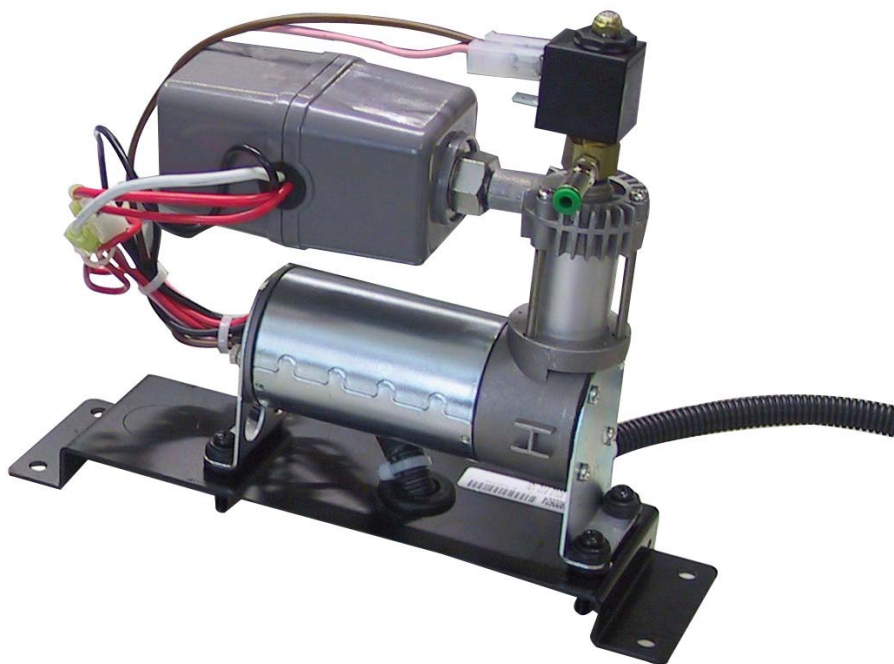


SYSTEM TO CONTROL PNEUMATIC PTO's AND TIP- PING VALVES

100-019

"AIR-PACK"



Rev:AL

Codice foglio:997-100-01906

Codice fascicolo:997-100-01910 Rev:AM

Data: Lunedì 12 luglio 2010

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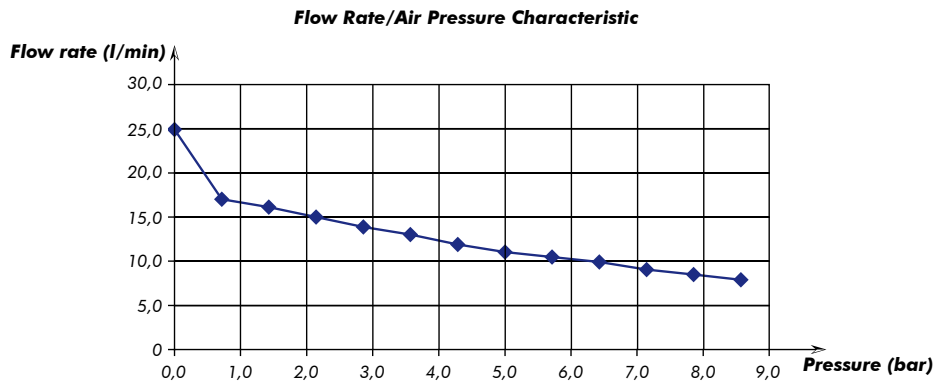
1. General comments

1.1 The AirPack pneumatic system

The AirPack pneumatic system developed by OMFB generates the compressed air needed to pneumatically engage power take-offs, as well as--in one of the **3 available versions**--the OMFB pneumatic tipping valve.

In this way it is possible to install pneumatic PTOs on any vehicle, leading to improved reliability of the overall system.

The heart of the AirPack system is a high-performance compressor as illustrated in the Flow Rate/Air Pressure characteristic graph shown below.



Examining the graph, and considering--as better specified in the technical specifications listed later in this manual--that the maximum and minimum opening and closing trip pressure of the pressure switch are $P_{min}=4.2$ bar and $P_{max}=5.8$ bar, it is clear that within this range of pressures **the compressor flow rate always remains greater than 10 l/min**. Another strong point of the compressor of the AirPack system compared to other systems available on the market, is **direct coupling of the transmission between the prime motor (150W direct current electric motor) and the compressor piston** and not a gear transmission, which presents the problem of stress breakage after a few thousand cycles, especially if the drive gear is plastic.

A significant contribution to system reliability also comes from the fact that the entire pneumatic circuit, to the air outlets (toward the PTO and pneumatic deflector), is a **monobloc**, thus with no fittings: this significantly reduces the likelihood of leaks within the compressor, compared to similar products available on the market.

