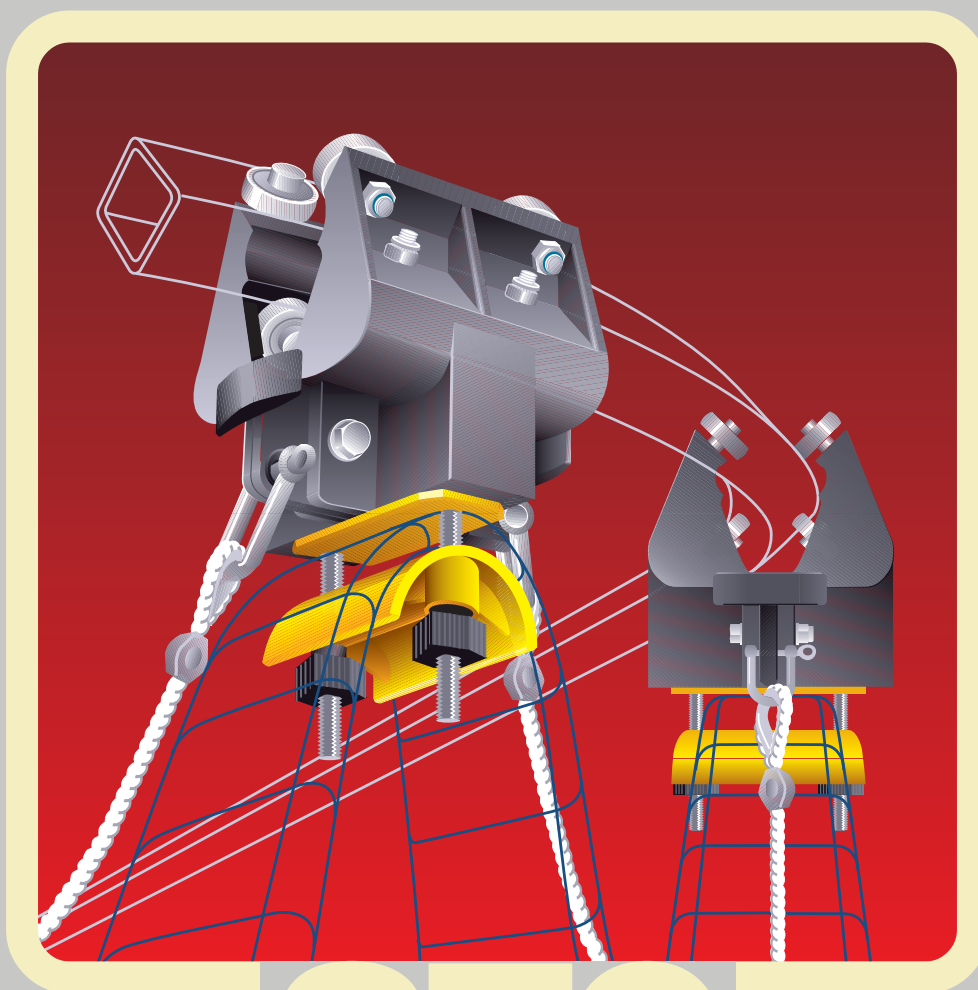


Energy Supply Systems

◇-RAIL PROGRAM

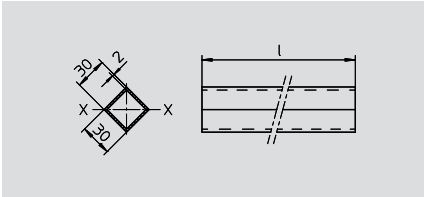


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◇-Rails and Accessories for Curved Tracks

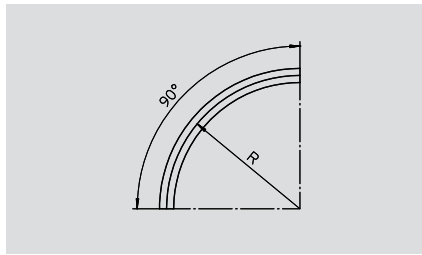
◇-Rail 30 x 30



Order No.	l [mm]	Static values
027200-6	6000	$I_x = 2.95\text{cm}^4$
027200-4	4000	$W_x = 1.39\text{cm}^3$

Material: galvanized steel
Other lengths are available on inquiry.

