

Installation and Operational Instructions for ROBA-stop[®]-Peak Load Brake Type 86_.41_. Sizes 7 – 11

(B.1110.2.GB)

Please read these Operational Instructions carefully and follow them accordingly!

Ignoring these instructions may lead to malfunctions or to clutch failure, resulting in damage to other parts.

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Manufacturer's Declaration

ROBA-stop[®] brakes work according to the spring applied brake principle, and are components produced for installation in a machine or system based on machine regulations 98/37/EC.

It is forbidden to start use of the component until the machine or system into which it should be built is operating to EC standards.

ROBA-stop[®] brakes are developed and produced to correspond with the national STANDARD DIN VDE 0580, according to the Low voltage regulations 73/23/EC.

Continual compliance with the EMC regulations 89/336/EEC is the responsibility of the product user.

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Safety Guidelines

These Safety Guidelines are user hints only, and may not be complete!



Danger!

Danger of death! Do not touch voltage-carrying cables and components.

To prevent injury or damage, only professionals and suitably qualified personnel should work on the devices.

Danger!

This caution applies when:

- ☐ the electromagnetic brake is used incorrectly.
- ☐ the electromagnetic brake is modified or retrofitted.
- ☐ the relevant safety STANDARDS for safety and/or installation conditions are ignored.



Warning!

Before machine installation and operation, please read the Installation and Operational Instructions carefully. Please follow the Safety Guidelines to avoid injury or damage. The electromagnetic brakes have been developed in accordance with the latest technology regulations for the time and are, at the point of delivery, operationally safe.

Information:

Without a conformity inspection, this product is not suitable for use in areas where there is a high danger of explosion. This statement is based on the regulation 94/9 /EC (ATEX regulation).

Caution!

- ☐ Only professional, qualified personnel, trained in the transport, installation, starting operations, maintenance and general operation of these devices as well as the relevant STANDARDS, should be allowed to carry out this work.
- ☐ Technical data and specifications (Type tags and documentation) must be followed!
- ☐ The correct connection voltage must be connected according to the information on the Type tag.
- ☐ Never loosen electrical connections or carry out installations, maintenance or repairs while the voltage connection is energised!
- ☐ Cable connections must not be under mechanical strain.
- ☐ Check electrical components for signs of damage before putting them into operation. Never bring them into contact with water or other fluids!
- ☐ The braking torque can be lost if the friction lining and/or the friction surface come into contact with oil or grease.

Appointed Use

mayr® brakes are for use in machines and systems and must only be used in the situations for which they are ordered and confirmed and confirmed. Using them for any other purpose is not allowed!

Guidelines for Electromagnetic Compatibility (EMC)



In accordance with the EMC Regulations 89/336/EEC, the individual components produce no emissions. However, functional components e.g. rectifiers, phase demodulators, ROBA®-switches or similar controls for the mains-side energisation of the brakes can produce disturbance which lies above the allowed limit values. For this reason it is important to read the Installation and Operational Instructions very carefully and to keep to the EMC guidelines.

Device Conditions



The catalogue values are guideline values which can, in certain cases, vary. When designing the brakes, please allow for varying installation situations, torque fluctuations, permitted friction work, run-in behaviour and wear as well as for general ambient conditions, all of which should be carefully assessed and alignments made accordingly.

Caution!

- ☐ Mounting dimensions and connection dimensions must be adjusted according to the size of the brake at the place of installation.
- ☐ The brakes are designed for a relative duty cycle of 100 %.
- ☐ The brakes are only designed for dry running. The torque can be lost if the friction surface comes into contact with oil, grease or water.
- ☐ The torque is dependent on the present run-in condition of the brakes.
- ☐ Please check the manufacturer-side corrosion protection for the metallic surface.

Protection Class I

This protection can only be guaranteed if the basic insulation is intact and if all conductive parts are connected to the PE conductor. Should the basic insulation fail, the contact voltage cannot function (EN50144-1, Classification VDE 0740-1).

Protection Type IP 10

Protection against hard foreign bodies of 50 mm in diameter (back of hand protection). No water protection (DIN EN 60529).

Ambient Temperature from -20 °C up to +40 °C Danger!

