3 Troughing sets

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Summary

3.1 - Introduction

In a belt conveyor one may identify two types of troughing sets : the upper carrying sets, that have the function to support the loaded sections of the belt and to move the material ; and the lower sets that support the unloaded belt on its return section.

The upper troughing sets may basically be in two arrangements : flat, with a single horizontal roller generally supported by two fixed brackets from the convey or structure ; troughed, generally with 3 rollers supported within a frame which is itself fixed to the conveyor structure.

There may be then, in the loaded sections, impact troughing sets with rollers with rubber rings or suspended “garland” sets with 3 or 5 rollers.

In the majority of belt conveyors, the upper troughing sets are used in a troughing arrangement, so that the carrying belt may transport a much greater amount of material than it could if the belt was flat, assuming an equal belt width and speed.
The rollers of an upper troughing set are undoubtedly the most important components to be considered during the project phase.

3.2 - Choice of Troughing sets

When choosing the troughing sets and their arrangements during the project phase of the construction of a belt conveyor the following factors must be considered :

- total load capacity in tons / hour of conveyed material

- belt speed

- belt, uni-direction or reversible

- lump size of material and its angle of repose

- temperature and environmental challenge

- characteristics of load, humidity and material abrasiveness

- type, flexibility and weight of rubber belt

The development of detail concerning the above considerations is contained in chapter 1 - technical information.

Defining the belt width, in relation to the flow of conveyed material and establishing the speed, allows the choice to be made of the type of transom support and the correct roller series, matching the working conditions.

Above all when the rollers are subjected to a corrosive environment or materials (salt, chemical substances etc) very careful attention should be paid in their choice.

In the same way the transoms that carry the rollers must be protected with a suitable galvanised treatment.

The weight of the material determines the dynamic load which the troughing set has to sustain and also defines the pitch of the sets in the upper carrying sections of the belt.

In practice the type of troughing set is chosen that meets the criteria of load together with the use of the minimum rubber belt width to provide the most economic solution.

The choice of the return sets is also important, in that they take account of the belt centralising and cleaning conditions.

In fact on the return sets the rollers are in contact with the dirty side of the belt and thus face a variety of problems.

The residual material remains attached to the return section of the belt and may deposit onto the rollers in a non uniform way that promotes belt drifting and premature wear.

This material may act to abrade the roller shell in a serious way and place a critically high demand on the protection qualities of the sealing system of the roller bearings.

Therefore the solution must be to put in place the very best belt cleaning system, utilising the auto centralising system (self centralising troughing sets) and in the use of rollers with rubber rings that permits residual material to fall freely to the ground without build-up on the rollers.

The conveyed material deposits onto rollers and increases their diameter in an uneven way, usually less at the roller ends.

To choose the right troughing sets to suit the load see the chapter on rollers page 78 "Dynamic Load, on the carrying sets Ca_1, on the return sets Cr_1".

The load on the troughing set is given by the material load added to the weight of rollers ; and using ***Tab*. 23** the transom may be chosen, that has a greater load capacity than the load thus calculated ; finally adding the weight of the transom itself, taking account the roller capacity and diameter that may be utilised in the frame and the following general considerations :

- the load capacity of the transom in ***Tab*. 23** is given by the admissible load on the base angle leaving aside the type of attachments and the characteristics of the side and central bracket supports.

- the transoms A2S, A3L, and A3M, belong to the light and medium series and are fixed to the structure by means of a single hole per side. Their side supports are relatively light, and are used therefore on conveyors with regular loads and small lump size of material and low speed so that damaging vibrations are avoided.

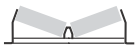
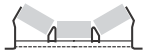
They are preferably not to be used at the loading points as impact sets especially when large lump size material exists and the loading heights are excessive.

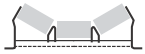
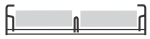
- the transoms A3P and A3S, form the heavy series for the iron and steel industry, and are fixed to the structure by plates with two holes in each plate, and have side brackets reinforced by shaping them as channels. They are therefore more adapted to be used in the transport of irregular loads, large material lump size, high speeds even if in the presence of vibrations.

They are most suitable for the positioning of the heaviest roller series up to the maximum capacities designed.

3.2.1 - Choice of the transom in relation to load

Tab. 23 - **Capacity of standard transom**

belt width	type of transom and diameter of suitable rollers			
	A2 S-20°	A3 L-30°	A3 M-30°	
				
	Ø 60÷110	Ø 76÷110	Ø 89÷110	Ø 110÷140
mm	Kg			
300	338			
400	286	286		
500	205	247	247	247
650	167	205	205	205
			354	354
800	167	167	289	289
			460	460
1000			244	244
			388	388
1200			204	204
			325	325
1400				
1600				
1800				
2000				
2200				

A3P-30°			A3 S-35°			R2 S-10°	R2 SP
							
Ø 89÷108	Ø 108÷133	Ø 133÷159	Ø 133	Ø 159	Ø 194	Ø 89÷180	Ø 133÷194
						354	
289	289	289	289	289		289	
460	460	460	460	460			
244	244	244	244				
388	388	388	388	388		388	
	581	581	581	581			
204	204	204	204				
325	325	325	325	325		325	
	487	487	487	487			
			634	634			
	288	288	431	431		431	
	431	431	561	561		561	
	561	561	710	710			
	387	387	387	387		387	
	503	503	503	503	503	503	
			637	637	753		
		446	446	446	446	342	
		667	667	667	667	446	446
				604	604	604	604
				909	909		
				558	558		840
				840	840		

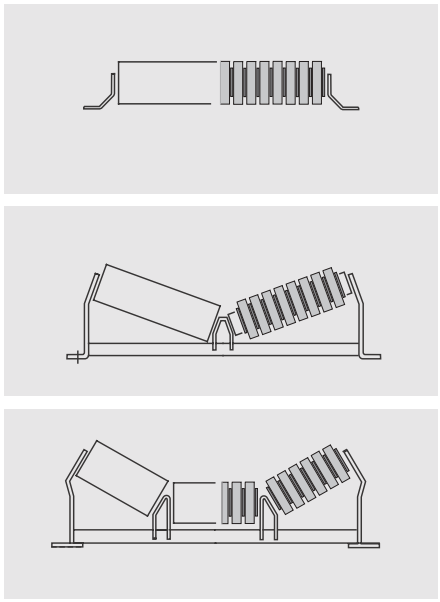
3.3 - Arrangements

According to the requirements of the specific project, different arrangements of transoms have been designed. These may be separated into fixed and suspended transoms.

In belt conveyors there are two basic types of troughing sets : that of the carrying set, which supports the belt on the loaded section, known as the upper troughing set; and that of the return set, which supports the empty belt on its return section.

A particular category of troughing sets is that known as the impact set which is positioned to correspond to the section where the belt is loaded with material.

Fig. **1** - Fixed troughing sets

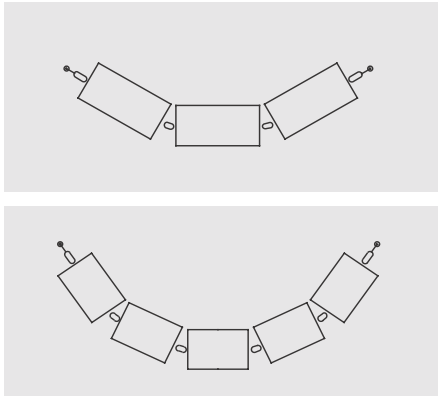


3.3.1 - Upper carrying troughing set

The drawings illustrate the arrangements of fixed carrying troughing sets with plain or impact rollers Fig. 1, and the suspended troughing set “garland” Fig. 2.

The carrying troughing sets of three rollers are designed as standard for unidirectional belts, and for this reason have a slight forward inclination of two degrees in the position of the side rollers.
This assists the belt tracking by an auto-centralising effect. For reversible belts the version R is required, which is without the above two degrees (see “order codes” para. 3.3.3)

Fig. **2** - "Garland" sets



3.3.2 - Return sets

The lower or return sets may also be chosen from varying arrangements according to the requirement : fixed sets with plain steel roller or with spacer rings Fig. 3 and suspended sets “garland” with plain rollers and with rings Fig. 4.

Fig. **3** - Fixed sets

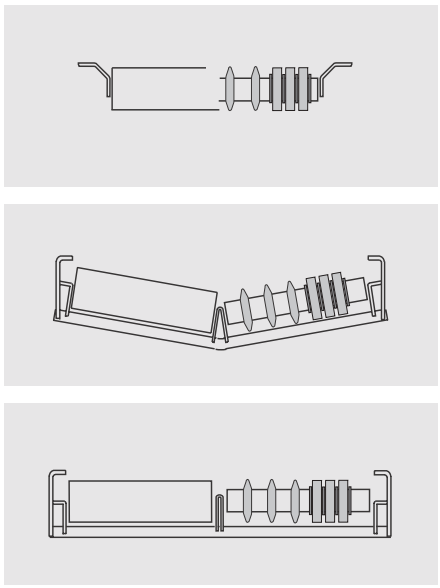
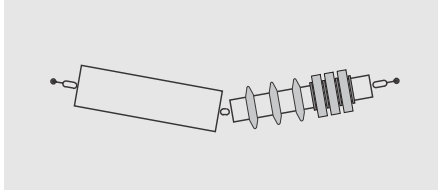
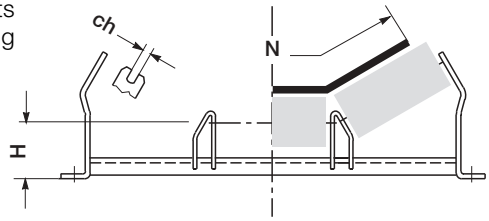


Fig. **4** - "Garland" sets



3.3.3 Order codes

The transoms and the support brackets are identified according to the following characteristics :



A3M/26 - 800 F14 H160 - - - YA R

Example: Transom

Order code
Special design (T : with bracket)
Belt width
Dimension of flats "ch"
Height "H" (where existing from the order)
Diameter of rollers (only for the self-centering transom)
Type of finish (see table)
Reversible design R (without 2° inclination of side brackets)

SPT 1478 F17 YA

Example: **Brackets**

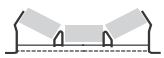
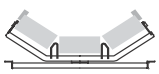
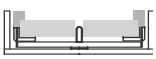
Support
Type
Dimension of flats "ch"
Type of finish (see table)

Type of finish of transom and brackets

	Code	Description of treatment
	YA	painted with anti rust
	YB	sandblasted SA 2,5 + inorganic zinc 70 micron
	YC	sandblasted SA 2,5 + inorganic zinc 70 micron + chlorinated rubber 30 micron
*	**Z**	hot zinc min. 70 microns
	J	electrolytic zinc min. 10 microns
	YS	special paint
	-	not specified: no finish

* Note: the type of finish "Z" for selfcentralising transoms is intended as zinc thermal spraying

3.3.4 - Programme of transoms and brackets

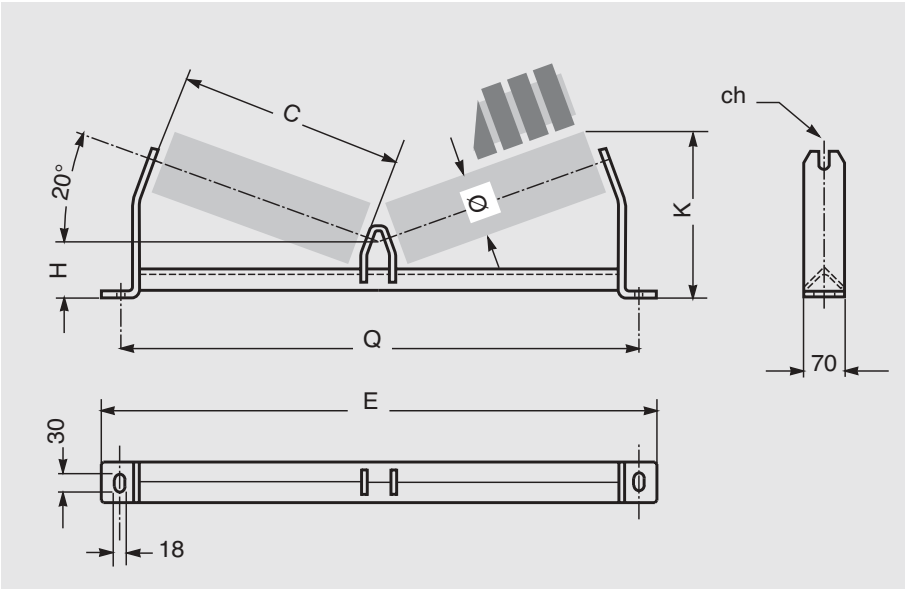
Series	Arrangements	Descriptions
A2 S 20°		upper transom for two rollers
A3 L 30° **A3 M** 30° **A3 P** 30° **A3 S** 35°		upper transom for three rollers
SPT 1657 **SPT 070** **SPT 1795**		upper brackets for one roller
SPT 1478 **SPT 243** **SPT 1495**		lower return brackets for plain roller
R2 S 10°		transom for two return rollers "V"
R2 SP		transom for two flat return rollers
P3 L,M,P,S - S **P3 L,M,P,S - F** **P3 L,M,P,S - R**		upper self-centralising transom for three rollers
Q1 L **Q1 P**		lower self-centralising return transom for one roller
Q2 L **Q2 P**		lower self-centralising return transom for two rollers

The production programme of frames and supports indicated in the table is related to the standard production according to the Unified Standards DIN 22107.
On request they can be supplied in different shapes and dimensions according to the standards CEMA, BS, JIS, AFNOR and ISO-FEM.

3 Troughing sets

transom
A2 S-20°

For light upper troughing sets with two rollers, plain or with impact rings



for rollers series:

MPS
ø 60, 76, 89, 102
spindle 15
bearing 6202
ch = 17

PSV 1,
ø 63, 89, 108
spindle 20
bearing 6204
ch = 14

PL
ø 90, 110
PLF
ø 89, 108
spindle 20
bearing 6204
ch = 30; 14

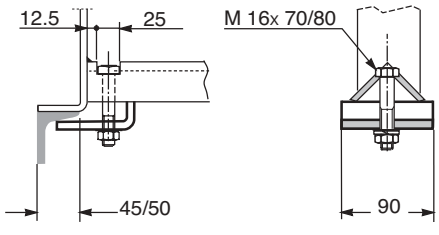
Order codes	belt width mm	roller Ø mm	C	ch	transom capacity Kg	H mm	K max	Q	E	Weight * without rollers Kg
A2 S/49	**300**	60 - 63 - 76 89 - 90 102 - 108 - 110	**208**	**14 - 17 - 30**	338	**95**	213	540	600	3.9
A2 S/51	**400**		**258**		286	**95**	240	640	700	4.4
A2 S/53	**500**		**323**		247	**95**	262	740	800	4.9
A2 S/55	**650**		**388**		205	**95**	285	890	950	5.6
A2 S/57	**800**		**473**		167	**95**	314	1090	1150	6.6

On request transoms may be supplied with different dimensions, characteristics and angles.

