



**FLF 15000/1800/500
Panther 8x8 CA-7**

OPERATION MANUAL

FLF 15000/1800/500 PANTHER

Air Crash Tender



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Annex

- Safety Precautions*
- Piping Diagram*

ROSENBAUER and its affiliates thank you for your confidence in our products and is sure that delivered products will provide quick, reliable, quality service in the years to come.

Several models whose principal components are identical are dealt with in this operation manual. Besides, this includes optional features. Your unit may therefore differ from some of the descriptions and illustrations.

For your own safety, use only spare parts and accessories from Rosenbauer. Use of other products and resultant injury, Rosenbauer assumes no liability!

Introduction

This operation manual is designed to provide clear answers to essential questions concerning the operation and maintenance of this product.

To ensure continuous operational reliability, we strongly recommend that all service, inspection and maintenance work listed in this manual be carried out on time.

For this purpose, Rosenbauer service stations are at your disposal.



ATTENTION !

Please read this manual carefully before starting operation.
Obey all instructions and hints.

Only personnel familiar with this manual, the vehicle, inclusive equipment, according operation, local safety regulations and accident prevention may operate this unit.

Rosenbauer is not liable for any injury or damage caused by personnel unfamiliar with the operational procedures described in this manual, failing to comply with the operation manual and/or failing to comply with regulations, subsequent procedures, safety and accident prevention.

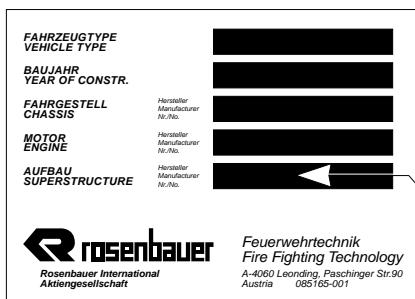
For more information kindly contact the Rosenbauer After Sales Service Department or your nearest Rosenbauer representative.

Manufacturer and After-Sales-Service Address



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Works Order Number

Identifying the works order number is important.
It is stamped at the type plate on the "Superstructure" plate located near the co-driver entrance.

X 2 S 0 1 6 5 Works order number of your vehicle

List of Conventional Signs

- * This sign indicates optional equipment that means:
The described position may not be installed on your unit, but it is a customer specific installation.



CAUTION !

This warning indicates possible danger to life and health of persons.

ATTENTION !

This warning indicates other dangers.

Warning Signs



- This warning sign indicates possible danger to the life and health of persons involved.



- This warning sign indicates electrical hazards.



- This warning sign indicates fire hazards.



- This warning sign indicates danger of cauterization.

DN Note: For all valve descriptions DN stands for Internal Diameter

Prohibition Signs



- *No smoking*



- *Handling of open flames is prohibited.*



- *Keep your distance! Be extremely careful!*

Mandatory Signs



- *Use ear protection.*



- *Wear helmet.*



- *Wear protective eye glasses.*



- *Wear protective work boots.*



- *Wear protective work gloves.*

ATTENTION !

All superstructural components (e.g. hinged steps, doors, ladder, etc.), are to be used for their intended purpose only.

For example:

Jumping out of the crew cabin onto the last step, transportation of heavy equipment on a hinged step or fixing ropes to the ladder, are all contrary to their intended purpose.

ATTENTION !

The vehicle should be operated by trained and certified personnel.

When driving on inclines, uneven or slippery roads / surfaces, as well as during curves or expecting a lane change, a prudent and precautionary driving style should be used.

The instructions in the chassis operators manual should be strictly followed, in particular when driving in off-road conditions.

Technical Data
Chassis

Type:	RBI 52.1250 8x8 CA-7 RHD
Engine:	2 x CAT C 18 Tier 3
Performance:	2 x 470 kW at 1800 - 2100 rpm
Voltage of consumers:	24 Volt
Batteries engine I:	2 x 12 Volt / 180 Ah
Batteries engine II:	2 x 12 Volt / 180 Ah
Generator:	2 x 28 Volt / 140 Ampere
Transmission:	2 x Allison 4800 R with Retarder with collectivetransfercase (cTv)
Power Take Off (P.T.O.) for N 100 pump:	on collectivetransfercase
Ratio:	$n_{\text{engine}} \times 1.48$
Rotating direction:	counterclockwise
Performance:	310 kW at 2300 rpm _(engine speed)
Wheel base:	1600 mm + 5000 + 1600 mm
Tyres:	Michelin 445/80 R 25 XGC
Powered axle:	8 x 8 permanent
Cabin:	1 + 1 + 1 + 1 + 2 men
Dimensions:	Length 13100 mm Width 3350 mm Height 3650 mm
Permissible weight:	Front axle I 13000 kg Front axle II 13000 kg Rear axle I 13000 kg Rear axle II 13000 kg Gross vehicle weight 52000 kg
Ramp angles:	Angle of approach 30° Ramp angle 12° Angle of departure 30°

ATTENTION !

Always use similar tyres when changing or replacing a tyre to allow maximum driving performance!

It is strictly prohibited to use retreaded tyres.

When changing the tyre type call for written approval from Rosenbauer.

For further technical data please refer to chassis operation manual.

Water tank

<i>Manufacturer:</i>	<i>ROSENBAUER</i>
<i>Capacity:</i>	<i>15000 l</i>
<i>Maximum tank pressure:</i>	<i>0.2 bar</i>
<i>Material:</i>	<i>PP polypropylene plastic</i>
<i>Manhole:</i>	<i>removable ϕ 450 mm cover</i>
<i>Overflow:</i>	<i>2 x with over- and under pressure diaphragm</i>
<i>Tank level indicator:</i>	<i>fludometer and visual gauge on the left and right hand sides</i>
<i>Hydrant fill connection:</i>	<i>2 x DN 65 butterfly valves with 2$\frac{1}{2}$" BSS male couplings and a non return valve on the tank flange. These connections are on the left and right hand sides.</i>
<i>Pump fill connection:</i>	<i>DN 50 ball valve</i>
<i>Suction connection:</i>	<i>DN 200 butterfly valve</i>
<i>Tank roof:</i>	<i>PP with anti-slip coating</i>
<i>Drainage:</i>	<i>DN 50 ball valve</i>

Foam compound tank

<i>Manufacturer:</i>	<i>ROSENBAUER</i>
<i>Capacity:</i>	<i>1800 l + 5% reserve</i>
<i>Maximum tank pressure:</i>	<i>0.2 bar</i>
<i>Material:</i>	<i>PP polypropylene plastic</i>
<i>Location:</i>	<i>integrated into the rear part of the water tank</i>
<i>Manhole:</i>	<i>removable φ 450 mm cover</i>
<i>Overflow:</i>	<i>with lamellar case</i>
<i>Tank level indicator:</i>	<i>fludometer and visual gauge placed on the engines module on the left and right hand sides</i>
<i>Service valve:</i>	<i>DN 65 butterfly valve</i>
<i>Suction connection:</i>	<i>DN 65 butterfly valve</i>
<i>Outside fill- /drain connection:</i>	<i>DN 40 ball valve with Storz 38 coupling on the left hand side</i>

Pump

Manufacturer and type: ROSENBAUER N 100

Performance at tank suction operation:

9000 l/min at 11 bar

Closing pressure: 13.5 bar

Design:

single stage

Pump speed:

max. 1800 rpm

Pump shaft seal:

mechanical seal

Rotating direction of pump: counterclockwise

Material of casing, diffusers and impellers:

bronze

bronze

Operating ability:

from -15° C to +50° C ambient temperature

Allowed fluids:

fire fighting water or drinking water

Fluid temperature range:

from +4° to +60° C

Tank suction connection:

DN 200 butterfly valve

Drafting connection:

DN 125 butterfly valve with 4" BSRT male coupling on the left hand side

Pressure outlets:

2 x DN 65 butterfly valves with 2½" BSS female couplings;
These connections are on the left and right hand sides.

Main pump valve:

DN 150 butterfly valve

Roof turret:

DN 125 butterfly valve

Bumper turret:

DN 65 butterfly valve

Untertruck nozzles:

DN 50 ball valve

Tank fill line:

DN 50 ball valve

Rapid intervention con.:

2 x DN 40 ball valves

Foam drafting- and flushing connection:

DN 50 ball valve with Storz C coupling on the left hand side

Pump drain valve:

DN 20 ball valve

Internal flushing valve:

DN 40 ball valve

Drive:

propeller shaft from cTv

Pump gearbox for N 100

Manufacturer and type: ROSENBAUER gearbox N 100

Ratio

with reversal of rotation: $Z1=64 : Z2=79 \rightarrow i=0,81$ *
from counterclockwise to clockwise

without reversal

of rotation: $Z1=53 : Z2=64 : Z3=79 \rightarrow i_{tot}=0.67$

Casing material: light alloy

Priming pump

Manufacturer and type: ROSENBAUER KAP 600
Double Piston Priming Pump

Material: light alloy

Method of operation: displacement

Type of drive: double V-belt via the N 100 pump shaft

Control: pneumatically with manual control *
electrically with automatic control

Lubrication: oil bath lubrication

Performance of the priming pump: 100 l to 75% vacuum within 10 sec

Foam proportioning system

Manufacturer and type: ROSENBAUER RVME 600 MID

Material: light alloy

Measuring range

water flow: 200 - 10000 l/min

foam compound flow: 10 - 600 l/min

Performance: up to 600 l/min foam compound with a viscosity of 10 cSt

Proportioning rate

electronically: adjustable by switches to

3% or 6% or 8%

electronically: *

continuously adjustable to

1% - 8% at 1000 - 7500 l/min

1% - 3% at 1000 - 10000 l/min

1% - 6% at 1000 - 10000 l/min

Proportioning accuracy:

from the range of 1-3%: according to NFPA 1901
over the range of 3%: -0 to +30% relative (from adjusted value)
max. +1% absolute (to adjusted value)

Roof turret

Manufacturer and type: ROSENBAUER RM 60 C

Location: mounted on the roof of the cabin

Material: light alloy

Nozzle: HSD 6000 CFD

Performance with

full output: 6000 l/min at 10 bar

reduced output: 3000 l/min at 10 bar

Throwing range: approx. 85 m with full output
approx. 70 m with reduced output

Control: remotely controlled from driver's cabin
or via cable remote control *
(via programmable CAN BUS module)
or manually from the vehicle's roof

Slewing range:

Elevation: -15° to +70°

Rotation: 270°

Options: search lights 2 x 50 Watt / 24 Volt

Bumper turret

<i>Manufacturer and type:</i>	<i>ROSENBAUER RM 15 C</i>
<i>Location:</i>	<i>mounted on the front bumper</i>
<i>Material:</i>	<i>light alloy</i>
<i>Nozzle:</i>	<i>HSD 1500 CFD</i>
<i>Performance:</i>	<i>1500 l/min at 10 bar</i>
<i>Throwing range:</i>	<i>approx. 65 m with full output</i>
<i>Control:</i>	<i>remotely controlled from driver's cabin (via programmable CANBUS module)</i>
<i>Slewing range:</i>	
<i>Elevation:</i>	<i>-30° to +70°</i>
<i>Rotation:</i>	<i>180°</i>
<i>Options:</i>	<i>search light 24 Volt / 55 Watt / H7 *</i>

Undertruck nozzles

<i>Manufacturer:</i>	<i>ROSENBAUER</i>
<i>Number:</i>	<i>3 nozzles in front of the front axle I</i>
<i>Performance:</i>	<i>75 l/min at 10 bar per nozzle</i>
<i>Range:</i>	<i>170°, 2 m radius</i>
<i>Number:</i>	<i>1 nozzle between the front axles</i>
	<i>1 nozzle behind the front axle II</i>
	<i>1 nozzle in front of the rear axle I</i>
	<i>1 nozzle between the rear axles</i>
<i>Performance:</i>	<i>50 l/min at 10 bar per nozzle</i>
<i>Range:</i>	<i>360°, 3 m radius</i>
<i>Control:</i>	<i>all together from drivers cabin</i>

Rapid intervention system

<i>Manufacturer and type:</i>	<i>ROSENBAUER low pressure hose reel 06</i>
<i>Material:</i>	<i>ABS/PE plastic</i>
<i>Brake:</i>	<i>friction brake</i>
<i>Rewinding device:</i>	<i>manually by crank and electrically</i>
<i>Location:</i>	<i>in the right locker compartment swivelable by 45° and 90° in driving direction</i>
<i>Nozzle:</i>	<i>RB 101</i>
<i>Performance:</i>	<i>115 - 230 - 360 - 475 l/min at 7 bar</i>
<i>Equipment:</i>	<i>with a 30 m DN 32 non-collapsible rubber hose</i>

Rapid intervention system

<i>Manufacturer and type:</i>	<i>REELCRAFT 2400 Series Twin-Agent Hose Reel</i>
<i>Brake:</i>	<i>mechanical brake</i>
<i>Rewinding device:</i>	<i>manually by crank and electrically</i>
<i>Location:</i>	<i>in the left locker compartment</i>
<i>Nozzle:</i>	<i>Twin-Agent nozzle</i>
<i>Performance with water/foam discharge:</i>	<i>230 l/min at 15 bar</i>
<i>dry powder discharge:</i>	<i>2.3 kg/sec</i>
<i>Equipment:</i>	<i>with 2 x 30 m DN 25 non-collapsible rubber hose</i>

Dry powder unit

<i>Manufacturer:</i>	<i>MINIMAX</i>
<i>Type:</i>	<i>P-BCsv 500 (2x250) epn</i>
<i>Dry powder:</i>	<i>2 x 250 kg Combi Troxin BC compatible to foam compound</i>
<i>Control:</i>	<i>electro-pneumatically</i>
<i>Propellant gas bottle:</i>	<i>25 ltr</i>
<i>Propellant gas:</i>	<i>nitrogen</i>
<i>Filling pressure:</i>	<i>200 bar</i>
<i>Number:</i>	<i>1 + 1</i>
<i>Powder outlet:</i>	
<i>Rapid intervention installation</i>	<i>2.5 kg/sec</i>

*For further information please refer to
manufacturer's operation manual.*

Deluge system

<i>Manufacturer:</i>	<i>ROSENBAUER</i>
<i>Capacity:</i>	<i>connected to the water tank</i>
<i>Drawing connection:</i>	<i>DN 25 ball valve on the front lowest partition of the water tank</i>
<i>Deluge pump:</i>	<i>24 VDC</i>
<i>Nozzle:</i>	<i>4 nozzles above the windscreen 1 nozzle above the left and right doors</i>

Light mast

<i>Manufacturer and type:</i>	<i>FIRECO CS 8518 NZ</i>
<i>Location:</i>	<i>in the right engine's compartment</i>
<i>Search lights:</i>	<i>4 x 43 Watt LED / 24 Volt</i>
<i>Lifting height:</i>	<i>approx. 6.0 m above ground</i>
<i>Control:</i>	<i>electropneumatically and via remote control</i>
<i>Power supply:</i>	<i>from drive engine's generator</i>

Technical Description

Pump

The pump consists mainly of the pump pressure casing, impeller, pump shaft, diffuser, and pump shaft sealing.

The water penetrates the impeller via the suction inlet. This process is called axial feed, since the water flows in the direction of the central axis.

The water which enters through the suction inlet is then seized by the impeller (impeller blades); thereby the water is deflected by 90° and flung out of the impeller in the direction vertically to the shaft. This is called radial discharge.

The water delivery depends mainly on the effect of centrifugal force, therefore this type of pump is called a centrifugal pump. Between the impeller and the diffuser, there is a small gap and the diffuser, fixed on the pump casing, is stationary. The gap is necessary in order to prevent the impeller and diffuser from touching.

The energy of a streaming liquid is composed of velocity and pressure forces and the energy of velocity can be transformed into pressure. The water is discharged from the impeller at high velocity and this transformation of velocity into pressure takes place in the diffuser.

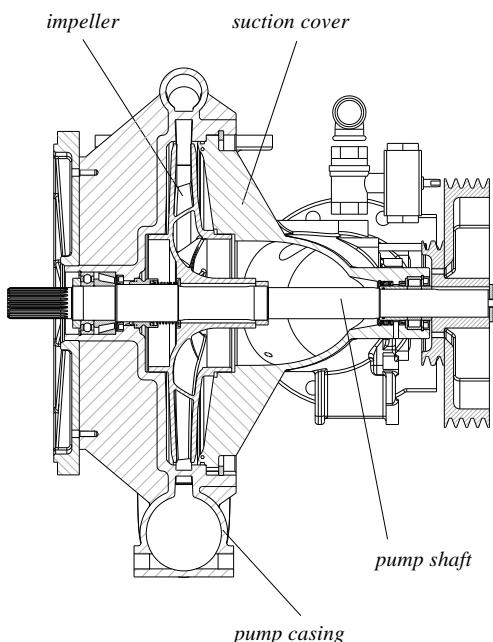
The cross sectional area through which the water passes from entering the diffuser until leaving it, is enlarged gradually. The velocity decreases while the streaming quantity remains unchanged. The pipe cross sections are dimensioned as to be large enough that the proportion of the velocity of the total energy at the pressure outlet of the pump is so small that it can be ignored in comparison to the proportion of pressure. Therefore only the suction lift of the pump (which is the sum of the indications on the manometer and vacuummeter) is mentioned.

Be certain that the pump is not operated with closed valves for a long period; a temperature increase results.

Disengage the pump if no water is discharged for a long period!

ATTENTION !

It is strictly prohibited to make any modifications on pump without approval of ROSENBAUER.



Pump

The Rosenbauer pump N 100 is a single-stage high volume pump with spiral casing and diffusor.

Because of the low nominal pump speed, the pump is best suited for direct connection (without a pump gearbox) to a low rpm engine, therefore a dramatic reduction of noise and harmful emission is achieved.

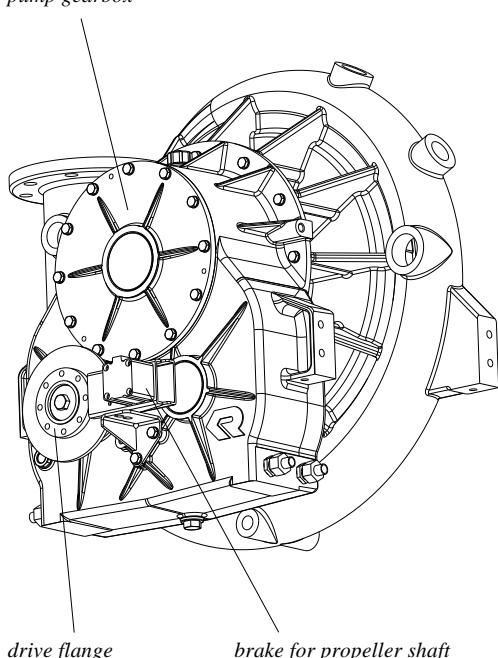
The hydraulic dimensioning and the high efficiency makes a very flat pump-curve with a differential pressure between rated- and close off pressure of only 2 bar at constant output. Based on the T-type suction cover, the pump has very compact dimensions and can be integrated into pipework very easily. The stainless steel pump shaft is supported on the suction side by a cylinder roller bearing and on the pressure side by a taper and a ball bearing.

A maintenance free axial face seal seals the pump on the pressure side and on suction side two shaft seals are installed.

The pump shaft is directed through the suction cover and ends in a belt drive to drive auxiliary units.

The centrifugal water pump with diffuser and impeller are made of corrosion resistant light alloy or bronze.

pump gearbox



Drive and gearbox

The pump is powered by a separate pump engine. If necessary, a pump gearbox delivers the required capacity by a set ratio in relation to the engine speed and output capacity. If necessary, the pump gearbox is equipped with a separate cooler whereby discharged water cools down the gearbox oil.

The pump system works completely independent of the drive engine, therefore allowing unlimited driving operation during fire fighting.

Computing maximum lift

Lift is measured from the surface of the static source to the centerline of the pump. The height of possible lift is not affected by the angle of the intake hose, but depends on the vacuum that the pump (priming pump) can produce and the atmospheric pressure.

Theoretically, at sea level a pump can lift water 10 m (33.8 feet). A perfect vacuum is impossible with a fire pump and there will be loss due to friction, so the maximum lift is nearer to 6 - 7.6 m (20 to 25 feet).

The height that water can be lifted decreases with altitude by about 0.3 m (1 foot) for each 300 m (1000 feet) of elevation.

The weather also affects drafting, but to a smaller degree.

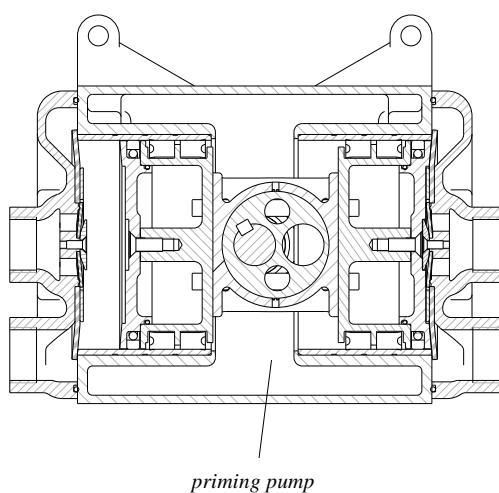
Priming system KAP 600

Since a centrifugal pump is not a self suction pump, a priming pump system is installed, which removes air from the pump allowing the subsequent vacuum to fill the pump with water. The piston priming pump is mounted with a pivot on the suction cover. It is driven by two V-belts and a belt tightening device. The priming pump has to be engaged only for the priming procedure.

The housing and the pistons are made of corrosion resistant light alloy. The cylinder liners are made of stainless steel.

Two pistons, provided with sealing and guide rings, are fitted together in a single unit. This double piston is driven by a sliding pad, which is driven by an eccentric shaft.

The moving parts are oil bath lubricated and suction and pressure valves are concentrically arranged in the cylinder heads (valve covers).



Working principle:

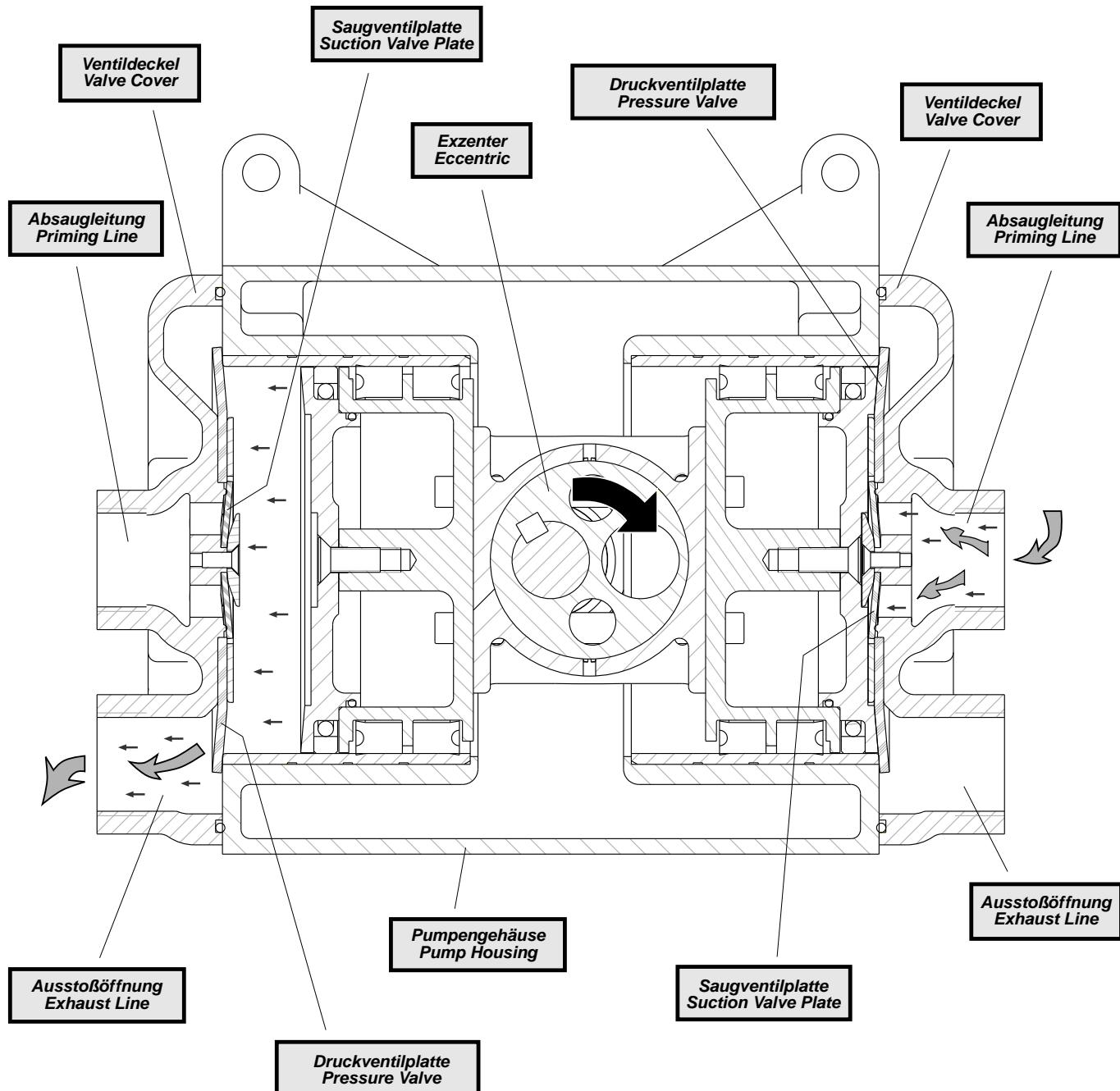
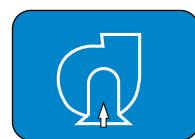
Upon engaging the priming pump (**) the ball valve mounted in the suction line will be opened. At the same time, the V-belts for driving the piston priming pump are tightened by a pneumatic cylinder. The priming pump now has approximately twice the speed of the centrifugal pump.

The rotating eccentric moves the piston to and fro. By the movements of the piston the vacuum (priming stroke) and simultaneous pressure (pressure stroke) are produced. The diaphragm-design valves are concentrically placed in the suction covers. The pump system is evacuated and water is forced into the water pump.

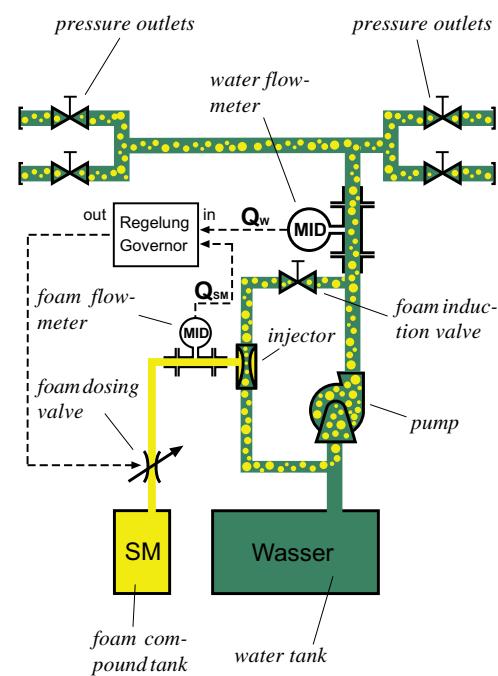
As soon as water is discharged from the piston priming pump the priming procedure is completed (**). The suction valve closes and the V-belts are released from tension via a pneumatic cylinder. When the water column breaks, this procedure is to be repeated.

** As an option the priming pump is controlled automatically.

Cutaway view of piston priming pump



Schedule with magnetic inductive flow meter in the water and foam compound pipe - optional equipment



Electronic controlled foam-proportioning system RVME 600

The RVME 600 is mainly composed of a foam induction pipe with injector, foam proportioning system and control.

The control consists of the water and foam flow meters, governor and two servo-motors.

Advantages:

Because the foam compound is added automatically in correct proportion to water discharge, there is no manual adjustment necessary. This simplifies operation and the system is therefore very precise.

Working principle:

Water discharged by the water pump is measured by the waterflow meter; this value is transmitted to the governor. The servo-motors are adjusted by the governor according to the required foam proportioning rate and are permanently matched to the discharged water rate. As soon as the foam induction valve is opened, the pressure travels from the centrifugal pump, through the injector, and returns to the suction side of the pump.

The foam compound flows from the foam tank to the foam dosing valves and finally to the injector. In the injector, water and foam are mixed by means of the injector principle (venturi). This mixture is then carried to the suction side of the centrifugal pump.

The induction water as well as the foam proportioner can be switched off by closing the foam induction valve.

As an option the system is equipped with a foam flow meter for measuring the actual foam quantity. Deviations (caused by different viscosity) will be recognized and the governor adjusts the servo-motors on the foam dosing valves, so that the preselected foam proportioning rate is achieved.

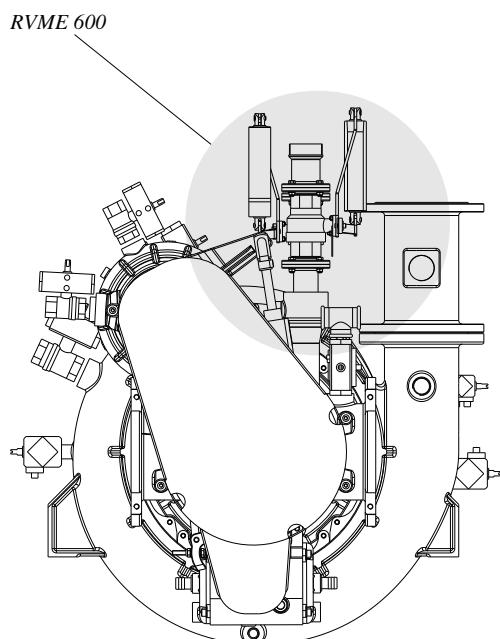
Range of use:

The electronic controlled foam-proportioning system RVME 600 is designed for proportioning all foam compound types available. An accurate proportioning rate is guaranteed over a range of 200 - 10000 l/min water output.

Proportioning rates:

The proportioning rate can be adjusted to three different possibilities (e.g. 3%, 6%, or 8%).

As an option the proportioning rate can be infinitely adjusted.



Overheating protection system

The pump case is equipped with a temperature sensor which controls the overheating protection system.

The pump drain valve opens and the pilot lamp (H62) illuminates on the external pump control panel and a warning is displayed on the pump control screen in the cabin, when 60°Celsius is exceeded. Water is discharged by the pump drain valve until the pump housing is cooled down below 50°Celsius.

