GENSCO

HMG

12 KW

Hydraulic Magnet Generator

HMG-PCI-RANGE

Operating Instructions

Dynaset Valves

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WARRANTY

ALL ORDERS FOR PRODUCT ARE SUBJECT TO THE FOLLOWING:

Gensco Equipment (1990) Inc. warrants each product to be free from defects in material and workmanship under normal use and service. Gensco Equipment's obligation under this warranty is limited to repairing or supplying, at our option, a part or parts to replace any defective part or parts which fail, within one (1) year from date of original sale. No product shall be returned without prior authorized approval, and if authorized, the transportation charges shall be prepaid to Gensco Equipment, Toronto, Canada, or Gensco America, Decatur, GA. Unauthorized returns will not be accepted.

The provisions of this warranty shall not apply to any part or parts which have been subject to misuse, negligence or accident, or which have been repaired or altered outside of Gensco Equipment's service department in any way, so, as in the judgment of Gensco Equipment to affect adversely its performance, stability or reliability.

Gensco Equipment neither assumes nor authorizes anyone to assume for it any other obligation or liability for any loss or damage, either direct, incidental or consequential, resulting from or arising out of, or in connection with, any of its defective part or parts.

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RETURN POLICY

A Returned Goods Authorization must be obtained from Gensco Equipment prior to the return of any product. All shipments to us must be sent freight prepaid. Upon inspection, should the Quality Control Department determine the product to be defective, credit will be issued accordingly.

For product returned in an *"as new"* condition, the restocking charges are as follows:

RETURNED FROM DATE OF ORIGINAL SHIPMENT	STOCK ITEMS	SPECIAL ORDER ITEMS
120 Days	20%	50%

GENERAL NOTES

DYNASET hydraulic magnet generator of HMG-range, designed for an installation to material handling machines (hydraulic excavators, heavy trucks with hydraulic cranes), is compact and complete power source for ferrous metal handling magnet. The only power source is a hydraulic system to provide generator with required hydraulic fluid flow at demanded pressure.
DYNASET hydraulic magnet generator transforms hydraulic power into a high quality electricity, which is used for energising metal handling magnet. HMG-PCI units are provided with an external electric control.
An automatic demagnetisation ensures fast disengagement of a picked and moved metal off from a magnet.
DYNASET HMG-generators operates with all 220 VDC metal handling magnets upon condition that magnet's coil inductance is 0 ... 20 H.

CONSTRUCTION

DYNASET hydraulic magnet generator is comprised of hydraulic synchronous generator and electric control unit which includes a rectifier block and operation control automatics. The power-to-weight ratio of DYNASET hydraulic magnet generator is excellent due to modern mono-bearing construction when the other end of rotor's shaft is supported by hydraulic motor. (Generators over 15 kVA are bi-bearing units).

The unit has an automatic rotation speed control valve with ports for pressure and return lines.

Unit's rotor, connected to the hydraulic motor's shaft, is provided with an excitation windings.
Electric power is taken from stator windings. Auxiliary winding of voltage control system is located in generator's stator as well. Windings are isolated from unit's body and their insulation class is H.

Protection class of DYNASET hydraulic magnet generator in standard execution complies with specifications IP23, electric control unit meets requirements of IP44. Units of protection class IP 54 are available by request.
AC-auxiliary electricity is optional (standard in HMG 3,0 kW).
Automatic circuit breakers protect unit from overload.

DYNASET hydraulic generators are self-excited.
DYNASET hydraulic generator is assembled in lightweight aluminium alloy molded case with footing for fixing.

AUTOMATIC VOLTAGE CONTROL

Automatic voltage regulator adjusts rotor's excitation power, maintaining constant output voltage at discontinuous electric load.
Voltage control function depends on the rotor's rotation speed, so that the nominal voltage value is being set at the nominal frequency.
Subject to unit size, three types of voltage regulator are applied.

Voltage control of HMG 3 kW is effected with a capacitor circuit, connected to an auxiliary winding. Voltage control keeps the voltage constant through the whole load range with accuracy of ± 6%. Performance speed of voltage control is less than 0,1 sec.

