Boost Unit

Series BLA

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

ENGINEERING YOUR SUCCESS.

Contents

The BLA boost unit simplifies the building of closed or semi-closed hydrostatic transmissions.

Main features are:

- Replaces conventional charge pump and corresponding valves in many applications
- Allows pump speeds above normal selfpriming speed.
- Suitable for system flow rates to 400 l/min
- Includes filter
- Simple construction - no moving/wear parts
- Cost-effective installation
- Small tank size
- Helps in building a low-cost hydrostatic transmission.

Typical applications:

- Fan drives
- Propeller drives
- Generator drives
- Pump drives.

Description

In a closed circuit hydrostatic transmission, a charge pump is normally included with the main pump, providing make-up fluid which replaces pump and motor volumetric losses. It also maintains sufficient pump inlet pressure to avoid cavitation.

The BLA boost unit replaces the charge pump in many applications, when the following conditions are met:

- The max-to-min pump flow ratio does not exceed 2:1
- System pressure changes gradually without frequent and pronounced pressure peaks
- The line length between pump and boost unit is relatively short.

There are two basic sizes of the BLA boost unit:

- BLA 4 (to 160 l/min pump flow)
- BLA 6 (to 400 l/min).

The main part of the unit is an aluminium housing with a built-in nozzle and an injector; refer to the cross section to the right.

When fluid flows from the motor outlet port through the unit and to the pump inlet port, the increased fluid velocity between the nozzle and injector creates a low pressure zone causing additional fluid to be drawn from tank into the main circuit.

Also, pressure increases after the injector, allowing the pump to be operated at speeds higher than the self-priming speed. The 'boost pressure' increases with flow as shown in the diagrams (fig. 4, page 5).

The housing includes ports that should be connected to the pump and motor drain ports respectively.

An additional bleed-off nozzle diverts approx. 10% of the main flow through the cartridge filter before being directed to the tank.

Oil cooling

An oil cooler is usually required in the hydraulic system, in order to remove the heat that is generated in the main circuit. A full-flow oil cooler should be installad in the return line between the motor and the boost unit; refer to fig. 3, page 4.

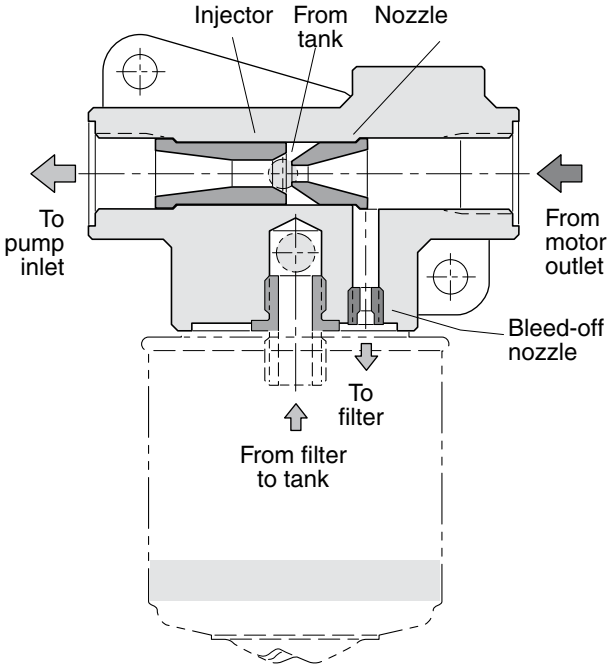


Fig. 1. BLA boost unit cross section.

