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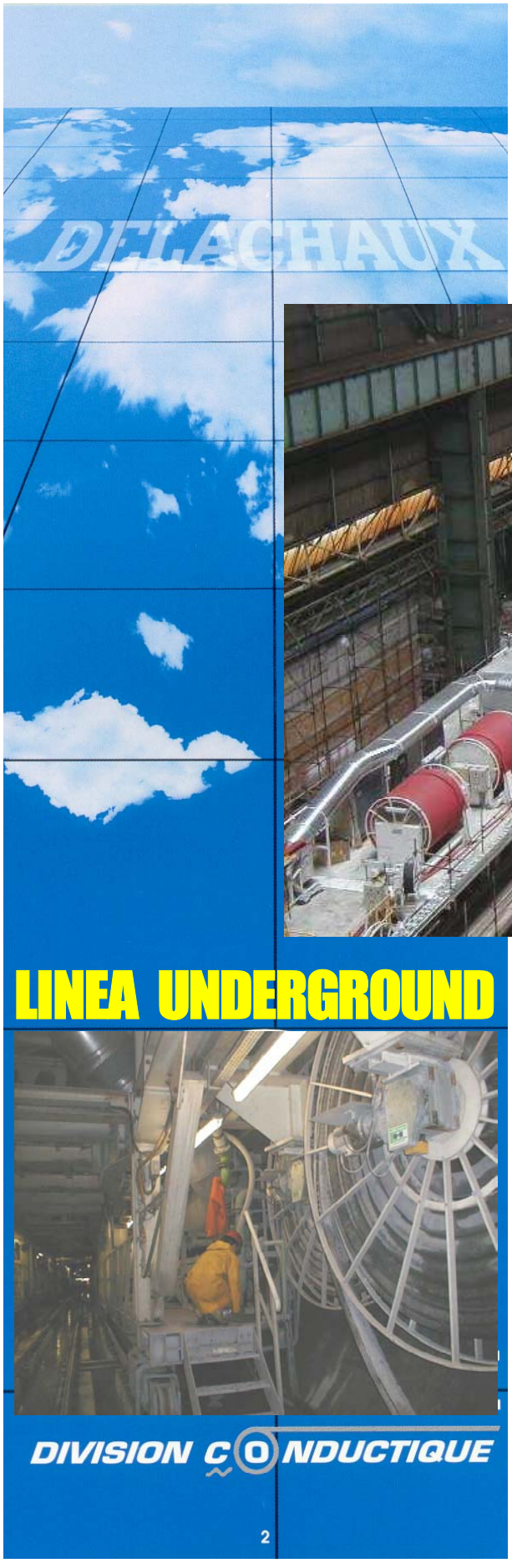

FITTINGS
FOR UNDERGROUND

TECHNICAL MANUAL

Cod. LC 60 000EB
July 2003

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SLIDES AND FEEDING TRUCKS

Slides and feeding trucks are usually used for driving in tunnels the feeding systems (cable reels or cable reels and control panels). Comes has set up, thanks to its twenty-years experience, a range of slides and trucks right for this function.

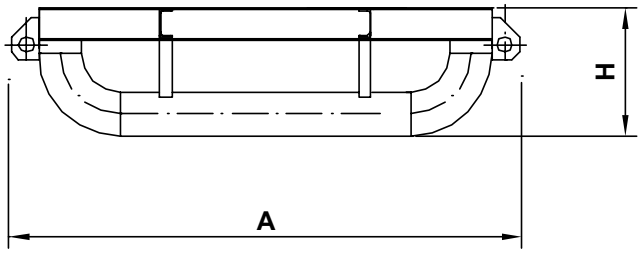
❑ SLIDES

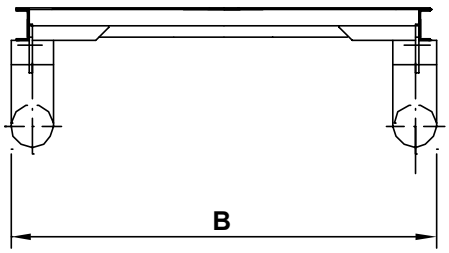
slides are considered as supports for the cable reel itself or , if necessary, for the cable reel and the control panels or the feeding towers that are towed inside the tunnels for the feeding of the machines operating on the front. Their structure allows an easy towing also if the ground is uneven and muddy, as the floor of the tunnels is during the digging. The main dimensions of the slides manufactured by Comes are described in the table below: it is obviously possible to manufacture slides having different dimensions.

GENERAL FEATURES

Slides	Tubular section bar white painted RAL 9001
Flat car	Steel section bar, checker plate flooring.
Tow hook	N° 4 holed plates (2 x each side), for tow with ropes.

STANDARD DIMENSIONS





Type	Dimensions (mm)		
	A	B	H
SL 2217	2200	1700	700
SL 2219		1900	
SL 2222		2200	
SL 2617	2600	1700	
SL 2619		1900	
SL 2622		2200	
SL 4017	4000	1700	530
SL 4022		2200	
SL 4317	4300	1700	
SL 4322		2200	

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❑ FEEDING TRUCKS

Feeding trucks, as the slides, can bring or only cable reels or cable reels and electrical equipment for the feeding of machines at the front. The standard assortment of the stuff carried by the trucks includes : power cable reels (generally MT), telephone systems cable reels, earthling cable reels and transformer station and electrical control panel. Usually, the trucks have, on the front, a protective barrier that protects the equipment on board from stones and debris that are thrown by the mines during the explosion. Usually the trucks are arranged on two axes; for particular needs we can also supply one axe trucks equipped with stabilizers for the stationing phase. The main dimensions of the tired truck are described in the table below, even if it possible to manufacture trucks having different dimensions. Comes has developed in the last years a considerable experience in manufacturing these systems for the tunneling; for this reason we can study with the customer special shapes and solutions that allow the most efficient performances. If the ground has different levels, we can plan also tracked truck.