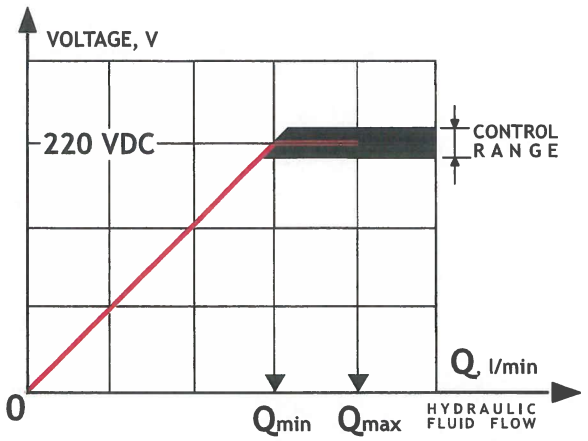
All other HMG-units are equipped either with a compound or electronic voltage regulator.
Compound regulator is connected to the auxiliary winding and maintains the output voltage constant through the entire load range with accuracy of ± 5%. Compound regulator sets the excitation current according to electric load of each phase with its separate current windings individually. Each phase can be loaded up to maximum current deliberately.
Performance speed of a compound voltage controls is less than 0,1 sec.

Electronic voltage regulator is connected to the stator's and separate excitation generator's windings and achieves an accuracy of ± 3%.
Electronic voltage regulator constantly compares output voltage to the pre-adjusted reference value and sets the excitation current according the load.
Performance speed of an electronic voltage controls is less than 0,1 sec.

Automatic frequency control valve is to keep rotation speed constant (±5 %) when incoming hydraulic oil flow (Q) can vary from minimal up to value exceeding Q_{min} by 10 - 30 l/min depending on generator size.
Voltage regulator maintains the voltage constant at constant rotor's rotation speed.

$$Q_{min} = Q_{nom} + 1...5 \text{ l/min}$$

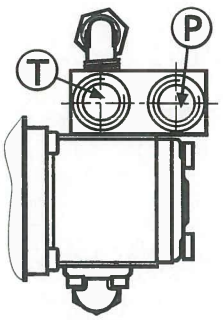
Q_{min} - minimal flow
Q_{nom} - nominal flow



CLASSIFICATION

DYNASET hydraulic generators are manufactured in conformity with the 98/37, 73/23, 89/336 CEE directives and their amendments. They are also manufactured in compliance with the following regulations: CEI 2-3, EN 60034-1, IEC 34-1, VDE 0530, BS4999-5000, CAN/CSA-C22.2, NF 51.100 and N°14-95 - N°100-95. By request DYNASET hydraulic generators can be equipped with a radio interference protection to meet requirements of specifications MIL STD 461 A/B and VDE 0875 class N.

INSTALLATION



DYNASET hydraulic magnet generator works being integrated into an original hydraulic system of a material handling machine.

Unit can be placed deliberately ensuring an easy access to the unit. Generator should be positioned horisontally. Additionally, return line must be connected to a hydraulic oil tank in the shortest possible way in order to keep return oil pressure under 5 bar. Cooling capacity of hydraulic system, designed for continuous operation (an excavator), is generally sufficient under proper installation of HMG-generator. An additional oil cooler is required when HMG-unit is installed to a truck with and hydraulic hoist. Ensure that the filtration capacity of a hydraulic system is sufficient.

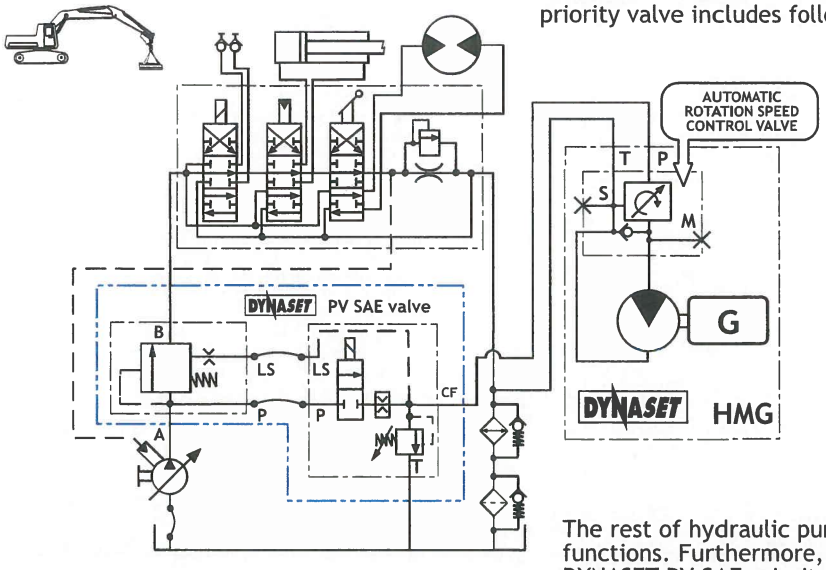
To enable putting DYNASET generator into operation only pressure- (P) and return (T) lines are to be connected to the hydraulic system.
Ensure that the hydraulic fluid flow is sufficient to run the unit, i.e. at least the minimal flow must be available. At the hydraulic flow less that demanded nominal rate the generator will not work properly at all. If the hydraulic flow is so excessive, that the automatic speed control valve is unable to handle it, the unit begins to hunt. In the latter case the hydraulic flow is to be reduced either by replacing an existing hydraulic pump with a suitable one or using flow limiter. **DYNASET PRIORITY VALVE is recommended.**

