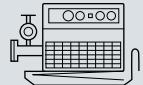
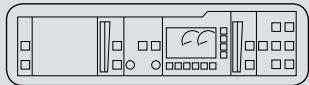




Ziegler



Fire pumps, turrets, foam proportioning systems, pump units and portable pumps





ZIEGLER Centrifugal Fire Pumps - Perfected top quality

ZIEGLER Centrifugal fire pumps are efficient and hard-wearing centrifugal pumps of one-stage or two-stage type. They are rugged, insensitive to dirt water, extremely reliable and absolutely easy to maintain. Thanks to the simple and clear structure the easily readable measuring instruments and automatic switching, priming and pressure control units ease of operation is provided. The pumps are designed as modular conception, thus they can be extended within their performance spectrum and adapted to special conditions, such as foreign non-European standards without any problems.

ZIEGLER Centrifugal fire pumps are manufactured from high-quality materials: housing, diffuser, guide wheels and pump cover are of sea-water resistant light alloy, pump shaft and split rings of stainless steel. Sealing of the pump shaft is made by radial seals in an exchangeable sealing bush. The delivery outlets are provided with self-closing screw-down valves and ball cocks according to DIN EN.

The performance of a vehicle-mounted centrifugal pump is dependent on rpm and output of the drive engine, the location of the pump unit, guiding of the piping as well as the conditions of water supply to the centrifugal pump. The pump diagrams depicted in the catalogue show performance curves metered under DIN EN conditions.

ZIEGLER Centrifugal fire pumps can be supplied for rear- or midship-installation in performance sizes of 750 up to 10.000 l/min each suitable for the output of the various vehicle engines. Thanks to the rugged and clear construction the pumps are reliable, thus allowing a well-arranged design of the pump bay in the vehicle, even at complicated pipe systems such as at the extension by foam proportioning units or the installation of turrets.

ZIEGLER Centrifugal fire pumps are powerful: they provide large water output at pressures up to 20 bar and higher and additionally the advantages of high-pressure action up to 40 bar by the switchable high-pressure part which only runs if high pressure will actually be required.

ZIEGLER Centrifugal fire pumps can be optimally operated: the fully automatic priming system TROKOMAT PLUS simplifies maximally the operation of the pump. After engaging only the throttle adjustment has to be controlled, provided no TOURMAT D has been installed by which the pre-selected pressure will be triggered at all service situations.

The rotational direction of the pump will be determined as seen from the pump cover (operator position). At pumps without gear transmission the rotational direction of the pump is equivalent to the one of the p.t.o. flange. At pumps with gear transmission the rotational direction of the pump is opposed to the rotational direction of the p.t.o. flange.

Type codes and abbreviations

FPN 10 - 2000 - 1 H H L

Centrifugal fire pump normal pressure: FPN

Centrifugal fire pump high pressure: FPH

Nominal pressure in bar (6, 10, 15)

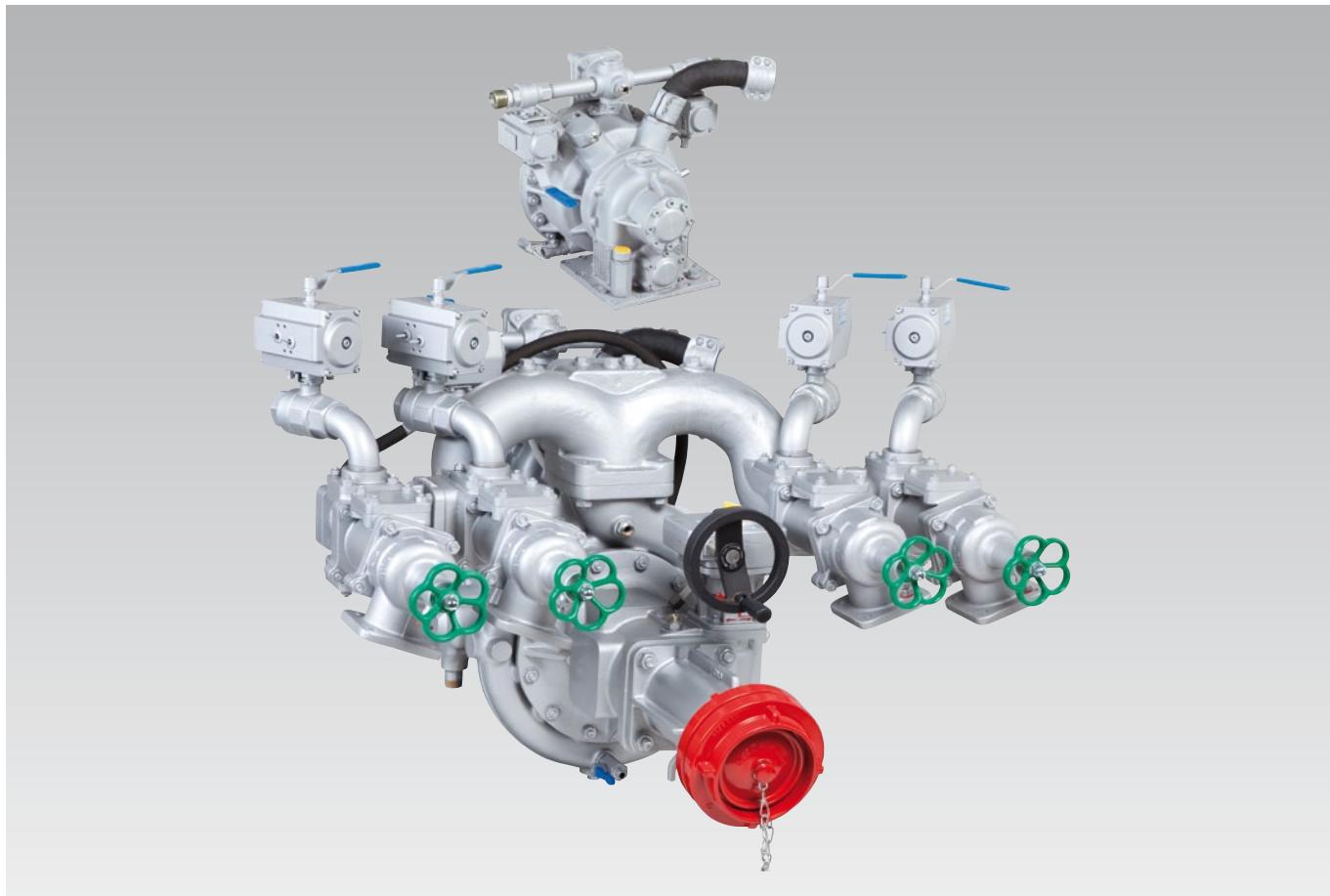
Nominal output in l/min

Number of stages (1, 2)

Rear-mounted pump: H (unit: A)

High pressure part

Rotational direction
(anti-clockwise, clockwise)



Fire pumps

ZIEGLER Centrifugal fire pumps in modular system

The proven ZIEGLER pumps are not only available in various performance sizes but depending on quantity and position they also can be provided with different delivery outlets, with automatic switching and pressure control as well as with various foam proportioning systems.

The demand for an extinguishing technology keeping the secondary water damages as small as possible will be met increasingly by sophisticated, electronic systems.

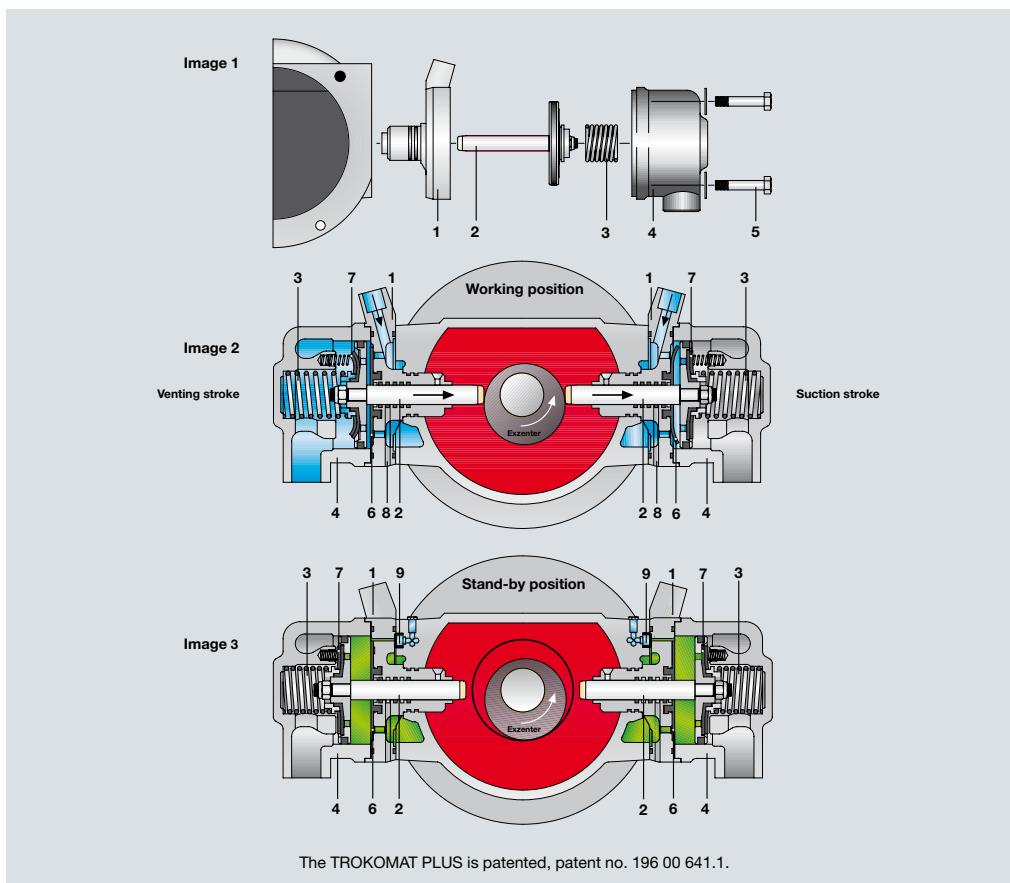
The three-stage ZIEGLER high-pressure pump proven since almost 50 years and continuously developed will be switched on via an electro-magnetic coupling of the running normal pressure pump if required. Its impellers are fixed on an own pump shaft, thus they will not run along with at sole operation of the normal pressure pump. This allows on the one hand an extremely compact design and on the other hand the wear will be reduced considerably. All ZIEGLER pumps are prepared suitably for relatively easy retrofit with a high-pressure pump.

If the connection line from the normal pressure pump to the high-pressure pump will be opened, the electro-magnetic coupling will be actuated simultaneously. Then, the delivery outlet to the high-pressure reel or the corresponding high-pressure outlet will be opened.

A thermal discharge line to the tank or at equipment with a pump proportioner to the outside prevents an overheating at interruption of the water delivery. Optionally, an additional warning buzzer is available.

The following operation modes are possible:

- pure normal pressure pump operation
(high-pressure pump stopped)
- pure high-pressure operation
(normal pressure pump in circulation only runs for supply of the high pressure pump)
- combined pump operation
(normal pressure and high pressure pump are running at the same time)



1. Bearing flange
2. Piston complete
3. Compression spring
4. Cylinder cap
5. Hexagon head screw
6. Inlet membrane
7. Outlet membrane
8. Leakage water bore
9. Re-start valve

TROKOMAT PLUS

This automatic priming system sets standards

Design and mode of operation:

The ZIEGLER TROKOMAT PLUS is a modern reciprocating pump which carries out the priming action fully automatically, thus simplifying the pump operation to a minimum.

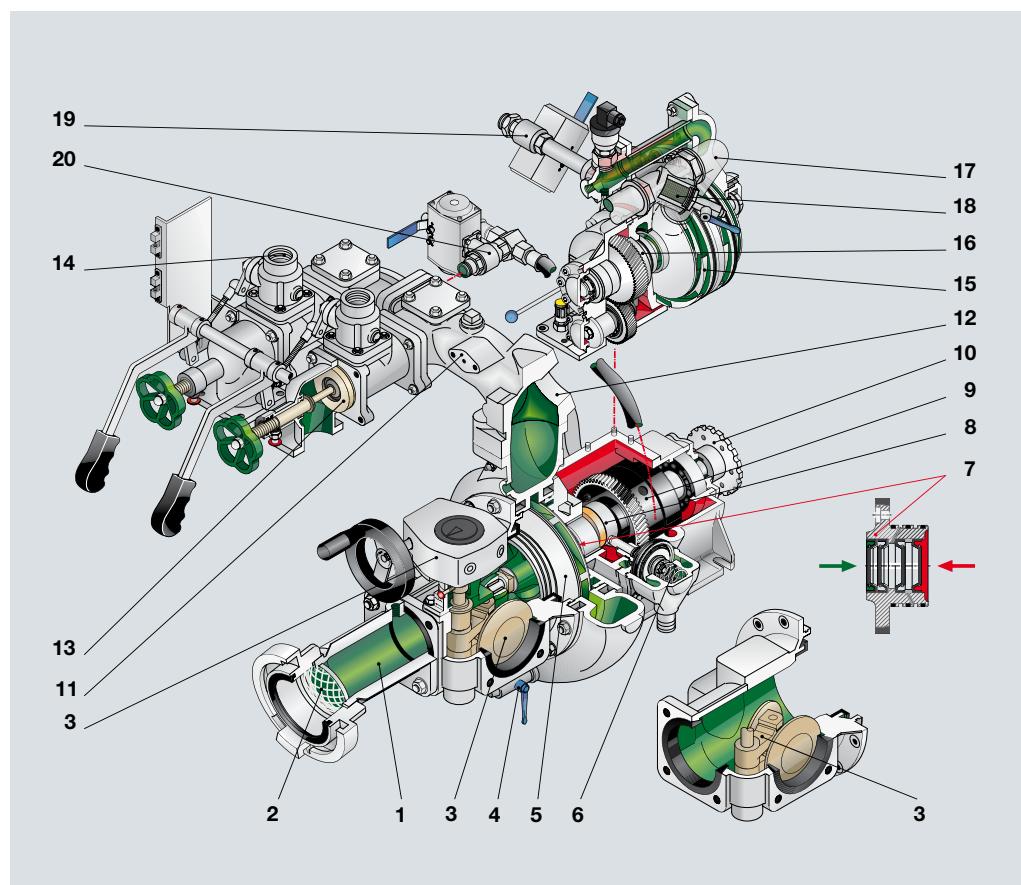
The TROKOMAT PLUS sucks dry, i.e. without any auxiliary fluids like water or oil.

The TROKOMAT PLUS is operated hydraulically by the feed water, no auxiliary control is required. The automatic operations are carried out by few parts (picture 1).

Thus, the TROKOMAT PLUS is not accident sensitive and the service-life is therefore increased.

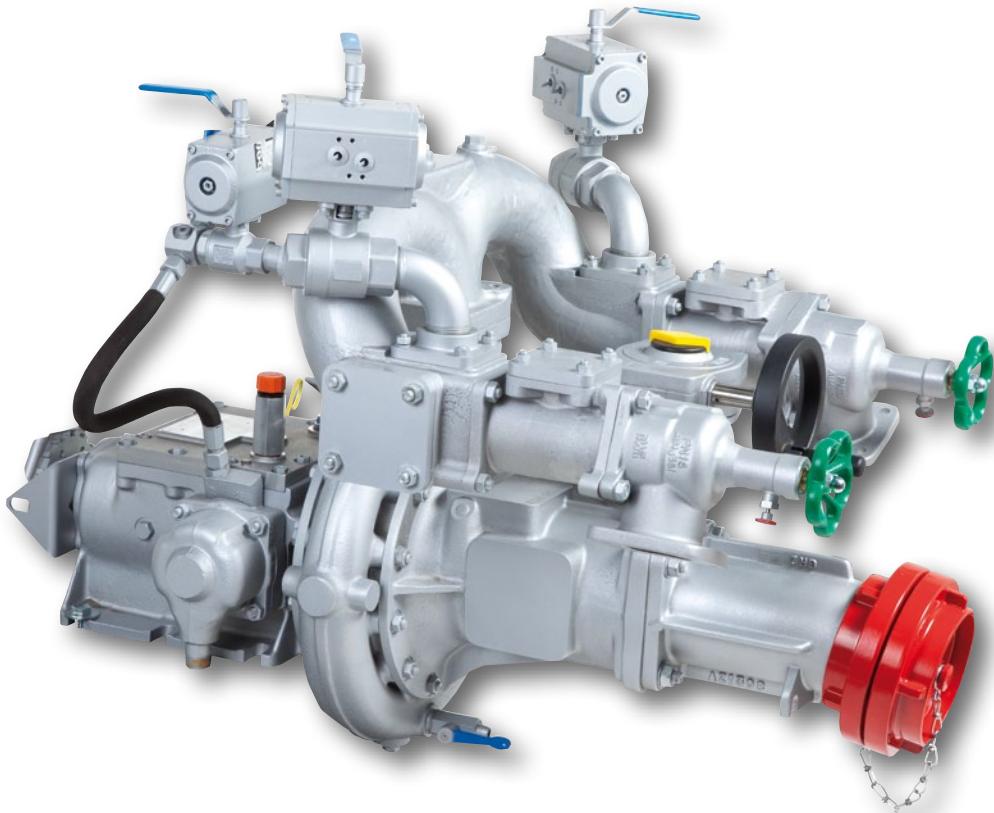
Even at low engine rpm the TROKOMAT PLUS starts the suction action. This has a most positive effect on the engine's service-life, especially from a cold start. The fully automatic priming system TROKOMAT PLUS consists of two completely separately working short-stroke reciprocating pumps. Each spring presses the pistons against an eccentric of the pump shaft. If the pump is engaged, the rotating eccentric shaft operates the pistons alternately. During this action air will be drawn in from the suction pipe and housing. The spring pressure moves the pistons internally. At the same time the intake air will be compressed and led outside by means of diaphragm control (picture 2).

FPN 10-2000-1H



1. Suction inlet A DN 100
2. Protective sieve/suction inlet
3. Butterfly valve tank operation/ suction operation
4. Drain cock DN 10
5. Impeller
6. TROKOMAT PLUS
7. Sealing bush with shaft sealing rings
8. Drive eccentric TROKOMAT PLUS
9. Electromagnetic clutch high-pressure pump
10. Connection from vehicle p.t.o.
11. Pressure distributor low pressure
12. Delivery outlet turret DN 80/100
13. Delivery outlet pressure valve size B
14. Delivery outlet DN 32 (tank filling line, reel connection)
15. High pressure pump three-stage
16. High pressure sealing
17. High pressure supply
18. Protective sieve with flush cock
19. Pressure distributor high pressure with ball cocks DN 20
20. TROKOMAT PLUS shut-off (for pump operation below 2 bar)





Pump type	Art. no.	Rpm max. min ⁻¹	Power input max. kW (HP)	Pump output max. at 10 bar Hs 3,0 m l/min	Weight approx. kg	Dimensions approx. LxWxH mm
FPN 10-1000-1HL	022160	4200	85 (116)	2500	90	1010x920x850
FPN 10-1000-1HR	022161					
FPN 10-1000-2HL	022082	3780	62 (85)			
FPN 10-1000-2HR	022183					
FPN 15-1000-2HL	022084	4080	75 (102)	1900	76	875x750x680
FPN 15-1000-2HR	022085					

Basic equipment:

1 stage or 2 stage centrifugal fire pump in clockwise or anti-clockwise rotational direction,
1 suction inlet size A,
2 delivery outlets size B,
each 1 connection for rapid intervention line and tank filling line,
1 connection for tank suction line lockable via butterfly valve.
Priming system: fully automatic TROKOMAT PLUS

Gauges and controls:

modular pump control system "Z-Control"
(sub chapter "Z-Control")