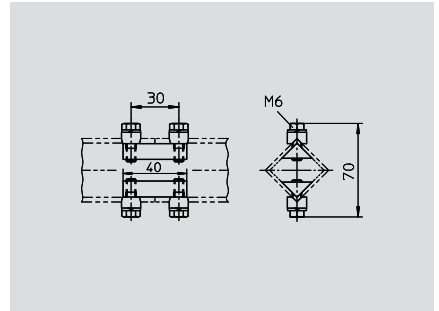
90°-Curve



Order No.	R [mm]
027203-00400	400
027203-00600	600
027203-00800	800
027203-01000	1000
027203-01200	1200
027203-01400	1400
027203-01600	1600
027203-01800	1800
027203-02000	2000

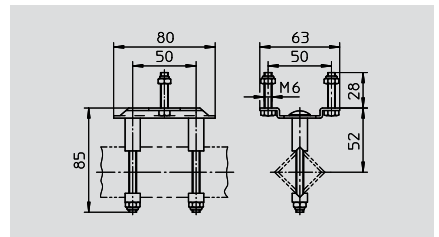
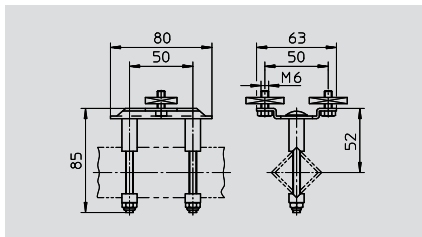
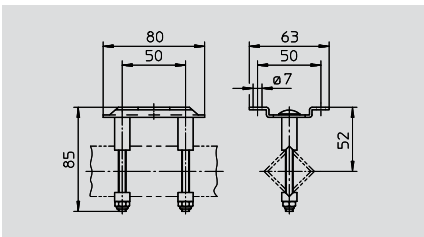
Material: galvanized steel
Other curves are available on inquiry.

Track Coupler



Order No. 027210
Material: galvanized steel

Track Support Bracket

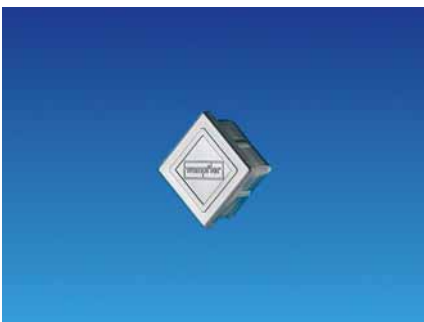


Order No. 027220
Material: galvanized steel
Perm. load: 125 kg

Order No. 027222
Material: galvanized steel
Perm. load: 125 kg

Order No. 027223
Material: galvanized steel
Perm. load: 125 kg

End Cap

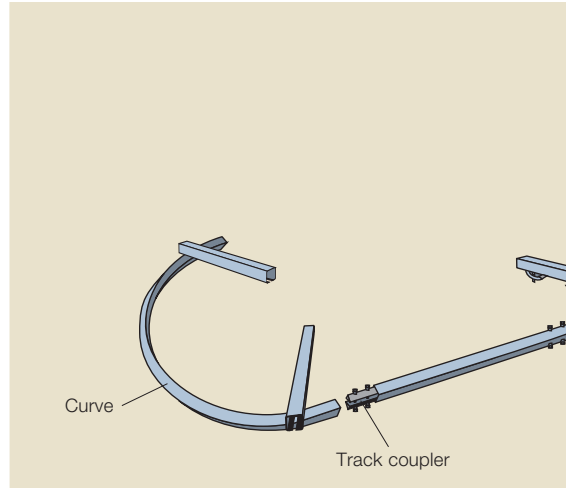


Order No. 020662-31
Material: plastic
For closing the rail ends.

Drilling Jig

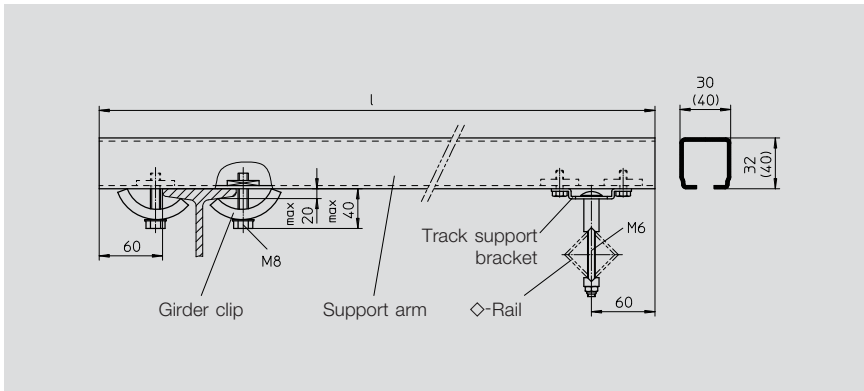


Order No. 027211
A drilling jig is necessary to drill the rails and curves.