After having been connected to the hydraulic system, DYNASET hydraulic magnet generator is to be started by directing the hydraulic flow to the unit's pressure port by means of control valve - manual or solenoid. Even simple ball valve or three-way valve can be used.
To ensure DYNASET's proper operation, the hydraulic pressure must be set at least to the level, at which the nominal power output is achieved (ref. to PARAMETERS). Lower pressure reduces output power. Maximum hydraulic pressure is 250 bar (ref. to PARAMETERS). If the hydraulic system main pressure is higher, service pressure relief valve must be used.
Ensure also that your machine's hydraulic fluid cooling is working properly when DYNASET magnet generator is in operation.

DYNASET HYDRAULIC GENERATORS ARE DESIGNED FOR EASY INTEGRATION INTO HYDRAULIC SYSTEM OF ANY TYPE:

1. OPEN CENTRE HYDRAULIC SYSTEM WITH VARIABLE DISPLACEMENT PUMP

The demanded hydraulic flow is to be ensured and controlled with a DYNASET PRESSURE COMPENSATED PRIORITY VALVE.



DYNASET PV SAE 3/4 - 1 1/4 -XX lpm - 12/24 V
priority valve includes following components:

1.
Sandwich-mounted pressure compensator with SAE-flange specification;
2.
Solenoid valve 12/24V;
3.
Flow limiter;
4.
Pressure relief valve.

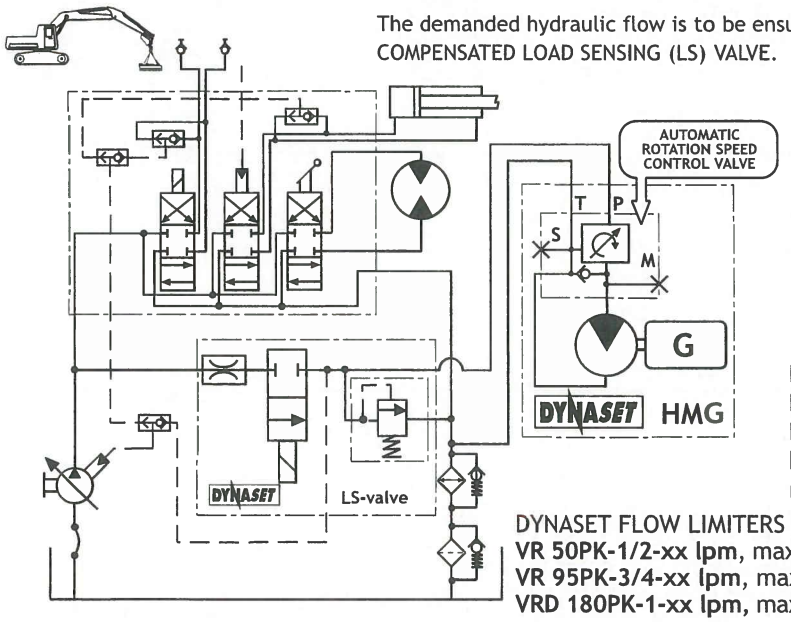
PV SAE priority valve is designed for the installation to main pressure line between SAE-flanges of main hydraulic pump. Pre-adjusted, independent from other functions and priorised hydraulic flow for DYNASET-unit comes from the solenoid valve.

The rest of hydraulic pump's capacity is available for all other functions. Furthermore, pump's control works together with DYNASET PV SAE priority valve.

ALSO AVAILABLE for open centre hydraulic systems with variable displacement pump: PRIORITY VALVE PV C3C ¾ - 1 ¼ - 12/24 V.

DYNASET PRIORITY VALVES enable to operate your DYNASET-unit simultaneously with other hydraulic executors.

2. CLOSED CENTRE HYDRAULIC SYSTEM WITH VARIABLE DISPLACEMENT PUMP



The demanded hydraulic flow is to be ensured and controlled with a DYNASET PRESSURE COMPENSATED LOAD SENSING (LS) VALVE.

DYNASET LS-valve includes following components:
1.
Flow limiter;
2.
Solenoid valve 12/24V;
3.
Pressure relief valve;
4.
Shuttle valve (OPTIONAL).