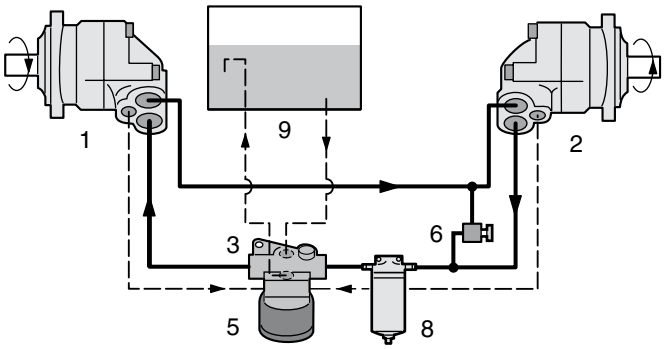
Parker Hannifin
Mobile Controls Division
Trollhättan, Sweden

Filter

The BLA boost unit is supplied with a standard spin-on cartridge filter. The paper insert provides a 20 µm nominal filtration (³ 50 µm absolute filtration).

Cartridges are available as spare parts (page 6).

For continuous operation, an additional full-flow return filter is usually required. It should be installed upstream of the BLA unit; refer to the top schematic to the right.



1. Pump
2. Motor
3. Boost unit (with injector and nozzle)
5. Filter cartridge
6. Pressure relief valve
8. Full-flow filter (when required)
9. Reservoir

Fig. 2. Boost unit installation (example).

Boost unit selection

The BLA 4 is available in four sizes with a max recommended flow of 40, 63, 100, and 160 l/min. A filter is included.

The BLA 6 is available in the following sizes: 250, 350 and 400 l/min; it also includes a filter.

Example

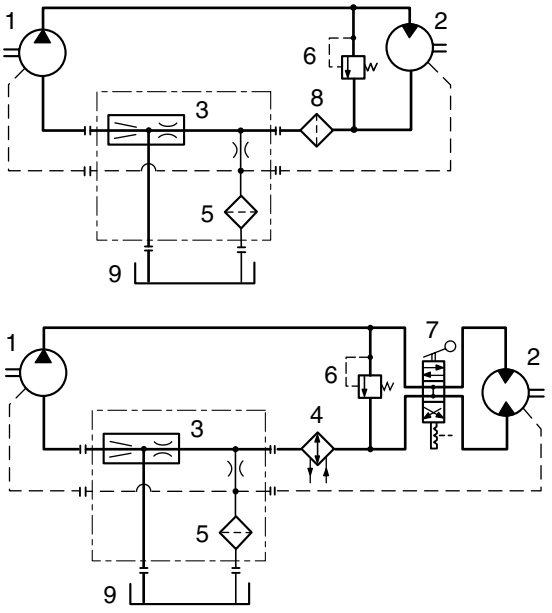
Select a suitable boost unit for a closed loop hydrostatic transmission that utilizes an F11-19 pump at 4 000 rpm; nominal flow is approx. 76 l/min.

According to the F11/F12 brochure, the required inlet pressure for an F11-19, operating as a pump at 4 000 rpm, is 0.9 bar absolute.

The BLA 4-100 is selected (refer to the middle diagram, fig. 4). It will supply about 1.7 bar boost pressure at approx. 76 l/min, providing a margin for line losses between the boost unit and the pump.

NOTE: The boost pressure (after the unit) is approx. half the pressure before the unit.

As an example, the up-stream pressure of a BLA 4-100 at max. flow (100 l/min) is about 6.5 bar.



1. Pump
2. Motor
3. Boost unit (with injector and nozzle)
4. Oil cooler (when required)
5. Filter cartridge
6. Pressure relief valve
7. Directional control valve
8. Full-flow filter (when required)
9. Reservoir

Fig. 3. Circuit schematics (examples).

Parker Hannifin
Mobile Controls Division
Trollhättan, Sweden

Boost pressure

The diagrams in fig. 4 show max outlet pressure versus flow through the various boost units. The pressure increase obtained at higher flows usually corresponds to the additional pump inlet pressure required at elevated shaft speeds.

To avoid pump cavitation, the boost unit should be installed as close to the pump as possible. The pressure at the pump inlet must not, under any operating condition, drop below the required pressure at a particular pump speed.