◇-Rails and Accessories for Curved Tracks

Support Arm and Girder Clip



Support arm 30x32 Order No.	I [mm]	Perm. load [N]
020275-0500	500	380
020275-1000	1000	190

Material: galvanized steel

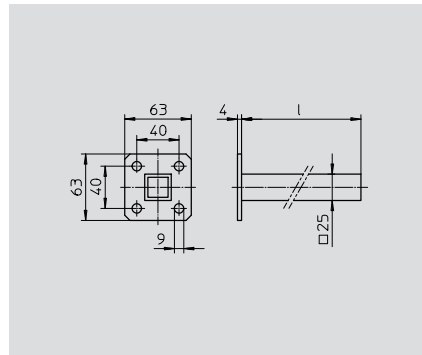
Support arm 40x40 Order No.	I [mm]	Perm. load [N]
020276-0500	500	825
020276-1000	1000	410

Material: galvanized steel

Girder clip Order No. 020180-08

Material: galvanized steel

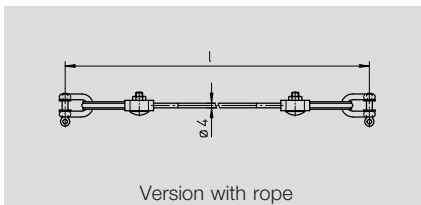
Towing Arm for Towing Trolley



Towing arm Order No.	I [mm]
020195-400	400
020195-630	630

Material: galvanized steel

Towing Lines for Cable Trolleys



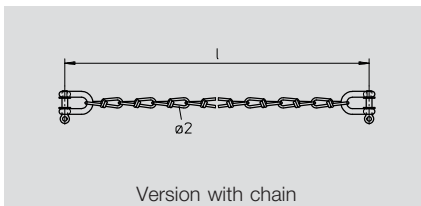
Version with rope

Rope ø4, Polyamide Order No.	I [mm]
020316-04	as stated

Tensile force max. 400 N

Rope ø4, galv. steel Order No.	I [mm]
020326-04	as stated

Tensile force max. 800 N

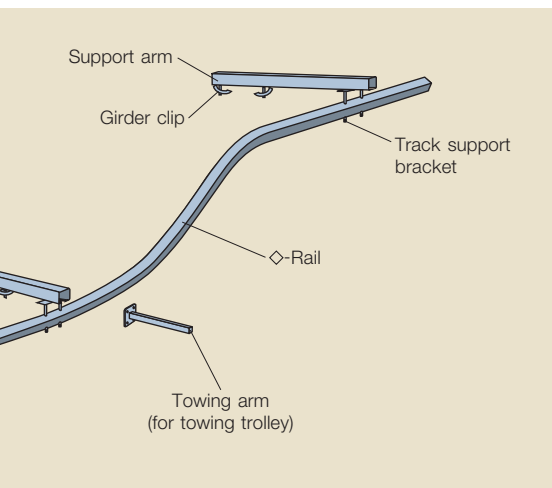


Version with chain

Chain ø2, steel Order No.	I [mm]
020346-02	as stated

Tensile force max. 250 N

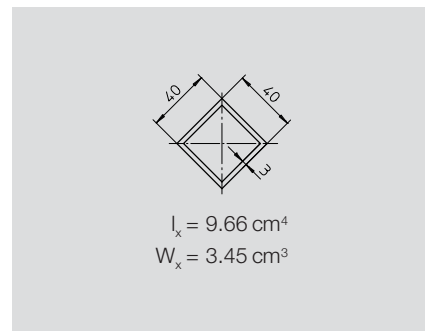
For curved tracks it is necessary to install towing lines between the cable trolleys.



Heavy Type

◇-Rail 40 x 40

A similar range of these systems is available for heavier cable loads.



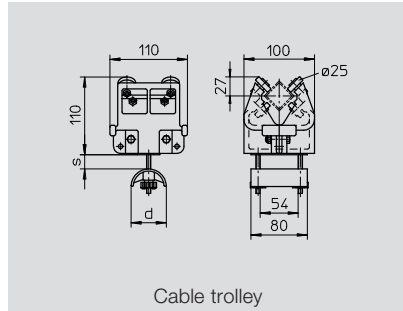
Program 0280

- ◇-Rail
- Curves
- Track coupler
- Track support brackets
- Cable trolleys:
 - Max. load capacity max. 36kg
 - Roller ø 40 mm
- Ideal control unit trolley
- Other accessories

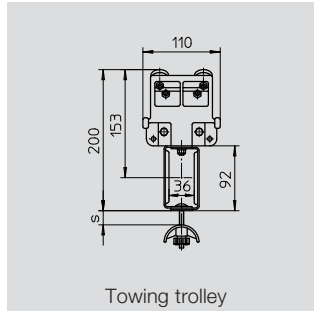
Please send your inquiry.

Flat Cable Trolleys

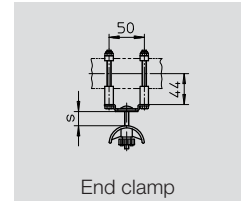
Plastic Cable Trolley and Cable Support



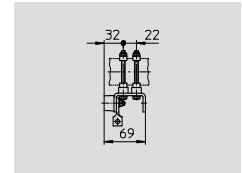
Cable trolley



Towing trolley



End clamp

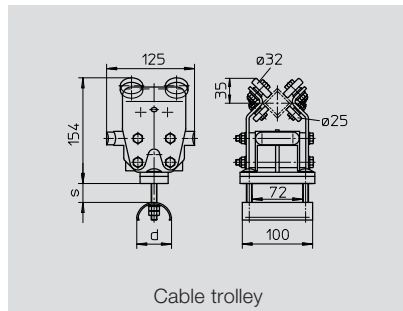


End stop
Order No. 027112

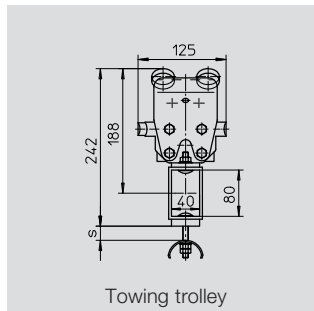
Cable trolley Order No.	Towing trolley Order No.	End clamp Order No.	d [mm]	s [mm]
027261	027267	027268	50	25
027271	027277	027278	80	15