GENERAL FEATURES

Flat car	Steel section, checker plate flooring white painted RAL 9001
Axles	2 axles, both movable in order to reverse the sense of tow of the truck. The axle that is not towing can be locked by a fast system. The capacity of each axle is 9.000 Kg.
Wheels	4 assembled wheels. Pneumatic, 860x275 mm. Capacity for each wheel of 3.850 Kg.
Fifth Wheel	2 balls steering fifth wheel capacity 8.000 Kg each.
Stationing Brake	blocks with manual drive by handwheel.
Tow	with swinging rudder and a type approved tow hook capacity 30.000 Kg.

OPTIONS

Protective Barrier	Strong steel section bar, high thickness checker plate flooring white painted RAL 9001.
Special Wheels	Different sizes and capacities. Anti- flattening fill with polyurethane.
Special Rudder	double joint to recover the variability of the tow height.
Ramp	painted steel, retractable during the towing.
Compressed air	Feeding systems for compressed air implements and for electrical substations pressurization for explosion proof fittings.
Stationing blocks	4 stationing steel block to be placed under the wheels.
Retroreflector	4 to be placed on front and back doors.
Turn-key Service	on demand, we can also supply complete trucks (assembly of all components): cable reels, MT and LT cables, electrical substations, control panels and ant other plants.

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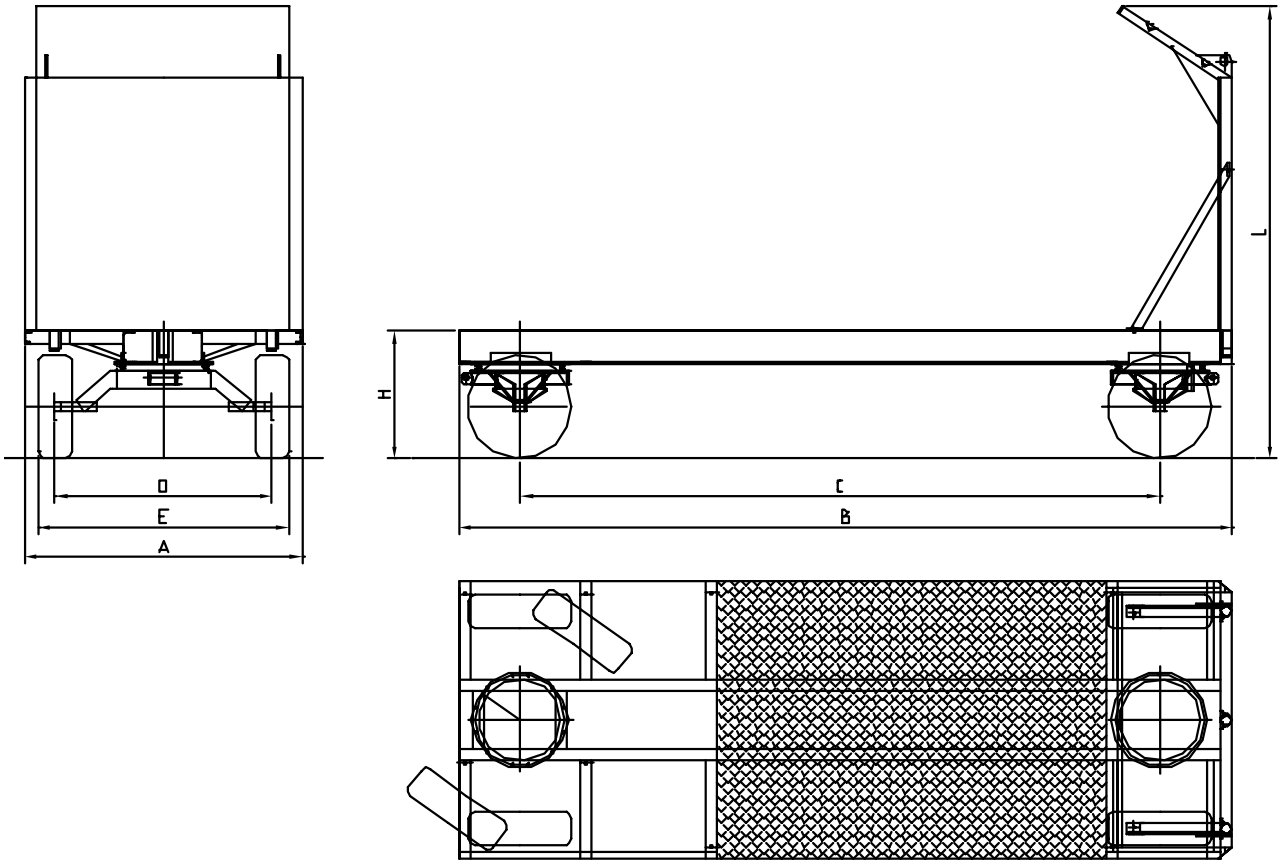

Type	Dimensions (mm)						
	A	B	C	D	E	H	L
CAR 3520	3500	2000	2400	1500	1775	1060	3750
CAR 4020	4000		2900				
CAR 4520	4500		3400				
CAR 5023	5000	2300	3900	1800	2075		
CAR 5523	5500		4400				
CAR 6023	6000		4900				
CAR 6423	6400		5300				
CAR 6923	6900		5800				

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DECOILERS

Very often, in underground yards, it is necessary to uncoil very heavy cable spools or cable spools that, during the unwinding phase, must allow the front feeding. Every time you need to wind the cable instead of the standard cable reel you can use decoilers. These ones can be manual or motorized, with or without electric slip ring. Obviously, any type of cable can be uncoiled : power low or medium voltage, signals, phone cables.