Counteraction: Open a pressure discharge valve for a short period (until the temperature falls short of 50°C) to cool down the pump or reduce the pump speed to idle.

ATTENTION !

To avoid critical operational circumstances and to react immediately the operator must in easy reach of the pump control panel.



CAUTION !

Keep pump drainage area clear. Remember the possibility of hot water being expelled!

Superstructure System Control
LCS Logic Control System

This operation and control system is designed to facilitate the operation and supervision of several systems, mounted on the fire fighting vehicle.

The main operating system is a CAN Bus (Controller Area Network) with a serial data rate of 250 kB/sec. Data with high priority will be sent first.

The fire fighting superstructure will be controlled via a display in the drivers cabin and in the pump compartment.

Bracket for Breathing Apparatus

Bostrom brackets

Opening the bracket for breathing apparatus

- Stop the vehicle and apply parking brake.
- Fasten the belts of breathing apparatus.
- Pull the "release-lever" of the breathing apparatus bracket.
- Take out the breathing apparatus.



CAUTION !

Do not open the back-rest for the breathing apparatus or even pick up the apparatus itself unless the vehicle is travelling dead slow, immediately prior to reaching the scene or when vehicle is stopped. Opening the bracket (releasing of support plier) and taking out the breathing apparatus must be done only when vehicle is stationary.

Closing the bracket for breathing apparatus

- Put the breathing apparatus into the breathing apparatus bracket.
- Push down the "release-lever" of the breathing apparatus bracket.
- Swivel down the headrest.



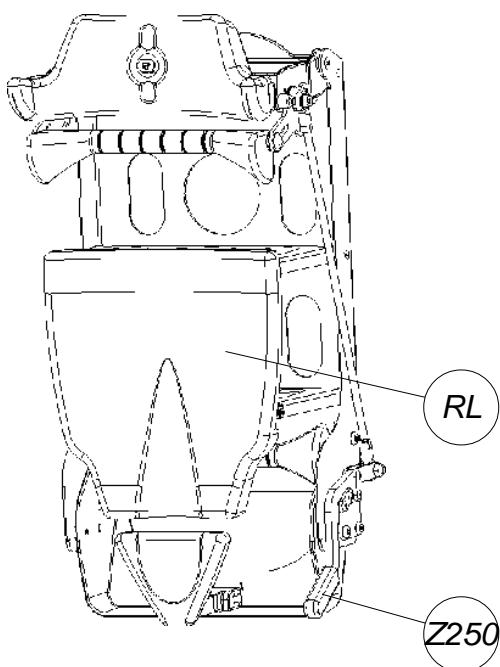
CAUTION !

Always use your seat belts!

Brackets and breathing apparatus belts cannot take the place of standard-checked seat belts.

Check the condition of brackets with all locks, clamps, belts, etc. (the occasion may arise for accessories like spare bottles, masks, and so on) at regular intervals, especially after each use.

FAILURE TO FOLLOW THIS CAN RESULT IN SERIOUS INJURY IN CASE OF AN ACCIDENT !!!

Comfort 2002 brackets


- *Opening the bracket for breathing apparatus:*

- ◊ Stop the vehicle and apply parking brake.
- ◊ Fasten the belts of breathing apparatus.
- ◊ Lift lever (Z250).

The headrest with lock system swivels upwards and releases the breathing apparatus.

CAUTION !

Open the bracket right before leaving the cabin after the vehicle is stopped.

*To prevent possible opening of bracket while driving the vehicle, a pneumatic cylinder locks the releasing mechanism until parking brake is applied. **

Note:

When driving the vehicle without breathing apparatus in the bracket, pull down the backrest (RL) and press down lever (Z250).

- *Closing the bracket for breathing apparatus:*

- ◊ Bring backrest (RL) to rear position.
- ◊ Put the breathing apparatus into bracket.
- ◊ Push down lever (Z250) to lower stop.


CAUTION !

Always use your seat belts!

Brackets and breathing apparatus belts cannot take the place of standard seat belts.

The brackets cannot fulfill the function of a seat belt during an accident.

Due to the large forces developed during an accident, the safety function of the brackets cannot be guaranteed.

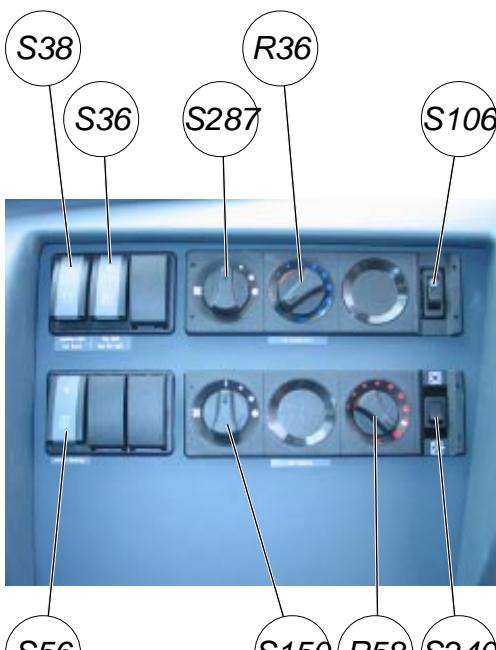
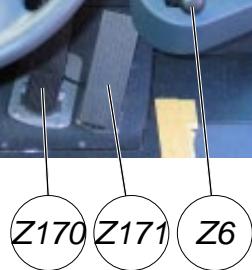
FAILURE TO FOLLOW THIS CAN RESULT IN SERIOUS INJURY IN CASE OF AN ACCIDENT !!!

The bracket must be adjusted to the breathing apparatus in use according to assembly manual.

Check for tight seat of breathing apparatus every six months and adjust if necessary.

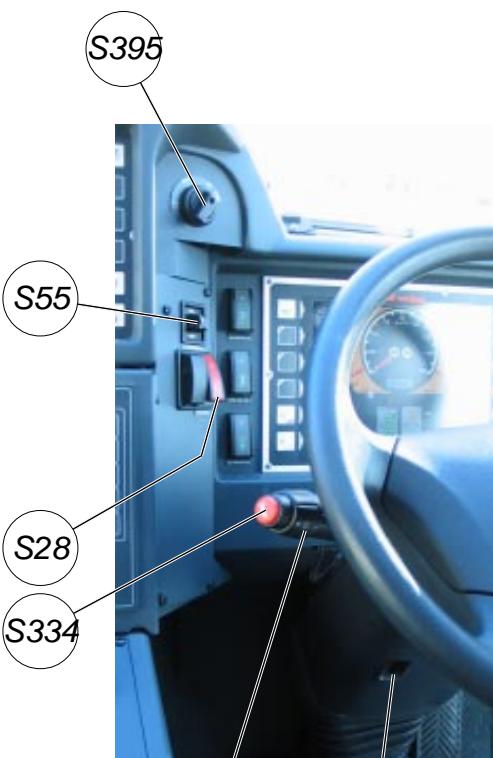
Switches and Controls in the Drivers Cabin

Switches and pilot lamps off fire fighting superstructure in the cabin on the right hand side



- E50 reading lamp with integrated switch *
- N10 display for front camera */***
- R36 air conditioning temperature regulator **
- R58 heating temperature regulator **
- S36 switch: fog lights "1st" position - front fog lights engaged
"2nd" position - front and rear fog lights engaged - active if switch (S38) is ON only **
- S38 switch: vehicle lights "1st" position - position lights engaged
"2nd" position - position lights and head lights engaged **
- S56 switch: left and right rear view mirror heatings
- S106 switch: air conditioning ON/OFF **
- S150 switch: heater ventilator **
- S163 switch: headlamp wash system *
- S177 switch: air field projectors *
- S240 selector switch: recirculating air / fresh air
Heating or air conditioning operation with recirculating air or fresh air.
◊ "0" position -> recirculating air operation
◊ "I" position -> fresh air operation
- S287 switch: ventilator for the air conditioning
Note: This switch will NOT be active unless the drive engine is running and the switch (S106) is on.
- U36 GPS global positioning system - not shown ***
- Z6 parking brake **
- Z170 service brake pedal **
- Z171 accelerator pedal **

** for further information please refer to the chassis operation manual
 *** for further information please refer to the manufacturer's operation manual



Switches and pilot lamps of fire fighting superstructure in the cabin on the right hand side

- S1/3 switch: two-tone acoustical alarm activation - active if switch (S1/I) is ON only - please see page 28 *
- S28 switch: hazard warning lights **
- S40 steering column switch **
- S55 switch: adjustment of rear view mirrors
- S334 switch: horn button
- S395 switch: battery main switch / ignition / engines START / engines STOP **
- S485 switch: rear axle steering system ON / OFF */**/
 ◊ "0" position -> rear axle steering system engaged *
 ◊ "I" position -> rear axle steering system disengaged *
- Z281 steering column lock **
- Z282 parking brake quick release system **

** for further information please refer to the chassis operation manual

*** for further information please refer to the manufacturer's operation manual





Switches and pilot lamps of fire fighting superstructure in the cabin on the right hand side

N8 *panther driver's display **
after engaging the ignition the driver's screen will be displayed*

Note:

By using switch (S383) or (S384) the next/previous screen (pump operation screen) will be displayed; detail information of the pump operation screen please see next pages.

N11 *display for infra-red camera */****

Sx *switch: not in use*

S70 *switch: differential locks of the rear axles ***

S71 *switch: differential locks of the front axles ***

S72 *switch: inter axle locks ***

S152 *switch: back up alarm cancellation*

S173 *switch: engine brake OFF ***

S341 *switch: ABS off road mode ***

S383 *switch: next screen*

S384 *switch: previous screen*

S385 *switch: day / night cabin illumination*

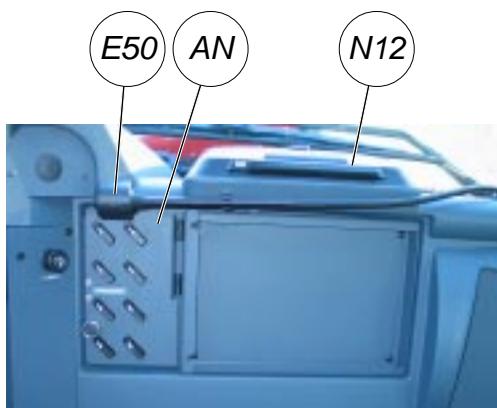
S386 *switch: dimm screen illumination*

S387 *switch: brighten screen illumination*



** *for further information please refer to the chassis operation manual*

*** *for further information please refer to the manufacturer's operation manual*



Switches and pilot lamps of fire fighting superstructure in the cabin on the left hand side

AN cover and lock for the emergency control elements *

E50 reading lamp with integrated switch

N12 display for camera on the roof turret */***

S2N switch: emergency water pump engagement - only active with the drive engines are engaged *

S9 switch: manual throttle control during emergency operation *

X104 power source for 24 Volt DC consumers (for cigarette lighter)

X119 socket for the CAN BUS diagnostics **

Y28 emergency valve: water tank suction *

Y61 emergency valve: foam compound tank suction and internal flushing valve *

Y126 emergency valve: discharge on the roof turret *

Y133 emergency valve: discharge on the bumper turret *

Y145 emergency valve: discharge on the undertruck nozzles *

Y190 emergency valve: dry powder unit control pressure *

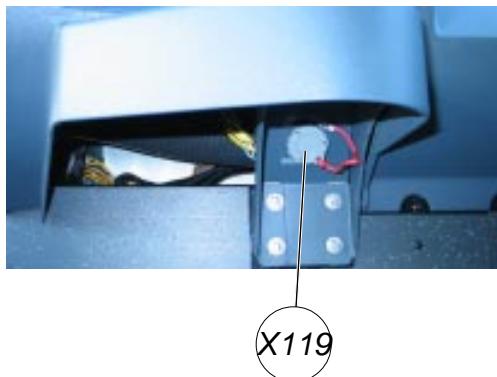
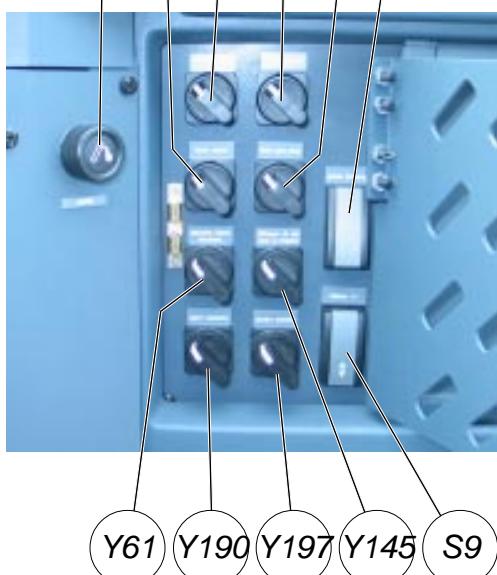
Y197 emergency valve: dry powder discharge on the rapid intervention system *

Y283 emergency valve: main air supply for the pump system *

* optional equipment

** for authorized personnel only

*** for further information please refer to the manufacturer's operation manual





Switches and pilot lamps of fire fighting superstructure in the cabin on the centre console

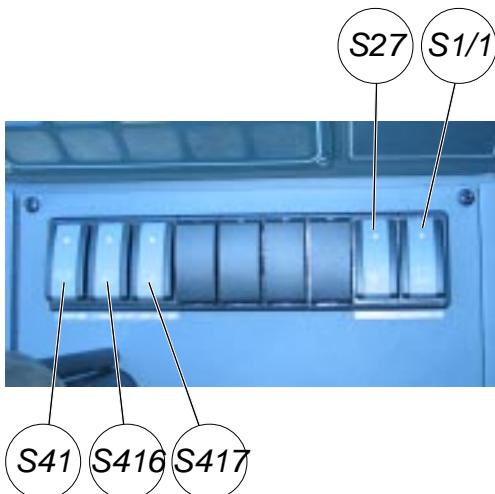
- 19 joystick for control the bumper turret - for detailed information please refer to the "Bumper Turret Operation" chapter
- 20 control handle for control the roof turret- for detailed information please refer to the "Roof Turret Operation" chapter

A2CP cabin pump control panel - for detailed information please see next pages

A2TR transmission control panel **

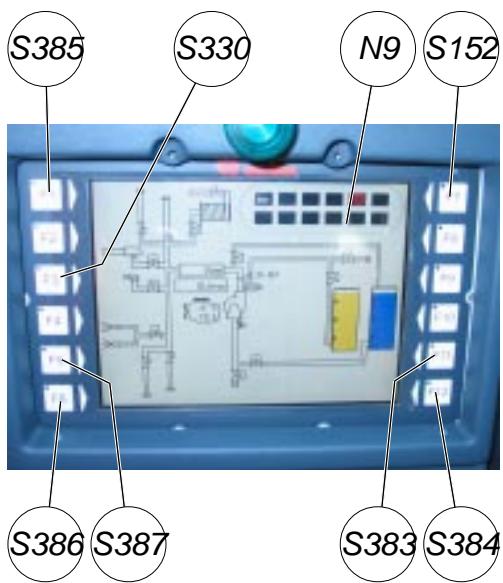
N9 fire fighting display - for detailed information please see next page

- S1/1 switch: rotating beacons
- S2 switch: water pump ON/OFF - only active with the engines are running
- S27 switch: air traffic warning lights
- S41 switch: cabin illumination
 - ◊ "front" position -> OFF
 - ◊ "centre" position -> engaged with an open door
 - ◊ "rear" position -> permanently engaged
- S77 switch: yellow rotating beacon *
- S416 switch: left surrounding field illumination ***
- S417 switch: right surrounding field illumination ***
- S538 switch: rear scene lights */***



** for further information please refer to the chassis operation manual

*** only active with the parking lights engaged
 if installed the rear surrounding field illumination will be engaged together with the left and right surrounding field illumination as well as with the reverse gear



Switches and pilot lamps of fire fighting superstructure in the cabin on the centre control panel

N9 *fire fighting display*
After engaging the ignition the pump operation screen will be displayed.

By using switch (S383) or (S384) the next/previous screen will be displayed.

- ◊ *pump operation screen - for detailed information please see next pages*
- ◊ *driver's screen - for further information please refer to the chassis operation manual*

Note:

If an engine error code exist, the "Engine Information Screen" will be automatically called up.

- ◊ *reversing camera screen*

Note:

The reversing camera signal will be automatically displayed with engaging the reverse gear.



CAUTION !

The distance scale shown on the display during reversing is only effective on the ground!

S152 *switch: back up alarm cancellation*

S330 *switch: to the maintenance menu (to request different parameters)*

S383 *switch: next screen*

S384 *switch: previous screen*

S385 *switch: day / night cabin illumination*

S386 *switch: dimm screen illumination*

S387 *switch: brighten screen illumination*



Installations in the rear partition of the cabin

B8 microphone of public address system (U18)

B8a microphone of radio system (U21a)

B8b microphone of radio system (U21b) *

U18 public address system ***

U21a radio ***

U21b radio 2 */***

X120 socket for speaker system *

Note: *

A second socket is placed on the rootturret's control panel.*

*** for further information please refer to the manufacturer's operation manual

Note:

For operation of optional installed systems (radio or speaker systems as well as units bought by the customer and rear few warning systems), please refer to corresponding operation manual.

ATTENTION !

Due to possible interference effects to the vehicle, use only allowed mobile phones and hand radios.



Switches and pilot lamps of fire fighting superstructure in the cabin - vehicles electrics

A3 *main control box with fuses (FB) - electrics of fire fighting system - placed behind the left codrivers seat; accessible after removing the cover*

The description of the fuses please find on the sticker affixed on the cover.

A51 *main control box with fuses (FB) - electrics of chassis system - placed behind the cabin's ladder*

A314 *control box with fuses for the windscreens and side window heatings **

S507 *switch: cTv release left ****

S508 *switch: cTv release right ****

X119 *CAN BUS diagnostic socket ***

X119.ABS *diagnostic socket ABS ***

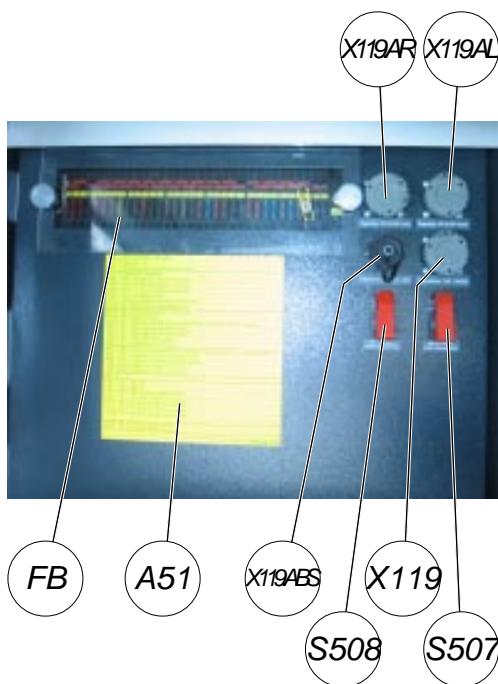
X119.AL *diagnostic socket "power train left" ***

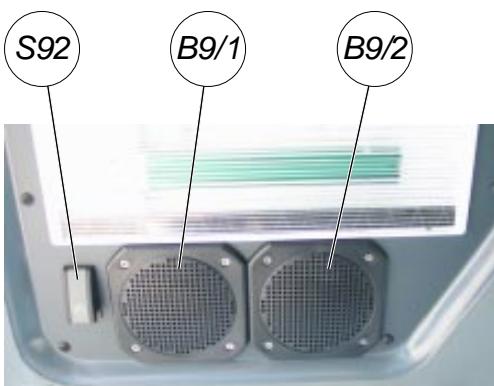
X119.AR *diagnostic socket "power train right" ***

* *optional equipment*

** *for authorized personnel only*

*** *for further information please refer to the chassis operation manual*





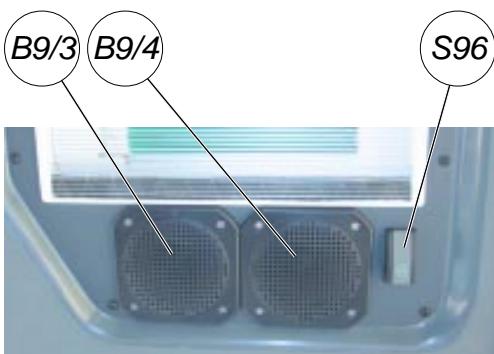
Switches and pilot lamps of fire fighting superstructure in the cabin on the left hand side

B9/1 speaker - not in use *

B9/2 speaker - not in use *

S92 switch: left cabin door control *

* optional equipment



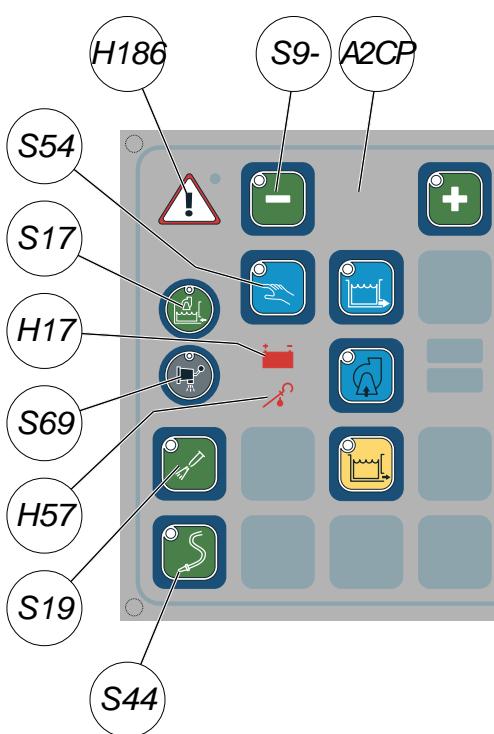
Switches and pilot lamps of fire fighting superstructure in the cabin on the right hand side

B9/3 speaker - not in use *

B9/4 speaker of radio 2 (U21a) *

S96 switch: right cabin door control *

* optional equipment



Switches and pilot lamps of fire fighting superstructure in the cabin

A2CP cabin pump control panel

H17 warning lamp: indicates low battery charging of pump engine

H57 warning lamp: indicates low oil pressure of pump engine

H186 multiple warning lamp: it is blinking together with an active warning lamp

S3 switch: manual control of the priming pump

S9- switch: manual throttle decrease

S9+ switch: manual throttle increase

S11 switch: water tank suction valve

S14/1 switch: 3% foam proportioning rate

S14/3 switch: 8% foam proportioning rate

S17 switch: water tank pump fill valve / recirculation

S18 switch: preselection of foam compound tank suction valve

S19 switch: undertruck nozzles

S44 switch: left bottom regulated discharge valve **

S45 switch: right bottom regulated discharge valve **

S54 switch: manual / automatic pump control

◊ "OFF" position -> automatic mode

◊ "ON" position -> manual mode; the integrated pilot lamp illuminates

S69 switch: drainage of pump system

S178 switch: deluge system

Note: The windscreen and side windows will be deluged by 6 nozzles on top as long as the switch is depressed. The switch is only active with closed cabin doors.

Depending on the water quality operate the system in regularly intervals to clean the system from residues.

** only active with the corresponding roller shutter is open *

Note:

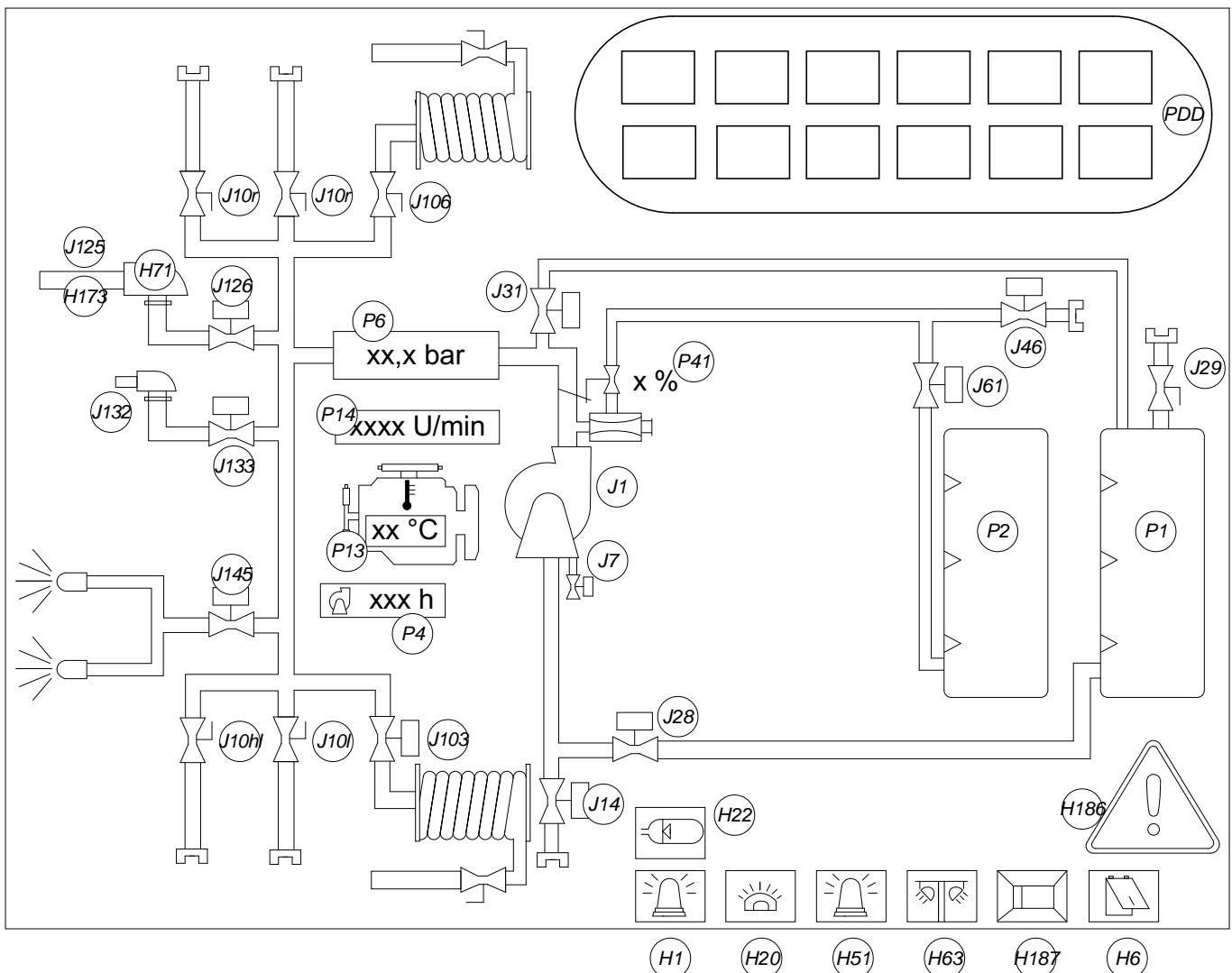
A LED is installed above each switch which illuminates when the corresponding switch on this or on an external pump control panel is engaged.

The description includes optional equipment which is possibly not installed on your vehicle.

Switches and pilot lamps of fire fighting superstructure in the cabin

Panther operator's display - after engaging the ignition the pump operation screen will be displayed.

The following descriptions describe the state of the display in the respective situations.


Note:

The description includes optional equipment which is possibly not installed on your vehicle.

Switches and pilot lamps off fire fighting superstructure in the cabin

PDD panther driver's display - for further information please refer to the chassis operation manual

- H1** pilot lamp: indicates engaged rotating beacons
H6 pilot lamp: indicates open roller shutter or compartment door
If the parking brake is released while a locker compartment is open, the (H6) indicator light changes from yellow to red, starts blinking together with (H186) warning triangle and during the first 5 seconds an acoustical warning tone sounds intermittent.
H20 pilot lamp: indicates engaged air traffic warning lights
H22 warning lamp: indicates low compressed air pressure -
If active the lamp (H186) is blinking simultaneously.
H51 pilot lamp: indicates engaged yellow rotating beacon(s) *
H63 pilot lamp: indicates light mast is not in transport position
If the light mast is raised, and the parking brake is released, the lamp (H63) starts blinking red and simultaneously the lamp (H186) starts blinking "STOP". At the same time, an acoustical warning tone sound continuously until the light mast is in transport position.
H66 pilot lamp: indicates turret in transport position *
H71 pilot lamp: turret symbol blinks green indicating roof turret engaged
Note: The turret symbol blinks green when started. If the vehicle was parked with "Turret not in transport position", the symbol illuminates red.
ATTENTION: Roof turret not in transport position!
H173 pilot lamp: indicates half output selected; half of the foam pipe is black coloured
H186 multiple warning lamp: always blinks together with an active warning lamp
H187 pilot lamp: indicates engaged surrounding field illumination

- J1** water pump
*blue - during priming procedure
red - warning - indicates water pump temperature higher than 60° Celsius and the pump drain valve will be opened;
The overheating protection system is engaged, the (H186) warning triangle starts blinking and during the first 5 seconds an acoustical warning tone sounds intermittent.*

ATTENTION !

If the pilot lamp (H6) or (H63) illuminates whilst driving, stop the vehicle and close the corresponding open locker compartment, or lower the light mast.

