



X



PB 50, PB1 50 (12-24V), PB 60, PB1 60 (12-24V), PB 85, PB1 85 (12-24V)

ITALIANO
(lingua originale)

IT

ENGLISH
(translation of original instructions)

EN



USE AND MAINTENANCE MANUAL

Machine: DIESEL FUEL PUMP
Models: PB 50, PB1 50 (12-24V), PB 60, PB1 60 (12-24V),
 PB 85, PB1 85 (12-24V)



the use and maintenance manual must be carefully stored near the machine in an environment protected against humidity and heat. The manual must accompany the machine if sold. It is prohibited to damage, modify or remove any part of the manual.

EC DECLARATION OF CONFORMITY





(Annex II A DIR. 2006/42/EC)

THE MANUFACTURER

ADAM PUMPS S.p.A., with its registered office in Via della Resistenza, 46/48, 41011, Campogalliano (MO), ITALY; represented by Davide Stassi, authorised to compile the relevant technical file at the undersigned premises,

DECLARES THAT THE MACHINE

Used as a diesel fuel pump to be integrated into a system for transferring fuel from a gravity tank.

 ADAM PUMPS Spa Via della Resistenza 48 41011 Campogalliano Modena Italy		   2016 JAN
Batch of	_____	
Model	Code : PB0852000	
Description	PUMP PB 12V-85	
Technical specifications	12 Volt - 440W - 36 A - 2600 rpm	
Weight	Weight Kg.: 7.5	

COMPLIES WITH DIRECTIVES

Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC.

Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits.

Applicable only for AC powered products.

Place and date of the document

Campogalliano, January 14, 2020

The legal representative

Davide Stassi

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1 - GENERAL WARNINGS

! IMPORTANT: It is essential to have understood the entire instruction manual before performing any operation, so as to safeguard operator safety and to avoid potential product damage.

Storing the manual:

This manual must be kept intact and fully legible. The end user and the skilled technicians authorised with installation and maintenance of the product in question must be able to consult it at all times.

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2 - MACHINE SPECIFICATIONS

2.1 - Intended use

The pumps described in this manual, once you have unpacked and inserted them in a pumping system, are machines that can fill a receiving tank with diesel fuel sucked from a gravity storage tank.

2.2 - Description of the machine

The pump is made up of the following parts:

PUMP: volumetric self-priming rotary vane electric pump fitted with a bypass valve.

MOTOR: brushed DC motor, closed (protection class IP55 in compliance with Standard EN60034-5-86), directly flanged to the pump body.

FILTER: stainless steel basket filter, can be inspected.

2.3 - Technical specifications

PUMP MODEL	Power supply	Maximum current [Amp] (*)	Rated power [Watt] (*)	(**) Work cycle [min]	Max flow rate [l/min]	Input/Output [BSP-G]:	Noise [dBA] (***)	Fuse (A):
PB 50 12 V	12V DC	28	216	(S2) 30 min	50	1" - 1"	80	30
PB1 50 12V	12V DC	28	216	(S2) 30 min	50	1" - 1"	80	30
PB 50 24 V	24V DC	13	216	(S2) 30 min	50	1" - 1"	80	15
PB1 50 24 V	24V DC	13	216	(S2) 30 min	50	1" - 1"	80	15
PB 60 12 V	12V DC	40	312	(S2) 30 min	60	1" - 1"	75	40
PB1 60 12 V	12V DC	40	312	(S2) 30 min	60	1" - 1"	75	40
PB 60 24 V	24V DC	33.7	408	(S2) 30 min	60	1" - 1"	75	40
PB1 60 24 V	24V DC	33.7	408	(S2) 30 min	60	1" - 1"	75	40
PB 85 12 V	12V DC	40	480	(S2) 30 min	85	1" - 1"	< 70	40
PB1 85 12 V	12V DC	40	480	(S2) 30 min	85	1" - 1"	< 70	40
PB 85 24 V	24V DC	32	768	(S2) 30 min	93	1" - 1"	74	40
PB1 85 24 V	24V DC	32	768	(S2) 30 min	93	1" - 1"	74	40

(*) The values refer to operation of the pump in bypass (maximum performance)

(**) CAUTION! Operation in bypass is allowed only for brief periods (1-2 minutes at most)

(***) The noise levels are measured at a distance of 1 metre from the electric pump in normal operating conditions.