The torque can be strongly reduced by condensation at temperatures around or under freezing point, or the rotors can freeze up. The user is responsible for suitable protective countermeasures.

Thermic Class F (+155 °C)

The magnetic coil and the casting compound are suitable for use up to operational temperatures of +155 °C.

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Safety Guidelines

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User-implemented Protective Measures:

Please cover moving parts to prevent crushing and catching.
Place a cover on the magnetic part to protect against injury through high temperatures.

Protect against electric shock by installing a conductive connection between the magnetic component and the PE conductor on the permanent installation (Protection Class I).
Protect against highly inductive switch off peaks by installing varistors, spark quenching units or similar devices, according to VDE 0580/2000-07, Paragraph. 4.6, to prevent damage to the coil insulations or switch contact consumption in extreme conditions.

Install additional protective measures against corrosion if the brake is subject to extreme ambient conditions or is installed in open air conditions, unprotected from the weather.

Take precautions against freeze-up of the armature disc and the rotor in high humidity and low temperatures.

Standards and Regulations:

The brakes are developed and produced in accordance with the national STANDARD DIN VDE 0580, following the Low voltage regulations 73/23/EEC

Regulations followed:

98/37/EC Machine regulations
73/23/EEC Low voltage regulations
89/336/EEC EMC regulations

Standards followed:

DIN EN ISO 12100-1 und 2	Machine safety regulations
EN61000-6-4	Technical basic standard Noise radiation
EN61000-6-2	Technical basic standard Interference resistance
EN60204	Electrical machine equipment

Liability

- ☐ The information, guidelines and technical data in these documents were up to date at the time of printing.
Demands on previously delivered brakes are not valid.
- ☐ Liability for damage and/or operational malfunctions will not be taken when:
 - the Installation and Operational Instructions are ignored or neglected.
 - brakes are used inappropriately.
 - the brakes are tampered with or altered.
 - the brakes are worked on unprofessionally
 - the brakes are handled or operated incorrectly

Guarantee

- ☐ The guarantee conditions correspond with the Chr. Mayr GmbH + Co. KG Sales and Delivery Conditions.
- ☐ Mistakes or deficiencies are to be reported to *mayr*[®] at once!

Conformity Marks

The product conforms to the CE according to the Low voltage regulations 73/23/EEC.

Identification

mayr[®] components are clearly marked and described on the Type tag:

Manufacturer
<i>mayr</i>[®]
Product name / Type
Article number
Serial number

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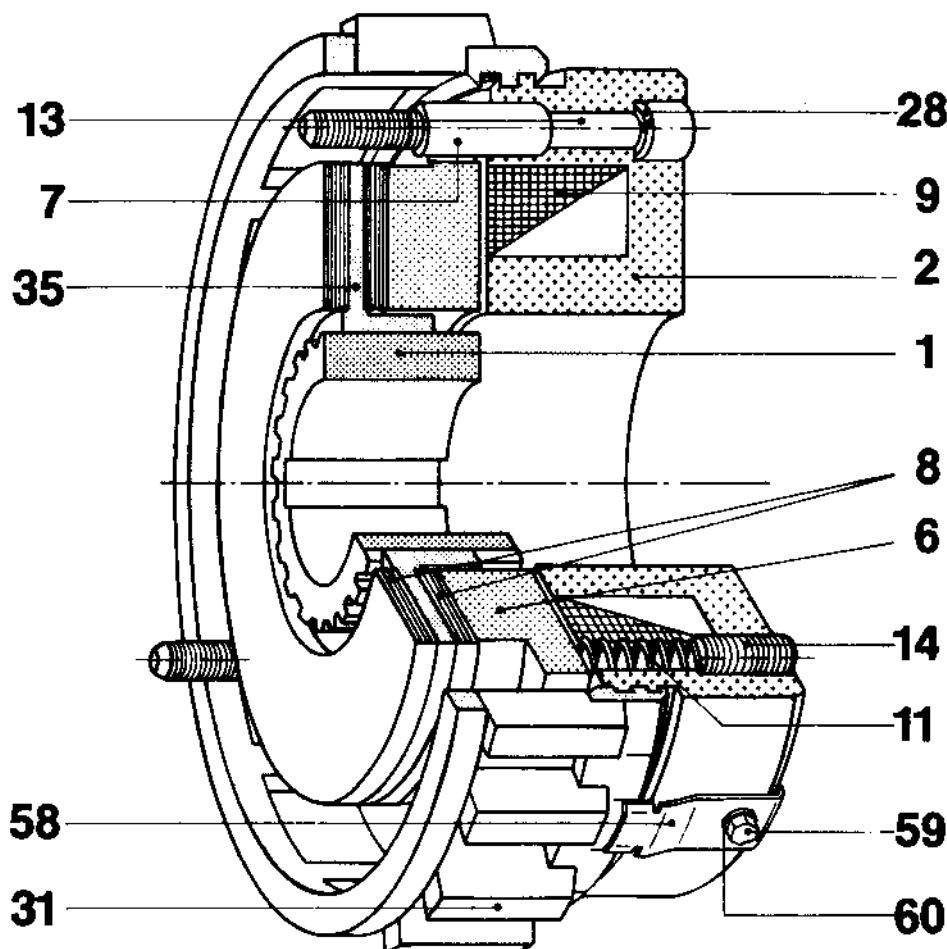