A2 S-20° Standard

A2 ST-20°

Special design with bracket
for fixing the transom without drilling the main frame



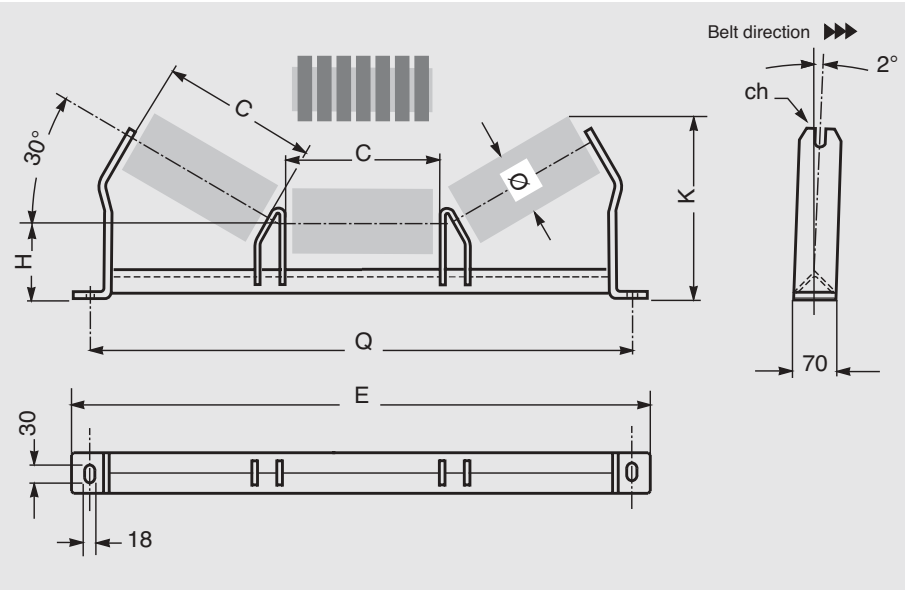
* Add 1.5 kg for the special design with bracket

Example of ordering
A2S /51, 400, F17,

for special designs
see page 204

transom
A3 L-30°

For light upper troughing sets with three rollers, plain or with impact rings



for rollers series:

MPS
ø 76, 89, 102
spindle 15
bearing 6202
ch = 17

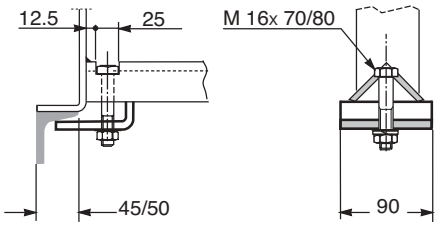
PL
ø 90, 110
PLF
ø 89, 108
spindle 20
bearing 6204
ch = 30; 14

Order codes	belt width mm	roller Ø mm	C	ch	transom capacity Kg	H mm	K max	Q	E	Weight * without rollers Kg
A3 L /1A	**400**	76 - 89 - 90 102 - 108 - 110	**168**	**17 - 30**	286	**125**	267	640	700	5.4
A3 L /01	**500**		**208**		247	**125**	287	740	800	5.9
A3 L /03	**650**		**258**		205	**125**	312	890	950	6.6
A3 L /05	**800**		**323**		167	**125**	344	1090	1150	7.5

On request transoms may be supplied with different dimensions, characteristics and angles.


A3 L-30° Standard

A3 LT-30°
Special design with bracket
for fixing the transom without drilling the main frame



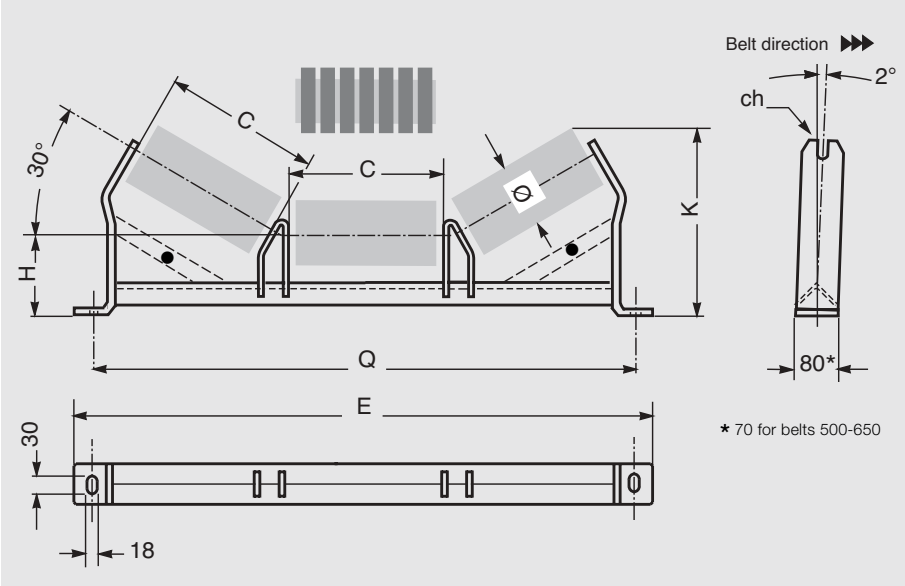
* Add 1.5 kg for the special design with bracket

Example of ordering
A3L /03, 650, F17, YA

for special designs
see page 204

transom
A3 M-30°

For medium upper troughing sets with three rollers, plain or with impact rings



● Reinforcing only for frames with order code: A3 M /24 - A3 M /28 - A3 M /32
A3 M /26 - A3 M /30 - A3 M /34
for belt widths 800 - 1000 - 1200

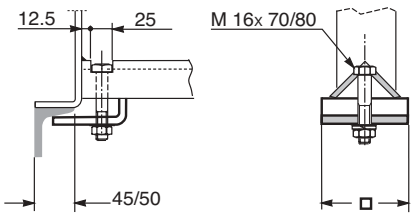
for rollers series:

PSV 1,
ø 89, 108
spindle 20
bearing 6204
ch = 14

PL
ø 90, 110, 140
PLF
ø 89, 108, 133
spindle 20
bearing 6204
ch = 30, 14

A3 M-30° Standard

A3 MT-30°
Special design with bracket
for fixing onto the transom without drilling a hole in the frame



☐ Bracket width available: 90 - 100 - 110

Example of ordering
A3M /28,1000,F14, H140, Z

for special designs
see page 204

transom
A3 M-30°

Order codes	belt width mm	roller Ø mm	C	ch	transom capacity Kg	H mm	K max	Q	E	Weight without rollers Kg
A3 M 1/3A	**500**	89 - 90 - 108 -110	**208**	**14 - 30**	247	**135**	292	740	800	6.0
A3 M 1/3E	**650**		**258**		205	**135**	317	890	950	6.7
A3 M /22					354	**135**	317	890	950	8.1
A3 M 1/3K	**800**		**323**		289	**140**	354	1090	1150	10.7
A3 M /24					460	**140**	354	1090	1150	13.3
A3 M 1/3P	**1000**		**388**		244	**140**	387	1290	1350	12.2
A3 M /28					388	**140**	387	1290	1350	15.1
A3 M 1/3J	**1200**		**473**		204	**140**	429	1540	1600	14.0
A3 M /32					325	**140**	429	1540	1600	17.4
A3 M 2/3C	**500**	133 - 140	**208**	**14 - 30**	247	**155**	325	740	800	6.5
A3 M 2/3G	**650**		**258**		205	**155**	350	890	950	7.2
A3 M 3/3I					354	**155**	350	890	950	8.6
A3 M 2/3M	**800**		**323**		289	**160**	387	1090	1150	11.4
A3 M /26					460	**160**	387	1090	1150	13.9
A3 M 2/3R	**1000**		**388**		244	**160**	420	1290	1350	12.7
A3 M /30					388	**160**	420	1290	1350	15.9
A3 M 2/3V	**1200**		**473**		204	**160**	462	1540	1600	14.5
A3 M /34					325	**160**	462	1540	1600	18.1

On request transoms may be supplied with different dimensions, characteristics and angles.

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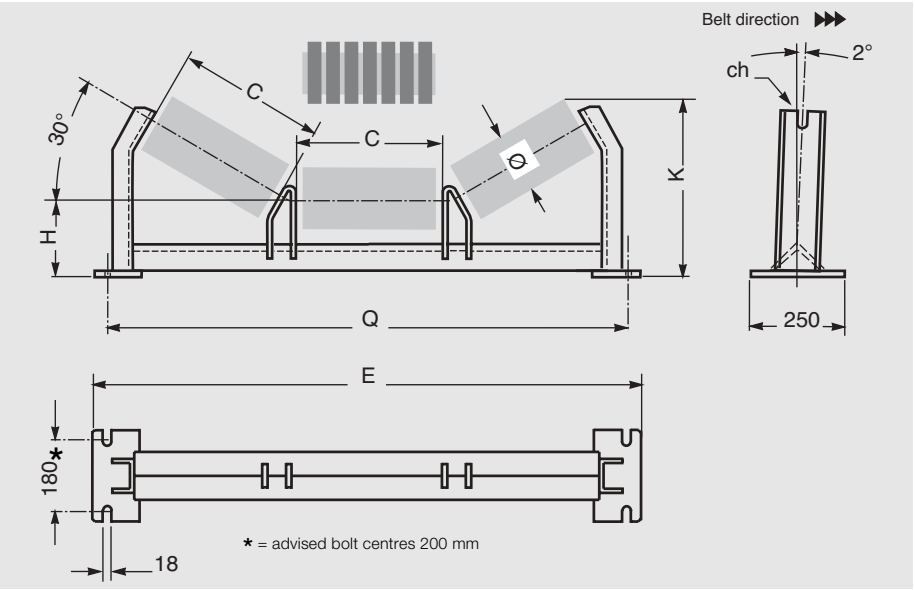
transom
A3 P-30°

For heavy upper troughing sets with three rollers, plain or with impact rings



for rollers series:

PSV 1,
ø 89, 108,133
spindle 20
bearing 6204
ch = 14

PSV 2, 3
ø 133, 159
spindle 25
bearing 6205, 6305
ch = 18

PSV 4, 5
ø 133, 159
spindle 30
bearing 6206, 6306
ch = 22

A3 P-30° Standard

Example of ordering
A3P/54,1200,4, F18, H168

for special designs
see page 204

transom
A3 P-30°

Order codes	belt width mm	roller Ø mm	C	ch	transom capacity Kg	H mm	K max	Q	E	Weight without rollers Kg
A3 P 1/5A	**800**	89 - 108	**323**	14	289	**133**	347	1090	1150	11.5
A3 P 2/5B					460	**140**	355	1090	1150	13.6
A3 P 1/5E	**1000**		**388**		244	**133**	380	1290	1350	12.7
A3 P 2/5F					388	**140**	387	1290	1350	15.3
A3 P 1/5K	**1200**		**473**		204	**133**	422	1540	1600	14.4
A3 P 2/5L					325	**140**	429	1540	1600	17.3
A3 P 3/5C	**800**	133	**323**	14 - 18 - 22	289	**153**	380	1090	1150	12.9
A3 P /50					460	**160**	388	1090	1150	15.0
A3 P 3/5G	**1000**		**388**		244	**153**	413	1290	1350	15.5
A3 P 4/5H					388	**160**	420	1290	1350	18.1
A3 P /52					581	**168**	428	1290	1350	21.0
A3 P 3/5M	**1200**		**473**		204	**153**	455	1540	1600	17.3
A3 P 4/5N					325	**160**	462	1540	1600	20.3
A3 P /54					487	**168**	470	1540	1600	23.7
A3 P 1/5R	**1400**		**538**	18 - 22	288	**160**	496	1740	1800	22.1
A3 P 2/5S					431	**168**	503	1740	1800	26.1
A3 P /56					561	**176**	511	1740	1800	28.3
A3 P 1/5V	**1600**		**608**		387	**168**	538	1940	2000	28.3
A3 P /58					503	**176**	546	1940	2000	30.7
A3 P 4/5D	**800**	159	**323**	18 - 22	284	**173**	413	1090	1150	13.8
A3 P /51					460	**180**	420	1090	1150	15.9
A3 P 5/5I	**1000**		**388**		244	**173**	445	1290	1350	16.6
A3 P 6/5J					388	**180**	452	1290	1350	19.1
A3 P /53					581	**188**	460	1290	1350	22.0
A3 P 5/5P	**1200**		**473**		204	**173**	475	1540	1600	18.3
A3 P 6/5Q					325	**180**	482	1540	1600	21.3
A3 P /55					487	**188**	490	1540	1600	24.8
A3 P 3/5T	**1400**		**538**		288	**180**	518	1740	1800	23.2
A3 P 4/5U					431	**188**	525	1740	1800	27.1
A3 P /57					561	**196**	533	1740	1800	29.3
A3 P 2/5W	**1600**		**608**		387	**188**	580	1940	2000	29.4
A3 P /59					503	**196**	588	1940	2000	31.8
A3 P 1/5X	**1800**		**678**		446	**196**	615	2190	2250	34.9
A3 P 2/5Y					667	**203**	623	2190	2250	43.9

On request transoms may be supplied with different dimensions, characteristics and angles.