In order to maximise performance, pressure losses have to be minimised in the pump suction line as follows:

- shorten the suction pipe as much as possible
- avoid, if possible, installing elbow fittings and/or throttling in the hydraulic circuit
- use a pipe with the same diameter or a diameter larger than the minimum specified in chapter 3 - INSTALLATION
- always keep the filter inside the pump clean and regularly inspected

3 - OPERATING CONDITIONS

3.1 Environmental conditions

Temperature: min. -20°C / max. +60°C (*)

Relative humidity: max. 90%

(*) *Caution! The temperature limits shown refer to the components making up the pump and should be respected to prevent any damages or malfunctions from occurring.*

3.2 - Power supply

Depending on the model, the pump must be powered by the single-phase AC line or by the DC line whose values are given in the table in section 1.3 - Technical specifications.

Powering the pump with values outside these limits can damage the electrical components or cause them to malfunction.

The maximum power supply variations allowed are: **Voltage +/- 15% of the nominal value**

3.3 - Allowed fluids / forbidden fluids

Allowed

DIESEL FUEL with 2 to 5.5 cSt viscosity (at 38°C).
Minimum flash point (MF): 55 °C

Forbidden

PETROL
SOLVENTS
FOOD LIQUIDS

FLAMMABLE LIQUIDS (MF <55°C)
LIQUIDS WITH > 20 cSt VISCOSITY
CORROSIVE CHEMICALS

4 - TRANSPORT AND HANDLING

4.1 - Transport

The weight and dimensions of the pump allow it to be easily transported by hand. The pump does not require lifting equipment to move it.

! CAUTION! *the manufacturer shall not be held liable for harm to people or animals or damage to property resulting from use of lifting systems other than those specified.*

Upon receipt, make sure the packaging is intact and in good condition. Any damage must be reported immediately.

4.2 - Unpacking

Unpack the product as follows:

1. Place the box on the floor in the direction drawn on the packaging
2. Carefully open the box, remove the pump and place it on the floor or on a stable surface
3. After ensuring that the pump and any accessories are intact, remove the two plugs and install it as described in the next chapter (4 - INSTALLATION).

4.3 - Storage

Prior to its use, the pump, still in its original packaging, should be stored in a dry and protected place in an environment with the conditions described in Section 2.1 - Environmental conditions. Failure to follow these instructions may affect proper operation of the pump

5 - INSTALLATION

5.1 - Preliminary checks and positioning the pump

Make sure the pump has not been damaged while being transported or stored.

Remove any remaining packaging material from the product (e.g. protective caps) and carefully clean the suction and discharge outlets.

Install the pump in any position (pump axis either horizontal or vertical), in a place sheltered from rain and weather events.

Position and fix the pump with screws that are suitably sized for the holes on the motor flange. The best performance in terms of noise and vibration reduction is achieved by placing 4 vibration dampers of suitable height between the pump and the base.

For the centre distances of the holes, see section 7.1 - Overall dimensions and weights.

! CAUTION! *The motors are not explosion-proof. They must not be installed in areas with flammable vapours or open flames.*

5.2 - Hydraulic pipe connection

Before connecting the pump, make sure the tank, fittings and pipes used are clean and free from waste or processing residues. Before connecting the discharge pipe to the pump, we recommend partially filling the pump body with diesel fuel to lubricate and facilitate the priming procedure.

! CAUTION! *Do not use couplings or connection fittings with conical threading, as these could damage the pump coupling outlets if tightened too much.*

We recommend using ADAM PUMPS suction and discharge pipes, which are designed specifically for the pump in use; alternatively, respect the dimensions and specifications in the table below.