AirPack has passed, both in our laboratories and in the field, the test of 100,000 cycles in normal ongoing operation, day and night, with 10-second cycles, and may therefore be considered a reliable system even for Heavy Duty applications.

1.2 Product Markings and certification

The **AirPack** pneumatic system complies with the essential requirements and other pertinent provisions set forth in European Directive 2006/28/EC and in ECE/ONU Regulation No 10 Addendum 2, relating to "Suppression of radio interference (Electromagnetic Compatibility) produced by spark-ignition engines fitted to motor vehicles".

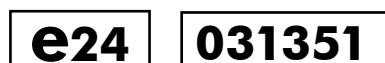
Concerning to **Electromagnetic Compatibility 2006/28/EC** is the reference directive for every electrical/electronic system included in road vehicles because it constitutes a "specific directive" for the purposes of Article 2, par. 2, of Council Directive 89/336/EC, effective beginning 1 January 1996.

The provisions of 2006/28/EC must be satisfied, concerning Electromagnetic Compatibility, by all vehicles as defined in Directive **70/156/EC** relating to the **type-approval of motor vehicles and their trailers**, as amended by 98/14/EC, as well as their **components or separate technical units** that are exempt from the compliance with the rules of 89/336/EC.

Conformity tests prescribed by Directive 2006/28/CE and ECE/ONU Reg. No 10 Add. 2 were carried out at the laboratory **PRIMA RICERCA & SVILUPPO** (via Campagna, 58 - 22020 Gaggino Faloppio (CO)).

Compliance of **Air-pack** pneumatic system with Dir. 2006/28/EC requirements is certified by the Notified Body NSAI (National Standards Authority of Ireland-Glasnevin, Dublin 9, Ireland (+353-1-80703910)) by releasing the approval number for the product marking:
e24*72/245*2006/28*1351.

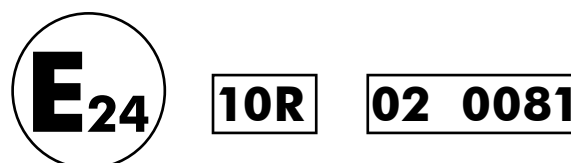
Compliance is shown by product marking:



Compliance of **Air-pack** pneumatic system with the ECE/ONU Reg. No 10 Add. 2 requirements is certified by the Notified Body NSAI (National Standards Authority of Ireland-Glasnevin, Dublin 9, Ireland (+353-1-80703910)) by releasing the approval number for the product marking:

E24 10R-020081.

Compliance is shown by product marking:



2. Ordering codes and spare parts

2.1 Ordering codes

The AirPack system is available in the following versions:

STANDARD:

- **100.019.00604** to control only the PTO 12V
- **100.019.00622** to control the PTO and electric tipping valve 12V
- **100.019.00631** to control the PTO and pneumatic tipping valve 12V
- **100.019.00659** to control only the PTO 24V
- **100.019.00668** to control the PTO and electric tipping valve 24V
- **100.019.00677** to control the PTO and pneumatic tipping valve 24V

SPECIAL:

- **100.019.00686** Air-Pack solo PTO 24V isuzu smoother
- **100.019.00695** Air-Pack PTO + FP 40 24V isuzu smoother
- **100.019.90106** Air-Pack solo PTO 12V refuse vehicles
- **100.019.90204** Air-Pack solo PTO 24V refuse vehicles

3. Technical specifications

3.1 AirPack system specifications

The table below shows the basic technical specifications of the AirPack pneumatic system for **Minimum**, **Typical**, and **Maximum** values.

Specification	U.M.	Min	Typ	Max
Flow rate with air pressure of 5 bar	dm ³ /min	10	11	12
Displacement	cm ³ /rev	5,5		
Motor speed at 5.8 bar	rpm	2300		
Maximum running pressure	bar	9		
Pressure switch trip pressure	bar	5	-	6,2
Noise level (at a distance of 1 meter)		65	68	70
Supply voltage	V	12		
Absorbed current	A	8	9	10
Average time to reach 5.8 bar	s	0,4	0,55	0,7
Mean engage time	s	0,3	0,4	0,5
Overall dimensions	mm	260x75x240		
Weight	kg	2,65		

Performance and given values are meant to be valid and guaranteed only if the product is used together with the P.T.O. OMFB IPN9.

Pay special attention to the 2 items that make the AirPack system ideal for use in controlling the power take-off and any pneumatic tipping valve that may be present: the **high flow rate**, with a typical value of 11 liters per minute, and the resulting **very short mean engage time** and to reach 5.8 bar.

Another significant aspects is the fact that the pressure switch with which the AirPack system is equipped has a dual trip pressure, with a broad hysteresis ranging from the minimum pressure of 4.2 bar to the maximum pressure of 5.8 bar.

In each case, even if there are leaks in the PTO air circuit, the compressor re-starts when the pressure falls below 4.2 bar and not before: this pressure is in any case sufficient to keep the power take-off engaged, with a high safety margin.