Type of roller:
- Ball bearing, galvanized
- Sealing: 2 Z
Load capacity: 16 kg

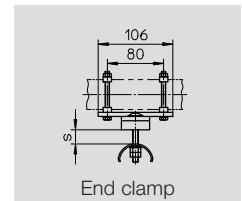
Steel Cable Trolley and Cable Support



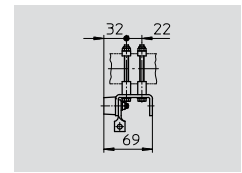
Cable trolley



Towing trolley



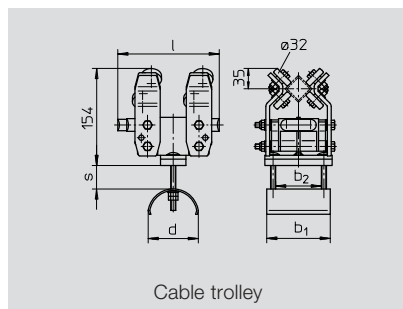
End clamp



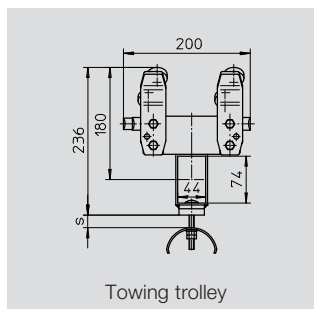
End stop
Order No. 027111

Cable trolley Order No.	Towing trolley Order No.	End clamp Order No.	d [mm]	s [mm]
027339-125x100	027349-125x100	027329-100x042	50	30
027340-125x100	027350-125x100	027330-100x068	80	15

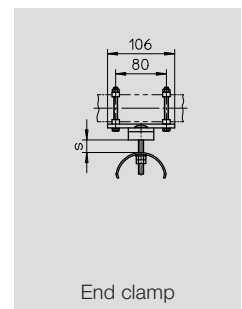
Type of roller:
- Ball bearing, galvanized
- Sealing: 2 Z
Load capacity: 20 kg



Cable trolley



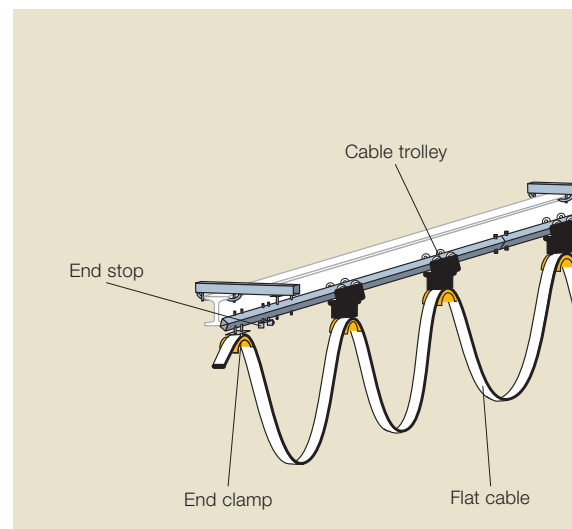
Towing trolley



End clamp

Cable trolley Order No.	Towing trolley Order No.	End clamp Order No.	d [mm]	l [mm]	b ₁ [mm]	b ₂ [mm]	s [mm]	
027310-160x100	027320-200x100	027330-100x068	80	160	100	72	38	
027310-160x160	027320-200x160	027330-160x068			160	132		
027310-200x100	027320-200x100	027330-100x068		200	160	100		72
027310-200x160	027320-200x160	027330-160x068				160		132
027312-200x100	027322-200x100	027332-100x048	125	200	100	72	35	
027312-200x160	027322-200x160	027332-160x048			160	132		