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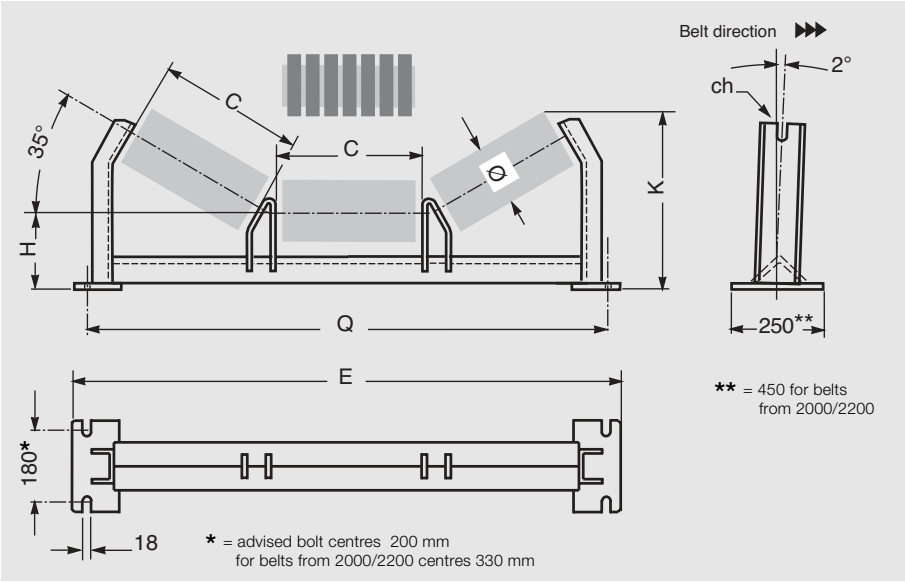
transom
A3 S-35°

For upper troughing sets, extra heavy with three rollers, plain or with impact rings



for rollers series:

PSV 2, 3
ø 133
spindle 25
bearing 6205; 6305
ch = 18

PSV 4, 5
ø 159
spindle 30
bearing 6206; 6306
ch = 22

PSV 7
ø 159, 194
spindle 40
bearing 6308;
ch = 32

A3 S-35° Standard

Example of ordering
A3 S/77, 1400, F22, H205

for special designs
see page 204

transom
A3 S-35°

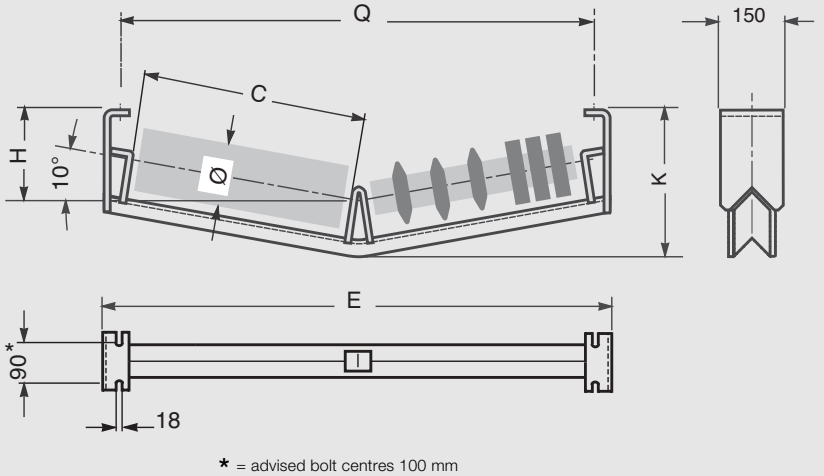
Order codes	belt width mm	roller Ø mm	C	ch	transom capacity Kg	H mm	K max	Q	E	Weight without rollers Kg
A3 S 1/80	**800**	133	**323**	18 - 22	289	**155**	407	1090	1150	14.1
A3 S /70					460	**163**	415	1090	1150	16.2
A3 S 1/82	**1000**		**388**		244	**155**	444	1290	1350	15.6
A3 S 2/83					388	**163**	451	1290	1350	18.1
A3 S 3/84					581	**170**	459	1290	1350	21.0
A3 S 1/87	**1200**		**473**		204	**155**	493	1540	1600	17.5
A3 S 2/88					325	**163**	500	1540	1600	20.4
A3 S 3/89					487	**170**	508	1540	1600	24.0
A3 S /74					634	**178**	516	1540	1600	25.9
A3 S 1/8C	**1400**		**538**		431	**170**	546	1740	1800	26.2
A3 S 2/8D					561	**178**	553	1740	1800	28.4
A3 S /76					710	**185**	560	1740	1800	30.6
A3 S 1/8G	**1600**		**608**		387	**170**	586	1940	2000	28.6
A3 S 2/8H					503	**178**	593	1940	2000	31.0
A3 S /78					637	**185**	600	1940	2000	33.5
A3 S 1/8K	**1800**		**678**		446	**178**	633	2190	2250	43.2
A3 S 2/8N					667	**185**	640	2190	2250	48.7
A3 S 2/81	**800**	159	**323**	18 - 22	289	**176**	437	1090	1150	15.8
A3 S /71					460	**183**	445	1090	1150	18.0
A3 S 4/85	**1000**		**388**		388	**183**	475	1290	1350	19.7
A3 S 5/86					581	**190**	490	1290	1350	22.6
A3 S 4/8A	**1200**	159	**473**	18 - 22 - 32	325	**183**	532	1540	1600	21.7
A3 S 5/8B					487	**190**	539	1540	1600	25.5
A3 S /75					634	**198**	547	1540	1600	27.4
A3 S 3/8E	**1400**		**538**		431	**190**	576	1740	1800	27.8
A3 S 4/8F					561	**198**	583	1740	1800	30.0
A3 S /77					710	**205**	591	1740	1800	32.2
A3 S 3/8I	**1600**		**608**		387	**190**	616	1940	2000	30.1
A3 S 4/8J					503	**198**	588	1940	2000	32.6
A3 S /79					637	**205**	631	1940	2000	35.0
A3 S 3/8P	**1800**		**678**		446	**198**	663	2190	2250	41.0
A3 S 4/8Q					667	**205**	671	2190	2250	49.8
A3 S 1/8T	**2000**		**758**		604	**210**	717	2420	2520	62.0
A3 S 2/8U					909	**225**	732	2420	2520	70.0
A3 S 1/8X	**2200**		**808**		558	**210**	746	2620	2720	66.1
A3 S 2/8Y					840	**225**	761	2620	2720	74.6
A3 S 5/8L	**1600**	194	**608**	32	503	**265**	672	1940	2000	40.7
A3 S 6/8M					753	**273**	680	1940	2000	48.7
A3 S 5/8R	**1800**		**678**		446	**265**	712	2190	2250	43.5
A3 S 6/8S					667	**273**	720	2190	2250	53.0
A3 S 3/8V	**2000**		**758**		604	**277**	803	2420	2520	64.6
A3 S 4/8W					909	**290**	816	2420	2520	72.3
A3 S 3/8Z	**2200**		**808**		558	**277**	832	2620	2720	68.3
A3 S 4/90					840	**290**	845	2620	2720	76.7

On request transoms may be supplied with different dimensions, characteristics and angles for belt widths up to 3000 mm.

3 Troughing sets

transom
R2 S

For return sets "V", with two rollers, plain or with rings



* = advised bolt centres 100 mm

for rollers series:

PSV 1,
ø 89, 108, 133
spindle 20
bearing 6204
ch = 14

PSV 2
ø 133, 159, 180
spindle 25
bearing 6205
ch = 18

PSV 4
ø 159, 180
spindle 30
bearing 6206
ch = 22

Order codes	belt width mm	roller Ø mm	C	ch	transom capacity Kg	H mm	K max	Q	E	Weight without rollers Kg
R2 S /81	**650**		**388**		354	**220**	365	890	950	**12.9**
R2 S /82	**800**		**473**		289	**238**	384	1090	1150	**14.4**
R2 S /83	**1000**		**608**		388	**256**	408	1290	1350	**18.1**
R2 S /84	**1200**		**708**		325	**279**	430	1540	1600	**20.1**
R2 S 1/8A	**1400**		**808**		431	**297**	454	1740	1800	**26.0**
R2 S /85					561	**297**	462	1740	1800	**28.3**
R2 S 1/8B	**1600**		**908**		387	**314**	474	1940	2000	**28.1**
R2 S /86					503	**314**	482	1940	2000	**30.7**
R2 S 1/8C	**1800**		**1008**		342	**338**	503	2190	2250	**30.0**
R2 S 2/8D					446	**338**	511	2190	2250	**32.8**
R2 S 1/8E	**2000**		**1108**		604	**358**	533	2420	2500	**45.3**
R2 S 1/8F	**2200**		**1258**		560	**375**	560	2620	2700	**50.4**

89 - 108 - 133 - 159 - 180

14 - 18 -22

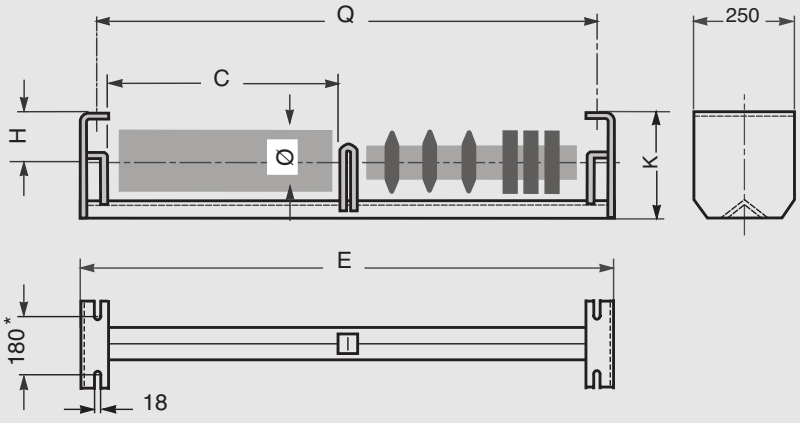
On request transoms may be supplied with different dimensions, characteristics and angles for belt widths up to 3000 mm.

Example of ordering
R2S/85, 1400, F14, J

for special designs
see page 204

transom
R2 SP

For flat return sets with two rollers, plain or with rings



* = advised bolt centres 200 mm

for rollers series:

PSV 4
ø 159, 180
spindle 30
bearing 6206
ch = 22

PSV 7
ø 133, 159, 194
spindle 40
bearing 6308
ch = 32

belt	roller			transom					
width mm	Ø mm	C	ch	capacity Kg	H mm	K max	Q	E	Weight without rollers Kg
1800	133-159-194	**1008**	22 - 32	446	**175**	372	2190	2250	54.5
2000		**1108**		604	**175**	380	2420	2500	68.0
2200		**1258**		840	**175**	395	2620	2700	76.5

On request transoms may be supplied with different dimensions, characteristics and angles for belt widths up to 3000 mm.

Example of ordering
R2SP, 2000, F22, YC

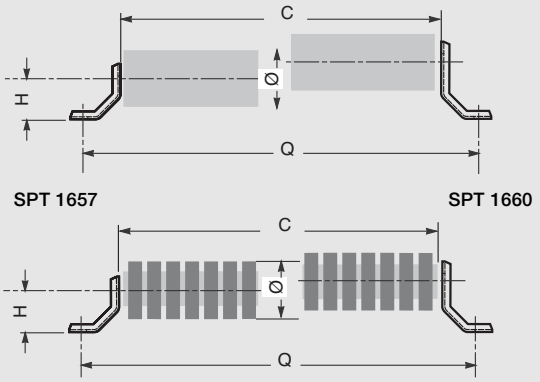
for special designs
see page 204

3 Troughing sets

support brackets

SPT 1657-1660

For light upper set flat roller, plain or with impact rings



with plain roller design N

with impact roller design NA

SPT 1657 for rollers series:

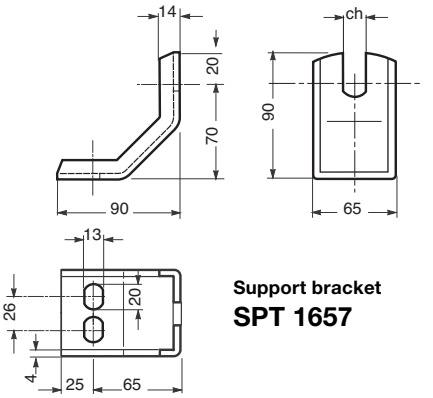
RTL
spindle 15
bearing cup and cone
ch = 17

MPS
spindle 15
bearing 6202
ch = 17

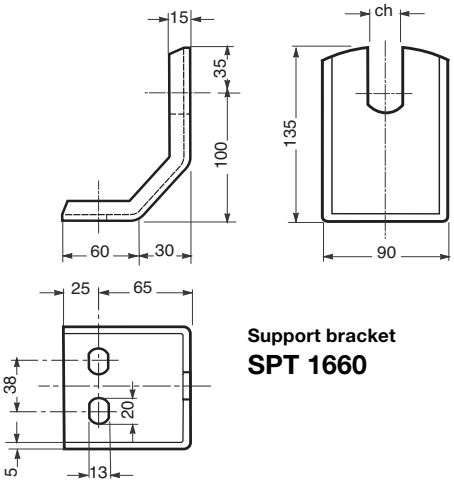
MPR
spindle 15
bearing 6202
ch = 17

PSV 1,
spindle 20
bearing 6204
ch = 14

M
spindle 15
bearing cup and cone
ch = 17



Support bracket
SPT 1657



Support bracket
SPT 1660

SPT 1660 for rollers series:

PSV 1
spindle 20
bearing 6204
ch = 14

PSV 4
spindle 30
bearing 6206
ch = 22

PSV 2
spindle 25
bearing 6205
ch = 18

PSV 5
spindle 30
bearing 6306
ch = 22

PSV 3
spindle 25
bearing 6305
ch = 18

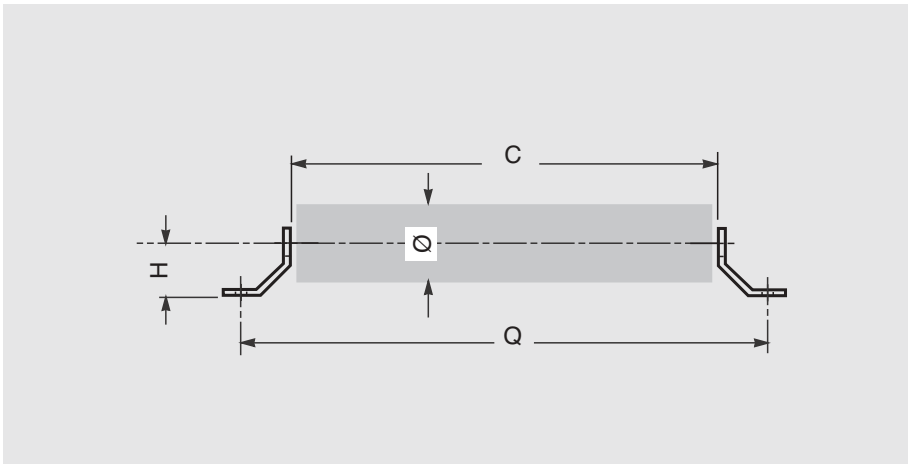
belt	roller								
width	Ø	C	ch	H		Q	Weight of two brackets without rollers	
				SPT 1657	SPT 1660		SPT 1657	SPT 1660
mm	mm			mm			Kg	
300	SPT 1657: 60 ÷ 133 SPT 1660: 60 ÷ 180	388	SPT 1657: 14 -17 SPT 1660: 14 - 18 - 22	70	100	520	0.7	1.5
400		508		70	100	640	0.7	1.5
500		608		70	100	740	0.7	1.5
650		758		70	100	890	0.7	1.5
800		958		70	100	1090	0.7	1.5
1000		1158		70	100	1290	0.7	1.5
1200		1408		70	100	1540	0.7	1.5
1400		1608		70	100	1740	0.7	1.5