This avoids the risks of "jerky" operation in case of small leaks, a problem that tends to occur with the pressure switches of other similar systems available on the market.

3.2 Operating conditions

The table below summarizes the environmental working conditions for the AirPack system and admissible work cycles.

Specification	U.M.	Min	Typ	Max
Temperature	°C	-25	-	90
Relative humidity	-	-	60%	-
Continuous operating time	s	60		
Duty Cycle	-		10%	
Maximum cycle repeat time	s	Unlimited in observance of the Duty Cycle		

The operating times bear further explanation:

- The maximum consecutive operating time refers to the maximum consecutive time for which the compressor may continue to emit compressed air with the downstream system under pressure;
- Duty Cycle refers to the ratio between the time for which the compressor emits air and the time for which the compressor is stopped. In particular, a Duty Cycle of 10% means that when the compressor has a running time of approximately 0.7 seconds (time necessary to reach 5.8 bar and then shut off the compressor itself), it is necessary and sufficient that the compressor stop for approximately 7 seconds before beginning a new cycle;
- Finally, stating that the maximum cycle repeat time is unlimited in observance of the Duty Cycle means that if the working cycle observes the minimum ratio between the time the compressor emits air and the stop time, the cycles may be repeated continuously day and night without interruption.

The last point described is one of the essential features of the AirPack pneumatic system, thus the fact that all available configurations **are suitable for Heavy Duty applications, such as for example waste collection systems, which require work cycles in rapid sequence and continuing over up to 3 work shifts, 24 hours a day.**

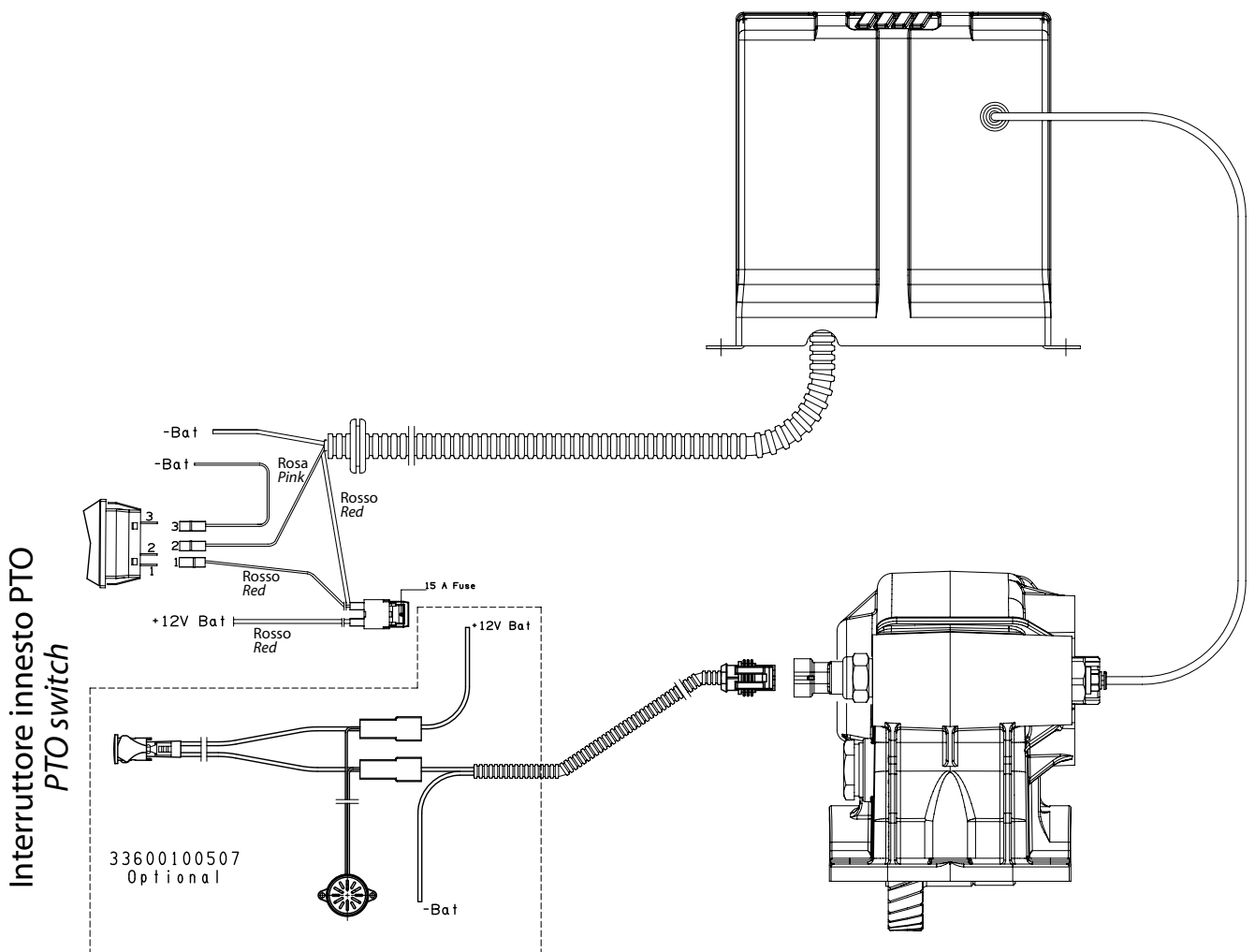
4. Available configurations and operation