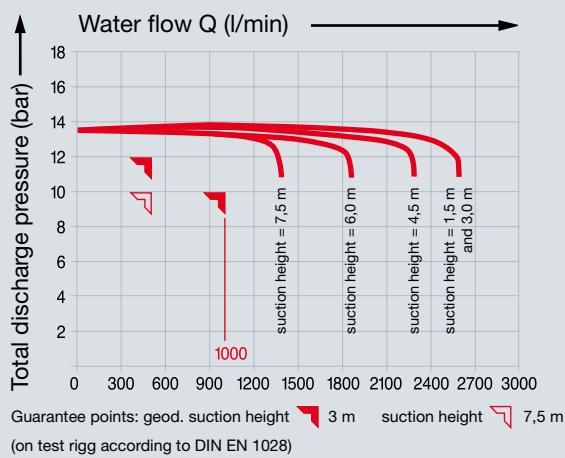
Paintwork:

silver coloured RAL 9006

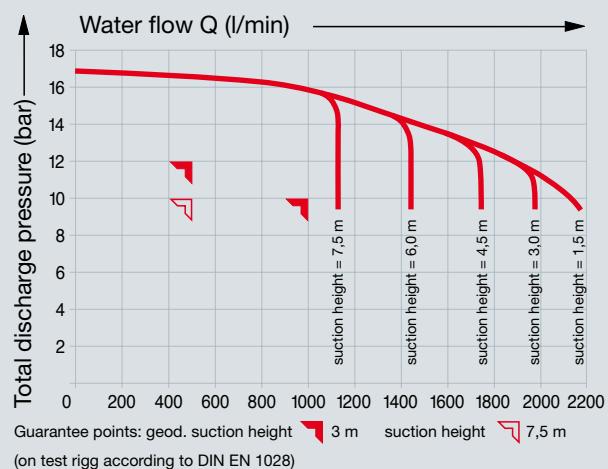
Drive:

via joint shaft from p.t.o. of the vehicle gearbox

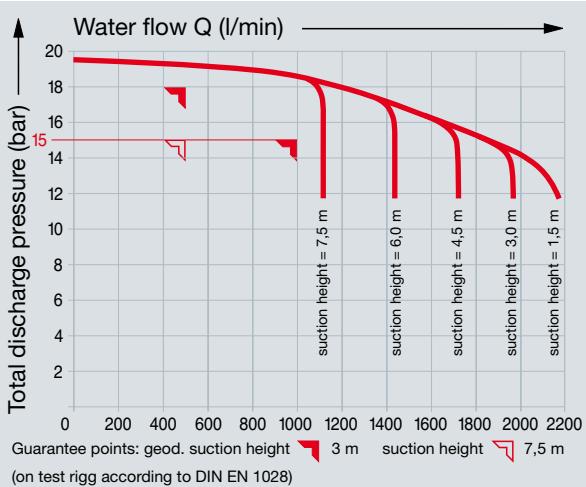
FPN 1000 (10-1000/15-1000)



FPN 10-1000-1, test number: AZ 101010605



FPN 10-1000-2, test number: AZ 101020403

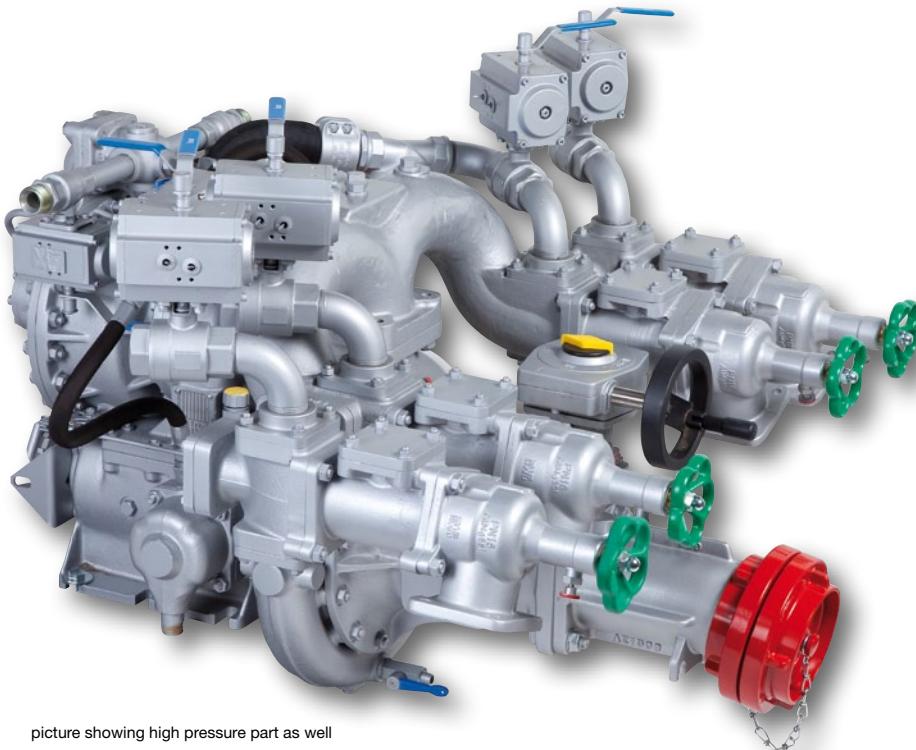


FPN 15-1000-2, test number: AZ 151020403

Auxiliary equipment and systems

on request, additionally charged:
third and fourth delivery outlet, connection for a second rapid intervention line, line for turret, installation of a pump proportioner, automatic p.t.o. engagement (ANS), automatic pressure governor (TOURMAT D), automatic water supply system (AWZ), TROKOMAT PLUS shut-off, pumping out unit.

If an rpm adjustment is necessary (p.t.o.) various integrated pump gearboxes are available.



Pump type	Art. no.	Rpm max. min ⁻¹	Power input max. kW (HP)	Pump output max. at 10 bar Hs 3,0 m l/min	Weight approx. kg	Dimensions approx. LxWxH mm	
FPN 10-2000-1HL	022094	4450	105 (143)	2500	90	1010x920x850	
FPN 10-2000-1HR	022095				115		
FPN 10-2000-2HL	022114				90		
FPN 10-2000-2HR	022115				115		
FPN 15-2000-1HL	022098		4700		90		
FPN 15-2000-1HR	022099				115		
FPN 15-2000-2HL	022118		3500		115		
FPN 15-2000-2HR	022119		115				

Basic equipment:

1stage or 2stage centrifugal fire pump in clockwise or anti-clockwise rotational direction,
1 suction inlet size A,
2 delivery outlets size B,
each 1 connection for rapid intervention line and tank filling line,
1 connection for tank suction line lockable via butterfly valve.

Priming system: fully automatic TROKOMAT PLUS

Gauges and controls:

modular pump control system "Z-Control"
(sub chapter "Z-Control")

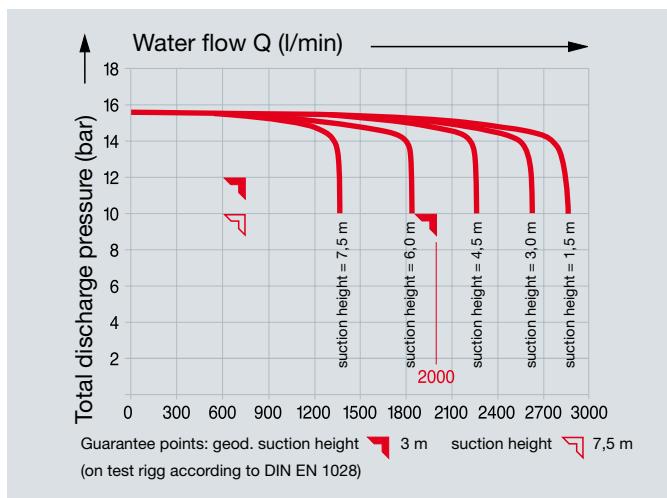
Paintwork:

silver coloured RAL 9006

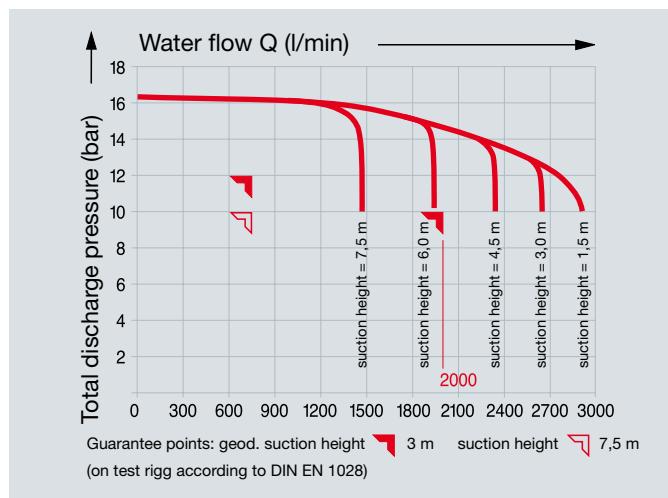
Drive:

via joint shaft from p.t.o. of the vehicle gearbox

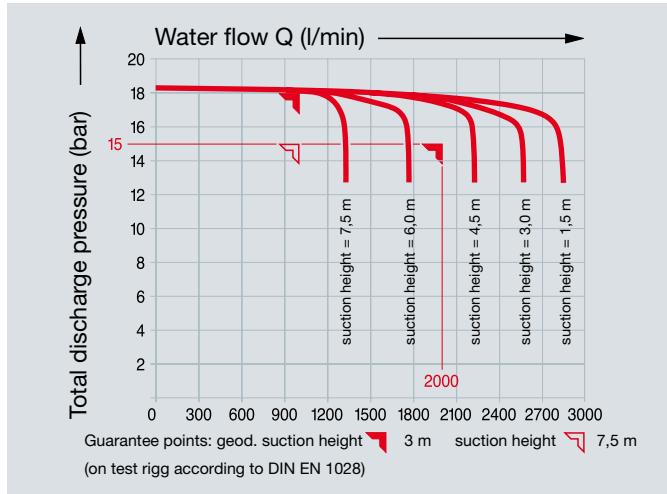
FPN 2000 (10-2000/15-2000)



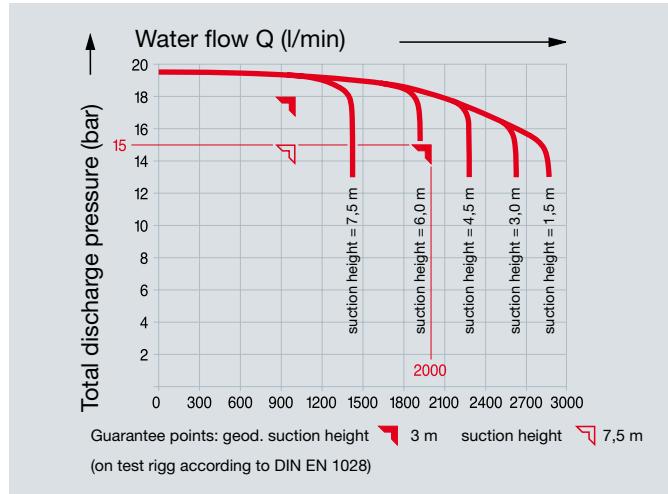
FPN 10-2000-1, test number: AZ 102010403



FPN 10-2000-2, test number: AZ 102020403



FPN 15-2000-1, test number: AZ 152010403

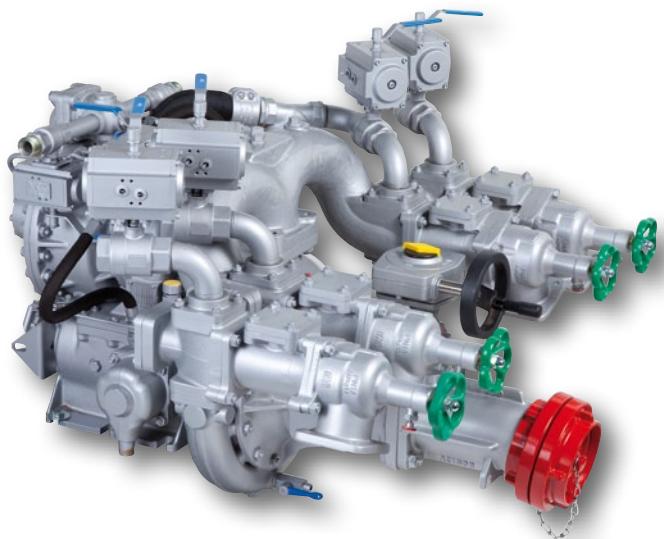


FPN 15-2000-2, test number: AZ 152020403

Auxiliary equipment and systems

on request, additionally charged:
third and fourth delivery outlet, connection for a second rapid intervention line, line for turret, installation of a pump proportioner, automatic p.t.o. engagement (ANS), automatic pressure governor (TOURMAT D), automatic water supply system (AWZ), TROKOMAT PLUS shut-off, pumping out unit.

If an rpm adjustment is necessary (p.t.o.) various integrated pump gearboxes are available.



picture showing high pressure part as well



FPN 15-3000-2

Pump type	Art no.	Rpm max. min ⁻¹	Power input max. kW (HP)	Pump output max. at 10 bar Hs 3,0 m l/min	Weight approx. kg	Dimensions approx. LxWxH mm	
FPN 10-3000-1HL	022096	4450	125 (170)	3800	90	1010x920x850	
FPN 10-3000-1HR	022097						
FPN 10-3000-2HL	022116		102 (139)	3200	115		
FPN 10-3000-2HR	022117						
FPN 15-3000-1HL	022100		150 (204)	3700	90		
FPN 15-3000-1HR	022101						
FPN 15-3000-2HL	022130		170 (232)	4600	97 (basic pump)		
FPN 15-3000-2HR	022131						

Basic equipment:

1stage or 2stage centrifugal fire pump in clockwise or anti-clockwise rotational direction,
suction inlet DN 125 (FPN 15-3000-2 → flange dia. 240 mm),
3 delivery outlets size B (FPN 15-3000-2 → flange dia. 150 mm).
Except for FPN 15-3000-2 each 1 connection for rapid intervention line and tank filling line, 1 connection for tank suction line, lockable by butterfly valve.
For all types: priming system fully automatic TROKOMAT PLUS

Gauges and controls:

modular pump control system "Z-Control"
(sub chapter "Z-Control")

Paintwork:

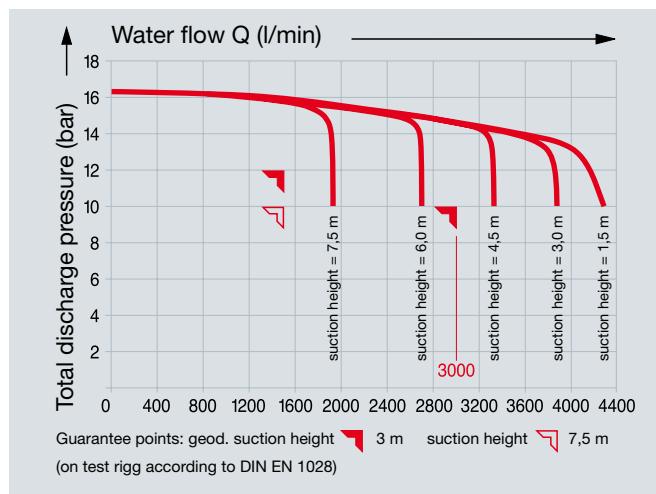
silver coloured RAL 9006

Drive:

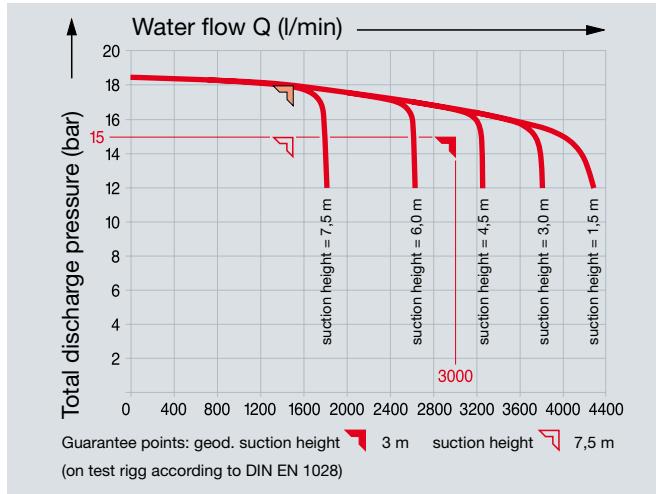
via joint shaft from p.t.o. of the vehicle gearbox

The pumps are also available in bronze. Minimum purchase is required. All FPN can be supplied/retrofitted with high pressure part (pls. see extra pages 92/93).

FPN 3000 (10-3000/15-3000)



FPN 10-3000-1, test number: AZ 103010403

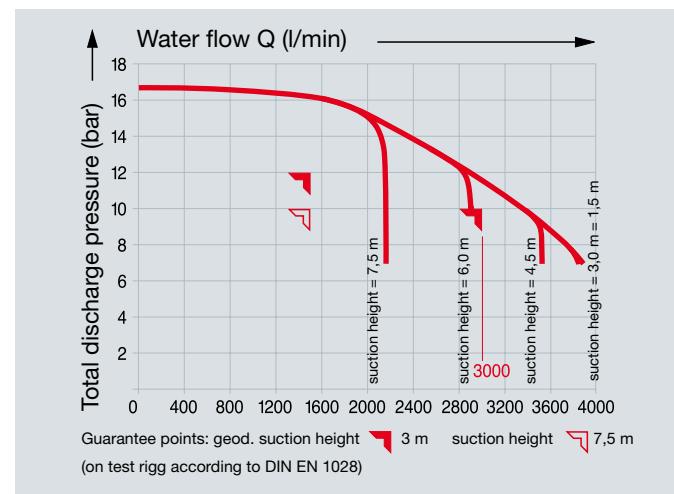


FPN 15-3000-1, test number: AZ 153010403

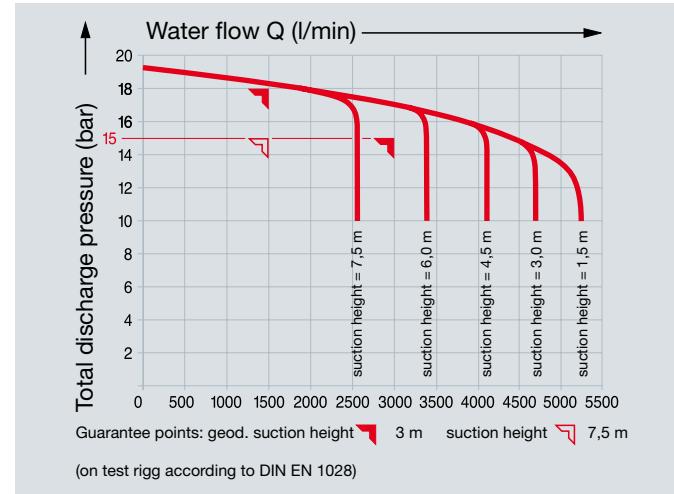
**Auxiliary equipment and systems
for FPN 10-3000-1, 10-3000-2 and 15-3000-1**

on request, additionally charged:

suction inlet 2x A, fourth delivery outlet, connection for a second rapid intervention line, line for turret, installation of a pump proportioner, automatic p.t.o. engagement (ANS), automatic pressure governor (TOURMAT D), automatic water supply system (AWZ), TROKOMAT PLUS shut-off, MAD 30, pumping out unit.



FPN 10-3000-2, test number: AZ 103020403



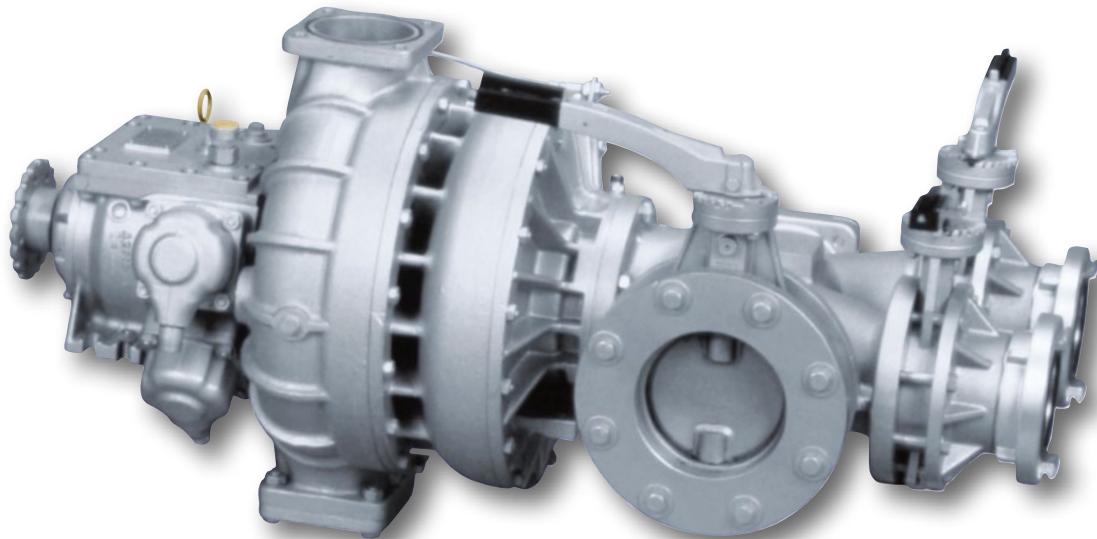
FPN 15-3000-2, test number: AZ 153020403

**Auxiliary equipment and systems
for FPN 15-3000-2**

on request, additionally charged:

suction inlet 2x A, alternatively 1x F, tank suction connection DN 150, up to 6 delivery outlets size B, 1 turret outlet, 2 delivery outlets to the rapid intervention lines, 1 outlet for tank filling line, installation of a pump proportioner, automatic p.t.o. engagement (ANS), automatic pressure governor (TOURMAT D), TROKOMAT PLUS shut-off, MAD 50, pumping out unit.

If an rpm adjustment is necessary (p.t.o.) various integrated pump gearboxes are available (except for FPN 15-3000).



Pump type	Art no.	Rpm max. min ⁻¹	Power input max. kW (HP)	Pump output max. at 10 bar Hs 3,0 m l/min	Weight approx. kg	Dimension approx. LxWxH mm
FPN 10-4000-2HL	022128	2500	130 (177)	4700	97	750x500x650
FPN 10-4000-2HR	022129					

Basic equipment:

2stage centrifugal fire pump in clockwise or anti-clockwise rotational direction,
suction inlet flange inside dia. 166 mm,
delivery outlet flange inside dia. 110 mm.