Example of ordering
support bracket SPT 1657, F17,YA

support brackets

SPT 070

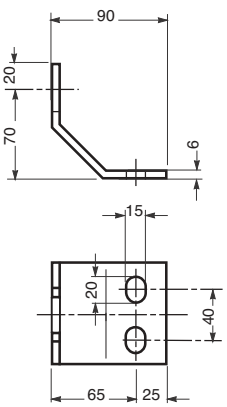
For upper set flat roller PL or PLF



for rollers series:

PL
ø 90,110,140
spindle 20
bearing 6204
ch = 30

PLF
ø 89,108,133
spindle 20
bearing 6204
ch = 30



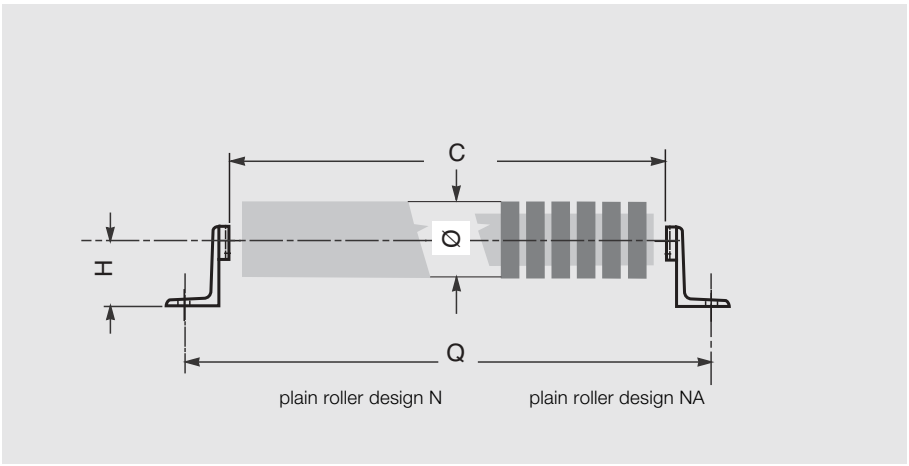
Support bracket
SPT 070

belt width mm	roller Ø mm	C	ch	H mm	Q	Weight of two brackets without rollers Kg
300	90-110-140	388	30	70	520	1.0
400		508		70	640	1.0
500		608		70	740	1.0
650		758		70	890	1.0
800		958		70	1090	1.0
1000		1158		70	1290	1.0
1200		1408		70	1540	1.0

Example of ordering
support bracket SPT 070,
F30,YC

support brackets
SPT 1795

For upper set heavy flat roller, plain or with impact rings

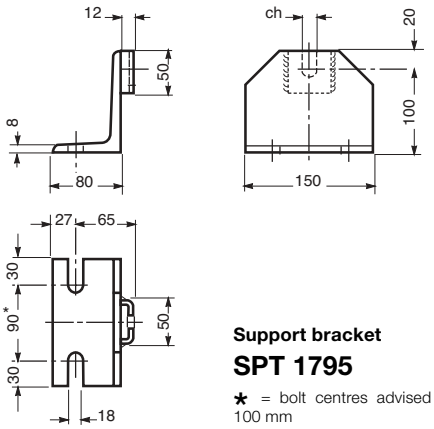


for rollers series:

PSV 1,
ø 89,108,133
spindle 20
bearing 6204
ch = 14

PSV 2
ø 108,133,159
spindle 25
bearing 6205
ch = 18

PSV 4
ø 108,133,159
spindle 30
bearing 6206
ch = 22



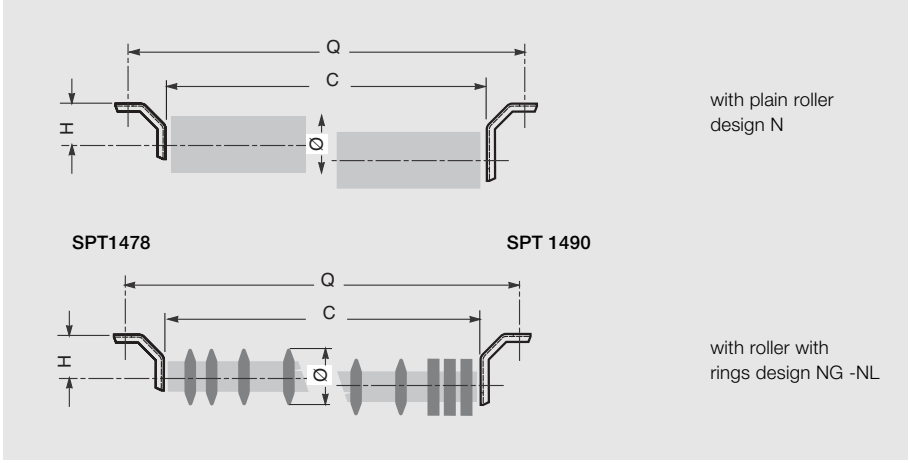
Support bracket
SPT 1795
★ = bolt centres advised 100 mm

belt width mm	roller Ø mm	C	ch	H mm	Q	Weight of two brackets without rollers Kg
500	89-108-133-159	608	14-18-22	100	740	3.7
650		758		100	890	3.7
800		958		100	1090	3.7
1000		1158		100	1290	3.7
1200		1408		100	1540	3.7
1400		1608		100	1740	3.7
1600		1808		100	1940	3.7
1800		2008		100	2140	3.7
2000		2208		100	2340	3.7

Example of ordering
support bracket SPT 1795, F22,Z

support brackets
SPT 1478 - 1490

For light flat return roller, plain or with rings



SPT 1478 for rollers series:

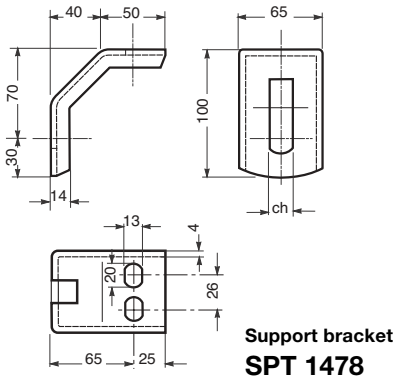
RTL
spindle 15
bearing cup and cone
ch = 17

MPS
spindle 15
bearing 6202
ch = 17

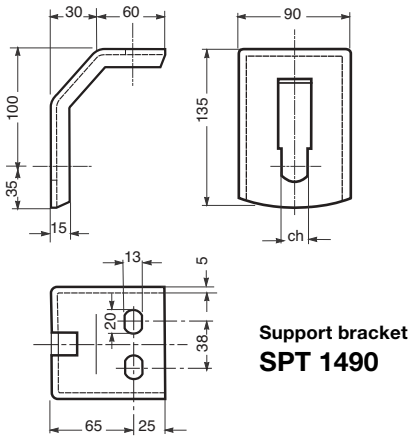
MPR
spindle 15
bearing 6202
ch = 17

PSV 1,
spindle 20
bearing 6204
ch = 14

M
spindle 15
bearing cup and cone
ch = 17



Support bracket
SPT 1478



Support bracket
SPT 1490

SPT 1490 for rollers series:

PSV 1
spindle 20
bearing 6204
ch = 14

PSV 4
spindle 30
bearing 6206
ch = 22

PSV 2
spindle 25
bearing 6205
ch = 18

PSV 5
spindle 30
bearing 6306
ch = 22

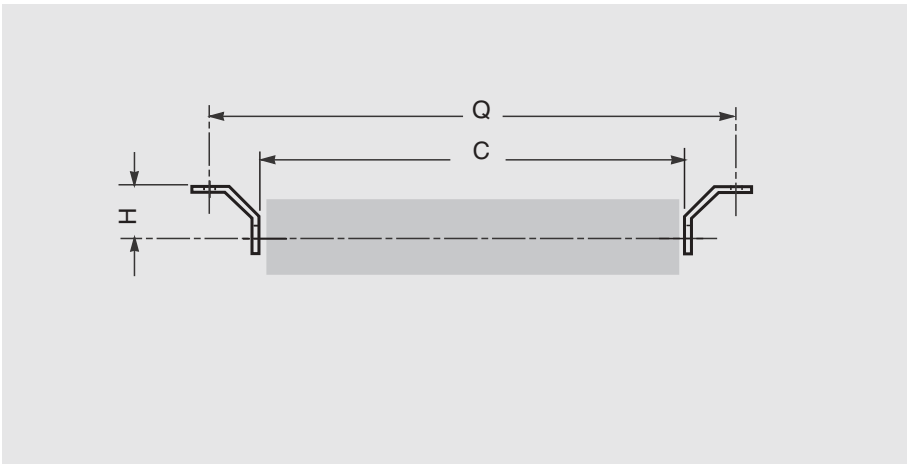
PSV 3
spindle 25
bearing 6305
ch = 18

belt width mm	roller Ø mm	C	ch	H SPT 1478 mm	H SPT 1490 mm	Q	Weight of two brackets without rollers SPT 1478 Kg	Weight of two brackets without rollers SPT 1490 Kg
300	SPT 1478: 60 ÷ 133 SPT 1490: 60 ÷ 180	388	SPT 1478: 14 -17 SPT 1490: 14 - 18 - 22	70	100	520	0.7	1.5
400		508		70	100	640	0.7	1.5
500		608		70	100	740	0.7	1.5
650		758		70	100	890	0.7	1.5
800		958		70	100	1090	0.7	1.5
1000		1158		70	100	1290	0.7	1.5
1200		1408		70	100	1540	0.7	1.5
1400		1608		70	100	1740	0.7	1.5

Example of ordering
support bracket SPT 1478, F14,

support brackets
SPT 243

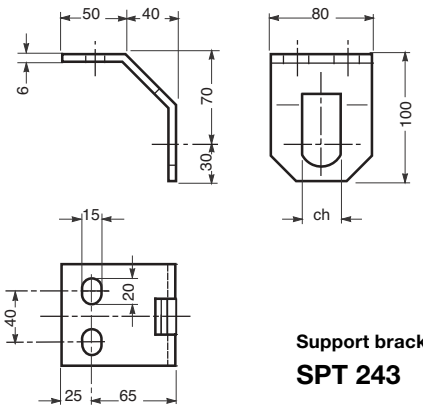
For flat return roller PL or PLF



for rollers series:

PL
ø 90,110,140
spindle 20
bearing 6204
ch = 30

PLF
ø , 89,108,133
spindle 20
bearing 6204
ch = 30



Support bracket
SPT 243

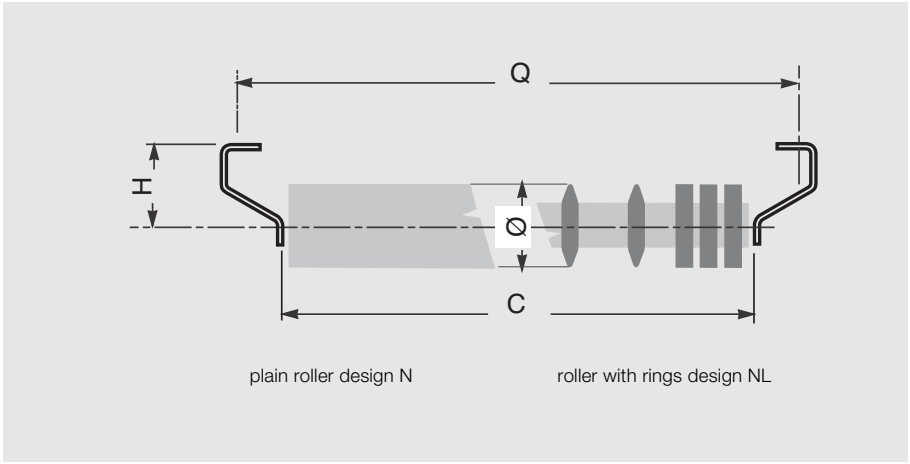
belt width mm	roller Ø mm	C	ch	H mm	Q	Weight of two brackets without rollers Kg
300	90-110-140	**388**	30	70	520	1.0
400		**508**		70	640	1.0
500		**608**		70	740	1.0
650		**758**		70	890	1.0
800		**958**		70	1090	1.0
1000		**1158**		70	1290	1.0
1200		**1408**		70	1540	1.0

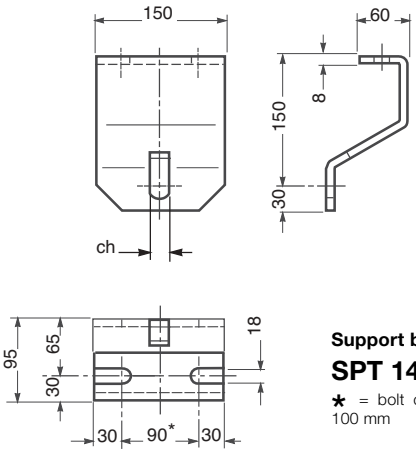
Example of ordering
support bracket SPT 243, F30,Z

support brackets

SPT 1495

For heavy return set flat roller, plain or with rings





Support bracket

SPT 1495

✱ = bolt centres advised 100 mm

for rollers series:

PSV 2
ø 108,133,159
spindle 25
bearing 6205
ch = 18

PSV 4
ø 108,133,159
spindle 30
bearing 6206
ch = 22

belt	roller					
width mm	Ø mm	**C**	**ch**	H mm	Q	Weight of two brackets without rollers Kg
500		**608**		150	740	4.6
650		**758**		150	890	4.6
800		**958**		150	1090	4.6
1000	**108-133-159-180**	**1158**		150	1290	4.6
1200		**1408**	**18-22**	150	1540	4.6
1400		**1608**		150	1740	4.6
1600		**1808**		150	1940	4.6
1800		**2008**		150	2140	4.6
2000		**2208**		150	2340	4.6

Example of ordering
support bracket SPT 1495, F18,YB

3.4 - Self-centralising troughing sets

Sometimes the difficult working conditions of the plant results in a lateral movement of the belt. In this case a self-centralising troughing set is used which acts in a way that corrects the belt tracking and maintains it constantly in the central position.

The self-centralising troughing set is designed as a series of rollers arranged in a trough positioned onto the supporting transom which itself is fixed to a slewing ring Fig. 5 which permits rotation.

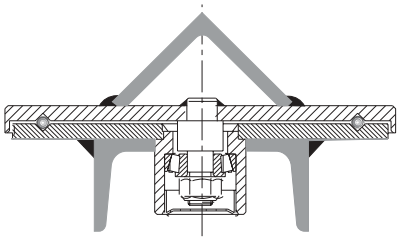


Fig. **5**

The slewing ring (a large ball bearing) permits a rotation limited to 5-8 degrees and is sized in proportion to the vertical loading; a tapered roller bearing assembled to the shaft of the slewing ring, absorbs any side forces or overturning pressures.