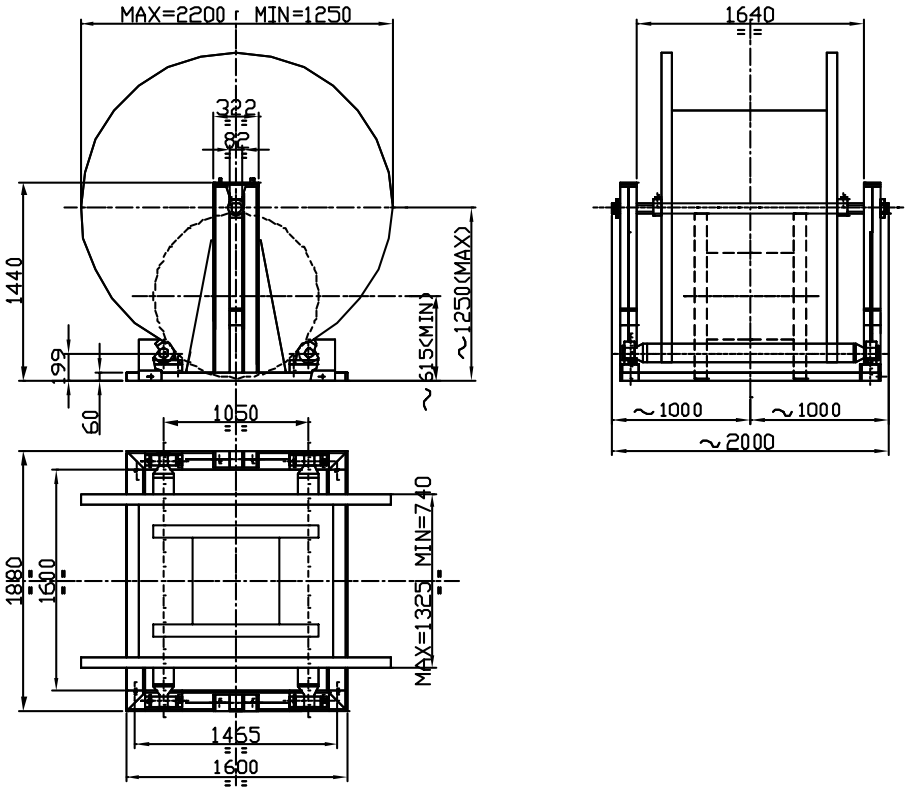
❑ MANUAL DECOILERS WITHOUT SLIP RING

Manual decoilers without electrical slip ring allow to uncoil every type of cable from every kind of spool. The unwinding is simplified because the spools rotate on loose rollers without ball bearings. When required helped by personnel, you can wind the cables on empty spools.

GENERAL FEATURES

Basement	Welded and hot galvanized sections bars.
Decoilers rollers	steel with superficial hard rubber vulcanization Rotation on ball bearings.
Decoling spools	Max outside diam. = 2.240 mm, Min. outside diam = 1250 mm. Max outside width = 1325 mm, Min. outside width = 740 mm.
Main axe	Galvanized steel. All-purpose for allowable spools. It automatically positions itself following the dimensions of the spool.
Locking ring nut	Double all-purpose ring nut for positioning the spool sideways inside the decoiler.

STANDARD DIMENSIONS



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❑ MOTORIZED DECOILERS WITHOUT SLIP RING

Motorized decoilers without electrical slip ring allow to uncoil every type of cable from every kind of spool, without man's help. The unwinding is simplified because it is motorized by an electrical motor and a reduction gear. On demand it is also possible to motorized the decoiler by an hydraulic or a pneumatic motor. Obviously the system allows to wind automatically the cables on the empty spool: the only limitation is the weight of the cable that must be consistent with the assembled motor. The decoiler is usually supplied with the control panel.