Priming system: fully automatic TROKOMAT PLUS

Gauges and controls:

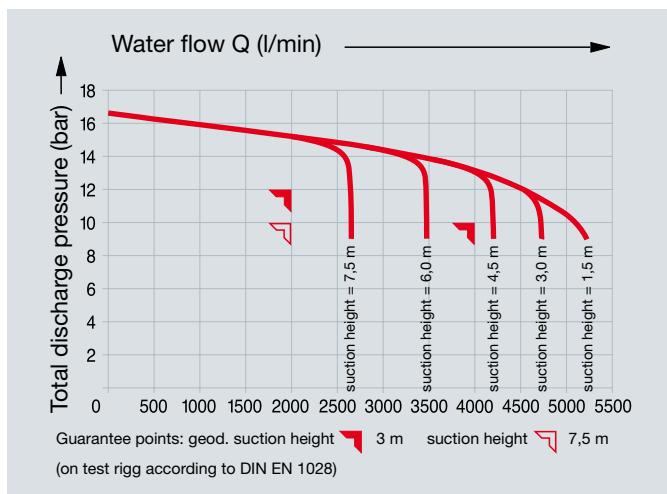
modular pump control system "Z-Control"
(sub chapter "Z-Control")

Paintwork:

silver coloured RAL 9006

Drive:

via joint shaft from p.t.o. of the vehicle gearbox

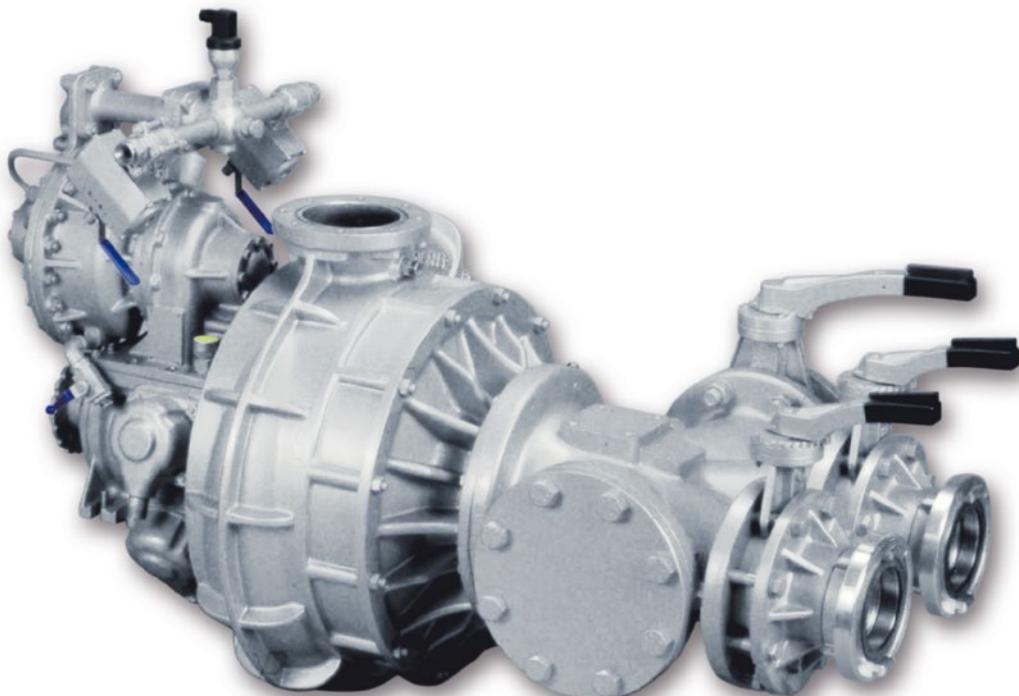
FPN 10-4000

FPN 10-4000-2, test number: AZ 104020403

Auxiliary equipment and systems

on request, additional charge:

suction inlet 2x A, alternatively 1x F, tank suction connection DN 150, up to 4 delivery outlets size B, 1 turret outlet, 2 delivery outlets to the rapid intervention lines, 1 outlet for tank filling line, installation of a pump proportioner, automatic p.t.o. engagement (ANS), automatic pressure governor (TOURMAT D), TROKOMAT PLUS shut-off, MAD 50, pumping out unit.



Pump type	Art. no.	Rpm max. min ⁻¹	Power input max. kW (HP)	Pump output max. at 10 bar Hs 3,0 m l/min	Weight approx. kg	Dimensions approx. LxWxH mm
FPN 10-6000-2HL	022136	2200	195 (265)	7200	128	750x650x700
FPN 10-6000-2HR	022137					

Basic equipment:

2stage centrifugal fire pump in clockwise or anti-clockwise rotational direction,
suction inlet flange inside dia. 196 mm,
delivery outlet flange inside dia. 126 mm.
Priming system: fully automatic TROKOMAT PLUS (4x).

Gauges and controls:

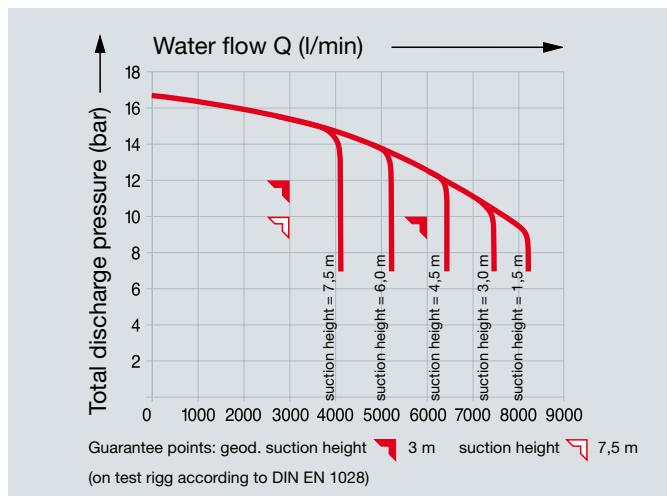
modular pump control system "Z-Control"
(sub chapter "Z-Control")

Paintwork:

silver coloured RAL 9006

Drive:

via joint shaft from p.t.o. of the vehicle gearbox

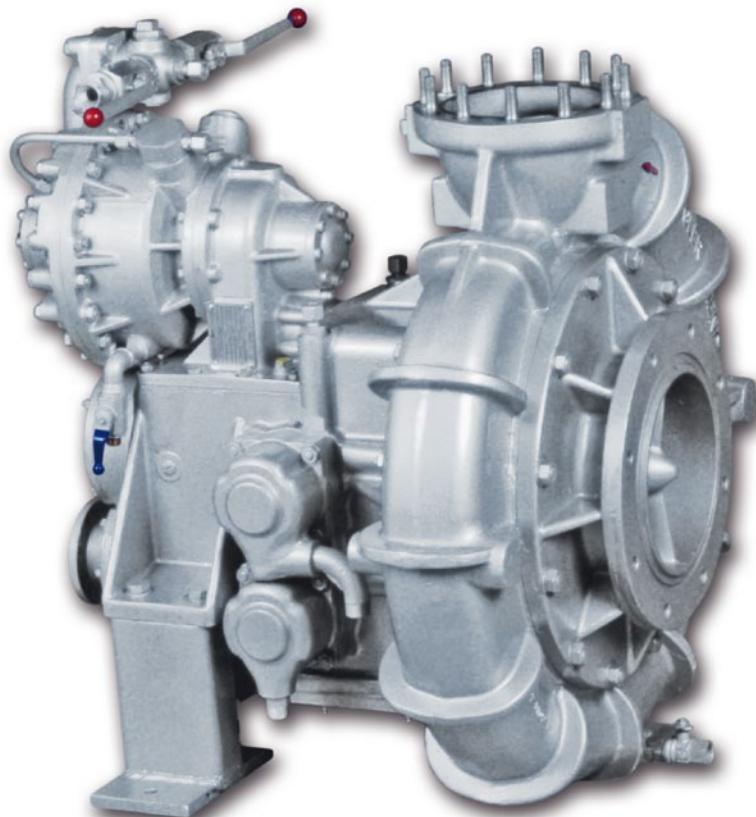
FPN 10-6000

FPN 10-6000-2, test number: AZ 106020403

Auxiliary equipment and systems

on request, additionally charged:

suction inlet 2x Storz 125, alternatively 1x DN 200, tank suction connection DN 200, up to 6 delivery outlets size B or optionally 2 delivery outlets size A lockable by intermediate flaps, up to 2 turret outlets, up to 2 delivery outlets to the rapid intervention lines, 1 outlet for tank filling line, installation of a pump proportioner, automatic p.t.o. engagement (ANS), automatic pressure governor (TOURMAT D), TROKOMAT PLUS shut-off, EAD, pumping unit.



picture showing high pressure part as well

Pump type	Art. no.	Rpm max. min ⁻¹	Power input max. kW (HP)	Pump output max. at 10 bar Hs 3,0 m l/min	Weight approx. kg	Dimensions approx. LxWxH mm
FPN 10-8000-1HR	022172	2500	270 (368)	10500	210	730x760x770
FPN 10-8000-1AR	022174					

Basic equipment:

1stage centrifugal fire pump in clockwise rotational direction,
suction inlet flange inside dia. 230 mm,
delivery outlet flange inside dia. 155 mm.

Priming system: fully automatic TROKOMAT PLUS,
integrated pump gearbox.

Gauges and controls:

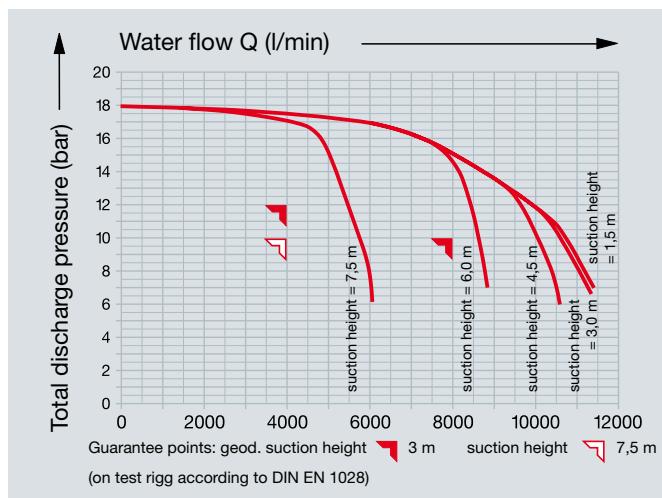
1 pressure gauge
1 mano-vacuummeter
1 working hour meter

Paintwork:

silver coloured RAL 9006

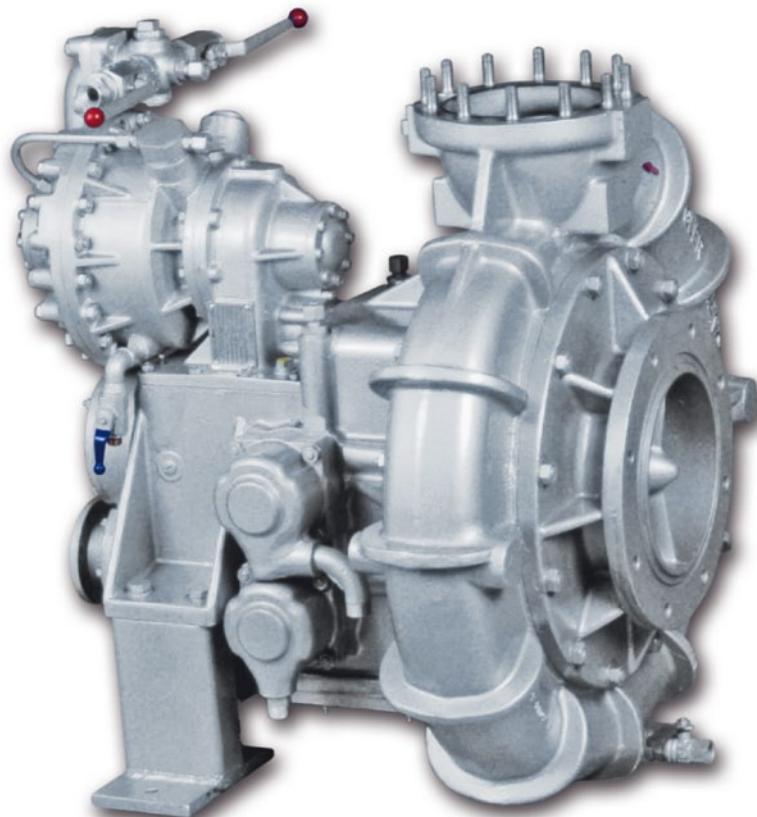
Drive:

via joint shaft from p.t.o. of the vehicle gearbox or pump unit

FPN 10-8000**FPN 10-8000-1****Auxiliary equipment and systems**

on request, additionally charged:

one central suction inlet DN 250 (to water tank), alternatively
3x F DN 150 led together via collector piece, up to 8 delivery outlets
size B or optionally 2 delivery outlets size A lockable by intermediate
flaps, up to 2 delivery outlets to the rapid intervention lines, 1 outlet
for tank filling line, up to 2 turret outlets, installation of up to 2 pump
proportioners, automatic pressure governor, TROKOMAT PLUS shut-
off, EAD.



picture showing high pressure part as well

Pump type	Art. no.	Rpm max. min ⁻¹	Power input max. kW (HP)	Pump output max. at 10 bar Hs 3,0 m l/min	Weight approx. kg	Dimensions approx. LxWxH mm
FPN 10-10000-1HR	022176	2500	330 (450)	10500	210	730x760x770
FPN 10-10000-1AR	022178					

Basic equipment:

1stage centrifugal fire pump in clockwise rotational direction,
suction inlet flange inside dia. 230 mm,
delivery outlet flange inside dia. 155 mm.

Priming system: fully automatic TROKOMAT PLUS,
integrated pump gearbox.

Gauges and controls:

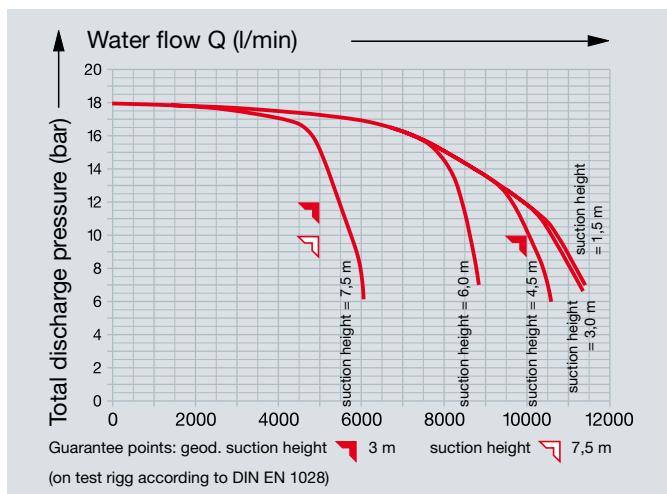
1 pressure gauge
1 mano-vacuummeter
1 working hour meter

Paintwork:

silver coloured RAL 9006

Drive:

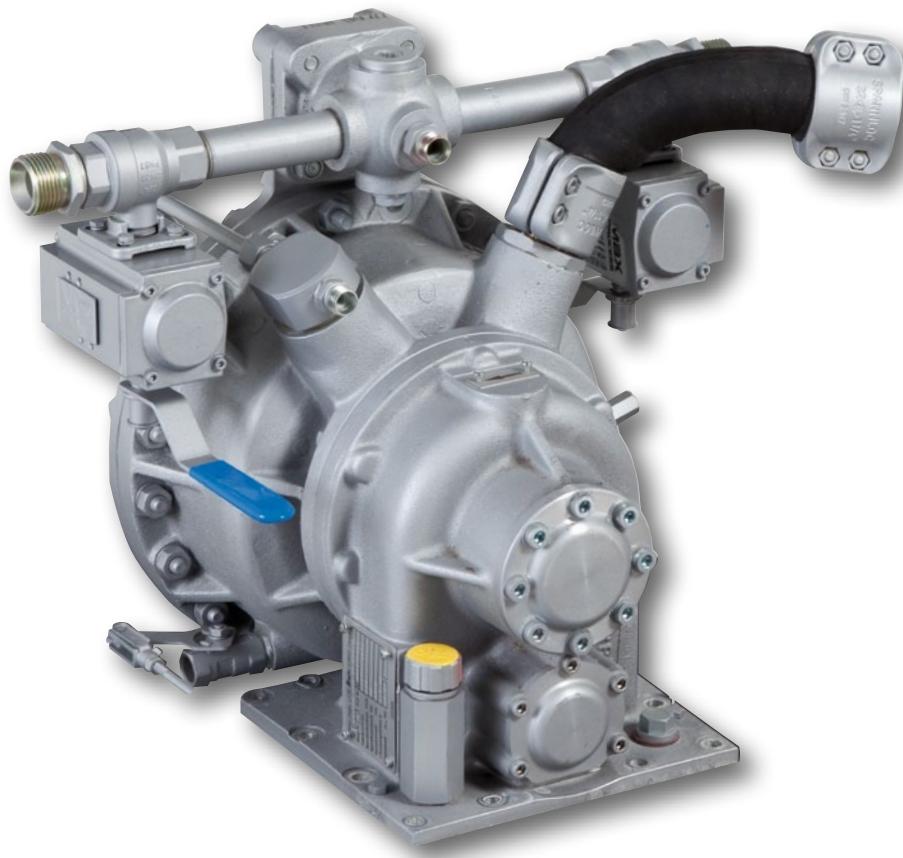
via joint shaft from p.t.o. of the vehicle gearbox or pump unit

FPN 10-10000**FPN 10-10000-1****Auxiliary equipment and systems**

on request, additionally charged:

one central suction inlet DN 250 (to water tank), alternatively
3x F DN 150 led together via collector piece, up to 8 delivery outlets
size B or optionally 2 delivery outlets size A lockable by intermediate
flaps, up to 2 delivery outlets to the rapid intervention lines, 1 outlet
for tank filling line, up to 2 turret outlets, installation of up to 2 pump
proportioners, automatic pressure governor, TROKOMAT PLUS shut-
off, EAD.



**Basic equipment:**

3stage centrifugal fire pump in clockwise or anti-clockwise rotational direction, normal pressure inlet optionally left-hand side or right-hand side with feed line, 2 Delivery outlets manually operated, Drain cock, Thermal relief line.

Gauges and controls:

1 high pressure gauge or eventually button "high pressure" in modular control panel (sub chapter "modular pump control unit Z-Control")

Paintwork:

silver coloured RAL 9006

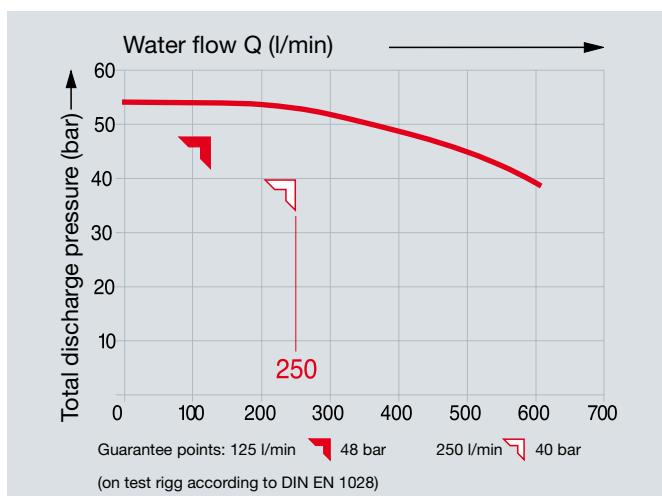
Drive:

via electro-magnetic clutch and gearbox to normal pressure pump

Auxiliary equipment and systems

on request, additionally charged:
third high pressure outlet, high pressure outlets remote-controlled, electronic pressure relief, acoustic overheat warning unit, electronic overheat protection with automatic water exchange.

Please consult us for calculations of output in combined operation (normal **and** high pressure).