The installation of the self-centralising troughing sets is advised to be positioned on the upper strand rather than the return section, and used only when the working conditions require.

Self - centralising troughing set for loaded strand of belt

The self-centralising troughing sets are designed and manufactured in a way that allows them to be entirely interchangeable with the normal transom.

Normally it is a good standard to install them at an approximate distance of 15 metre from the pulley and at a pitch of about 30 m.

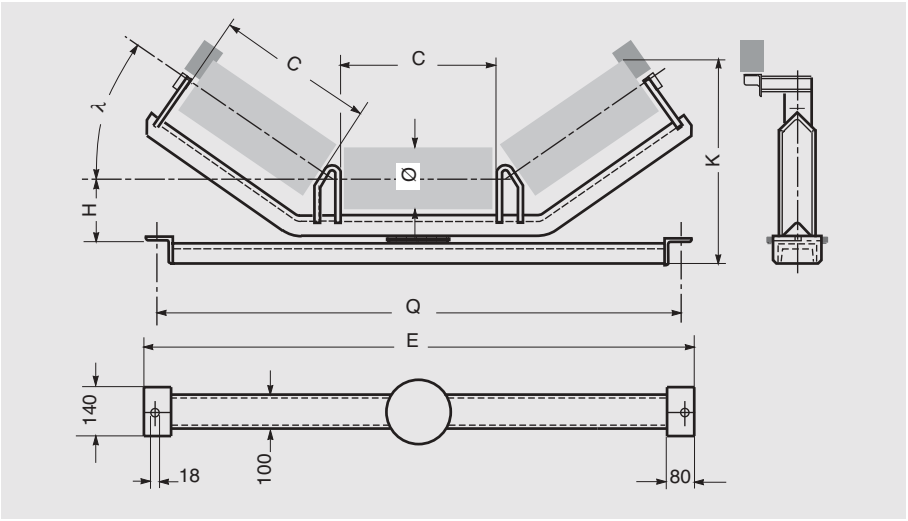
It is not advised to use self-centralising troughing sets on very short conveyors.

The self-centralising troughing sets are designed in 3 different versions : model S, with rigid arm; model F, with pivoting arm with brake; model R, with centralised pivoting arm with brake, for reversible belts.

self-centralising transom

Model S

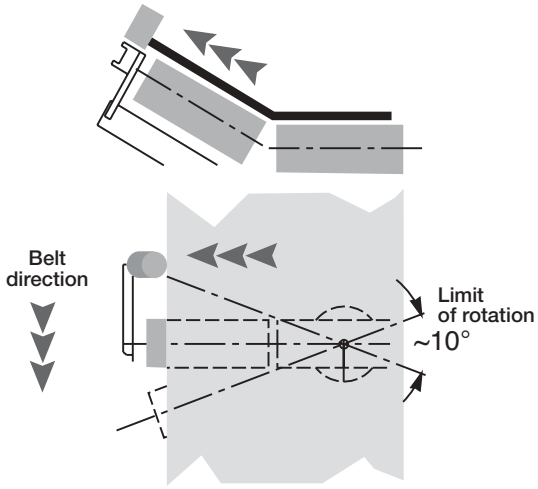
(without brake for unidirectional belt)



Characteristics and dimensions are similar to the corresponding fixed carrying transom

Series fixed transom	**A3L**	**A3M**	**A3P**	**A3S**
Series self-centralising transom	**P3L-S**	**P3M-S**	**P3P-S**	**P3S-S**

Carrying rollers and guide rollers
type PS G7 20M16 60N 100 have to be ordered separately.



Method of operation Model S

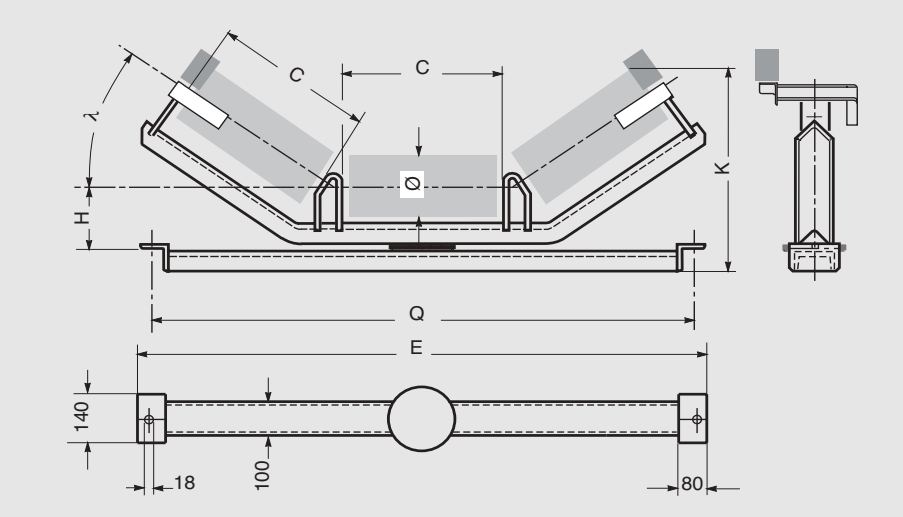
The system is very simple comprising a rigid lever arm, on which is positioned a belt guide roller.
The pressure exerted by the edge of the belt when tracking off, acts against the offset guide roller which in turn rotates the transom by an angle that encourages the belt to return centrally.
This model is used on small or medium unidirectional belts, where the tendency to track off is not excessive.

3 Troughing sets

self-centralising transom

Model F

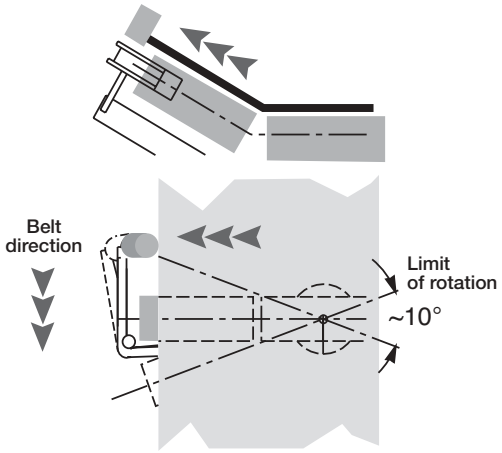
(with brake for unidirectional belt)



Characteristics and dimensions are similar to the corresponding fixed carrying transom

Series fixed transom	**A3L**	**A3M**	**A3P**	**A3S**
Series self-centralising transom	**P3L-F**	**P3M-F**	**P3P-F**	**P3S-F**

Carrying rollers and guide rollers type PS G7 20M16 60N 100 have to be ordered separately.



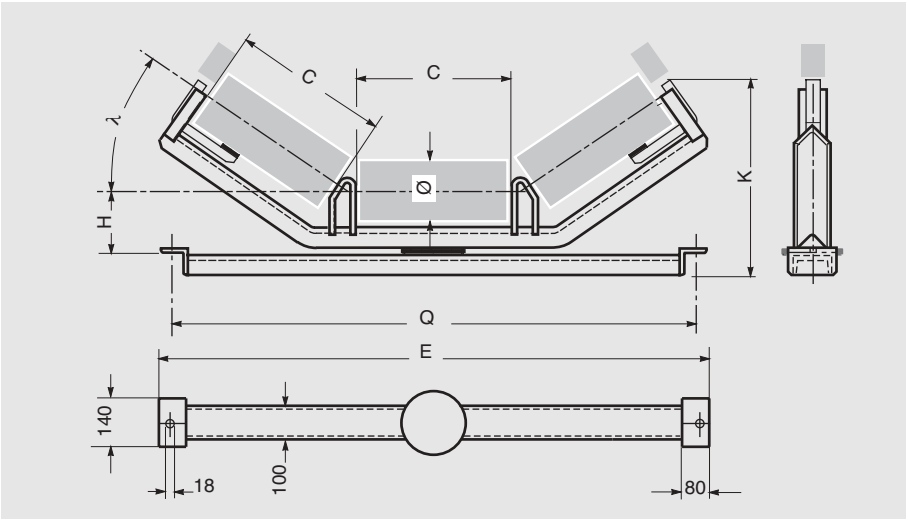
Method of operation Model F

In this design the lever arm pivots, transmitting a force produced by the belt onto the offset guide roller which in turn causes a brake to be applied to the side support roller.
This braking action together with the side belt force itself on the lever arm (as with model S) generates a force that rotates the transom and encourages the belt to return centrally.
Model F with brake, is normally used on very long uni-directional belts, where large material lumps and side or very irregular loading is experienced leading to a big centralising problem.

self-centralising transom

Model R

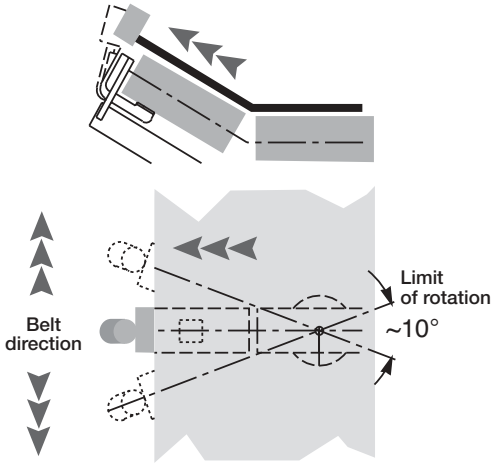
(with brake for reversible belt)



Characteristics and dimensions are similar to the corresponding fixed carrying transom

Series fixed transom	**A3L**	**A3M**	**A3P**	**A3S**
Series self-centralising transom	**P3L-R**	**P3M-R**	**P3P-R**	**P3S-R**

Carrying rollers and guide rollers
type PS G7 20S18 60N 100 have to be ordered separately.



Method of operation Model R

In reversible conveyors a double action is needed to suit either belt direction. Model R acts on the same principle of braking as model F, but in this design the lever arm is on the same centre line as the rollers.

The action of the braking effect is to rotate the transom, encouraging the belt to the centre. Thanks to the centralised arrangement the system functions in either direction of belt movement.

Series P3L *

codes	belt width mm	roller Ø mm	C mm	ch mm	transom capacity Kg	H mm	K max mm	Q mm	E mm	weight without rollers kg
P3L*/1A	**400**	**76 - 89 - 90 / 102 - 108 - 110**	**168**	**17 - 30**	286	125	334	640	700	20.7
P3L*/01	**500**		**208**		247	125	354	740	800	22.1
P3L*/02	**650**		**258**		205	125	379	890	950	24.3
P3L*/03	**800**		**323**		167	125	411	1090	1150	27.1

Series P3M *

codes	belt width mm	roller Ø mm	C mm	ch mm	transom capacity Kg	H mm	K max mm	Q mm	E mm	weight without rollers kg
P3M*/20	**500**	**89 - 90 - 108 - 110**	**208**	**14 - 30**	247	135	292	740	800	23.5
P3M*/21	**650**		**258**		354	135	317	890	950	25.9
P3M*/22	**800**		**323**		460	140	354	1090	1150	31.5
P3M*/24	**1000**		**388**		388	140	386	1290	1350	35.1
P3M*/26	**1200**		**473**		325	140	427	1540	1600	39.6
P3M*/2A	**500**	**133 - 140**	**208**	**14 - 30**	247	155	327	740	800	24.8
P3M*/2B	**650**		**258**		354	155	352	890	950	27.2
P3M*/23	**800**		**323**		460	160	390	1090	1150	32.7
P3M*/25	**1000**		**388**		388	160	422	1290	1350	36.3
P3M*/27	**1200**		**473**		325	160	465	1540	1600	40.8

*** = insert the transom model: S=with rigid arm, F=with pivoting arm with brake, R=reversible**

At order time please specify the height H, related to the corresponding upper transom selected.

Carrying rollers and guide rollers (PS G7 20M16 60N 100 for model F and S , PS G7 20S18 60N 100 for model R) have to be ordered separately.

Example of ordering:
P3LF/03, 800, F17, 76
P3LS/02,650,F17,89,YA
P3LR/01, 500,F30,110,YA
P3MF/25, 1000, F30, H160, 140 YB
P3MS/24,1000, F14, H140, 108, YB
P3MR/21, 650, F14, H135, 89

Series P3P *

codes	belt width mm	roller Ø mm	C mm	ch mm	transom capacity Kg	H mm	K max mm	Q mm	E mm	weight without rollers kg
P3P*/50	**800**	**89 - 108- 133**	**323**	**14 - 18 - 22**	460	133 140 153 160	460	1090	1150	33.9
P3P*/52	**1000**		**388**		581	133 140 153	499	1290	1350	40.7
P3P*/54	**1200**		**473**		487	160 168	573	1540	1600	45.8
P3P*/56	**1400**		**538**	**18 - 22**	561	160 168 176	582	1740	1800	52.2
P3P*/58	**1600**		**608**		503	168 176	597	1940	2000	56.7
P3P*/51	**800**	**159**	**323**	**18 - 22**	460	173 180	491	1090	1150	34.4
P3P*/53	**1000**		**388**		581	173 180	530	1290	1350	41.2
P3P*/55	**1200**		**473**		487	188	573	1540	1600	46.2
P3P*/57	**1400**		**538**		561	180 188 196	613	1740	1800	52.7
P3P*/59	**1600**		**608**		503	188 196	628	1940	2000	57.2
P3P*/5Y	**1800**		**678**		667	196 203	710	2190	2290	94.0

*** = insert the transom model: S=with rigid arm, F=with pivoting arm with brake, R=reversible**

At order time please specify the height H, related to the corresponding upper transom selected.

Carrying rollers and guide rollers (PS G7 20M16 60N 100 for model F and S , PS G7 20S18 60N 100 for model R) have to be ordered separately.