Fig. 1

Parts List

- | | |
|---|-----------------------------------|
| 1 Gear hub | 13 Fixing screw |
| 2 Coil carrier assembly with coil (9) and bushing (7) | 14 Set screw |
| 6 Fast-acting peak-load armature | 28 Spring ring |
| 7 Bushing | 31 Open thread distance ring |
| 8 Friction lining | 35 Rotor with friction lining (8) |
| 9 Coil | 58 Lock washer |
| 10 Shoulder screw (Fig. 3) | 59 Clamping screw |
| 11 Helical spring | 60 Spring ring |

State of Delivery (Completeness and Condition):

Delivery completeness and condition are to be inspected immediately on delivery.

mayr® will take no responsibility for damage during transport.

Reclaim:

- for damage during transport at the delivery company.
- for incomplete delivery and obvious defects immediately at the manufacturer establishment.

Function Description:

The braking torque is produced by the pressure force of several helical springs (11) via friction locking between both the rotor friction linings (35), the peak load armature disc (6) and the machine wall.

The brake is released electromagnetically or mechanically via hand release (see page 6).

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Installation Conditions

Before installing the brakes, the following points must be observed:

- ❑ The eccentricity of the motor shaft against the mounting hole circle may not exceed 0.4 mm.
- ❑ The position tolerance of the thread for the cap screws (13) may not exceed 0.2 mm.
- ❑ The axial eccentricity deviation of the screw-on surface to the shaft may not exceed the permitted axial eccentricity tolerance according to DIN 42955 R.
The reference diameter is the pitch circle diameter for brake attachment.
Larger deviations can lead to a reduction in torque, to continuous rotor slipping and to overheating.
- ❑ Please select the tolerances of hub and shaft so that the hub toothing does not become wider (observe the maximum join temperature of 200°C). Widening of the toothing leads to the rotor jamming on the hub and therefore to brake malfunctions. (Recommended hub-shaft tolerance H7/k6).
- ❑ The hub (1) is to be brought into position so that the rotor toothing (35) carries the load evenly across its whole surface.
- ❑ The rotor and the brake surface must be oil and grease-free.
- ❑ Please provide a suitable counter friction surface for the rotor (35), made out of steel or cast iron. Sharp-edged interruptions in the friction surface are to be avoided.

Installation

- ❑ Install the gear hub (1) onto the shaft and secure it axially. Avoid damage to the toothing. The gear hub (1) is to be installed so that the rotor (35) toothing remains completely engaged, even after friction lining (8) wear.
- ❑ Push the rotor (35) by hand onto the gear hub (1). The rotor collar should be facing the brake.
Please make sure that the toothing runs easily.
Do not cause damage!
- ❑ Screw on the brake using the fixing screws (13) included in delivery, and secure them with spring rings (28). Please observe the screw tightening tolerances, see Table 1.
Inspect air gap "a", Fig. 2. The nominal air gap "a" (see Table 2) must be fulfilled. The shoulder screws (10) Fig. 3 prevent the individual components from falling apart.
They have no effect on the brake function and should not be removed during installation.