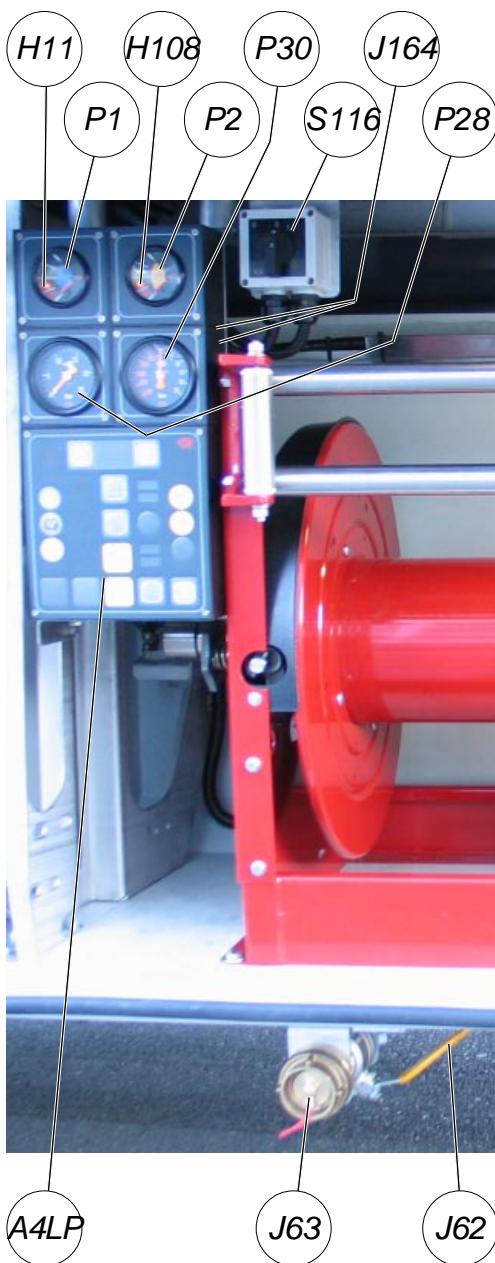
Switches and pilot lamps off fire fighting superstructure in the cabin

- J7 pump drain valve
J10hl left bottom regulated handline discharge valve *
J10hr right bottom regulated handline discharge valve *
J10l left handline discharge valve
J10r right handline discharge valve
J14 water drafting valve
J28 water tank suction valve
J29 water tank hydrant fill valve
J31 water tank pump fill valve / recirculation
J46 foam compound drafting / flushing valve
J61 foam compound tank suction valve
J103 left hose reel discharge valve
J106 right hose reel discharge valve
J125 roof turret
J126 roof turret's discharge valve
J132 bumper turret
J133 bumper turret's discharge valve
J145 undertruck nozzles' discharge valve
- P1 water tank level gauge **
P2 foam compound tank level gauge **
P4 hourmeter: indicates total working hours of the water pump *
P6 pump pressure gauge
P13 pump engine coolant temperature gauge
P14 pump engine revolution gauge
P41 foam compound proportioning rate indication

Note:

The piping system is white in empty condition, green when filled by water, blinking yellow when the foam compound tank suction valve is preselected, and yellow when filled by a mixture of water and foam compound.

- ** The tank level gauges are equipped with a low level warning. If the water or foam compound tank content is less than one third, a warning call-sign starts blinking and during the first 30 seconds an acoustical warning tone sounds continuously.



Operation Elements on the Left and Right External Control Stations

Indications, controls and connections on the left hand side

A4LP *left external pump control panel - for detailed information please see next pages*

H11 *pilot lamp: indicates water tank content less than one third*
 H108 *pilot lamp: indicates foam compound tank content less than one third*

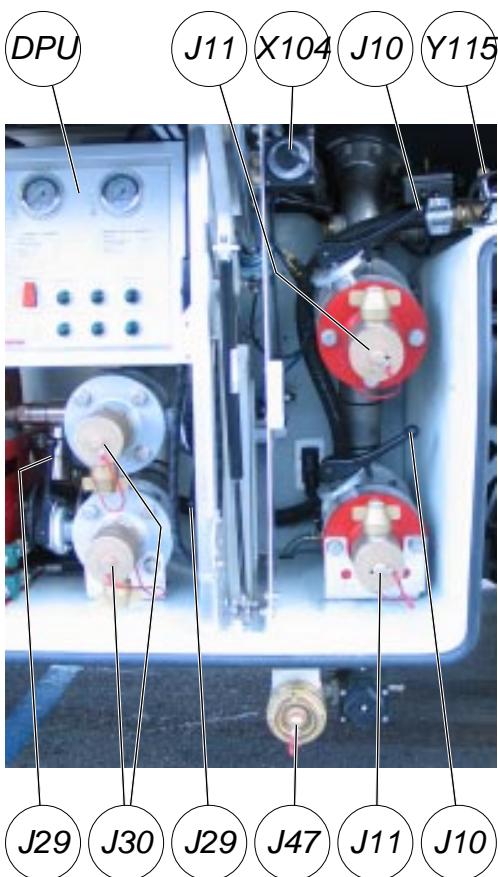
J62 *foam compound tank fill-/drain valve*
 J63 *foam compound tank fill-/drain connection*
 J164 *drain-/flushing valves for pressure gauges - placed behind the gauges*

P1 *water tank level gauge*
 P2 *foam compound tank level gauge*
 P28 *pressure manometer*
 P30 *manovacuummeter*

S116 *rewinding switch for the left hose reel - for further information please refer to the "Rapid Intervention System" chapter*

U31 *remote control for the light mast - for further information please refer to the "Light mast operation" chapter in this manual*





Controls and connections on the left hand side

90 emergency tool for control the pneumatic actuators - not shown - for further information please refer to the "Emergency Control of Pneumatic Actuators" chapter

DPU control panel for the dry powder unit - for further information please refer to the manufacturer's operation manual

J10 handline discharge valve

J11 discharge connection

J11h regulated discharge connection *

J15 water drafting connection

J29 water tank hydrant fill valve

J30 water tank hydrant fill connection

J46 foam compound drafting-/flushing valve - cancelled if the foam compound drafting-/flushing valve is controlled electropneumatically *

J47 foam compound drafting-/flushing connection

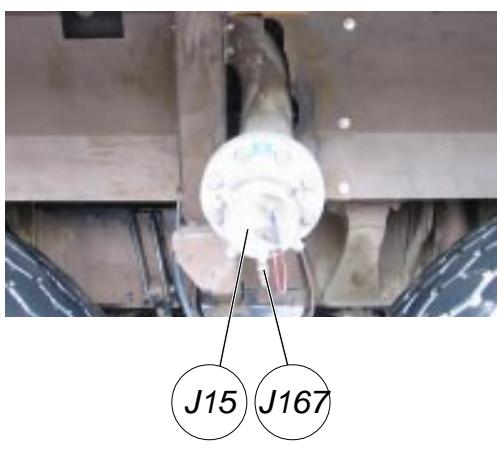
J167 drain valve - cancelled if the valve is controlled electro-pneumatically

Y115 purge valve for the left rapid intervention system

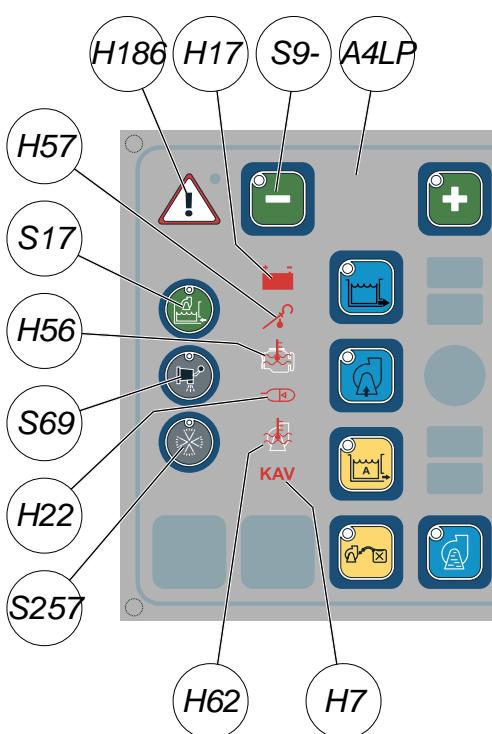
X104 24 VDC socket for foam compound tank fill pump

ATTENTION !

Operate the engine with idle speed to keep capacity of the batteries in good condition. This should be done when electric fill pump is engaged longer than 5 minutes.

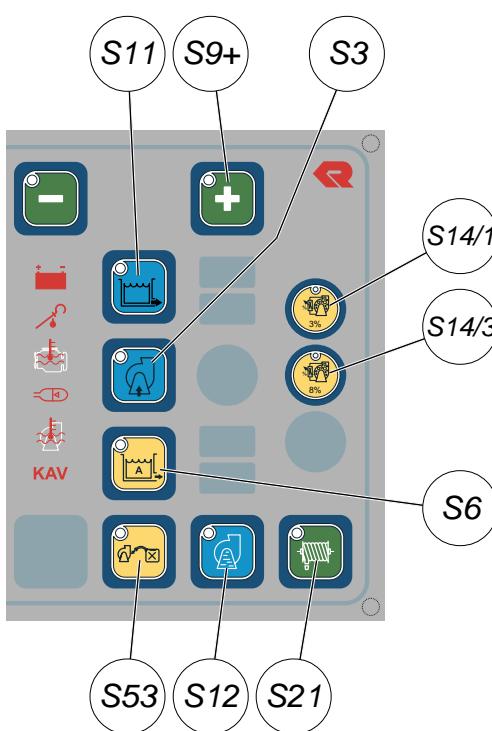


J15
J167


Switches and pilot lamps on the left pump control panel

A4LP left external pump control panel - detailed information

- H7** pilot lamp: indicates engaged pump pressure governor and cavitation *
- H17** warning lamp: indicates low battery charging of pump engine
- H22** warning lamp: indicates low compressed air supply for fire fighting system
- H56** warning lamp: indicates overheated coolant agent of pump engine
- H57** warning lamp: indicates low oil pressure of pump engine
- H62** warning lamp: indicates water pump temperature higher than 60° Celsius and the pump drain valve will be opened
- H110** warning buzzer - is engaged when the water or foam compound tank content is less than one third - not shown
- H186** multiple warning lamp: it is blinking together with an active warning lamp



S3 switch: manual control of the priming pump

S6 switch: foam compound tank suction valve

S9- switch: manual throttle decreasement **

S9+ switch: manual throttle increasement **

S11 switch: water tank suction valve

S12 switch: external drafting valve

S14/1 switch: 3% foam proportioning rate

S14/3 switch: 8% foam proportioning rate

S17 switch: water tank pump fill valve / recirculation

S21 switch: left hose reel discharge valve

S53 switch: internal flushing valve closed - foam compound drafting or external flushing

S69 switch: drainage of pump system

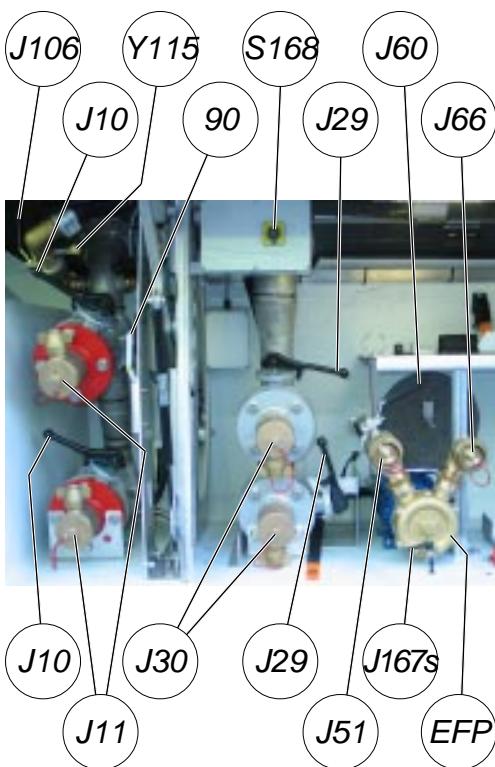
S257 switch: surrounding field illumination

** By varying the pump speed the "Manual Pump Operation Mode" will be automatically selected.

Note:

A LED is installed above each switch which illuminates when the corresponding switch on this or on the cabin pump control panel is engaged.

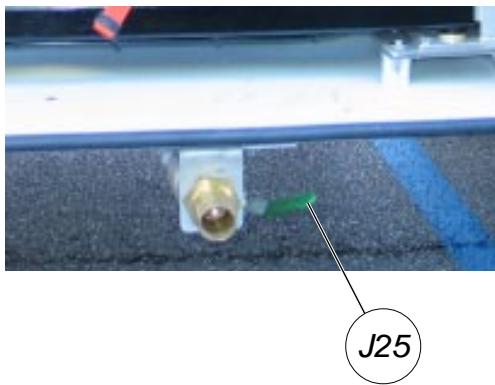
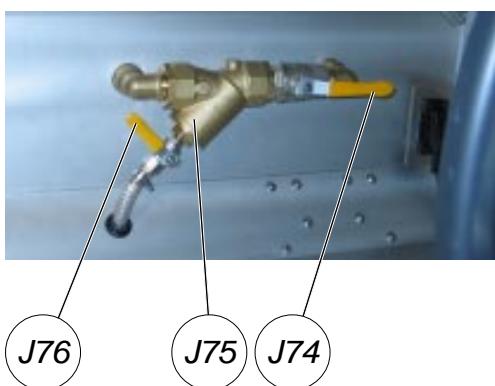
The description includes optional equipment which is possibly not installed on your vehicle.

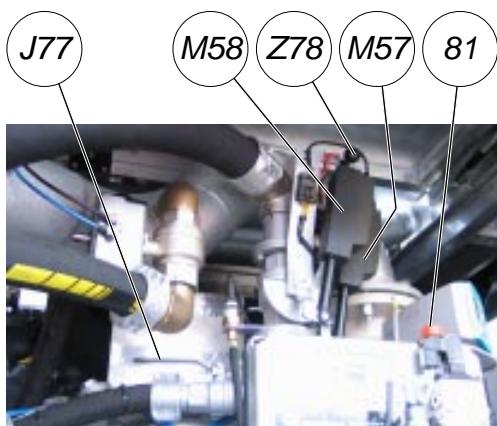

Controls and connections on the right hand side

- 90 emergency tool - for further information please refer to the "Emergency Control of Pneumatic Actuators" chapter
- EFP electric powered foam compound pump
- J10 discharge valve
 J10h regulated discharge valve *
 J11 discharge connection
 J11h regulated discharge connection *
 J25 water tank drain valve
 J29 water tank hydrant fill valve
 J30 water tank hydrant fill connection
 J51 flushing connection
 J60 foam compound pump three-way ball valve
 J66 foam compound drafting connection
 J74 deluge shut off valve
 J75 filter for deluge water
 J76 drain and flush valve for the deluge filter
 J106 right hose reel discharge valve
 J167s foam compound pump drain valve

S168 foam compound pump selector switch

Y115 purge valve for the right rapid intervention system





Further installations in the pump compartment

81 oil fill plug of the priming pump

J61r revision valve of the foam compound tank

Note:

valve open -> this is the normal operation position

Close the revision valve only during maintenance or service work.

J77 foam induction valve

Note:

valve open -> this is the normal operation position

Close the foam induction valve only for a pump performance test.

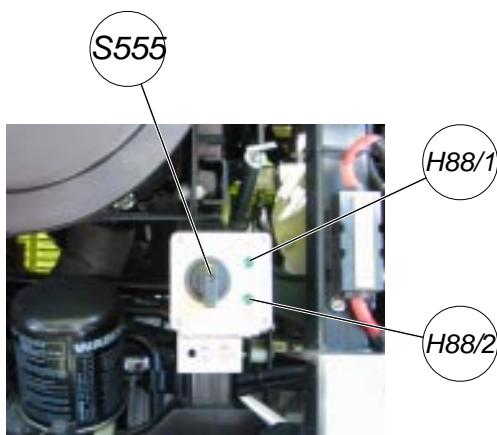
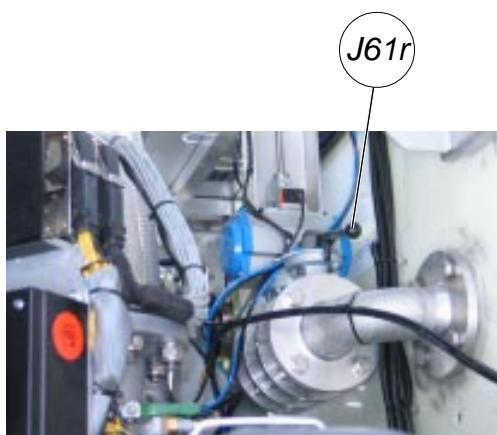
M57 adjusting motor for small proportioning rate

M58 adjusting motor for big proportioning rate

Z78 bolt for manually foam proportioning adjustment

Note:

For further information please refer to the "Emergency Adjustment of the Foam Proportioning Rate" chapter.



Oil level check system for pump gearbox and priming pump

H88/1 pilot lamp: priming pump oil level indication

H88/2 pilot lamp: pump gearbox oil level indication

S555 switch: oil level check

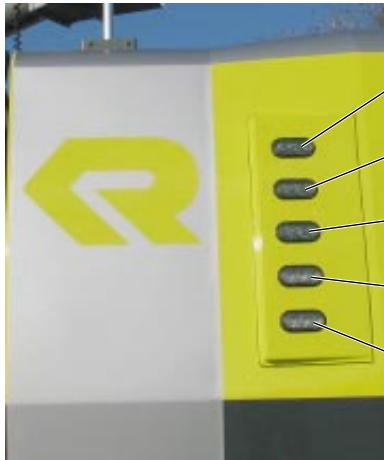
- ◊ "left" position -> to check the system for proper function
- ◊ "centre" position -> system disengaged
- ◊ "right" position -> to check both oil levels

Note:

For further information please refer to the "Service Procedures" chapter.

External water tank content indicators

placed behind the cabin on the left and right hand sides



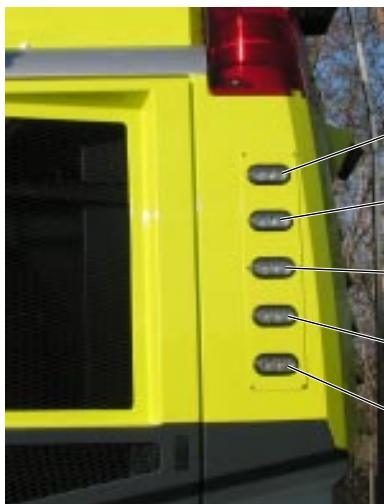
- E60
- E61
- E62
- E63
- E64

- E60 visual tank level indicator - tank content 100%
 E61 visual tank level indicator - tank content 80%
 E62 visual tank level indicator - tank content 60%
 E63 visual tank level indicator - tank content 40%
 E64 visual tank level indicator - tank empty <20%

Note: When tank is full, the indicators (E60 - E63) illuminates.
 When tank level drops, corresponding indicators extinguishes. The red indicators (E64) illuminates, when the tank content remains under 20%. The external indicators are active with water pump engaged.

External foam compound tank content indicators

placed on the rear module on the left and right hand sides



- E60s
- E61s
- E62s
- E63s
- E64s

- E60s visual tank level indicator - tank content 100%
 E61s visual tank level indicator - tank content 80%
 E62s visual tank level indicator - tank content 60%
 E63s visual tank level indicator - tank content 40%
 E64s visual tank level indicator - tank empty <20%

Note: When tank is full, the indicators (E60s - E63s) illuminates.
 When tank level drops, corresponding indicators extinguishes. The red indicators (E64s) illuminates, when the tank content remains under 20%. The external indicators are active with water pump engaged.

Note:

The roof illumination will be automatically engaged with the

- ◊ parking brake applied,
- ◊ the position lights engaged and
- ◊ the roof hatch opened or
- ◊ the rear ladder is swivelled down.


Power supply

A25 230 Volt AC terminal

Components powered via supply socket (X101) - description of the fuses in succession from rear to front:

Q1 - FI-safety cutout

Q2 - right engine coolant heating

Q3 - left engine coolant heating

Q4 - battery charging units

Q5 - compressor

G1/4 battery box pullout with 4 batteries

U9l battery charging unit for the left drive engine's batteries -

U9r battery charging unit for the right drive engine's batteries -

- for further information please refer to the manufacturer's operation manual



X101 230 Volt AC power supply socket - please see (A25)

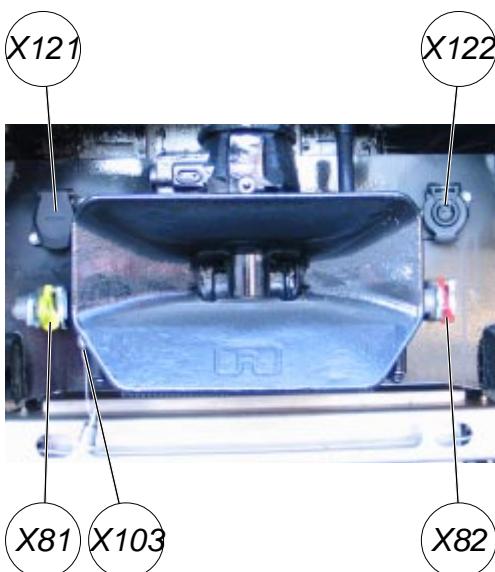
Note:

The power supply connection (X101) will be automatically disconnected as soon as the drive engine is started.

To prevent damage of the vehicle and/or the supply socket an automatic rewinding cable drum must be provided in the garage.

CAUTION !

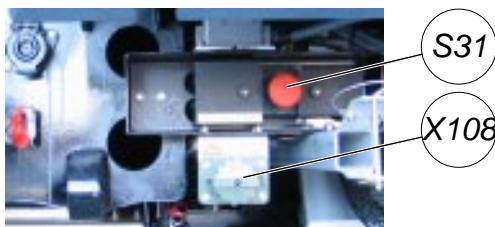
Connect socket with earthing contact and the garage fault current breaking system with max. 30 mA rated fault current.



Power supply

- S31 battery isolating switch - press -> ON, pull -> OFF - for further information please refer to the chassis operation manual
- S463 switch: emergency stop for the left drive engine ->
- S464 switch: emergency stop for the right drive engine -> -> for further information please refer to the chassis operation manual
- X79 compressed air connection / tyre fill connection - pressure up to 8.5 bar *
- X81 compressed air trailer brake coupling - brake pipe (yellow)
- X82 compressed air trailer brake coupling - supply pipe (red)

X103 supply socket for compressed air



ATTENTION !

Only fill with cleaned, dried, oil-free air with max. 80° Celsius and min. 7.0 to max. 8.0 bar pressure!

X108 24 Volt starting socket

please refer to the "Battery Service Procedures" maintenance chapter in this operation manual

ATTENTION !

The use of the additional starting socket is only allowed by using a correctly polarized plug and according to chassis manufacturers instructions. Check for correct voltage when using a starting socket.

X121 trailer socket

X122 trailer ABS socket

emergency stop switch in the right engine's compartment



Preparation for Use



CAUTION !

Before operating the vehicle pay attention to the following:

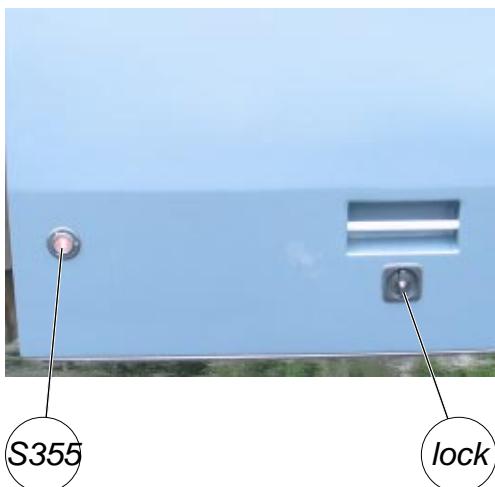
- *Have the safety and support of the fixing devices been checked?*
- *Is the hinged ladder locked ?*
- *Are the supply cables (power supply, compressed air) disconnected ?*
- *Have the wheels and their air pressure been checked ?*
- *Are all roller shutters closed ?*
- *Are all doors and hinged steps closed ?*
- *Is the light mast in transport position ?*
- *Is the roof turret in transport position ?*

Equipment incorrectly prepared for operation is unsafe for use. If something is found that needs attention, have it checked before it leaves for operation. Even minor mechanical defects can lead to accidents, or personnel injury.

For further instructions concerning maintenance, please refer to the "Inspection, Maintenance and Service Procedures" chapter in this manual.



Locker Compartment Doors



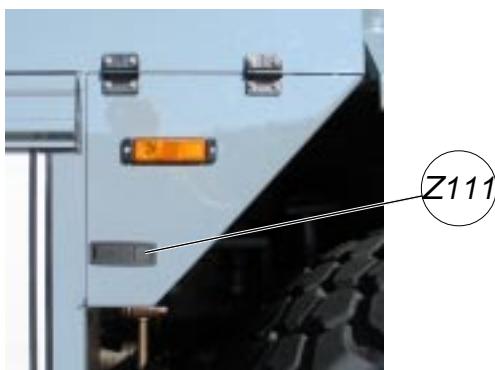
The left and right locker compartment doors are pneumatically powered.

The door control functions when

- *the ignition is engaged and*
- *the appropriate door is unlocked (if locked the integrated pilot lamp in switch (S355) blinks) and*
- *the pneumatic supply pressure is more than 6.5 bar.*

Opening / closing

- *Press switch (S355) at the left or right door:*
 - ◊ *Appropriate door will open or close.*



Z111 lock of compartment doors

Depending on the shape of the compartment doors they are designed with one or two locks.

For opening press the short section of lock (Z111).

For closing press the long section of lock (Z111).

ATTENTION !

Pay attention to the spring- and load force when opening or closing a hinged step or a compartment door. Generally guide hinged steps or compartment doors slowly against their rest positions. To avoid injuries grasp hinged steps or compartment doors at suitable position.

Do not let hinged steps or compartment doors fall!

Note: *Open roller shutters before swivelling out hose reel or equipment panels.*

Starting the Drive Engines

ATTENTION !

For further instructions please refer to the chassis operation manual.



Tow away adapter

ATTENTION !

For towing the panther always use the front or rear tow away adapter respectively as shown in the picture beside.

For further information please refer to the chassis operation manual.



Alarm Start *

In order to reduce intervention time, the panther is equipped with an alarm-start-device. It is possible thereby to start the drive engines from outside before entering the cabin.

Condition: Battery isolating switch (S31) engaged.

Emergency stop switch (S34) in the ON position. *

Left and right drive engine stop switches in the ON position.

Parking brake applied.

Both cabin doors unlocked.

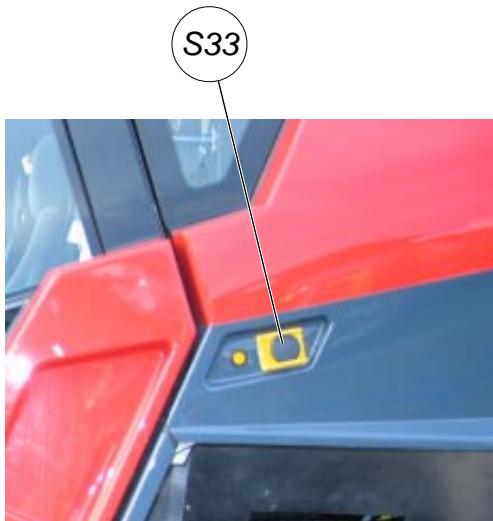
- Push switch (S33) above the left or right* front wheel.
 - ◊ If engines fails to start within 15 seconds time, the starting cycle will automatically break off.

- With the alarm start also

- ◊ the rotating beacons,
- ◊ the front flash lights,
- ◊ the air traffic warning lights, *
- ◊ the vehicles illumination is switched on,
- ◊ the water tank suction valve and ventilation valve is opened
- ◊ the external power supply will be disconnected. *

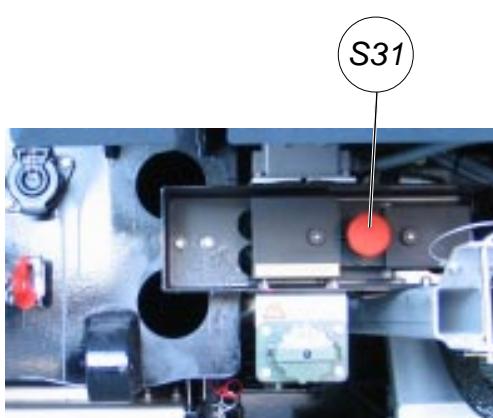
This additional alarm start functions can be disengaged by turning switch (S395) to the "IGN" ignition position, then switch on and off the activated functions, OR by disengaging the drive engines.

The turrets has to be separately disengaged.



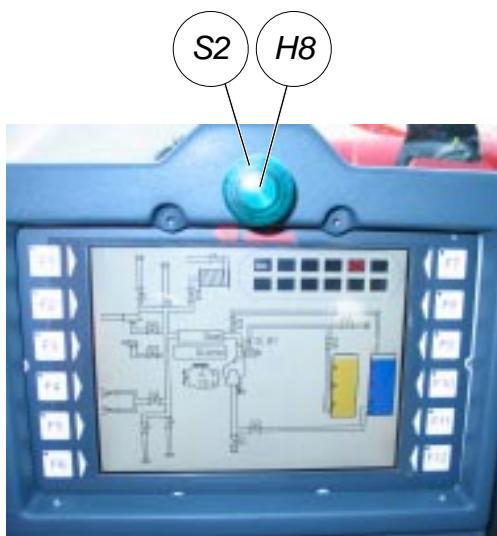
Switching off the drive engines

- Stop the vehicle.
- Apply parking brake.
- Shift transmission to the "N" position.
- Switch off the turrets.
- Disengage the drive engines:
 - ◊ Turn switch (S395) to the "IGN" ignition position and then return to the "OFF" position.



ATTENTION !

- Before stopping, let the engines idle for approx. 2 minutes.
- Do not stop engines when they are running at a high speed !
- If a cabin door is locked, the engine cannot be started from outside via the alarm-start-switch.
- Disengage the battery isolating switch (S31) to lock the alarm start function.



Engaging the Pump

- The operation of the pump unit is independent of the PANTHER's drive mode.
 - ◊ Start the drive engines as mentioned in the chassis operation manual.

Note:

Engaging the pump is controlled electronically. The pump is driven by the right engine which is then no longer used for traction power. The driving performance during pump operation is provided from the left engine.

Engaging the pump:

- available in all gears and in the complete speed range.
 - ◊ Push switch (S2).
 - ◊ The integrated pilot lamp (H8) in switch (S2) blinks during the engaging procedure and half of the right tachometer illuminates blue.
 - ◊ When the pump is running, the integrated pilot lamp (H8) in switch (S2) illuminates and the right tachometer becomes completely blue.

Disengaging the pump:

- ◊ Pull switch (S2).
- ◊ The integrated pilot lamp (H8) in switch (S2) blinks during the disengaging procedure and extinguishes when the pump is off. The tachometer of the right engine switches back into drive mode (completely orange).

ATTENTION !

Before engaging the pump, please refer to the separate chassis operation manual !



When remaining in the presence of a working pump for prolonged periods of time, the operator should wear proper ear protection.

Avoid operating the pump without water for longer than 3 minutes. Operation without water supply can result in damage of the pump shaft seal.

If the drive engines are turned off with a running pump, the battery switch stays connected, the integrated pilot lamp in switch (S2) blinks and an acoustical alert rings.



Roof Turret RM 60 C

Description of RM 60 C

The electronically controlled RM 60 C turret, mounted on the vehicles roof is designed for water operation as well as for water/foam operation.