Example of ordering:
P3PF/56,1400, F18, H168, 89, Z
P3PS/54, 1200, F18, H160, 133
P3PR/52,1000, F14, H140, 108, YB

Series P3S *

codes	belt widh mm	roller Ø mm	C mm	ch mm	transom capacity Kg	H mm	K max mm	Q mm	E mm	weight without rollers kg
P3S*/70	**800**		**323**		460	155 163	484	1090	1150	33.2
P3S*/72	**1000**		**388**		581	155 163 170	537	1290	1350	41.9
P3S*/74	**1200**	**133**	**473**	**18 - 22**	634	155 163 170 178	586	1540	1600	47.3
P3S*/76	**1400**		**538**		710	170 178	630	1740	1800	58.5
P3S*/78	**1600**		**608**		637	185	670	1940	2000	63.7
P3S*/71	**800**		**323**		460	176 183	517	1090	1150	34.8
P3S*/73	**1000**		**388**	**18 - 22**	581	183 190	570	1290	1350	43.5
P3S*/75	**1200**	**159**	**473**		634	183 190 198	619	1540	1600	48.9
P3S*/77	**1400**		**538**	**18 - 22 - 32**	710	190 198 205	663	1740	1800	60.0
P3S*/79	**1600**	**159 194**	**608**		637	190 198 205 265 273	703	1940	2000	65.3
P3S*/8S	**1800**	**133 159 194**	**678**		667	178 185 198 205 265 273	849	2190	2290	104.0
P3S*/8W	**2000**	**159 - 194**	**758**	**18 - 22 - 32**	909	210 225 277 290	912	2420	2520	126.6
P3S*/90	**2200**		**808**		840	210 225 277 290	641	2620	2720	133.1

*** = insert the transom model: S=with rigid arm, F=with pivoting arm with brake, R=reversible.**

At order time please specify the height H, related to the corresponding upper transom selected.

Carrying rollers and guide rollers (PS G7 20M16 60N 100 for model F and S , PS G7 20S18 60N 100 for model R) have to be ordered separately.

Example of ordering:

P3SF/79, 1600, F32, H190, 133, YC
P3SS/77, 1400, F22, H205, 159, Z
P3SR/75, 1200, F22, H198, 159,Z

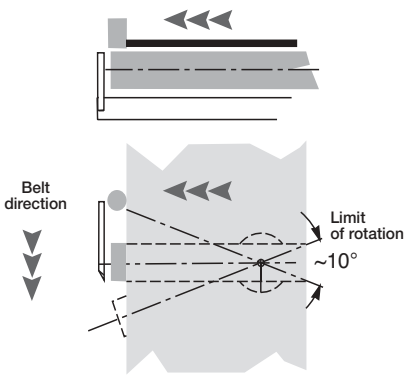
Self-centralising troughing sets for return belt

Sometimes even on the return section it is necessary to correct the tracking of the movement of the belt.

As with the upper section, the return section self-centralising troughing set excercises a corrective action on the belt.

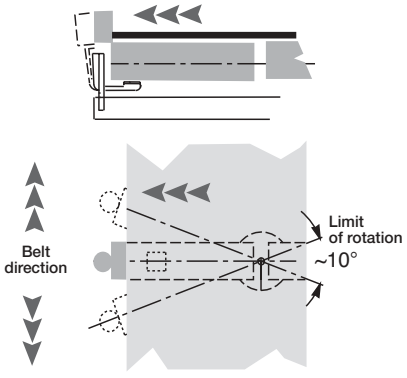
The method of function is similar to that of the upper self-centralising troughing set.

Model S



Model **S**
Standard version for uni-directional conveyor belt with single roller and fixed lever arm with offset guide roller.
Guide rollers type PS G7 20M16 60N 100
to be ordered separately

Model R



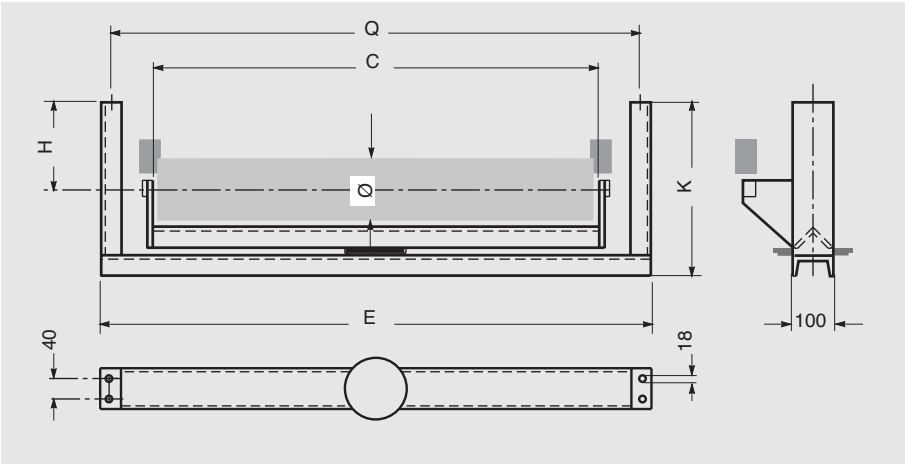
Model **R**
Special version used on reversible belt, using two rollers and pivoting lever arms with the brake and guide roller located in line. Guide rollers type PS G7 20S18 60N 100
to be ordered separately

3 Troughing sets

transom self-centralising model S

Q1 L
Q1 P

return model with fixed lever-arm
for uni-directional belts



Q1 L

for rollers series:

MPS
ø 76, 89, 102
spindle 15
bearing 6202
ch = 17

PSV 1
ø 89,108,133
spindle 20
bearing 6204
ch = 14

belt width mm	roller Ø mm	C	ch	self-centralising transom capacity Kg	H mm	K max	Q	E	Weight without rollers Kg
400	76-89-102 108-133	508	14 - 17	175	70	259	640	700	20.8
500		608		143	70	259	740	800	22.2
650		758		197	70	267	890	950	25.9
800		958		158	70	267	1090	1150	29.1
1000		1158		209	70	275	1290	1350	34.7
1200		1408		167	70	275	1540	1600	39.2

Q1 P

for rollers series:

PSV 2
ø 133
spindle 25
bearing 6205
ch = 18

PSV 4
ø 159
spindle 30
bearing 6206
ch = 22

belt width mm	roller Ø mm	C	ch	self-centralising transom capacity Kg	H mm	K max	Q	E	Weight without rollers Kg
800	133	958	18 - 22	158	150	367	1090	1150	32.9
1000		1158		209	150	375	1290	1350	38.6
1200		1408		167	150	375	1540	1600	43.1
1400		1608		227	150	389	1740	1800	50.5
1600		1808		202	150	389	1940	2000	54.6
800	159	958	18 - 22	158	150	387	1090	1150	34.2
1000		1158		209	150	395	1290	1350	39.9
1200		1408		167	150	395	1540	1600	44.4
1400		1608		227	150	409	1740	1800	52.0
1600		1808		202	150	409	1940	2000	55.9

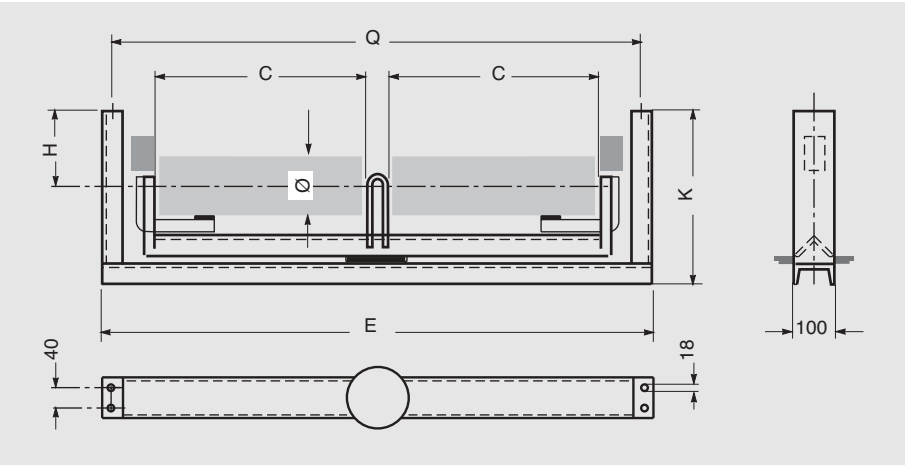
Return roller and guide rollers type PS G7 20M16 60N 100 have to be ordered separately

Example of ordering
Q1L, 800, F 14, 108
Q1P, 1000, F 18, 133, YA

transom
self-centralising model R

Q2 L
Q2 P

return model with fixed lever-arm and fbrake for reversible belts.



Q2 L

for rollers series:

MPS
ø 76, 89, 102
spindle 15
bearing 6202
ch = 17

PSV 1,
ø 89,108,133
spindle 20
bearing 6204
ch = 14

belt width mm	roller Ø mm	C	ch	self-centralising transom capacity kg	H mm	K max	Q	E	Weight without rollers Kg
400	**76- 89-102 108-133**	**198**	**14 - 17**	175	70	259	640	700	22.7
500		**248**		143	70	259	740	800	24.1
650		**323**		197	70	267	890	950	27.1
800		**408**		158	70	267	1090	1150	30.8
1000		**508**		209	70	275	1290	1350	36.4
1200		**608**		167	70	275	1540	1600	40.5

Q2 P

for rollers series:

PSV 2
ø 133
spindle 25
bearing 6205
ch = 18

PSV 4
ø 159
spindle 30
bearing 6206
ch = 22

PSV 7
ø 159, 194
asse 40
cuscinetto 6308
ch = 32

belt width mm	roller Ø mm	C	ch	self-centralising transom capacity kg	H mm	K max	Q	E	Weight without rollers Kg
800	**133**	**408**	**18 - 22**	158	150	367	1090	1150	33.2
1000		**508**		209	150	375	1290	1350	38.8
1200		**608**		167	150	375	1540	1600	43.0
1400		**708**		296	150	389	1740	1800	52.3
1600		**808**		262	150	389	1940	2000	56.6
800	**159**	**408**	**18 - 22 - 32**	158	150	387	1090	1150	34.3
1000		**508**		209	150	395	1290	1350	39.9
1200		**608**		167	150	395	1540	1600	44.1
1400		**708**		296	150	409	1740	1800	53.4
1600		**808**		262	150	409	1940	2000	57.7
1800	**159-194**	**1008**		351	175	473	2190	2290	87.5
2000		**1108**		318	175	473	2420	2520	94.2
2200		**1258**		440	175	490	2620	2720	117.1

Return roller and guide rollers type PS G7 20S18 60N 100 have to be ordered separately

Example of ordering
Q2L, 1000, F 14, 133, YA
Q2P, 1200, F 18, 159, YB

3 Troughing sets

3.5 - Cantilevered sets

The development of this troughing set is the result of long practical experience in the field.

The two rollers that comprise the set are assembled onto a single shaft of 15 mm diameter, and their external end caps hermetically sealed. Together with the central support the unitary assembly is extremely strong.

Cantilevered sets are available with rollers from series RTL and MPS and their use is applicable to light or medium load capacity belt conveyors with small material piece size.

The support positions the two rollers in a manner that minimises the gap between them, without affecting their free rotation.

In this manner the belt is perfectly supported and no damage results even to a flexible belt due to the proximity of the two support rollers.

The cantilevered sets may be located by their support fixing with screws or onto an appropriate base plate part number SPT 1316.

The support brackets of the set have been designed with longitudinal “fixing” slots to allow for perfect belt alignment.

cantilever sets

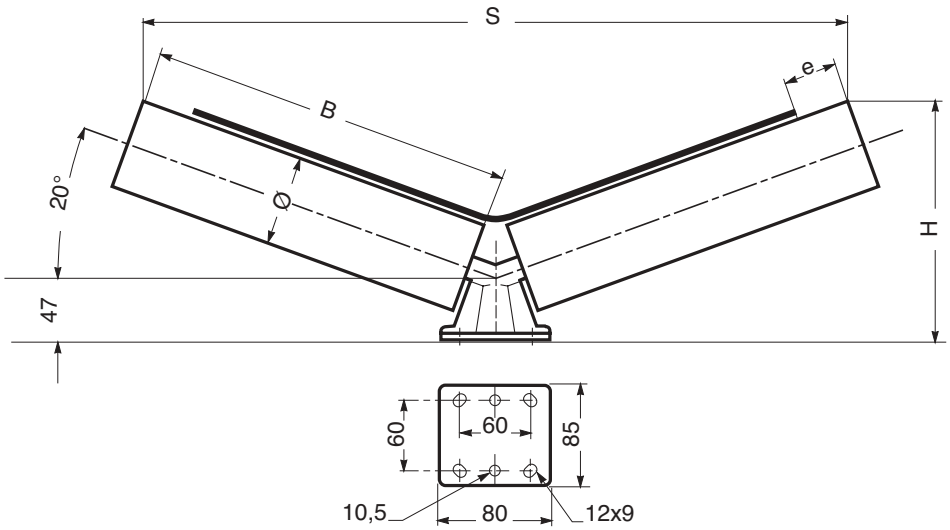
GRS

Type	roller series	roller Ø mm	belt width mm	B mm	H	S	e	weight Kg
GRS 1	MPS	60N	300	195	152	370	48	3.1
2			400	245	171	464	48	3.9
3			450	275	182	520	53	4.0
4			500	305	193	576	58	4.4
5			600	355	211	668	58	5.0
GRS 1	MPS	76N	300	195	160	364	46	3.6
2			400	245	179	458	46	4.3
3			450	275	190	514	51	4.7
4			500	305	201	570	56	5.1
5			600	355	219	662	56	5.8

The table indicates the dimensions and the type of cantilever sets for various belt widths.
The maximum load capacity is calculated based on a life of 10,000 hours in relation to a belt speed of 1÷2 m/s.

max load capacity with rollers series MPS 95 Kg

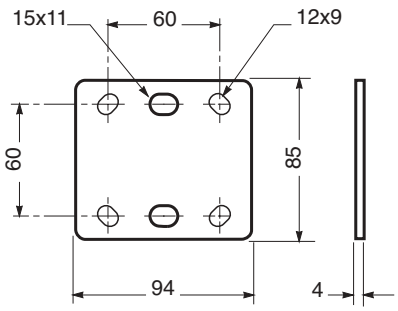
Example of ordering
GRS 4, 76N, 500
Base plate SPT 1316



Type	roller series	Ø mm	belt width mm	B mm	H	S	e	Weight Kg
GRS 21	**RTL**	**60N**	**300**	195	152	370	48	2.8
22			**400**	245	171	464	48	3.8
23			**450**	275	182	520	53	3.1
24			**500**	305	193	576	58	3.2
25			**600**	355	211	668	58	4.4
GRS 21	**RTL**	**76N**	**300**	195	160	364	46	3.1
22			**400**	245	179	458	46	3.4
23			**450**	275	190	514	51	3.5
24			**500**	305	201	570	56	3.7
25			**600**	355	219	662	56	4.0

The table indicates the dimensions and the type of cantilever sets for various belt widths.
The maximum load capacity is calculated based on a life of 10,000 hours in relation to a belt speed of 1÷2 m/s.

max load capacity with rollers series RTL 75 Kg



Base plate type SPT 1316
To be welded to structure to allow bolting the cantilever set to it.

Example of ordering
GRS 23, 76J, 450
Piastra base SPT 1316

3 Troughing sets

3.6 - Suspended sets

Increased activities of the bulk handling industry world wide necessitate conveying even greater quantities of bulk and large lump materials. This demand has accelerated the development of realistic solutions for belt conveyor that couple robust strength with working flexibility, resulting in even higher belt speeds.