Type of roller: Ball bearing, galvanized; Sealing: 2 Z
Load capacity: 25 kg



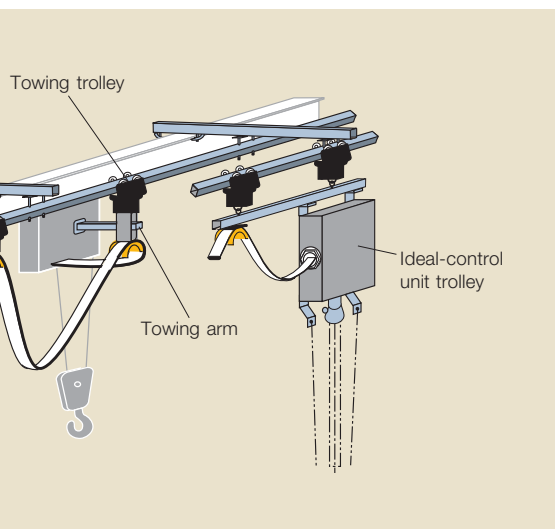
Flat Cable Trolleys

Rubber Flat Cables

Type	Number of cores and cross section [mm ²]	Order No.	Max. dimension s x b [mm]	Approx. weight [kg / 100 m]
NGFLGÖU-J	14x1.5	0401-14X1.5	16.4 x 18.5	20
NGFLGÖU-J	15x1.5	0401-15X1.5	16.4 x 21.5	24
NGFLGÖU-J	18x1.5	0401-18X1.5	16.4 x 32.0	35
NGFLGÖU-J	10x1.5	0401-10X1.5	17.0 x 41.5	50
NGFLGÖU-J	12x1.5	0401-12X1.5	17.0 x 48.5	59
NGFLGÖU-J	14x2.5	0401-14X2.5	18.2 x 23.0	29
NGFLGÖU-J	15x2.5	0401-15X2.5	18.2 x 28.5	42
NGFLGÖU-J	18x2.5	0401-18X2.5	18.2 x 42.0	55
NGFLGÖU-J	10x2.5	0401-10X2.5	18.8 x 54.5	83
NGFLGÖU-J	12x2.5	0401-12X2.5	18.8 x 58.0	86
NGFLGÖU-J	14x4.5	0401-14X4.5	19.6 x 28.0	41
NGFLGÖU-J	17x4.5	0401-17X4.5	19.6 x 44.0	71
NGFLGÖU-J	14x6.5	0401-14X6.5	10.4 x 30.0	52
NGFLGÖU-J	14x10.	0401-14X10	12.1 x 36.0	80
Rubber flat cables with screened individual cores				
GCFLGÖU-O	4x1.5	0404- 4X1.5	7.4 x 19.5	25
GCFLGÖU-O	8x1.5	0404- 8X1.5	7.4 x 37.3	51

PVC Flat Cables

Type	Number of cores and cross section [mm ²]	Order No.	Max. dimension s x b [mm]	Approx. weight [kg / 100 m]
H07VVH6-F	4G1.5	0325- 4G1.5	5.2 x 15.5	15.3
H07VVH6-F	5G1.5	0325- 5G1.5	5.2 x 18.5	18.5
H07VVH6-F	8G1.5	0325- 8G1.5	5.2 x 31.0	29.7
H07VVH6-F	10G1.5	0325-10G1.5	5.2 x 37.0	36.2
H07VVH6-F	12G1.5	0325-12G1.5	5.2 x 41.5	42.8
H07VVH6-F	4G2.5	0325- 4G2.5	5.9 x 19.0	22.4
H07VVH6-F	5G2.5	0325- 5G2.5	5.9 x 22.5	26.9
H07VVH6-F	8G2.5	0325- 8G2.5	5.9 x 38.0	43.7
H07VVH6-F	10G2.5	0325-10G2.5	5.9 x 45.0	53.4
H07VVH6-F	12G2.5	0325-12G2.5	5.9 x 52.0	62.8
H07VVH6-F	4G4	0325- 4G4	7.1 x 22.0	31.0
H07VVH6-F	7G4	0325- 7G4	7.1 x 38.0	53.7
H07VVH6-F	4G6	0325- 4G6	7.8 x 25.0	41.5
H07VVH6-F	4G10	0325- 4G10	9.9 x 31.5	68.0
H07VVH6-F	4G16	0325- 4G16	11.2 x 36.5	99.0
PVC flat cables with screened individual cores				
YCFLY-O	4x1	0320- 4X1	5.0 x 13.9	13.1
YCFLY-O	8x1.5	0320- 8X1.5	6.0 x 32.4	37.5
YCFLY-O	12x1.5	0320-12X1.5	5.9 x 52.0	61.0



Cable Glands and Lock Nuts

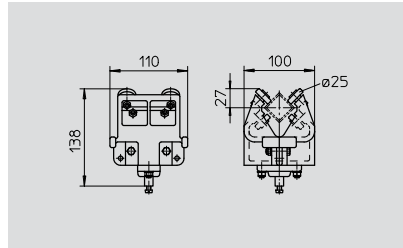
Size	Flat cable gland Order No.	for cable dimension s x b [mm]				Lock nut Order No.
		min.	max.	min.	max.	
M25	020626-25x16	4	5.5	13	16.0	020657-25
M25	020626-25x21	5	7.5	14	19.5	020657-25
M32	020626-32x29	5	10.0	19	25.0	020657-32
M40	020626-40x29	5	10.0	19	27.0	020657-40
M50	020626-50x36	5	13.0	29	38.5	020657-50
M50	020626-50x42	5	14.0	38	41.0	020657-50
M63	020626-63x48	5	18.0	44	46.0	020657-63
M63	020627-63x48	6	9.0	54	62.0	020657-63

Material: case: impact resistant plastic; seal: oil resistant rubber; thrust washer: galvanized steel.