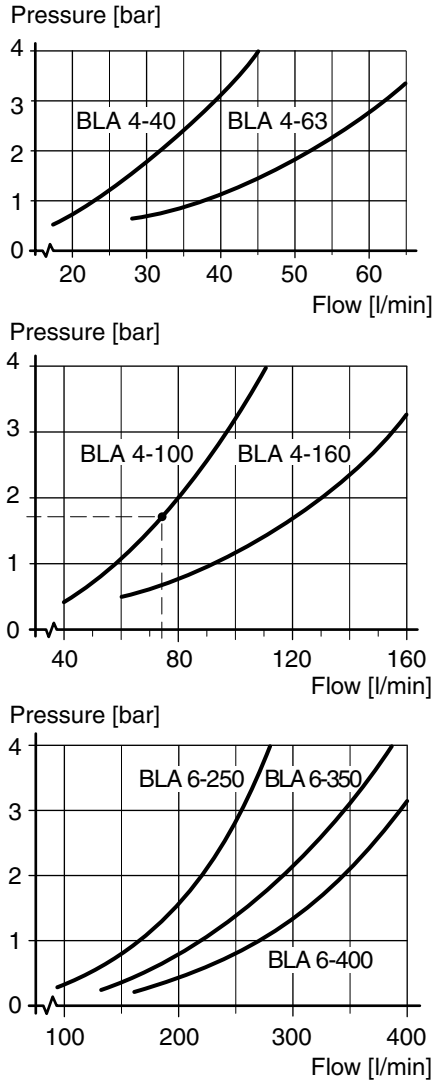


Fig. 4. BLA pressure/flow diagrams.

Installation

For proper functioning, the boost unit must be installed well below the lowest oil level in the reservoir.

The BLA can either be bolted directly to the reservoir side wall as shown below or connected separately with piping or hoses.

An adapter plate, with mounting face and hole pattern corresponding to that of the boost unit housing, should be fabricated and welded in place. The sealing is accomplished with seal washers.

The filtered oil flow from the boost unit must enter the reservoir as far away as possible from the inlet, and the pipe must always be well below the lowest oil level.

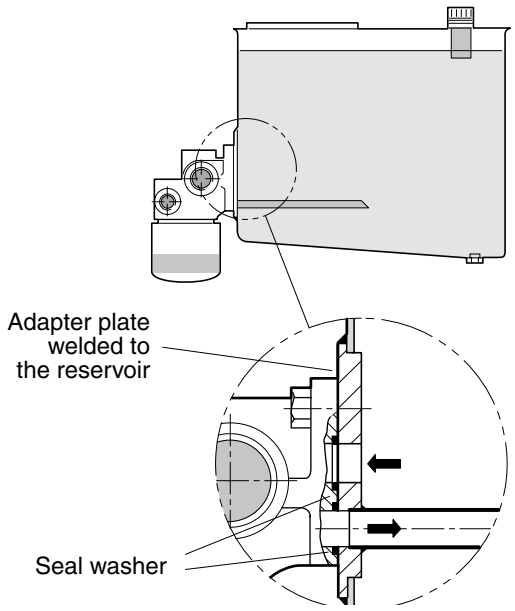


Fig. 5. Boost unit/reservoir installation (example).

Parker Hannifin
Mobile Controls Division
Trollhättan, Sweden

Line connection

When the boost unit is connected to the reservoir with piping or hoses, line length should not exceed 0.5 m, and the inner diameter should equal or exceed 13 mm ($^1/_2$”).

To avoid large pressure losses between the boost unit and the pump inlet, the line should be as straight as possible, not to exceed 0.5 m in length.

The recommended, minimum inner diameter of the line is shown in the following table.

BLA 4 size	Inner dia. [mm]	BLA 6 size	Inner dia. [mm]
-40	13	-250	32
-63	20	-350	38
-100	20	-400	38
-160	25		

Reservoir

The reservoir should be large enough to allow the oil to be turned over in 1.5 to 2 min. The oil will then be sufficiently de-aerated. The size of the reservoir normally corresponds to 15-20 % of the pump flow.

As an example, a pump flow of 75 l/min requires a reservoir of 10 to 15 l.