In particular, research into solutions for the most critical area of the conveyor, that of the loading zone, has resulted in the RULMECA development of the suspended “garland” troughing sets.

These suspended sets are quickly and simply installed, and allow maintenance to be performed on them without shutting down the plant.

For these reasons, the “garland” suspended system has been the subject of substantial research and development, resulting in their increasing use in the most diverse applications.

3.6.1 - Characteristics and advantages

The “garland” consists of a series of load carrying rollers, attached together by chain links.

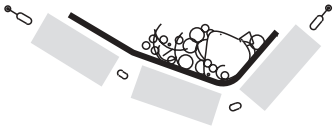
This arrangement gives to the troughing set the characteristics of mobility and flexibility resulting in a perfect central belt trough.

The “garland” is suspended from rigid supports or occasionally spring loaded which adds further flexibility to the structure.

The principal advantage obtained using these types of suspended sets, is their possibility to “flex”, in the direction of the conveyor or indeed in a transverse sense.

This movement helps to dissipate some of the kinetic energy derived from the friction contained in the conveyed material itself.

In this way forces and stresses are absorbed and limited with the consequent reduction in damage to the belt and to the rollers themselves.



With respect to other lighter types of suspended sets (made from steel cable rotating in only two bearings), the RULMECA “garland” troughing set has spindles with two bearings in each roller (therefore up to 10 bearings for a set of 5 rollers) which combines to gives constructive strength with the easiest fluency of rotation.

In comparison with the fixed troughing sets the “garland” systems have other notable superior features to recommend them :

- Improved absorption of dynamic stresses, above all, in the case of conveying large lump size material, which in turn results in a longer life for the rubber belt and the rollers.

- Improved belt centralising, in that any tracking off is absorbed by the articulation of the suspended set which realigns the belt.

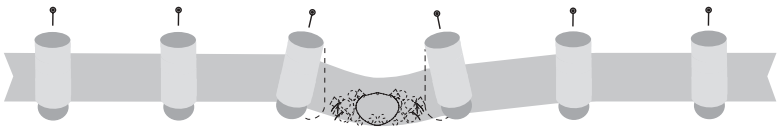
- Improved load containment towards the centre of the belt.

- Improved load capacity, given the same belt width, due to the great increase in obtainable loading without material spillage.

- Maximum working speeds are higher

- Less maintenance down time

- Lower structural conveyor weight and installation costs.



3.6.2 - Applications and configurations

The suspended "garland" systems are particularly suitable for the high speed conveying of large lump size material or very sharp or angular material, and to absorb loading from excessive heights.

In these cases, the characteristic of flexibility of the suspended troughing set avoids over dimensioning that is necessary in the cases where a fixed troughing set of traditional design would be employed.

The Rulmeca suspended set utilises, as standard, rollers from the series PSV, PL and PLF, whose characteristics have previously been described in the respective chapters.

The "garland" may comprise 2, 3 or 5 plain rollers for the load carrying sets Fig. 6 ; a pair of plain rollers or with rings, for the return sets Fig. 7 ; and from 3,5 (or more as required) rollers with shock absorbing rings for the impact troughing sets Fig. 8.

In the latter case, if the average weight of material lump or the fall height is not excessive, it is possible to use plain rollers without shock absorbing rings.

"Garland" with 5 rollers in the loading zone The major forces on the rollers and belt occur, as has been noted, in the loading zone.

It is here that the suspended system clearly exhibits its advantages over the fixed system. Studying the dynamic forces involved in this section one is able to demonstrate that, thanks to the ability to absorb impact, a system of 5 rollers as a "garland" increases the load capacity 2 or 4 times with respect to traditional fixed troughing sets.

Other configurations as required may be taken into consideration on request.

Fig. **6** - Suspended set for carrying belt

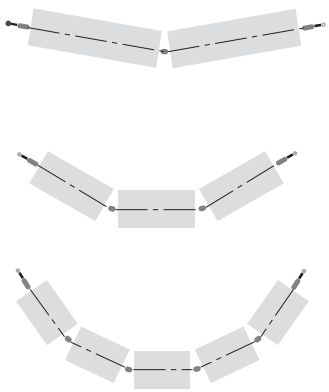


Fig. **7** - Suspended set for return belt

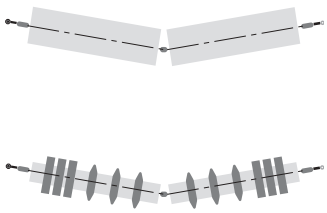
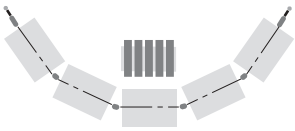
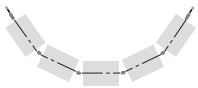


Fig. **8** - Suspended set for impact troughing set with three or five plain rollers or with shock absorbing rings



3 Troughing sets

3.6.3 - Programme

Garland type	Arrangements	description
GS 2		for upper and return set with two rollers
GS 3		for upper and impact set with three rollers
GS 5		for upper and impact set with five rollers
Suspension brackets and connections		for upper and return sets

3 Troughing sets

"garland" series

GS2

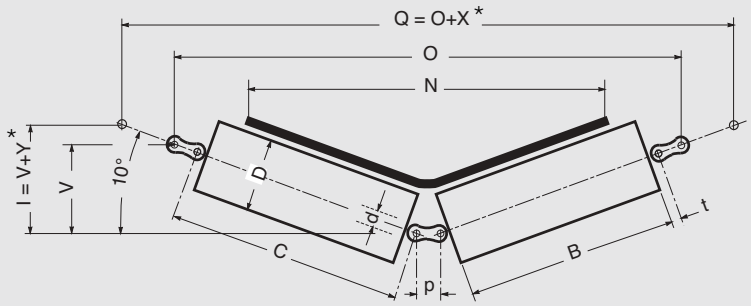
The diameters and types of rollers in the table are those advised for suspended sets with two rollers, for different widths of belt. The diameter of the roller is chosen from those possible for the type of roller considered (see chapter 2 rollers) and must be suitable for the speed and load capacity of the belt (see chapter 2 para. 2.3 selection method).

Rollers that may be utilised to comprise the “garland” GS2 must be from the series : PSV, PL, PLF, and where needed, with return rings (see chapter 2, rollers with rings).

belt width mm	roller D mm	B	C	A	type	bearing	V	O	spindle d	spindle p	form of suspensions
500	63-89 108-133	315	343	363	PSV 1	6204	64	751	20	25.40	A-C-F
		315	347	371	PSV 2	6205	66	778	25	31.75	A-C-F
		315	347	371	PSV 3	6305	66	778	25	31.75	A-C-F
650	63-89 108-133	380	408	428	PSV 1	6204	75	879	20	25.40	A-C-F
		380	412	436	PSV 2	6205	77	906	25	31.75	A-C-F
		380	412	436	PSV 3	6305	77	906	25	31.75	A-C-F
		380	420	452	PSV 4	6206	80	940	30	38.10	B-C-F
800	63-89-108 133-159	465	493	513	PSV 1	6204	90	1046	20	25.40	A-C-F
		465	497	521	PSV 2	6205	92	1073	25	31.75	A-C-F
		465	497	521	PSV 3	6305	92	1073	25	31.75	A-C-F
		465	505	537	PSV 4	6206	94	1108	30	38.10	B-C-F
1000	63-89-108 133-159	600	628	648	PSV 1	6204	113	1312	20	25.40	A-C-F
		600	632	656	PSV 2	6205	115	1339	25	31.75	A-C-F
		600	632	656	PSV 3	6305	115	1339	25	31.75	A-C-F
		600	640	672	PSV 4	6206	118	1374	30	38.10	B-C-F
1200	89-108 133-159	700	728	748	PSV 1	6204	131	1509	20	25.40	A-C-F
		700	732	756	PSV 2	6205	133	1536	25	31.75	A-C-F
		700	732	756	PSV 3	6305	133	1536	25	31.75	A-C-F
		700	740	772	PSV 4	6206	135	1571	30	38.10	B-C-F
		700	744	776	PSV 7	6308	137	1597	40	44.45	B-C-F
1400	89-108 133-159-194	800	828	848	PSV 1	6204	148	1706	20	25.40	A-C-F
		800	832	856	PSV 2	6205	150	1733	25	31.75	A-C-F
		800	832	856	PSV 3	6305	150	1733	25	31.75	A-C-F
		800	840	872	PSV 4	6206	152	1768	30	38.10	B-C-F
		800	844	876	PSV 7	6308	154	1794	40	44.45	B-C-F

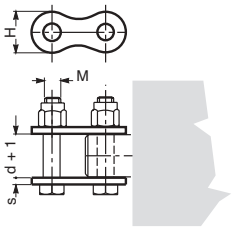
Example of ordering
standard design
GS2, 1000/PSV 1, 20K, 89N, C=628

specify form and suspensions
see page 250-251 for available types)



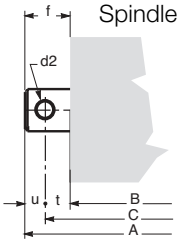
* for X and Y measures see pages 250-251 regarding to the suspensions

belt width mm	roller D mm	B	C	A	type	bearing	V	O	spindle d	spindle p	form of suspensions
1600	89-108 133-159-194	900	932	956	PSV 2	6205	167	1930	25	31.75	A-C-F
		900	932	956	PSV 3	6305	167	1930	25	31.75	A-C-F
		900	940	972	PSV 4	6206	170	1965	30	38.10	B-C-F
		900	944	976	PSV 7	6308	172	1991	40	44.45	B-C-F
1800	108-133 159-194	1000	1032	1056	PSV 2	6205	185	2127	25	31.75	A-C-F
		1000	1032	1056	PSV 3	6305	185	2127	25	31.75	A-C-F
		1000	1040	1072	PSV 4	6206	187	2162	30	38.10	B-C-F
		1000	1044	1076	PSV 7	6308	189	2188	40	44.45	B-C-F
2000	133 159-194	1100	1132	1156	PSV 2	6205	202	2324	25	31.75	A-C-F
		1100	1132	1156	PSV 3	6305	202	2324	25	31.75	A-C-F
		1100	1140	1172	PSV 4	6206	205	2359	30	38.10	B-C-F
		1100	1144	1176	PSV 7	6308	206	2385	40	44.45	B-C-F
2200	133 159-194	1250	1282	1306	PSV 3	6305	228	2619	25	31.75	A-C-F
		1250	1290	1322	PSV 5	6306	231	2654	30	38.10	B-C-F
		1250	1294	1326	PSV 7	6308	232	2681	40	44.45	B-C-F
2400	133 159-194	1400	1432	1456	PSV 3	6305	254	2915	25	31.75	A-C-F
		1400	1440	1472	PSV 5	6306	257	2949	30	38.10	B-C-F
		1400	1444	1476	PSV 7	6308	258	2976	40	44.45	B-C-F
2600	159 194	1500	1544	1576	PSV 7	6308	276	3173	40	44.45	B-C-F



d	20	25	30	40
s	3	4	5	6
H	21	24	30	36
M	8	10	14	16

Spindle design **K**



d	20	25	30	40
u	10	12	16	16
t	14	16	20	22
f	24	28	36	38
d_2	8,3	10,3	14,5	16,5

3 Troughing sets

"garland" series

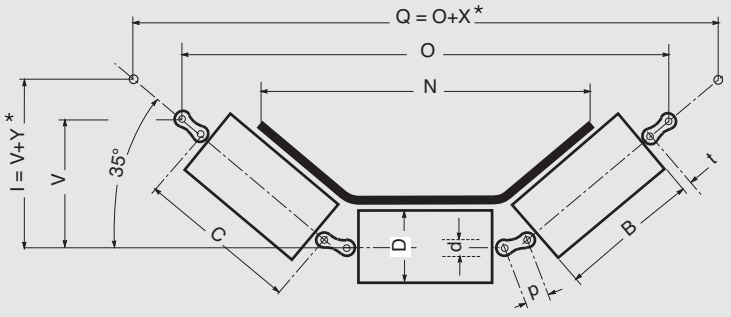
GS3

The diameters and types of rollers in the table are those advised for suspended sets with three rollers, for different widths of belt. The diameter of the roller is chosen from those possible for the type of roller considered (see chapter 2 rollers) and must be suitable for the speed and load capacity of the belt (see chapter 2 para. 2.3 selection method).
Rollers that may be utilised to comprise the "garland" GS3 must be from the series : PSV, PL, PLF, exceptionally, and only where absolutely necessary, with impact rings (see chapter 2, impact rollers).

belt width mm	roller D mm	B	C	A	type	bearing	V	O	spindle d	spindle p	form of suspensions
500	63-89 108-133	200	228	248	PSV 1	6204	153	692	20	25.40	A-C
		200	232	256	PSV 2	6205	161	725	25	31.75	A-C
		200	232	256	PSV 3	6305	161	725	25	31.75	A-C
		200	240	272	PSV 4	6206	171	768	30	38.10	B-C-E
650	63-89 108-133	250	278	298	PSV 1	6204	182	824	20	25.40	A-C
		250	282	306	PSV 2	6205	190	857	25	31.75	A-C
		250	282	306	PSV 3	6305	190	857	25	31.75	A-C
		250	290	322	PSV 4	6206	200	900	30	38.10	B-C-E
800	63-89 108-133-159	315	343	363	PSV 1	6204	219	995	20	25.40	A-C
		315	347	371	PSV 2	6205	227	1028	25	31.75	A-C
		315	347	371	PSV 3	6305	227	1028	25	31.75	A-C
		315	355	387	PSV 4	6206	237	1072	30	38.10	B-C-E
1000	63-89 108-133-159	380	408	428	PSV 1	6204	256	1166	20	25.40	A-C
		380	412	436	PSV 2	6205	264	1200	25	31.75	A-C
		380	412	436	PSV 3	6305	264	1200	25	31.75	A-C
		380	420	452	PSV 4	6206	274	1243	30	38.10	B-C-E
1200	89-108 133-159	465	493	513	PSV 1	6204	305	1391	20	25.40	A-C
		465	497	521	PSV 2	6205	313	1424	25	31.75	A-C
		465	497	521	PSV 3	6305	313	1424	25	31.75	A-C
		465	505	537	PSV 4	6206	323	1467	30	38.10	B-C-E
		465	509	541	PSV 7	6308	331	1501	40	44.45	B-C-E
1400	89-108 133-159-194	530	558	578	PSV 1	6204	342	1562	20	25.40	A-C
		530	562	586	PSV 2	6205	350	1595	25	31.75	A-C
		530	562	586	PSV 3	6305	350	1595	25	31.75	A-C
		530	570	602	PSV 4	6206	360	1639	30	38.10	B-C-E
		530	574	606	PSV 7	6308	368	1672	40	44.45	B-C-E