For metal types see accessories program 0200 (KAT0200-0001-E).

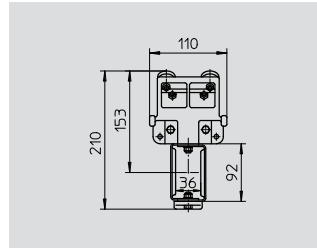
Round Cable Trolleys

Plastic Trolley with Ball Joint



Trolley
Order No. 027291

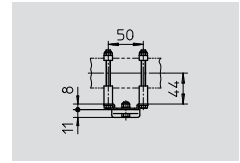
Cable clip Order No.	Cable diameter [mm]
020131-16	10 - 16
020131-25	17 - 25
020131-36	26 - 36



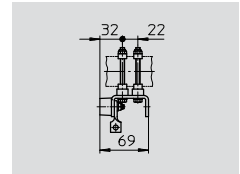
Towing trolley
Order No. 027297

Type of roller: Ball bearing, galvanized; Sealing: 2 Z
Load capacity: 16 kg

The cable clips can be combined in multiple variations.



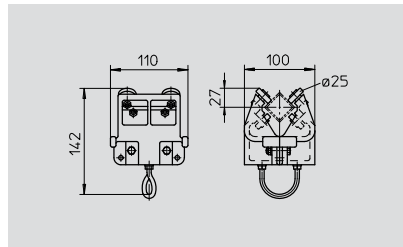
End clamp
Order No. 027298



End stop
Order No. 027112

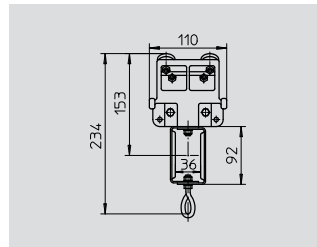


Plastic Trolley with U Bolt



Trolley
Order No. 027281

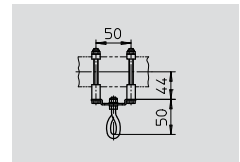
Cable clip Order No.	Cable diameter [mm]
020133-16	10 - 16
020133-25	17 - 25
020133-36	26 - 36



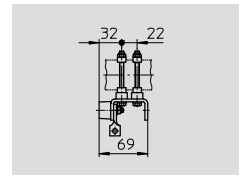
Towing trolley
Order No. 027287

Type of roller: Ball bearing, galvanized; Sealing: 2 Z
Load capacity: 16 kg

The cable clips 020131 fit below the cable clips with bracket 020133.



End clamp
Order No. 027288



End stop
Order No. 027112



Rubber Round Cable

Type	No. of cores and nom. cross section [mm ²]	Order No.	Outer diameter min. - max. [mm]	Approx. weight [kg / 100 m]
H07RN-F	4G1.5	0601- 4G1.5	10.5 - 13.5	21
H07RN-F	4G2.5	0601- 4G2.5	12.5 - 15.5	30
H07RN-F	4G4	0601- 4G4	14.5 - 18.0	40
H07RN-F	4G6	0601- 4G6	16.5 - 22.0	54
H07RN-F	5G1.5	0601- 5G1.5	11.5 - 15.0	23
H07RN-F	5G2.5	0601- 5G2.5	13.5 - 17.0	36
A07RN-F	7G1.5	0602- 7G1.5	14.0 - 17.5	37
A07RN-F	7G2.5	0602- 7G2.5	16.5 - 20.0	52
A07RN-F	12G1.5	0602-12G1.5	18.0 - 23.0	57
A07RN-F	12G2.5	0602-12G2.5	18.5 - 26.5	80

Compressed-air Hoses

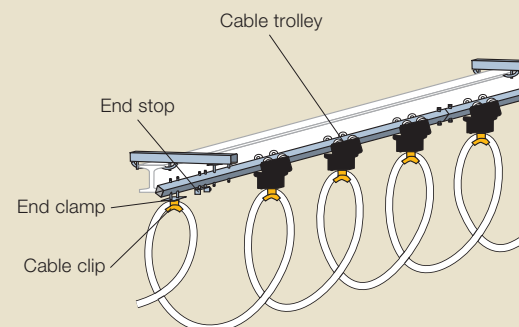
Order No.	Hose ø interior [mm]	Hose ø exterior [mm]	Pressure at 20°C [bar]
040421-1	6	12	23
040421-2	9	15	19
040421-3	12	21	16

Material: clear PVC with textile braid; oil and gasoline resistant.