Valves

A system pressure relief valve or directional control valve should be connected as shown in figure 3 (page 4).

The valve return must be connected to the boost unit inlet (**not** directly to the reservoir).

NOTE: The drain lines from the pump and the motor are also connected to the boost unit; refer to the schematics and installation drawings on page 4.

Ordering information

Example: **BLA 6 - 250**

Type: BLA 4 or 6

Size: BLA 4: **40**, **63**, **100** or **160**
BLA 6: **250**, **350** or **400**

Available versions

Version	Part no.
BLA 4-40	73 186
BLA 4-40-X*	379 7824
BLA 4-63	73 061
BLA 4-100	73062
BLA 4-160	73 159
BLA 6-250	73 311
BLA 6-350	370 1097
BLA 6-400	73 312

***** X - Bleed-off nozzle plugged; BLA 4

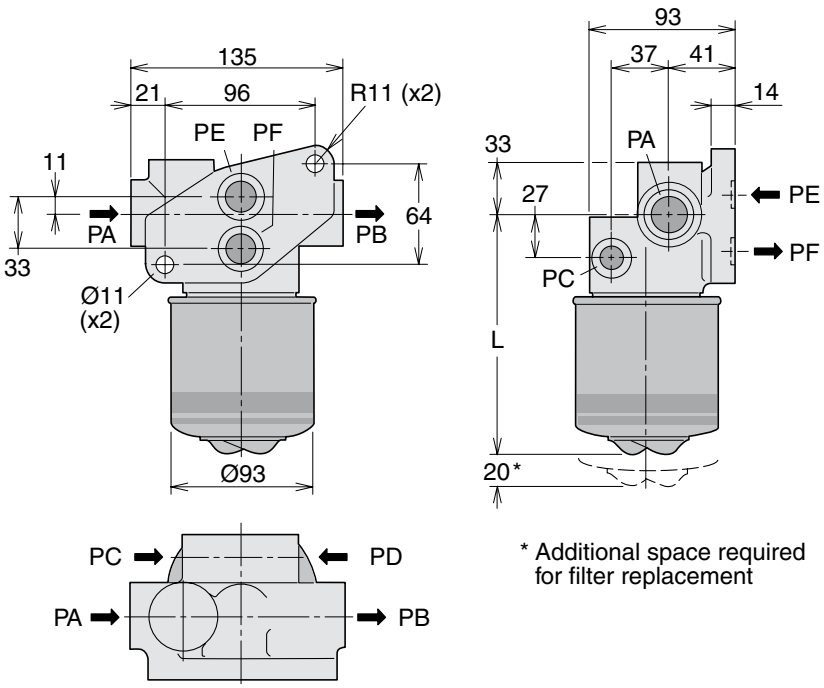
Filter cartridges

Version	Part no.
BLA 4-40,-63, -100	351 7857
BLA 4-160	73 194
BLA 6-250	73 308
BLA 6-350,-400	73 309

Seal washers (for ports PE and PF)