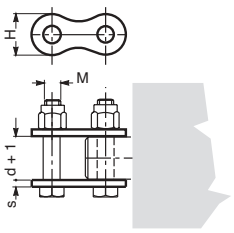
Example of ordering
standard design
GS3, 1200/PSV 4, 30K, 133N, C=505

specify form and suspensions
(see page 250-251 for available types)



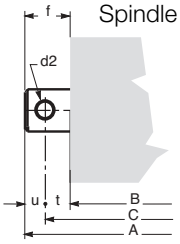
* for X and Y measures see pages 250-251 regarding to the suspensions

belt width mm	roller D mm	B	C	A	type	bearing	V	O	spindle d	spindle p	form of suspensions
1600	89-108 133-159-194	600	632	656	PSV 2	6205	390	1780	25	31.75	A-C
		600	632	656	PSV 3	6305	390	1780	25	31.75	A-C
		600	640	672	PSV 4	6206	400	1824	30	38.10	B-C-E
		600	644	676	PSV 7	6308	408	1857	40	44.45	B-C-E
1800	108-133 159-194	670	702	726	PSV 2	6205	430	1965	25	31.75	A-C
		670	702	726	PSV 3	6305	430	1965	25	31.75	A-C
		670	710	742	PSV 4	6206	441	2008	30	38.10	B-C-E
		670	710	742	PSV 5	6306	441	2008	30	38.10	B-C-E
		670	714	746	PSV 7	6308	448	2041	40	44.45	B-C-E
2000	133 159-194	750	790	822	PSV 4	6206	486	2219	30	38.10	B-C-E
		750	790	822	PSV 5	6306	486	2219	30	38.10	B-C-E
		750	794	826	PSV 7	6308	494	2252	40	44.45	B-C-E
2200	133 159-194	800	840	872	PSV 4	6206	515	2351	30	38.10	B-C-E
		800	840	872	PSV 5	6306	515	2351	30	38.10	B-C-E
		800	844	876	PSV 7	6308	523	2384	40	44.45	B-C-E
2400	133 159-194	900	940	972	PSV 4	6206	572	2615	30	38.10	B-C-E
		900	940	972	PSV 5	6306	572	2615	30	38.10	B-C-E
		900	944	976	PSV 7	6308	580	2648	40	44.45	B-C-E
2600	159 194	950	994	1026	PSV 7	6308	609	2780	40	44.45	B-C-E



d	20	25	30	40
s	3	4	5	6
H	21	24	30	36
M	8	10	14	16

Spindle design **K**



d	20	25	30	40
u	10	12	16	16
t	14	16	20	22
f	24	28	36	38
d_2	8,3	10,3	14,5	16,5

3 Troughing sets

"garland" series

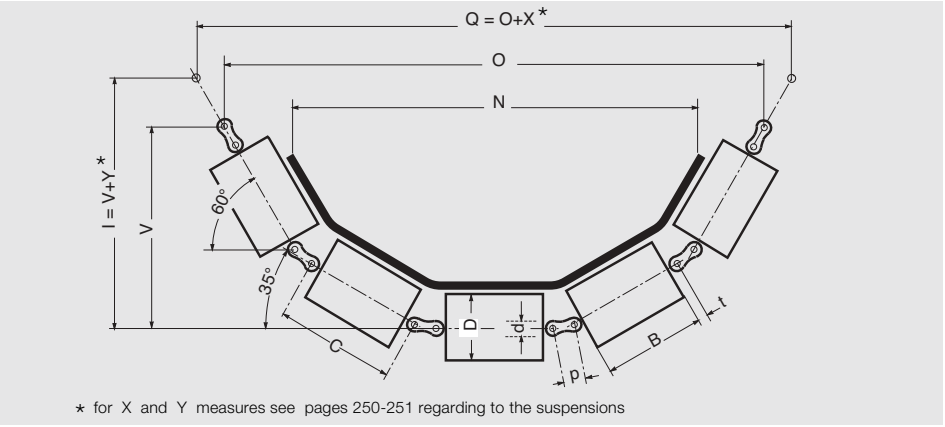
GS5

The diameters and types of rollers in the table are those advised for suspended sets with five rollers, for different widths of belt. The diameter of the roller is chosen from those possible for the type of roller considered (see chapter 2 rollers) and must be suitable for the speed and load capacity of the belt (see chapter 2 para. 2.3 selection method).
Rollers that may be utilised to comprise the "garland" GS5 must be from the series : PSV, PL, PLF, exceptionally, and only where absolutely necessary, with impact rings (see chapter 2, impact rollers).

belt width mm	roller D mm	B	C	A	type	bearing	V	O	spindle d	spindle p	form of suspensions
800	89 108-133	165	193	213	PSV 1	6204	326	810	20	25.40	A-C
		165	197	221	PSV 2	6205	344	852	25	31.75	A-C
		165	197	221	PSV 3	6305	344	852	25	31.75	A-C
		165	205	237	PSV 4	6206	368	908	30	38.10	B-C-E
1000	89 108-133	205	233	253	PSV 1	6204	384	956	20	25.40	A-C
		205	237	261	PSV 2	6205	402	997	25	31.75	A-C
		205	237	261	PSV 3	6305	402	997	25	31.75	A-C
		205	245	277	PSV 4	6206	425	1054	30	38.10	B-C-E
1200	89-108 133-159	250	278	298	PSV 1	6204	449	1120	20	25.40	A-C
		250	282	306	PSV 2	6205	466	1161	25	31.75	A-C
		250	282	306	PSV 3	6305	466	1161	25	31.75	A-C
		250	290	322	PSV 4	6206	490	1217	30	38.10	B-C-E
		250	294	326	PSV 7	6308	508	1259	40	44.45	B-C-E
1400	89-108 133-159-194	290	318	338	PSV 1	6204	506	1265	20	25.40	A-C
		290	322	346	PSV 2	6205	524	1307	25	31.75	A-C
		290	322	346	PSV 3	6305	524	1307	25	31.75	A-C
		290	330	362	PSV 4	6206	548	1363	30	38.10	B-C-E
		290	334	366	PSV 7	6308	565	1404	40	44.45	B-C-E
1600	89-108 133-159-194	340	372	396	PSV 2	6205	596	1489	25	31.75	A-C
		340	372	396	PSV 3	6305	596	1489	25	31.75	A-C
		340	380	412	PSV 4	6206	620	1545	30	38.10	B-C-E
		340	384	416	PSV 7	6308	637	1586	40	44.45	B-C-E

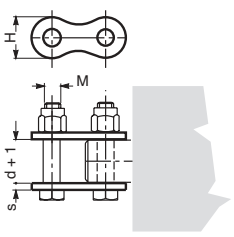
Example of ordering
standard design
GS5, 1600/PSV 7, 40K, 159N,C=384

specify form and suspensions
(see page 250-251 for available types)



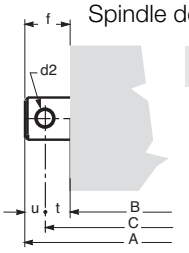
* for X and Y measures see pages 250-251 regarding to the suspensions

belt width mm	roller D mm	B	C	A	type	bearing	V	O	spindle d	spindle p	form of suspensions
1800	108-133 159-194	380	412	436	PSV 2	6205	654	1634	25	31.75	A-C
		380	412	436	PSV 3	6305	654	1634	25	31.75	A-C
		380	420	452	PSV 4	6206	677	1690	30	38.10	B-C-E
		380	420	452	PSV 5	6306	677	1690	30	38.10	B-C-E
		380	424	456	PSV 7	6308	695	1732	40	44.45	B-C-E
2000	133 159-194	420	460	492	PSV 4	6206	735	1836	30	38.10	B-C-E
		420	460	492	PSV 5	6306	735	1836	30	38.10	B-C-E
		420	464	496	PSV 7	6308	753	1877	40	44.45	B-C-E
2200	133 159-194	460	500	532	PSV 4	6206	792	1981	30	38.10	B-C-E
		460	500	532	PSV 5	6306	792	1981	30	38.10	B-C-E
		460	504	536	PSV 7	6308	810	2023	40	44.45	B-C-E
2400	133 159-194	500	540	572	PSV 4	6206	850	2127	30	38.10	B-C-E
		500	540	572	PSV 5	6306	850	2127	30	38.10	B-C-E
		500	544	576	PSV 7	6308	868	2169	40	44.45	B-C-E
2600	159 194	540	584	616	PSV 7	6308	925	2314	40	44.45	B-C-E



d	20	25	30	40
s	3	4	5	6
H	21	24	30	36
M	8	10	14	16

Spindle design **K**

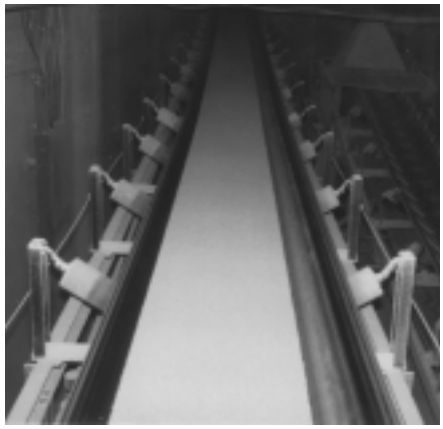


d	20	25	30	40
u	10	12	16	16
t	14	16	20	22
f	24	28	36	38
d_2	8,3	10,3	14,5	16,5

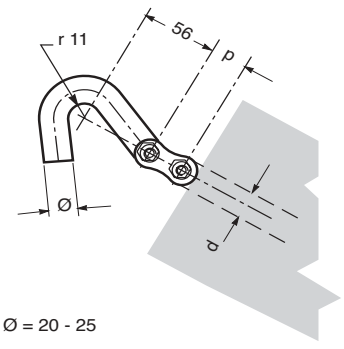
3.6.4 - Suspensions

The connecting links and the suspensions are important components that assure ample movement possibilities and at the same time grant a rapid, straight forward installation and maintenance.

Different types of suspension satisfy different working conditions. The following indicate just some of the most common in use.

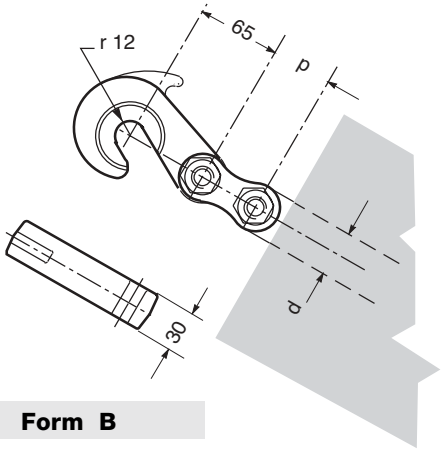


Form A
for upper and return sets with roller spindle d = 20 and 25 mm



Ø = 20 - 25

Form B
for upper and return impact sets with roller spindle d =30 and 40 mm for heavy loads

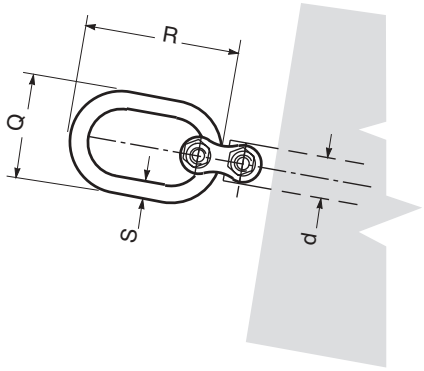


	Form A		Form B	
⋆	X	Y	X	Y
10°	105	19	122	22
35°	86	36	100	42
60°	56	48	65	56

⋆ The measures X and Y are used to determine the fixation distance Q - see GS2-GS3-GS5 garlands drawings at previous pages.

Form C

upper and return sets for light loads



d	Q	R	S
20	40	85	10
25/30	52	108	13
40	64	132	16

⋆	d	X	Y
10°	20	96	17
	25/30	122	22
	40	154	28
35°	20	78	33
	25/30	100	42
	40	126	53
60°	20	51	44
	25/30	65	56
	40	82	71

Important note : all types of supports that are designed to fit to the belt conveyor structure and those, in particular that hook up to the suspensions, must have an equal inclination to the side rollers angle and allow complete freedom of movement of the suspensions and of the rollers in both longitudinal and vertical senses.

Form E

This is a system for rapid “unhooking” of an upper troughing set. To be used when the conveyor cannot be stopped. This system allows sets to be removed from below the belt and allows substitution, during normal maintenance breaks.
Fig. 1 shows the application of a system using a retaining pin, in the case of an overloaded conveyor.
Fig. 2 without pin.

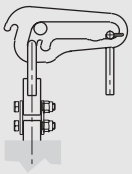


Fig. 1

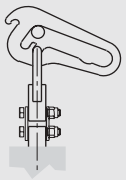
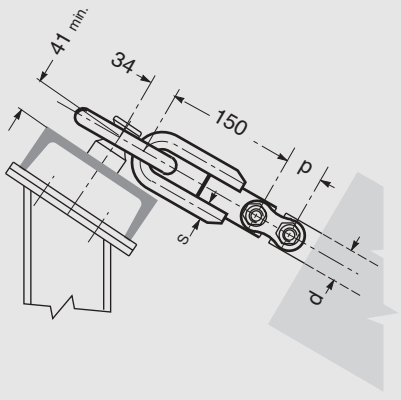


Fig. 2

d	S	p
30	20	38,10
40	20	44,45

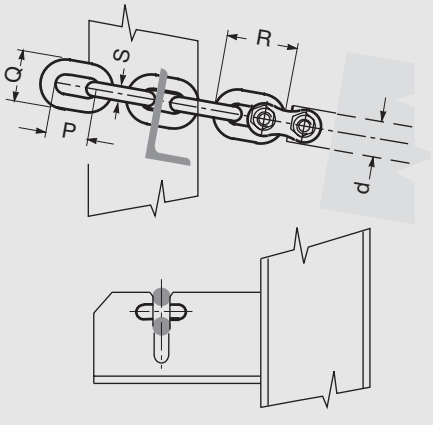


⋆	X	Y
10°	346	63
35°	282	118
60°	184	159

⋆ The measures X and Y are used to determine the fixation distance Q - see GS2-GS3-GS5 garlands drawings at previous pages.

Form F

To support the return belt and where it is necessary to change the angle of the rollers, the chain may be slotted into the fork as the links permit.



d	S	P	Q	R
20	10	35	34	55
25/30	13	45	44	71
40	16	56	54	88

⋆ Measures X and Y to be calculated according to the chain fixation point.

3 Troughing sets