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MAINTENANCE OF THE CONVEYOR BELT

INDEX

1.INTRODUCTION

IMPORTANT ! !

OPERATIONS TO BE CARRIED OUT BEFORE INSTALLATION AND USE OF THE MACHINE.

It is absolutely necessary to read the following manual carefully.
Failure to observe the instructions contained in the manual could be the cause of hazards to personnel.

Operator warnings

It is the responsibility of the user to make known the contents of the present Manual to all operators.

It is further the responsibility of the user to adequately train the personnel involved in the (construction) and maintenance of the machine described herein, and to verify its suitability for its function.

Maintenance programs

In order for the machine to function correctly the use, cleaning and everyday maintenance instructions must be followed, as well as the instructions for preventive, corrective and predictive maintenance.

Personnel

List of personnel qualifications.

Operator: responsible for running the machine: gives the operator commands, and undertakes other simple operations in the course of normal production, cleaning and daily inspection. Must work with all guards activated.

Mechanical maintenance technician

May intervene in any running condition of the machine and at any level of protection. May intervene with the guards down in so far as he has the tools necessary to de-activate them. May undertake any mechanical adjustment/repair, but may not act upon live electrical plant.

Electrical maintenance technician

May intervene in any running condition of the machine and at any level of protection. May undertake any adjustment/repair of the electrical plant.

The company builder will not be held responsible for breakages, accidents or any damages due to the non-observation (or non-application) of the instructions contained in the present manual. The same applies to modifications, variations and/or the installation of accessories not previously authorised.

Use only ORIGINAL SPARE PARTS for replacing machine parts.

The present instruction manual is an integral part of the machine and as such must be carefully retained.

The characteristics, data and drawings published herein are and remain the exclusive property of company builder

The reproduction or disclosure of said property to third parties is punishable by law.

WARNINGS FOR THE USER

The present manual may be updated and the user may request further information and suggest improvements.

In the case of sale or transfer of the machine, the user is requested to inform the manufacturer so that updates of the present manual can be sent to the new address.

Always observe the safety standards and other instructions contained in this manual.

The MANUFACTURER declines all responsibility in the case of incorrect use of the machine or tools supplied.

TRANSPORTATION, UNLOADING, ASSEMBLY AND STARTING OF THE MACHINE must be carried out exclusively by specialized and authorized personnel.

THE POWER SUPPLY CURRENT AND FREQUENCY must correspond to that indicated on the machine.
Be careful not to invert the phase.

THE POWER SUPPLY PLANT must conform to current standards

CHECK periodically that the power cables are in perfect condition

⚠ WARNING ⚠

DO NOT ALLOW UNAUTHORIZED PERSONNEL TO APPROACH THE MACHINE.
Use, maintenance and repair of the machine are to be carried out only by qualified operators. Such operators must be physically and intellectually suitable to the job.

⚠ WARNING ⚠

When the machine is not functioning, protect it from unintentional movements.
Cut off the electrical supply by disconnecting the machine from the grid.
Make sure that unauthorized personnel cannot approach the machine until it has come to a complete halt after being switched off.

SELLING-ON OF THE MACHINE

If the machine should be sold on, the company builder must be informed so that future manual updates can be sent to the new user.

2. GENERAL DESCRIPTION , USE AND MISUSE

The belt conveyors series "TN" have been designed for the transportation of bulk material with a size of less than 30 mm diameter

Forbidden to transport people and animals
Forbidden the transport of moist or wet materials
Forbidden the transportation of flammable or explosive materials
Forbidden the transport of highly abrasive materials
Forbidden the transport of materials which contain corrosive substances

Forbidden to use the machine in an explosive atmosphere.
Forbidden to use the machine in a flammable atmosphere

The machine can be used in closed environments to:

Ambient temperature from 10 to 40 ° C
Maximum altitude of 1000 meters
Degree of normal humidity (40-50%)

Forbidden to climb over the machine.
Prohibited to pass under the machine.

Any use other than as expressly stated in this manual, is "PROHIBITED".

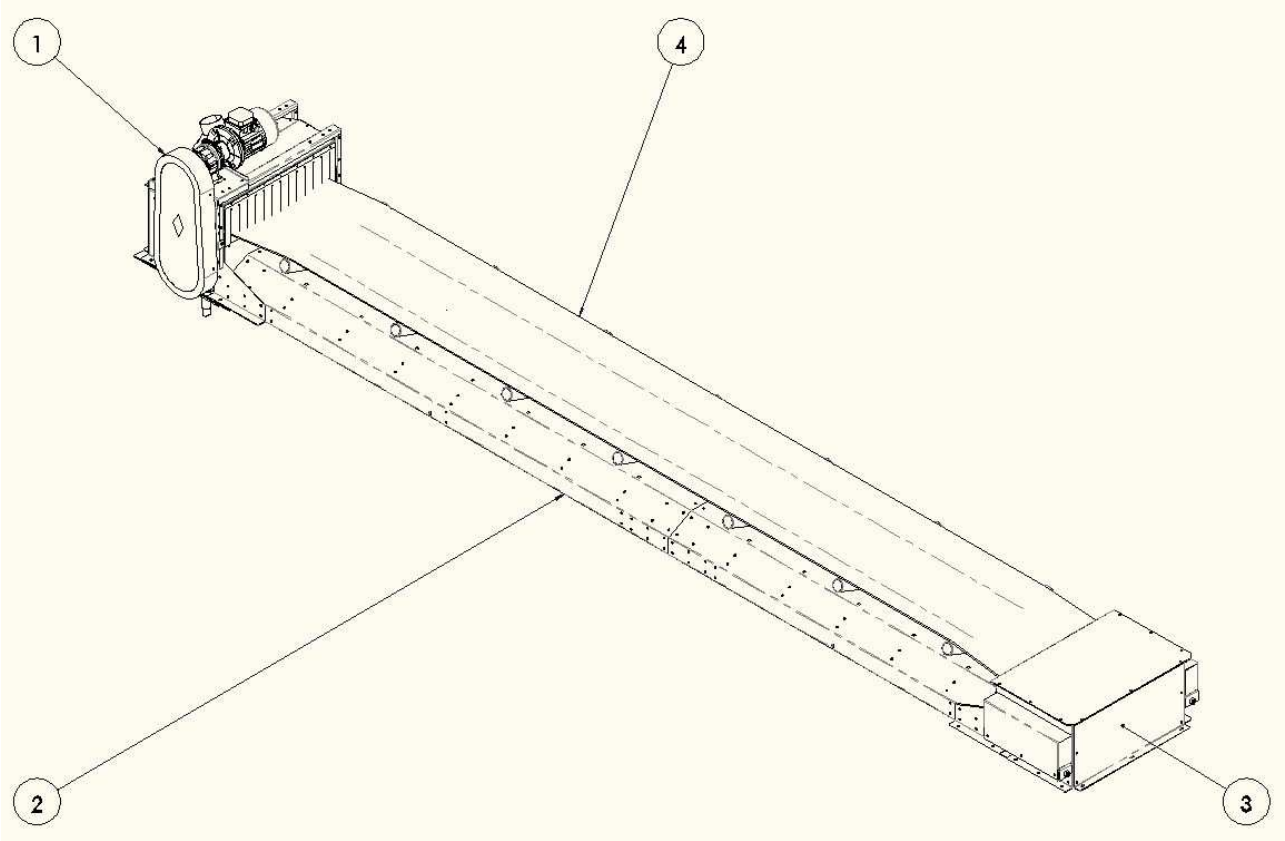
The structure of the belt conveyors series "TN" is constituted by:

1 - Drive unit with motor

2 – Sheet metal frame with rollers on which the belt slides.
The rollers are in plan, in basin or in tern, depending on the type of material to be transported and scope.