Cable Glands and Accessories

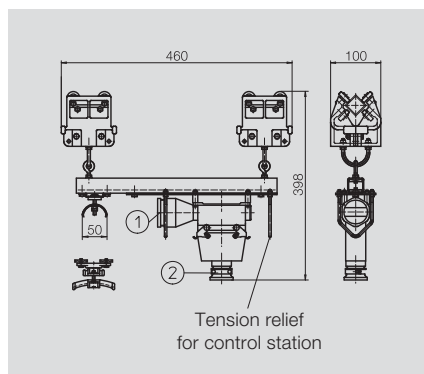
Size	Round cable gland Order No.	Cable-ø range [mm]	Lock nut Order No.
M20	020646-20x13	10 - 12	020657-20
M25	020646-25x16	12 - 14	020657-25
M25	020646-25x21	15 - 17	020657-25
M32	020646-32x29	24 - 26	020657-32

Material: case: impact resistant plastic; seal: oil resistant rubber; thrust washer: galvanized steel.
For metal types see accessories program 0200 (KAT0200-0001-E).



Supplements to the Program

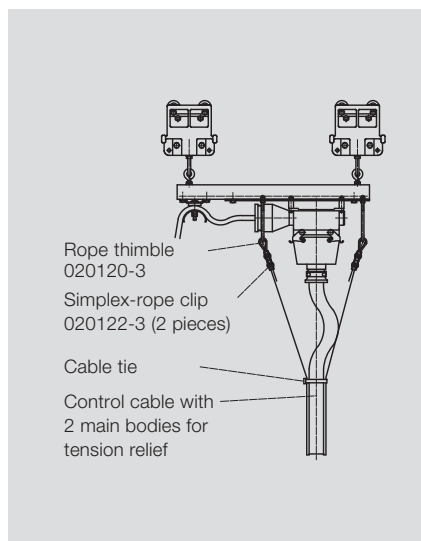
Ideal Control Unit Trolley with Plug and Socket Connection



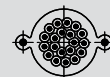
Order No.	Type for	Number of poles	Glands		Perm. Load [kg]
			①	②	
027178-16	Flat cable	16 + E	M25	M25	20
027178-24		24 + E		M32	
027179-16	Round cable	16 + E	M32	M25	
027179-24		24 + E		M32	

Nominal voltage 400 V; Nominal current 16 A; protection grade IP55; screw connection 2,5 mm²

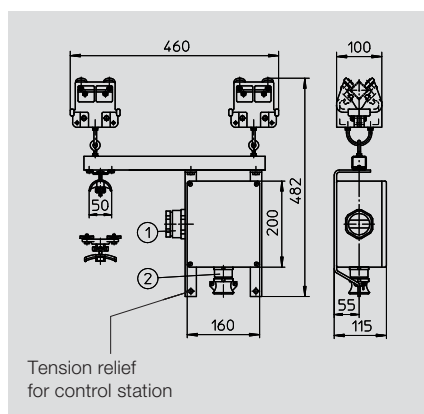
Accessories



PVC control cable with two strainer wires; type: MTTY-O



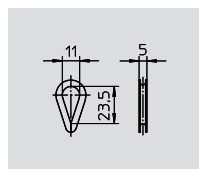
Ideal Control Unit Trolley with Terminal Box



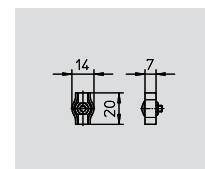
Order No.	Type for	Clamps quantity	Glands		Perm. Load [kg]
			①	②	
027174-16	Flat cable	16 + E	M50	M25	20
027174-24		24 + E		M32	
027175-16	Round cable	16 + E	M32	M25	
027175-24		24 + E		M32	

Nominal voltage 400 V; Nominal current 16 A; protection grade IP54; screw connection 4 mm²

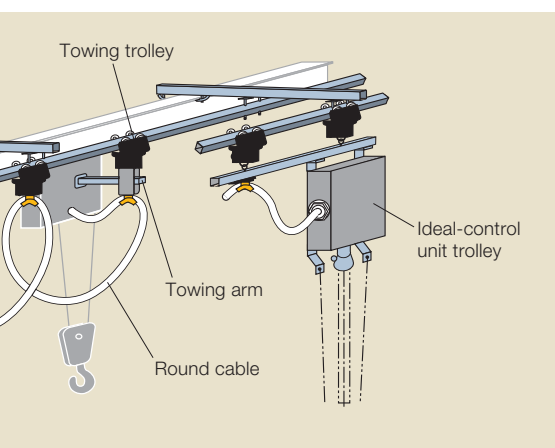
Order No.	Number and nom. cross section [mm ²]	Size
0609-12X1.5	12 x 1.5	M25
0609-16X1.5	16 x 1.5	
0609-20X1.5	20 x 1.5	M32
0609-24X1.5	24 x 1.5	