4.1 PTO only

In this configuration the AirPack system is equipped with a single output to control the engagement of the vehicle's power take-off.

The kit is made up of the following components:

- Air-Pack
- Electrical wiring to connect the AirPack to the cab control
- PTO engage switch
- Power supply fuse
- PTO engaged signal wire, from the indicator installed as standard on the power take-off to which to connect any buzzer and/or lighted engaged indicator.



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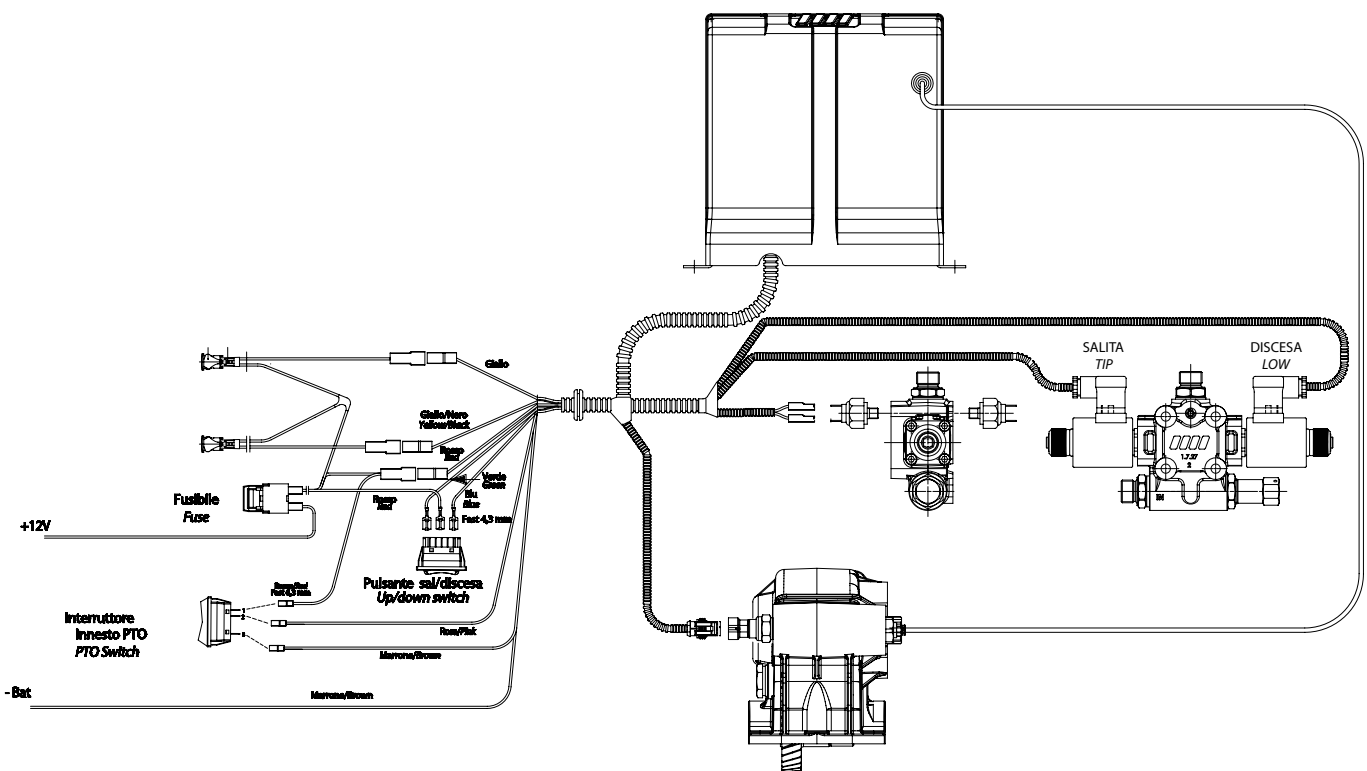
4.2 PTO+electric tipping valve

In this configuration the AirPack system is equipped with a single air outlet to control engagement of the vehicle's power take-off, and two electrical outputs (solenoid valve connectors) to control the OMFB FE 40 electric tipping valve.