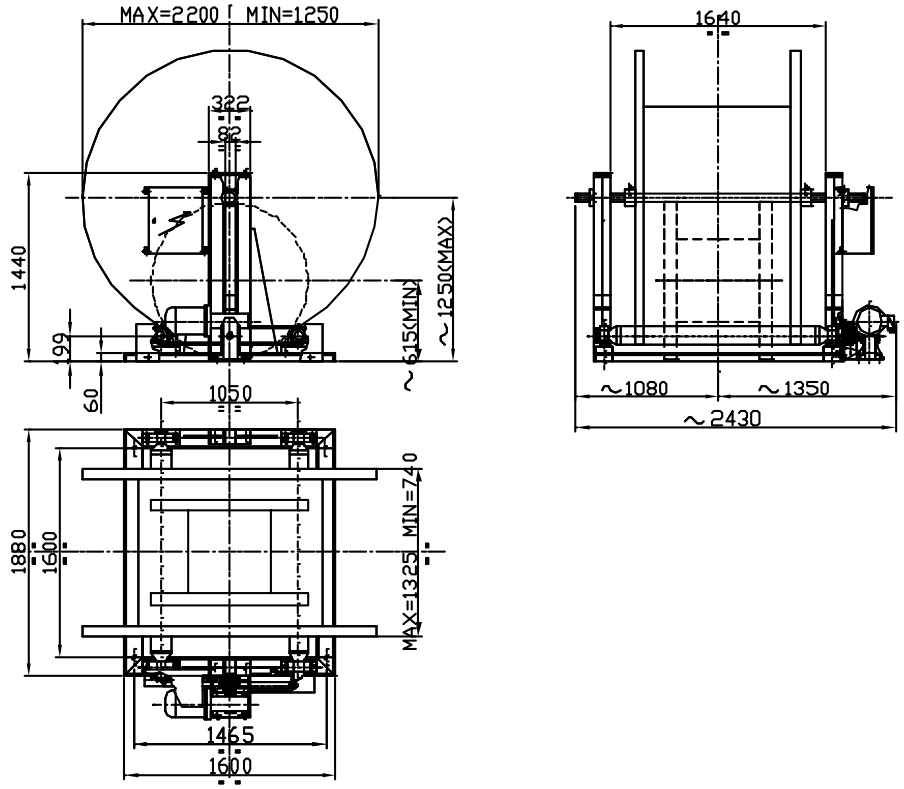
GENERAL FEATURES

Basement	Welded and hot galvanized sections bars.
Decoilers rollers	steel with superficial hard rubber vulcanization. Rotation on ball bearings.
Decoling spools	Max outside diam. = 2.240 mm, Min. outside diam = 1250 mm. Max outside width = 1325 mm, Min. outside width = 740 mm.
Main axe	Galvanized steel. All-purpose for allowable spools. It automatically positions itself following the dimensions of the spool.
Locking ring nut	Double all-purpose ring nut for positioning the spool sideways inside the decoiler.
Motor	Asynchronous three-phase 230 / 400 Vac, IP 55 protection.
Reduction gear	Worm screw a fine, oiling.
Control panel	for drive and control. IP 55 protection.

OPTIONS

Special motor	Pneumatic, set on with 6 bar air / Hydraulic.
Control board	Pneumatic/hydraulic.

STANDARD DIMENSIONS



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❑ MANUAL DECOILERS WITH SLIP RING

The manual decoilers with slip-ring allow to unwind the cable from each type of spool. Normally, the spools are charged with signals cables, especially telephone cables. They allow the flow of signals also during the rotation, being equipped with an electric slip ring. A rapid connector, placed between the slip ring and the spools allows a speed replacement of the spool. If needed, with men's help, it is also possible to use them to wind the cables on empty spools.

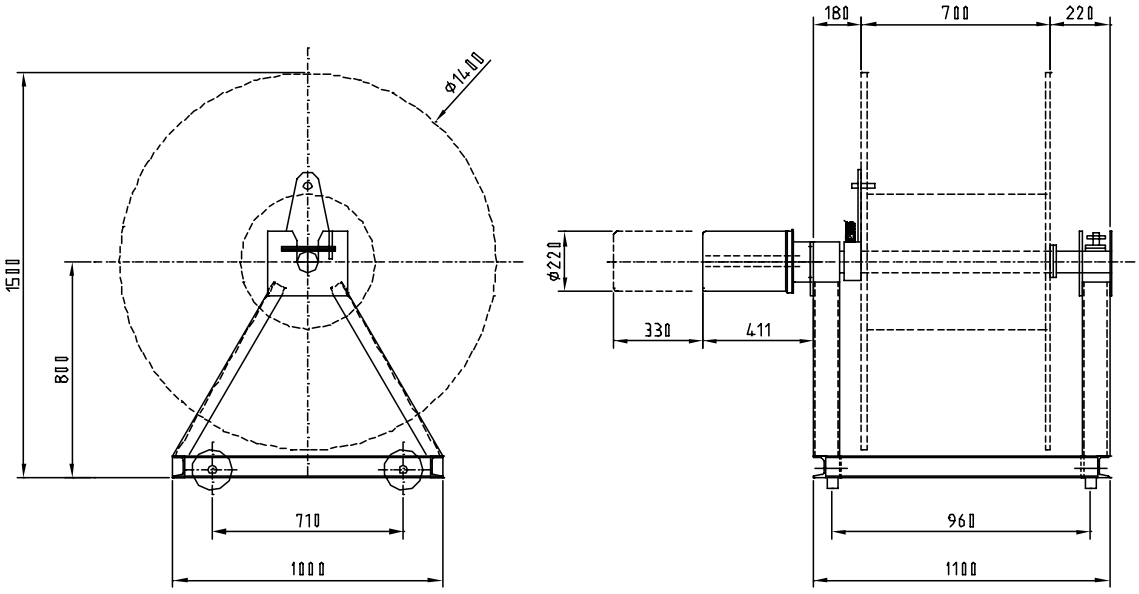
GENERAL FEATURES

Basement	Welded and hot galvanized sections bars.
Decoilers rollers	Steel. Rotation on ball bearings.
Decoling spools	Max outside diam. = 1.400 mm. Max outside width = 700 mm.
Main axe	Galvanized steel. All-purpose for allowable spools. It automatically positions itself following the dimensions of the spool.
Locking ring nut	Double all-purpose ring nut for positioning the spool sideways inside the decoiler.
Motor	Asynchronous three-phase 230 / 400 Vac, IP 55 protection.
Reduction gear	Worm screw a fine, oiling.
Control panel	for drive and control. IP 55 protection.
1.400 mm.	
Towing bracket	All-purpose for towing the spools.
Brake	Mechanical brake for limiting the rotation of the spool during its winding phase
Electric slip ring	Outside the decoilers. Cast alloy bronze power rings, brass auxiliary rings, gold-plating or silver-plating signal rings. Power and auxiliary copper-graphite brushes, Signals silver-graphite brushes. Plastic reinforced by fiber glass insulators. Gray painted steel timing case RAL 9006, or yellow painted RAL 1028.

OPTIONS

Sliding wheels	steel for the movement of the decoiler in in the tunnel, on the tracks.

