EM4	INP	160 - 280	300 - 450	500 - 600	/	1500
	IPE	160 - 240	270 - 400	450 - 600	/	
	HEA	/	160 - 180	200 - 220	/	
	Wing min. - max.	48 - 120	125 - 180	185 - 220	/	

*Available on request: electric trolleys suitable to run on a bend by guide roller kit.

DLK ELECTRIC CHAIN HOISTS - OVERALL DIMENSIONS - WEIGHTS - EYE SUSPENSION



Size	Type DLK	*Hoist weight (kg)	Overall dimensions (mm)											
			A	A1	B	C	C1	C2	D	E	F	G	H	I
1	132E	23	276	23	253	384	19	206	120	130	80	70	14	27
	112E	23	276	23	253	384	19	206	120	130	80	70	14	27
2	234E	33	310	23	268	438	19	236	135	151	92	70	14	27
	214E	33	310	23	268	438	19	236	135	151	92	70	14	27
3	334E	50	378	28	293	515	25	275	160	188	114	70	14	30
	314E	50	378	28	293	515	25	275	160	188	114	70	14	30
4	434E	80	483	32	332	585	27	319	200	245	146	90	20	35
	414E	80	483	32	332	585	27	319	200	245	146	90	20	35

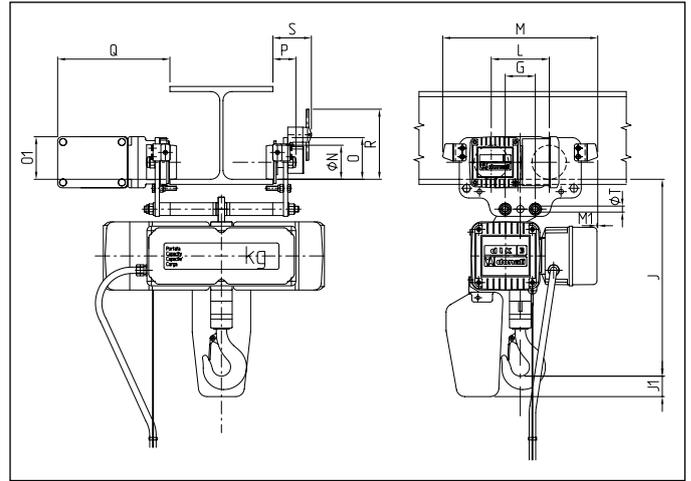
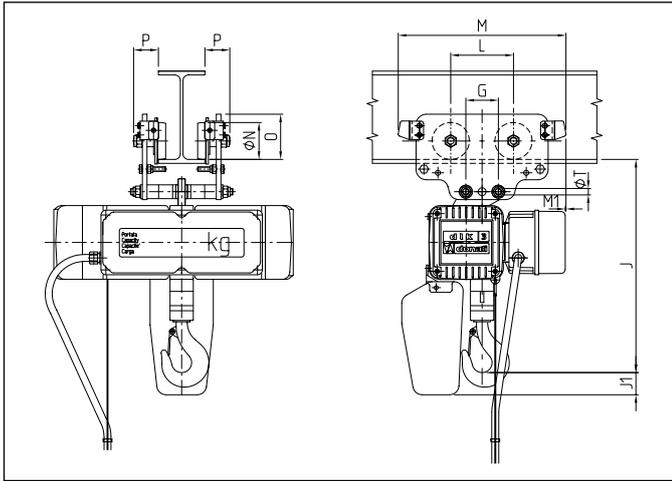
- * Weight of hoist with 3m hook run and 2m pushbutton panel cable.
- ** With application of raise/lower electric limit switches A and E dimensions increase by:
 - DLK 1 + 45 mm
 - DLK 2 + 40 mm
 - DLK 3 + 45 mm
 - DLK 4 + 60 mm

Chain box type (C-D-E-F-G-H-I)

Size		C	D	E	F	G	H	I
1	Max hook run (m)	5	8	12	20	32	70	115
	E1	347	372	397	427	467	522	607
	F1	47	63	77	100	120	150	200
2	Max hook run (m)	/	4	7	12	18	24	85
	E1	/	385	410	440	480	535	620
	F1	/	56	70	92	112	142	192
3	Max hook run (m)	/	/	3	5	10	12	24
	E1	/	/	440	470	510	560	650
	F1	/	/	55	77	97	127	177
4	Max hook run (m)	/	/	/	/	4	8	16
	E1	/	/	/	/	560	610	700
	F1	/	/	/	/	80	110	160

NOTE: With application of raise/lower limit switches the maximum capacity of the chain box decreases by 1 m of hook run and the E1 dimension increases by 25 mm.