ROBA-stop®	Size	7	8	9	10	11
Fixing screws		3xM6	3xM8	6xM8	6xM8	6xM12
Tightening torques [Nm]		8	10	10	10	40

Table 1

Braking Torque Adjustment

ROBA-stop® brakes are adjusted to the braking torque requested on order, manufacturer-side.

By turning the set screws (14) to the left, the braking torque is reduced. By turning them to the right, the braking torque is increased.

When adjusting the braking torque, all set screws (14) must be adjusted evenly.



Danger!

Do not confuse the set screws (14) with the fixing screws (13)!

Should the braking torque be greatly reduced, the helical springs (11) must be removed. To do this, it is necessary to remove two springs which lie opposite to each other, to guarantee an even load on the peak load armature (6).

Air Gap Adjustment

The working air gap "a" between the peak load armature (6) and the coil carrier (2) are installed manufacturer-side to the nominal dimension, (see Fig. 2). As the rotor (35) is worn, however, this air gap "a" is increased. By turning the thread distance ring (31), the nominal air gap can be reinstated. This readjustment must – at the latest – take place when the maximum permitted working air gap (see Table 2) is reached.

Readjustment

1. Measure the air gap before adjustment in a deenergised condition. The difference between the measured air gap to the nominal air gap "a" (see Table 2) must be readjusted.
2. Loosen the fixing screws (13).
3. Loosen the clamping screws (59) and the lock washer (58).
4. Turn the thread distance ring (31) anti-clockwise (facing the brake rear side). Turn the distance ring (31) by one graduation of the engraved scale (which is equal to an air gap adjustment of 0.05 mm).
5. Tighten the fixing screws (13) and observe the tightening torques (see Table 1).
6. Tighten the clamping screw (59).
7. Inspect the air gap: nominal air gap „a“ (see Table 2) must be fulfilled.

Adjustments can be repeated until the threaded distance ring (31) lies against the coil carrier (2) collar, Fig. 2. This component prevents unpermitted wear on the rotor (35). If no more adjustment is possible, the rotor (35) must be replaced. The thickness of the rotor in new condition and the thickness after maximum wear can be found in Table 2.

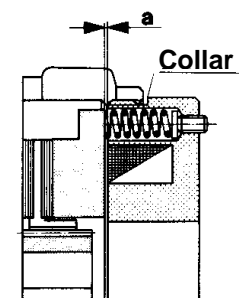


Fig. 2

ROBA-stop®	Size	7	8	9	10	11
Nominal air gap "a" [mm]		0.35	0.35	0.4	0.4	0.5
max. permitted working air gap* [mm]		0.8	0.85	1.1	1.5	1.8
Rotor thickness in new condition [mm]		11	12.5	15	17	24
Rotor thickness after total wear [mm]		8.9	10.2	12	13.4	20.1

Table 2

* As the working temperature increases, the maximum working air gap can decrease.

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Replacement of Components Subject to Wear

Components which are subject to wear are the rotor (35), the peak load armature (6) and the gear hub (1). Unscrew the brake (remove fixing screws (13)) and replace the rotor (35). Should there be excessive backlash in the toothing between the rotor (35) and the gear hub (1), please remove the gear hub from the shaft and replace it. In the same way, inspect the peak load armature (6) for axial parallelity and wear and replace if necessary. In order to replace the peak load armature (6), the shoulder screws (10) as well as the hand release (if available) must be removed.

Electrical Connection



Danger!

Carry out electrical connection only under deenergised conditions.
The coil voltage is shown on the Type tag as well as being imprinted on the brake.

The brakes are designed according to the Euro – Voltage DIN IEC 38.

Operation requires D.C. power.

Switching can take place D.C. – side or A.C. –side. However, D.C. – side switching has a quicker connection time (brake engagement).
If an accelerated disconnection time is required, it is necessary to install a special fast-acting rectifier. Please ask us for details.

Warning!

As the electromagnetic devices are switched off, switch-off peaks can occur. These can destroy the device and must therefore be damped.
Connection times can be lengthened due to this damping. Please ensure a power supply according to the power values. The brakes are designed for a relative duty cycle of 100 %.

Installation of the Hand Release.