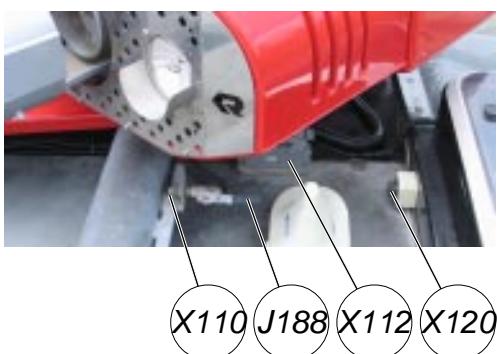
- 1 foam pipe
- 2 deflector
- 9 aspirating nozzle
- E17 turret search light
- H11 pilot lamp: indicates water tank content less than one third *
- H66 pilot lamp: indicates turret engaged
- H108 pilot lamp: indicates foam compound tank content less than one third **
- J188 releasing valve of the roof turret *
- Note:
Keep the releasing valve of the roof turret open for normal operation procedures -> base setting.
Close the releasing valve only when a emergency releasing of the roof turret is required.
- P1 water tank level gauge *
- P2 foam compound tank level gauge *
- P28 pressure gauge: indicates water pressure at the turret
- S5 switch: turret discharge and foam compound tank suction valve
- S9 switch: throttle control for pump engine (water pump)
- S48 switch: discharge reduction
 - ◊ "0" position -> full discharge
 - ◊ "I" position -> half discharge
- S49 switch: deflector adjustment
 - ◊ "left" position -> to close - spray
 - ◊ "right" position -> to open - full jet

- U38t roof turret camera *
- X110 compressed air supply connection
- X112 power supply connection
- X120 socket for speaker system *

Note:

For access open the protection cap. *
A second socket (not shown) is placed in the cabin. *

- Z119 handwheel for elevation
- Z120 handwheel for rotation




Description of control handle of RM 60 C

The turret is remotely controlled from the drivers cabin. This is done by a control handle. The turret follows the movement of this control handle.

20 control handle

H65 position LED

S46 START - switch

S47 STOP - switch

S48 discharge reduction switch

◊ "OFF" position -> full output

◊ "ON" position -> half output; the integrated pilot lamp illuminates

S49f roof turret deflector adjustment switch -> full jet

S49s roof turret deflector adjustment switch -> spray

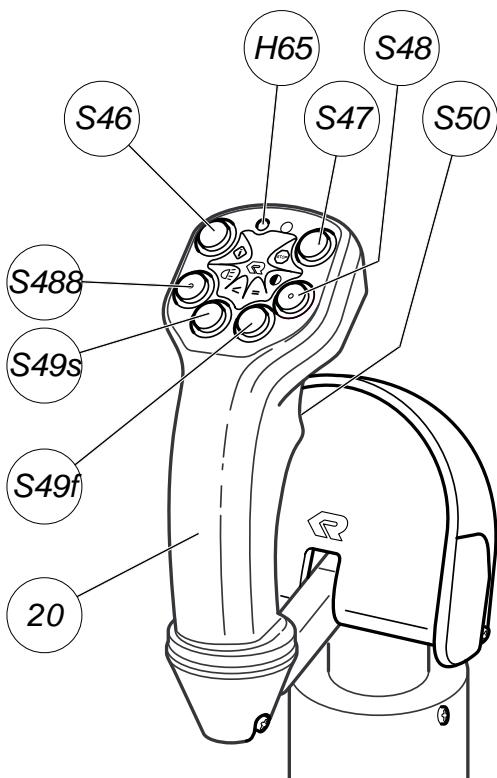
S50 toggle switch for turret discharge valve

S488 permanent roof turret discharge switch - with integrated pilot lamp which indicates open discharge valve

Note:

The windshield wipers are engaged with roof turret's discharge valve open.

The roof turret will always start with full discharge amount selected.


ATTENTION !

Operate the roof turret with closed roof hatch only !


CAUTION !

Before activating the turret control please make sure to have enough operation area available. The turret moves automatically into the same position like the control handle is pointing to.

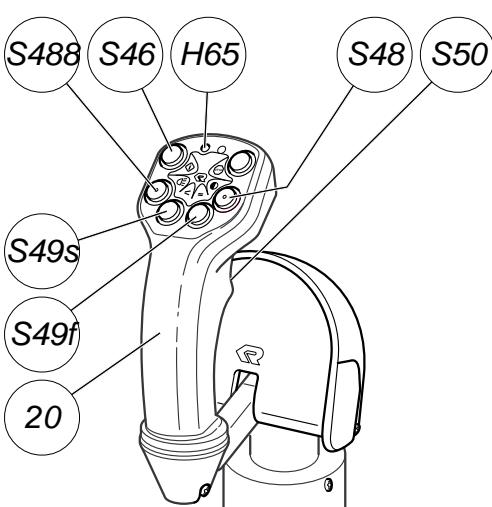
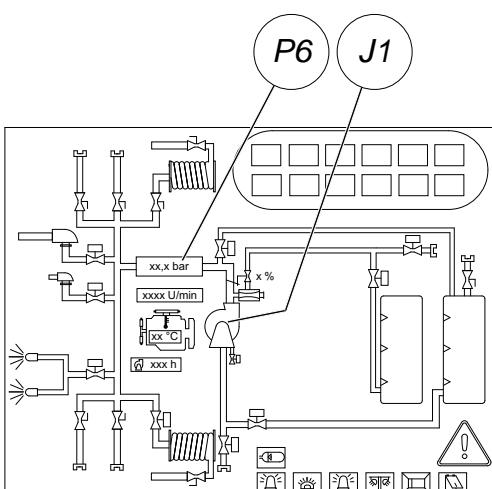
Never point the discharge jet at anybody.

DANGER OF INJURY TO PERSONNEL!



Roof turret RM 60 C - operation with water

- Operate pump in automatic mode (base setting):
 - ◊ The integrated pilot lamp in switch (S54) is off.
- Engage the pump:
 - ◊ Please refer to the "Engaging the Pump" chapter.
- When the pump is engaged the following program starts:
 - ◊ The water tank suction valve opens automatically.
 - ◊ The priming pump is engaged automatically until a pressure of 2 bar is achieved (visible on water pressure gauge (P6)) and the engine speed increases.
 - ◊ The pump icon (J1) illuminates blue as long as the priming pump is engaged.
 - ◊ After achieving a pressure of 2 bar the engine speed decrease to idle.
- Press "START"-switch (S46).
 - ◊ The turret moves automatically to the actual position of the control handle (20).
 - ◊ The position LED (H65) illuminates when the turret has reached the control handles position.
- Direct the turret to the desired position by using control handle (20).
- Open the turret discharge valve:
 - ◊ Press switch (S50) as long as water discharge is desired or for permanent discharge press switch (S488).
 - ◊ Pump speed is increased automatically to full speed, as soon as the turret discharge valve is opened.
- To reduce to half discharge rate press switch (S48), the integrated pilot lamp illuminates.
- To generate spray press switch (S49s) or for full jet press switch (S49f). This can be done whilst fire fighting.

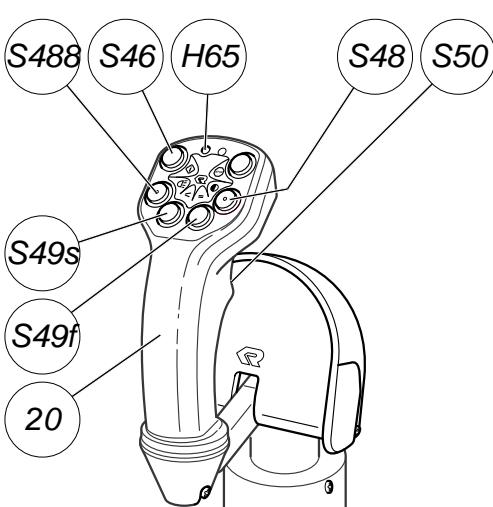
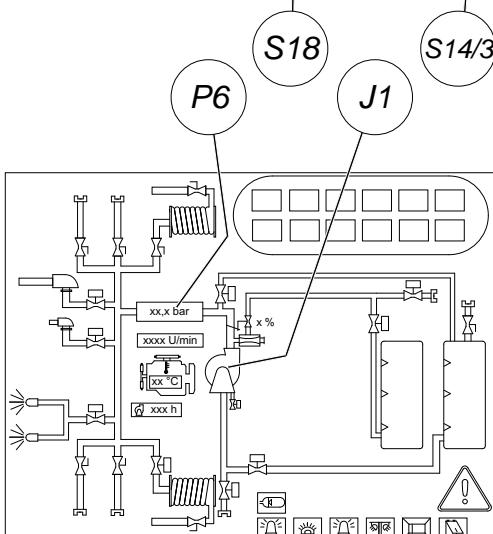


Temporary stopping of turret operation:

- Close turret discharge valve:
 - ◊ Release switch (S50) or press activated switch (S488).
 - ◊ The pump engine will idle.

Stopping of turret operation:

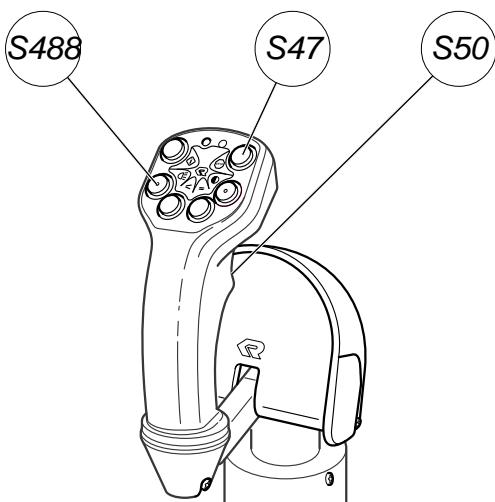
- ◊ Release switch (S50) or press activated switch (S488).
- ◊ The pump engine will idle.
- ◊ Press "STOP"-switch (S47).
The turret moves to its transport position.
- ◊ Disengage the pump - please refer to the "Engaging the Pump" chapter.


Roof turret RM 60 C - operation with foam

- Operate pump in automatic mode (base setting):
 - ◊ The integrated pilot lamp in switch (S54) is off.
- Engage the pump:
 - ◊ Please refer to the "Engaging the Pump" chapter.
- When the pump is engaged the following program starts:
 - ◊ The water tank suction valve opens automatically.
 - ◊ The priming pump is engaged automatically until a pressure of 2 bar is achieved (visible on water pressure gauge (P6)) and the engine speed increases.
 - ◊ The pump icon (J1) illuminates blue as long as the priming pump is engaged.
 - ◊ After achieving a pressure of 2 bar the engine speed decrease to idle.
- Preselect the foam compound tank suction valve:
 - ◊ Press switch (S18), the integrated pilot lamp blinks.
- If required change the foam proportioning rate:
 - ◊ Press switch (S14/1) if 3% or (S14/3) if 8% is required otherwise 6% foam proportioning rate will be created.
- Press "START"-switch (S46).
 - ◊ The turret moves automatically to the actual position of the control handle (20).
 - ◊ The position LED (H65) illuminates when the turret has reached the control handles position.
- Direct the turret to desired position by using control handle (20).
- Open turret discharge line and foam compound tank suction valve:
 - ◊ Press switch (S50) as long as water/foam discharge is desired or for permanent discharge press switch (S488).
 - ◊ The pilot lamp in switch (S18) illuminates.
 - ◊ Pump speed is increased automatically to full speed, as soon as the turret discharge valve is opened.
- To reduce to half discharge rate press switch (S48), the integrated pilot lamp illuminates.
- To generate spray press switch (S49s) or for full jet press switch (S49f). This can be done whilst fire fighting.

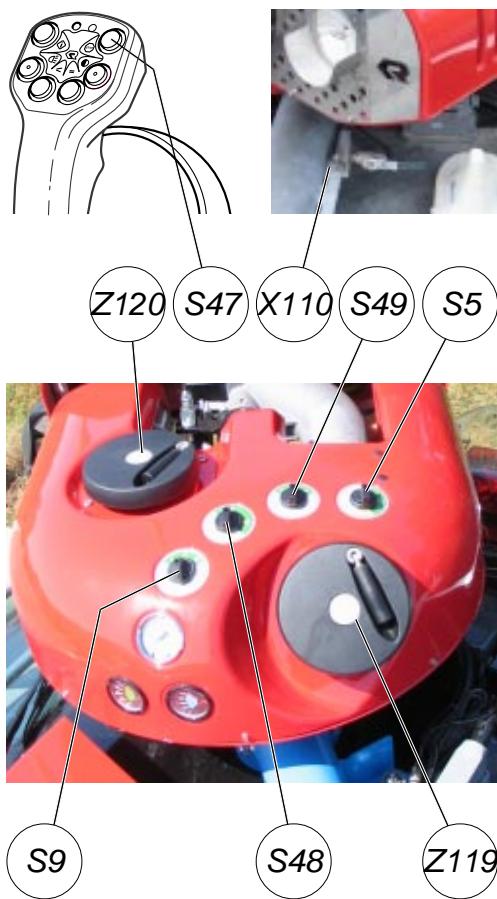
Stopping of turret operation:

- ◊ Press switch (S18) again - the turret is flushed automatically when continuing water discharge.
- ◊ Release switch (S50) or press activated switch (S488).
- ◊ The pump engine will idle.
- ◊ Press "STOP"-switch (S47).
The turret moves to it's transport position.
- ◊ Disengage the pump - please refer to the "Engaging the Pump" chapter.


ATTENTION !

On designs without a turret pipe, AFFF foam compound should be used, otherwise the foam quality is poor ! *

The pump system must be flushed after every foam operation.
Please refer to the "Flushing after Foam Operation" chapter.
Operate the roof turret with closed roof hatch only !



Roof turret RM 60 C - emergency operation with water or foam

If an electric component for the roof turret control is defective the turret can be controlled manually from vehicle's roof.

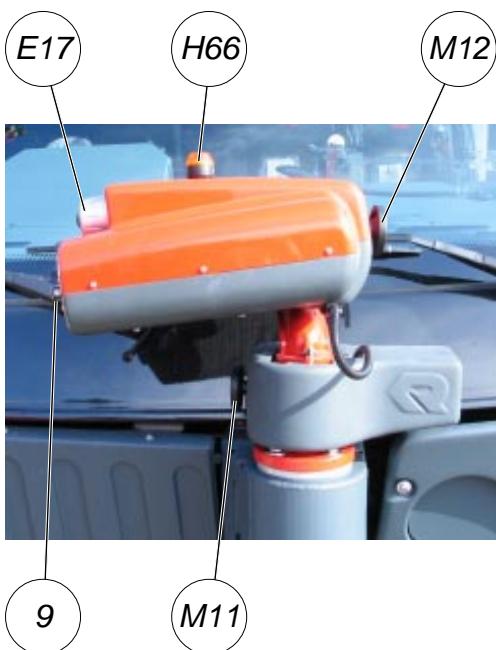
- Press "STOP"-switch (S47).
 - Engage the P.T.O. - please refer to the "Engaging the Pump" chapter for STATIONARY OPERATION.
 - Before leaving the cabin prepare pump system for fire fighting as mentioned before.
 - Select desired foam proportioning rate.
 - Open the roof hatch.
 - Put up safety railings when working on the roof.
 - Direct the turret to desired position:
 - ◊ Operate the switch (S49) whilst moving the turret out from transport lock by using handwheel (Z119) for elevation until the turret's covering can not contact the transport lock.
 - ◊ For rotating movements use handwheel (Z120).
 - ◊ If switch (S49) will not release the turret disconnect the compressed air supply connection (X110) and open transport lock - push back the pneumatic cylinder by hand.
- Note:** Start with elevating out from the transport lock.
- Water operation:
 - ◊ Turn switch (S5) to the green position or;
 - ◊ Activate pneumatic solenoid (Y126) - please refer to the "Emergency Control of Electro Pneumatic Solenoids" chapter.
 - Foam operation:
 - ◊ Turn switch (S5) to the yellow position or;
 - ◊ Activate pneumatic solenoid (Y126), (Y50) and (Y61) - please refer to the "Emerg.Con.ofEl.Pneu.Solenoids" chapter.
 - Adjust required discharge pressure and throwing range by using switch (S9).
 - For half discharge turn switch (S48) to the "I" position.
 - To adjust the discharge pattern operate switch (S49).

Stopping of turret operation:

- Let engine idle.
- Return switches to the "0" position or set the pneumatic solenoids back to the neutral position (please refer to the "Emergency Control of Electro Pneumatic Solenoids" chapter).
- Move the turret back to its transport position.
 - ◊ Direct turret above the transport lock before lowering it, not to damage the turret's covering.
 - ◊ Fix transport lock by reconnecting the compressed air supply line.

Note:

When operating the turret in combination with foam operation from an external foam compound container, turn switch (S5) to the green area only and do not operate the switch (S18) and pneumatic solenoid (Y61)!



Bumper Turret RM 15 C

Description of RM 15 C

The electronically controlled RM 15 C turret, which is mounted on the front bumper is designed for water operation as well as for water/foam operation.

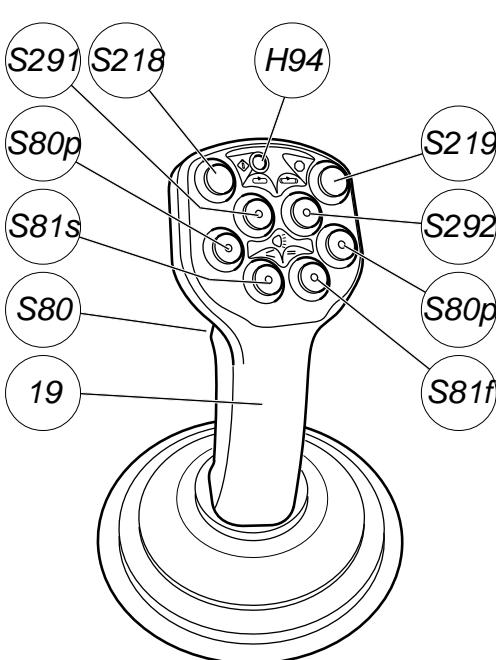
- 1 foam pipe *
- 2 deflector *
- 9 non aspirating nozzle

E17 turret search light *

H66 pilot lamp: indicates turret engaged

M11 motor for rotation with handwheel for manually operation

M12 motor for elevation with handwheel for manually operation



Description of control elements of the turret RM 15 C

The turret is remotely controlled from the drivers cabin. This is done by a joystick. The turret follows the movement of this joystick.

19 joystick for bumper turret

H94 position LED

S80 toggle switch for bumper turret discharge valve

S80p permanent bumper turret discharge switch - with integrated pilot lamp which indicates open discharge valve *

S81f bumper turret nozzle adjustment switch -> full jet

S81s bumper turret nozzle adjustment switch -> spray

S218 START - switch

S219 STOP - switch

S221 discharge reduction switch *

S291 switch: activation of oscillator operation *

S292 switch: oscillation adjustment *

CAUTION !



Before activating the turret control please make sure to have enough operation area available.

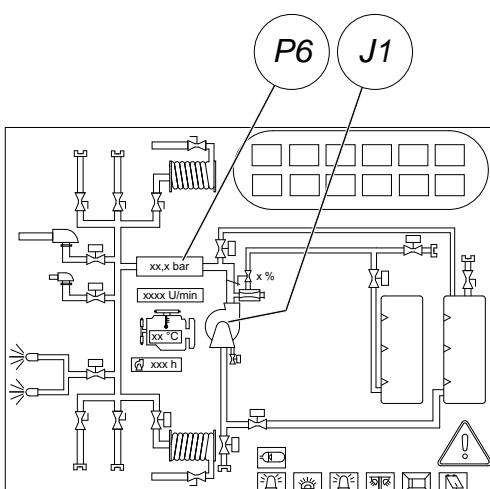
Sight contact with the turret discharge is absolutely essential!

Never point the discharge jet at anybody.

DANGER OF INJURY TO PERSONNEL!


Bumper turret RM 15 C - operation with water

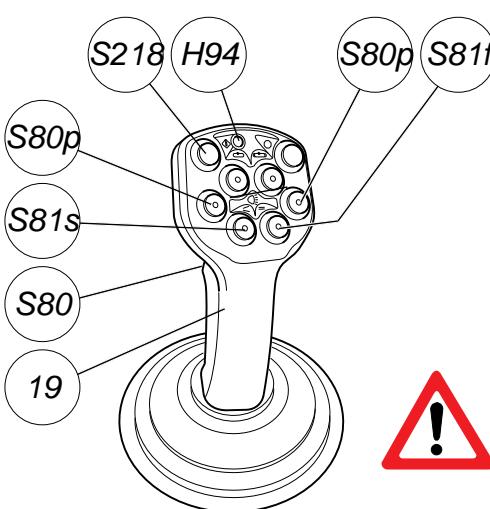
- Operate pump in automatic mode (base setting):
 - ◊ The integrated pilot lamp in switch (S54) is off.
- Engage the pump:
 - ◊ Please refer to the "Engaging the Pump" chapter
- When the pump is engaged the following program starts:
 - ◊ The water tank suction valve opens automatically.
 - ◊ The priming pump is engaged automatically until a pressure of 2 bar is achieved (visible on water pressure gauge (P6)) and the engine speed increases.
 - ◊ The pump icon (J1) illuminates blue as long as the priming pump is engaged. After achieving a pressure of 2 bar the engine speed decrease into idle.
- Press "START"-switch (S218).
 - ◊ The turret automatically moves to the pre-programmed attack position.
 - ◊ The position LED (H94) illuminates when the turret has reached the attack position.
- Direct the turret to desired position by using joystick (19).
- Open turret discharge valve:
 - ◊ Press switch (S80) as long as water discharge is desired or for permanent discharge press a switch (S80p). *
 - ◊ Pump speed is increased automatically to full speed, as soon as the turret discharge valve is opened.
- To generate spray press switch (S81s) or for full jet press switch (S81f). This can be done whilst fire fighting.


Temporary stopping of turret operation:

- Close turret discharge valve:
 - ◊ Release switch (S80) or press an activated switch (S80p)*.
 - ◊ The pump engine will idle.

Stopping of turret operation:

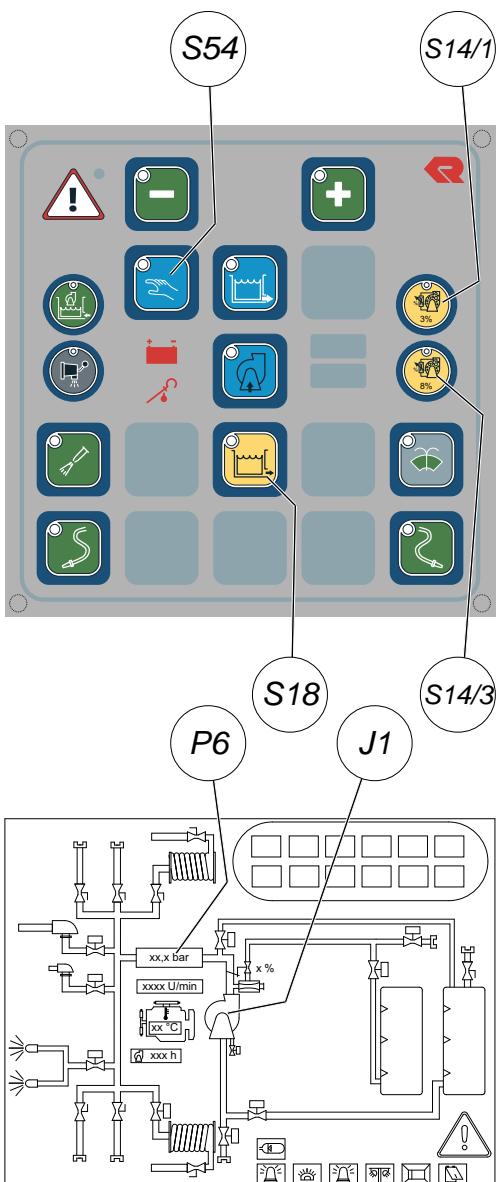
- ◊ Release switch (S80) or press an activated switch (S80p)*.
- ◊ The pump engine will idle.
- ◊ Press "STOP"-switch (S219).
The turret moves to its transport position.
- ◊ Disengage the pump - please refer to the "Engaging the Pump" chapter.


CAUTION !

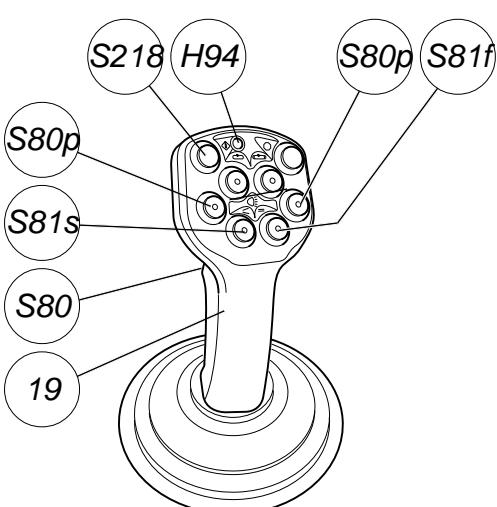
Sight contact with the turret discharge is absolutely essential!

Never point the discharge jet at anybody.

DANGER OF INJURY TO PERSONNEL!

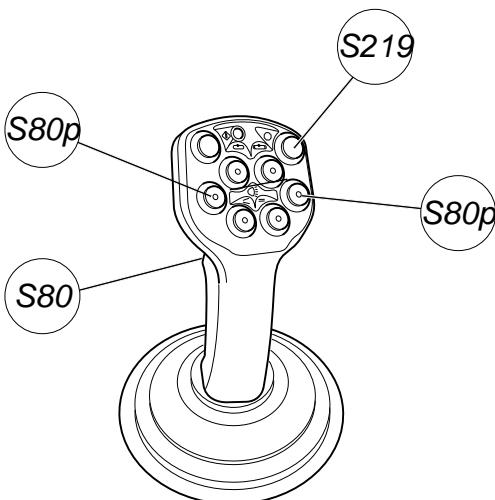

Bumper turret - operation with foam

- Operate pump in automatic mode (base setting):
 - ◊ The integrated pilot lamp in switch (S54) is off.
- Engage the pump:
 - ◊ Please refer to the "Engaging the Pump" chapter.
- When the pump is engaged the following program starts:
 - ◊ The water tank suction valve opens automatically.
 - ◊ The priming pump is engaged automatically until a pressure of 2 bar is achieved (visible on water pressure gauge (P6)) and the engine speed increases.
 - ◊ The pump icon (J1) illuminates blue as long as the priming pump is engaged.
 - ◊ After achieving a pressure of 2 bar the engine speed decrease to idle.
- Preselect the foam compound tank suction valve:
 - ◊ Press switch (S18), the integrated pilot lamp blinks.
- If required change the foam proportioning rate:
 - ◊ Press switch (S14/1) if 3% or (S14/3) if 8% is required otherwise 6% foam proportioning rate will be created.
- Press "START"-switch (S218).
 - ◊ The turret automatically moves to the pre-programmed attack position.
 - ◊ The position LED (H94) illuminates when the turret has reached the attack position.
- Direct the turret to desired position by using joystick (19).
- Open turret discharge line and foam compound tank suction valve:
 - ◊ Press switch (S80) as long as water/foam discharge is desired or for permanent discharge press a switch (S80p). *
 - ◊ The pilot lamp in switch (S18) illuminates.
 - ◊ Pump speed is increased automatically to full speed, as soon as the turret discharge valve is opened.
- To generate spray press switch (S81s) or for full jet press switch (S81f). This can be done whilst fire fighting.



Stopping of turret operation:

- ◊ Press switch (S18) again - the turret is flushed automatically when continuing water discharge.
- ◊ Release switch (S80) or press an activated switch (S80p). *
- ◊ The pump engine will idle.
- ◊ Press "STOP"-switch (S219).
- ◊ Disengage the pump - please refer to the "Engaging the Pump" chapter.

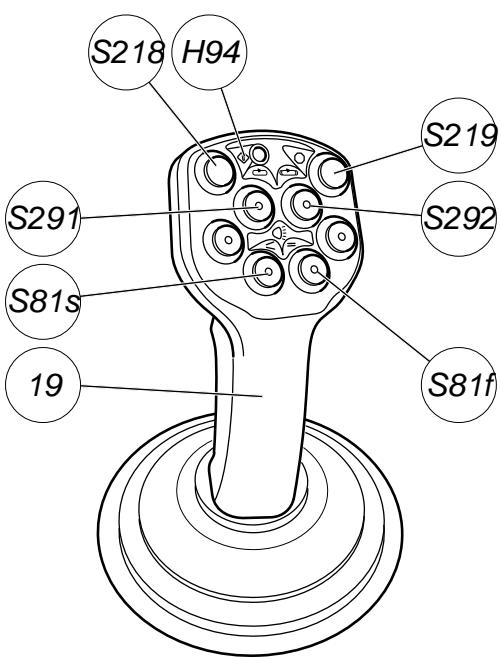

ATTENTION !

On designs without a turret pipe, AFFF foam compound should be used, otherwise the foam quality is poor !

*The pump system must be flushed after every foam operation.
Please refer to the "Flushing after Foam Operation" chapter.*

Bumper turret RM 15 C oscillator operation *

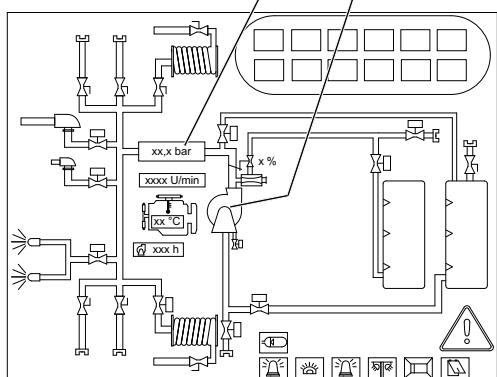
The bumper turret is equipped with an oscillating mode, which means the turret moves automatically within a preprogrammed area.



- Operate the bumper turret as mentioned in the
 - ◊ "Bumper turret operation with water" or
 - ◊ "Bumper turret operation with foam" chapter.
- Press "START"-switch (S218).
 - ◊ The bumper turret moves automatically to the preprogrammed "attack position".
 - ◊ The position LED (H94) illuminates.
- Move the turret to the desired oscillation center.
- Start the oscillating operation:
 - ◊ Press switch (S291).
 - ◊ The pilot lamp in switch (S291) illuminates.
 - ◊ The turret moves automatically according to the preprogrammed oscillation area and velocity.
- The oscillation center can be adjusted by using joystick (19).
- To finish the oscillation mode press "START"-switch (S218); continue with normal turret operation or
 - ◊ Press "STOP"-switch (S219).
 - ◊ The turret moves to its transport position.