3 – Head tension

4 – Rubber belt



On belt conveyors series "TN", can be mounted accessories, on request of the customer and to be agreed upon in the order:

AXLE
DEVIATOR
SIDES OF CONTAINMENT
ROLLER GUIDE TAPE
COVER UPPER AND LOWER
LEG SUPPORT
WEIGHING SYSTEM
METALDETECTOR

Contact the manufacturer for more information on accessories.

The machine in question does not require the constant verification or processing by an operator as it works in automatic mode, then there 'isnt a precise point where the operator must stand while the machine works.

In case it is necessary to upload and / or download manually or with equipment maneuvered by operator (forklift and / or trans pallet), the position to perform this operation will be signaled by a special scheme. (see "Scheme operator")

The machine object of this manual does not require operator

scheme operator

NAMEPLATE

Matricola = Registration number
Modello = Type
Data costruzione = Date construction

3.TRANSPORT AND INSTALLATION

PACKAGING

The packing is agreed with the client in relation to the distance and means of transport chosen.
The whole machine is covered with a plastic sheet (PVC or polyethilene cartene) to protect it from humidity and powder.
The packing weight is indicated on the carrier's documentation.

The label on the outside of the packing contains the following information:

- Manufacturer
- Addressee

DELIVERY OF THE MACHINE

The material to be transported is carefully checked over before being handed over to the carrier.

When the machine arrives make sure that it has not been damaged during transport and that the packing has not been interfered with and parts removed.

If there should be damage or parts missing inform the carrier and the manufacturer immediately giving photographic evidence.

Make sure, furthermore, that the goods delivered correspond to the order.

⚠ WARNING ⚠

During the phases of transporting, moving or positioning the machine:

- Danger of the machine tipping over.
- Danger of impact and crushing to personnel.

You must:
- Make sure that all necessary precautions are taken during the lifting operations of the machine with a forklift truck, crane or overhead crane.
- Mark the installation area to prevent access to unauthorized personnel.
- Use PPE such as helmets, gloves and protective footwear
- Do not stand under the machine suspended or not yet firmly fixed to the ground

Until the machine has been completely lifted, it is best to check that it is correctly balanced. Lifting must be carried out in a gradual manner (without jerks or blows).

Packages can be moved using steel cables, polyester belts whose suitability must be verified according to the load to be moved.

lift the load and move it in the discharge zone , take care not to cause oscillation of the same during the move.

 Use a lifting device of adequate capacity for the load to be moved

The machine is delivered assembled or disassembled into several parts depending on the size and the agreements made with the customer, to the size and weight refer to the packing list.

Take care that there are no persons exposed in the danger zone.

DURING THE LIFTING OPERATION THE WHOLE AREA SURROUNDING THE MACHINE IS TO BE CONSIDERED A DANGER ZONE.

For unpackaged machines covered transport is necessary.

The manufacturer is not responsible for breakages due to transport after delivery.

All the parts which might be subject to changes of position during transport are fixed down so as to avoid dangerous movements or accidental falling over on the part of the machine.

The floors must be smooth and flat to avoid imbalance problems.

ASSEMBLY

See the attached "Installation Instructions TN v-2"

SPACE REQUIRED FOR OPERATION

The operator's area must be delimited, with areas defined for the operation, maintenance and disengagement of the machine.

Environmental and operational conditions must not form obstacles to free access to the machine's controls, in particular the emergency halt.

The operational viability of the machine must be guaranteed, taking maintenance into account.
Particular attention must be paid to the space required for opening the sidewise hatches.

Should the machine be sold on as 'secondhand' the client/user must supply all the installation information (ventilation, electrical earth, etc) to the buyer, requiring him to observe the information given above.

STARTING UP INSTRUCTIONS

WARNINGS

Before starting up the machine, make sure that the contents of the present manual have been read and understood.

For clarification and further explanations contact the manufacturer directly.

The operators and maintenance technicians must have the specific competence required by the present manual, and also the psycho-physical prerequisites for carrying out work on the machine.

The machine was tested at our factory before being delivered.

Testing is carried out using the products for which the machine was built. Thus, the testing simulates as closely as possible the work which the machine will carry out continuously at the user's site.

The following paragraphs describe the installation of the machine.

The installation must be carried out by qualified personnel who are familiar with the contents of the present manual.

Danger zones and residual risks during use

Area where the conveyor belt and installed.

In this area there is a risk of falling material transported. you must:
If this risk is high, depending on the type of material transported (flow and size),
predict a fence which prevents access to the area by unauthorized personnel.
it is necessary for personnel having access to use PPE, such as helmets, gloves and protective footwear.

Risk of limb injury
The conveyor belt must allow passage of material, then presents risks not always be eliminated, particularly in the area of drums and rollers there is a risk of crushing or dragging of the limbs, so use PPE such as gloves, in any case, never operate in proximity of the organs of movement during operation of the machine.

noise levels
Although the sound emission values fall within the scope of the rule, (70 db) it recommends the use of protective earmuffs or earplugs because of the sound pressure level of the environment in which the machine is installed.
If you exceed the levels laid down by legislation, it is necessary to stop the car and look for the causes of the malfunction.

FUNCTIONING AND OPERATION

In order to assess whether the machine has gone subject to damage during transport, carefully carry out the following checks.

Preliminary checks
Before starting the machine:

-Make sure that the mains electrical current corresponds to that indicated on the machine (cf plaque, or elsewhere).

-Make sure that the plaques are present and readable.

Checks with the machine connected
With the machine connected to the power supply and ready to operate:

-Check that all the guards and safety devices are present and functioning (they might have been damaged during transport).

CONNECTION TO THE MAINS

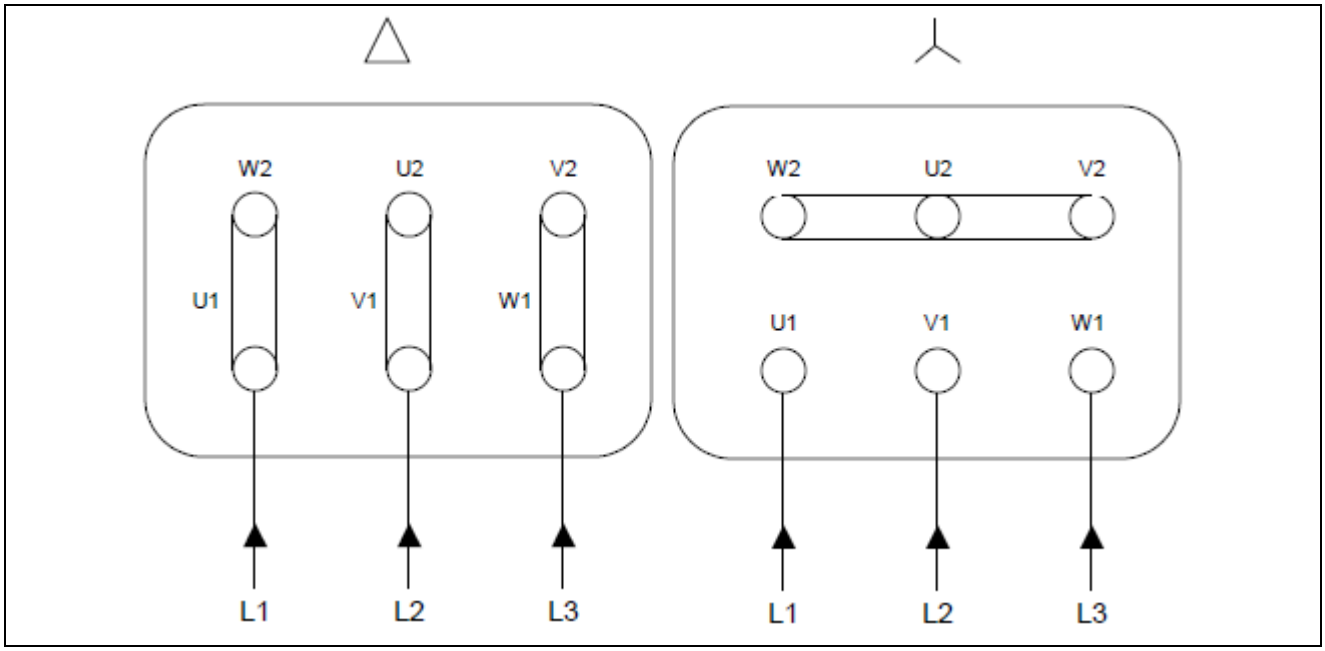
Conveyor belt with motorization without power cord.
The user must obtain a suitable power cable to be connected to the gear motor or design and wire a special electrical control panel.