FPN 40-250

FPN 40-250-3, test number: AZ 400230403

Survey of centrifugal fire pumps

Normal pressure pump	High pressure pump	Art. no.	Power input max. kW (HP)	Torque max. Nm	Weight approx. kg
FPN 10-1000-1HHL	FPH 40-250-3-L	022194	135 (184)	306	122
FPN 10-1000-1HHR	FPH 40-250-3-R	022195			
FPN 10-1000-2HHL	FPH 40-250-3-R	022088	115 (157)	290	108
FPN 10-1000-2HHR	FPH 40-250-3-L	022089			
FPN 10-2000-1HHL	FPH 40-250-3-L	022104	155 (211)	350	122
FPN 10-2000-1HHR	FPH 40-250-3-R	022105			
FPN 10-2000-2HHL	FPH 40-250-3-L	022122	140 (190)	420	147
FPN 10-2000-2HHR	FPH 40-250-3-R	022123			
FPN 10-3000-1HHL	FPH 40-250-3-L	022106	175 (238)	395	122
FPN 10-3000-1HHR	FPH 40-250-3-R	022107			
FPN 10-3000-2HHL	FPH 40-250-3-L	022124	155 (211)	455	147
FPN 10-3000-2HHR	FPH 40-250-3-R	022125			
FPN 10-4000-2HHL	FPH 40-250-3-L	022132	180 (245)	690	129 Basic pump
FPN 10-4000-2HHR	FPH 40-250-3-R	022133			
FPN 10-6000-2HHL	FPH 40-250-3-L	022138	245 (333)	1060	160 Basic pump
FPN 10-6000-2HHR	FPH 40-250-3-R	022139			
FPN 10-8000-1HHR	FPH 40-250-3-R	022173	320 (435)	1570	242 Basic pump
FPN 10-8000-1AHR	FPH 40-250-3-R	022175			
FPN 10-10000-1HHR	FPH 40-250-3-R	022177	380 (517)	1850	242 Basic pump
FPN 10-10000-1AHR	FPH 40-250-3-R	022179			
FPN 15-1000-2HHL	FPH 40-250-3-R	022090	125 (170)	300	108
FPN 15-1000-2HHR	FPH 40-250-3-L	022091			
FPN 15-2000-1HHL	FPH 40-250-3-L	022108	175 (238)	355	122
FPN 15-2000-1HHR	FPH 40-250-3-R	022109			
FPN 15-2000-2HHL	FPH 40-250-3-L	022126	160 (218)	440	147
FPN 15-2000-2HHR	FPH 40-250-3-R	022127			
FPN 15-3000-1HHL	FPH 40-250-3-L	022110	200 (272)	410	122
FPN 15-3000-1HHR	FPH 40-250-3-R	022111			
FPN 15-3000-2HHL	FPH 40-250-3-L	022134	220 (300)	780	129 Basic pump
FPN 15-3000-2HHR	FPH 40-250-3-R	022135			



Assignment of pumps for fire fighting vehicles

Pump type	Standard vehicles						Special vehicles		
	StLF 10/6	(H)LF 10/6	(H)LF 20/16	TLF 16/24 Tr	TLF 20/40	TLF 20/40 SL	TLF SLF	FLF	Industry
FPN 10-1000	x	x					x		
FPN 10-2000			x	x	x	x	x		
FPN 10-3000							x	x	x
FPN 10-4000							x	x	x
FPN 10-6000							x	x	x
FPN 10-8000							x	x	x
FPN 10-10000							x	x	x



Z-Control

BKT – The proven control panel Ergonomic and clear – at a glance

The pump operator's stand located in the rear of the vehicle features optimum arrangement of all switches necessary for the operation of the pump unit. The controls are clear at a glance. If desired, the control panel also can be swivel-type design, thus particularly easy to maintain.

Z-Control – the new dimension of pump operation

In close connection with the launch of the new Z-Cab in summer 2011 is the completely adapted vehicle electrical system, visible for the user by the new control panel Z-Control replacing the present pump control panel BKT which still will be available until.

Already at the BKT control panel clear arrangement and ease of operation have been the guiding design principles which have been permanently continued and perfected at the Z-Control. Despite of various functionalities and state-of-the-art technology the pump operation has to be simple, logical and controllable even in critical situations.

Z-Control meets these requirements and provides simple operation, ergonomics and continuous control logic of sophisticated technology and convincing modularity.

The complete arrangement of the controls meets the recommendations for standardization of pump control of the German Fire Service Association DFV. Large, glove-fitting keys with tactile and visual feedback, visibility and ease of access of all controls and indicators simplify the operation and avoid operating errors even under stress and adverse environmental influences.

The same user and control logic at the uniform designed control-sections light mast control, pump control, turret stand and control unit in the driver's cab allows intuitive operability by use of standard industrial components. Safety will be provided by tightness of the housings against water and dust according to protection class IP 65.

On customer request the Z-Control will be available with analogous or digital displays. The corresponding equipment of the keys and control lights is dependent on the outfit of the pump unit and the complete vehicle.



Z-Control digital – long



Control panel	Module	Variants e.g.	
1	basic module	pump functions	TOURMAT, high pressure, rapid intervention reel
2	tank module water	tank indication water	level adjustment, high pressure, rapid intervention reel
3	display	pressure gauges, indicator, display	rpm counter, diagnostic, tank filling pressure
4	special extinguishing agent	operation/control pressure proportioning unit	operation/control compressed air foam
5	tank module special extinguishing agent	tank indication foam	tank filling, flushing foam filling pump
6	special functions	special functions e.g. turret	special functions e.g. generator
7	lighting	Tri-Blitz, ambiance lighting	roof lighting

Z-Control analogous – long



Control panel	Module	Variants e.g.	
1	basic module	pump functions	TOURMAT, high pressure, rapid intervention reel
2	tank module water	tank indication water	level adjustment, high pressure, rapid intervention reel
3	display	pressure gauges, indicator	rpm counter, diagnostic, tank filling pressure
4	special extinguishing agent	operation/control pressure proportioning unit	operation/control compressed air foam
5	tank module special extinguishing agent	tank indication foam	tank filling, flushing foam filling pump
6	special functions	special functions e.g. turret	special functions e.g. generator
7	lighting	Tri-Blitz, ambiance lighting	roof lighting



Z-Control digital – short



Control panel	Module	Variants e.g.	
1	basic module	pump functions, simple foam functions	TOURMAT, high pressure, rapid intervention reel, lighting
2	tank module	tank indication water and/or foam	level adjustment, high pressure, rapid intervention reel
3	display	pressure gauges, indicator, display	rpm counter, diagnostic, tank filling pressure

The variant “Z-Control” analogous (short) is available with pressure gauges, indicators and also without display.



Foam/Water turrets

ZIEGLER provides a comprehensive range of water, foam and powder turrets. Thanks to the long-standing experience in development of such turrets an optimum adjustment to the ZIEGLER pump technology and the ZIEGLER proportioning systems has been achieved. Thus, excellent performance values at high reliability are guaranteed. Based on the corresponding intended pump output the matching pump, turret and proportioner configuration can be arranged for any requirement.

The variety of the ZIEGLER turrets worldwide in use bears witness to the quality, reliability and the technical progress of these products.

At the foam-water turrets the foaming ratio is depending on the used foaming agent concentrate and is on average at 1:6 up to 1:8 with protein foaming agents, at 1:12 up to 1:15 with synthetic foaming agents.

Features of the ZIEGLER turrets are the optimum throws and the small friction losses thanks to the aerodynamically efficient supply of extinguishing agent.

Joints on ball bearings with mechanic or gas spring-supported force balancing provide high stability against shocks during driving and vibrations as well as the smooth running of all movements. Due to use of sea-water and brackish water-resistant aluminium alloys a high corrosion resistance at light-weight design is achieved. All water-bearing parts are anodized.

At foam pipes up to 3000 l/min a self-aspiration of the foam agent can be arranged. Turrets without self-aspiration are available with a switchable flow rate reduction to 50 %.

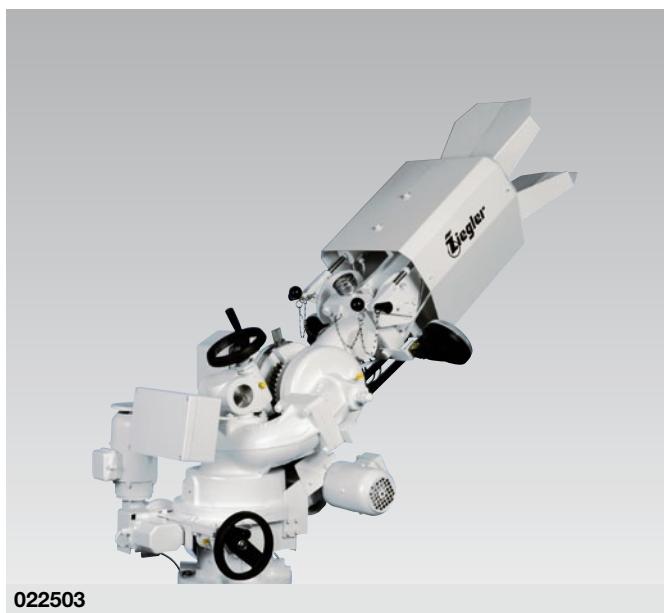
The adjustment of the jet pattern is made by deflectors or multiple-gallonage nozzles also being particularly suitable for mixtures of AFFF and water. Air foam branchpipes are designed as combination pipes for water and/or air foams as well as for AFFF-foams.

At all remote-controlled turrets a central cable duct and an emergency manual operation are provided.

**Survey for assignment of the turret series according to flow rate**

Flow rate l/min Water	Flow rate kg/s Powder	Operation electrically remote-controlled	Operation manually	Inside controlled	Carriage	Self- aspirating	Flow rate adjustment*
200		Viper					
800		Viper					
1000		Viper					
1000	6	Viper-Double pipe					
1200		Viper, Python	Kobra	Mamba	Kobra	Kobra	Kobra, Mamba, Python
1600		Viper, Python	Kobra	Mamba	Kobra	Kobra	Kobra, Mamba, Python
1600 - 3600	10/20 10/20/30/40	Python-Double pipe Python	Kobra				
2400		Python	Kobra	Mamba	Kobra	Kobra	Kobra, Mamba, Python
3000		Python	Kobra	Mamba	Kobra	Kobra	Kobra, Mamba, Python
3600		Python	Kobra	Mamba	Kobra	Kobra	Kobra, Mamba, Python
4000		Boa	Boa				Boa
4500		Boa	Boa				Boa
5000		Boa	Boa				Boa
6000		Boa	Boa				Boa

Foam/Water turret BOA



Turret pipe	combination pipe or multiple gallonage nozzle
Jet adjustment	deflector at combination pipe
Flow rate adjustment	100 % - 50 %
Operation turret pipe	electrically or manually emergency control via hand lever central cable duct connection 45° DIN or tank wagon flange up to 4000 l/min connection 90° with square flange from 4500 l/min
Operation turret body	electrically or manually emergency control via hand lever
Swivel range horizontally	330° at electrical operation 360° at manual operation
Swivel range vertically	-15° bis +60°
Options	searchlights (2 pcs.) proportional control position indication MAZ 4000 remote-control via joy-stick switchboard with control portable control panel support locking at combination pipe

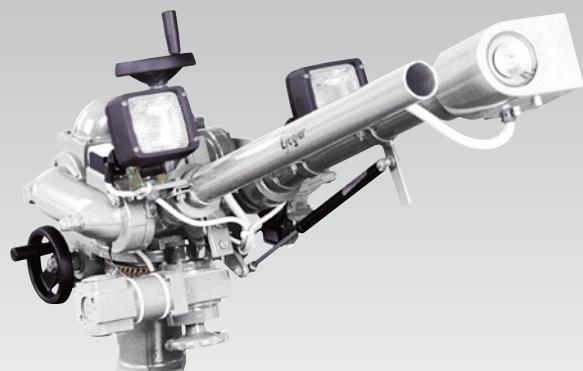
Throw m					Weight Basic type approx. kg
Q (l/min) at 10 bar	4000	4500	5000	6000	142
Water	70	85	80	85	
Foam	60	65	70	75	



Foam/Water turrets VIPER



022500



022499

	Standard	Double pipe	
Turret pipe	combination pipe or multiple gallonage nozzle	multiple-gallonage nozzle	powder pipe powder nozzle up to 6 kg/s
Jet adjustment	deflector	infinitely	no
Flow rate adjustment	no	no	no
Operation turret pipe	electrically no emergency control		
Operation turret body	electrically	electrically with disengageable friction coupling	
Swivel range horizontally	330° as bumper turret 180°		
Swivel range vertically	-15° up +60°		
Options	searchlights (2 pcs.) water inlet vertical or horizontal remote-control via joy-stick switchboard with control friction clutch	searchlights (2 pcs.) remote-control via joy-stick switchboard with control	

		Throw m		Weight Basic type approx. kg
Q (l/min) at 10 bar	800	1200 (1000 Double pipe)	1600 (not for Double pipe)	25
Water	40	45	50	
Foam	30	35	40	
Multiple gallonage nozzle water	35	40	45	

Foam/Water turrets PYTHON



	Standard	Double pipe	
Turret pipe	combination pipe or multiple gallonage nozzle	combination pipe	powder pipe powder nozzle up to 10 und 20 kg/s
Jet adjustment	deflector at combination pipe	deflector	no
Flow rate adjustment	100 % - 50 %	100 % - 50 %	no
Operation turret pipe	electrically emergency control via hand lever		
Operation turret body	electrically with disengageable friction coupling		
Swivel range horizontally	330° at electrical operation		
Swivel range vertically	-15° up to +60°		
Options	searchlights (2 pcs.) proportional control position indication MAZ 4000 remote-control via joy-stick switchboard with control portable control panel support locking at combination pipe		

Throw m					Weight Basic type approx. kg
Q (l/min) at 10 bar	1600	2400	3000	3600	100
Water	55	60	65	70	
Foam	45	50	55	60	



Foam/Water turrets KOBRA



022504

Turret pipe	combination pipe (with self-aspiration)
Jet adjustment	deflector
Flow rate adjustment	100 % - 50 % only at combination pipe without self-aspiration
Operation turret pipe	hand lever
Operation turret body	hand lever, hand wheel
Swivel range horizontally	360°
Swivel range vertically	-15° up to +60°
Options	on carriage or on trailer

Throw m					Weight Basic type approx. kg
Q (l/min) at 10 bar	1600	2400	3000	3600	
Water	55	60	65	70	100
Foam	45	50	55	60	
Self-aspiration	70	60	-	-	

Foam/Water turrets MAMBA



022501

Turret pipe	combination pipe or multiple gallonage nozzle
Jet adjustment	deflector at combination pipe
Flow rate adjustment	100 % - 50 %
Operation turret pipe	deflector adjustment and flow rate adjustment via cable pull
Operation turret body	hand lever directly from driver/crew cab
Swivel range horizontally	330°
Swivel range vertically	-15° up to +60°
Options	multiple gallonage nozzle electrically operated

Throw m					Weight Basic type approx. kg
Q (l/min) at 10 bar	1600	2400	3000	3600	95
Water	55	60	65	70	
Foam	45	50	55	60	





Foam proportioning systems

ZIEGLER provides by its versions of foam proportioning units a wide spectrum for all user requirements.

Proportioning systems on the suction side of the pump such as the ZIEGLER pump proportioner (ZPV) are sucking foaming agent according to the ejector pump principle and are available with variable dosage units, from the manually operated dosage valve via the mechanic-automatic dosage unit (MAD) with three pre-adjusted proportioning rates up to the electronic-automatic dosage unit (EAD) with infinite modification of the proportioning rates.

At proportioning systems on delivery side ZIEGLER offers various versions:

The spectrum ranges from a maximum volume flow of the foam agent from 12 l/min (Foam System 12) via 24 l/min (Foam System 24) and 240 l/min (Foam System 240) up to maximum 600 l/min at Foam System 600 with the ZIEGLER foaming agent pump with hydrostatic drive.

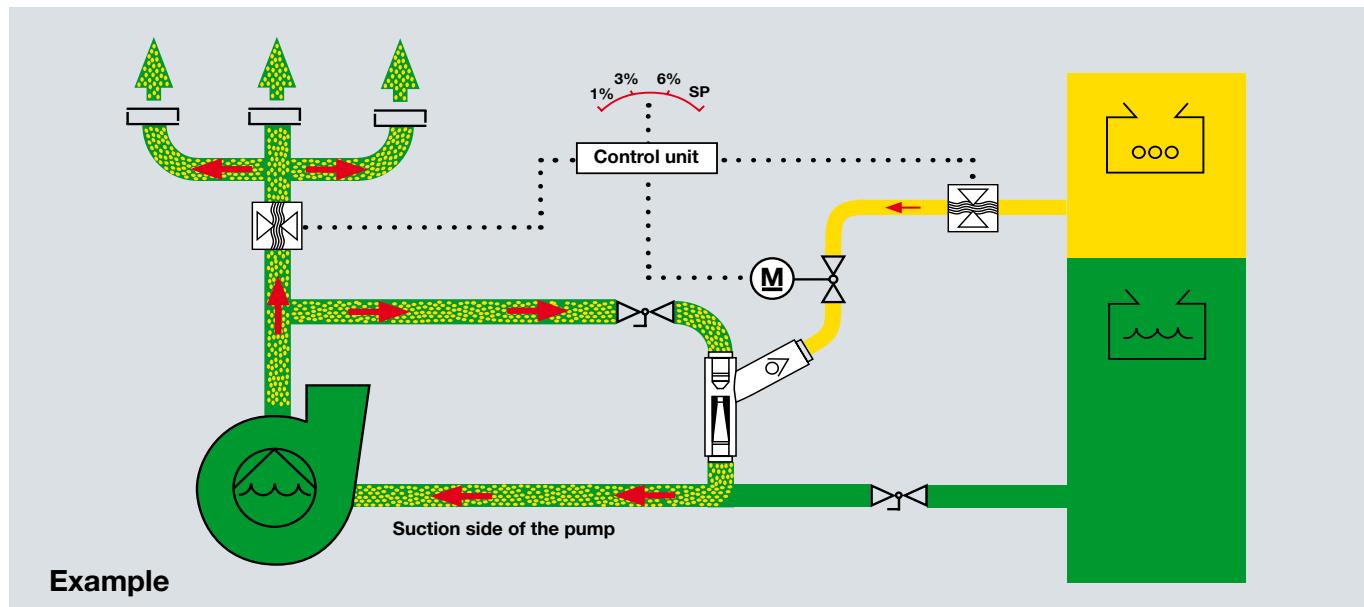
At the most comfortable type ZIEGLER PROFOMAT any delivery outlet can be triggered with an individual proportioning rate.

For the generation of compressed-air foam (CAFS) the versions POWER FOAM PRO 12 and POWER FOAM PRO 24 are available. The foaming agent will be supplied via a water-driven turbine and a toothed wheel pump and the compressed air will be fed from an installed compressor. The reliable Z-control monitors all functions and is easily and safely operated.



Proportioning systems on suction side

Proportioning units supplying foaming agent on pump inlet side.



Type*	Flow rate foaming agent max. in l/min	Type of proportioning	Dosage adjustment	Proportioning rate	Adjustment
ZPV 50	50	Central proportioning: Constant, adjustable proportioning (foam rate or %) independent of the number of delivery outlets or consumers	The foaming agent rate has to be calculated in % dependent on the water flow rate and the desired proportioning rate and adjusted at the dosage cock	not relevant	manually
ZPV 75	75				
ZPV 100	100				
ZPV 150	150				
ZPV 200	200				
ZPV 300	300				
ZPV 400	400				
ZPV 500	500				
ZPV 600	600				
MAD 30	300				manually (3 different adjustments are possible)
MAD 50	500	The desired proportioning rate will be directly adjusted in %	1 up to 8 %	electro-pneumatically (3 different adjustments)	electronically (infinite adjustment)
EAD 30	300				
EAD 60	500				
EAD 80	700				

*ZPV – ZIEGLER Pump Proportioner

MAD – Manual Automatic Dosage Unit

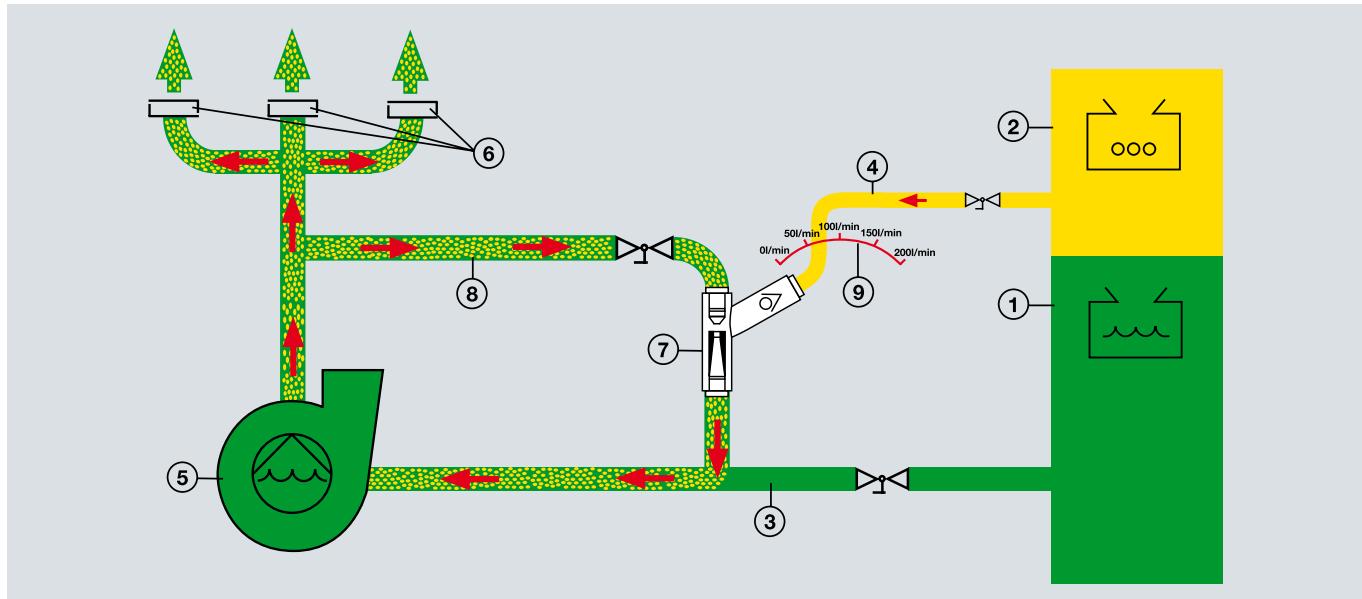
EAD – Electronic Automatic Dosage Unit

The type designation at ZPV refers to the max. foam agent delivery (ZPV 200 - max. 200 l/min foam agent delivery).