DYNASET LOAD SENSING VALVES:
LSV 40, 60, LSV 95 and LSV 150 - LS-connection, pressure relief, max. hydraulic flow 40, 60, 95 and 150 l/min respectively.

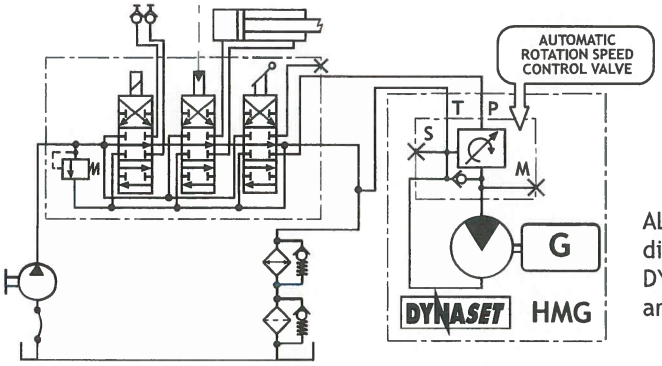
DYNASET FLOW LIMITERS to the pressure line:
VR 50PK-1/2-xx lpm, max. 50 l/min, with pressure compensation;
VR 95PK-3/4-xx lpm, max. 95 l/min, with pressure compensation;
VRD 180PK-1-xx lpm, max. 180 l/min, with pressure compensation.

ALSO AVAILABLE for closed centre hydraulic systems with variable displacement pump:
DYNASET SOLENOID VALVE to the pressure line for remote starting.

SV 70 NC - 1/2 - 12 / 24 V	max 70 l/min with LS -connection;
SV 150 NC– 1 - 12 / 24 V	max 150 l/min with LS -connection.

1. HYDRAULIC SYSTEM WITH CONSTANT DISPLACEMENT PUMP

The demanded oil flow is to be ensured with proper hydraulic pump choice. In systems with redundant hydraulic flow an installation with **DYNASET PRIORITY VALVE** is recommended.



Installation with a standard pressure compensated 3-way valve should be avoided in order to close off potential waving in hydraulic system.

ALSO AVAILABLE for hydraulic systems with constant displacement pump:
DYNASET FREE-CIRCULATION VALVE with solenoid and pressure control, type **VKV 90—3/4.**

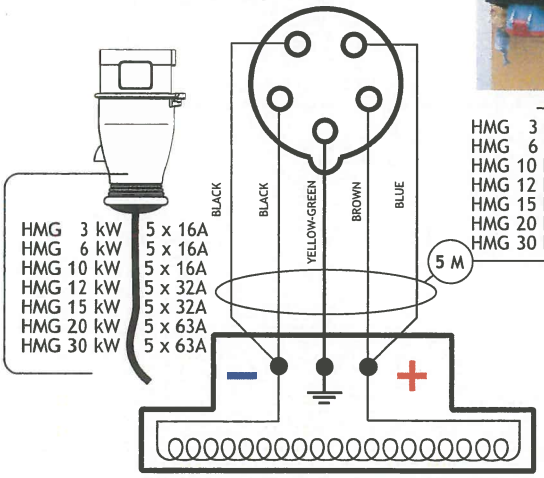
ELECTRIC INSTALLATION KITS TO HMG MAGNET GENERATORS

Having fitted mechanically a generator to your carrier, acomplish an electric connection.
Along with a DYNASET HMG-generator following wiring kits can be purchased:

1. MAGNET WIRING KIT
2. HMG CONTROL WIRING KIT

1. MAGNET WIRING KIT

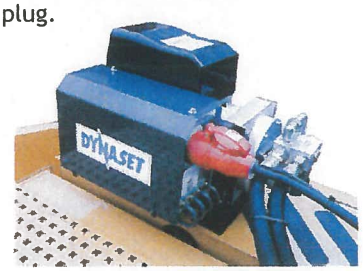
1.1
Magnet's cable 5m with plug.