The AirPack system in this configuration also includes the 95 dB buzzer to indicate the pressure present in the system oil circuit: in particular, if the application is on a tipper truck, the buzzer signals the bin raised status as required by current regulations.

The kit is made up of the following components:

- AirPack (with built-in pre-connected buzzer)
- Electrical wiring to connect the AirPack to the cab control, valve FE 40 (solenoid valve connectors and connector for hydraulic circuit pressure switch), and power take-off (connector for the engage signal present on the standard PTO)
- PTO engage switch
- Unstable switch to control the electrical tipping valve
- Power supply fuse



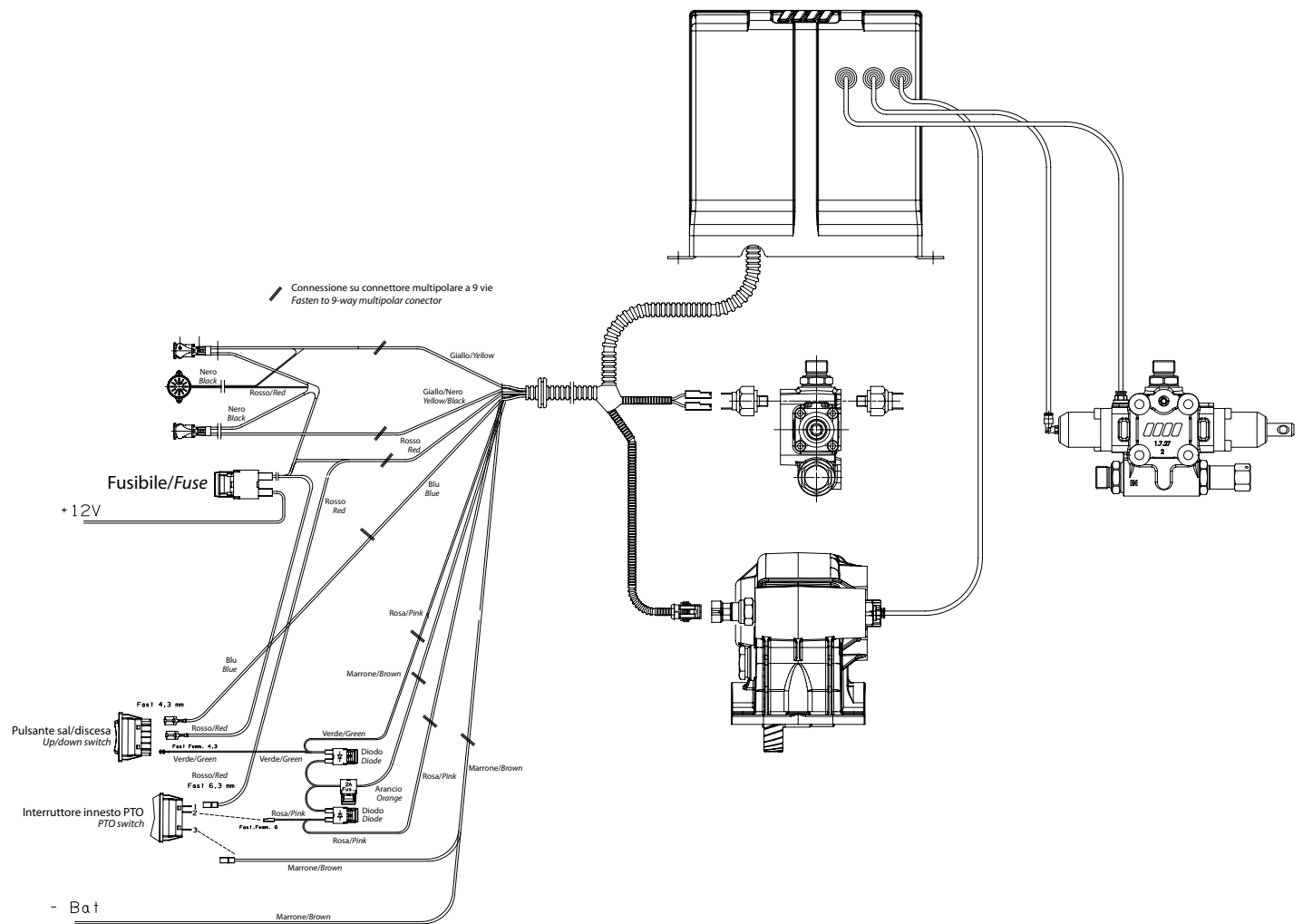
4.3 PTO+pneumatic tipping valve

In this configuration the AirPack system is equipped with three air outlets to engage the power take-off of the vehicle and OMFB FP 40 pneumatic tipping valve.

The AirPack system in this configuration also includes the 95 dB buzzer to indicate the pressure present in the system oil circuit: in particular, if the application is on a tipper truck, the buzzer signals the body raised status as required by current regulations.