Programming the oscillation working area and velocity:

- Adjust oscillation working area:
 - ◊ Start the oscillation mode as described above.
 - ◊ Keep the turret's discharge valve closed.
 - ◊ Move the joystick (19) to desired direction and value corresponding to the oscillation area, then press switch (S292).
 - Moving the joystick to the left -> the horizontal oscillation distance decreases.
 - Moving the joystick to the right -> the horizontal oscillation distance increases.
 - Moving the joystick forward -> the vertical oscillation distance decreases.
 - Moving the joystick backward -> the vertical oscillation distance increases.
 - ◊ Press switch (S81s) to increase or (S81f) to decrease the oscillating velocity, then press switch (S292).
 - ◊ Press switch (S291) and (S292) simultaneously to save the oscillation working area and velocity.



Undertruck Nozzles

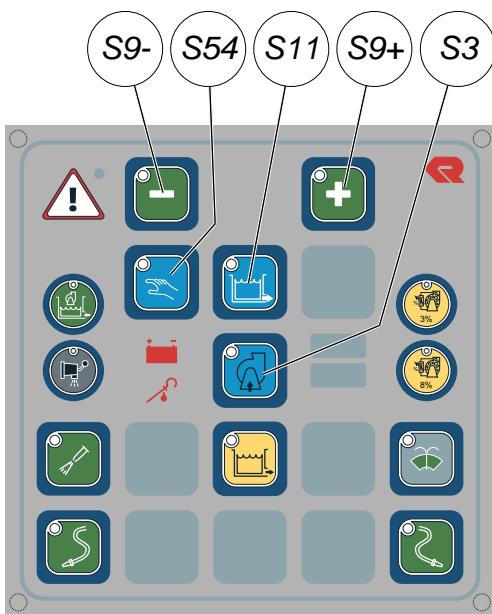
- Operate pump in automatic mode (base setting):
 - ◊ The integrated pilot lamp in switch (S54) is off.
- Engage the pump:
 - ◊ Please refer to the "Engaging the Pump" chapter.
- When the pump is engaged the following program starts:
 - ◊ The water tank suction valve opens automatically.
 - ◊ The priming pump is engaged automatically until a pressure of 2 bar is achieved (visible on water pressure gauge (P6)) and the engine speed increases.
 - ◊ The pump icon (J1) illuminates blue as long as the priming pump is engaged.
 - ◊ After achieving a pressure of 2 bar the engine speed decrease to idle.
- Water operation:
 - ◊ Open the undertruck nozzles discharge valve - press switch (S19).
 - ◊ Pump speed is increased automatically to half speed, as soon as the undertruck nozzles discharge valve is opened.
- For foam operation additionally:
 - ◊ Open the foam compound tank suction valve - press switch (S18).
 - ◊ The pilot lamp in switch (S18) illuminates.
 - ◊ If required change the foam proportioning rate - press switch (S14/1) if 3% or (S14/3) if 8% is required otherwise 6% foam proportioning rate will be created.

Stopping of operation the undertruck nozzles:

- Close the foam compound tank suction valve:
 - ◊ Press switch (S18) again.
 - ◊ Continue operation with water to flush the system.
 - ◊ Press switch (S19) again.
 - ◊ The pump engine will idle.
 - ◊ Disengage the pump - please refer to the "Engaging the Pump" chapter.

ATTENTION !

*The pump system must be flushed after every foam operation.
Please refer to the "Flushing after Foam Operation" chapter.*



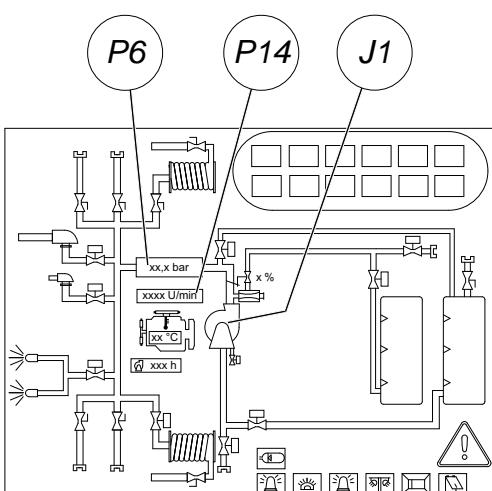
Manual Pump Operation

ATTENTION !

If the automatic mode fail to work the pump system can be operated manually.

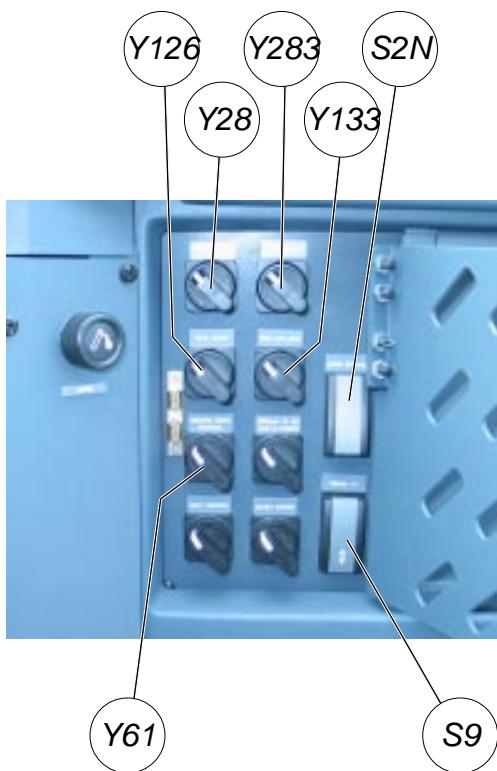
Procedure:

- Shift pump system to manual mode:
◊ Press switch (S54), the integrated pilot lamp illuminates.
- Engage the pump:
◊ Please refer to the "Engaging the Pump" chapter.
- Open the water tank suction valve:
◊ Press switch (S11), the integrated pilot lamp illuminates.
- Prime the pump system:
◊ Press switch (S3) until a pressure of max. 2 bar is achieved (visible on water pressure gauge (P6)).
◊ During priming operation accelerate to approx. 1000 rpm engine speed (visible on rpm gauge (P14)) by using switch (S9+).
◊ The pump icon (J1) illuminates blue as long as the priming pump is engaged.
- Operate turrets and undertruck nozzles as described before.
- Adjust required discharge pressure and throwing range:
◊ Press switch (S9+) to increase the pump speed.
◊ Press switch (S9-) to decrease the pump speed.



ATTENTION !

The pump system must be flushed after every foam operation. Please refer to the "Flushing after Foam Operation" chapter.



*Emergency operation after a complete failure of the electric system **

The most important valves can be controlled pneumatically in the cabin.

- Engage the pump:
 - ◊ Tilt down switch (S2N).
- Open the main air supply valve:
 - ◊ Turn main air supply valve (Y283) by 90° clockwise.

Roof turret operation

- ◊ Water operation:

(Turn pneumatic valves (Y28) and (Y126) by 90° clockwise) or use the emergency operation on the valve block - please refer to the "Emergency Control of Electro Pneumatic Solenoids" chapter.

- ◊ Foam operation:

(Turn pneumatic valves (Y28), (Y126) and (Y61) by 90° clockwise) or use the emergency operation on the valve block - please refer to the "Emergency Control of Electro Pneumatic Solenoids" chapter.

- ◊ Adjust required discharge pressure and throwing range by using switch (S9).

Bumper turret operation

- ◊ Water operation:

(Turn pneumatic valves (Y28) and (Y133) by 90° clockwise) or use the emergency operation on the valve block - please refer to the "Emergency Control of Electro Pneumatic Solenoids" chapter.

- ◊ Foam operation:

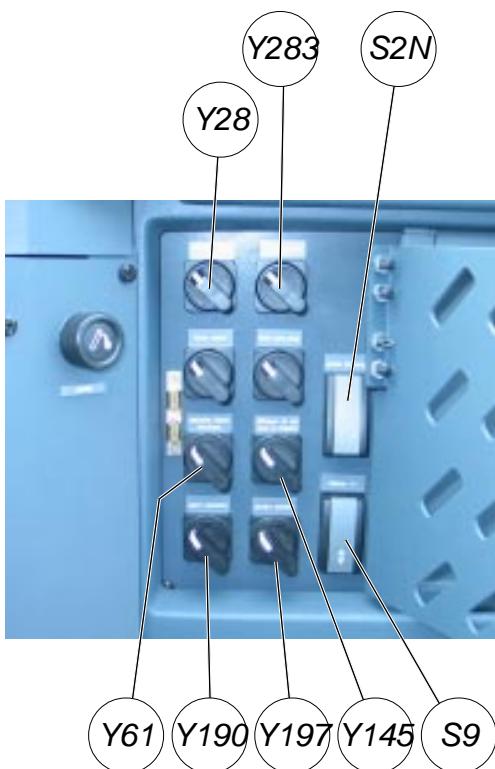
(Turn pneumatic valves (Y28), (Y133) and (Y61) by 90° clockwise) or use the emergency operation on the valve block - please refer to the "Emergency Control of Electro Pneumatic Solenoids" chapter.

- ◊ Adjust required discharge pressure and throwing range by using switch (S9).

ATTENTION !

- After an emergency operation return all pneumatic valves to the initial position; if an emergency operation on the valve block is activated, please refer to the "Emergency Control of Electro Pneumatic Solenoids" chapter.
- After an emergency operation return switch (S2N) to the "0" position.
- The system must be repaired immediately!

* optional equipment



*Emergency operation after a complete failure of the electric system **

The most important valves can be controlled pneumatically in the cabin.

Undertruck nozzles operation

- Engage the pump:
◊ Tilt down switch (S2N).
- Open the main air supply valve:
◊ Turn main air supply valve (Y283) by 90° clockwise.
- Undertruck nozzles - water operation:
◊ (Turn pneumatic valves (Y28) and (Y145) by 90° clockwise) or use the emergency operation on the valve block - please refer to the "Emergency Control of Electro Pneumatic Solenoids" chapter.
- Undertruck nozzles - foam operation:
◊ (Turn pneumatic valves (Y28), (Y145) and (Y61) by 90° clockwise) or use the emergency operation on the valve block - please refer to the "Emergency Control of Electro Pneumatic Solenoids" chapter.
- Adjust required discharge pressure and throwing range by using switch (S9).

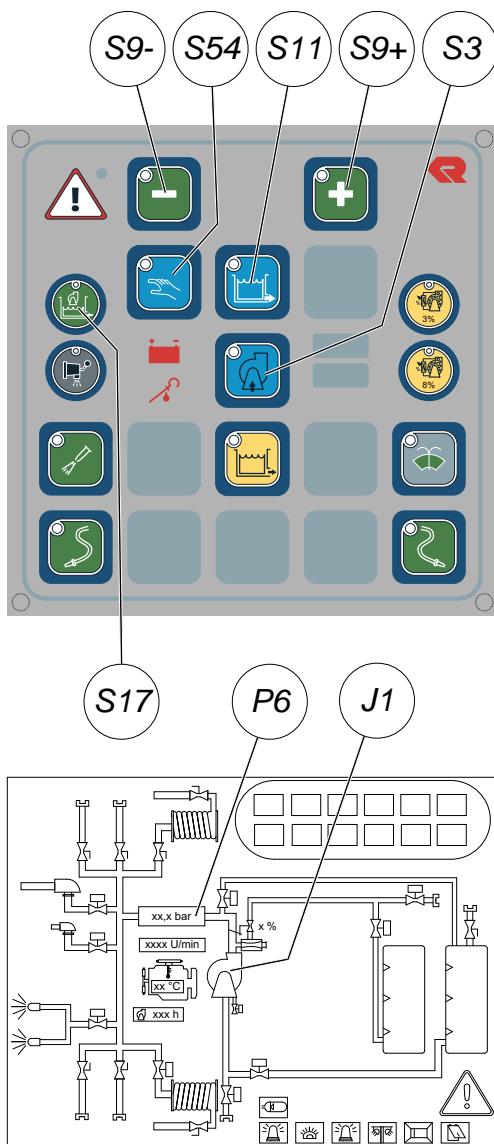
Dry powder rapid intervention system operation

- Open the main air supply valve:
◊ Turn main air supply valve (Y283) by 90° clockwise.
- Release the control pressure:
◊ Turn pneumatic valve (Y190) by 90° clockwise.
- Open the dry powder discharge valve:
◊ Turn pneumatic valve (Y197) by 90° clockwise or use the emergency operation on the dry powder valve block - please refer to the dry powder manufacturer's operation manual.

ATTENTION !

- After an emergency operation return all pneumatic valves to the initial position; if an emergency operation on the valve block is activated, please refer to the "Emergency Control of Electro Pneumatic Solenoids" chapter.
- After an emergency operation return switch (S2N) to the "0" position.
- The system must be repaired immediately!

* optional equipment



Stand-by Operation

This procedure protects the pump system from freezing at ambient temperatures below 0°C, and prevents the system from overheating. This also applies when the pump must not be disengaged due to an emergency.

- Operate the pump as mentioned in the
 - ◊ "Manual Pump Operation" or
 - ◊ "Automatic Pump Operation" chapter.
- Engage the pump:
 - ◊ Please refer to the "Engaging the Pump" chapter.
- When the pump is engaged the following program starts:
 - ◊ The water tank suction valve opens automatically.
 - ◊ The priming pump is engaged automatically until a pressure of 2 bar is achieved (visible on water pressure gauge (P6)) and the engine speed increases.
 - ◊ The pump icon (J1) illuminates blue as long as the priming pump is engaged.
 - ◊ After achieving a pressure of 2 bar the engine speed decrease to idle.
- Open the recirculating valve / water tank pump fill valve:
 - ◊ Press switch (S17).
 - ◊ Water is pumped from the water tank, through the pump, and back into the water tank.
- Let the engine idle.

Back to fire fighting after stand-by mode

- Close the recirculating valve / water tank pump fill valve:
 - ◊ Press switch (S17) again.
- Open desired discharge valve(s).
- Adjust required discharge pressure and throwing range:
 - ◊ Press switch (S9+) to increase the pump speed.
 - ◊ Press switch (S9-) to decrease the pump speed.

Note:

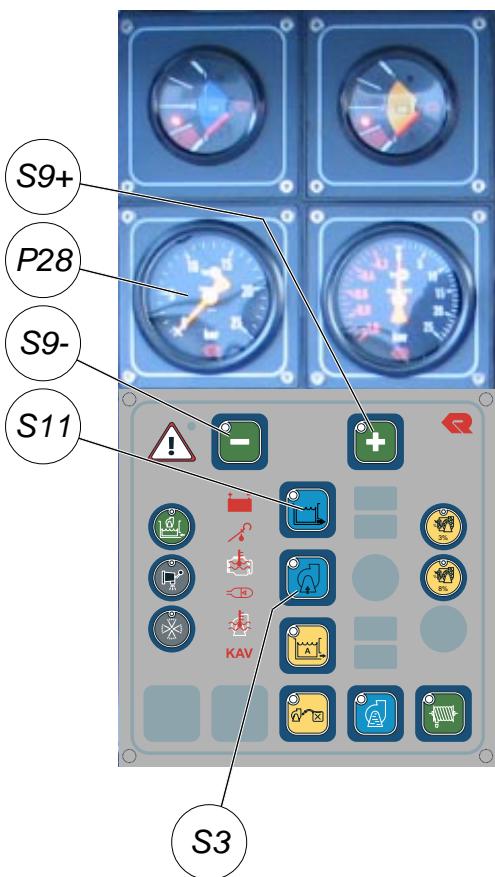
The recirculating valve / water tank pump fill valve can not be opened until a flushing cycle is performed.

The recirculating valve / water tank pump fill valve can also be controlled from the external pump control panels.

ATTENTION !

Do not operate in Stand-By mode when foam compound has been used before. Neglecting this warning will result in the overflow of foam compound into the water tank !

Tank Suction Operation



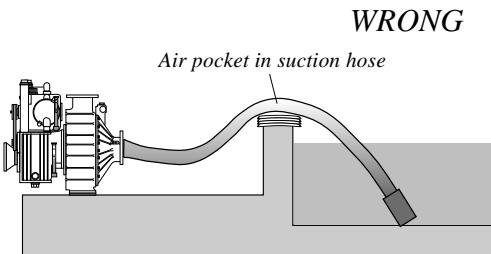
- Connect pressure hoses to the left and/or right pressure outlets.
- Shift pump system to manual mode:
 - ◊ Please refer to the "Manual Pump Operation" chapter.
- Engage the pump:
 - ◊ Please refer to the "Engaging the Pump" chapter.
- Open the water tank suction valve:
 - ◊ Press switch (S11), the integrated pilot lamp illuminates.
- Prime the pump system:
 - ◊ Press switch (S3) until a pressure of max. 2 bar is achieved (visible on water pressure gauge (P28)).
 - ◊ During priming operation accelerate to approx. 1000 rpm engine speed by using switch (S9+).
 - ◊ The pilot lamp in switch (S3) illuminates as long as the priming pump is engaged.
- Open the left and/or right discharge valve(s) slowly.
- Adjust required discharge pressure:
 - ◊ Press switch (S9+) to increase the pump speed.
 - ◊ Press switch (S9-) to decrease the pump speed.

Note:

For more information please refer to the "Handline Operation" chapter.

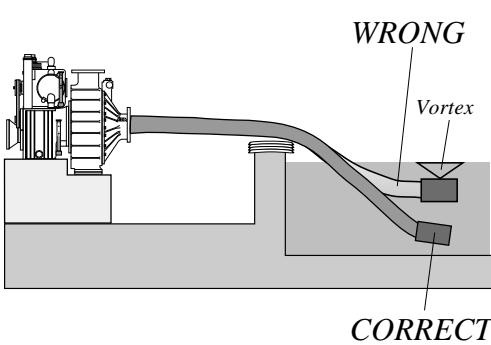
The procedure described above can be carried out on the left as well as on the right hand sides. *

By pressing a speed adjustment switch (S9-) or (S9+) on an external pump control panel, the system will changeover to the "Manual Pump Operation Mode" automatically.



Drafting Operation from Open Water Source

- Connect suction- and pressure hoses.
- ◊ The suction hose with attached strainer should be at least 20 cm under the water surface (Do not place the strainer in sand or mud as dirt reduces the service life of the pump system!).



ATTENTION !

When the suction height is increased, the pump capacity is reduced, which means that the nozzle diameter must be reduced to maintain a low discharge rate and constant pressure. When operating with great suction heights, high pump speeds and large nozzle diameters the pump may cavitate. Cavitation sounds like marbles are being pumped through the system, and a slight pressure drop is visible at the manometer.

Cavitation must be avoided by all means, because the internal parts of the pump might be damaged by this excessive load.
Remedy: Decrease speed, water discharge, or suction height.

Never operate the pump without a strainer or suction screen, or at full speed without a nozzle - cavitation may occur.

Watch the declining water level of the water source.

When operating in drafting mode, the water discharge is limited to 2500 l/min, due to one drafting connection ϕ 100 mm. If this warning is ignored, the pump may cavitate and severely damage the internal parts of the pump.

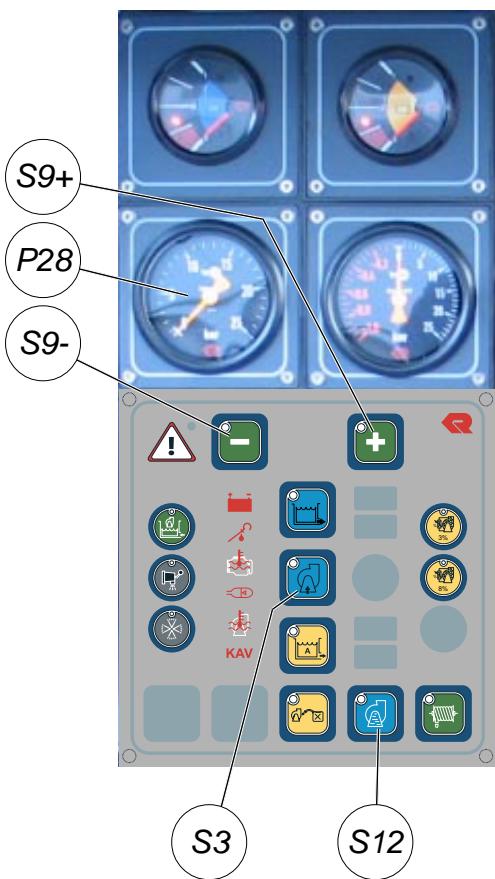
Note:

Avoid operating the pump without water longer than 3 minutes!
Dry operation can result in damage of the pump shaft sealing !



J15

- Connect the suction hoses to the left drafting connection (J15).

Drafting operation from open water source


- Open the drafting valve:
◊ Press switch (S12).
- Connect pressure hoses to the left and/or right pressure outlets.
- Shift pump system to manual mode:
◊ Please refer to the "Manual Pump Operation" chapter.
- Engage the pump:
◊ Please refer to the "Engaging the Pump" chapter.
- Prime the pump system:
◊ Press switch (S3) until a pressure of max. 2 bar is achieved (visible on water pressure gauge (P28)).
◊ During priming operation accelerate to approx. 1000 rpm engine speed by using switch (S9+).
◊ The pilot lamp in switch (S3) illuminates as long as the priming pump is engaged.
- Open the left and/or right discharge valve(s) slowly.
- Adjust required discharge pressure:
◊ Press switch (S9+) to increase the pump speed.
◊ Press switch (S9-) to decrease the pump speed.

Note:

For more information please refer to the "Handline Operation" chapter.

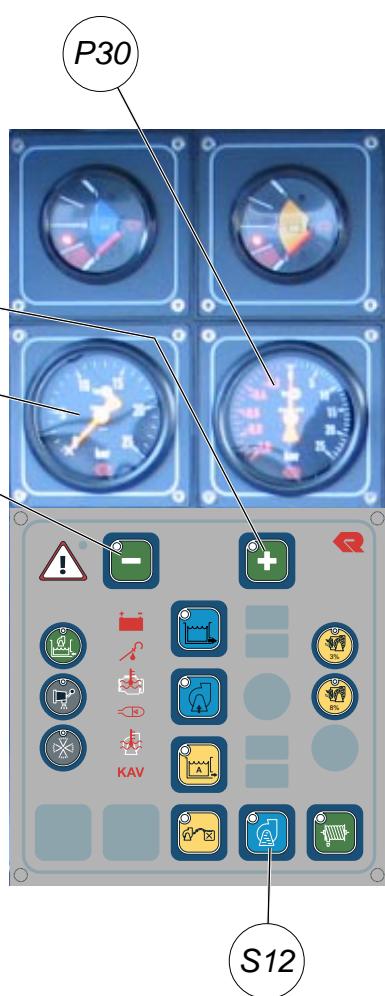
The procedure described above can be carried out on the left as well as on the right hand sides. *

By pressing a speed adjustment switch (S9-) or (S9+) on an external pump control panel, the system will changeover to the "Manual Pump Operation Mode" automatically.

ATTENTION !

Never operate the pump without a strainer or suction screen or at full speed without a nozzle - cavitation may occur.

Watch declining water level of the water source.



Hydrant Operation / Supply Operation

- Shift pump system to manual mode:
◊ Please refer to the "Manual Pump Operation" chapter.
- Connect pressure hoses to the left and/or right pressure outlets.
- Connect the supply hoses to the drafting connection (J15) (use a collector piece if required).
- Open drafting valve:
◊ Press switch (S12).
- Open at least one discharge valve to pull down the pressure peaks.
- Open the hydrant valve slowly.
- When the water has reached the pump, it can be engaged:
◊ Please refer to the "Engaging the Pump" chapter.
- Open further discharge valve(s) slowly.
- Adjust required discharge pressure:
◊ Press switch (S9+) to increase the pump speed.
◊ Press switch (S9-) to decrease the pump speed.

Note:

For more information please refer to the "Handline Operation" chapter.



J15

ATTENTION !

The pressure indicated at the manometer (P28) must not exceed 16 bar !

The pressure indicated at the manovacuummeter (P30) must not drop below 2 bar, otherwise the supply hose will collapse and restrict water flow.

The priming pump must not be engaged !

Before connecting a hose to the hydrant open the hydrant valve to allow discharge, until clean water flows out of the hydrant.

For foam operation, it is necessary to feed water into the water tank and operate the pump in tank suction mode otherwise the working principle of the normal pressure foam proportioner is impaired by intake pressure, the foam quality is poor and water would come into the foam compound tank. Neglecting this warning can result in damage of the foam compound tank.



CAUTION !

- Before opening a handline discharge valve make sure that the nozzles are held tightly - danger of water hammer effect!
- Release pressure before disconnecting a hose!



CAUTION !

Do not operate the pump with closed pressure outlets - dangerous increase of temperature will result!

Water and foam compounds are conducting electricity!

Remain a safe distance from electricity conductors!

Some materials will increase in volume and/or weight when mixed with water.

Because of the possibility of chemical reactions, some materials must not come into contact with water!

FAILURE TO FOLLOW THIS PROCEDURE COULD CAUSE PERSONAL INJURY!

When the flow of water through the fire hose or pipe is suddenly stopped, the resulting surge is referred to as "water hammer".

Water hammer can often be heard as a distinct, sharp clank, very much like a hammer striking a pipe. This sudden stoppage results in a change in the direction of energy and this energy is instantaneously multiplied many times. These excessive pressures can cause considerable damage to water mains, plumbing, fire hoses, and fire pumps.

Nozzle controls, hydrants, and valves should be operated slowly to prevent water hammer.

Use nozzles for fire fighting purposes only.

Never aim the jet at people.



Foam Operation

Procedure from foam compound tank

- Operate the pump as mentioned in the
 - ◊ "Tank Suction Operation" or
 - ◊ "Drafting Operation from Open Water Source" chapter.
- Provide the pressure hoses with foam branch pipes.
- Open the foam compound tank suction valve:
 - ◊ Press switch (S6).
 - ◊ The pilot lamp in switch (S6) illuminates.
- If required change the foam proportioning rate:
 - ◊ Press switch (S14/1) if 3% or (S14/3) if 8% is required otherwise 6% foam proportioning rate will be created.
- Open the desired discharge valve(s).
- Increase the pump speed slowly to desired pressure.
- The foam compound is sucked out of the foam compound tank and the water/foam mixture, according the preadjusted proportioning rate, is created.



Procedure with an external foam compound container

- Operate pump as mentioned in the
 - ◊ "Tank Suction Operation" or
 - ◊ "Drafting Operation from Open Water Source" chapter.
- Provide the pressure hoses with foam branch pipes.
- Connect the foam suction hose to the foam drafting/flushing connection (J47) and put the opposite end into a foam compound container.
- Close the internal flushing valve and open the foam compound drafting/flushing valve:
 - ◊ Press switch (S53).
 - ◊ The pilot lamp in switch (S53) illuminates.
- If required change the foam proportioning rate:
 - ◊ Press switch (S14/1) if 3% or (S14/3) if 8% is required otherwise 6% foam proportioning rate will be created.
- Open discharge valve(s).
- Increase pump speed slowly to the desired pressure.
- The foam compound is sucked out of the external foam compound container and the water/foam mixture, according the preadjusted proportioning rate, is created.

ATTENTION !

The pump system must be flushed after every foam operation.
Please refer to the "Flushing after Foam Operation" chapter.

Watch out during Pump Operation

- *The operator's stand should be always in reach of machinist.
Continuously monitor:*
 - ◊ Water- and foam compound tank content
 - ◊ Fuel, coolant temperature and oil pressure
 - ◊ In case of unusual noise (e.g. cavitation, etc.), reduce the pump speed to idle and then disengage it.



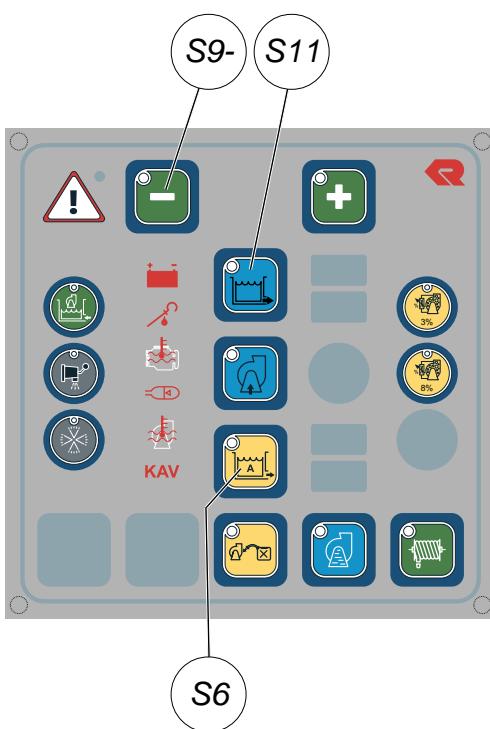
CAUTION !

If danger to personnel arises from the pumping process, (e.g. burst hose) immediately reduce the pump speed to idle and close the corresponding pressure outlet. Disengage pump if required.



Disengaging the Pump System

- Reduce engine speed to idle:
◊ Press switch (S9-) until the pump engine idles.
- If open, close the foam compound tank suction valve:
◊ Check, if the pilot lamp in switch (S18) in the cabin or (S6) on an external control panel illuminates, press corresponding switch.
- If open, close the water tank suction valve:
◊ Check, if the pilot lamp in switch (S11) illuminates, press switch (S11).
- After foam operation the pump has to be flushed:
◊ Please refer to chapter "Flushing after Foam Operation".
- Disengage the pump:
◊ Please refer to the "Engaging the Pump" chapter.
- Shift pump system to manual mode to prohibit automatic cycles:
◊ Please refer to the "Manual Pump Operation" chapter.
- Uncouple the pressure and suction hoses.
- Drain the entire pump system:
◊ Please refer to the "Operation in Cold Climates" chapter in this manual.
- Drying the priming pump:
◊ Please refer to the "Operation in Cold Climates" chapter.
- Close all drain valves, pressure outlets, etc. again.
- Prepare the pump system for the next use.