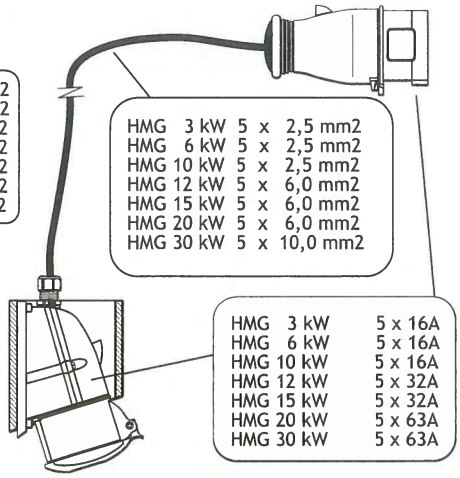


1.2
Socket with a protective cover, to be fitted to a stub boom.

HMG 3 kW 5 x 2,5 mm2
HMG 6 kW 5 x 2,5 mm2
HMG 10 kW 5 x 2,5 mm2
HMG 12 kW 5 x 6,0 mm2
HMG 15 kW 5 x 6,0 mm2
HMG 20 kW 5 x 6,0 mm2
HMG 30 kW 5 x 10,0 mm2

1.3
Cable 20 m from beam's socket to a generator's socket, with plug.

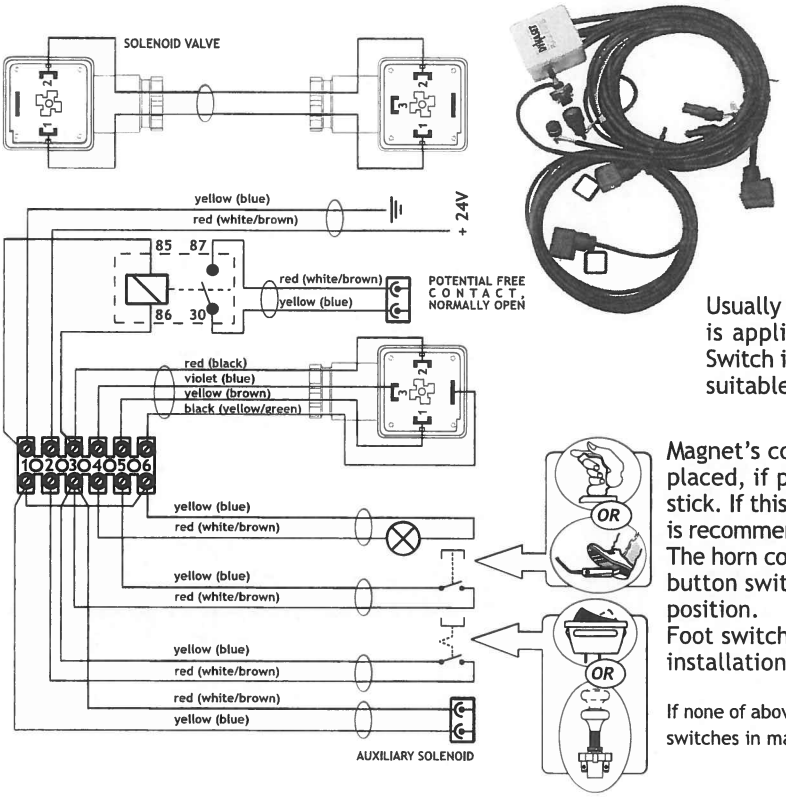




HMG 3 kW 5 x 2,5 mm2
HMG 6 kW 5 x 2,5 mm2
HMG 10 kW 5 x 2,5 mm2
HMG 12 kW 5 x 6,0 mm2
HMG 15 kW 5 x 6,0 mm2
HMG 20 kW 5 x 6,0 mm2
HMG 30 kW 5 x 10,0 mm2

HMG 3 kW 5 x 16A
HMG 6 kW 5 x 16A
HMG 10 kW 5 x 16A
HMG 12 kW 5 x 32A
HMG 15 kW 5 x 32A
HMG 20 kW 5 x 63A
HMG 30 kW 5 x 63A

2. HMG CONTROL WIRING KIT



HMG control wiring kit includes magnet's control switch, generator's starting switch, plugs for both generator and solenoid valve, magnetisation indicator light and cables (5m).
The kit is available by request.

Usually either pull-on switch or rocker switch is applied for magnet generator's starting. Switch is to be placed on a dashboard or other suitable position.

Magnet's control push-button switch should be placed, if possible, on top of a boom's control stick. If this is not possible, machine's horn switch is recommended to connect to a magnet's control. The horn connection should be changed to a push-button switch, placed in other user-friendly position.
Foot switch is an option in a number of installations.

If none of above options are available, any other unconnected switches in machine's cab can be applied for the purpose.

DC VOLTAGE VERIFICATION AND ADJUSTMENT AT START-UP

Your DYNASET hydraulic magnet generator is tested and adjusted at factory, however is recommended to check the DC voltage prior to taking the unit into operation.

1
Ensure that the generator is properly installed and connected to the hydraulic system of your carrier machine and there are no hydraulic fluid leakages.