STANDARD DIMENSIONS



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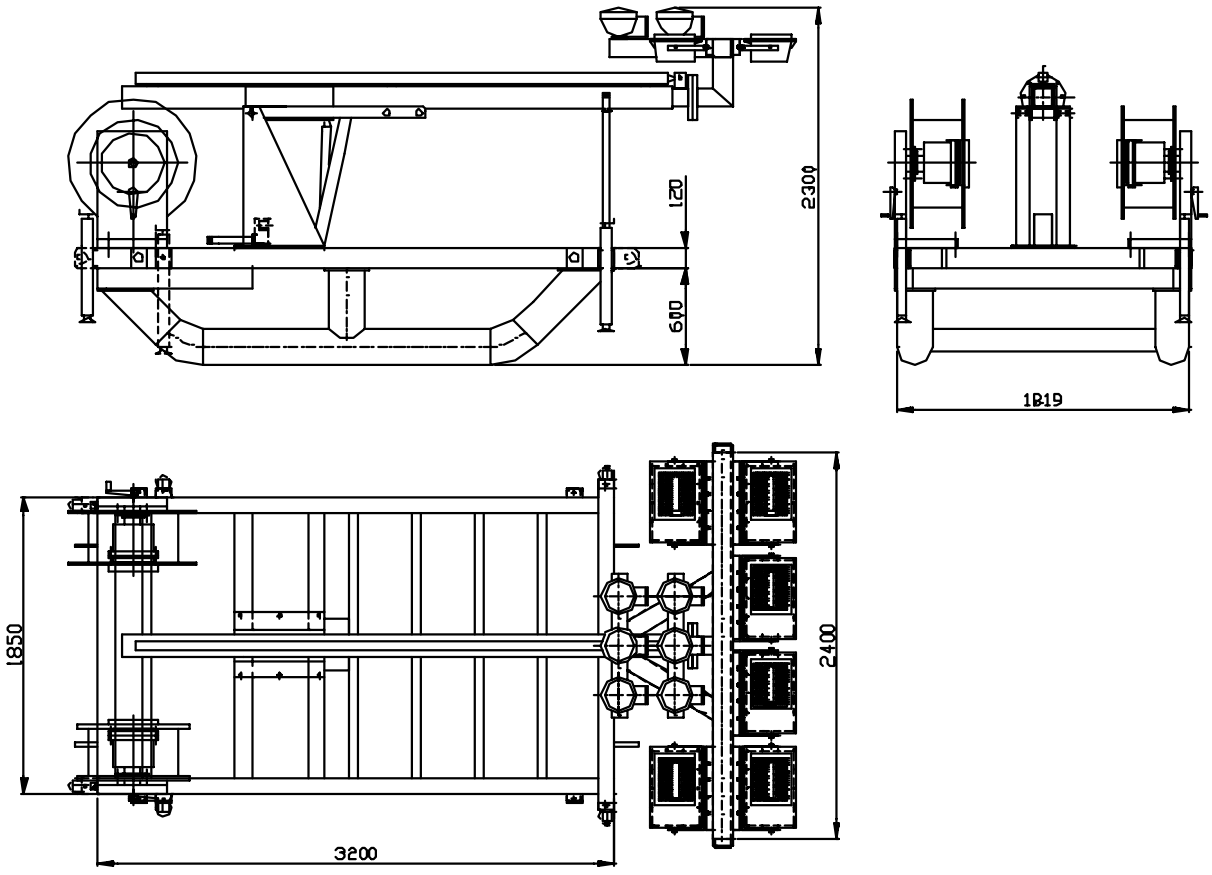
HEADLIGHT MOVING TOWERS

The headlight moving towers bring light into the tunnel. Usually they are assembled on slides or, better, on tired trolleys that are towed by machines operating into tunnels. The headlights can vary both in number and power. They can be supplied both normal and explosion-proof.

GENERAL FEATURES

Support	Slide/tired trolleys
Post	Telescopic in galvanized steel.
Post drive	Mechanic with winch. Pneumatic, air motor. Pneumatic with gearcase.
Windfastness	80 Km/h.
Stabilizer	adjustable in height.
Floodlght	4 x 1000 W - 4 x 1500 W. (standard). Number, power and configuration of the lamps on demand.
Protection	IP 55 /EExd I I M2.

STANDARD DIMENSIONS



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ELECTRIC/PNEUMATIC CONTROL PANELS