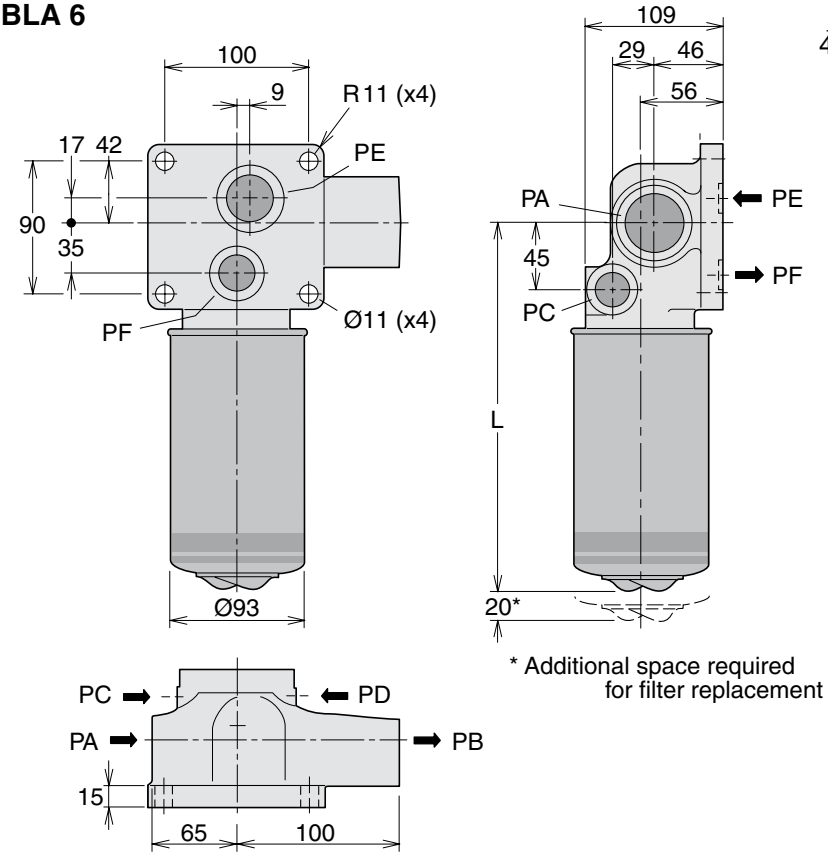
Version	Part no.	Washer size
BLA 4 (all)	943 908	$^1/_2$”
BLA 6-250	944 252	$^3/_4$”
BLA 6-350, -400	944 498	1”

BLA 4



* Additional space required for filter replacement

BLA 6



* Additional space required for filter replacement

Port sizes (all are BSP)

Port	BLA 4	BLA 6	Description
PA	3/4"	1 1/4"	From motor outlet
PB	3/4"	1 1/4"	To pump inlet
PC	3/8"	3/4"	From pump and
PD	3/8"	3/4"	motor drain ports
PE[1)]	1/2"	1"	From reservoir
PF[1)]	1/2"	3/4"	Return to reservoir
PG	1/2"	3/4"	To cooler
PH	1/2"	3/4"	From cooler

1) Countersunk to accept seal washer:
PE: BLA4 – ϕ 29x2.4; BLA6 – ϕ 44x2.9
PF: BLA4 – ϕ 29x2.4; BLA6 – ϕ 36x2.4.

Weight

BLA size	Weight [kg]
4-40, -63, -100	1.9
4-160	2.1
6-250	3.1
6-350, 400	3.2

Dimension L

BLA size	L [mm]
4-40, -63, -100	153
4-160	203
6-250	250
6-350, -400	301

Parker Hannifin
Mobile Controls Division
Trollhättan, Sweden

Parker Worldwide

AE – UAE, Dubai
Tel: +971 4 8127100
parker.me@parker.com

AR – Argentina, Buenos Aires
Tel: +54 3327 44 4129

AT – Austria, Wiener Neustadt
Tel: +43 (0)2622 23501-0
parker.austria@parker.com

AT – Eastern Europe,
Wiener Neustadt
Tel: +43 (0)2622 23501 900
parker.easteurope@parker.com

AU – Australia, Castle Hill
Tel: +61 (0)2-9634 7777

AZ – Azerbaijan, Baku
Tel: +994 50 2233 458
parker.azerbaijan@parker.com

BE/LU – Belgium, Nivelles
Tel: +32 (0)67 280 900
parker.belgium@parker.com

BR – Brazil, Cachoeirinha RS
Tel: +55 51 3470 9144

BY – Belarus, Minsk
Tel: +375 17 209 9399
parker.belarus@parker.com

CA – Canada, Milton, Ontario
Tel: +1 905 693 3000

CH – Switzerland, Etoy
Tel: +41 (0) 21 821 02 30
parker.switzerland@parker.com

CL – Chile, Santiago
Tel: +56 2 623 1216

CN – China, Shanghai
Tel: +86 21 2899 5000

CZ – Czech Republic, Klecany
Tel: +420 284 083 111
parker.czechrepublic@parker.com