	PB 50 12 V, PB 50 24 V, PB1 50 12 V, PB1 50 24 V, PB 60 12 V, PB 60 24 V, PB1 60 12 V, PB 1 60 24 V		PB 85 12 V, PB 85 24 V, PB1 85 12 V, PB1 85 24 V	
	Suction	Discharge	Suction	Discharge
Pump inlet connection thread	1" G - BSP	1" G - BSP	1" G - BSP	1" G - BSP
Recommended minimum internal diameters	ø25 mm	ø19 mm	ø25 mm	ø25 mm
Recommended rated pressure	10 Bar	10 Bar	10 Bar	10 Bar
Pipe suitable for operation under negative pressure	•		•	

5.3 - Remarks on the suction lines

SUCTION LINE

The electric pumps in this manual are self-priming and can draw the liquid from a maximum height of 2 metres. Caution, proper priming and the time required for this can be affected by an automatic nozzle on the discharge line, which prevents normal air extraction from the pipe. It is therefore always advisable to prime the pump for the first time without the automatic nozzle and with the discharge pipe emptied from the liquid. To facilitate the subsequent start-up operations of the pump so that they are immediate, it is always recommended to install a foot valve to prevent the suction pipe from emptying and to keep the pump wet. When the system is in operation, the pump can work with negative pressure at the suction inlet up to 0.5 Bar, after which cavitation phenomena can start with consequent reduction of the flow rate and increase in noise. To prevent this phenomenon from occurring it is important to ensure low suction negative pressure, by using short pipes or pipes with a diameter larger than or the same as those recommended, minimising bends and using large section suction filters and foot valves with the least resistance possible. Moreover, it is very important to keep all suction filters clean to prevent the system resistance from increasing when they are clogged.

DISCHARGE LINE

The electric pump must be chosen based on the system's specifications. Incorrect combinations of the length of the pipe, of its diameter, of the flow rate of the diesel fuel and/or of the accessories installed on the line, can create a counterpressure on the discharge line that is higher than the maximum set and so cause the pump bypass to open (partially) with consequent reduction in the flow rate dispensed. To prevent this from happening and allow the pump to work properly, the system resistance has to be reduced using pipes that are shorter and/or with a larger diameter and line accessories with less resistance (e.g. an automatic nozzle for greater flow rates).

5.4 - Electrical connection of the pump

PB 85 12 V - 24 V PB 60 12 V - 24 V PB 50 12 V - 24 V	PB pumps are supplied without service switch, safety fuse, 4 m cable and crocodile clips for connection to the battery. The fuse specifications are indicated for each model and in the technical specifications section (Chap. 2.3).
PB1 85 12 V - 24 V PB1 60 12 V - 24 V PB1 50 12 V - 24 V	PB1 pumps are supplied with service switch, safety fuse, 4 m cable and crocodile clips for connection to the battery. The fuse specifications are indicated for each model on its body and in the technical specifications section (Chap. 2.3).

For proper installation and electrical maintenance of the system, please follow these instructions:

- make sure the power lines are not live when installing or carrying out maintenance operations on the system
- use cables with minimum section, rated voltages and type of installation suitable for the system's specifications
- always use a fuse that is suitable to the current required by the pump

⚠ CAUTION! *The pumps are provided without safety devices such as fuses (only for the PB 85 model), motor protectors, systems against accidental restart after a power failure. The switch, if any, will only start/stop the pump. It is therefore the direct responsibility of the installer to connect the pump to the power source in compliance with the regulations in force in the country of use.*

6 - INTENDED USE

6.1 - Preliminary checks and start-up

After ensuring there is diesel fuel in the suction tank, that all pipes and components on the hydraulic line are in good condition and properly sealed, and the nozzle is closed, the pump can be started.

After inserting the nozzle into the filling hole, switch the pump on, gradually release the nozzle lever and start transferring the diesel fuel. When you have finished filling, close the nozzle and switch the pump off. If you are using an automatic nozzle, it will automatically close as soon as you have finished filling.