2
Start the engine of your carrier machine. Adjust the engine speed to the demanded level if necessary.

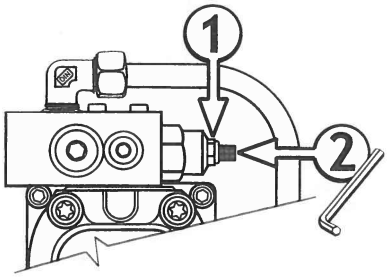
3
Start the generator with a ON/OFF switch and turn on the magnet.

4
Read generator's voltmeter. Verify the voltage value with an multimeter from generator's socket.

5.
If voltage reading is out of limits:

5.1
ensure whether the hydraulic fluid flow is on the demanded level.

5.2
make setting by adjusting the RPM-cartridge:



Loosen the checknut (1), make an adjustment (2) with adjusting screw according to the readings of an instrument and then tighten the checknut.

NOTE !
When making adjustment, the hydraulic fluid should be at normal operation temperature !

OPERATION

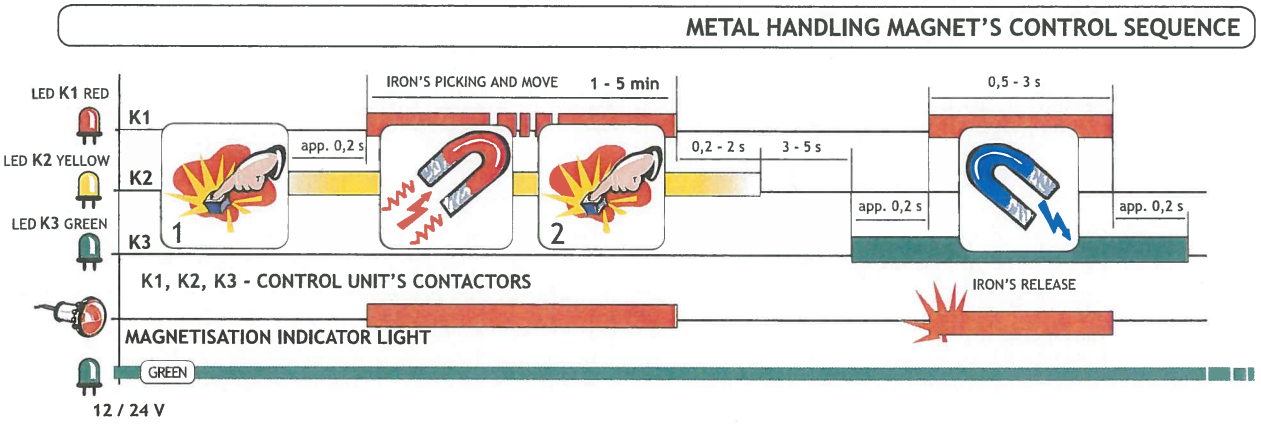
After ensuring the proper operation of the generator, plug magnet's cable to generator's socket.
Start machine's engine.
Direct the hydraulic flow to a generator by opening a solenoid valve, when the control voltage 12/24V, brought to the control unit, activates (ref. HMG CONTROL WIRING KIT on a previous page). Magnet is ready for use when hydraulic flow achieves a minimal demanded level.
Generator rotates constantly the pressure line being open.

Magnet's current is switched on by pressing magnet's control push-button once for app. 1 sec, when material is to be picked and moved. Magnetisation indicator light is ON.

Press the push-button sequently to cut-off magnet's current (magnetisation indicator light is OFF) and to turn on the reverse current, when a residual field discharges due to demagnetisation and all material being kept by a magnet drops down. During a demagnetisation an indication light flashes once. Generally discharge time is 2 - 3 sec subject to magnet.

After release of a material, magnet is returned to an iron picking point and the job continues in above sequence.

Magnetisation and demagnetisation of a magnet is controlled by PCI-card, located in HMG's control unit. Control is effected according to push-button's impulses by means of contactors K1, K2 and K3, also located in control unit's enclosure. Contactor status is indicated with LEDs found on a PCI-card.



ATTN! LEDs K1, K2 AND K3 ARE LOCATED IN CONTROL UNIT'S ENCLOSURE.

1. PUSH-BUTTON IMPULSE 0,2 sek (app. 1 s when testing)
   CONTACTOR **K2** ⇦ ENGAGED DELAY app. 0,2 s
   CONTACTOR **K1** ⇦ ENGAGED
   Contactors K1 and K2 are kept engaged;
   MAGNET IS ON...