The kit is made up of the following components:

- AirPack (with built-in pre-connected buzzer)
- Electrical wiring to connect AirPack to the cab control, FP 40 valve (hydraulic circuit pressure switch connector), and power take-off (connector for the engage signal on the standard PTO)
- PTO engage switch
- Unstable switch to control the electrical tipping valve
- Power supply fuse

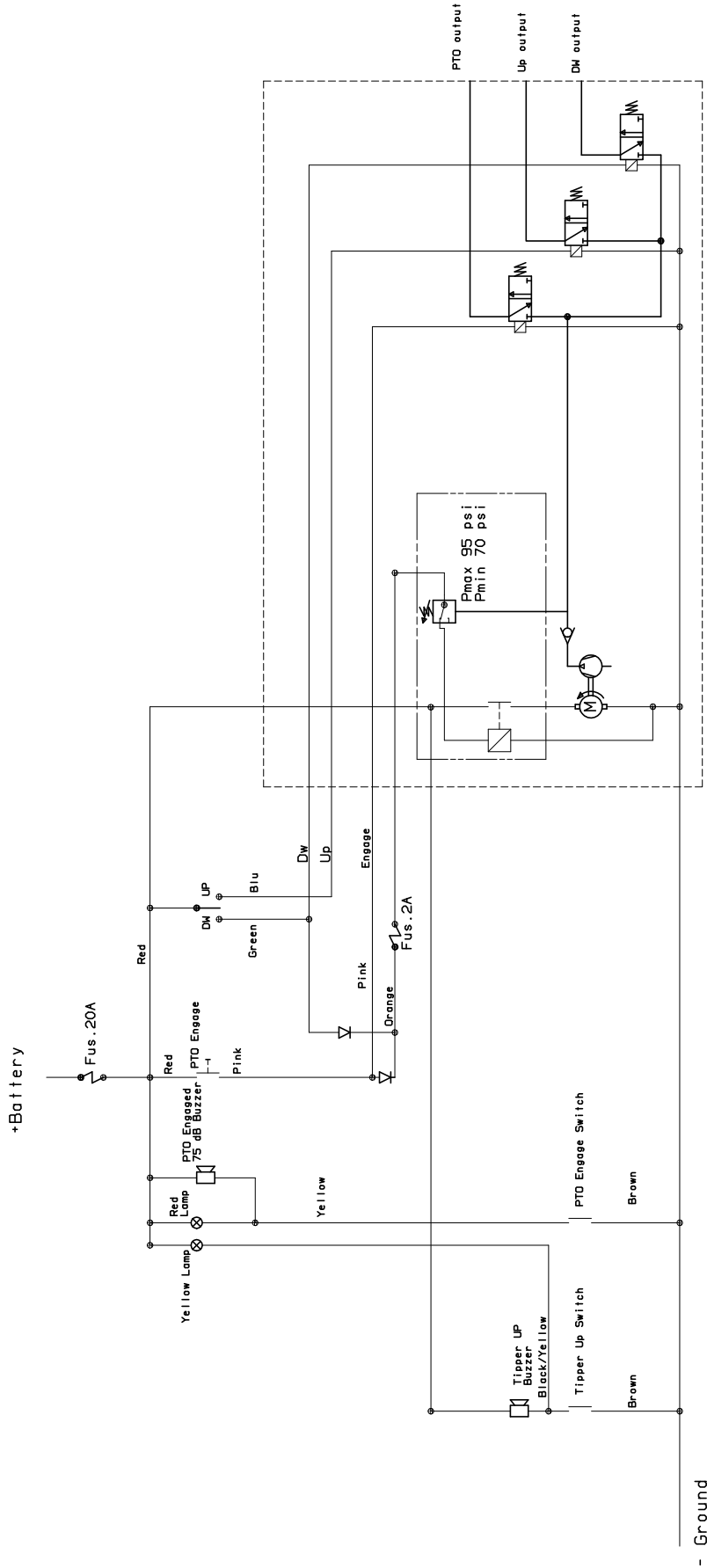


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Complete wiring kit pneumatic tipping valve FP 40