⚠ WARNINGS! *Never leave the filling position to prevent accidental diesel fuel spillage. Do not start the pump before having connected the suction and discharge pipes. Do not start or stop the pump by connecting or disconnecting any crocodile clips to the battery. Do not touch any switches with wet hands. Avoid direct contact of the diesel fuel with skin or eyes as it may cause harm. Use of goggles and gloves is recommended. In the event of a power failure, remember to switch the pump off and unplug it before restoring it. Work cycles that are continuous or in extreme conditions for the pump can cause the motor temperature to rise and its subsequent shutdown by the circuit breaker. Switch the pump off and wait for it to cool down before resuming work. The circuit breaker automatically switches off when the motor has cooled sufficiently.*

⚠ CAUTION! *During the first priming phase, the pump must be able to discharge the air, initially present in the suction pipe and in the pump, from the discharge line. To facilitate this procedure, make sure the nozzle or the discharge outlet is kept open. If an automatic nozzle is installed on the discharge line, it is recommended to temporarily disassemble the nozzle to facilitate pump suction during first start-up.*

6.2 - Daily use

- If hoses are used, make sure the ends are properly connected to the tanks. Firmly hold the end of the discharge pipe to prevent accidental spillage.
- Before starting the pump, make sure the discharge valve or the nozzle is closed.
- When you are ready, switch the pump on. The pump can remain in bypass (internal circulation if the discharge is closed) only for brief periods.
- With the pump on and in bypass, open the discharge valve or nozzle holding it firmly.
- When you have finished dispensing, close the valve or nozzle and switch the pump off.

! CAUTION! Operation of the pump with discharge closed is allowed only for brief periods (max 1-2 minutes).

Make sure the pump is switched off after use.

If there is a power failure:

1. Close the discharge valve or nozzle
2. Put the end of the discharge pipe into its housing on the tank
3. Switch the pump OFF

When the power has returned, restart the pump as described at the beginning of the section.

6.3 - Noise level

Under normal operating conditions the noise emitted by all models does not exceed 80 dB at a distance of 1 metre from the electric pump.

6.4 - Compatibility in an electromagnetic environment

The machine is designed to operate correctly in an industrial electromagnetic environment, and staying within the Emission and Immunity limits laid down in the following Harmonised Standards:

- IEC EN 61000-6-2** Electromagnetic compatibility (EMC) - Generic standards – Immunity for industrial environments
IEC EN 61000-6-4 Electromagnetic compatibility (EMC) - Generic standards – Emission standard for industrial environments

7 - TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
THE PUMP DOES NOT START UP	Power failure	Check the electrical connections and the safety devices
	The circuit breaker has tripped	Use the electric pump in the recommended operating conditions and according to its intended use (chap. 2 - chap. 5)
	Impeller blocked	Make sure there are no obstructions in the pump body or along the suction and discharge lines
	Defective motor	Contact the dealer (fault code M1)
PUMP IS VERY NOISY	Cavitation	Reduce the negative suction pressure Make sure there are no leaks or restrictions on the suction part (recommended pipes chap. 5.2)
	Air in the hydraulic circuit	Make sure there are no suction leaks
		Dispense to bleed the air from the circuit
LIQUID LEAK	Clamps loosened	Make sure all clamps are properly tightened
	Gaskets worn	Replace the worn gaskets
	Non-compatible liquids used	Check compatibility of the fluid used (chap. 3.3)
	Shaft seal ring dirty or damaged	Contact the dealer (fault code A1)

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
LOW OR NO FLOW RATE	Low level of liquid in the tank	Fill the tank
	Filter dirty or clogged	Clean or replace the filter
	Foot valve dirty or clogged	Clean or replace the foot valve
	Pipe or dispensing nozzle damaged	Replace the damaged components
	Excessive negative pressure to the suction line	Make sure there are no leaks or restrictions on the suction part (recommended pipes chap. 5.2)
	High pressure drops in the circuit	Change the hydraulic discharge configuration
	Bypass valve open or blocked	Check the condition of the valve and clean or replace it if necessary
	Vanes blocked	Check and clean the vanes and their housings
	Excessive wear of the vanes or impeller	Replace the worn components
	Leaks from the gaskets	Make sure the gaskets are properly tightened and not worn
	Incorrect power supply voltage	Power the pump as specified on the rating plate
	Defective motor	Contact the dealer (fault code M2)