The type designation at MAD and EAD refers to the max. water delivery x 100 (EAD 60 – max. 6000 l/min water delivery).

Proportioning systems on suction side ZPV

Proportioning units supplying foaming agent on pump inlet side.



- | | |
|----------------------------|--------------------------------|
| 1. Water tank | 6. Delivery outlets |
| 2. Foam tank | 7. Pump proportioner |
| 3. Suction line water tank | 8. Feed water line |
| 4. Suction line foam tank | 9. Dial for foaming agent rate |
| 5. Centrifugal fire pump | |

ZPV ZIEGLER Pump Proportioner

The ZPV is a proportioning unit which works on the ejector pump principle. The foam concentrate is sucked in and mixed on the suction side of the pump. By a dosage lever the foaming agent rate can be adjusted. ZIEGLER pump proportioners PV are available in the following sizes: 50, 75, 100, 150, 200, 300, 400, 500 and 600.

Advantages (ejector pump principle):

- thorough mixing
- independent of counter pressure
- simple and reliable proportioning system at favourable prices

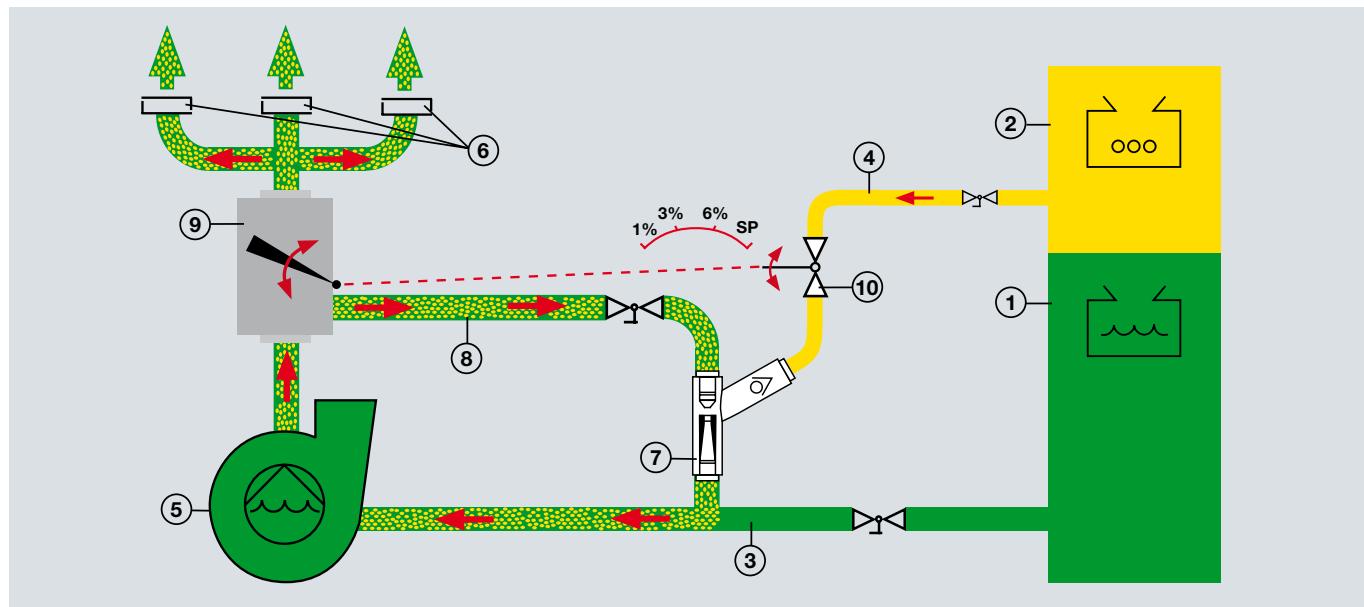
Disadvantages (ejector pump principle):

- when changing the flow rate manual readjustment is necessary
- using hydrant supply, the delivery pressure has to be 2,5 times higher
- the complete pump unit must be flushed
- reduction of output due to feed water line



Proportioning systems on suction side MAD

Proportioning units supplying foaming agent on pump inlet side.



- | | |
|----------------------------|---------------------------------------|
| 1. Water tank | 6. Delivery outlets |
| 2. Foam tank | 7. Pump proportioner |
| 3. Suction line water tank | 8. Feed water line |
| 4. Suction line foam tank | 9. Mechanic-automatic dosage unit MAD |
| 5. Centrifugal fire pump | 10. Foam adjusting lever |

ZPV MAD – ZIEGLER Pump Proportioner with a mechanic-automatic dosage unit

The proportioning unit consists of a flow-controlled admixing regulator and a pump pre-mixer. Thus, an automatic control of the foaming agent rate will be achieved. The proportioning rate can be set on three values between 1 % and 8 %.

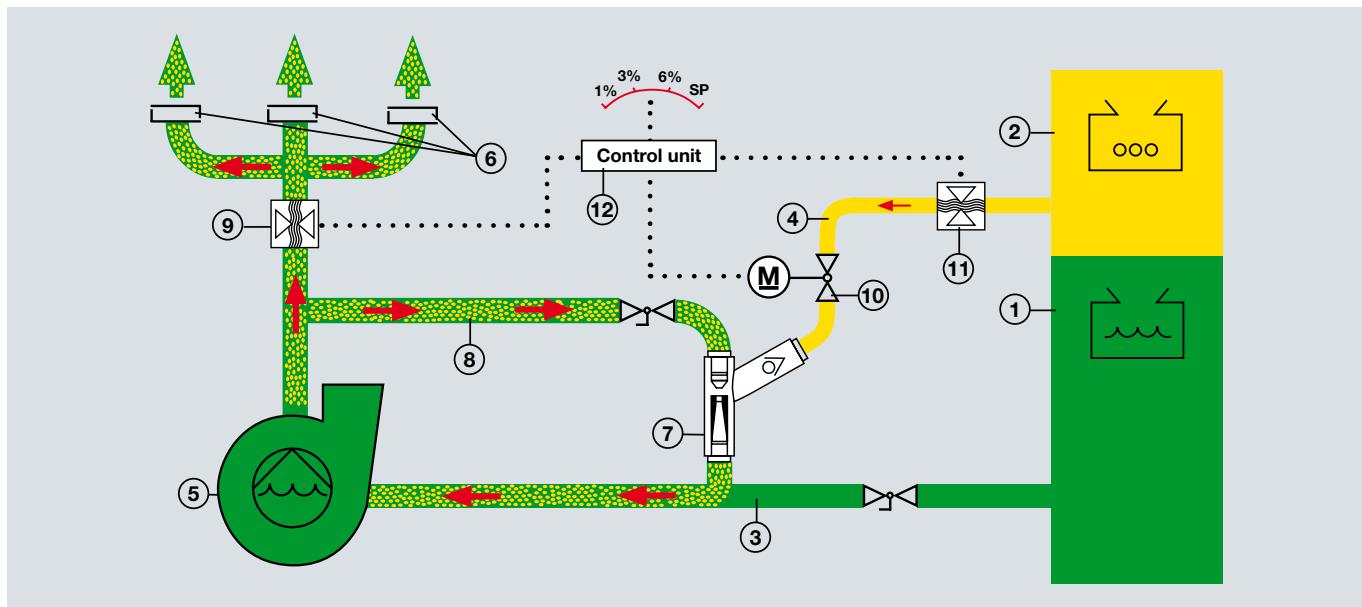
The MAD reacts quickly on variations of the flow rate and always delivers exactly the required quantity of foam concentrate to the ejector pump maintaining the selected percentage of foam.

ZPV MAD is available in two sizes:

- ZPV MAD 30 for flow rates of 1000 – 3000 l/min
- ZPV MAD 50 for flow rates of 200 – 5000 l/min, at reduction to 6 % even up to 6000 l/min

Proportioning systems on suction side EAD

Proportioning units supplying foaming agent on pump inlet side.



- | | |
|----------------------------|----------------------------------|
| 1. Water tank | 7. Pump proportioner |
| 2. Foam tank | 8. Feed water line |
| 3. Suction line water tank | 9. Flow meter water-foam mixture |
| 4. Suction line foam tank | 10. Dosage unit |
| 5. Centrifugal fire pump | 11. Flow meter foaming agent |
| 6. Delivery outlets | 12. Control system |

ZPV EAD – ZIEGLER Pump proportioner with an electronic-automatic dosage unit

The proportioning unit consists of an electromagnetic flow meter in the delivery line of the centrifugal fire pump, one additional electromagnetic flow meter as well as an electrically controlled dosage unit in the foam suction line of the pump pre-mixer.

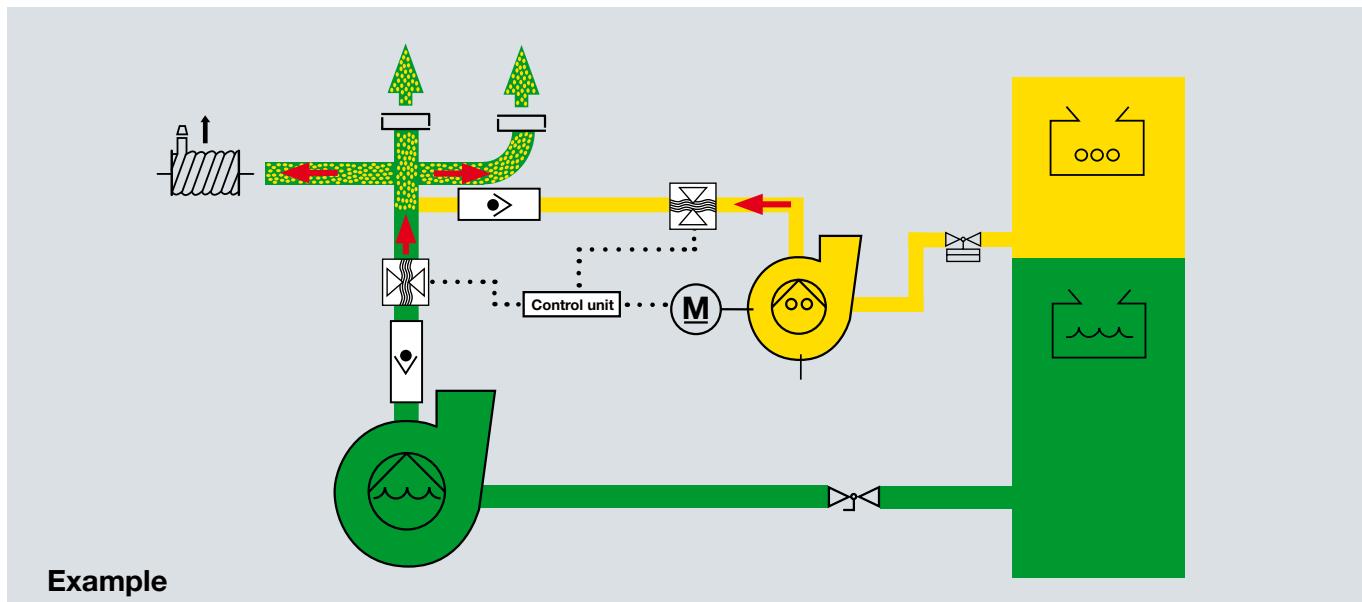
The foaming agent will be sucked in by a pump pre-mixer and fed in the suction inlet of the centrifugal fire pump. A control evaluates the signals coming from the flow meters and controls the dosage unit according the pre-selected proportioning rate.



Proportioning systems on delivery side

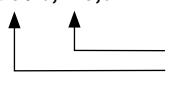
Proportioning systems on delivery side FOAM SYSTEM

Proportioning units admixing foaming agent on pump delivery side.



Type	Designation DIN 14430*	Volume flow foaming agent max. l/min	Type of proportioning
FOAM SYSTEM 12	DZA 4/0,2 - 3,0	12	Central proportioning: Constant, adjustable proportioning (foam rate or %) independent of the number of delivery outlets or consumers
FOAM SYSTEM 24	DZA 8/0,2 - 3,0	24	
FOAM SYSTEM 24	DZA 16/0,2 - 1,5	24	
FOAM SYSTEM 240**	DZA 16/0,3 - 8,0	240	Local proportioning: Adjustable proportioning rate (%) possible at any outlet.
FOAM SYSTEM 240**	DZA 24/0,3 - 8,0	240	
FOAM SYSTEM 600	-	600	

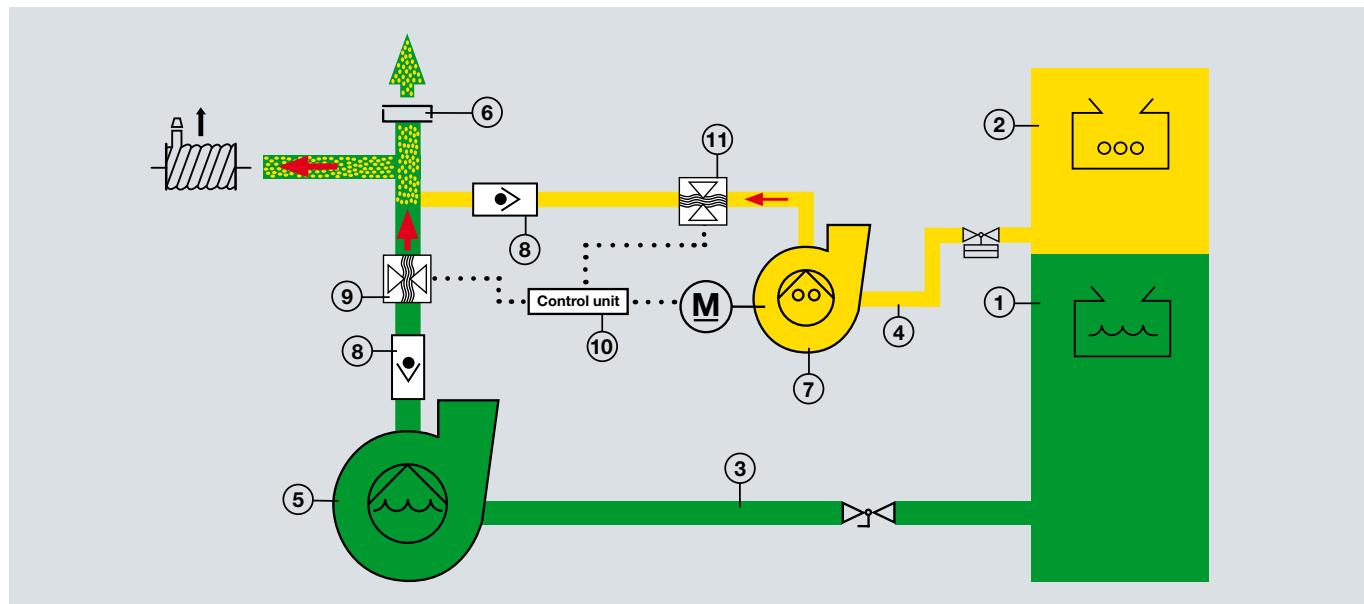
* DZA – Pressure proportioning unit 8 / 0,2-3,0



Proportioning range foaming agent in %
Nominal delivery of extinguishing agent x 100 in l/min at nominal proportioning
rate = 1 %

**Proportioning systems on delivery side FOAM SYSTEM 12**

Proportioning units admixing foaming agent on pump delivery side.



- | | |
|----------------------------|---|
| 1. Water tank | 7. Foam pump |
| 2. Foam tank | 8. Non-return valve |
| 3. Suction line water tank | 9. Flow meter water |
| 4. Suction line foam tank | 10. Control system with controls and indicators |
| 5. Centrifugal fire pump | 11. Flow meter foam agent |
| 6. Delivery outlet | |

ZIEGLER FOAM SYSTEM 12

For the generation of Class-A-foam with fire class A foaming agents and branchpipes (CM branchpipes, multiple gallonage nozzles etc.) at proportioning of 0,2 – 6 %. The proportioning rate is infinitely adjustable independent of the delivered quantity of water. By use of foam pipes (S2 – S4 respectively M2 – M4) and universal respectively fire class B foaming agents foam can be generated.

The unit can be operated at all vehicle types with FPN. We recommend vehicles with FPN and integrated tank.

Suitable for:

Vehicles with available FPN 10-1000 (e.g. LF 10/6) up to FPN 10-12000 (e.g. LF 20/16 or TLF 20/30).

Foam operation can be made via one or several hoses or a turret. The multiple gallonage nozzles have proved to be the most suitable branchpipes for use of Class-A-foam. The use of multiple gallonage nozzles supports the generation of the fine droplet spectrum.

Technical data:

Foaming agent pump: 12 l/min

Volume flow: up to 1200 l/min

Proportioning rate: 0,2 – 6 %

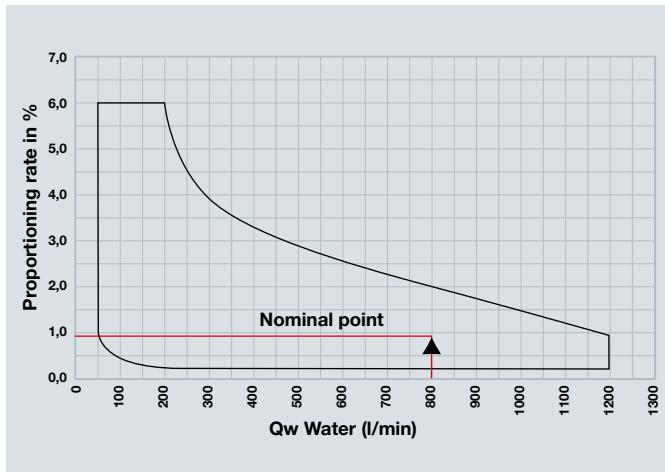
(pls. see pump characteristic line)

The ZIEGLER FOAM SYSTEM 12 consists of:

- ZIEGLER centrifugal fire pump FPN or portable pumps PFPN for delivery of the required extinguishing water,
- foam proportioning system with foaming agent pump (12 l/min), dosage unit, foam tank (Class A or universal foam) integrated in the vehicle or via foam can, electro-pneumatic selector valve for foaming agent selection at two-chamber tank, with flush position, foaming agent filter and non-return valves,
- connection foam unit with the pump pressure line,
- special foam can cover with connections for foam, supply and return, foam agent filter and non-return valves,
- volume flow up to 1200 l/min through the dosage unit,
- outlet via 1x B Storz,
- electric cabling,
- control element integrated in Z-Control,
- control panel with indication of actual volume flow, proportioning rate, water and foaming agent consumption as well as efficiency.

FOAM SYSTEM 12 DZA 4/0,2 – 3,0 DIN 14430

Diagram of foaming agent pump



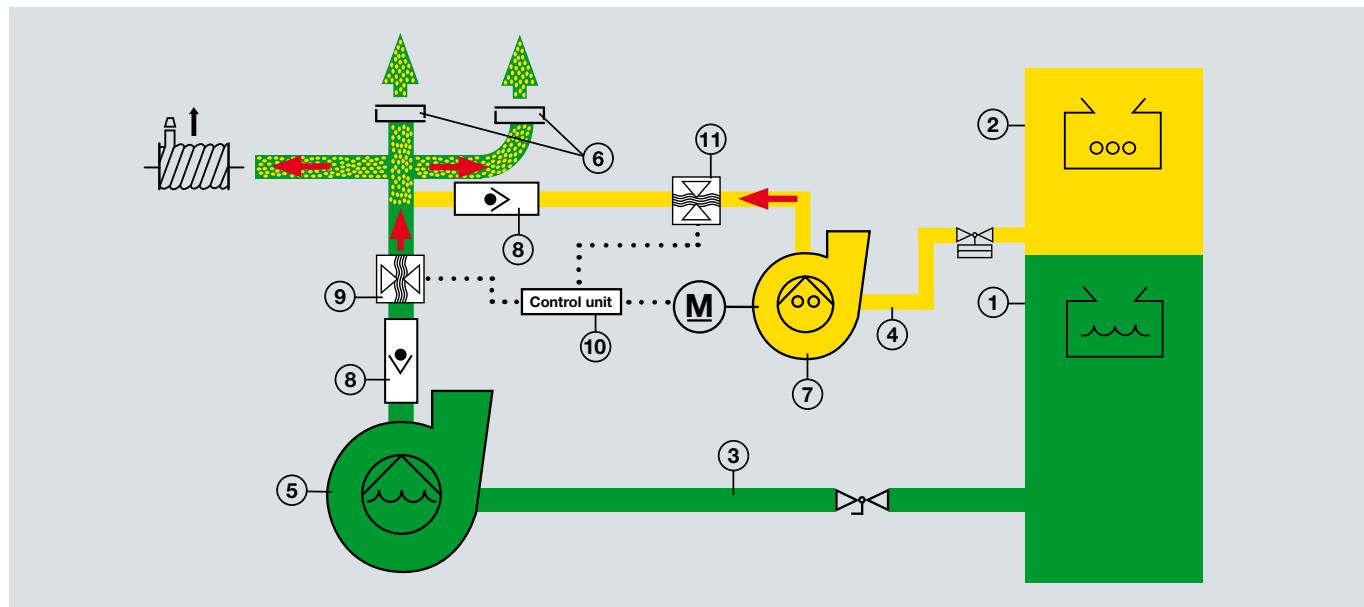
Pa max.	=	17 bar
Qa max.	=	12 l/min
Qw nominal	=	400 l/min
QW max.	=	1200 l/min
Max. adjustable proportioning rate	=	6,0 %
Min. adjustable proportioning rate	=	0,2 %
Proportioning rate at:		
QW nominal	=	3,0 %

Pa max.
 max. operating pressure foam pump
 Qa max.
 max. delivery rate foam pump
 Qw nominal
 Nominal delivery rate flow meter water
 QW max.
 max. metering range of the flow meter water



**Proportioning systems on delivery side FOAM SYSTEM 24**

Proportioning units admixing foaming agent on pump delivery side.