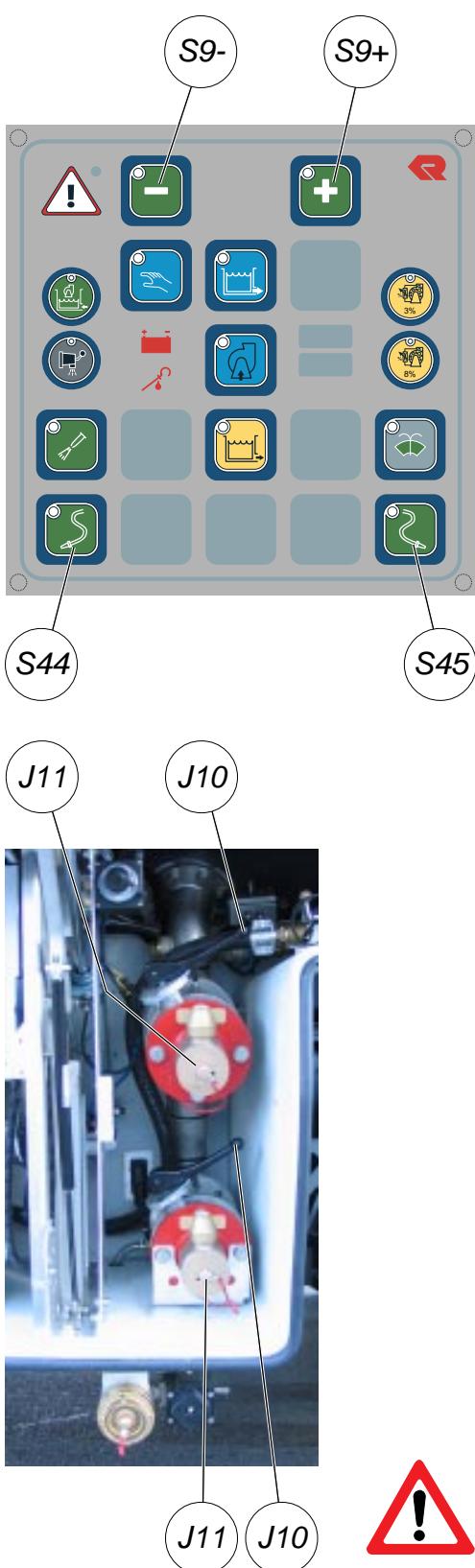
ATTENTION !

Uncouple suction hoses before releasing pressure of rising fire mains - max. permissible pressure for suction hoses is 3 bar.



CAUTION !

Release pressure before disconnecting a hose!



Handline Operation

- Connect the pressure hoses to the left and/or right pressure outlets (**J11**).
- Connect the pressure hoses to the left and/or right pressure outlets (**J11h**). *
- Connect branch pipes to the pressure hoses.
- Pull out the collapsible hoses completely before opening a discharge valve.
- Operate the pump as mentioned in the
 - ◊ "Manual Pump Operation" or
 - ◊ "Air Crash Mode Operation" chapter.
- Open the left and/or right discharge valve(s) (**J10**) slowly.
- Open required handline discharge valve(s): *
 - ◊ Press switch (**S44**) to open the left bottom regulated discharge valve. *
 - ◊ Press switch (**S45**) to open the right bottom regulated discharge valve. *
- Adjust required discharge pressure:
 - ◊ With "Manual Pump Operation" use switch (**S9+**) to increase the pump speed or switch (**S9-**) to decrease the pump speed.

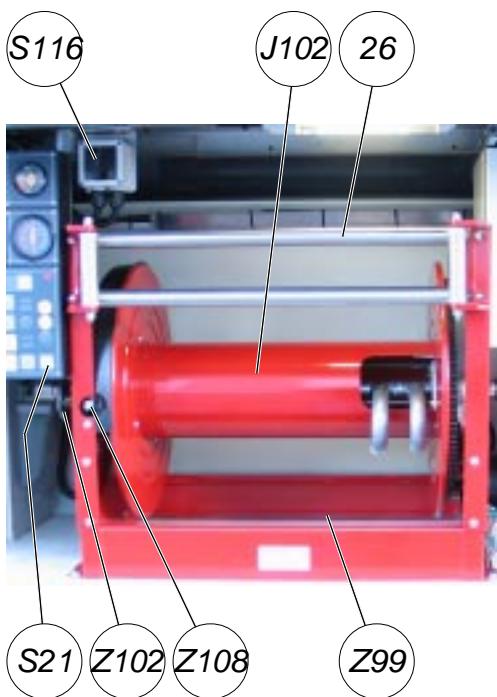
Note:

A pressure reduction valve, mounted into the discharge lines (**J11h**), reduces the discharge pressure for handlines to approx. 7 bar. *

The handline and the regulated handline discharge valves can be controlled from the pump control panel in the cabin as well as from an external pump control panel. *

CAUTION !

- Before opening a handline discharge valve, completely pull out the collapsible hose.
- Before opening a handline discharge valve make sure that the nozzles are held tightly - danger of water hammer effect!
- Release pressure before disconnecting a hose!



Twin Agent Rapid Intervention System

The vehicle is equipped with a twin agent hose reel in the left locker compartment.

The hose reel can be operated either with water or with water / foam compound mixture and additionally with dry powder.

ATTENTION !

The hose reel is connected to the pressure outlet of the centrifugal pump; the pressure is up to 16 bar. Higher pressure peaks are also possible, therefore it is strictly prohibited to aim the jet of the nozzle at any persons; severe injuries may occur !

It is strictly advised to use the installed rapid intervention device for fire fighting only. Any other use is strictly prohibited by Rosenbauer.

In cases of misuse, Rosenbauer is not liable for any injury or damage.

26 hose guide frame

J99 twin-agent nozzle - not shown

J102 left twin-agent hose reel without non collapsible rubber hoses

S21 switch for the left hose reel discharge valve

S116 rewinding switch: for rewinding purposes always release the brake (Z102), operate switch whilst guiding the hose carefully and without tension then apply brake (Z102) again

Y115 purge valve for the left rapid intervention system

Z99 hose reel crank - placed below the hose reel

Z102 hose reel-brake

Z108 connection for hose reel crank

Rewinding the hose manually:

- Release hose reel brake (Z102).
- Put on the hose reel crank (Z99) to connection (Z108).
 - ◊ Rewind the hose as to be only very slightly tensioned and guide it exactly.
- Lock brake (Z102) again.

Twin agent rapid intervention system

Operation with water

- Operate the pump as mentioned in the
 - ◊ "Manual Pump Operation" or
 - ◊ "Tank Suction Operation" or
 - ◊ "Drafting Operation from Open Water Source" or
 - ◊ "Hydrant / Supply Operation" pump panel operation chapter.

Foam operation

- Operate the pump as mentioned in the
 - ◊ "Foam Operation" pump panel operation chapter.
 - ◊ Provide nozzle with the foam extension (J98). *
- Release hose reel brake (Z102).
- Remove nozzle (J99) from stowage, pull out length of hose desired and lock brake (Z102) again.
- Open the left hose reel discharge valve:
 - ◊ Press switch (S21).

Note:

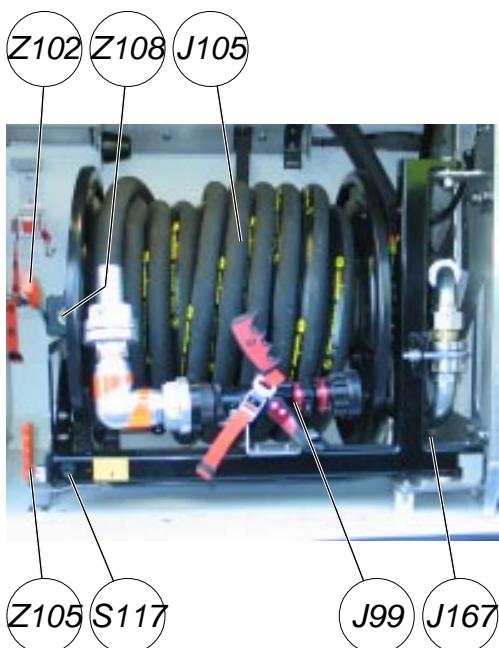
For best foam quality, operate pumping installation with pressure more than 6 bar!

The left hose reel discharge valve can be operated on the left external pump control panel as well as on the cabin's pump control panel. *



CAUTION !

Before opening a handline discharge valve make sure that the nozzles are held tightly - danger of water hammer effect!
Release pressure before disconnecting hose!



Rapid Intervention System

The vehicle is equipped with a hose reel in the right locker compartment.

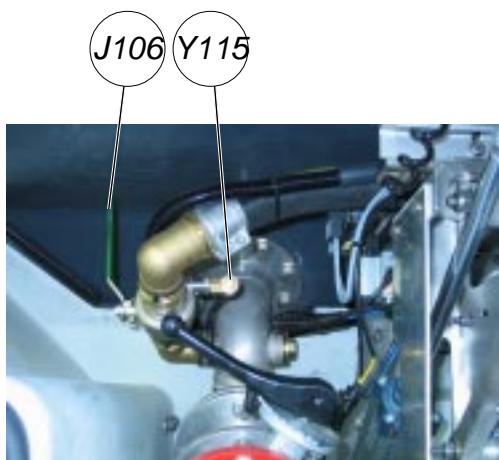
The hose reel can be operated either with water or with water / foam compound mixture.

ATTENTION !

The hose reel is connected to the pressure outlet of the centrifugal pump; the pressure is up to 16 bar. Higher pressure peaks are also possible, therefore it is strictly prohibited to aim the jet of the nozzle at any persons; severe injuries may occur !

It is strictly advised to use the installed rapid intervention device for fire fighting only. Any other use is strictly prohibited by Rosenbauer.

In cases of misuse, Rosenbauer is not liable for any injury or damage.



- 26 hose guide frame *
- J98 foam extension - not shown
- J99 multi-purpose nozzle
- J105 hose reel with non collapsible rubber hose
- J106 right hose reel discharge valve
- J167 drain valve of hose reel hub

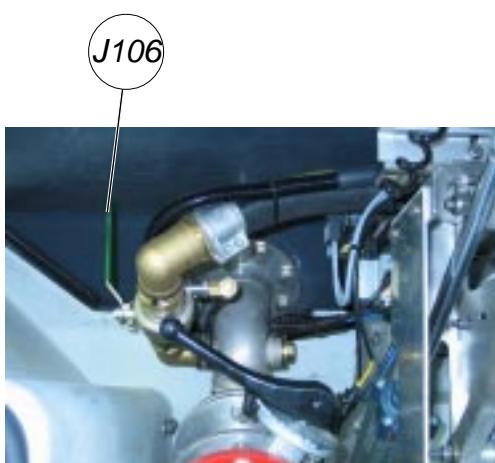
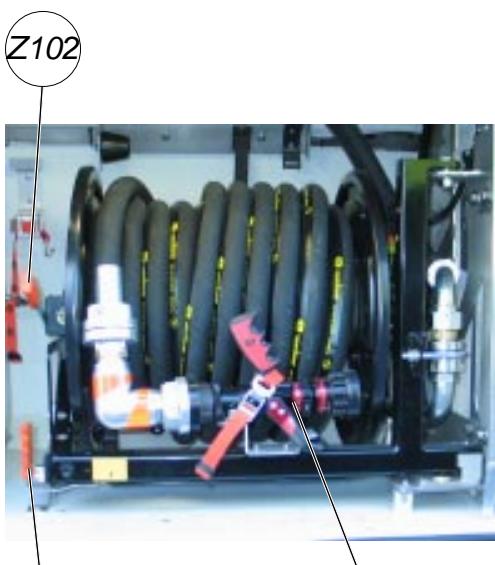
S117 rewinding switch: for rewinding purposes always release the brake (Z102), press switch whilst guiding the hose carefully and without tension then apply brake (Z102) again

Y115 purge valve for the right rapid intervention system

- Z99 hose reel crank - not shown - placed behind the hose reel
- Z102 hose reel-brake lever
- Z105 hose reel swivelling lever
- Z108 connection for hose reel crank

Rewinding the hose manually:

- Release hose reel brake (Z102).
- Put on the hose reel crank (Z99) to connection (Z108).
 - ◊ Rewind the hose as to be only very slightly tensioned and guide it exactly.
- Lock brake (Z102) again.



Rapid intervention system

Operation with water

- Operate the pump as mentioned in the
 - ◊ "Manual Pump Operation" or
 - ◊ "Tank Suction Operation" or
 - ◊ "Drafting Operation from Open Water Source" or
 - ◊ "Hydrant / Supply Operation" pump panel operation chapter.

Foam operation

- Operate the pump as mentioned in the
 - ◊ "Foam Operation" pump panel operation chapter.
 - ◊ Provide nozzle with a foam extension (J98).
- Release hose reel brake (Z102).
- Lift the hose guide frame (26) to top position. *
- Remove nozzle (J99) from stowage, pull out length of hose desired and lock brake (Z102) again.
- Open the hose reel discharge valve (J106).

- To provide easier hose reel access from the direction of the fire the hose reel frame can be swivelled forward by 45° and 90°, using lever (Z105). Ensure the hose reel frame is locked afterwards.

Note:

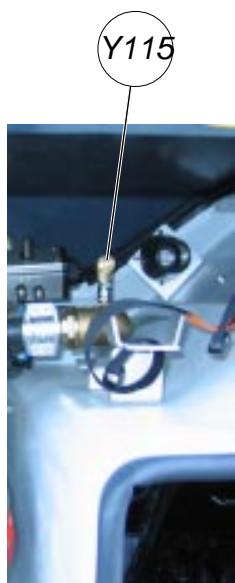
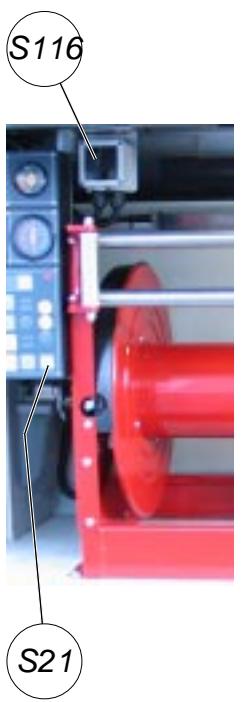
For best foam quality, operate pumping installation with pressure more than 6 bar!

Before closing the roller shutter swivel down the hose guide frame (26). *



CAUTION !

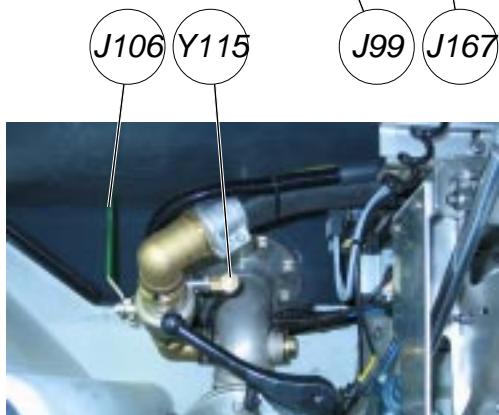
Before opening a handline discharge valve make sure that the nozzles are held tightly - danger of water hammer effect!
Release pressure before disconnecting hose!



Drainage of the left and right low pressure hose reels

The rapid intervention systems are equipped with a purge valve. The system can be drained with the vehicle's compressed air. For stowage and to protect the system from freezing in adverse conditions, the hoses and the nozzles must be drained carefully after each use.

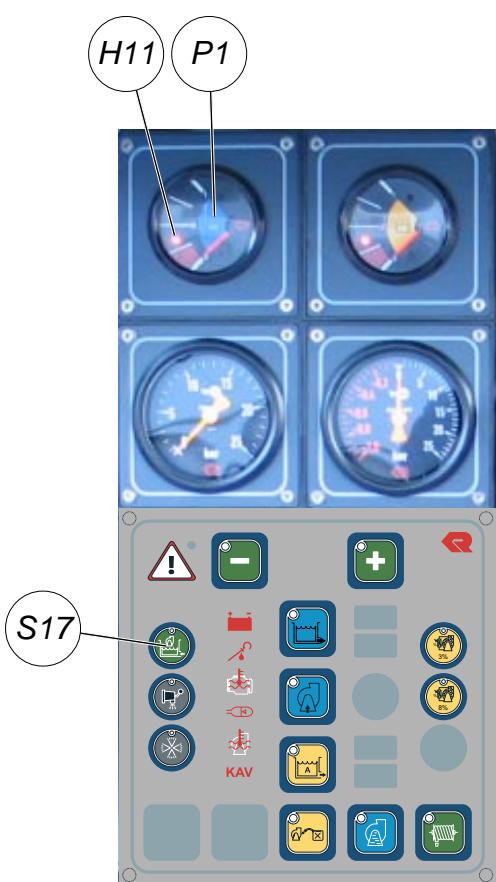
- Close the left and the right hose reel discharge valves:
 - ◊ Close hose reel discharge valve (J106).
 - ◊ If active, press again switch (S21) on the external pump control panel.
- Push the corresponding purge valve (Y115) and open the nozzle (J99) intermittently until just air is discharged (this is to allow enough pressure to build up).
- Open drain valve (J167) of right hose reel hub.



ATTENTION !

Do not tension the hose when rewinding! If the hose is tensioned too much, it could damage the hose reel, when supplied with pressure.

At no time open the water tank suction or the water tank pump fill valve during purge procedure (as long as compressed air overpressure is in the piping system). Compressed air can severely damage the water tank. After each purge procedure the compressed air overpressure must be completely released via the pump drain valve.



Filling the Water Tank via the Pump

- Operate the pump as mentioned in the
 - ◊ "Drafting Operation from Open Water Source" or
 - ◊ "Hydrant / Supply Operation" chapter.
- Open the water tank pump fill valve:
 - ◊ Press switch (S17).
- Observe water tank level gauge (P1).
 - ◊ The pilot lamp (H11) illuminates as long as the water tank content is less than one third.
- When the water tank is full, reduce pump speed and close the fill valve.
 - ◊ Press switch (S17) again.

Note:

The procedure described above can be carried out on the left as well as on the right hand sides. *

The water tank pump fill valve will be closed automatically as soon as a discharge valve is opened.

ATTENTION !

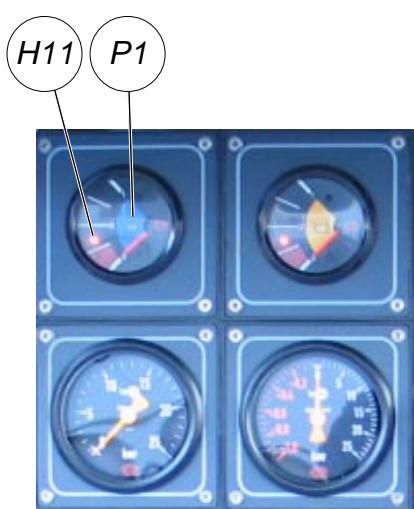
Before filling the water tank, the drain valve must be closed!

The maximum fill pressure is 5 bar!

By opening the tankfill valve, it is possible to run the system in "By-Pass mode" to prevent the system from overheating. Therefore, open the tank suction and the tank pump fill valves.

Condition: No foam compound in the pump.

Please refer to the "Stand-By Operation" air crash mode chapter.

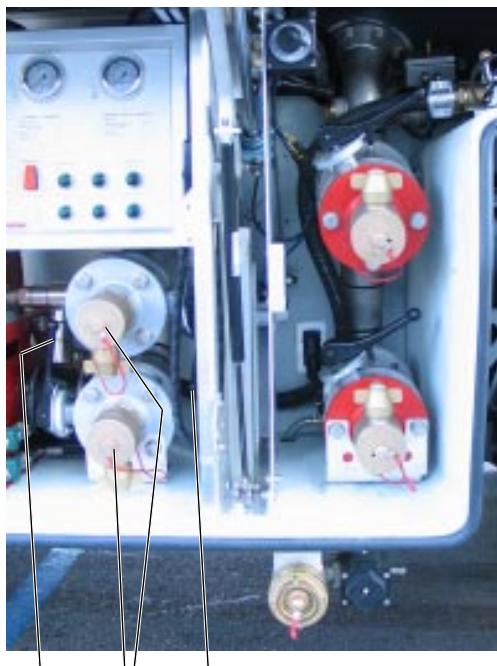


Filling the Water Tank via Tank Supply Lines

- Connect supply hoses to the left and/or right connections (J30).
- Open hydrant valve slowly.
- Open left and/or right tank fill valve(s) (J29).
- Observe water tank level gauge (P1).
 - ◊ The pilot lamp (H11) illuminates as long as the water tank content is less than one third.
- When the water tank is full, close fill valve(s) (J29).

Uncoupling the supply hoses:

- Close the hydrant valve.
- Release pressure by opening the tank fill valve(s) (J29).
- Uncouple the supply hoses and secure the fill connection with its blind coupling.



ATTENTION !

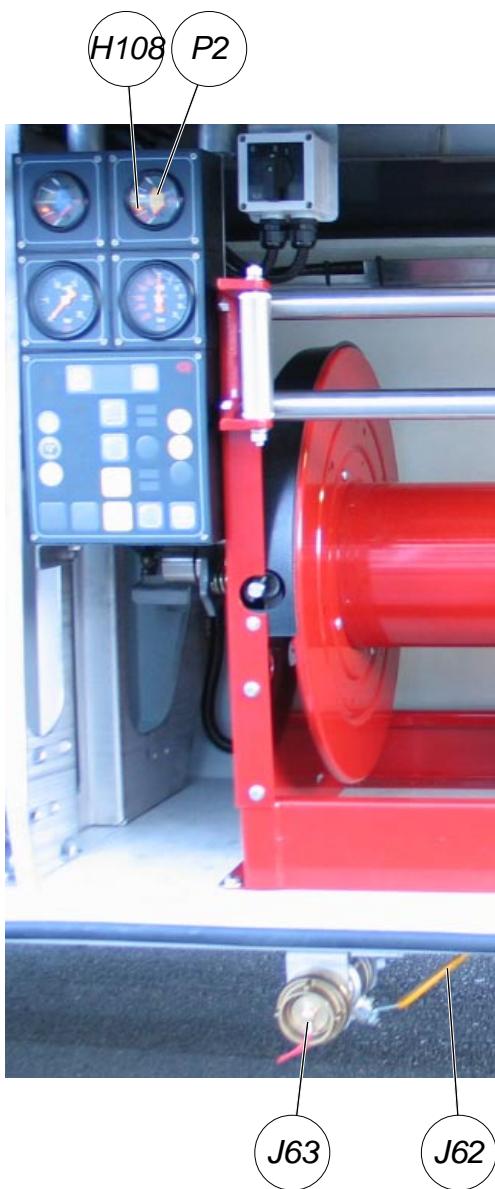
Before filling the water tank, the drain valve must be closed! The maximum tank filling pressure must not be more than 5-7 bar. In case of higher pressure, decrease the supply pressure accordingly.

When the water tank is overfilled (by overriding the automatic water tank levelling system), reduce the water flow to maximum 2000 l/min.*

Completely filling the tank (overfilling) with too much pressure may cause damages at a later stage.

It is strictly prohibited to make any modifications or adjustments on the tank filling lines (screens), overflows and manholes (spring -pretension).

Before connecting the supply hoses to the hydrant, allow water discharge until clear water flows out of the hydrant.



Filling the Foam Compound Tank

Filling the foam compound tank with an external foam compound pump

- Connect the supply hose (foam compound) to the fill connection (J63) located below the left locker compartment.
- Engage the external foam compound pump (please refer to the operation manual of the foam compound pump manufacturer).
- Open the foam compound tank fill valve (J62).
- Check the foam tank level gauge (P2) during filling or open foam tank cover to watch the rise and stop filling on time.
 - ◊ The pilot lamp (H108) illuminates as long as the foam compound tank content is less than one third.
- When the foam compound tank is full close the valve (J63).
- Stop delivery of foam compound and uncouple the hose.

Note:

The foam compound tank can also be drained by means of connection (J63) and the valve (J62). Provide a suitable collecting container.

ATTENTION !

Before beginning foam compound tank filling ensure that the drain valve is closed.

Always provide the foam compound tank fill/drain connection (J63) with a blind coupling.

Please take care that the foam tank must be drained completely as soon as the brand of foam compound is changed.

Furthermore the foam proportioning systems must be flushed and cleaned before refilling the foam compound tank - please refer to the "Flushing after Foam Operation" chapter.


Filling the foam compound tank with the electric foam compound pump

- Connect drafting connection (J66) of the foam compound pump to the external foam compound container.
- Turn three-way ball valve (J60) to tank fill mode "inside" position.
- Open the external foam compound container supply valve.
- Turn switch (S168) to the "left" position.
 - ◊ Turn switch (S168) to the left until pump is turning then release switch (S168).
 - ◊ The foam compound pump will automatically disengage, when the tank is full.
- Observe foam compound level in the external foam compound container!

Never run pump without foam compound!
- When the external foam compound container is empty or the foam tank is full return switch (S168) to the "0" position and turn three-way ball valve (J60) to the "transport" position.
- Flush the foam compound pump after each use!
 - ◊ Please refer to the "Flushing of the electric foam compound pump" chapter in this manual.
- Always provide connections (J51) and (J66) with blind couplings.

Note:

Operate the engine with high idle speed to keep capacity of the batteries in good condition. This should be done when electric fill pump is engaged longer than 5 minutes.

ATTENTION !

Before beginning foam compound tank filling ensure that the drain valve is closed.

The foam compound pump must be flushed after each use!



Drainage of the foam compound tank / Intertank transfer via the electric foam compound pump

- Connect drafting connection (J66) of the foam compound pump to the empty external foam compound container.
- Turn three-way ball valve (J60) to tank fill mode "inside" position.
- Open the external foam compound container fill valve.
- Turn switch (S168) to the "right" position.
 - ◊ Turn switch (S168) to the right until pump is turning then operate switch (S168) in the fully right position until drainage / intertank transfer is completed.
- Observe foam compound level in the foam compound tank! Never run pump without foam compound!
- When the foam compound tank is empty or the external foam compound container is full return switch (S168) to the "0" position and turn three-way ball valve (J60) to the "transport" position.
- Flush the foam compound pump after each use!
 - ◊ Please refer to the 'Flushing of the electric foam compound pump' chapter in this manual.
- Always provide connections (J51) and (J66) with blind couplings.

Note:

Operate the engine with high idle speed to keep capacity of the batteries in good condition. This should be done when electric fill pump is engaged longer than 5 minutes.

ATTENTION !

Before beginning foam compound tank filling ensure that the drain valve is closed.

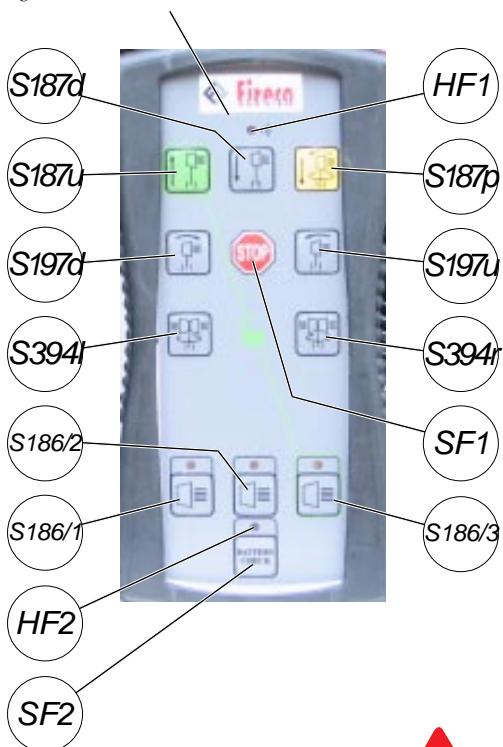
The foam compound pump must be flushed after each use!



Flushing of the electric foam compound pump

- Connect the foam suction hoses to the foam drafting/flushing connection (J66) and put the opposite end into a container with clean water.
- Connect hose to the flushing connection (J51).
- Turn three-way ball valve (J60) to tank fill mode "outside" position.
- Turn switch (S168) to the "left" position.
◊ Turn switch (S168) to the left until pump is turning then release switch (S168).
- Flush pump until clean water is discharged.
- Return switch (S168) to the "0" position.
- Disconnect hoses from connections (J51) and (J66).
- Open drain valve (J167s).
- Turn three-way ball valve (J60) to the transport position!
- Always provide connections (J51) and (J66) with blind couplings.
- Close drain valve (J167s).

light mast control unit



HF1 operation pilot lamp **
 HF2 battery capacity warning lamp **
 SF1 light mast stop switch **
 SF2 battery check switch **
 S186/2 switch for a third flood light - not in use
 ** for further information please refer to the light mast manufacturer's operation manual

Light Mast Operation

- Place the vehicle at a convenient location:
 - ◊ Apply parking brake.
 - ◊ Ensure that there is free space above the roof (no obstructions).
- Engage the light mast control system:
 - ◊ Press switches (S186/3) and (S187u) simultaneously.
- Lift the flood lights:
 - ◊ Press switch (S187u) until desired height is reached; if required lower the system using switch (S187d) (do not use switch (S187d) for parking the light mast).
- Engage the alternator: *
 - ◊ Please refer to the "Alternator Operation" chapter or supply the light mast via the external light mast power supply connection (XLM). *
- Engage the flood lights by using switch (S186/1) and/or (S186/3).
- The light mast can be rotated to the left by using switch (S394l) or to the right by using switch (S394r).
- The flood lights can be tilted upwards by using switch (S197u) or downwards by using switch (S197d).



CAUTION !

Do not drive with flood lights lifted!

Light mast should be operated only on level ground.

Minimum distance 1 m to overhead lines of up to 1 kV

Minimum distance to high-voltage line:

3 m 1 kV - 110 kV, 4 m 110 kV - 220 kV, 5 m 220 kV - 380 kV

Light mast operation - shutting down

- Switch off the flood lights:
 - ◊ Press switch (S186_) again.
- Lower the flood lights:
 - ◊ Press switch (S187p).
 - ◊ The light mast will be returned and lowered automatically.

Note: The flood lights are only ready for lifting when the parking brake is applied. The flood lights can be engaged only in the lifted position.
 Pressing switch (SF1) will disengage all active light mast functions.

ATTENTION !

After working for a long period, let the flood lights cool down before lowering them! *

Do not extend the light mast when wind velocity exceeds 100 km/h!

Maintenance

Extend the light mast approx. 1m once a month and lower it by means of base-valve (13) on light mast in order to drain the condensate.

The base-valve can also be used as an emergency lowering valve in case of a pneumatic failure. For greasing use only "Fireco Grease". The mast is permanent lubricated; an additional lubrication is therefore not necessary.