8 - MAINTENANCE

Maintenance includes inspections, checks and interventions which, to prevent interruptions and breakdowns, systematically keep the machine lubrication status and the parts subject to wear under control. These operations, although simple, must be carried out by Qualified Personnel. The machine is designed to minimise routine maintenance. It is the operator's responsibility to assess the status and its suitability for use. We recommend stopping the operations and performing maintenance every time operation is not perfect. This will always allow maximum efficiency.

⚠ CAUTION! Make sure the pump is disconnected from the power supply and is not in operation before carrying out any maintenance.

Always use the appropriate PPE (Personal Protective Equipment):



Safety footwear



Protective clothing




Protective gloves



Safety goggles

⚠ WARNING! Failure to comply with these requirements will release the manufacturer from any liability resulting from the effects of the Warranty.

MAINTENANCE	FREQUENCY	MACHINE STATUS	SYMBOL
Make sure the pipes and couplings are properly connected	Every month	Isolation for Maintenance purposes	
Check/clean pipes and fittings	Every 12 months	Isolation for Maintenance purposes	
Check/clean filter and fittings	Every month	Isolation for Maintenance purposes	
Check/clean pump body	Every month	Isolation for Maintenance purposes	

9 - DEMOLITION AND DISPOSAL

If the electric pump is to be scrapped, its parts are to be given to companies specialised in disposing of and recycling industrial waste, as shown on the table below:

PARTS TO BE DISPOSED OF	DISPOSAL METHOD
PACKAGING	The packaging consists of biodegradable cardboard which can be sent to companies for normal pulp recycling.
METAL PARTS	The metal parts, whether painted or stainless steel, are usually recycled by companies specialised in the scrap metal industry.
ELECTRICAL AND ELECTRONIC COMPONENTS	These must be disposed of by companies specialised in disposing of electronic components, in compliance with the requirements of Directive 2002/96/EC (see Directive text below).
PARTS OF A DIFFERENT NATURE	Other parts of the system in which the electric pump is installed, such as pipes, rubber gaskets, plastic parts and wiring, are to be given to companies specialised in disposing of industrial waste.
APPLICABLE REGULATIONS FOR CUSTOMERS IN THE EUROPEAN UNION	The European Directive 2002/96/EC states that the equipment bearing this symbol on the product and/or on the packaging is not to be disposed of with unsorted municipal waste. The symbol indicates that this product must not be disposed of with normal household waste. It is the responsibility of the owner to dispose of these products and the other electrical and electronic equipment through specific collection facilities appointed by the government or by local authorities.



10 - WARRANTY

The warranty provided by the manufacturer Adam Pumps Spa covers the product for 2 years from the date of production.

Adam Pumps Spa (manufacturer) provides its customers with:

a warranty that covers problems resulting from production and conformity defects in the purchased products

the warranty period starts from the date indicated on the CE label which indicates the date of manufacture. A label indicating the date of manufacture will be applied to those products which are not provided with a CE label. Therefore, the warranty period will start from that date; the warranty will become immediately null and void should the data of manufacture be illegible, for any reason, unless Adam Pumps Spa is responsible for this;

the warranty covers repairs or replacement of the product, in the event it cannot be repaired repair operations can be carried out only by Adam Pumps or by Adam Pumps' authorised centres;

the warranty will not be valid in the event the product is tampered with by unauthorised persons, bodies, and/or companies;

any warranty request is subject to approval by Adam Pumps. The goods can be returned only if provided with an authorisation code. Upon

request, Adam Pumps will provide this code which will invoke the warranty for the product to be repaired or replaced unless otherwise agreed with Adam Pumps, the returned goods must be sent via transport pre-paid by who has invoked the warranty to Adam Pumps Spa;

goods returned without authorisation and/or with transport not paid can be rejected;

The warranty will not be applied in the following cases

Failure to use or install the product according to Adam Pumps' instructions

The product has been used with unauthorised fluids.