- | | |
|----------------------------|---|
| 1. Water tank | 7. Foam pump |
| 2. Foam tank | 8. Non-return valve |
| 3. Suction line water tank | 9. Flow meter water |
| 4. Suction line foam tank | 10. Control system with controls and indicators |
| 5. Centrifugal fire pump | 11. Flow meter foaming agent |
| 6. Delivery outlet | |

ZIEGLER FOAM SYSTEM 24

For the generation of Class-A-foam with fire class A foaming agents and branchpipes (CM branchpipes, multiple gallonage nozzles etc.) at proportioning of 0,2 – 6 %. The preset proportioning rates adjust automatically to the varying volume flows. By use of foam pipes (S2 – S4 respectively M2 – M4) and universal respectively fire class B foaming agents foam can be generated.

The unit is suitable for installation in any vehicle type with an FPN 10-1000 or an FPN 10-2000. Either 4 pipes (C, M4, S4) or a turret can be used.

The multiple gallonage nozzles have proved to be the most suitable branchpipes for use of Class-A-foam. The use of multiple gallonage nozzles supports the generation of the fine droplet spectrum.

Technical data:

Foaming agent pump: 24 l/min

Volume flow: up to 1600 l/min (1900 l/min possible, on request)

Proportioning rate: 0,2 – 6 %

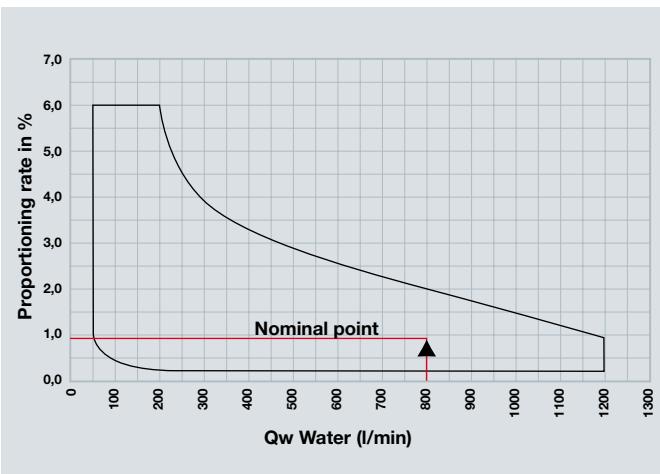
(pls. see pump characteristic line)

The ZIEGLER FOAM SYSTEM 24 consists of:

- ZIEGLER centrifugal fire pump FPN for delivery of the required extinguishing water,
- foam proportioning system with foaming agent pump (24 l/min), dosage unit, foam tank (Class A or universal foam) integrated in the vehicle, electro-pneumatic selector valve for foaming agent selection at two-chamber tank, with flush position, foaming agent filter and non-return valves,
- connection foam unit with the pump pressure line,
- volume flow up to 1900 l/min (standard 1600 l/min) through the dosage unit,
- electric cabling,
- control element integrated in Z-Control,
- control panel with indication of actual volume flow, proportioning rate, water and foaming agent consumption as well as efficiency.

FOAM SYSTEM 24 DZA 8/0,2 – 3,0 DIN 14430

Diagram of foaming agent pump

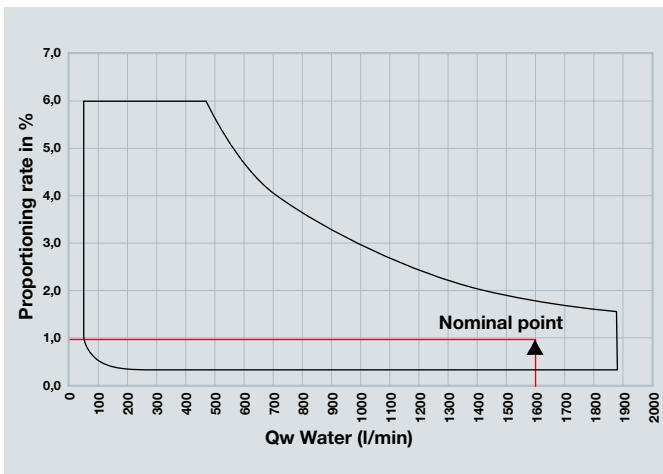


Pa max.	= 17 bar
Qa max.	= 24 l/min
Qw nominal	= 800 l/min
QW max.	= 1600 l/min
Max. adjustable proportioning rate	= 6,0 %
Min. adjustable proportioning rate	= 0,2 %
Proportioning rate at:	
QW nominal	= 3,0 %

Pa max.
 Max. operating pressure foam pump
 Qa max.
 Max. delivery rate foam pump
 Qw nominal
 Nominal delivery rate flow meter water
 QW max.
 Max. metering range of the flow meter water

FOAM SYSTEM 24 DZA 16/0,2 – 1,5 DIN 14430

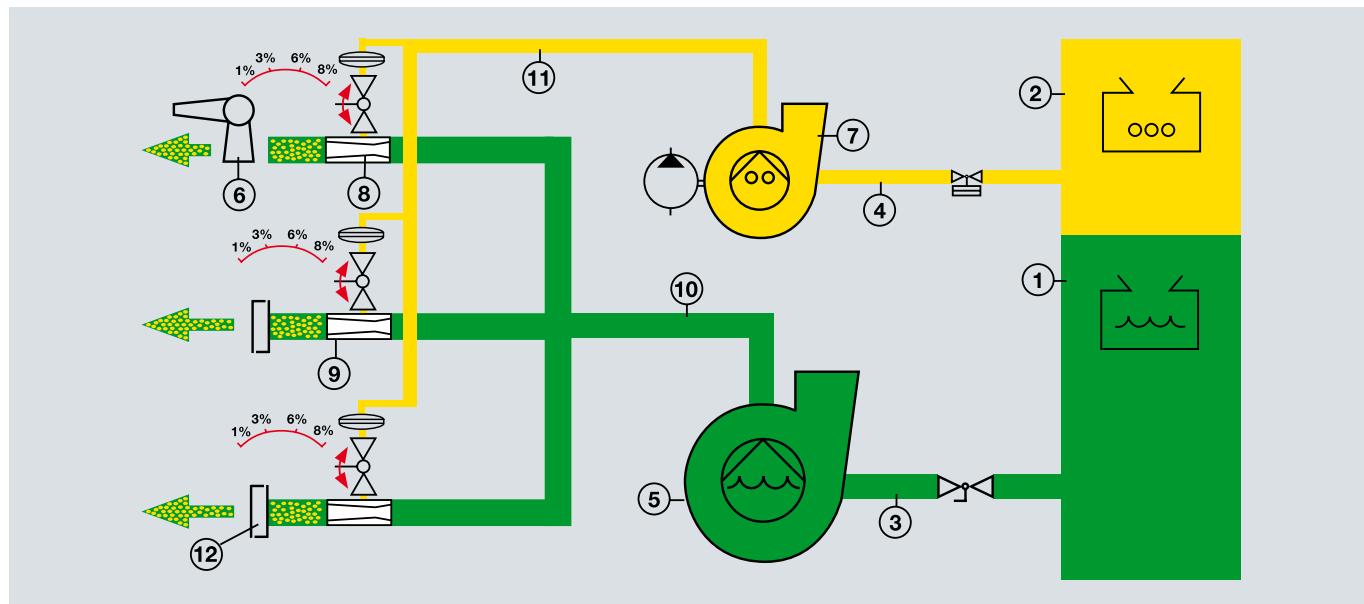
Diagram of foaming agent pump



Pa max.	= 17 bar
Qa max.	= 24 l/min
Qw nominal	= 1600 l/min
QW max.	= 1900 l/min
Max. adjustable proportioning rate	= 6,0 %
Min. adjustable proportioning rate	= 0,2 %
Proportioning rate at:	
QW nominal	= 1,5 %

**Proportioning systems on delivery side FOAM SYSTEM 240**

Proportioning units admixing foaming agent on pump delivery side.



1. Water tank
2. Foam tank
3. Suction line water tank
4. Suction line foam tank
5. Centrifugal fire pump
6. Delivery outlet turret
7. Foam pump with hydrostatic drive
8. Pressure proportioning system WSD 24*
9. Pressure proportioning system WSD 12*
10. Water line
11. Foam line
12. Delivery outlets „B“

ZIEGLER FOAM SYSTEM 240

For the generation of Class-A-foam with fire class A foaming agents and branchpipes (CM branchpipes, multiple gallonage nozzles etc.) at proportioning of 0,3 - 10 %. The proportioning rate is infinitely adjustable independent of the delivered quantity of water. By use of foam pipes (S2 – S4 respectively M2 – M4) and universal respectively fire class B foaming agents foam can be generated.

Foam operation can be made via one or several hoses or a turret. The multiple gallonage nozzles have proved to be most efficient for use of Class-A-foam. The use of multiple gallonage nozzles supports the generation of the fine droplet spectrum.

Technical data:

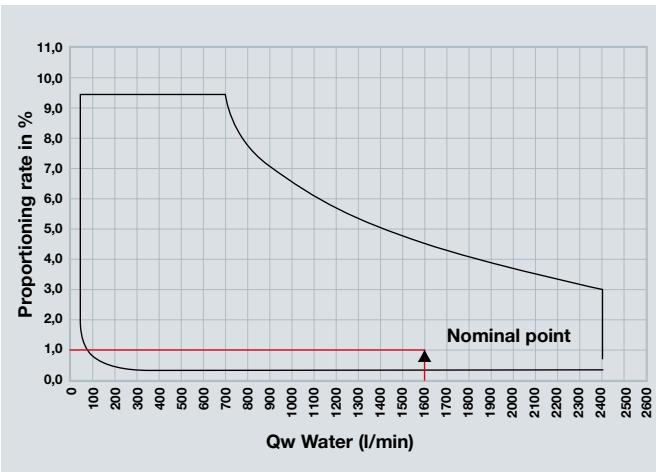
Foaming agent pump: 240 l/min
Volume flow: up to 3000 l/min
Proportioning rate: 0,3 - 10 %
(pls. see pump characteristic line)

The ZIEGLER FOAM SYSTEM 240 consists of:

- ZIEGLER centrifugal fire pump FPN for delivery of the required extinguishing water with integrated gearbox for drive of the foaming agent pump via hydraulic engine,
- foam proportioning system with foaming agent pump, dosage unit (WSD*) at the corresponding desired delivery outlets, integrated in the vehicle,
- connection foam unit at the necessary pump pressure lines,
- electric cabling,
- control element integrated in Z-Control,
- indication when the max. foam pump efficiency is reached.

FOAM SYSTEM 240 DZA 16/0,3 – 10

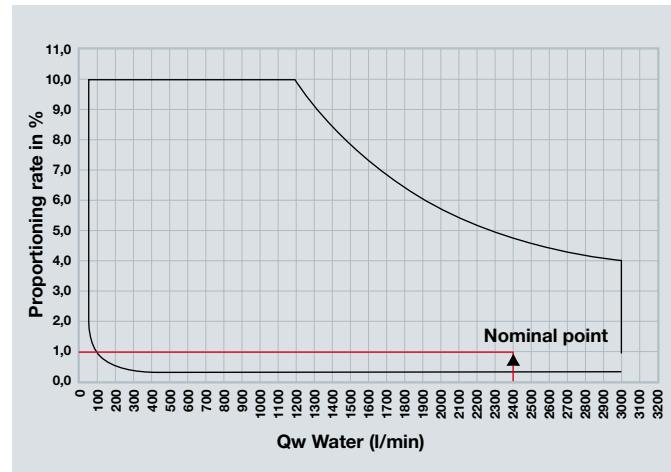
Diagram of foaming agent pump



Pa max.	=	17 bar
Qa max.	=	72 l/min (up to 240 l/min possible)
Qw nominal	=	1600 l/min
QW max.	=	2400 l/min
Max. adjustable proportioning rate	=	10,0 %
Min. adjustable proportioning rate	=	0,3 %
Proportioning rate at:		
QW nominal	=	4,5 %

FOAM SYSTEM 240 DZA 24/0,3 – 10

Diagram of foaming agent pump

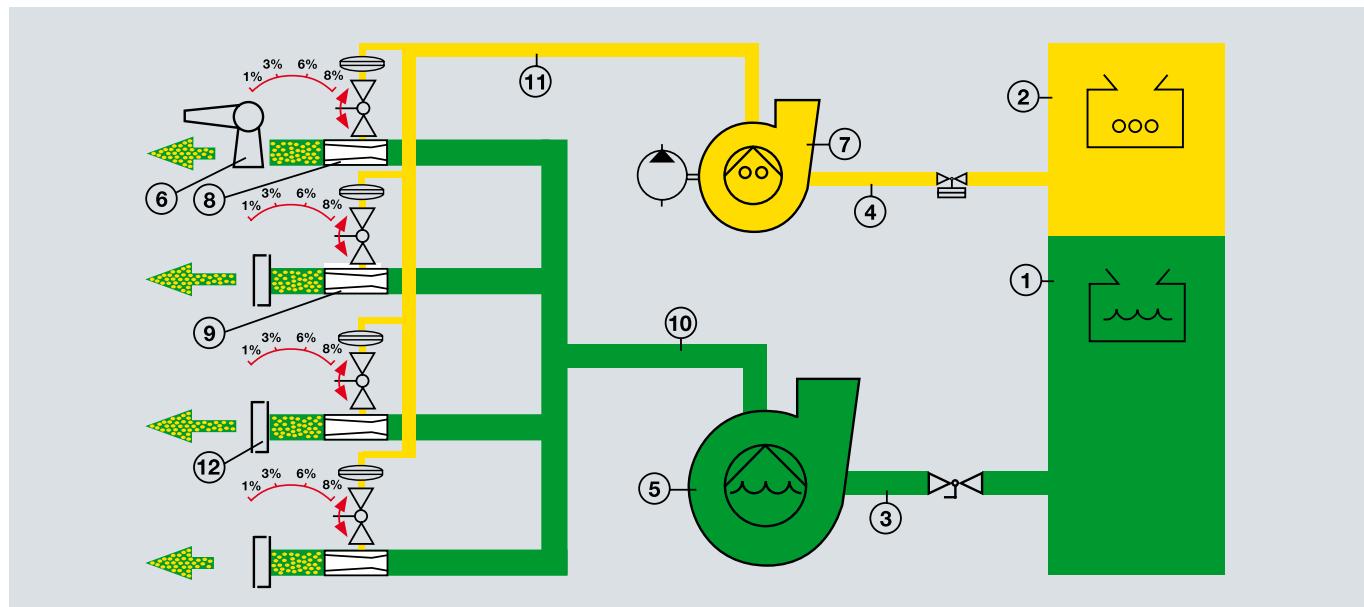


Pa max.	=	17 bar
Qa max.	=	120 l/min (up to 240 l/min possible)
Qw nominal	=	2400 l/min
QW max.	=	3000 l/min
Max. adjustable proportioning rate	=	10,0 %
Min. adjustable proportioning rate	=	0,3 %
Proportioning rate at:		
QW nominal	=	5,0 %



Proportioning systems on delivery side FOAM SYSTEM 600

Proportioning units admixing foaming agent on pump delivery side.



- | | |
|----------------------------|--|
| 1. Water tank | 7. Foam pump with hydrostatic drive |
| 2. Foam tank | 8. Pressure proportioning system WSD 50* |
| 3. Suction line water tank | 9. Pressure proportioning system WSD 12* |
| 4. Suction line foam tank | 10. Water line |
| 5. Centrifugal fire pump | 11. Foam line |
| 6. Delivery outlet turret | 12. Delivery outlets „B“ |

PROFOMAT – The automatically regulating pressure proportioning system for foam concentrates

The PROFOMAT pressure proportioning system is used for automatic and exact admixing of foam concentrates over the full pressure and delivery range of centrifugal fire pumps. The PROFOMAT system consists of one or several admixers, the dosage unit with adjustment dial, a pressure regulator, a non-return valve to the foam concentrate tank and a foam concentrate pump. The proportioner/s is/are mounted on the delivery side of the pump. The pressure water for the consumers flows through the admixer/s. By means of the dosage unit the desired proportioning rate for the foam concentrate can be adjusted manually/remote controlled. The foam concentrate is pumped from the foam concentrate pump via a pressure regulator to the admixer.

During this action the pressure of the foam concentrate must be at least 2 bar higher than the corresponding delivery pressure. In the pressure regulator the difference between water pressure and foam concentrate pressure is mechanically controlled by means of a membrane. The foam concentrate flowing through the pressure regulator and the dosage unit will be admixed via the proportioner in the pre-selected rate (percentage) to the pressure water.

Advantages/features:

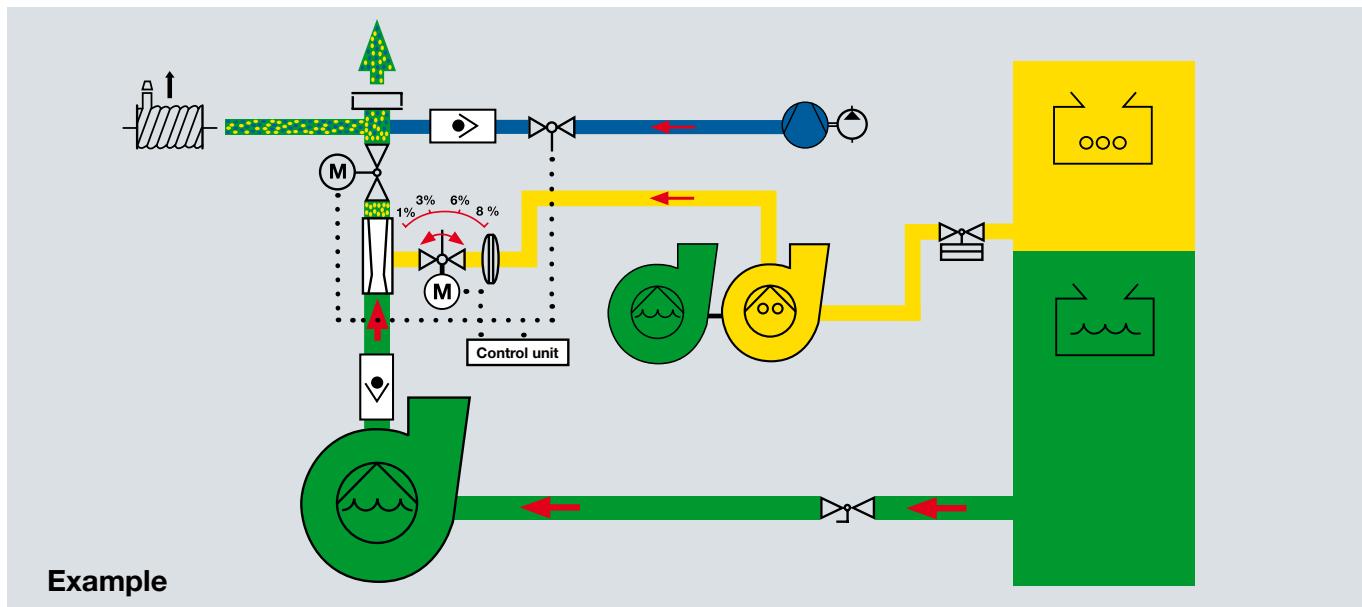
- Independent of the water flow and pressure of the water delivered from the centrifugal fire pump the admixing will remain constant as long as the pressure of the foam concentrate will remain at least 2 bar above the water pressure. During this action the output delivered from the centrifugal fire pump and the foam concentrate pump only must satisfy the requirements of the largest consumer (turret).
- If necessary, a proportioner can be provided at each output (pressure water outlets, turret, body/ground protection, etc.). In such cases the proportioner delivers according to the requirement of the maximum output.
- If individual proportioners are provided at the output, they can be supplied with water or foam concentrate solution in variable admixture (percentage of foam concentrate) suitable for the output.
- Adjustment of the percentage is infinitely variable.
- No moving parts are used and for this reason service-life is nearly infinite.