Dry Powder Unit

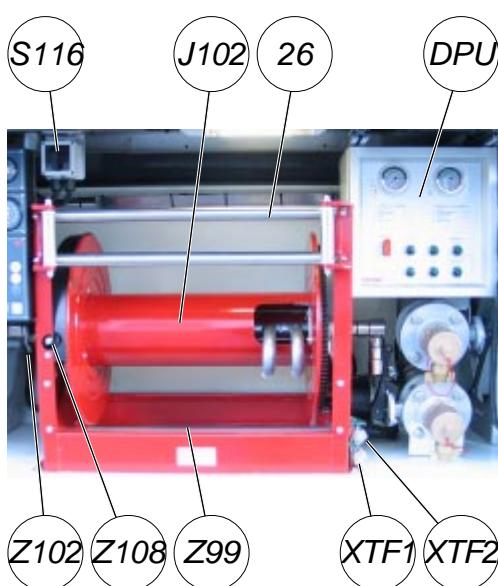
Two dry powder units are installed in the compartment behind the cabin. Both dry powder units are connected with the twin agent hose reel, located in the left locker compartment and equipped with non-collapsible hose and dry powder pistol.

The hose reel can be powder supplied either by the left or right dry powder unit.

For further information please refer to the manufacturer's operation manual.

Controls and indications of the dry powder unit

- 26 *hose guide frame*
DPU *control panel for the dry powder unit - for further information please refer to the manufacturer's operation manual*
JC_ *nitrogen bottle with manually and pneumatically valve drive*
J99 *twin-agent nozzle - not shown*
J102 *left twin-agent hose reel without non collapsible rubber hoses*
S116 *rewinding switch: for rewinding purposes always release the brake (Z102), operate switch whilst guiding the hose carefully and without tension then apply brake (Z102) again*
XTF1 *external filling connection for nitrogen bottle (JC1)*
XTF2 *external filling connection for nitrogen bottle (JC2)*
Z99 *hose reel crank - placed below the hose reel*
Z102 *hose reel-brake lever*
Z108 *connection for hose reel crank*



Rewinding the hose manually:

- *Release hose reel brake (Z102).*
 - *Put on the hose reel crank (Z99) to connection (Z108).
◊ Rewind the hose as to be only very slightly tensioned and guide it exactly.*
 - *Lock brake (Z102) again.*

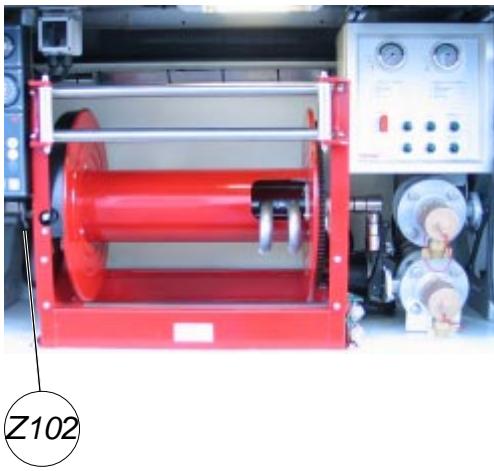
ATTENTION !

The rapid intervention system is connected to the dry powder unit; the pressure is up to 16 bar. Therefore it is strictly prohibited to aim the jet of the nozzle at any persons; severe injuries may occur!

*the jet of the nozzle at any persons, severe injuries may occur.
It is strictly advised to use the installed rapid intervention device
for fire fighting only. Any other use is strictly prohibited by
Rosenbauer.*

In cases of misuse Rosenbauer is not liable for any injury or damage.

Operation of the dry powder rapid intervention system



- Stop the vehicle and apply parking brake.
- Open the compartment door completely.
- Operate the dry powder unit according to the manufacturer's operation manual.
- Release the control pressure.
- Release hose reel brake (Z102).
- Lift the hose guide frame (26) to top position. *
- Remove nozzle from stowage, pull out length of hose desired and lock brake (Z102) again.
- Open the hose reel discharge valve.
- Start fire fighting.
- To provide easier hose reel access from the direction of the fire the hose reel frame can be swivelled forward by 45° and 90°, using lever (Z105). Ensure the hose reel frame is locked afterwards. *



CAUTION !

Before opening a handline discharge valve make sure that the nozzles are held tightly - danger of backstroke effect!
 Release pressure before disconnecting hose!

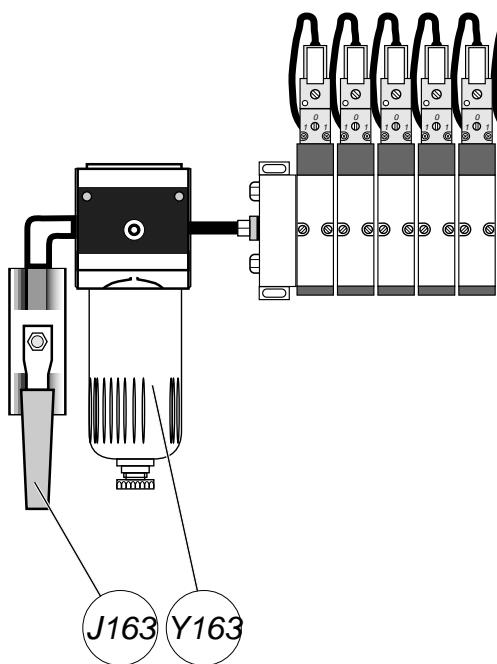
Note: *

Before closing the roller shutter swivel down the hose guide frame (26). *

ATTENTION !

- After each operation of the dry powder unit the system has to be flushed carefully - please refer to manufacturer's operation manual "Flushing after Dry Powder Operation".
- For further operation- and maintenance procedures, please refer to the manufacturer's operation manual.
- Dry chemical powder in combination with moisture is a strong oxidant, especially on galvanized, bare aluminium and bronze surfaces.

Please ensure that the vehicle, if the situation allows, does not come in contact with dry chemical powder. Should the vehicle become contaminated by dry chemical powder, it is imperative to remove the powder with compressed air. Do not clean the powder with water. Washing with water can accelerate the corrosion process of the vehicle.



Compressed Air Supply

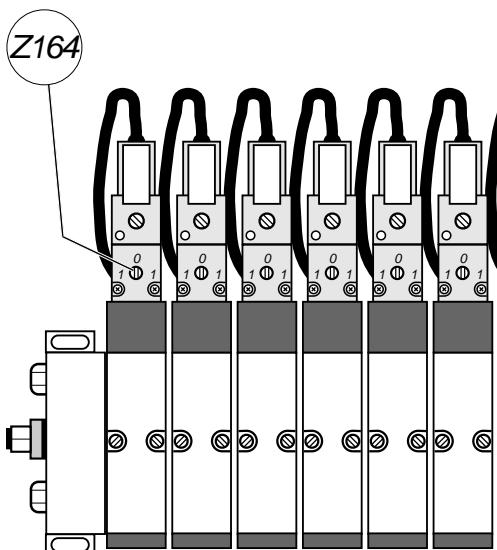
In the pump installation, a shut-off-valve (J163) and a pneumatic service unit (Y163) for the pneumatic system are installed. For further information, please refer to the "Service Procedures" maintenance chapter. The shut-off-valve (J163) disconnects the fire fighting pneumatic system from the chassis.

ATTENTION !

The shut-off-valve (J163) must be open at all times for normal pump operation!

If the shut-off-valve (J163) is closed, the solenoids cannot be switched manually!

The shut-off-valve (J163) may be closed only for service and repair works!



Emergency Control of Electro Pneumatic Solenoids

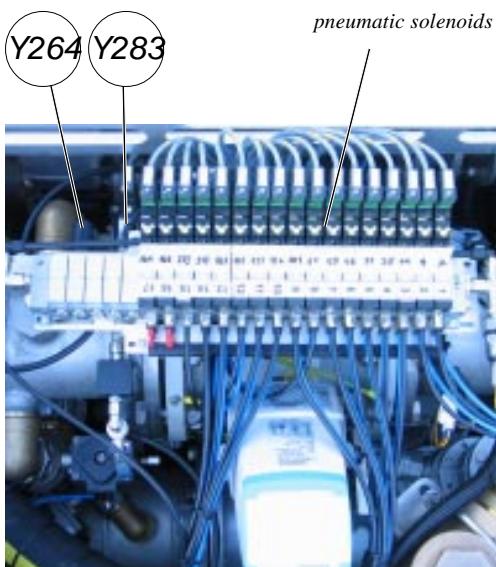
In the case of a failed electric switch, the pneumatic solenoid concerned can be switched manually if compressed air is still available.

Procedure:

The solenoids are mounted in the pump compartment.

For identification, the solenoids are described according to their purpose.

Turn the little yellow lever (Z164) by 180° clockwise: the solenoid is activated.



Emergency control of electro pneumatic solenoids

The pneumatic solenoids are mounted in one group in the pump compartment.

Sequence of description from right to left:

- Y7 solenoid for pump drainage*
- Y9 solenoid for priming pump*
- Y14 solenoid for water drafting valve*
- Y28 solenoid for water tank suction valve*
- Y31 solenoid for water tank pump fill / recirculating valve*
- Y46 solenoid for foam compound drafting / flushing valve*
- Y50 solenoid for internal flushing valve*
- Y61 solenoid for foam compound tank suction valve*
- Y103 solenoid for left hose reel discharge valve*
- Y126 solenoid for roof turret discharge valve*
- Y133 solenoid for bumper turret valve*
- Y145 solenoid for undertruck nozzles valve*
- Y167 solenoid for drainage of roof and bumper turret*
- Y212 solenoid for ventilation valve*
- Y282 solenoid for transmission barke*
- Y164 solenoid not in use - spare valve*
- Y164 solenoid not in use - spare valve*

Y283 pneumatic main valve

Y264 light mast pressure reduction valve

Note:

The pressure reduction valve (Y264) for the light mast is preset to 2 bar and must not be adjusted.

Emergency Control of Pneumatic Actuators

In case compressed air is not available, or a solenoid fails the pneumatic actuators can be operated manually to open or close the valve concerned.

Procedure:

- Close shut-off-valve (J163).
 - ◊ Pressure is released from the pumps pneumatic system.
- Put emergency tool on drive of pneumatic actuator.
- Turn emergency tool by 90° clockwise to operate valve.

Note: After closing the shut-off valve (J163), all pneumatic actuators must be operated manually.

The pneumatic system has to be repaired immediately after use.

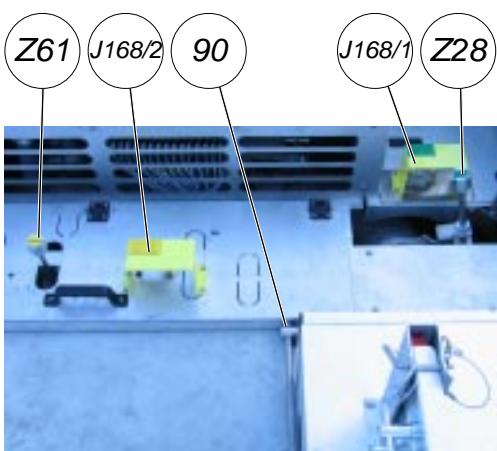


J163



CAUTION !

Before opening the pressure supply, make sure that the emergency tool is removed from the valve-drive - danger of jamming!



Emergency operation of a single pneumatic actuator

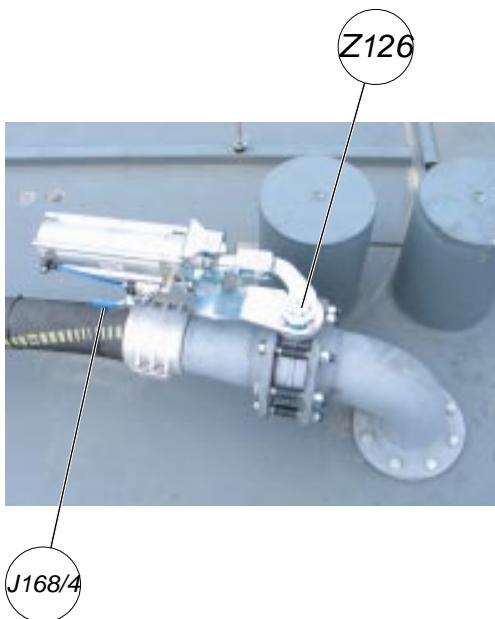
The water tank suction valve, the foam compound tank suction valve and the rootturret valve as well as the left and right regulated discharge valves* can be separately disconnected from the pneumatic system.

After that each valve can be operated by using the emergency tool (90).

Procedure:

Close valve (J168/1) and operate the water tank suction valve drive (Z28) by using the emergency tool.

Close valve (J168/2) and operate the foam compound tank suction valve drive (Z61) by using the emergency tool.

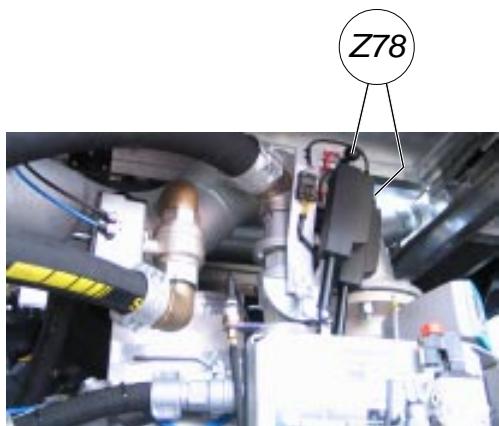


Emergency operation of a single pneumatic actuator

Close valve (J168/3) and operate the roof turret valve drive (Z126) by using the emergency tool.

*Close valve (J168/5) and operate the left regulated discharge valve drive (Z10l) by using the emergency tool. **

*Close valve (J168/6) and operate the left regulated discharge valve drive (Z10r) by using the emergency tool. **



Emergency Adjustment of the Foam Proportioning Rate

If an electric foam proportioning adjustment motor will not open/control the foam proportioning valve, it can be disconnected and the valve concerned can be controlled manually.

Procedure:

- Remove bolt (Z78) on top end of defective adjustment motor.
- Lift the motor together with the linkage to open the foam proportioning valve concerned.

Note:

Initial position: foam proportioning adjustment motor fully extended -> foam proportioning valve closed

In case of emergency it is sufficient to open completely the big valve only.



Flushing after Foam Operation

ATTENTION !

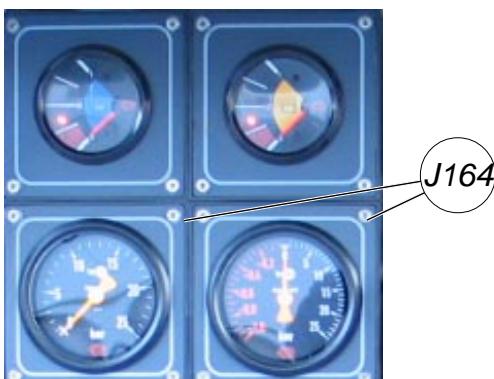
To ensure the pump operates without malfunctions, it is important to flush the pump, priming pump, pipes and foam proportioner.

Flushing with the internal flushing line - automatic flushing procedure

Whenever the pump is operated with clean water as mentioned in the

- ◊ "Air Crash Mode Operation" or
- ◊ "Tank Suction Operation" or
- ◊ "Drafting Operation from Open Water Source" chapter,
the pump system is flushed automatically.

- Shift pump system to manual mode:
◊ Press switch (S54), the integrated pilot lamp illuminates.
- Select the maximum proportioning rate:
◊ Press switch (S14/3), the integrated pilot lamp illuminates.
- Open all outlets (turrets, undertruck nozzles, hose reels, pressure outlets).
- Increase pump pressure to approx. 5 bar.
- Carry on flushing until clean water is discharged.
- Open manometer flushing valves (J164) placed behind the gauges on the left and right* hand sides.
- Before completion of flushing, flush the priming pump:
◊ Reduce pump speed to idle (pump pressure below 2 bar).
◊ Press switch (S3) for approx. 5 seconds.
- Disengage the pump engine:
◊ Please refer to the "Starting the Pump Engine" chapter.
- Drain the entire pump system:
◊ Please refer to the "Operation in Cold Climates" chapter.



ATTENTION !

The Flushing procedure must be done carefully after each foam operation, as well as after operation with seawater or mucky water.

Drain the pump system when flushing is finished.


Flushing after foam operation
ATTENTION !

To ensure the pump operates without malfunctions, it is important to flush the pump, priming pump, pipes and foam proportioner.

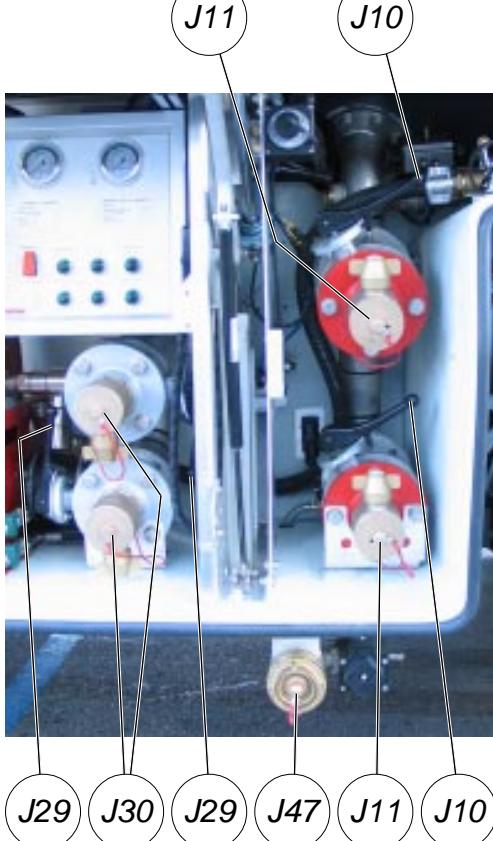
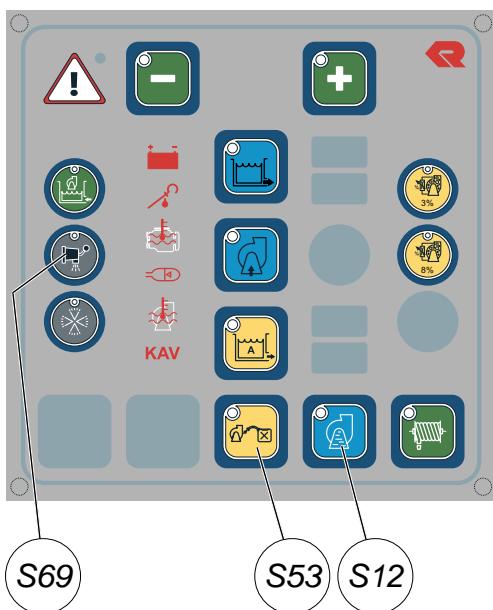
Flushing with the foam compound drafting/flushing connection

- Connect the foam suction hose to the foam drafting/flushing connection (J47) and put the opposite end into a container with clean water.
- Close the internal flushing valve and open the foam compound drafting/flushing valve:
◊ Press switch (S53).
- Select the maximum proportioning rate:
◊ Press switch (S14/3), the integrated pilot lamp illuminates.
- Shift pump system to manual mode as mentioned in the "Manual Pump Operation" chapter.
- Operate the pump with clean water as mentioned in the
◊ "Tank Suction Operation" or
◊ "Drafting Operation from Open Water Source" chapter.
- Open all outlets (turrets, undertruck nozzles, hose reels, pressure outlets).
- Increase pump pressure to approx. 5 bar.
- Carry on flushing until clean water is discharged.
- Open manometer flushing valves (J164) placed behind the gauges on the left and right* hand sides.
- Before completion of flushing, flush the priming pump:
◊ Reduce pump speed to idle (pump pressure below 2 bar).
◊ Press switch (S3) for approx. 5 seconds.
- Disengage the pump engine:
◊ Please refer to the "Starting the Pump Engine" chapter.
- Drain the entire pump system:
◊ Please refer to the "Operation in Cold Climates" chapter.


ATTENTION !

The Flushing procedure must be done carefully after each foam operation, as well as after operation with seawater or mucky water.

Drain the pump system when flushing is finished.



Drainage of the Pump System / Operation in Cold Climates

To protect the fire fighting unit from damage by corrosion and freezing water make sure to drain the entire pump system (especially at temperatures below 0° Celsius).

- Drain the entire pump system:
 - ◊ Press switch (S69).
The discharge valves of the roof turret, bumper turret and undertruck nozzles will be automatically opened.
 - ◊ Remove blind coupling of water drafting connection (J15).
 - ◊ Remove blind coupling of the foam compound drafting connection (J47) and open the foam compound drafting valve.
 - ◊ Press switch (S53).
 - ◊ Open drain valve (J167). *
 - ◊ Press switch (S12).
 - ◊ Remove blind coupling of pressure outlets (J11) or disconnect the pressure hoses.
 - ◊ Remove blind coupling of pressure outlet (J11h) or disconnect the pressure hose. *
 - ◊ Open the left discharge valves (J10).
 - ◊ Press switch (S44) longtime. *

- Open manometer flushing valves (J164) placed behind the gauges.
- Wait until the pump system is drained.
- Drainage of the left hose reel:
◊ Please refer to the "Rapid Intervention System" chapter.

- Drainage of left tank fill line:
◊ Open drain valve (J167). *
- ◊ Remove blind couplings of tank fill connections (J30).
- ◊ Open tank fill valves (J29).
- ◊ Press switch (S35M) until the fill pipes are empty. *

- Operate all ball valves several times; keep ball valves in half open position to allow drainage of the valve casing.

- Close all pressure outlets and drain valves, secure with blind couplings.

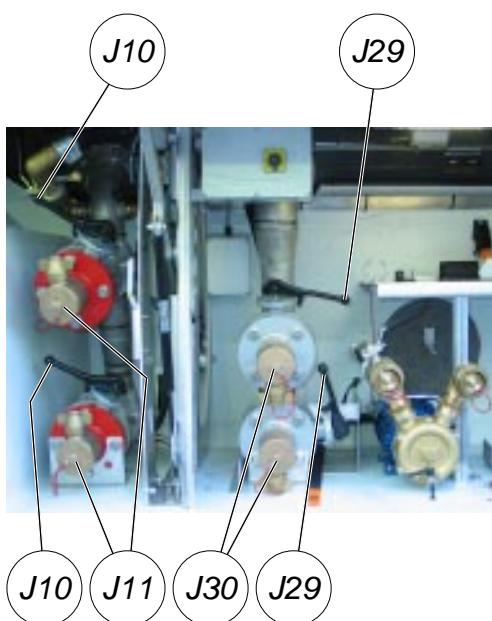


CAUTION !

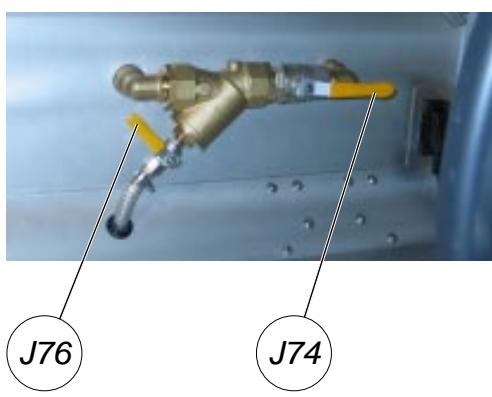
Release pressure before disconnecting a hose!


Drainage of the Pump System / Operation in Cold Climates

- Remove blind coupling of pressure outlet (J11) or disconnect the pressure hose.
◊ Open the right discharge valve (J10).
- Drying the priming pump:
◊ Shift pump system to manual mode - please refer to the "Manual Pump Operation" chapter - this is to prohibit automatic opening of the water tank suction valve.
◊ Engage the pump - please refer to the "Engaging the Pump" chapter.
◊ Press switch (S3) for approx. 5 seconds time.
◊ Disengage the pump.
- Drainage of the right hose reel:
◊ Please refer to the "Rapid Intervention System" chapter.



- Drainage of the electric foam compound pump:
◊ Please refer to the "Flushing of the electric foam compound pump" chapter.
- Drainage of right tank fill line:
◊ Remove blind couplings of tank fill connections (J30).
◊ Open tank fill valves (J29).
- Drain the deluge filter by closing shut off valve (J74) and opening drain valve (J76).
- Operate all ball valves several times; keep ball valves in half open position to allow drainage of the valve casing.
- Wait until the pump system is drained.
- Close all pressure outlets and drain valves, secure with blind couplings.
◊ Press all switches again, with the integrated pilot lamp illuminates.


ATTENTION !

To keep the fire fighting superstructure in functioning condition below 0° Celsius please take appropriate measures (e.g. engage the water tank heating, park vehicle in non-freezing garage,...).

Inspection Procedures

Inspection procedures may be done by fire brigade personnel familiar with the vehicle and pumping system.

These activities must be performed after each operation to ensure optimal reliability of the vehicle.

- *Check all locks, holding devices and equipment for good condition and safe support.*

Any discrepancies, defects or faults should be immediately corrected or repaired.



CAUTION !

Equipment improperly prepared for operation is unsafe for use. If something is noticed and requires attention, have it checked before it leaves for operation. Even minor mechanical defects can lead to accidents or personal injury.

Pay attention to the operation manuals of equipment and apparatus carried in the vehicle.



CAUTION !

Before starting any inspection-, maintenance-, or service work on the roof, put up the safety railing elements to protect personnel from falling

Take care when working on the vehicle's roof - danger of falling!

Inspection procedures - Chassis and superstructure

- *Check vehicle exterior for dents or damage.*
- *Visually check for missing bolts, loose or damaged hoses and damaged wires.*
- *Inspect wheel hugs, axles, transfer casing, and transmission for signs of lubrication leakage.*
- *Clean all lights, reflectors and mirrors, and check for broken glass.*
- *Check under the vehicle for fuel, oil, or coolant leakage.*
- *Check V-belts of the drive and pump engines.*
- *Inspect chassis according to instructions listed in the manufacturers manual.*
- *Check operation and general condition of cabin / compartment doors and roller shutters. Visually inspect seals around doors for looseness and/or damage.*
- *Inspect all glass for cracks and discoloration. Check operation of sliding windows in cab.*
- *Check operation and condition of seat adjusting mechanism.*
- *Take inventory of removable equipment. Replace any missing or damaged items.*

Inspection procedures - Chassis and superstructure

Wheels and Tyres

- Visually inspect each tyre for correct inflation. If the tyre appears to be low in pressure, refer truck to maintenance. Recommended air pressure must be maintained in every tyre. Inflate to correct pressure when tyres are cold.
- Inspect tyres for uneven wear, chinks, or cuts.
- Inspect rims for damage and inspect lugnuts.
- To prevent damage, tyres must not be cleaned with a high pressure steam jet.
- High ambient temperature causing higher tyre pressure. For this reason, reduce the permitted maximum speed accordingly!



ATTENTION !

Do not use the spring parking brakes if the service brakes are hot, such as after descending a steep grade or making several stops in succession.

To do so could damage the brakes due to rapid localized cooling.

Retighten wheel securing nuts after every 500 km.

When changing a tyre, retighten wheel securing nuts after driving a distance of 50 km.

Please refer to chassis operation manual for specified tightening torque.

The permissible driving distance, with maximum velocity (135 km/h), is 8 km; started with cool tyres - after that let the tyres cool down for at least 2 hours.

For longer driving distances do not exceed a velocity of 80 km/h.

Front axles tyre inflation 7.0 bar

Rear axles tyre inflation 7.0 bar

The headlights washing agent tank - capacity approx. 12 litres - access to the fill cap (87) via maintenance cover in the foot-area of the left co-driver.

The windshield washing agent tank - capacity approx. 12 litres - access to the fill cap (87) via maintenance cover in the foot-area of the right co-driver. The windshield washing agent tank is equipped with a low level warning, which is shown on the drivers display.

Inspection procedures - Chassis and superstructure

In the cabin

- Observe operation of all gauges.
- Operate windshield washer and wiper.
- Operate beacon lights and alarm system.
- Operate traffic guidance light and check proper operation.
- Turn on all truck lights and check for correct function.
- Operate the horn, heater, and defroster.
- Operate the communication system.
- Check fuel level, add fuel if necessary.
- Check level of windshield washing agent, add if necessary.



Brakes

- Check brakes for proper function.
- Check for uneven or spongy action, dragging, squealing, or chatter when braking.
- Test parking brake for proper function.
- Check air system for leaks.

Inspection procedures - Pump system

- Inspect all fire fighting equipment for corrosion, damage or other defects.
- Engage the water pump and check that it functions correctly.
- Check function and condition of valves, instruments and gauges.
- Check turret conditions.
- Inspect hose reel operation. Follow procedures listed below:
 - ◊ Pull hoses from reels and inspect brake lever to ensure brake function is sufficient.
 - ◊ Visually inspect hoses for cuts or damage.
 - ◊ Check hose couplings for tight connection and defects.
- Check levels in water and foam compound tanks visually.
 - ◊ Check non return valves of the water tank fill connections.
- Check condition of the screen fitted on the suction connection.

Maintenance Procedures

Maintenance procedures may be done by fire brigade personnel familiar with the vehicle and pump system.

These activities must be performed after each operation to ensure optimal reliability of the vehicle.

- *Refill the fuel tank and tanks of fire fighting agents.*
- *If the compartments and driver's cabin require cleaning, do not use a high pressure hose or running water. Loose dirt should be removed with a vacuum cleaner, after that, use moist cloths.*
- *Use moist towels to clean the control panel. Excess water can damage electric components. Do not use solvents.*

Maintenance Procedures - Washing the vehicle

Wash the vehicle frequently with cold or lukewarm, but never hot, water. Do not use household soap or detergent. The use of a reliable car shampoo will assist in dissolving traffic film.

When a hose is used, the water should not be turned onto the body at full pressure, as this tends to drive the grit and dirt into the paintwork. If the high-pressure fog gun is used for washing the vehicle, it must be operated with no greater than 6 bar of pressure with "Water Fog Spray" and never at "Water Straight Stream". High pressure cleaning equipment must not be used; the danger of damage to the paintwork is enormous.

After the surplus of dirt has been washed off, clean the body with a sponge and plenty of water. At the same time it is advisable to wash the windshield wiper blades by using clean water. Incorporate the wheelhouses into the washing procedure. Pay attention to open drainage holes. Rinse off with cold water, then rub down with a clean chamois leather.

ATTENTION !

Should the vehicle become contaminated by dry chemical powder, it is imperative to remove the powder with compressed air. Do not clean the powder with water. Washing with water can accelerate the corrosion process of the vehicle.

Dry chemical powder in combination with moisture is a strong oxidant, especially on galvanized, bare aluminium and bronze surfaces.

Maintenance Procedures - Washing the vehicle

At less frequent intervals, after washing and leathering the vehicle thoroughly, apply an approved body polish to impart a brilliant, water-resistant and lasting finish to the paintwork. Never rub the vehicle down with a dry cloth when it is dirty because this causes cracks in the paintwork which progressively destroy it. Do not try to polish with crude oil or grease because this may cause serious damage to paintwork in a short period of time.