SAFETY INSTRUCTIONS

Below are the indications for the safe execution of the operations of electrical connection of the conveyor belt.

- The electrical connection must be made by an electrical technician and in accordance with current legislation on "Electrical equipment of industrial machines"
- Disconnect the plant mains before proceeding with the electrical connection operations of the conveyor belt.
- Consult the electrical connection diagrams of the motor (Tab 3.1) and the microswitch diagrams (at the end of the manual)
- If there is an electrical control panel, disconnect the main switch.
- Check that the electrical power supply system is equipped with differential intervention protection in order to ensure protection against indirect contacts with calibration adequate for the power of the machine;
- Provide a suitable fixed power cable (metal channel or tube) in accordance with current regulations and on the characteristics of the electric motor. (see Tab.3.2)
- The building must be equipped with a good earthing system and check that the yellow/green conductor reaches the power terminal with a minimum section corresponding to the phase section
- Check that the voltage, frequency and number of power phases corresponds to that indicated on the gearmotor and on the machine plate.

Tab. 3.1 Electrical connection



Tab. 3.2 Technical characteristics
Efficiency class IE3 - Service S1 - 400V - 50 Hz - 4 poli - 1500 giri/min

Tipo *Type*	Potenza *Power* Kw	Velocità *Speed* Giri/min *rpm*	J Kgm2	Rend *Eff* %	Fattore di potenza *Power factor* CosØ	Corrente *Current* In (400V) A	Coppia Nominale *Nominal Torque* Nm	Coppia di spunto *Starting torque* Csp/Cn *Tst/Tn*	Corrente di spunto. *Starting current* Isp/Cn *Ist/In*	Coppia massima *Max torque* Cmax/Cn *Tmax/Tn*	Rumor. *Noise* dB(A)	Forma B3 *Mount.B3* Peso *Weight* Kg
Serie TA – Carcassa in alluminio												***TA Line – Aluminium Frame***
T3A 802-4	0.75	1420	0.0023	82.5	0.76	1.73	5.04	2.3	5.4	2.9	70	12.6
T3A 90S-4	1.1	1425	0.00335	84.1	0.78	2.42	7.37	2.3	5.9	2.7	70	17.2
T3A 90L-4	1.5	1420	0.0042	85.3	0.79	3.21	10.09	2.4	6.4	2.7	70	21.6
T3A 100L1-4	2.2	1430	0.00805	86.7	0.82	4.47	14.7	2.4	6.6	2.9	70	28.9
T3A 100L2-4	3	1430	0.00955	87.7	0.80	6.17	20.0	2.4	6.9	2.8	70	31.6
T3A 112M-4	4	1435	0.0126	88.6	0.79	8.25	26.6	2.5	7.9	3	73	42.2
T3A 132S-4	5.5	1430	0.0317	89.6	0.82	10.81	36.73	2.3	7.1	2.8	63	59.3
T3A 132M-4	7.5	1430	0.0389	90.4	0.83	14.43	50.08	2.3	7.8	2.7	63	74.8

4.NATURE AND FREQUENCY OF CHECKS

INSTRUCTIONS REGARDING MAINTENANCE AND REPAIR

⚠ WARNING ⚠

All the maintenance, repair and cleaning operations for this machine must be carried out with the machine halted, disconnected from the mains current, and with the emergency stop button activated.

For ordinary maintenance it is sufficient that personnel be adequately trained and qualified by the client.
For extraordinary maintenance, repair and exchange of machine parts, call the company builder Technical Assistance Centre.

Operators qualified in the use of the machine need have no particular professional training. They must, however, have undergone a specific training course and have read this use and maintenance manual in its entirety.

The training can be undertaken by the company builder installation technician when the machine is first switched on.
Use only company builder spare parts.

MAINTENANCE SAFETY STANDARDS

DURING MAINTENANCE AND REPAIR:

⚠ WARNING ⚠

Do not clean the electrical components with water or other fluids.

Do not perform maintenance in the presence of water.

Avoid working in areas of high humidity.

The area where maintenance operations are executed must always be kept clean and dry. Remove oil stains immediately.

If you need to perform maintenance in poor lighting conditions, it is required a portable lighting system.
For this operation use lighting devices stack or devices installed on the columns and connected to the power supply network of the establishment.

Do not wear rings, watches, jewelry, clothing dangling , such as ties, scarves, etc. that could get caught in moving parts.

The employer is required to inform workers about the safety requirements and risks associated to work.

Do not make changes on the machine frame such as punctures, cuts, etc.. it risk of damaging electrical cables and weaken the structure.

During electric arc welding, isolate the machine from the metal parts involved, the risk of damage to the electrical equipment

All repair operations must directed by a foreman.

Before carrying out any maintenance and inspection, verify that you have triggered the safety switch or the safety fungus at the machine

For the entire period of maintenance and repair the machine must remain switched off at the master switch.

Prevent operation by unauthorized persons using a padlock.
Make sure, before attempting to operate the machines, the maintenance staff is at a safe distance and tools or materials that may have been left in hazardous areas.

Failure by the user to implement the following conditions will release the manufacturer from all liability .

- The machine must only be used for the purposes stated and must only be used by suitably trained and authorised personnel .

- Follow the installation instructions given in this manual .

- Use the recommended power supply rating

- Install the machine in the conditions and premises recommended by the manufacturer .

- Perform routine and special maintenance at the intervals specified .

- Do not modify the machine without the prior, written consent of the manufacturer .

- Only use original spare parts for repairs and maintenance .

- Follow the instructions given in this manual

-If the machine undergoes damage caused by flooding, earthquake or other natural catastrophes it must be repaired and tested before being returned to service .

Danger zones and residual risks during maintenance

Area where there are electrical connections.

In this area there are electrical hazards. you must:
Make sure, before entering these areas that the machine is turned off and disconnected from the power supply line.

Use, where appropriate, PPE to ensure good insulation especially in the limbs of the operator.

⚠ WARNING ⚠

Failure to carry out inspections and maintenance can lead to serious damage for persons and thing .

MAINTENANCE OF THE MACHINE

We list the maintenance operations to be performed on the conveyor belts, including an approximate indication of the frequency with which the various operations should be carried out.
In general the following is valid not only for conveyor bearings, but also for all machines using bearings, reductions gears, ecc.