Rope thimble Order No. 020120-3 galvanized steel



Simplex-rope clip Order No. 020122-3 galvanized steel



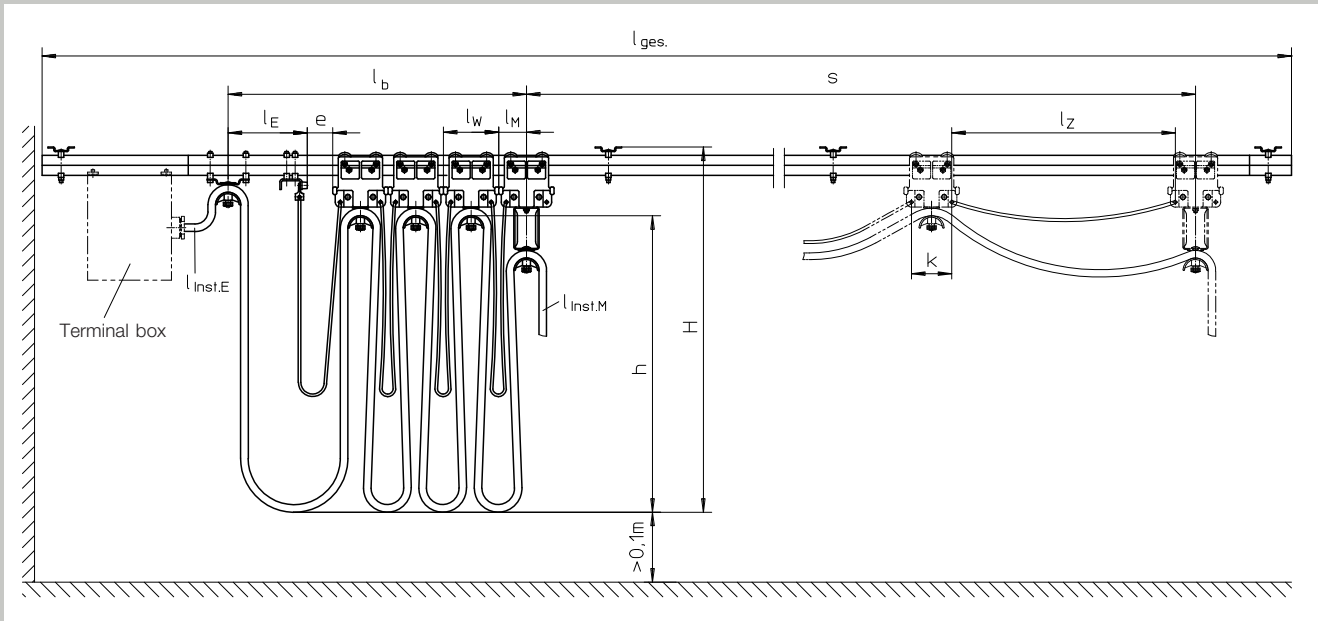
Special Rollers for Trolleys

Special roller Order No.	Type		Load cap. [kg]
	Roller	Sealing	
...../010 for plastic or steel cable trolleys	Ball bearing, galvanized	2 RS	as Standard Type
...../017 for steel cable trolleys, roller ø32	Ball bearing, galvanized outer runner Polyurethane low noise run	2 RS	16

All the cable trolleys on page 4 to 7 can be supplied with special rollers. Add the additional order no. to the order no. of the cable trolleys.

Projecting

Cable Loop - Number of Loops - Cable Length - Length of Tension relief



Cable loop resp. loop length

$$h \approx 0.5 \cdot l_{\text{Schl.}} \leq 0.7 \cdot R_{\text{min}} \quad [\text{m}]$$

The max. permissible cable loop depends on the smallest radius to be passed. Loops which do not pass this radius can be larger accordingly.

Required number of loops

$$n = \frac{f \cdot s}{2 \cdot h - f \cdot l_w} \quad [\text{Number}]$$

h [m] = Cable loop
 $l_{\text{Schl.}}$ [m] = Loop length
 R_{min} [m] = Smallest radius for curved track
 n = Number of loops
 f = 1.2 = Addition factor for cable length

Required cable length

$$L = n \cdot l_{\text{Schl.}} + l_{\text{Inst.E}} + l_{\text{Inst.M}} \quad [\text{m}]$$

s [m] = Travel distance
 l_w [m] = Cable trolley length
 L [m] = Total required cable length
 $l_{\text{Inst.E}}$ [m] = Length for fixed installation, end clamp side
 $l_{\text{Inst.M}}$ [m] = Length for fixed installation, towing trolley side
 l_z [m] = Length of tension relief
 l_b [m] = Length of trolley ambush
 e [m] = Free space at ambush

Required length of tension relief

$$l_z = \frac{1.05 (s + l_b)}{n} - k \quad [\text{m}]$$

$$l_b \approx l_E + e + (n-1) l_w + l_M \quad [\text{m}]$$

For plastic trolleys:
 $k = 0.08$ [m]

For steel trolleys:
 $k = l_w - 0.06$ [m]

In addition to our standard program we offer you stainless steel constructions for special applications.

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