DE – Germany, Kaarst
Tel: +49 (0)2131 4016 0
parker.germany@parker.com

DK – Denmark, Ballerup
Tel: +45 43 56 04 00
parker.denmark@parker.com

ES – Spain, Madrid
Tel: +34 902 330 001
parker.spain@parker.com

FI – Finland, Vantaa
Tel: +358 (0)20 753 2500
parker.finland@parker.com

FR – France, Contamine s/Arve
Tel: +33 (0)4 50 25 80 25
parker.france@parker.com

GR – Greece, Athens
Tel: +30 210 933 6450
parker.greece@parker.com

HK – Hong Kong
Tel: +852 2428 8008

HU – Hungary, Budapest
Tel: +36 1 220 4155
parker.hungary@parker.com

IE – Ireland, Dublin
Tel: +353 (0)1 466 6370
parker.ireland@parker.com

IN – India, Mumbai
Tel: +91 22 6513 7081-85

IT – Italy, Corsico (MI)
Tel: +39 02 45 19 21
parker.italy@parker.com

JP – Japan, Fujisawa
Tel: +(81) 4 6635 3050

KR – South Korea, Seoul
Tel: +82 2 559 0400

KZ – Kazakhstan, Almaty
Tel: +7 7272 505 800
parker.easteurope@parker.com

LV – Latvia, Riga
Tel: +371 6 745 2601
parker.latvia@parker.com

MX – Mexico, Apodaca
Tel: +52 81 8156 6000

MY – Malaysia, Shah Alam
Tel: +60 3 7849 0800

NL – The Netherlands,
Oldenzaal
Tel: +31 (0)541 585 000
parker.nl@parker.com

NO – Norway, Ski
Tel: +47 64 91 10 00
parker.norway@parker.com

NZ – New Zealand, Mt Wellington
Tel: +64 9 574 1744

PL – Poland, Warsaw
Tel: +48 (0)22 573 24 00
parker.poland@parker.com

PT – Portugal, Leca da Palmeira
Tel: +351 22 999 7360
parker.portugal@parker.com

RO – Romania, Bucharest
Tel: +40 21 252 1382
parker.romania@parker.com

RU – Russia, Moscow
Tel: +7 495 645-2156
parker.russia@parker.com

SE – Sweden, Spånga
Tel: +46 (0)8 59 79 50 00
parker.sweden@parker.com

SG – Singapore
Tel: +65 6887 6300

SK – Slovakia, Banská Bystrica
Tel: +421 484 162 252
parker.slovakia@parker.com

SL – Slovenia, Novo Mesto
Tel: +386 7 337 6650
parker.slovenia@parker.com

TH – Thailand, Bangkok
Tel: +662 717 8140

TR – Turkey, Istanbul
Tel: +90 216 4997081
parker.turkey@parker.com

TW – Taiwan, Taipei
Tel: +886 2 2298 8987

UA – Ukraine, Kiev
Tel +380 44 494 2731
parker.ukraine@parker.com

UK – United Kingdom,
Warwick
Tel: +44 (0)1926 317 878
parker.uk@parker.com

US – USA, Cleveland
(industrial)
Tel: +1 216 896 3000

US – USA, Lincolnshire
(mobile)
Tel: +1 847 821 1500

VE – Venezuela, Caracas
Tel: +58 212 238 5422

ZA – South Africa,
Kempton Park
Tel: +27 (0)11 961 0700
parker.southafrica@parker.com

HYGE Ed. 200910-01

Catalogue HY30-8224/UK. POD 10/2009 PC

European Product Information Centre
Free phone: 00 800 27 27 5374
(from AT, BE, CH, CZ, DE, DK, EE, ES, FI, FR, IE, IL, IS, IT, LU, MT, NL, NO, PL, PT, RU, SE, UK, ZA)
Fax: +44 1442 458112
US Product Information Centre
Free phone: 1-800-27 27 537
www.parker.com

Your local authorized Parker distributor