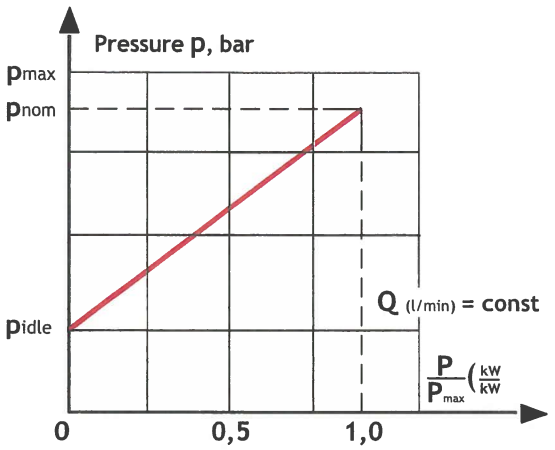
2. PUSH-BUTTON IMPULSE 0,2 sek (app. 1 s when testing)
   CONTACTOR **K1** ⇨ DISENGAGED DELAY 0,2 - 2 s
   CONTACTOR **K2** ⇨ DISENGAGED DELAY 1 - 5 s
   CONTACTOR **K3** ⇦ ENGAGED DELAY app. 0,2 s
   CONTACTOR **K1** ⇦ ENGAGED

   DEMAGNETISATION BEGINS...
   DELAY 0,5 - 3 s
   CONTACTOR **K1** ⇨ DISENGAGED DELAY app. 0,2 s
   CONTACTOR **K3** ⇨ DISENGAGED

... OPERATION

Hydraulic pressure is being adjusted according to the magnet's power demand, when the hydraulic fluid flow is being kept constant.

DYNASET hydraulic magnet generator produces high quality electric power within pressure range from idle run pressure to the maximum allowed value. The nominal power output is achieved at pressure value, which is noticeably less than the maximum allowed operation pressure.
Refer to the attached diagram and technical specifications.



ATTN !
HMG generator is equipped with an overload circuit breaker as well as with a temperature switch. At overload the circuit breaker switches off magnet's current without demagnetisation. However, the iron comes off for a long while causing dangerous situation. **NEVER STEP TO THE AREA UNDER LOADED MAGNET !** Having rectified a problem, reset the circuit breaker with its pushbutton or switch.
Temperature switch cuts off magnet's current without demagnetisation when control unit's temperature exceeds maximum allowed value. Generator can be left running in order to cool it as fast as possible. The unit being cooled enough, temperature switch turns on the magnet's current automatically, when an operator can proceed with his job.
ATTN !
Magnet's load duty is 60%. Exceeding of ED-value causes magnet's overheating !

MAINTENANCE

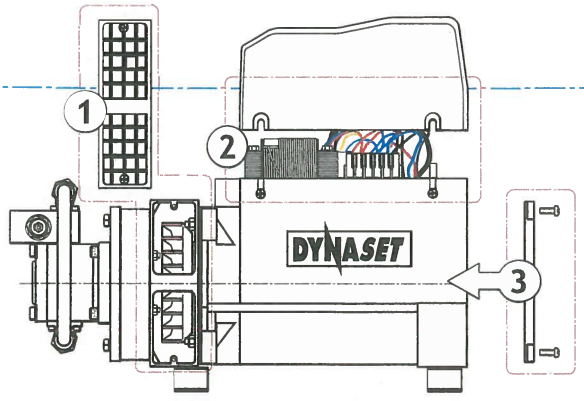
DYNASET hydraulic generators are low-maintenance units. Only normally wearing parts such as sealings in hydraulics, brush collector and bearings should be replaced when necessary.
Refer also to the TROUBLESHOOTING section.
ATTN. !
Capacitors in control unit keep the charge for a long time after stopping a generator.
Prior to commence any service:

* stop both magnet generator and the carrier
* wait at least 10 minutes
* ensure with a gauge that capacitors have no charge.

ATTN. !

CLEANLINESS OF YOUR HMG-UNIT MUST BE MAINTAINED ON A REGULAR BASIS. CHECK YOUR EQUIPMENT AFTER EVERY WORKING SHIFT AND DEPENDING ON AN OPERATIONAL ENVIRONMENT CLEAN A GENERATOR AS FREQUENTLY AS NECESSARY TO KEEP IT IN PERFECT WORKING CONDITION.

Use blow gun with a **REASONABLE DELIBERATION** to dust your equipment.



Remove side screens (1) and air diffuser (3) to clean fan compartment as well as rotor and stator.
Remove cover (2) to dust alternator's electric components.
Having dusted/cleaned the generator, replace screens/covers and secure them with appropriate screws.
(Above picture for reference only - refer to the data pages of specific HMG-model).