Operation A
1 - Greasing of bearings and housings
The greasing of bearings and housings in the haulage rollers, the return rollers and all other support which are required to be installed to house any counterweight tensioning rollers and contrast rollers under the pulling and return heads.
The lubrificator screwed to the body of the bearing should be cleaned before the start of any greasing operations, and the protective cap must be always be replaced at the end of every operation.
When re-greasing, it is necessary to use a grease compatible with the original one used, and said grease must therefore be lithiumbased.
It is also possible to use a calcium-based grease, but never a sodium-based grease.
The fresh grease should be introduced slowly, keeping the bearing turning, until the grease seeps out from the guards, taking care not to exert excessive pressure in order not to damage the latter.
It is hard to give a general rule as regards the interval of time beetween re-greasing, as it can vary greatly according to the operating condition: experience is usually the best guide. However, when the machinery only undergoes seasonal use, it is advisable to re-grase the bearings at the end of each season, or at any rate before leaving the machinery inactive for a certain period.
When the working temperature of the bearing raches 100°C or when working at the high speeds or when working conditions are dusty or extremely humid, it is advisable to re-grease more frequently. This operation is carried out by hand, using the special portable oil-can.

Operation B
2 - Reduction gears

2.1 - Maintenance
The permanently-greased reduction gears using synthetic life-long greases have no need of maintenance for the change of lubrificant, for this reson they are not provided with caps for charging, level testing and discharge of oil.
During the running-in period the oil can reach higher temperatures than normal, and only at the end of this period will the gears reagh their maximum working capacity.
Grease the rotating parts with water-repellant grease in corrispondence with the junk rings, in order to avoid any leakage of oil or greade due to wear caused to the ring by dirt. The frequency with which this operation is performed should be established on the basis of the actual working and environmental conditions.

2.2 - Installation

It is extremely important, when substituting a reduction gears, that the following rules be followed:

- ensure that the reduction gear clamp is stable, in order to avoid any vibration
- while painting, if possible using anti-corrosion paint, it is advisable to protect the outer edge of the rings, so that the paint does not dry up the rubber, ruining the sealing capacity of the oil seal itself
- the contact surfaces should be cleaned and treated with suitable protective substances before assembly, in order to avoid rusting and the consequent blockage of the parts
- make sure that the voltage of the motor (if the reduction gear in question is a motor reduction gear) corresponds to the power supply. If the direction of rotation does not correspond to the one required, invert two phases of the power-supply line.

Consult the following table for a comparison of oil and greases:

<table>
<tr><td rowspan="3">OIL TYPE</td><td rowspan="3">APPLICATION</td><td rowspan="3">MANUFACTURER</td><td colspan="2">TYPE OF LOAD</td></tr>
<tr><td>AVERAGE</td><td>HEAVY</td></tr>
<tr><td>220 cSt - 40°C</td><td>320 cSt - 40°C</td></tr>
<tr><td rowspan="14">MINERAL OIL</td><td rowspan="7">GEAR REDUCTION UNITS</td><td>AGIP</td><td>BLASIA 220</td><td>BLASIA 320</td></tr>
<tr><td>MOBIL</td><td>MOBILGEAR 630</td><td>MOBILGEAR 632</td></tr>
<tr><td>SHELL</td><td>OMALA OIL 220</td><td>OMALA OIL 320</td></tr>
<tr><td>BP</td><td>ENERGOL GR-XP 220</td><td>ENERGOL GR-XP 320</td></tr>
<tr><td>ROL-OIL</td><td>EP 220</td><td></td></tr>
<tr><td>ESSO</td><td>SPARTAN EP 220</td><td>SPARTAN EP 320</td></tr>
<tr><td>IP</td><td>MELLANA OIL 220</td><td>MELLANA OIL 320</td></tr>
<tr><td rowspan="7">WORM SCREW REDUCTION GEARS</td><td>AGIP</td><td>BLASIA 220</td><td>BLASIA 320</td></tr>
<tr><td>MOBIL</td><td>MOBILGEAR 630</td><td>MOBILGEAR 632</td></tr>
<tr><td>SHELL</td><td>OMALA OIL 220</td><td>OMALA OIL 320</td></tr>
<tr><td>BP</td><td>ENERGOL GR-XP 220</td><td>ENERGOL GR-XP 320</td></tr>
<tr><td>ROL-OIL</td><td>EP 220</td><td></td></tr>
<tr><td>ESSO</td><td>SPARTAN EP 220</td><td>SPARTAN EP 320</td></tr>
<tr><td>IP</td><td>MELLANA OIL 220</td><td>MELLANA OIL 320</td></tr>
<tr><td rowspan="3">SYNTHETIC GREASE</td><td rowspan="6">GEAR REDUCTION UNITS WORM SCREW REDUCTION GEARS</td><td>IP</td><td colspan="2">TELESIA COMPOUND B</td></tr>
<tr><td>KLUBER</td><td colspan="2">STRUCTOVIS P LIQUID</td></tr>
<tr><td>TOTAL</td><td colspan="2">TOTALCARTER SY00</td></tr>
<tr><td rowspan="3">SYNTHETIC OIL</td><td>IP</td><td colspan="2">TELESIA OIL 150</td></tr>
<tr><td>KLUBER</td><td colspan="2">SYNTHESO D 220 EP</td></tr>
<tr><td>AGIP</td><td colspan="2">BLASIA S</td></tr>
</table>

It must be remembered that the mineral oils indicated above are indicatively valid for a room temperature of between 0°C and +30°C.

For room temperatures higher than 30°C/35°C, use the next grade up from that indicated in the table.

If the room temperature is lower than 0°C, use the next grade down from that indicated in the table.

Syntetic lubrificants can be used for room temperatures of between -10°C and +40°C (grease) and of between -30°C (-25 for BLASIA S) and +50°C (oil).

In order to determine with greater precision the average value (cSt) of kinematic viscosity, the following table should be used.

SCREW SPEED (R/P/M)	ROOM TEMPERATURE +/- 10°C	
	0-20°C	10-40°C
2800-710	150	320
710-180	220	460
<180	320	680

For plants involving a high number of start-ups it is advisable to protect the motor with termal probes (incorporated within the same) : the termal cut-out does not perform this function, as it must be calibrated to values higher than that of the motor's nominal current.
TA gearboxes are oil lubrificated.
They are supplied empty and must be filled by the customer before use.
Therefore these gearboxes are fitted with filling, draining and oil level plugs.

OIL LUBRIFICATION (LITRES)				
TA 30	TA 35-35	TA 40-40 TA 40-45	TA 45-45 TA 45-50 TA 45-55	TA 50-50 TA 50-55 TA 50-60
0,500	1,2	2,1	3,1	8
	TA 35-35 D	TA 40-40 D TA 40-45 D	TA 45-45 D TA 45-50 D TA 45-55 D	TA 50-50 D TA 50-55 D TA 50-60 D
	1,1	1,8	3,6	7,3

TA 60-60 TA 60-70	TA 70-70 TA 70-85	TA 80-80 TA 80-100	TA 100-100 TA 100-125	TA 125-125 TA 125-135
7,5	1,2	2,1	3,1	8
TA 60-60 D TA 60-70 D	TA 70-70 D TA 70-85 D	TA 80-80 D TA 80-100 D	TA 100-100 D TA 100-125 D	TA 125-125 D TA 125-135 D
10	14	10,6	17,5	26,5

The size 025 to 090 gears are supplied complete with synthetic oil and therefore do not require any maintenance. The size 110, 130 and 150 gears are supplied with the quantity of mineral oil foreseen for the B3 assembly position. It is the client's responsibility to adapt the quantity of oil to the assembly position and in addition, to substitute the filling plug, supplied closed for transport reasons, with the one equipped with a hole attached to the gear. If the breather plug is not installed it may create internal pressure with a consequent leakage of oil from the oil seals. For the sizes 110, 130 and 150 we recommend that the oil is changed after the running in period, approx. 300 working hours.