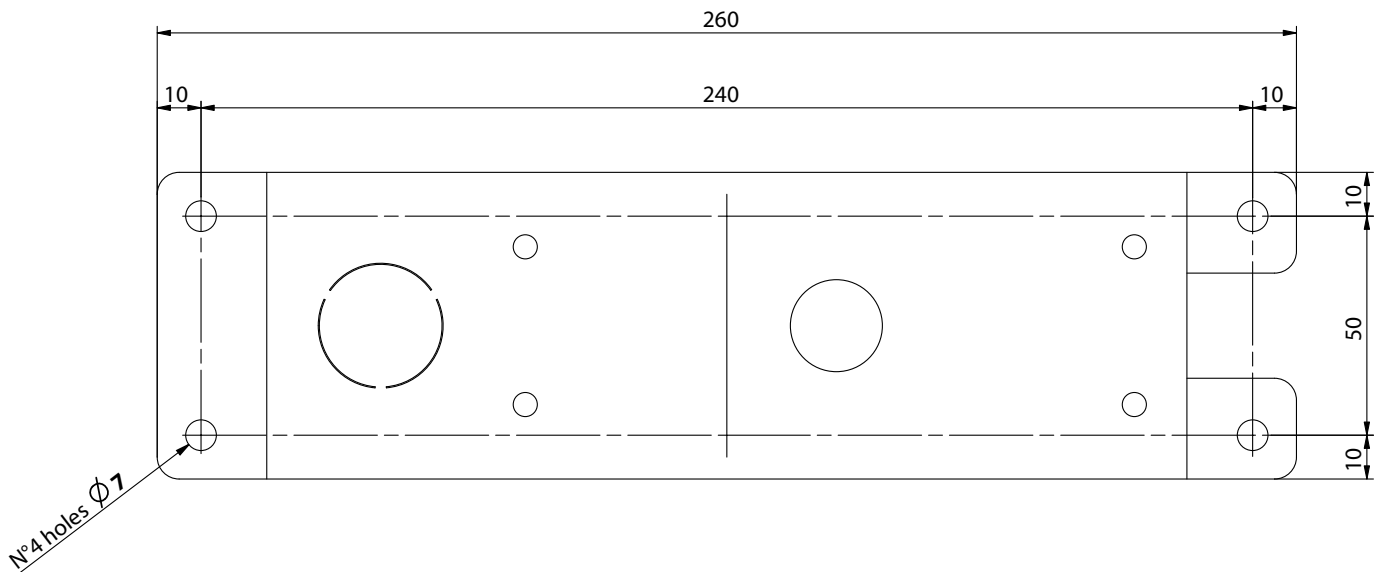
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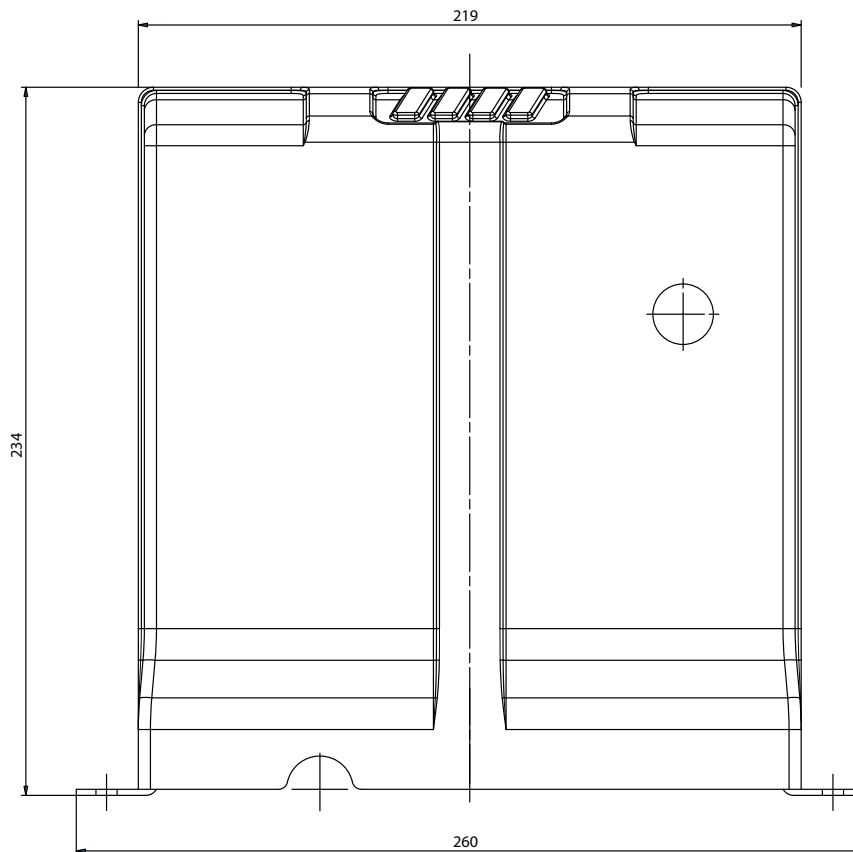
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5. Installing the Air-Pack system

5.1 Overall flat dimensions and drilling for fastening



5.2 Overall front panel dimensions



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5.3 AirPack Installation

As the AirPack system is made up of fully airtight components, the only limitation is against full immersion in water.

The AirPack system may be placed anywhere in the vehicle within reach of the wires.

For the electrical connection of the AirPack system, follow the wiring instructions enclosed with the product, remembering in particular that the main power supply must be drawn from a positive locked phase of the vehicle.