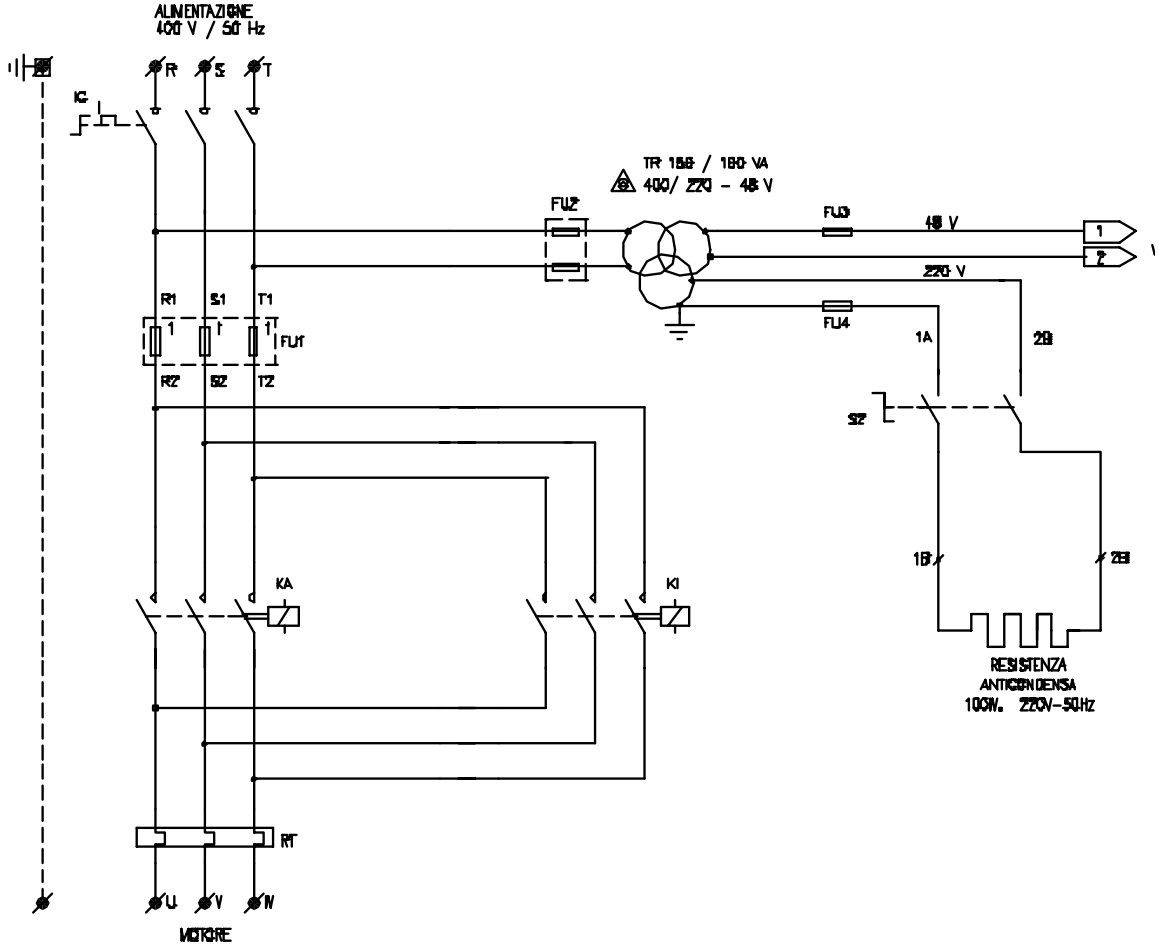
For all the cable reels that Comes produces for the tunneling, we can offer control panels too. Usually these panels are electric, but as option it is possible to supply also pneumatic control panels in order to control the pneumatic motors. Obviously Comes has designed a standard shape that you can see in this catalogue, but on demand it is possible to design and supply different shapes for the particular needs of the customer.

TECHNICAL FEATURES OF ELECTRIC CONTROL PANEL

GENERAL FEATURES

Panel	Metallic case, dimensions 500 X 400 X 200 mm
Feeding Motors	Power from 0,55 KW to 11 KW
Protection	IP 55
Functions	Drive ahead/back Electrical protection (if electrical board) Running of the fittings (anticondensate resistance, rotary limit switch)
Installations	On the cable reel, turn-key.

WIRING DIAGRAM



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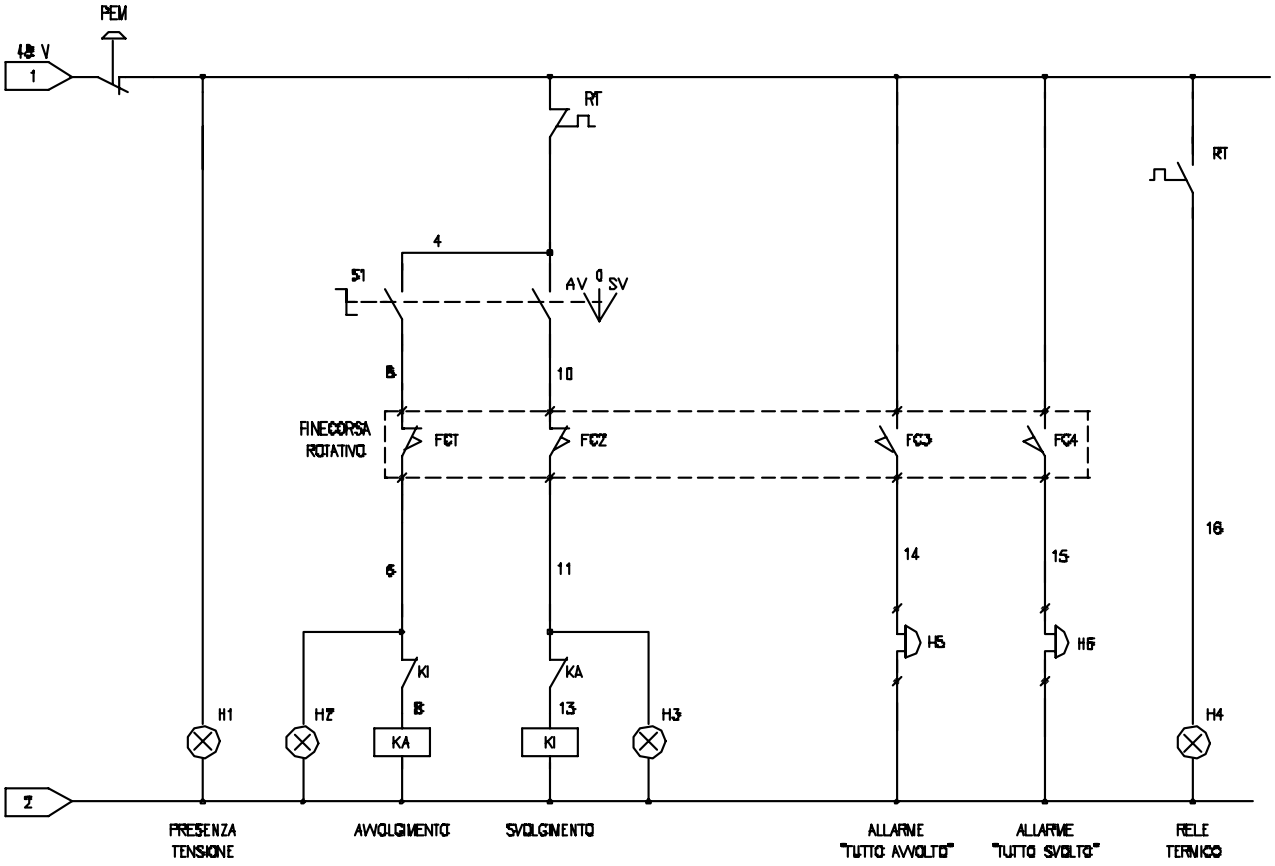
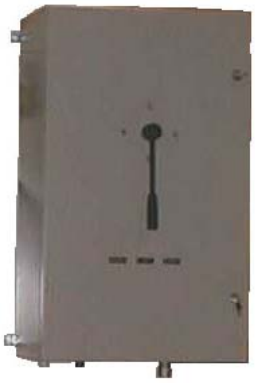