Lubrication

	CHM 025/090	**CHM 110/150**			**CHPC**
Lubricant	Synthetic	Mineral			Synthetic
°C ambient	-25°C/+50°C	-25°C/+50°C	-5°C/+40°C	-15°C/+25°C	-25°C/+50°C
ISO	VG320	VG320	VG460	VG220	VG320
AGIP	TELIUM VSF320	BLASIA 320	BLASIA 460	BLASIA 220	TELIUM VSF320
SHELL	TIVELA OIL S 320	OMALA OIL 320	OMALA OIL 460	OMALA OIL 220	TIVELA OIL SC 320
IP	TELIUM VSF	MELLANA OIL 320	MELLANA OIL 460	MELLANA OIL 220	TELIUM VSF

Quantity of oil in litres

CHM	025	030	040	050	063	075	090	110	130	150	CHPC	63	71	80	90
B3	0,02	0,04	0,08	0,15	0,30	0,55	1	3	4,5	7		0,05	0,07	0,15	0,16
B8	0,02	0,04	0,08	0,15	0,30	0,55	1	1,4	1,7	5,1		0,05	0,07	0,15	0,16
B6/B7	0,02	0,04	0,08	0,15	0,30	0,55	1	2,2	3,3	5,4		0,05	0,07	0,15	0,16
V5	0,02	0,04	0,08	0,15	0,30	0,55	1	3	4,5	7		0,05	0,07	0,15	0,16
V6	0,02	0,04	0,08	0,15	0,30	0,55	1	2,2	3,3	5,1		0,05	0,07	0,15	0,16

Operation C
3 - Conveyor belts
Check the tightness and state of wear of the belt.
On these occasions, if the belt is found to be dirty, on either its incoming or outgoing side, it is necessary to adjust all the belt-scrapers (if there are) and eliminate, if possible, the causes of dirt at their source. If the scrapers are so worn as to make further adjustement impossible, they must be changed within a short time.
It must be remembered that sometimes when changing external belt-scrapers it is preferable to install a brush, because the belt carpet has a patterned surface, and it is therefore necessary, in order to maintain efficiency, to ensure it does not became clogged up with product.
To adjust the tension of the carpet, use the nuts mounted on the threaded bars situated at the sides of the tensioning head, unfasten the lock nut and bring the thrust nut forwards, taking care to make the same number of turns on both the left-hand and the rigth-hand nut, otherwise the belt carpet will no longer turn centrally.
If the conveyor belt is tensioned with counterweights, check that the metal cables bearing the counterweights do not have broken threads, and that the countrweights itself is performing its correct function, descending when the belt is fully loaded and rising suddenly on starting up.
It is important to check tensioning every time there is a noticeable change in temperature during the season, and in particular if the conveyor belts are situaded in the open air and are not tensioned with counterweights have a fixed, and not a self-adjusting, tension.

Operation D
4 - Belt drives and chains
Check the tension and state of wear of the belt drives and driving chains and, if necessary, change them.
To carry out a reliable check it is advisable to remove the protective carter, usually fixed with not more than 3 bolts, each time.

Operation E
5 - Checking nuts and bolts
Check the tightness of nuts and bolts in all the structures subject to vibration, including the carring structures.
If nuts and bolts show a tendency to loosen in certain places, it is necessary to improve the blocking system using special washers, cup springs wich always give a certain amount of pre-tensioning, with nuts of the self-locking type or with small doses of LOCTITE. Following this, check these critical points more frequently.
It is necessary to replace all nuts and bolts seriously affected by rust with black, nongalvanized bolts, of a quality equal to, but not less than, 8.8. Do not use bolts that have no mark indicating their resistance. When making the substitution, clean the bolt housing carefully to remove all rust, paint the housing, install and tighten the bolt, and then paint the bolt as well.

Operation F
6 - Carrying structures
Check the state of preservation of the carrying structures.
It is important to repair as soon as possible any areas which may have been attacked by rust for various reasons. It is sometimes hard to identify these areas, as they are not immediately visible and require a more careful examination. In particular, for small areas of rust, it is possible to rimedy the problem by laying the metal bar, using metal brushes (or the like) mounted on BOSCH or any other make of acessories, and immediately afterwards painting over the area with a brush, using the same type of product as that used for the original paint work. Sunny days are ideal for this kind of job.
Only in the case of special maintenance, after years of use, will it be necessary to sand-blast the structure and re-paint it entirely.

Operation G
7 - Centering the conveyor
Centering operations are performed with the conveyor working unloaded.

A - B - The belt skids on the haulage rollers and on the idle roller.
Unscrew by a single turn only the hexagonalhead scews using the spanner provided, slowly manoeuvre the lateral regulators and move the roller as indicated in the figure until the belt is completely centered. Leave the belt working for a couple of minutes before tightening the screws.

C - D - The belt skids at intermediate points.
Unscrew the hexahonal-head screws only in the part provided with eyelets, move the rollers very slowly, as indicated in the figure, until the belt is completely centered, and than tighten the screw without moving the rollers.

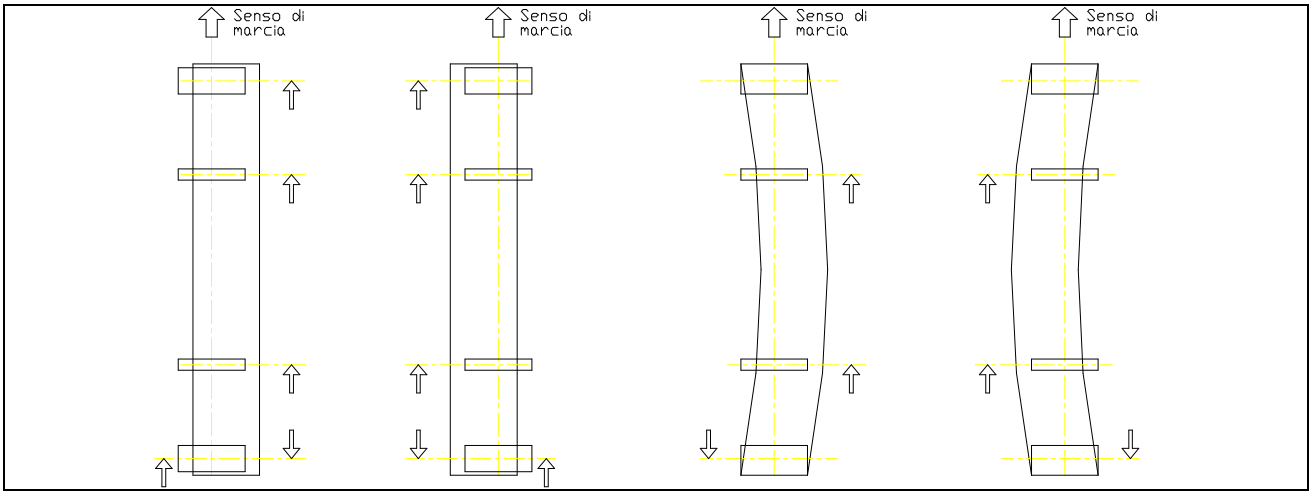
E - F - Dismantle a roller in the position at which the belt is most off-line, introduce a 16 mm. diameter rod into the bore in the support and exert force on it, trying to move its axis as indicated in the figure; replace the roller, tighten the hexagonal-head screw and observe the belt; then repeat the operation on the adjacent rollers until the belt is totally centered.
This operation should only be performed as a last resort.
If on the contrary the pair or set of three rollers is installed on a crossbar, it is sufficient to loosen the screws in the bracket fixing said crossbar to the frame, and than to move the crossbar itself, tapping it gently with a hammer, in the direction indicated in the figure until the belt is centered;then fix the crossbar again by tightening the screws in the bracket.

General and recapitulatory table showing the initial maintenance operations, after which said operations should be based on the indications given above, and on personal experience.
Tick the boxes to indicate maintenance work already performed, including that not marked on the table.