Any tar or asphalt spots on the body may be removed with a tar cleaner and the use of a soft cloth.

Chrome plated parts

Great care should be taken that the chrome plated parts of your vehicle are kept clean and free from rust. These parts should be cleaned periodically with an approved chrome cleaner.

Upholstery

Upholstery of the PVC-type can be suitably cleaned with a reliable interior cleaner. Never use polishes, oils, petroleum, or a dry cleaning fluid.

Cleaning of 3M Scotchcal™ and Controltac™ films

Cleaner:

Logos and text made of Scotchcal and Controltac films can be cleaned with normally available car cleaning products, as long as these do not contain abrasive particles or organic thinners.

Cleaning:

Please refer to the "Washing the vehicle" chapter.

Car wash:

Scotchcal and Controltac films are car wash safe.

ATTENTION !

It is not allowed to wash a vehicle within the first 48 hours after decals are applied.

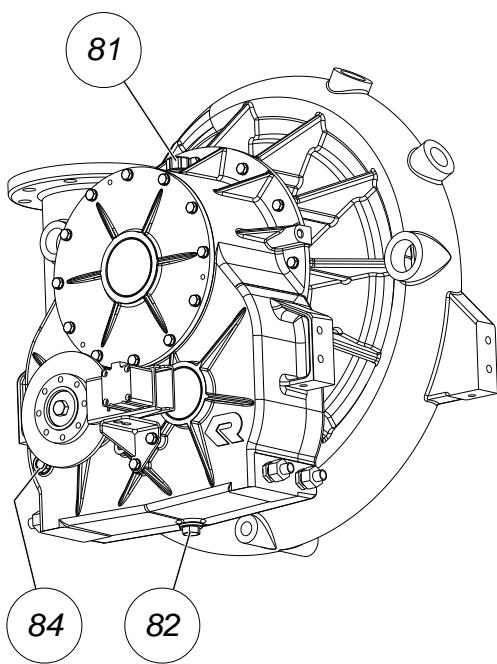
Service Procedures

*Service and repair procedures must be done by specialists.
These activities must be performed according to manufacturer set intervals.*

ATTENTION !

*Obey all operation and service manuals of chassis, optional equipment and apparatus carried in the vehicle unconditionally.
Negligence can cause damage and ultimately, loss of warranty.*

Observe service intervals and officially ordered terms and note executed jobs in a report.



81 oil filler plug
 82 oil drain plug
 84 oil level plug

Service procedures - Lubrication of pump gearbox

Always drain the oil while the housing is warm, as the oil will flow freely and will carry foreign particles with it.

For drainage, remove the oil drain plug (82).

After reinstalling the drain plug (82), remove the oil level plug (84) and fill with oil. Correct oil level is achieved when the oil is level with the bottom of the oil level plug opening, reinstall oil level plug (84) when oil level is correct.

Oil change: after 50-100 working hours
at least every two years

Oil quantity: 7.2 ltr.

Oil type: SAE 90 transmission oil
 API / GL 4
 MIL-L-2105

ATTENTION !

For oil change, please obey current disposal regulations.

Oil level check system for pump gearbox and priming pump

H88/1 pilot lamp: priming pump oil level indication

H88/2 pilot lamp: pump gearbox oil level indication

S555 switch: oil level check

- ◊ "left" position -> to check the system for proper function
- ◊ "centre" position -> system disengaged
- ◊ "right" position -> to check both oil levels

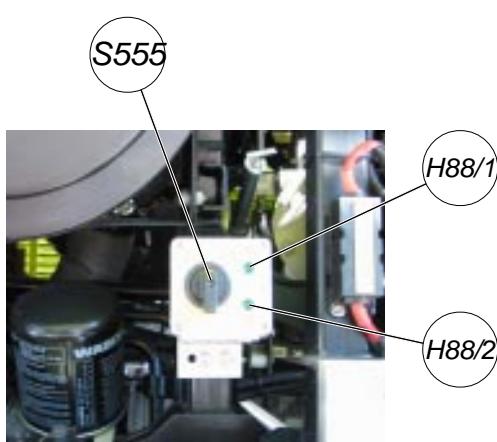
Oil level check procedure:

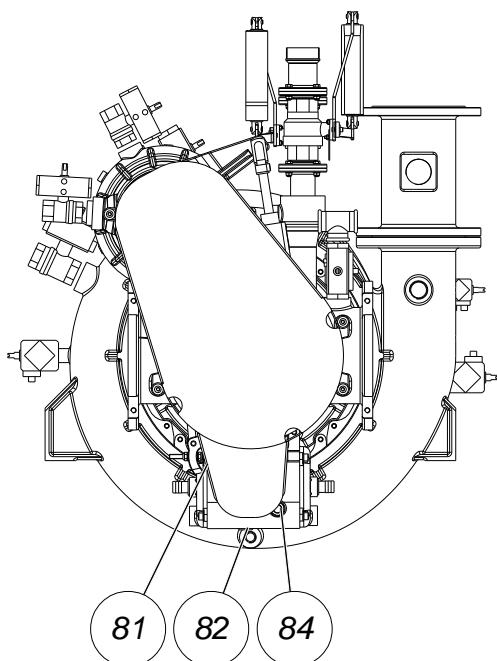
- Turn switch (S555) counterclockwise to check the system for proper function during ignition is engaged.
◊ Pilot lamps (H88/1) and (H88/2) must illuminate.
- Turn switch (S555) clockwise to check the oil levels.
◊ Illuminating pilot lamp (H88/1) indicating oil level of the priming pump is correct.
◊ Illuminating pilot lamp (H88/2) indicating oil level of the pump gearbox is correct.

Note:

Hold switch (S555) in the "right" position during oil filling, until the corresponding pilot lamp illuminates.

Do not overfill - too much oil will not be indicated !





- 81 oil filler plug
 82 oil drain plug
 84 oil level gauge

Service procedures - Lubrication of priming pump

All moving parts of the priming pump are oil bath lubricated. The oil has to be changed once a year. Always drain the oil while the priming housing is warm, as the oil will flow freely and will carry foreign particles with it. For drainage, remove the oil drain plug (82). After reinstalling the drain plug (82), remove the oil filler plug (81) and fill with oil. Correct oil level is achieved when the oil is level with the upper mark of the oil level gauge (84), reinstall oil filler plug (81) when oil level is correct.

*Oil change: after 25-50 working hours
 at least once a year*

Oil filling capacity: 1.0 ltr

*Recommended oil: SAE 30 (Engine oil)
 API / SF
 MIL-L-46 152 B
 FORD M2C 9011
 GM 6048 M*

ATTENTION !

Avoid contact between priming pump drive V-belt and all lubricants - danger of belt sliding!

After an oil change please obey current disposal regulations.

Service procedures - Checking and replacing rubber valve plates

To guarantee the reliable operation of the double piston priming pump, the valve plates have to be checked for damages once a year. Therefore dismantle the valve plate housing and check rubber valve plates for damages (cracks, brittleness, etc.).

V-belts of priming pump drive

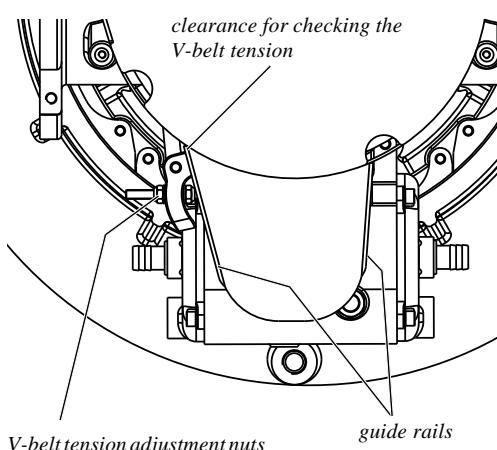
Check V-belt carefully for signs of mechanical damage at least once a year.

Avoid contact between the V-belt and all lubricants!

Further check the correct tension of the V-belts. This is to be done whilst the N100 pump is disengaged and the priming pump is engaged. Press against the belt (in the middle of the belt) with a force of 50 N. The free play of the belt must be 10 mm. Adjust the tension by using the adjustment nuts. Further adjust both guide rails of the priming pump to a clearance of 2 mm between guide rails and V-belt.

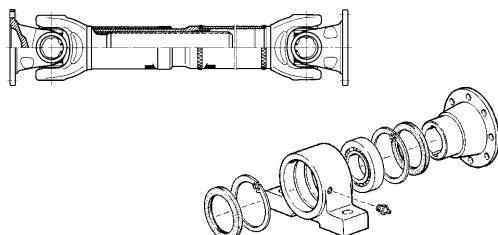
Note:

If the priming pump is disengaged, the V-belts must touch the cover therefore allowing the pulleys to run free.



ATTENTION !

*If a V-belt is worn, always change both.
 Only use original spare belts.
 Rsb. Art. Nr.: 084225*

Service procedures - Propeller shaft


The pump is driven by the Power Take Off of the vehicle by means of propeller shafts. The propeller shafts and their supports must be checked for the solid seating of the bolts and smooth-running of the shafts at periodical intervals.

Interval: yearly

Lubricant: grease according DIN 51825-K2K-30

rosenbauer article number: 004824

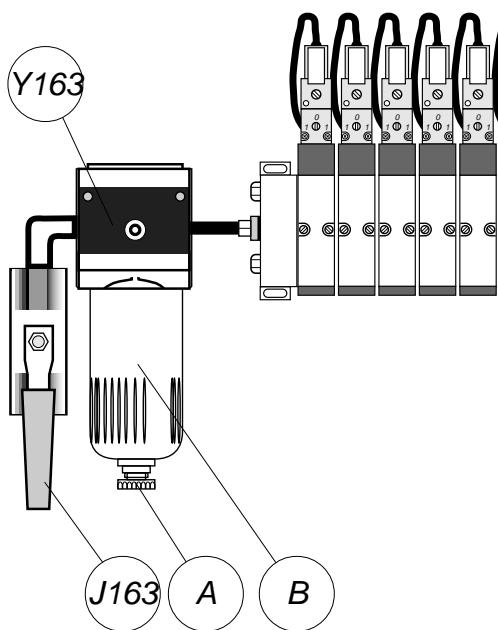
Note:

If maintenance free propeller shafts and intermediate shafts are in use no grease nipples are installed. No further greasing needed.

ATTENTION !

The propeller shaft must stand still with engine running and disengaged pump !

Slight spin of the P.T.O. results in damage of the pump sealing ! Directly spraying onto universal joints with high-pressure steam cleaner is forbidden!

Service procedures - Pneumatic service unit

ATTENTION !

Before cleaning the glass of the water separator, close the shut-off valve (J163).

Draining of condensate

The service unit (Y163) has to be drained at least once a month! Loosen the drain screw (A) by turning it approx. two turns to the left. Let the condensate drain out and fix the drain screw (A) again.

Cleaning the reservoir

When the pressure is exhausted, the plastic reservoir (B) can be unscrewed by turning it to the left.

To clean the plastic reservoirs, use only water, petroleum, or benzine. Cleaning agents containing tri, such as benzene, acetone, and all liquids containing softeners, must not be used.

Cleaning the sintered bronze filter cartridge

After removing the reservoir, the filter cartridge can be unscrewed. The filter cartridge should be washed with petroleum or benzine and should then be blown dry from the inside to outside. If heavily fouled, the filter cartridge should be replaced.

Service procedures - Battery

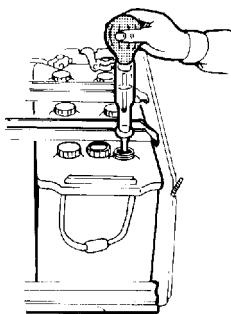
Charged batteries lose capacity without a closed circuit. This static-discharge amounts daily to 0.2 - 1% of the capacity, depending on the age of the battery and the temperature.

ATTENTION !

Discharged batteries are damaged because they sulphate. The service life is thus reduced.
It is also very important to check the battery every 3 months and if necessary, charge it.

Please notice the following during charging:

- The density of the acid decreases with increasing temperature (0.01 kg/dm³ per 15° temperature difference).
- Disconnect the negative pole.
- Charging current should amount to max. 1/10 of capacity (e.g. battery 110 Ah - max. charging current = 11 A).
- After charging, check the density of the acid by using a refractometer or acid-siphon.
- If necessary use distilled water to bring the level of the acid between the min. and max. markings on the battery.


CAUTION !

Batteries contain acid which is hazardous to skin and eyes. When working on batteries, smoking and the use of open flames is strictly prohibited.

When servicing a battery, safety goggles must be worn.

Safety instructions on the outside of the battery must be followed.

Never short-circuit the battery!

Battery disconnecting instructions:

- Disconnect external power supply and ventilate the battery compartment for 15 minutes to remove explosive gases.
- Switch off the main battery switch, and deactivate any consumers located "outside" the main battery switch.
- Always remove the ground connection FIRST, and connect it LAST, to avoid causing sparks. When batteries are connected in series, always remove the "-" pole that is connected to the chassis FIRST. Next, remove the connection between the two batteries, and LASTLY, disconnect the "+" pole. Installation connections are carried out in reverse order.

Note:

Due to the chemical process that takes place during charging, (during driving or stationary charging) the battery heats up. Because of this process, water in the electrolyte is converted to hydrogen and oxygen. If these gases are in correct proportions, an explosive mixture forms. Any spark, for example by disconnecting the "+" pole first or by short-circuiting due to a tool, or a cigarette, etc. is enough to detonate the gas and cause the battery to explode.

Service procedures - Battery
Starting Aid (Jump Starting)
ATTENTION !

Jump starting is allowed only with a 24 voltage battery-package in direct connection (jumper cables)!

Before disconnecting the jumper cables engage a large current consumer (e.g. heating system) on the "giver vehicle" in order to dampen voltage spikes. Never attempt to start the vehicle with a quick charger - this will surely result in damage to the electrical system.

If your vehicle is equipped with a battery charging socket, it is possible to charge the batteries by means of a positively polarized plug without dismounting the batteries.

Precondition:

Use only electronically controlled charging units.

ATTENTION !

To avoid damage to the alternator and radio installed in the vehicle, it is absolutely necessary to switch off the main battery switch only after the engine of the vehicle has been shut off.

Before connecting a battery charging unit to the charging socket, please switch off the main battery switch. similarly switch it off when the vehicle is stowed in the garage.

Battery charge and acid-density in kg/dm³ at 20° C:

Charge	Acid-density at battery gen.	Acid-density at tropic batt.	Action
Charged	1,28	1,23	none
1/2 charged	1,20	1,16	charge necessary
empty	1,12	1,08	charge immediately

Batteries, which show maintenance mistakes, are not replaced by the manufacturer.

We cannot cover the cost of such batteries !

Torque list:

Screw connections on the PP-tank:

Maximum permissible torque of the bronze thread inserts

<i>M 6</i>	3.0 Nm
<i>M 8</i>	7.5 Nm
<i>M 10</i>	10 Nm
<i>M 12</i>	13 Nm
<i>M 16</i>	30 Nm

Note:

The fastening bolts (*M 16*) are sealed (by Loctite 243) to the tank saddle and must not be retightened.

Further handling of PP-tank material:

Recommended thread sealing compound:

Loctite 5331 or teflon strip for small diameters

Recommended gaskets:

flat gaskets or O-rings consists of EPDM (approx. 45 Shore)

Bolted fastening:

Bolting of plastic flanges must be invariably tighten by using a torque wrench !

Service procedures - PP-Water and foam compound tank

Instruction for use

- Make sure that the tank is always completely full - avoid driving with a half-full tank.
- On tank design with an integrated locker compartment the maximum capacity is 250 kg per shelf.
- The water tank service and maintenance procedures as listed below, must be performed at specified intervals (**once every year**) for maximum uptime.
- The foam compound tank service and maintenance procedures as listed below, must be performed at specified intervals (**every two years**) for maximum uptime.

Maintenance procedures

1. **INSPECTION**
 - 1.1 Drain the tank completely.
 - 1.2 Flush the tank thoroughly to remove residue and contaminants. Ferruginous foreign particles have to be removed completely.
 - 1.3 Visually check condition of tank inside at manhole cover.
 - 1.4 Check baffle plates, tank supports, auxiliary frame supports, and tightness of all bolts.
 - 1.5 Inspect level indicator system "Fludometer" - linkage and float for proper condition and gauges for proper reading.
 - 1.6 Check manhole cover and tank filling connection.

Transport:

Lifting the tank is only allowed by using a suitable traverse via the provided eyebolts and with the tank is empty.



CAUTION !

Pay attention to have sufficient air ventilation during any work inside the tank.

Whenever using chemicals inside of the tank

ALWAYS USE BREATHING APPARATUS OR FRESH AIR MASK AND PROVIDE WATCHMAN OUTSIDE THE TANK.

Torque list:

*Bolting to glass fibre-tank:
(flange and threaded bushes; approx.
20% of steel value)*

<i>M 8</i>	<i>8.8</i>	<i>5 Nm</i>
<i>M 10</i>	<i>8.8</i>	<i>10 Nm</i>
<i>M 12</i>	<i>8.8</i>	<i>17 Nm</i>
<i>M 16</i>	<i>8.8</i>	<i>40 Nm</i>
<i>M 20</i>	<i>8.8</i>	<i>80 Nm</i>

Sub frame:

<i>M 10</i>	<i>10.9</i>	<i>65 Nm</i>
<i>MB-screw steel to steel</i>		
<i>M 10</i>	<i>10.9</i>	<i>58 Nm</i>
<i>cast aluminum-bracket to sub frame</i>		
<i>M 8</i>	<i>8.8</i>	<i>24 Nm</i>
<i>silent bloc to cast aluminum-bracket</i>		

Propeller shaft:

<i>M 8</i>	<i>10.9</i>	<i>36 Nm</i>
<i>steel to steel</i>		
<i>M 10</i>	<i>10.9</i>	<i>72 Nm</i>
<i>steel to steel</i>		

The bolting (under the screw head and on the thread) must not be oiled under any circumstances and invariably tighten by using a torque wrench !

Chassis-thrust plate:

<i>M 12 x 1.25</i>	<i>10.9</i>	<i>125 Nm</i>
<i>M 14 x 1.5</i>	<i>10.9</i>	<i>195 Nm</i>

*Superstructure (according to DIN/
ÖNORM):*

<i>flat headed screw</i>	<i>12 Nm</i>
<i>M 8</i>	<i>8.8</i>
<i>M 10</i>	<i>8.8</i>
<i>M 12</i>	<i>8.8</i>
<i>M 14</i>	<i>8.8</i>
<i>M 16</i>	<i>8.8</i>

Service procedures - Chassis

All screws and bolts between the superstructure and chassis frame must be re-tightened after the first 500 km and then regularly checked at least every 5000 km or at least every year. Replace damaged parts of the suspension immediately.

Check if the bolts are tight (please refer to torque list). The vehicle is operated in extreme temperature, driving and atmospheric conditions; therefore check the hollow protection and underseal of the complete vehicle at least once a year and repair if necessary.

Check for any rust spots or damages and repair them immediately. At the same time apply corrosion protection for any replaced or repaired part. An approved corrosion preventing plastic paint for this purpose, may be obtained from Rosenbauer International Aktiengesellschaft.

Roller shutters *

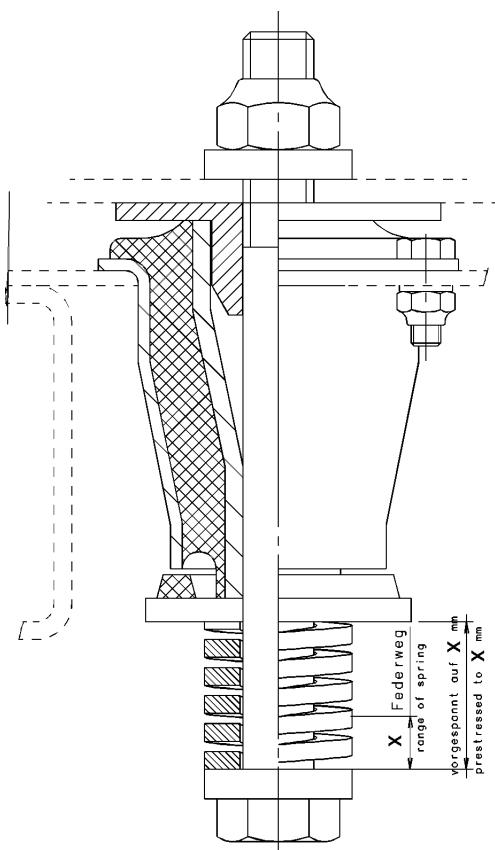
On roller shutters, the sliding-guide rail must be lubricated with Teflon spray Rsb. art.no. 535553 or equal quality, at regular intervals (every 6 months).

Service procedures - Air dryer

An air dryer is installed in the compressed air supply system, close to the board compressor. The drying agent filter is to be changed every year.

ATTENTION !

Please obey current disposal regulations.



Service procedures - Mounting devices for body, water- and foam compound tank - sub frame / chassis

The sub frame is fixed to the chassis but bolted flexibly in some areas by means of spring loaded elements.

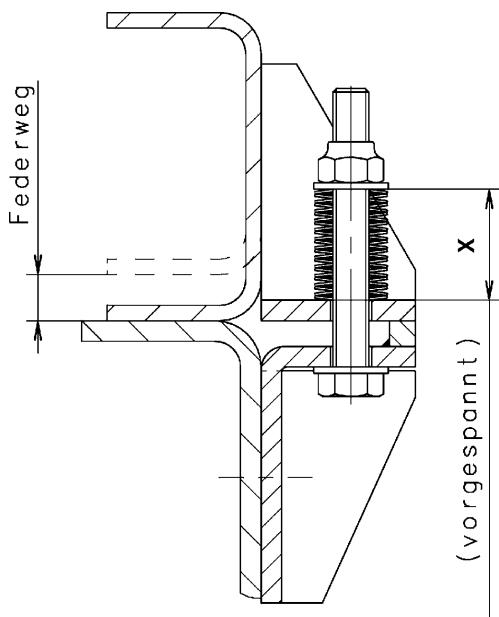
The original pre-adjusted flexible element, see reading (x) must not be changed or bolted to "block" condition under any circumstances.

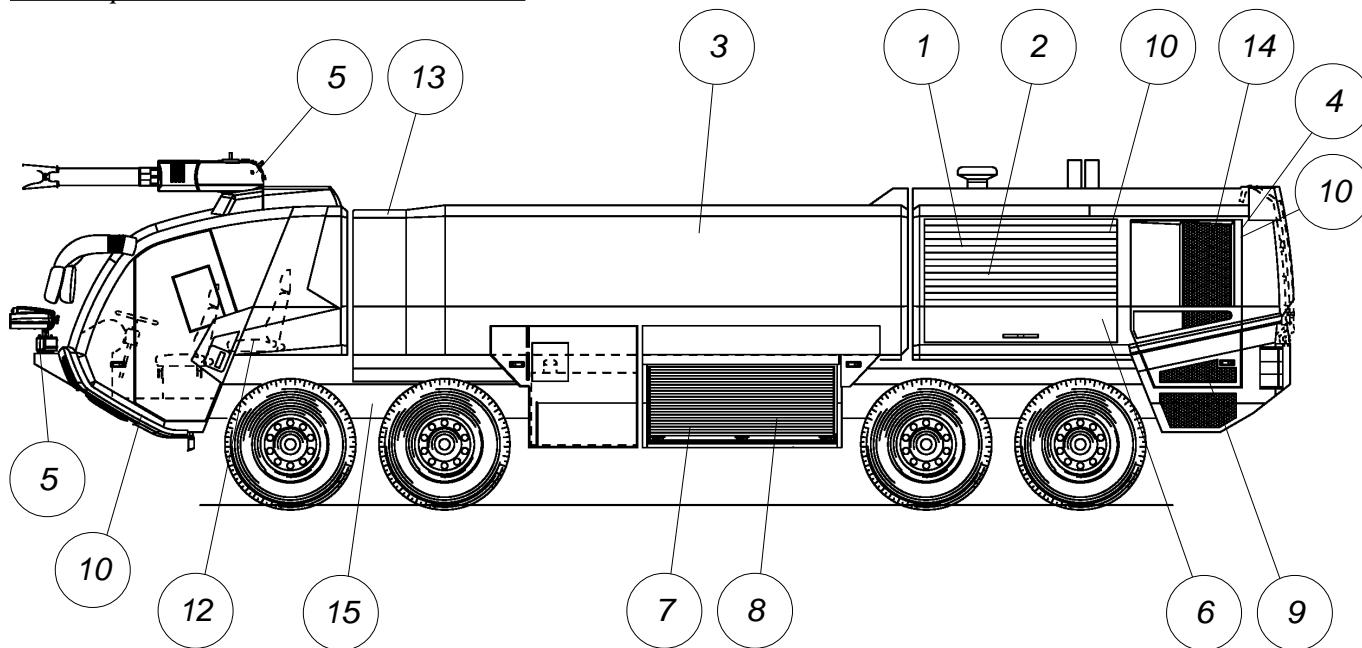
During regular service and maintenance procedures these flexible elements have to be checked for free movement, rust and to make sure that unit is not "stucked" in area of bolt and spring.

The "free movement" can turn into a "rigid" condition by soiling, dirt, corrosion etc. and might cause damages on body and sub frame.

Remedy:

- Check flexible elements regularly according to maintenance manual.
 - If necessary, dismantle unit, clean and grease parts or change damaged items.
- ATTENTION!** Check pre-adjusted reading (x) before dismantling!
- Install unit and adjust to correct necessary (x) reading.
Use grease (Article No.: 004824) only



Service procedures - Maintenance chart


ITEM	COMPONENT	LUBRICANT	VOLUME	OIL CHANGE HOURS/TERM	GREASE- INTERVALL	CHECK
1	Pump gearbox ²⁾	Gearboxoil SAE 90	7.2 ltr.	50-100 every two years	-	M
2	Priming pump ¹⁾ Valve plates V-belt	Engine oil SAE 30	1.0 ltr.	25-50 J	-	M
3	Tank - internal walls Sacrificial anodes *	water tank only	-	-	-	J
4	Hinges and steps	Multi purp. grease according NLGI II	-	-	H	-
5	Turrets RM 15, RM 60 Elevation devices Rotation devices Nozzles, Deflector	Klüber Klüberplex SK 12 according NLGI I	-	-	H	-
6	Compressor	SAE 10	0.25 ltr.	- H	-	D
7	Hose reel hub Swivelling device	Multi purp. grease according NLGI II	-	-	H	-
8	Roller shutters *	Teflon spray art.no.: 535553	-	-	H	-
9	Equipment supports	Multi purp. grease	-	-	J	H
10	Gas struts	silicon spray	-	-	-	H
11	Compressor f. alarm sys. *	SAE 10 special oil	-	-	-	J
12	Equipment	Please refer to manufacturers manual				
13	Dry powder unit	Please refer to manufacturers manual				
14	Engines, transmissions	Please refer to manufacturers manual				
15	Chassis, axles	Please refer to manufacturers manual				

D..... every day
M monthly

H..... every six month
J once a year

¹⁾ SAE 30, API / SF, MIL-L-46152 B, FORD M2C 9011, GM 6048 M

²⁾ SAE 90, API / GL 4, MIL-L-2105, FORD M2C-28-B

Problems and their Solutions

Propulsion problems:

please refer to manufacturers manual

Pump problems:

please refer to the list below; this list is not a complete list,
but it may help to locate the source of the problem

FAILURE	PROBABLE CAUSE	CORRECTIVE ACTION
Pump does not operate	<ul style="list-style-type: none"> - Pump not engaged - Priming pump disengaged - Suction lift too high - Suction strainer not under water - Suction strainer obstructed - Suction hose defective or gasket not installed properly or damaged - Suction screen obstructed - Drafting valve closed - Drain valve not closed - Discharge valve leaks due to impurity or gasket damage - V-belt oily or turned-off 	<ul style="list-style-type: none"> Engage pump Engage priming pump Reduce suction lift Place suction strainer under water Clean suction strainer Change suction hose, install gaskets properly or change them Clean suction screen Open drafting valve Close drain valve Clean discharge valve (rinse with clean water) or change gasket Clean resp. change the V-belt
Poor priming performance	<ul style="list-style-type: none"> - Inlet- and/or outlet valves of the priming pump are damaged 	<ul style="list-style-type: none"> Change inlet- and/or outlet valves
Pump is noisy and vibrates	<ul style="list-style-type: none"> - Suction lift too high - Pump cavitates 	<ul style="list-style-type: none"> Reduce suction lift Reduce engine speed and nozzle diameter, clean suction strainer and suction screen
Poor pump performance	<ul style="list-style-type: none"> - Suction strainer is obstructed - Suction hose defective, gaskets not properly installed or damaged - Suction screen obstructed - Engine does not perform - Discharge valves not fully opened 	<ul style="list-style-type: none"> Clean suction strainer Change suction hose, install gaskets properly or change them Clean suction screen Check engine Open discharge valve

ATTENTION !

If any assistance is necessary do not hesitate to call your nearest "Rosenbauer" representative or contact the "Rosenbauer" Service Department.

Repetitive Test Cycle for Electrical Components

*Repetitive tests are only to be carried out by certified electricians.
These tests are to be carried out according to the specifications listed in the component test manual.*

Electrical systems (230 volts / 400 volts) are to be tested regularly.

- ◊ 1st test at 3 years
- ◊ 2nd test at 2 years after 1st test
- ◊ 3rd test and further tests every year after that

- Alternators are to be tested for at least 1 hour every six months at least 50% of nominal capacity, or if not, at least with the maximum allowed permanent engine rpm.
- All carried out certifications and tests are to be recorded in a logbook.

The installed FI protection is to be tested under load every six months (press test button on the FI protection).

Hints for Disposal

For all used parts and materials resulting from repairs and operating this unit, we request for non-polluting disposal.

Oil: Please obey current disposal regulations.

Foam compound: Obey Safety Data Sheet according to DIN 52900, ÖNORM Z1008.

Sacrificial anodes: Disposal at nonferrous metal.

Rubber- and plastic parts: Please obey current disposal regulations.

Metal parts: Please obey current disposal regulations.

Paint- and coating material: Please obey current disposal regulations.

Adhesive material: Please obey current disposal regulations.

Fuel: Fuel must not get into sewerage system or gutters.

Battery and battery acid: Please obey current disposal regulations.

Dry powder: Disposal according to manufacturers regulations.