Use:

- Water/foam tenders for refineries and industrial plants.
- Local proportioning in stationary foam systems of refineries and tank farms.

Proportioning systems on delivery side POWER FOAM PRO

Proportioning units admixing foaming agent on pump delivery side.



Type	Designation DIN 14430*	Volume flow foaming agent max. l/min	Nominal volume flow air l/min	Operating pressure DLS bar	Compressor drive
POWER FOAM PRO 12	DLS 1200/400	24	1200	10	hydraulic engine via integrated pump gearbox (constant compressor rpm)
POWER FOAM PRO 24	DLS 2400/800	24	2400	10	hydraulic engine via second p.t.o. (constant compressor rpm)

* DLS – Compressed-air proportioning unit 2400 / 800

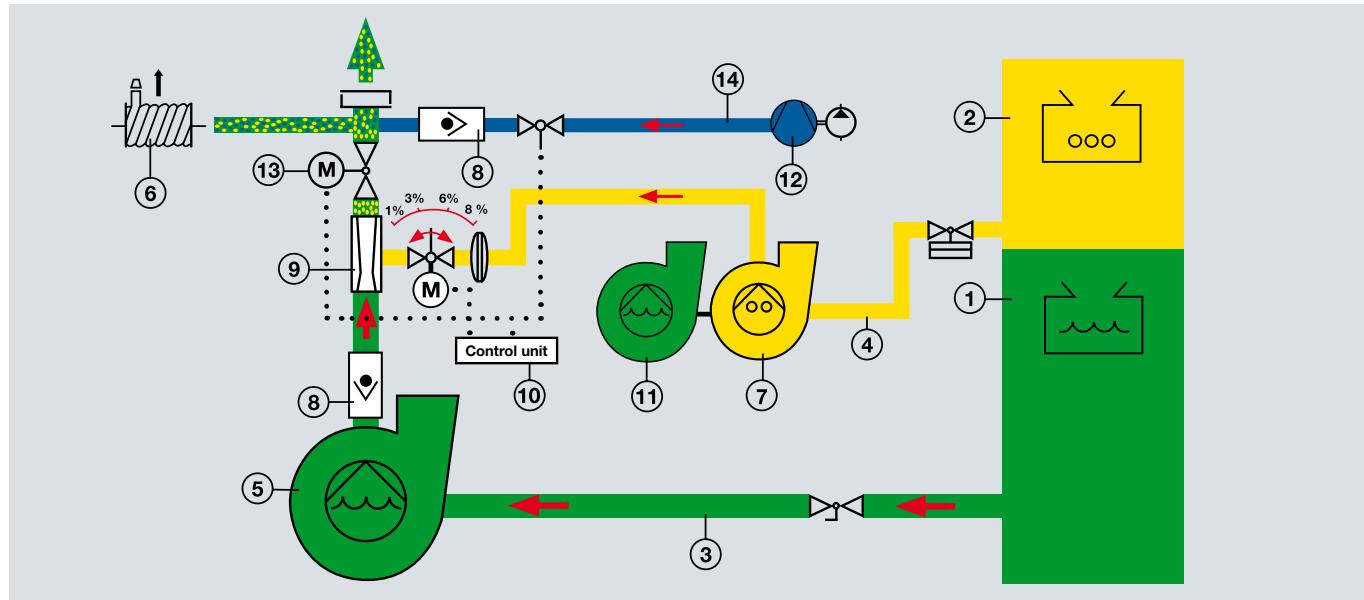




Proportioning systems on delivery side

Compressed-air foaming unit POWER FOAM PRO 12

Proportioning units admixing foam agent on pump delivery side.



- | | |
|----------------------------|---|
| 1. Water tank | 8. Non-return valve |
| 2. Foam tank | 9. Foam proportioning with percentage |
| 3. Suction line water tank | 10. Control system with controls and indicators |
| 4. Suction line foam tank | 11. Water-turbine driven foam pump |
| 5. Centrifugal fire pump | 12. Air compressor with hydrostatic drive |
| 6. Delivery outlets | 13. Wet or dry adjustment, infinitely variable |
| 7. Foam pump | 14. Air line |

ZIEGLER POWER FOAM PRO 12

For the generation of Class-A-foam and compressed-air foam. The foam proportioning rate is adjustable from 0,2 up to 6 % independent of the volume flow.

The compressor output is 1200 l/min at max. 10 bar.

Adjusting range of the compressed-air foam:

Volume ratio (Vv) air to water-foam mixture
wet: $3 \leq Vv \leq 10$
dry: $10 < Vv \leq 15$

The unit will be operated with a working pressure of max. 10 bar.

The clearly designed system is easy to operate. The complete unit can be switched on with the push of a button. During operation the unit can be switched to water, foam or CAFS-operation. Constant foam quality thanks to air control. Air supply dependent on volume flow. The unit is suitable for installation in LF 10/6, LF 20/16, TLF 10/20, TLF 20/30 et al.

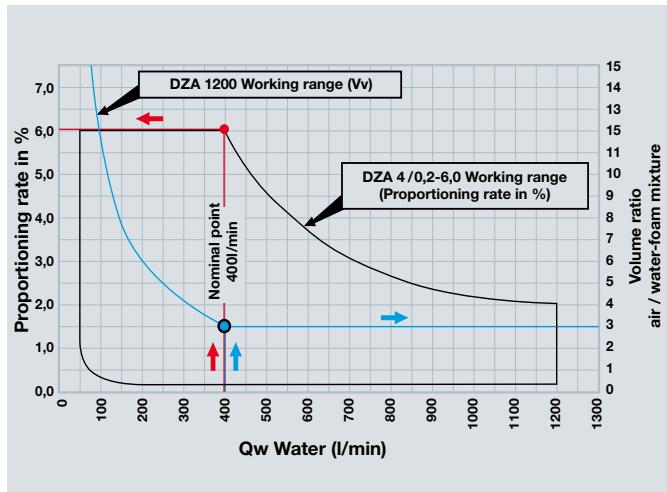
The simultaneous use of 3 pipes size C in foam as well as compressed-air foam operation (wet operation) or the use of a turret is possible.

The ZIEGLER POWER FOAM PRO 12 unit consists of:

- ZIEGLER centrifugal fire pump for delivery of the required extinguishing water,
- foam proportioning system with toothed-wheel foam concentrate pump with turbine drive via pump pressure water, foam tank, electro-pneumatic selector valve for foam concentrate selection with flushing position, compact foam proportioning module with pressure by-pass, Venturi nozzle and electrical adjustment of proportioning rate,
- rotary compressor with hydrostatic drive via integrated pump gearbox. Cooling via heat exchanger, control block for constant rpm regulation, pressure and temperature control,
- air mixing module with air injection nozzles, valve control unit (VNT) for control of the foaming wet/dry,
- standard type: delivery outlets water 1x B, delivery outlet DLS 1x B, electric indication "wet/dry", 1 foam concentrate pump.

DLS 1200/400 DIN 14430

Diagram of proportioning systems compressed-air foam unit POWER FOAM PRO 12



Technical data: foam concentrate pump

- Toothed-wheel foam concentrate pump 24 l/min
- Foam concentrate pump drive: water turbine (pump water)
- Type of proportioning: central proportioning
- Adjustment of proportioning rate: central adjustment
- Nominal delivery rate water: 400 l/min
- Max. proportioning rate at nominal delivery rate: 6,0 %
- Max. delivery rate water in foam operation at 1 % proportioning rate: 1200 l/min

Technical data: compressor

- Rotary compressor
- Compressor output: 1200 l/min at 10 bar (type up to 13 bar available)
- Compressor drive
- Hydrostatic drive with control block for constant compressor rpm
- Power consumption of compressor: 11 kW
- Compressor cooling: water-heat exchanger (pump water)

Technical data: pump operation

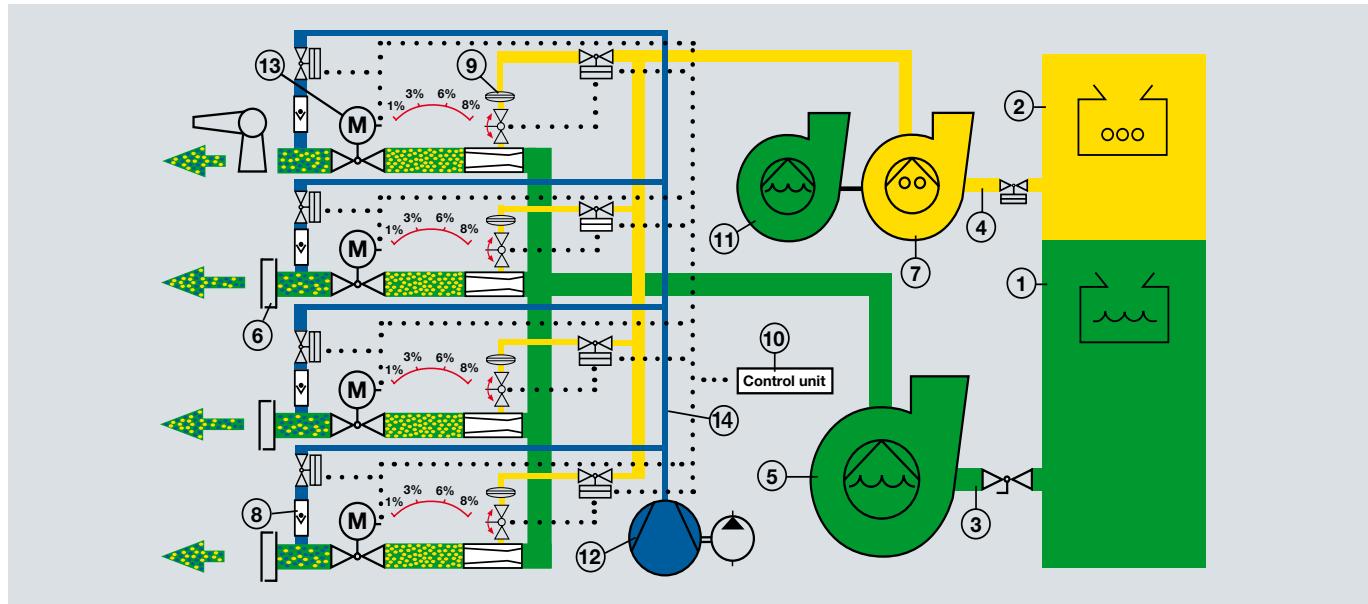
- Water operation in CAFS-line: full pump output possible



Proportioning systems on delivery side

Compressed-air foam unit POWER FOAM PRO 24

Proportioning units admixing foam agent on pump delivery side.



1. Water tank
2. Foam tank
3. Suction line water tank
4. Suction line foam tank
5. Centrifugal fire pump
6. Delivery outlets
7. Foam pump
8. Non-return valve
9. Foam proportioning with percentage
10. Control system with controls and indicators
11. Water-turbine driven foam pump
12. Air compressor with hydrostatic drive
13. Wet or dry adjustment, infinitely variable
14. Air line

ZIEGLER POWER FOAM PRO 24

For the generation of Class-A-foam and compressed-air foam. The foam proportioning rate is adjustable from 0,2 up to 6 % independent of the volume flow.

The compressor output is 2400 l/min at max. 10 bar.

Adjusting range of the compressed-air foam:

Volume ratio (Vv) air to water-foam mixture
wet: $3 \leq Vv \leq 10$
dry: $10 < Vv \leq 15$

The unit will be operated with a working pressure of max. 10 bar.

The clearly designed system is easy to operate. The complete unit can be switched on with the push of a button. During operation the unit can be switched to water, foam or CAFS-operation.

The unit is suitable for installation in LF 10/6, LF 20/16, TLF 10/20, TLF 20/30 et al.

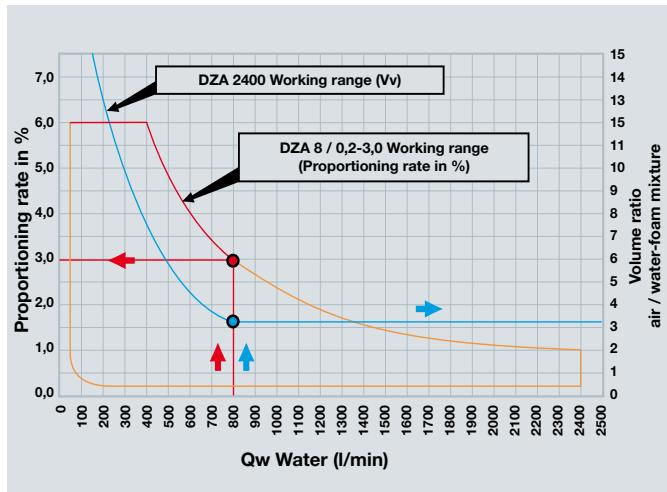
The simultaneous use of 6 pipes size C in foam as well as compressed-air foam operation (wet operation) or the use of a turret is possible.

The ZIEGLER POWER FOAM PRO 24 unit consists of:

- ZIEGLER centrifugal fire pump for delivery of the required extinguishing water,
- foam proportioning system with toothed-wheel foam concentrate pump with turbine drive via pump pressure water, foam tank, electro-pneumatic selector valve for foam concentrate selection with flushing position, compact foam proportioning module with pressure by-pass, Venturi nozzle and manual adjustment of proportioning rate (electric adjustment of the proportioning rate optionally),
- rotary compressor with hydrostatic drive via second p.t.o. Cooling via heat exchanger, control block for constant rpm regulation, pressure and temperature control,
- air mixing module with air injection nozzles, valve control unit (VNT) for control of the foaming wet/dry,
- standard type: delivery outlets water 2x B, delivery outlets CAFS 2x B, foam concentrate pump.

DLS 2400/800 DIN 14430

Diagram of proportioning systems compressed-air foam unit POWER FOAM PRO 24



Technical data: foam concentrate pump

- Toothed-wheel foam concentrate pump 24 l/min
- Foam concentrate pump drive: water turbine (pump water)
- Type of proportioning: individual proportioning per delivery outlet
- Adjustment of proportioning rate: individual adjustment per delivery outlet
- Nominal delivery rate water: 800 l/min
- Max. proportioning rate at nominal delivery rate: 3,0 %
- Max. delivery rate water in foam operation at 1 % proportioning rate: 2400 l/min

Technical data: pump operation

- Water operation in CAFS-line: full pump output possible

Technical data: compressor

- Rotary compressor
- Compressor output: 2400 l/min at 10 bar (type up to 13 bar available)
- Compressor drive
- Hydrostatic drive via second p.t.o. with control block for constant compressor rpm
- Power consumption of compressor: 20 kW
- Compressor cooling: Water-heat exchanger (pump water)

Technical data: CAFS-switching

- Individual switching per delivery outlet
- Foam quality: individual "wet/dry" adjustment per delivery outlet
- Combined operation in CAFS-lines: at each outlet optionally water or foam or compressed-air foam





Pump units

ZIEGLER pump units according to the pump size are used for medium up to heavy fire fighting actions, also with automatic foam proportioning (e.g. EAD).

They are used at disaster operations with high water demand, for pressure maintenance of ring lines in industrial plants respectively as booster pumps for water transport over long distances.

The pump units are mounted on a basic frame, thus they are either available as stationary units or mounted on a platform trailer as mobile units. The ZIEGLER units are in accordance with the "Installation guidelines of engine manufacturers". Checking of acceptance of installation has been made by the engine manufacturer. Thus, they are part of the corresponding guarantee conditions of the engine manufacturer concerning optimum technical respectively economical function.

They can be used worldwide, the cooler is of tropicalized design. The large tank capacity provides long duration of operation without refuelling in permanent operation.

The short and compact design allows transverse installation in vehicles, thus a pump operation independent of the vehicle drive is provided.

The suction and delivery connections of sizes up to DN 125 are available on customer request so that the basis has been provided for all types of application.

The simple operation via push-button on the control panel belongs to the high safety standards for the staff just as the reduced emission values of the engines which do not only adhere to international valid guidelines but surpass them.

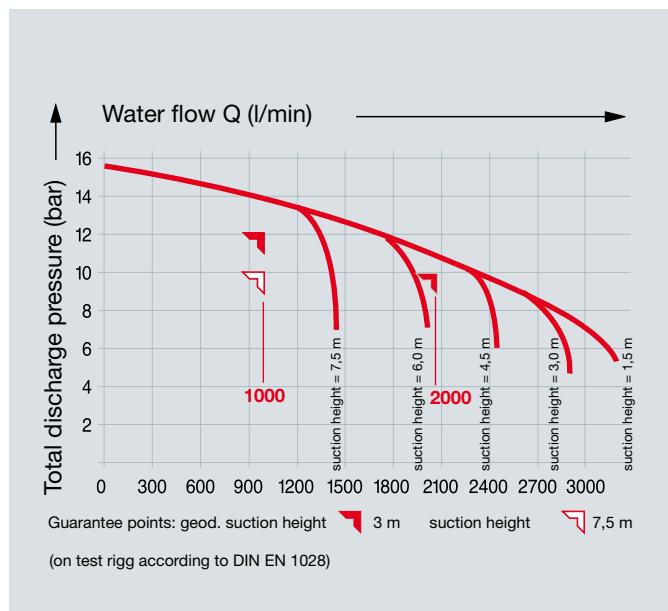
The risk of accidents during operation is limited as far as possible from the outset, e.g. by cover of the drive shaft and fan wheel, the insulation of exhaust pipes, avoiding of sharp edges as well as the cover of tank and batteries as protection against overheating.



FPN 10-2000-1A



FPN 10-2000-1A



Pump type	Art. no.	Engine	Pump output max. at 10 bar Hs 3,0 m l/min	Weight approx. kg	Dimensions approx. LxWxH mm
FPN 10-2000-1 with set-up gearbox, transmission i = 1:1,35	1061791	VW industrial Diesel engine type TDI 2,0-463 MC engine with 4 cylinders in line water-cooled, 63 kW (85 HP) electric starter battery 12 V/66 Ah generator 12 V/90 A fuel tank approx. 50 l	2200	650	2000x1000x1200

Basic equipment

1 stage centrifugal fire pump,
1 suction inlet size A,
2 delivery outlets size B with self-closing DIN-screw down valves,
suction inlets and delivery outlets with blank cap.

Priming system: fully automatic TROKOMAT PLUS with cover

Auxiliary equipment and systems

on request, additionally charged:
suction inlet respectively delivery outlets on customer request
automatic pressure governor (TOURMAT), single axle platform trailer.

Gauges and controls

Pressure gauge and mano-vacuummeter.
All instruments and switches for engine operation and control are integrated in an instrument box.

Pump drive

via joint shaft and elastic coupling

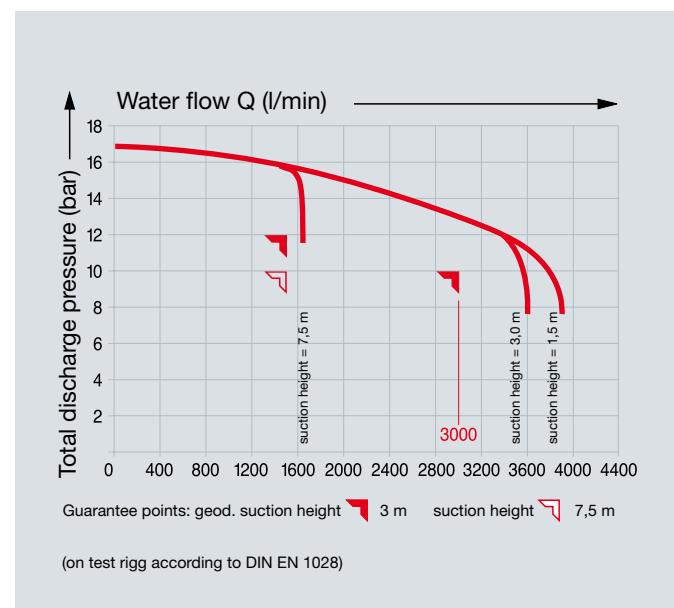
Paintwork

basic frame black
pump silver coloured RAL 9006
cover red RAL 3000

FPN 10-3000-1A



FPN 10-3000-1A



Pump type	Art. no.	Engine	Pump output max. at 10 bar H_s 3,0 m l/min	Weight approx. kg	Dimensions approx. LxWxH mm
FPN 10-3000-1 with set-up gearbox, transmission $i = 1:2,1$	1029829	Deutz industrial Diesel engine type TCD 2013 L04 engine with 4 cylinders in line water-cooled, 129 kW (175 HP) electric starter battery 12 V/88 Ah generator 12 V/80 A fuel tank approx. 90 l	3500	1250	2400x1000x1750

Basic equipment

1 stage centrifugal fire pump,
1 suction inlet size A,
4 delivery outlets size B with self-closing DIN-screw down valves,
suction inlets and delivery outlets with blank cap.