To install the hand release, the brake must be dismantled.

- ☐ Push the return spring (19) onto the restoring bolt (17).
- ☐ Take out the plastic plugs on the rear side of the coil carrier (2).
- ☐ Push the restoring bolts (17) through the recesses in the peak load armature (6) and through the borings in the coil carrier (2).
- ☐ Screw the hand release bar (22) with the locking nuts (21) onto the restoring bolts (17).

Hand Release Adjustment

The restoring bolts (17) limit the stroke of the peak load armature (6) in the direction of the brakes, Fig. 4.



Warning:

When tightening the restoring bolts, (17) only tighten them using the locking nuts (21) so much that (at least) the adjustment dimension "X" between the peak load armature (6) and the coil carrier remains, acc. to Table 3 and Fig. 4.

Table 3

ROBA-stop®	Size	7	8	9
Adjustment value "X" [mm]		1.4	1.5	1.5

Parts List, Hand Release

- | | |
|--------------------|-------------------------|
| 17 Restoring bolts | 21 Securing nut |
| 19 Return spring | 22 Hand release bracket |

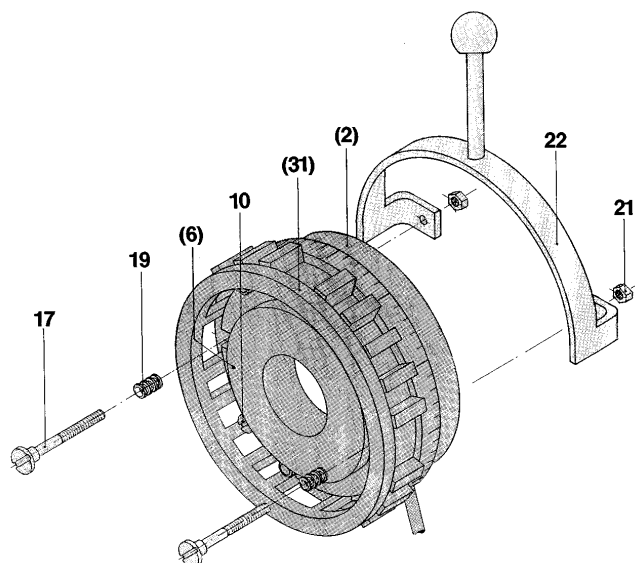


Fig. 3

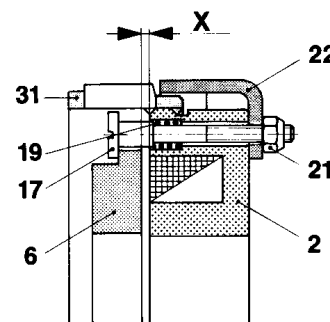


Fig. 4

Brake Inspection

The braking torque is only reached after the run-in procedure is completed. The braking torque (switching torque) is the effective torque as the brake slips in the shaft train at a sliding speed of 1 m/s referring to the middle friction radius (according to DIN VDE 0580/10.94).

Maintenance

ROBA-stop® brakes are mainly maintenance-free. The friction lining pairing is robust and wear-resistant to ensure the longest possible brake lifetime.

However, the gear hub (1), the peak load armature (6) and the rotor with its friction linings (35) are of course subject to wear and must be regularly inspected and replaced if necessary. For more information, see the paragraph „Replacement of Components Subject to Wear“.

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Terminal Box Installation

Baseplate (44) equipped with: (subject to choice)

- | | |
|--------------------|------------------------|
| 1. Terminal 2-pole | 4. Half-wave rectifier |
| 2. Terminal 4-pole | 5. Bridge rectifier |
| 3. Terminal 6-pole | |

Terminal Box Components List

- | | |
|--------------------------------|------------------------|
| 37 Holding bracket | 46 Terminal |
| 38 Cap screw M3 x 12 | 47 Terminal marking |
| 39 Terminal box, lower section | 48 Cap screw M2,5 x 12 |
| 40 O-ring | 49 Cap screw M4 x 8 |
| 41 Sealing plate | 50 Terminal box lid |
| 42 Hexagon nut M3 | 51 Sealing ring |
| 43 Cable gland | 52 Cap screw M4 x 30 |
| 44 Baseplate | 53 Sealing washer |
| 45 Countersunk screw M4 x 8 | |

Attachment

Components 37 to 43 in the Components List are preassembled.