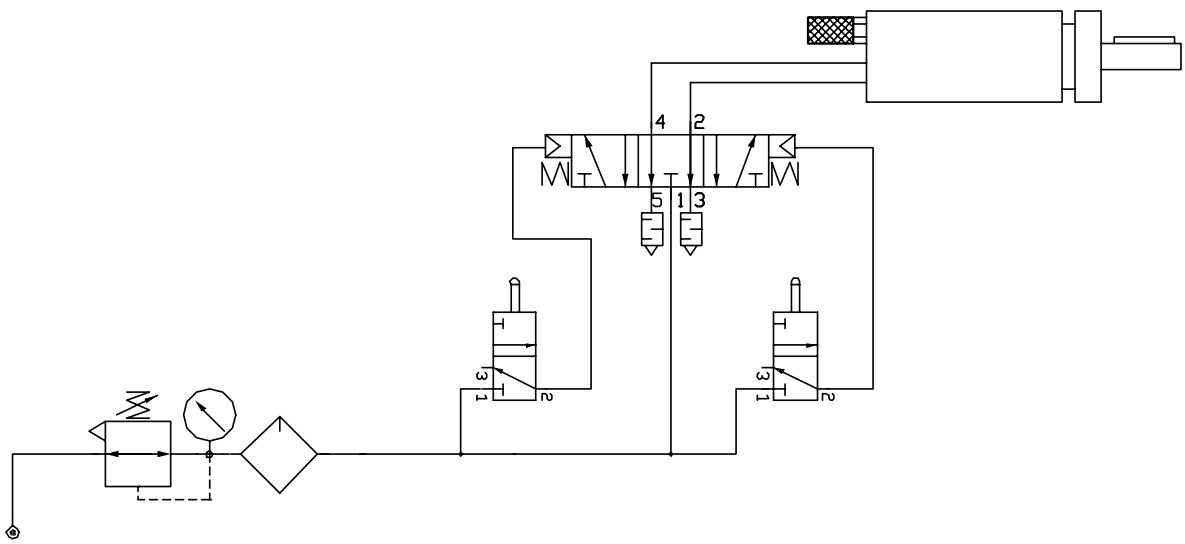
TECHNICAL FEATURES OF PNEUMATIC CONTROL PANEL



GENERAL FEATURES

Panel	Metallic case, dimensions 600 X 400 X 250 mm, up to 2500 l/min. capacity Metallic case, dimensions 975 X 600 X 310 mm, from 2500 a 5000 l/min. capacity.
Functions	Drive ahead/back Adjustable capacity, adjustable pressure Running of the pneumatic fittings
Installations	On the cable reel, turn-key..

PNEUMATIC DIAGRAM



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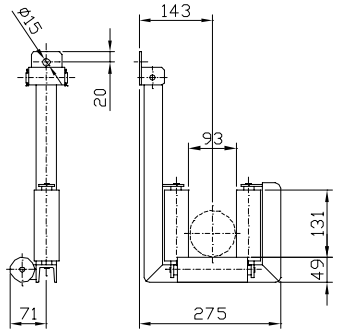
SUPPORT SYSTEM FOR CABLES

Very often, in the tunnels, you need to support or deviate mobile cables without making them suffer a friction because of the contact with the floor or with the parts operating on the front. For this reason, Comes has designed a series of fittings to guide the cable in order to allow, always, to solve the problem at the best. It is useful to use the cable guide for reduced friction systems: since the cables don't lean on anything they are protected from scratches, rubbings and breaking. We have three different types of support for the cables: rollers for cables, cable guide devices (two ways and one way), loose pulleys for transmission of cables.

GENERAL FEATURES ON CABLE GUIDE ROLLERS

The cable guide rollers support the mobile cables during the handling phase. Since they rotate on lifetime greased tight ball bearings, they avoid any sliding of the cable, safeguarding their life. We have designed an all-purpose system able to house cables having a diameter from 30 mm up to 85 mm max, extremely sturdy and fit for heavy duty such as work in tunnel. They have to be placed as facing with a variable distance following the diameter of the cable (see table below). The support of the rollers is hot galvanized steel and has an oscillating system that allows a positioning in all possible situations.

Cable Ø (mm)	Recommended distance between the rollers (m)
30 - 40	0,8
41 - 50	1,0
51 - 60	1,5
61 - 70	2,0
71 - 85	2,5