DLK ELECTRIC CHAIN HOISTS WITH DMT TRAVEL TROLLEYS OVERALL DIMENSIONS - WEIGHTS



DLK Size	DMT Trolley type	*Hoist trolley weight (kg)	Overall dimensions (mm)											
			J	L	M	M1	ØN	O	O1	P	**Q	R	S	ØT
1	SM2	29	326	100	236	54	52	72	/	20	/	/	/	M16
	EM3	58	346	135	362	-10	80	98	100(108)	54	263(280)	165	90	M14
2	SM2	39	360	100	236	58	52	72	/	20	/	/	/	M16
	EM3	68	380	135	362	-6	80	98	100(108)	54	263(280)	165	90	M14
3	SM3	62	448	135	362	-3	80	98	/	54	/	/	/	M14
	EM3	85	448	135	362	-3	80	98	100(108)	54	263(280)	165	90	M14
4	SM4	105	560	160	402	-15	100	120	/	60	/	/	/	M20
	EM4	130	560	160	402	-15	100	120	110(118)	60	269(286)	165	96	M20

* Weight referred to 3m- hook-run hoist.

** Dimensions for 2-speed trolley in brackets.

NOTE When the hoist is equipped with raise/lower limit switches, dimension J increases as much as dimensions A and E, page 9 and note regarding the chain box.

Maximum reactions of DMT trolleys wheel on beam flange

DLK Size	Max capacity (kg)	DMT Trolley type	Overall dimensions (mm)					
			Ør	i	b	*R max (kg)	Sp max	
1	250	SM2	52	5	15	80	17	
		EM3	80	7	16	87	26	
2	500	SM2	52	5	15	154	17	
		EM3	80	7	16	161	26	
3	1000	SM3	80	7	16	309	26	
		EM3						
4	2000	SM4	100	9	19	608	26	
		EM4						

*Max R calculated with a dynamic coefficient of 1.15 and no M increasing coefficient

ELECTRIC CHARACTERISTICS OF MOTORS, FUSES AND POWER CABLES

Hoist type	Motor type	Poles	Power kW	Power factor cosφ	Ia 50Hz - (In) 50Hz 400V	Fuses aM 400V A	Power cable section 400V (ΔU20)	
							Ømm ²	L m
112E - 132E	71C3AS1	2 / 8	0.2 / 0.05	0.5 / 0.6	4.6 / 1.4 (1.3 / 0.9)	4	1.5	≤100
214E - 234E	80C5AS2	4 / 12	0.4 / 0.12	0.6 / 0.6	5.5 / 2.5 (2 / 1.7)	4	1.5	≤100
314E - 334E	90C5AS3	4 / 12	0.8 / 0.24	0.65 / 0.65	13.5 / 4.2 (2.9 / 2.3)	6	1.5	≤70
414E - 434E	100C5AS4	4 / 12	1.6 / 0.48	0.68 / 0.5	27 / 7.5 (5 / 4.3)	10	2.5	≤40

Trolley type	Motor type	Poles	Power kW	Power factor cosφ	Ia 50Hz - (In) 50Hz 400V
EM3 - EM4	71C4TS1	4	0.25	0.43	3.8 (1.4)
EM3 - EM4	71C8TS1	8	0.12	0.53	2.5 (1.3)
EM3 - EM4	80C5TS2	4/12	0.25/0.08	0.54/0.7	4.5/1.8 (1.4/1.2)

HIGH QUALITY PRODUCTS

BY A LEADING COMPANY

Established in 1930, DONATI SOLLEVAMENTI Srl is present in the hoisting and internal transport sector with a wide range of products for handling small and medium capacity loads.

DONATI SOLLEVAMENTI Srl is one of the few companies in the world that can guarantee a full range of standard hoisting electrical mechanisms and equipment. Made with high quality materials through state of the art manufacturing processes, Donati products meet all the requirements of the international market.

The DONATI product range includes:

- Electric chain and rope hoists in various sizes
- Manual rotation and electric jib cranes
- Suspended systems made in channel profile
- Drives, endcarriages and wheel units for handling bridge cranes, gantry cranes, etc.



since 1930



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ISO 9001
Cert. n. 0114