Priming system: fully automatic TROKOMAT PLUS with cover

Auxiliary equipment and systems

on request, additionally charged:
suction inlet respectively delivery outlets on customer request
automatic pressure governor (TOURMAT), tandem platform trailer acc. to art. no. 1007531.

Gauges and controls

Pressure gauge and mano-vacuummeter.
All instruments and switches for engine operation and control are integrated in an instrument box.

Pump drive

via joint shaft and electromagnetic clutch

Paintwork

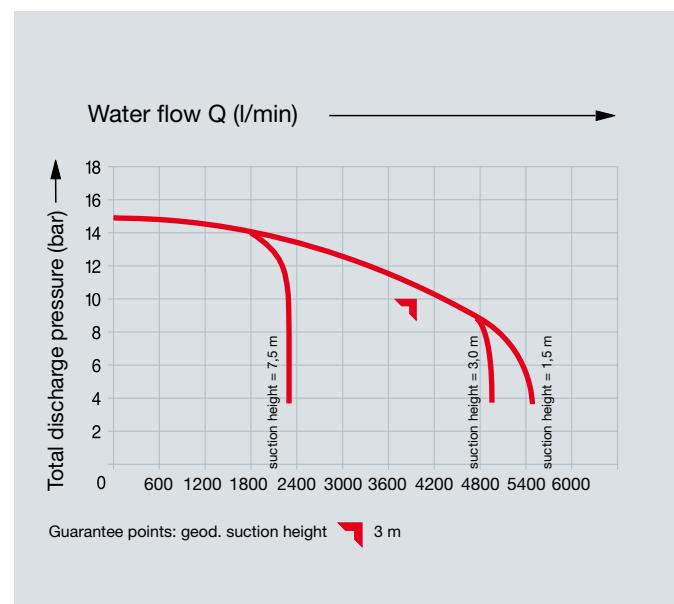
basic frame black
pump silver coloured RAL 9006
cover red RAL 3000



FPN 10-4000-2A



FPN 10-4000-2A



Pump type	Art. no.	Engine	Pump output max. at 10 bar HS 3,0 m l/min	Weight approx. kg	Dimensions approx. LxWxH mm
FPN 10-4000-2	1024453	Mercedes-Benz Diesel engine Type OM 904 LA engine with 4 cylinders in line turbocharged and charge-cooled water-cooled, 129 kW (175 HP) electric starter battery 12 V/88 Ah generator 28 V/80 A fuel tank approx. 100 l	4200	1260	2870x1000x1750

Basic equipment

2 stage centrifugal fire pump,
2 suction inlets size A,
4 delivery outlets size B with self-closing DIN-screw down valves,
suction inlets and delivery outlets with blank cap.

Priming system: fully automatic TROKOMAT PLUS with cover

Auxiliary equipment and systems

on request, additionally charged:
suction inlet respectively delivery outlets on customer request
automatic pressure governor (TOURMAT), single axle platform trailer
acc. to art. no. 1010155.

Gauges and controls

Pressure gauge and mano-vacuummeter.
All instruments and switches for engine operation and control
are integrated in an instrument box.

Pump drive

via joint shaft and electromagnetic clutch

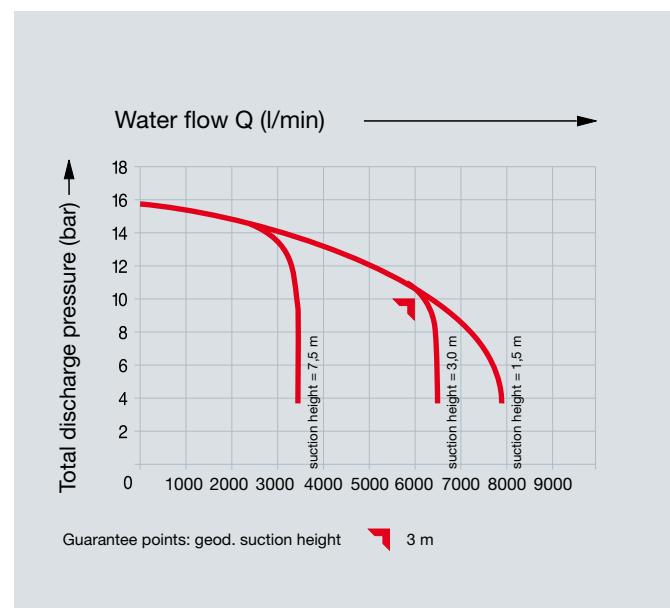
Paintwork

basic frame black
pump silver coloured RAL 9006
cover red RAL 3000

FPN 10-6000-2A



FPN 10-6000-2A



Pump type	Art. no.	Engine	Pump output max. at 10 bar HS 3,0 m l/min	Weight approx. kg	Dimensions approx. LxWxH mm
FPN 10-6000-2	1061795	Mercedes-Benz Diesel engine Type OM 906 LA engine with 6 cylinders in line turbo-charged and charge-cooled water-cooled, 205 kW (280 HP) electric starter battery 12 V/88 Ah generator 28 V/80 A fuel tank approx. 160 l	6000	2100	3400x1200x2000

Basic equipment

2stage centrifugal fire pump,
2 suction inlets size A,
6 delivery outlets size B with self-closing DIN-screw down valves,
suction inlets and delivery outlets with blank cap.

Priming system: fully automatic TROKOMAT PLUS with cover

Auxiliary equipment and systems

on request, additionally charged:
suction inlet respectively delivery outlets on customer request
automatic pressure governor (TOURMATIC), tandem platform trailer
acc. to art. no. 242489.

Gauges and controls

Pressure gauge and mano-vacuummeter.
All instruments and switches for engine operation and control are integrated in an instrument box.

Pump drive

via joint shaft and electromagnetic clutch

Paintwork

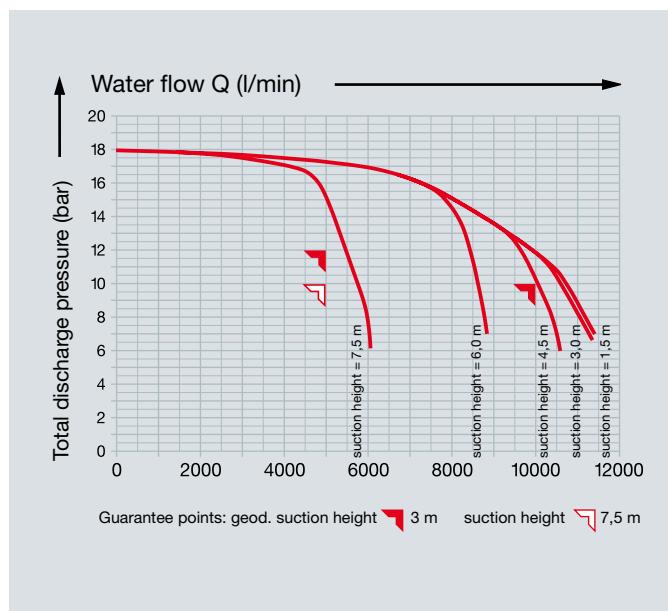
basic frame black
pump silver coloured RAL 9006
cover red RAL 3000



FPN 10-10000-1A



FPN 10-10000-1A



Pump type	Art. no.	Engine	Pump output max. at 10 bar Hs 3,0 m l/min	Weight approx. kg	Dimensions approx. LxWxH mm
FPN 10-10000-1	1061793	Deutz industrial Diesel engine type TCD 2015 V06 engine with 6 cylinders in line turbo-charged and charge-cooled water-cooled, 360 kW (490 HP) electric starter battery 12 V/140 Ah generator 28 V/55 A fuel tank approx. 200 l	10500	2950	3400x1200x2040

Basic equipment

1 stage centrifugal fire pump,
3 suction inlets Storz F (DN 150),
delivery outlets on customer request in sizes up to DN 125, lockable,
with intermediate flaps or ball cocks, suction and delivery outlets with
blank cap.

Priming system: fully automatic TROKOMAT PLUS with cover

Auxiliary equipment and systems

on request, additionally charged:
suction inlets on customer request, automatic pressure governor
(TOURMAT), tandem platform trailer acc. to art. no. 229258.

Gauges and controls

Pressure gauge and mano-vacuummeter.
All instruments and switches for engine operation and control
are integrated in an instrument box.

Pump drive

via joint shaft and elastic coupling

Paintwork

basic frame black
pump silver coloured RAL 9006
cover red RAL 3000



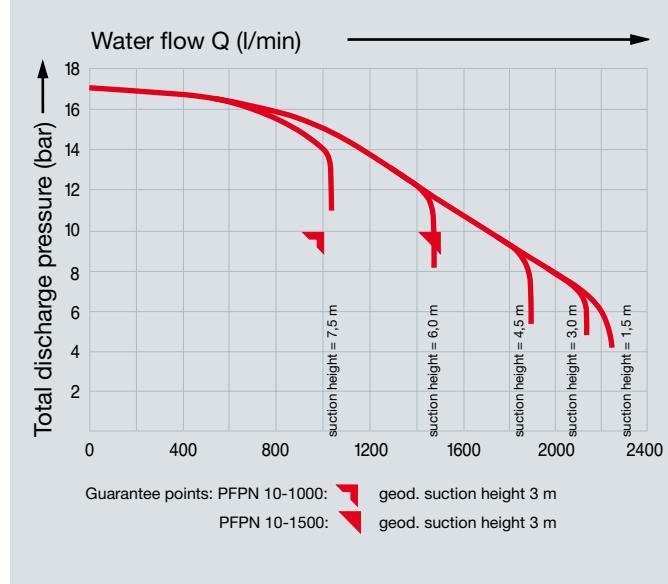
Portable pumps

ZIEGLER portable pumps with the proven automatic priming system TROKOMAT PLUS are efficient, reliable and in tough use for decades.

ZIEGLER is manufacturing portable pumps of various capacities with outputs from 500 l/min up to 2000 l/min. Safe and easy handling thanks to ergonomically designed carrying frames in standard dimensions. Clear control panels with necessary controls facilitate the work of the operators and give them room for other activities, too.

The PFPN 6-500 which has already acquired an excellent reputation under the name of ULTRA COMPACT can be referred to as starting module. Top model of the series is TS ULTRA POWER (PFPN 10-1500). In between ranges the new designed TS ULTRA BASIC (PFPN 10-750). All portable pumps are powered by efficient petrol or Diesel engines according to their specific use.

They all have in common the design proven in practice with absolutely efficient priming systems and solid, reliable engines. Thus, the ZIEGLER portable pumps have become sought-after dependable equipment for fire brigades worldwide. In the meantime more than 70000 ZIEGLER portable pumps are in use all over the world.

**ULTRA POWER PFPN 10-1000/PFPN 10-1500****ULTRA POWER**

Type	Art. no.	Test no.	Priming time in seconds		Pump output max. at 10 bar Hs 3,0 m approx. l/min	Weight approx. kg	Dimensions approx. LxWxH mm
			Hs 3,0 m	Hs 7,5 m			
Without pump pressure governor TOURMAT	022220	PFPN 10-1000 AZ 10101P108					
With pump pressure governor TOURMAT	022230	PFPN 10-1500 AZ 10151P108	5	19	1700	195	1042x710x820

Pump: PFPN 10-1500 according to DIN 1028

One-stage centrifugal fire pump of high efficiency. Water-bearing parts of sea-water resistant light alloy or corrosion-resistant steel. Sealing of the pump by radial seals. With suction inlet size A and two delivery outlets size B with self-closing screw-down valves, all of them with tight couplings and blank caps.

Power transmission from engine via single disc dry clutch.

Priming system: fully automatic TROKOMAT PLUS

Engine

VW 3 cylinder 4 stroke aluminium engine with electronic fuel injection. Output: 45 kW at 5200 rpm. Cooling via closed cooling water circuit with heat exchanger and additional cooler.

Electronic 2stage rpm limitation for suction rpm and max. rpm acting on the injection unit, contactless battery ignition, maintenance-free valve operation by hydraulic valve lifter.

Start unit: electric start, starter cable optionally.

Shapely symmetric plastic cowling, 2 l fuel tank for non-leaded premium gasoline (ROZ 95) or regular gasoline (ROZ 91). Engine control via knock sensor, fuel pump with filling level sensor integrated in tank, fuel cock is not required.

Easy to handle

After opening of the cover checking respectively refuelling of cooling agent and engine oil is particularly easily possible.

Carrying frame of the portable pump

High-strength light metal frame with 4 hinged and turnable grips as well as rubberized cold hand guard.

Gauges and controls

Improved handling thanks to clear multifunction display for following functions:

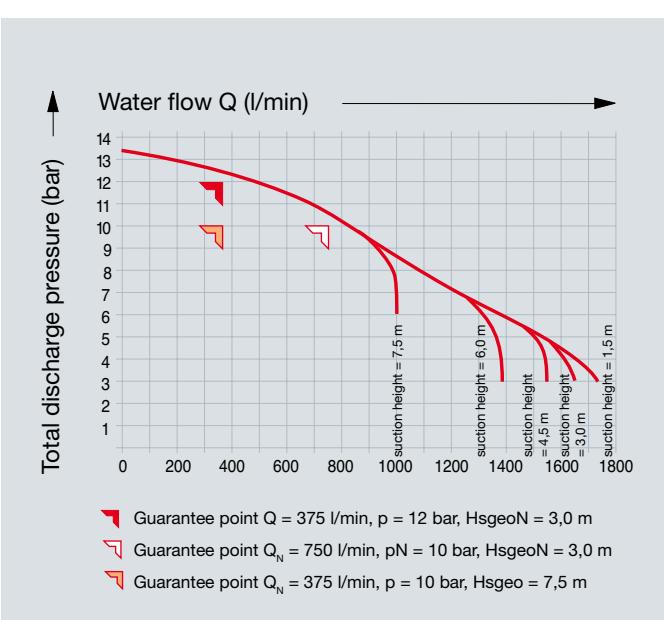
- graphic tank indication with reserve warning light
- rpm counter and control light for suction rpm limitation
- working hour recorder
- warning and control lights for cooling water, oil pressure and charging control

Lighting

One Halogen searchlight, extendible.

TOURMAT: The automatic pump pressure governor TOURMAT relieves the operator during service. At changed water delivery, e.g. at opening or shutting of branchpipes the pressure will be re-adjusted within seconds and kept constant. Particularly advantageous for series connection of several pumps.



**ULTRA BASIC PFPN 10-750-1****ULTRA BASIC**

Type	Art. no.	Test no.	Priming time in seconds		Pump output max. at 10 bar Hs 3,0 m approx. l/min	Weight approx. kg	Dimensions approx. LxWxH mm
			Hs 3,0 m	Hs 7,5 m			
Electric start	022212	AZ 10071P710	8,5 values according to type test	21	850	144	980x580x750

Pump: PFPN 10-750

One-stage centrifugal fire pump, water-bearing parts of sea-water resistant light alloy or corrosion-resistant steel. Impeller with stainless steel split water rings. Sealing of the pump shaft by radial seals. With suction inlet size A and cover as well as e.g. delivery outlets with self-closing screw-down valves. Power transmission from engine via centrifugal clutch.

Priming system: fully automatic TROKOMAT PLUS

Engine

Kohler 2 cylinder 4 stroke V-light engine, piston displacement 1000 cm³.

Output: 25 kW at 3600 min⁻¹, premium gasoline min. ROZ 90, fuel tank 14 l, air cooling with blower and integrated oil cooler, electric starter, magneto ignition.

Gauges and controls

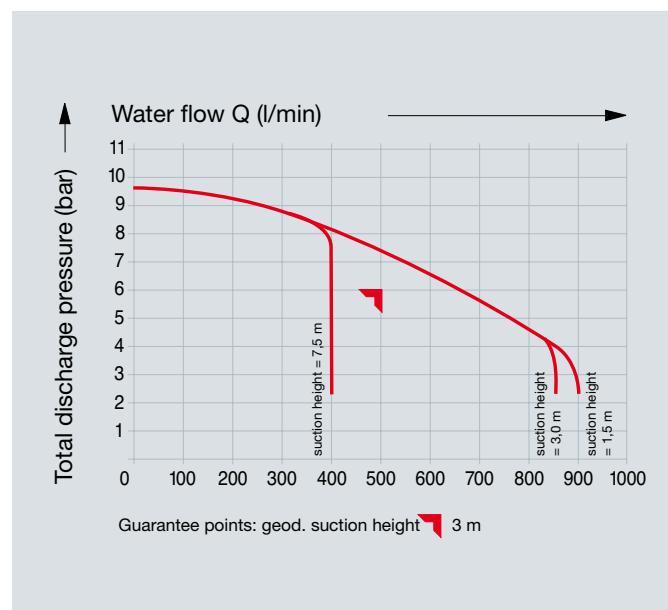
Control panel with pressure gauge and mano-vacuummeter, working hour recorder and pilot light for fuel reserve, ignition lock, throttle and choke handle at control panel of the engine.

Carrying frame

High-strength light metal frame with 4 hinged grips as well as cold hand guard.

Lighting

One Halogen searchlight, extendible.

ULTRA COMPACT PFPN 6-500**ULTRA COMPACT**

Type	Art. no.	Test no.	Priming time in seconds		Pump output max. at 10 bar Hs 3,0 m approx. l/min	Weight approx. kg	Dimensions approx. LxWxH mm
			Hs 3,0 m	Hs 7,5 m			
Electric start with manual emergency start	020033	AZ 06052P106	7	25	400	96	745x440x590

Pump: PFPN 6-500

Two-stage centrifugal fire pump. Water-bearing parts of sea-water resistant light alloy or corrosion-resistant steel. Impellers with stainless steel split water rings. Sealing of the pump shaft by radial seals. With suction inlet size B and cover as well as 1 delivery outlet size B with self-closing screw-down valve. Power transmission from engine via centrifugal clutch.

Priming system: fully automatic TROKOMAT PLUS

Engine

Briggs & Stratton 2 cylinder 4 stroke V-engine, piston displacement 570 cm³.

Output: 13 kW (18 HP) at 3600 rpm, with 8,5 l fuel tank for non-leaded or leaded regular gasoline (min. 85 ROZ), air cooling by blower, maintenance-free, electronic contactless magneto ignition, start unit with recoil starter and with electric starter and battery.

Gauges and controls

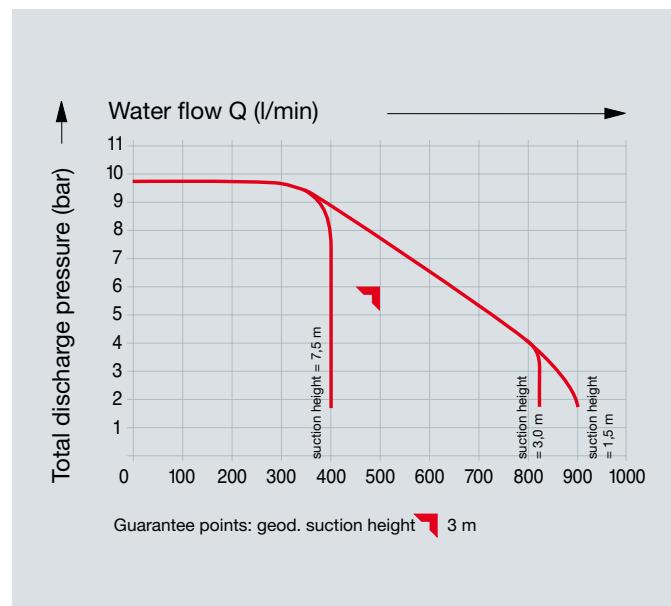
One pressure gauge and one mano-vacuummeter on the pump. Modern control panel with turning handle for "throttle", stop button. In the version with starter provided with ignition switch, working hour recorder, oil pressure control light and Halogen searchlight.

Carrying frame

High-strength light metal frame with 4 hinged grips as well as cold hand guard.

Lighting

One Halogen searchlight, extendible.

**PFPN 6-500 Diesel****PFPN 6-500 Diesel**

Type	Art. no.	Test no.	Priming time in seconds		Pump output max. at 10 bar Hs 3,0 m approx. l/min	Weight approx. kg	Dimensions approx. LxWxH mm
			Hs 3,0 m	Hs 7,5 m			
Electric start with manual emergency start	022201		7	25	400	119	825x450x530

Pump: PFPN 10-1500 acc. to DIN 1028

Two-stage centrifugal fire pump. Water-bearing parts of sea-water resistant light alloy. Shaft of corrosion-resistant steel. Sealing of the pump shaft by radial seals. With suction inlet size B and delivery outlet size B with self-closing screw-down valve, tight couplings size B.

Priming system: fully automatic TROKOMAT PLUS

Engine

Lombardini 2 cylinder 4 stroke Diesel engine, type LD425/2, direct injection, air cooling by flywheel blower, output 13 kW (17,7 HP) at 3600 min⁻¹, piston displacement 851 cm³, fuel tank 4,0 l, with decompression.

Gauges and controls

One pressure gauge and one mano-vacuummeter on the pump. Control panel with throttle and starter/stop button.

Carrying frame

Protective and carrying frame of steel pipe with 4 hinged grips.