Regarding applications in which the PTO must remain engaged even with the vehicle off, such as for example overhead platforms, we recommend taking the positive phase directly from the vehicle battery.

It should be emphasized that configurations with electric or pneumatic valves control already include the buzzer inside the AirPack, located on the base bracket of the system itself: thus in the configurations with valve control, only the connectors of the pressure switch and the engage signal connector on the PTO must be connected to the valve itself.

The system also already includes everything necessary to connect the pneumatic circuit. In particular, the quick outlet fitting for the AirPack is already mounted, as well as the quick fittings on the PTO and pneumatic deflector.

The standard system is designed to connect a 4x2 air hose. However, it is also possible to use a 6x4 hose, merely keeping in mind that the PTO engage time is slowed by approximately 2-3 tenths of a second.

The correct installation of the Air-Pack system on the vehicle must be guaranteed by checking the sealing of the pneumatic circuit as described at par.6 "Ordinary Maintenance".

6. Regular maintenance

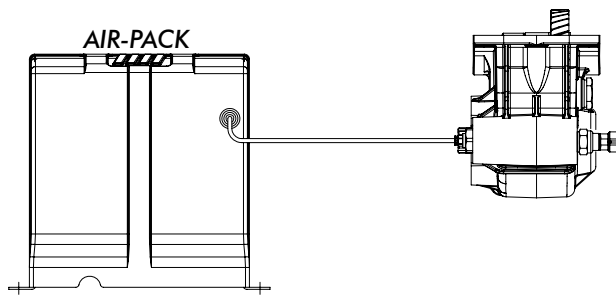
The AIR-PACK system and its components do not require regular maintenance or precautionary replacements as long as they are used on the proper applications by following the instructions reported in the Instruction Manual. The only necessary operation is to verify the sealing of the pneumatic circuit **after 1 year of vehicle's life or 500 hours of PTO's working.**

• **Necessary material:**

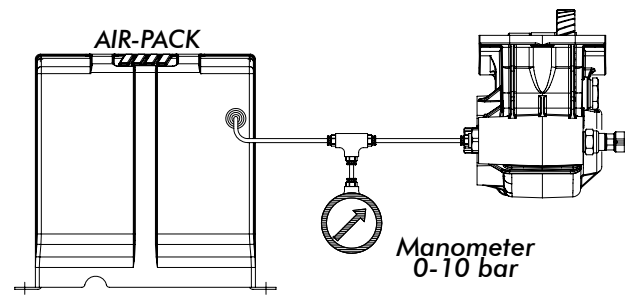
- 1 pc of 0-10 bar manometer with a minimum resolution of 0,5 bar
- 1 pc of "T" air fitting for 4mm pipes
- 2 section of 1m air pipe having a diameter of 4mm

• **Instructions:**

Connect the components for the testing as shown in the picture:



ORIGINAL CONFIGURATION







TEST CONFIGURATION

- Start the truck's engine and engage the PTO;
- Read on the manometer the value of pressure reached by the pneumatic circuit. After 20-30 seconds this value must be stabilizing at a fixed value higher than 6 bar. Leave the engine running and the PTO engaged, then after 5 minutes read again the manometer. According to the shown value, act as follows:
 - the pressure value has not varied : the system is in perfect conditions, disconnect the manometer and restore the original AIR-PACK conditions;
 - the pressure value is higher than 5.2 bar but lower than the initial value : in the system there is a small air leakage that belongs to the admitted range by the AIR PACK. However, it is necessary to act as soon as possible for eliminating the air leakage.
 - the pressure is lower than 5.2 bar: it is absolutely necessary to check the whole engaging system in order to eliminate the problem.

• **Identification and elimination of the air leakage**

- Disconnect the "T" air fitting;
- Connect the manometer directly on the air pipe coming from the AIR-PACK;
- Start the truck's engine and engage the PTO;
- Wait until the pressure value is positioned at a value and read the manometer after 30 seconds;
- Keep the PTO engaged and after 5 minutes read the manometer again. According to the shown value, act as follows:
 - the pressure value does not vary: the compressor is in perfect conditions. The air leaking is caused either by the pipe connecting Compressor and PTO or by the air fitting mounted on the PTO or by the engaging cylinder;
 - the pressure value is lower than the initial value: the air leakage is caused only by the compressor.

7. Accessoires

DESCRIPTION	CODE	PICTURE
Clutch sensor kit for Air-Pack	306.007.00228	
Air-Pack bracket for vertical mounting	100.019.10004	
Control box for DAILY 2002	321.001.00133	
Universal control box	321.065.00119	

 **ATTENTION PTO ENGAGED SWITCH USE: OMFB Hydraulic Components spa is not responsible for damage or problems due to a use of the PTO Switch that differs from the simple lighting of the cabin PTO Engaged LED.**