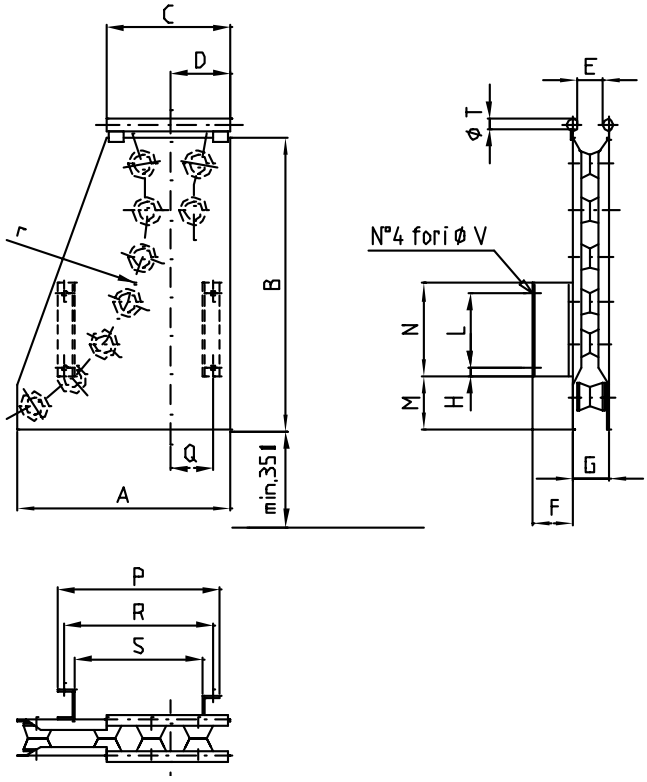


GENERAL FEATURES CABLE GUIDE DEVICES

It is a fitting for guiding the cable in an excellent way during the winding/unwinding phase of the cable itself. Two types are possible: one and two ways. In the one way cable guide device, the entrance of the cable is only from left to right or from right to left. In the two ways cable guide device, the entrance is the same.

ONE WAY CABLE GUIDE DEVICE

One way cable guide device			
Type	SMGO/1	SMG1/1	SMG2/1
A	300	500	675
B	400	650	850
C	180	300	400
D	90	150	200
E	40	55	95
F	50	65	80
G	65	80	125
H	25	50	100
L	120	200	300
M	50	110	100
N	170	300	450
P	236	350	495
Q	65	110	160
R	210	320	465
r	300	500	700
S	160	266	405
T	30	30	40
V	11	13	16



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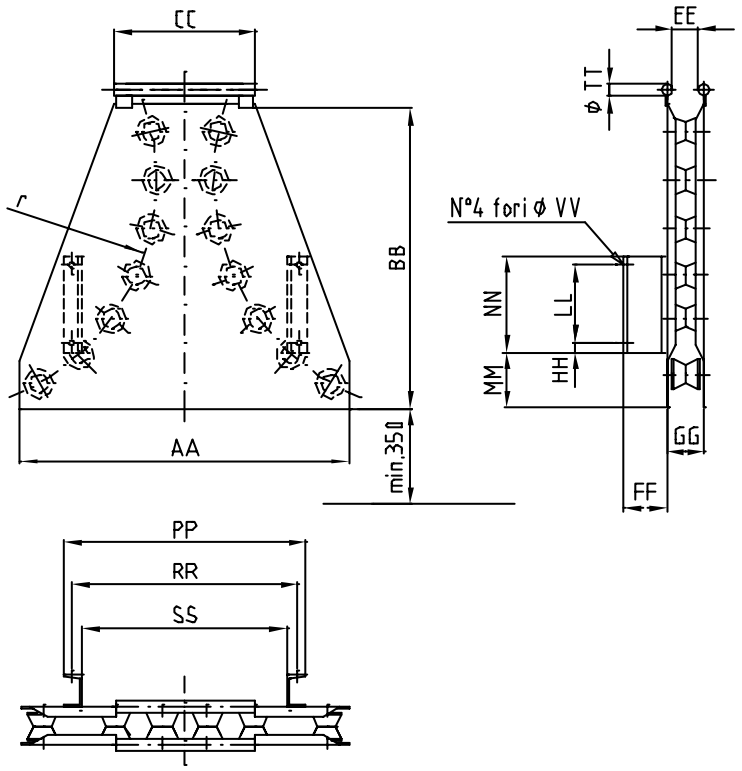
TWO WAYS CABLE GUIDE DEVICE



Two way cable guide device			
Type	SMG0	SMG1	SMG2
AA	420	700	950
BB	400	650	850
CC	180	300	400
EE	40	55	95
FF	50	65	80
GG	65	80	125
HH	25	50	100
LL	120	200	300
MM	50	110	100
NN	170	300	450
PP	316	450	640
RR	290	420	610
r	300	500	700
S	240	366	550
TT	30	30	40
VV	11	13	16

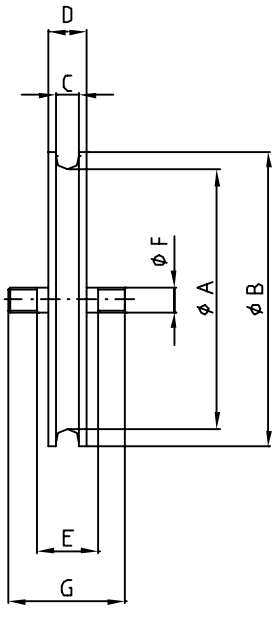
GENERAL FEATURES LOOSE PULLEYS

Loose pulleys, rotating on ball bearings that guide and/or joint the cable before winding it on the spool of the cable reel. Two versions are possible:

- “PF” type, standard guide roller.
- “PFA” type, standard guide roller to fleet the cable

Type	Dimensions (mm)								
	cable Ø	A	B	C	D	E	F	G	H
PF 0	0 – 12	200	250	15	55	105	25x1,5	195	
PFA 0									155
PF 1	13 – 20	300	400	25	65	115	25x1,5	205	
PFA 1									230
PF 2	21 – 28	400	500	30	70	120	25x1,5	210	
PFA 2									280
PF 3	29 – 38	600	700	45	85	135	40x1,5	235	
PFA 3									400
PF 4	39 – 45	800	950	55	95	145	40x1,5	245	
PFA 4									525
PF 5	46 – 59	1000	1200	65	125	175	50x1,5	275	
PFA 5									660
PF 6	60 - 70	1200	1400	75	155	205	50x1,5	305	
PFA 6									760

Type PF



Type PFA