OPERATION	AT HOUR					THEN
	50	200	500	1000	2000	EVERY
A		X				LOOK AT “A”
B		X		X		2000
C		X	X			500
D	X	X	X			500
E		X				4000
F					X	2 YEARS
G			X		X	2000

N.B. Remember that should it be necessary to install a new reduction gear, it should be made to run with the conveyor empty for 1 hour and then checked to see whether any malfunction has made it overheat. If this unloaded running-in is successful, load the conveyor up to 50-70% of its normal production level for several working hours, before going on to 100% load.
This is in order to reach a working load gradually over a space of time.

COMMAND HEAD SIDE



TENSION HEAD SIDE

The large arrows indicate the direction of movement of the belt, the small arrows indicate the direction in which the rollers must be moved in order to center the belt; the position of the belt, in the figure, is that preceding its correction.

The centering of the belt should be checked every time the belt is checked for wear (as this can occur in an uneven manner), when bearing or return rollers are changed, when the tension of the belt is adjusted and when the belt scrapers are adjusted.
Furthermore, should it be necessary to add or remove weight from the counterweights of a conveyor with counterweight tensioning, this should be done in a homogeneous manner. That is to say, weight should not be added or removed from one side only, as this would causedifferent tensions on the left and right side of the belt, and thus drag it off-center.

To restart the machinery safely, make sure that no one is working on the machinery, restore the microswitch or the safety push-button , check that there are no foreign bodies on the machinery, finally reconnect the main switch.

DISMANTLEMENT AND SAFE DISPOSAL

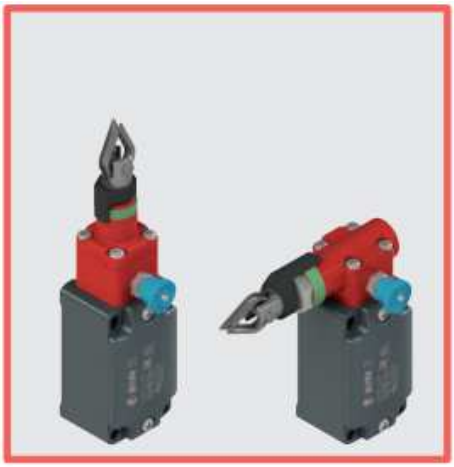
The dismantling of the conveyor belt must be carried out by specialized technicians and must follow safety standards on temporary and mobile construction sites.
In the design stage , the Manufacturer took into account the risks during the dismantling operations. Disposal operations must be carried out by technicians specialized in disposal, recycling and pollution.
The Manufacturer declines any responsibility for environmental damage caused by improper disposal of the machinery and waste products.
The conveyor belt is made of galvanized steel sheet.

The remaining parts (gearmotor, electrical materials, commercial materials, rubber belt, etc.) must be delivered to companies that deal with waste disposal and recycling.
The machinery is free of harmful substances.

⚠ WARNING ⚠

The waste oil from the gearmotor must be recovered and disposed in according to current legislation.

SAFETY ROPE SWITCHES WITH RESET FOR EMERGENCY STOP FD 2078 – FD 2083 – FD 2084



Main features

- Metal or plastic housing, from one to three conduit entries
- Protection degree IP67
- In compliance with EN ISO 13850
- 7 contact blocks available
- Versions with vertical or horizontal actuation
- Versions with assembled M12 connector
- Versions with gold-plated silver contacts

Quality marks:

IMQ approval: EG605
UL approval: E131787
CCC approval: 2007010305230000
EAC approval: RU C-IT.АД35.В.00454

Technical data

Housing

FP series housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: ⧈
FD, FL and FC series: metal housing, baked powder coating.

FD, FP, FC series: one threaded conduit entry:	M20x1.5 (standard)
FL series: three threaded conduit entries:	M20x1.5 (standard)
Protection degree:	IP67 acc. to EN 60529 with cable gland of equal or higher protection degree

General data

SIL (SIL CL) up to:	SIL 3 acc. to EN 62061
Performance Level (PL) up to:	PL e acc. to EN ISO 13849-1
Safety parameters:	
B_{10D}:	2,000,000 for NC contacts
Mission time:	20 years
Ambient temperature:	-25°C … +80°C (standard) -40°C … +80°C (T6 option)
Max. actuation frequency:	1 cycle / 6 s
Mechanical endurance:	1 million operating cycles
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s
Tightening torques for installation:	see page 339
Wire cross-sections and wire stripping lengths:	see page 357

In compliance with standards:
IEC 60947-5-1, IEC 60947-1, IEC 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN ISO 13850, EN 418, EN 50581, UL 508, CSA 22.2 No.14.
Approvals:
EN 60947-5-1, UL 508, CSA 22.2 No.14 , GB/T14048.5-2017.

Compliance with the requirements of:
Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

Electrical data

without connector

Thermal current (I_{th}): 10 A
Rated insulation voltage (U_i): 500 Vac 600 Vdc
400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34)
Rated impulse withstand voltage (U_{imp}): 6 kV
4 kV (contact blocks 20, 21, 22, 33, 34)
Conditional short circuit current: 1000 A acc. to EN 60947-5-1
Protection against short circuits: type aM fuse 10 A 500 V
Pollution degree: 3

Utilization category

Alternating current: AC15 (50÷60 Hz)

U_e (V)	250	400	500
I_e (A)	6	4	1

Direct current: DC13

U_e (V)	24	125	250
I_e (A)	3	0.55	0.3

with M12 connector, 4 and 5-pole

Thermal current (I_{th}): 4 A
Rated insulation voltage (U_i): 250 Vac 300 Vdc
Protection against short circuits: type gG fuse 4 A 500 V
Pollution degree: 3

Alternating current: AC15 (50÷60 Hz)

U_e (V)	24	120	250
I_e (A)	4	4	4

Direct current: DC13

U_e (V)	24	125	250
I_e (A)	3	0.55	0.3

with M12 connector, 8-pole

Thermal current (I_{th}): 2 A
Rated insulation voltage (U_i): 30 Vac 36 Vdc
Protection against short circuits: type gG fuse 2 A 500 V
Pollution degree: 3

Alternating current: AC15 (50÷60 Hz)

U_e (V)	24
I_e (A)	2

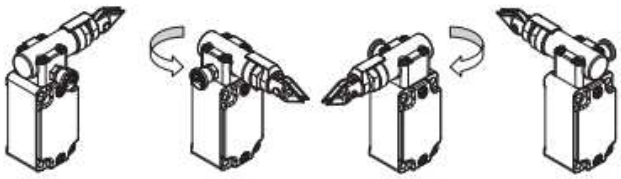
Direct current: DC13

U_e (V)	24
I_e (A)	2

Description

These rope-operated safety switches are installed on machines or conveyor belts and allow the machine to be brought to an emergency stop from any point and with any pull on the rope. This means significant cost savings for medium and large machines, since multiple emergency-stop buttons can be replaced with a single switch. They are equipped with a self-control function that constantly checks the correct function and signals a possible loosening or breaking of the rope through the opening of the contacts. These safety switches keep the contacts open after activation until the reset is performed, even if the rope is released.

Head with variable orientation



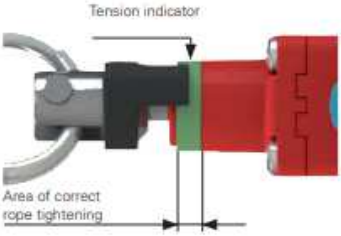
For all switches, the head can be adjusted in 90° steps after removing the four fastening screws.

Extended temperature range

-40°C

These devices are also available in a special version suitable for an ambient operating temperature range from -40°C up to +80°C. They can therefore be used for applications in cold stores, sterilisers and other equipment with low temperature environments. The special materials used to produce these versions retain their characteristics even under these conditions, thereby expanding the installation possibilities.