- a) Screw the rectifier into the terminal box lower section (39) or
b) Screw the baseplate (44) into the terminal box lower section (39) using the countersunk screws (45). Attach the 2, 4 or 6-terminal terminals (46) with the cap screws (48) onto the baseplate (44).
Stick the terminal marking (47) onto the base plate (44).
(Observe the terminal marking position according to Fig. 5).
- Measure out a suitable length of brake coil cable and strip it. Insert the cable through the components 39, 40 and 41 in the terminal box.
- Screw the holding bracket (37) with cap screws (49) to the rear side of the brake.
- Pull the brake coil cable and tighten the hexagon nuts (42).
- Connect the brake according to the "Installation and Operational Instructions No. B.1110.4.GB for ROBA-stop® brakes / electrical connection".
- Close the terminal box. Be careful with the seal (51) and the seal washers (53).

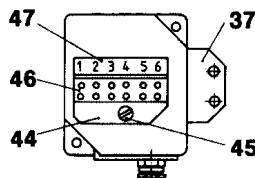


Fig. 5

Operational Malfunctions:

Malfunction	Possible Causes	Possible Solutions
Brake does not release	<input type="checkbox"/> Wrong rectifier voltage <input type="checkbox"/> Rectifier failure <input type="checkbox"/> Air gap too large (worn rotor) <input type="checkbox"/> Air gap too large (metal particles between the armature disc and the coil carrier) <input type="checkbox"/> Coil interruption <input type="checkbox"/> Excessive brake heat	<input type="checkbox"/> Apply correct voltage <input type="checkbox"/> Replace the rectifier <input type="checkbox"/> Renew the rotor <input type="checkbox"/> Clean the brake <input type="checkbox"/> Replace the brake <input type="checkbox"/> Use a fast-acting rectifier
Motor doesn't brake	<input type="checkbox"/> Wrongly adjusted hand release <input type="checkbox"/> Hand release backlash; (possible at reduced torque or during operation with a fast-acting rectifier)	<input type="checkbox"/> Coordinate the distance <input type="checkbox"/> Replace the rotor
Brake engages too late	<input type="checkbox"/> Brake is switched to A.C.-side.	<input type="checkbox"/> Switch to D.C.-side

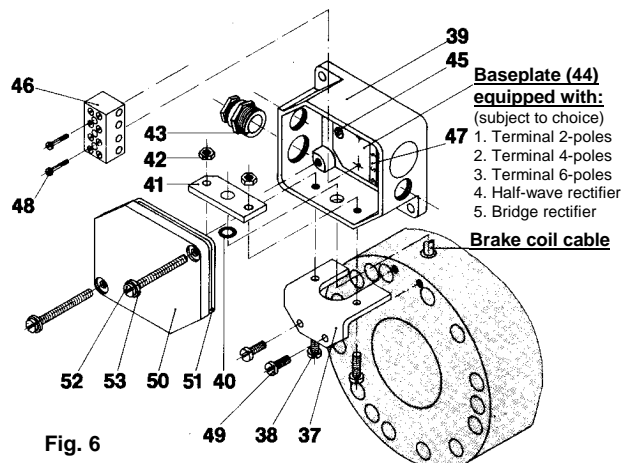


Fig. 6

Disposal

Electronic assembly elements

(Rectifier / ROBA®-switch / Micro switch):

Products which have not been dismantled can be disposed of under the Code Nr. 150106 (mixed materials) for material disposal or put in the household waste (Code No. 200301).

The assembly components of our electromagnetic brakes must be disposed of separately as they consist of different materials. Please observe the official regulations. Code numbers can change depending on how the components have been dismantled (metal, plastic and cable).

Brake bodies made out of steel girders with coil / cable and all steel components:

Steel scrap (Code No. 160117)

Aluminium distance rings:

Non-ferrous metals (Code No. 160118)

Brake rotor (Steel or aluminium girders with friction linings):

Brake linings (Code No. 160112)

Seals, O-rings, V-seals, elastomere, terminal boxes (PVC):

Plastics (Code No. 160119)