The product has been modified or tampered with

The product is used in an area with power supply defects (voltage changes, current phase shift, etc.)

The product is used without the supplied suction filter (inside or outside the pump).

Immediately excluded from the warranty are: adhesive labels, plastic and metal casing, keyboards and masks, components subject to wear such as blades, impellers, graphite brushes (where present in the motors), seals and gaskets in general.

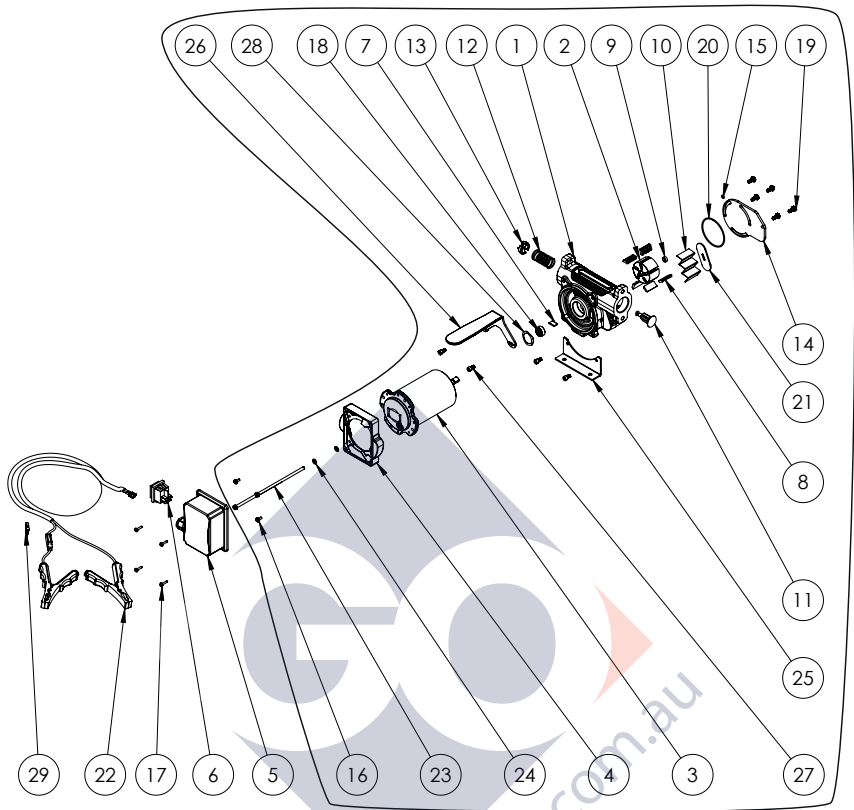
11 - TECHNICAL SUPPORT

The Manufacturer is always available for any information required on installation, operation or maintenance of the machine.

The Customer should ask the questions clearly, with reference made to this Manual and to the instructions listed.