Indicator for rope adjustment



All switches are provided with a green ring that shows the area of the correct tightening of the rope. The installer has only to tighten the rope until the black indicator will be in the middle of the green area. With this setting, the switch can be reset by pulling the blue knob to close the electrical safety contacts.

If the tension (or loosening) on the rope is so high that the black indicator exits the green area, the electrical safety contacts will open and the reset device will trigger.

Laser engraving

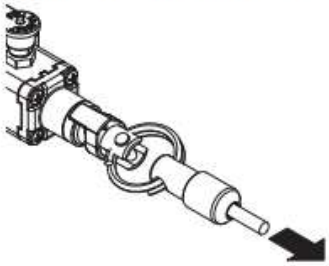
All devices are marked using a dedicated indelible laser system. These engravings are therefore suitable for extreme environments too. Thanks to this system that does not use labels, the loss of plate data is prevented and a greater resistance of the marking is achieved over time.

Protection degree IP67

IP67

These devices are designed to be used in the toughest environmental conditions and they pass the IP67 immersion test acc. to EN 60529. They can therefore be used in all environments where maximum protection degree of the housing is required.

Reduced actuating force



These switches can be supplied with reduced hardness internal springs on request. The force required to actuate the switch can thereby be reduced without changing the actuating path of the electrical contacts. This is particularly advantageous for smaller spans, but must, however, always make use of rope pulleys.

Indicator for the state of the reset

If the tension indicator is in the green area, the electrical safety contacts can be closed by pulling the blue knob. The reset status can be identified quickly by the green ring under the blue knob.

Features approved by IMQ

Rated insulation voltage (Ui):	500 Vac 400 Vac (for contact blocks 20, 21, 22, 33, 34)
Conventional free air thermal current (Ith):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (Uimp):	6 kV 4 kV (for contact blocks 20, 21, 22, 33, 34)
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (Ue):	400 Vac (50 Hz)
Operating current (Ie):	3 A

Forms of the contact element: Zb, Y+Y, Y+Y+X, Y+Y+Y, Y+X+X
Positive opening contacts on contact blocks 9, 18, 20, 21, 22, 33, 34
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU.

Please contact our technical department for the list of approved products.

Features approved by UL

Electrical Ratings:	Q300 pilot duty (69 VA, 125-250 V dc) A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings:	Types 1, 4X, 12, 13

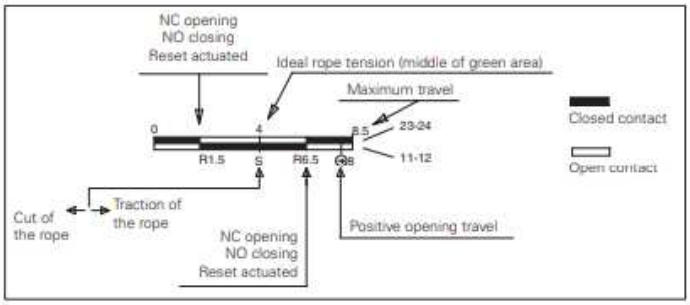
Use 60 or 75°C copper (Cu) conductor and wire size range 12, 14 AWG, stranded or solid.

The terminal tightening torque of 7.1 lb in (0.8 Nm).

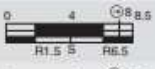
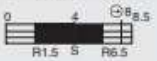
For FP series: the hub is to be connected to the conduit before the hub is connected to the enclosure.

Please contact our technical department for the list of approved products.

How to read travel diagrams



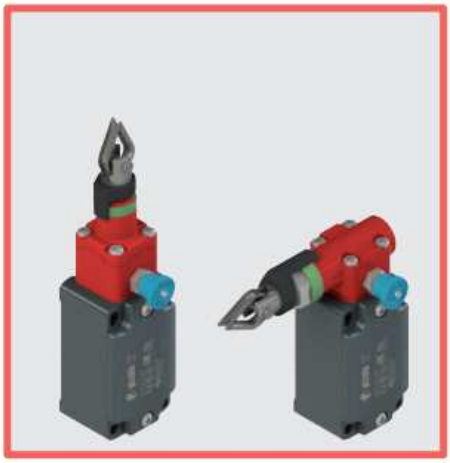
Travel diagrams table

Contact blocks		Group 1	Group 2
9 2NC			
18 1NO+1NC			
20 1NO+2NC			
21 3NC			
22 2NO+1NC			
33 1NC+1NO			
34 2NC			

IMPORTANT:

In **safety applications**, actuate the switch **at least up to the positive opening travel** shown in the travel diagrams with symbol ⊕. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.

SAFETY ROPE SWITCHES WITH RESET FOR EMERGENCY STOP FD 1878 FD 1883 FD 1884



Main features

- Metal or plastic housing, from one to three conduit entries
- Protection degree IP67
- In compliance with EN ISO 13850
- 7 contact blocks available
- Versions with vertical or horizontal actuation
- Versions with assembled M12 connector
- Versions with gold-plated silver contacts

Quality marks:

IMQ approval: EG605
UL approval: E131787
CCC approval: 2021000305000099
EAC approval: RU C-IT.YT03.B.00035/19

Technical data

Housing

FP series housing made of glass fibre reinforced technopolymer, self-extinguishing, shock-proof and with double insulation: ⧈
FD, FL and FC series: metal housing, baked powder coating.

FD, FP, FC series: one threaded conduit entry:	M20x1.5 (standard)
FL series: three threaded conduit entries:	M20x1.5 (standard)
Protection degree:	IP67 acc. to EN 60529 with cable gland of equal or higher protection degree

General data

SIL (SIL CL) up to:	SIL 3 acc. to EN 62061
Performance Level (PL) up to:	PL e acc. to EN ISO 13849-1
Safety parameters:	
B_{10D}:	200,000 for NC contacts
Mission time:	20 years
Ambient temperature:	-25°C … +80°C (standard) -40°C … +80°C (T6 option)
Max. actuation frequency:	1 cycle / 6 s
Mechanical endurance:	100,000 operating cycles
Max. actuation speed:	0.5 m/s
Min. actuation speed:	1 mm/s
Tightening torques for installation:	see page 441
Wire cross-sections and wire stripping lengths:	see page 461

In compliance with standards:
IEC 60947-5-1, IEC 60947-5-5, IEC 60947-1, IEC 60204-1, EN ISO 14119, EN ISO 12100, IEC 60529, EN ISO 13850, EN IEC 63000, UL 508, CSA C22.2 No. 14.
Approvals:
EN 60947-5-1, UL 508, CSA C22.2 No. 14, GB/T14048.5

Compliance with the requirements of:
Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU.
Positive contact opening in conformity with standards:
IEC 60947-5-1, EN 60947-5-1.

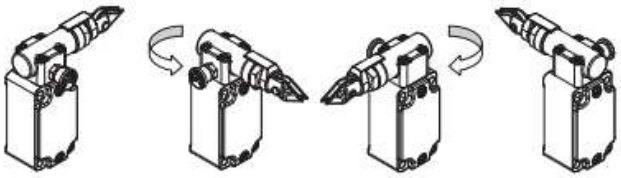
Electrical data

			Utilization category
without connector	Thermal current (I_{th}):	10 A	Alternating current: AC15 (50÷60 Hz)
	Rated insulation voltage (U_i):	500 Vac 600 Vdc 400 Vac 500 Vdc (contact blocks 20, 21, 22, 33, 34)	U_e (V) 250 400 500 I_e (A) 6 4 1
	Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (contact blocks 20, 21, 22, 33, 34)	Direct current: DC13
	Conditional short circuit current:	1000 A acc. to EN 60947-5-1	U_e (V) 24 125 250 I_e (A) 3 0.55 0.3
	Protection against short circuits:	type aM fuse 10 A 500 V	
	Pollution degree:	3	
with M12 connector, 4 and 5-pole	Thermal current (I_{th}):	4 A	Alternating current: AC15 (50÷60 Hz) U_e (V) 24 120 250 I_e (A) 4 4 4
	Rated insulation voltage (U_i):	250 Vac 300 Vdc	
	Protection against short circuits:	type gG fuse 4 A 500 V	Direct current: DC13
	Pollution degree:	3	U_e (V) 24 125 250 I_e (A) 3 0.55 0.3
with M12 connector, 8-pole	Thermal current (I_{th}):	2 A	Alternating current: AC15 (50÷60 Hz) U_e (V) 24 I_e (A) 2
	Rated insulation voltage (U_i):	30 Vac 36 Vdc	
	Protection against short circuits:	type gG fuse 2 A 500 V	Direct current: DC13
	Pollution degree:	3	U_e (V) 24 I_e (A) 2

Description

These rope-operated safety switches are installed on machines or conveyor belts and allow the machine to be brought to an emergency stop from any point and with any pull on the rope. This means significant cost savings for medium and large machines, since multiple emergency-stop buttons can be replaced with a single switch. They are equipped with a self-control function that constantly checks the correct function and signals a possible loosening or breaking of the rope through the opening of the contacts. These safety switches keep the contacts open after activation until the reset is performed, even if the rope is released.

Head with variable orientation



For all switches, the head can be adjusted in 90° steps after removing the four fastening screws.

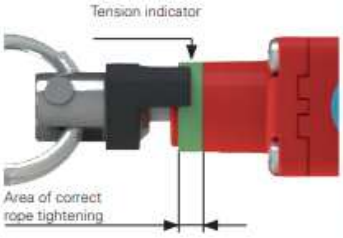
Extended temperature range

-40°C

These devices are also available in a special version suitable for an ambient operating temperature range from -40°C up to +80°C.

They can therefore be used for applications in cold stores, sterilisers and other equipment with low temperature environments. The special materials used to produce these versions retain their characteristics even under these conditions, thereby expanding the installation possibilities.

Indicator for rope adjustment



All switches are provided with a green ring that shows the area of the correct tightening of the rope. The installer has only to tighten the rope until the black indicator will be in the middle of the green area. With this setting, the switch can be reset by pulling the blue knob to close the electrical safety contacts.

If the tension (or loosening) on the rope is so high that the black indicator exits the green area, the electrical safety contacts will open and the reset device will trigger.

Laser engraving

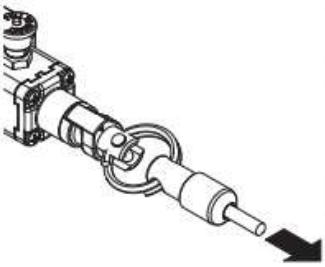
All devices are marked using a dedicated indelible laser system. These engravings are therefore suitable for extreme environments too. Thanks to this system that does not use labels, the loss of plate data is prevented and a greater resistance of the marking is achieved over time.

Protection degree IP67

IP67

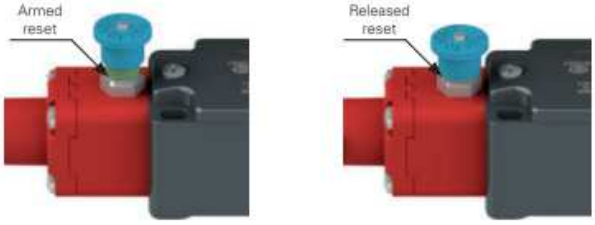
These devices are designed to be used under the toughest environmental conditions, and they pass the IP67 immersion test acc. to EN 60529. They can therefore be used in all environments where the maximum degree of protection is required for the housing.

Reduced actuating force



These switches can be supplied with reduced hardness internal springs on request. The force required to actuate the switch can thereby be reduced without changing the actuating path of the electrical contacts. This is particularly advantageous for smaller spans, but must, however, always make use of rope pulleys.

Indicator for the state of the reset



If the tension indicator is in the green area, the electrical safety contacts can be closed by pulling the blue knob. The reset status can be identified quickly by the green ring under the blue knob.

Features approved by IMQ

Rated insulation voltage (Ui):	500 Vac 400 Vac (for contact blocks 2, 11, 12, 20, 21, 22, 28, 29, 30, 33, 34, 37)
Conventional free air thermal current (Ith):	10 A
Protection against short circuits:	type aM fuse 10 A 500 V
Rated impulse withstand voltage (U_{imp}):	6 kV 4 kV (for contact blocks 20, 21, 22, 28, 29, 30, 33, 34)
Protection degree of the housing:	IP67
MV terminals (screw terminals)	
Pollution degree:	3
Utilization category:	AC15
Operating voltage (Ue):	400 Vac (50 Hz)
Operating current (Ie):	3 A

Forms of the contact element: Za, Za+Za, X+X, Zb, Y+Y, Y+Y+X, Y+Y+Y, Y+X+X, Y, X.
Positive opening of contacts on contact blocks 5, 6, 7, 8, 9, 11, 13, 14, 16, 17, 18, 19, 20, 21, 22, 28, 29, 30, 33, 34, 37, 38, 39, 66.
In compliance with standards: EN 60947-1, EN 60947-5-1, fundamental requirements of the Low Voltage Directive 2014/35/EU.

Features approved by UL

Electrical Ratings:	Q300 pilot duty (69 VA, 125-250 V dc) A600 pilot duty (720 VA, 120-600 V ac)
Environmental Ratings:	Types 1, 4X, 12, 13

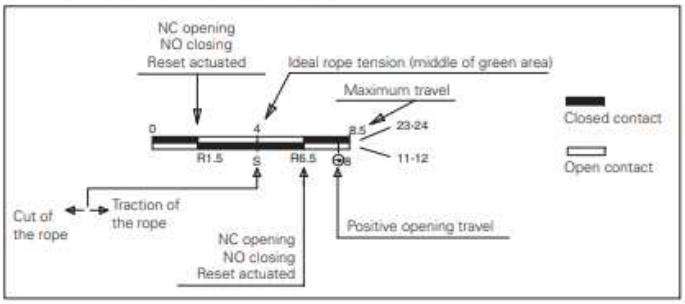
Use 60 or 75°C copper (Cu) conductor and wire size range 12, 14 AWG, stranded or solid.

The terminal tightening torque of 7.1 lb in (0.8 Nm).

For FP series: the hub is to be connected to the conduit before the hub is connected to the enclosure.

Please contact our technical department for the list of approved products.

How to read travel diagrams



Travel diagrams table

Contact blocks		Group 1	Group 2
9 2NC	11 21 12 22	0 4 8.5 R1.5 S R6.5 8	0 8 14 16 R4.5 S R12
18 1NO+1NC	11 23 12 24	0 4 8.5 R1.5 S R6.5 8	0 8 14 16 R4.5 S R12
20 1NO+2NC	11 21 33 12 22 34	0 4 8 8.5 R1.5 S R6.5	0 8 14 16 R4.5 S R12
21 3NC	11 21 31 12 22 32	0 4 8 8.5 R1.5 S R6.5	0 8 14 16 R4.5 S R12
22 2NO+1NC	11 23 33 12 24 34	0 4 8 8.5 R1.5 S R6.5	0 8 14 16 R4.5 S R12
33 1NC+1NO	13 21 14 22	0 4 8 8.5 R1.5 S R6.5	0 8 14 16 R4.5 S R12
34 2NC	11 21 12 22	0 4 8.5 R1.5 S R6.5 8	0 8 14 16 R4.5 S R12

IMPORTANT:
In **safety applications**, actuate the switch **at least up to the positive opening travel** shown in the travel diagrams with symbol ⊕. Actuate the switch **at least with the positive opening force**, reported in brackets below each article, next to the actuating force value.