EXPLODED VIEWS

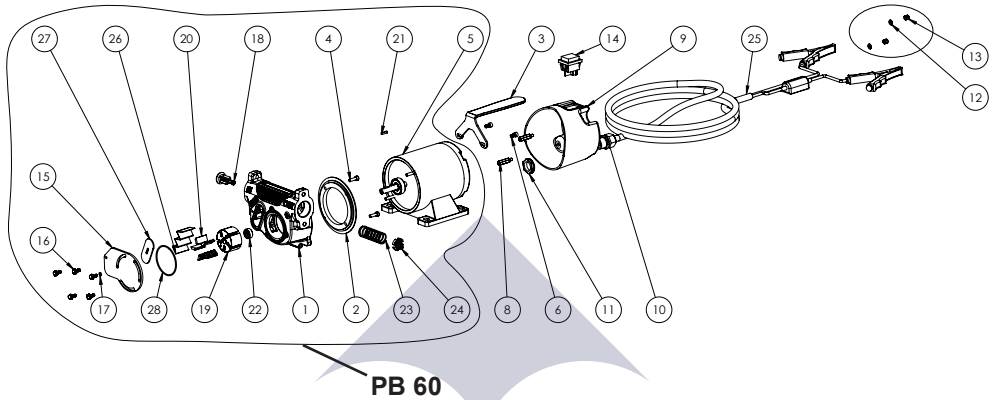
PB 50- PB1 50



PB 50

	12V	24V	DESCRIPTION	QTY		12V	24V	DESCRIPTION	QTY
1	CP011X	CP011X	BODY PUMP	1	16	82301410100	82301410100	SCREW TC M4 X 8	2
2	61000003	61000003	ROTOR Ø45	1	17	VT004	VT004	SCREW TC Ø3,5X16	4
3	ME040	HE041	MOTOR 12V PB 50	1	18	12010031000	12010031000	SHAFT SEAL Ø19	1
4	PA017	PA017	FLANGE	1	19	VT046	VT046	SCREW TE M5X12	5
5	PA016	PA016	CONDENSATOR BOX	1	20	OR039	OR039	O-RING NBR70 57X2	1
6	190050210000	190050210000	SWITCH 22X30 + COVER	1	21	OR037	OR037	FILTER SEAL	1
7	71000517	71000517	PLASTIC PIN	1	22	17001108	17001108	4M CABLE WITH CLAMPS	1
8	71000522	71000522	SMALL VANE	5	23	61004600000	61004600000	TIE ROD M5 X 125	2
9	DC007	DC007	BUSH PA66 DE 10 D16 H4	1	24	83101810000	83101810000	PLATE WASHER 5X10X1	2
10	PA019	PA019	INOX FILTER 16X49	1	25	71000031	71000031	HOLDER	1
11	71000520	71000520	BY-PASS VALVE	1	26	PB003	PB003	HANDLE	1
12	71008006	71008006	SPRING Ø21.4X42	1	27	VT033	VT033	SCREW M5 X 10 (PB1 50)	4
13	PA037	PA037	BYPASS CAP	1	28	VT042	VT042	COMPENSATION RING	1
14	PA018	PA018	SWIVEL LOCKING PLATE	1	29	190170130000	190170130000	FUSE	1
15	11010040200	11010040200	O-RING 2015 NBR	1					

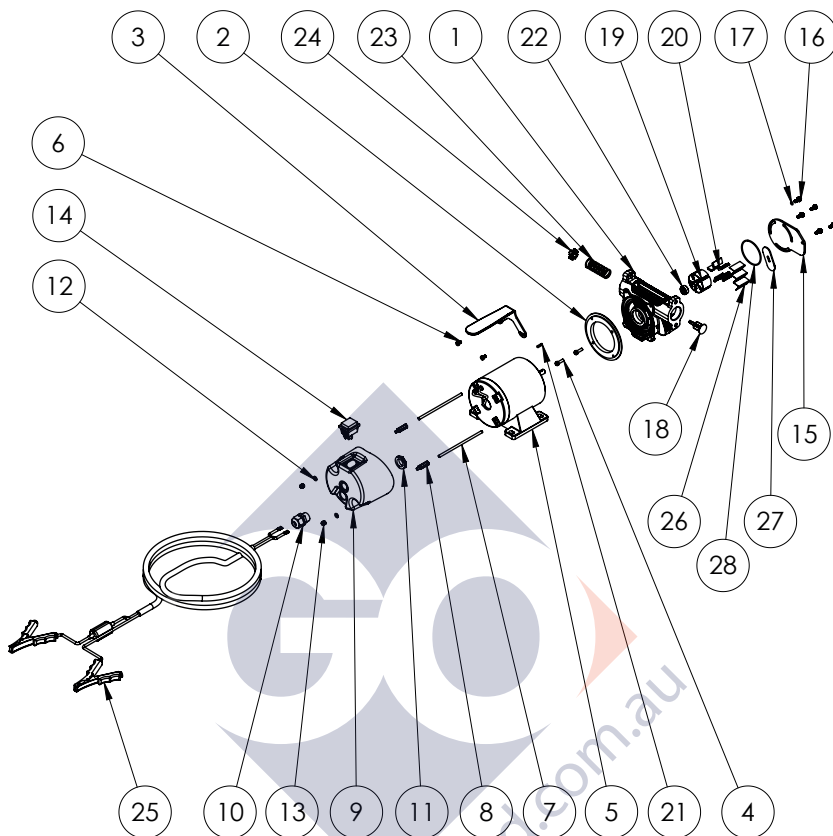
PB 60 - PB1 60



CODE	DESCRIPTION	QTY
1	CP012X PUMP BODY PB 60 LTD	1
2	PB005X COUPLING MOTOR FLANGE PB LTD	1
3	PB003 PB PUMPS HANDLE	1
4	13001007 SCREW TCCE M5x16 ISO 4762	2
5	ME042 12V MOTOR FOR PB 60/85	1
-	ME043 24V MOTOR FOR PB 60/85	
6	VT033 SCREW T.C.E.I. M5 X 10 ZINC	2
8	VT022 HEX SPACER MF M5X25	2
9	PB001 MOTOR COVER IP55 PB1 60L	1
10	53015030 CABLE GLAND PG 13.5	1
11	53019030 CABLE GLAND NUT GMP-GL 13.5	1
12	83101810000 PLATE WASHER 5x10x1 UNI 6592	2
13	82021810000 SELF-LOCKING NUT M5 UNI 7473	2
14	190050210000 SWITCH 22X30 + COVER	1

CODE	DESCRIPTION	QTY
15	PA018 SWIVEL LOCKING PLATE	1
16	VT046 SCREW TE M5X12 FLANGED UNI5541	5
17	11010040200 O-Ring 2015 NBR	1
18	71000520 BY-PASS VALVE	1
19	61000003 ROTOR Ø45	1
20	71000522 SMALL VANE	5
21	17001097 PIN 3x3x15 UNI 6604-B	1
22	12010031000 SHAFT SEAL Ø19	1
23	16001005 BY-PASS SPRING	1
24	PA037 BLACK REINFORCED BYPASS CAP	1
25	190000150000 4m CABLE WITH CLAMPS + FUSE	1
26	PA019 INOX FILTER 16X49	1
27	OR037 FILTER SEAL	1
28	OR039 O-RING NBR70 57x2 BODY PUMP	1

PB 85 - PB1 85



CODE	DESCRIPTION	QTY	CODE	DESCRIPTION	QTY
1	CP010X PUMP BODY	1	15	PA018 SWIVEL LOCKING PLATE	1
2	PB005X COUPLING MOTOR FLANGE	1	16	VT046 SCREW TE M5X12 FLANGED	5
3	PB003 HANDLE	1	17	11010040200 O-Ring 2015 NBR	1
4	13001007 SCREW TCCE M5x16	2	18	71000520 BY-PASS VALVE	1
5	ME042 12V MOTOR	1	19	61000003 ROTOR Ø45	1
6	VT070 SCREW TCEI M5X8	2	20	71000522 SMALL VANE	5
7	VT028 TIE Ø5X135	2	21	17001097 PIN 3x3x15 UNI 6604-B	1
8	VT022 HEX SPACER MF M5X25	2	22	12010031000 SHAFT SEAL Ø19	1
9	PB001 MOTOR COVER IP55	1	23	16001005 BY-PASS SPRING	1
10	53015030 CABLE GLAND	1	24	PA037 BY-PASS CAP	1
11	53019030 CABLE GLAND NUT	1	25	190000150000 4M CABLE + FUSE	1
12	83101817100 PLATE WASHER Ø5	2	26	PA019 INOX FILTER 16X49	1
13	82021810000 SELF-LOCKING NUT M5	2	27	OR037 FILTER SEAL	1
14	190050210000 SWITCH 22X30 + COVER	1	28	OR039 O-RING NBR70 57x2	1