Remove all oil deposits. Remove all unnecessary grease and oil from the unit. Accumulated grease and oil can cause overheating and subsequent generator damage and may present a potential fire hazard. Do not leave in the generator case or control box anything which does not belong to the assembly.

The tightness of lids and covers as well as of all screw joints must be inspected on a regular basis, for instance at least once a week or more frequently, if a generator is exposed to a noticeable vibration.

Having carried a maintenance or cleaning, NEVER LEAVE ALTERNATOR'S COVER AND/OR ELECTRIC BOX' COVER UNREPLACED AND UNSECURED ! Condition of any seal/gasket must be inspected and defective parts replaced.

HYDRAULIC FLUIDS

Wide range of standard hydraulic fluids can be used with the DYNASET hydraulic equipment.
Subject to the operating temperature, following mineral hydraulic oils are recommended:

ISO VG 32S for oil's operation temperature up to 70 °C;
ISO VG 46S for oil's operation temperature up to 80 °C;
ISO VG 68S for oil's operation temperature up to 90 °C.

Synthetic and bio-oils can be used as well if their viscosity characteristics and lubricating efficiency are corresponding to above mineral oils. Automatic transmission fluids and even engine oils can be used, provided that they are allowed to be used in hydraulic system of your carrier machine.
Prior to use special hydraulic fluids a with DYNASET equipment, please be kindly requested to contact nearest DYNASET representative for an advice.

SAFETY

The generator's output voltage is as high as 230/400 V. Operators and maintenance personnel must always comply with local safety regulations and precautions in order to close out the possibility of damages and accidents. Prior to detaching a magnet from a carrier, unplug it from a generator's socket ! Capacitors of control unit can discharge developing voltage over 200V even the equipment stands still.

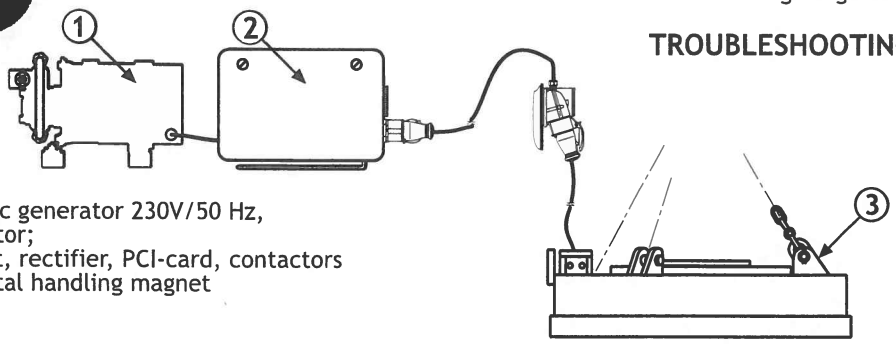
The hydraulic system is usually pressurised up to 250 (420) bar. Follow all your local safety instructions related to the high pressure hydraulics.
TECHNICAL CONDITION OF YOUR MACHINERY AND EQUIPMENT MUST BE SUBJECTED TO CONSTANT SURVEILLANCE. Hydraulic system of a carrier machine should be maintained according to the service program. All couplings, valves and hoses of the system should be leak-proof and kept clean in order to follow their technical condition. Hydraulic leakages must be rectified immediately to avoid injuries caused by hot oil blowouts.

Prior to maintenance, detaching from a carrier or disassembling a DYNASET-unit, the hydraulic system of a machine should be stopped and DYNASET's hydraulic circuit depressurised.

When working with a DYNASET hydraulic equipment, appropriate protective clothing, safety goggles and gloves should be worn. Do not touch parts heated by hydraulic oil.

WHEN CARRYING OUT ANY SERVICE DISASSEMBLING OR REPAIR OF DYNASET HYDRAULIC UNIT (AND/OR HYDRAULIC SYSTEM OF A CARRIER MACHINE), **ABSOLUTE CLEANLINESS MUST BE MAINTAINED TO ENSURE RELIABLE AND TROUBLE-FREE OPERATION OF YOUR EQUIPMENT.**

All installation and service of both hydraulic and electric equipment must be performed by qualified and experienced personnel only.



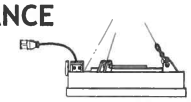
1. AC-hydraulic generator 230V/50 Hz, RPM-regulator;
2. Control unit, rectifier, PCI-card, contactors
3. Ferrous metal handling magnet

1. MAGNET DOES NOT WORK	1.1 Magnet unplugged or magnet's cable damaged. Red failure indication LED on PCI-card is ON.	1.1 Replug the magnet; change the cable if damaged.
	1.2 Magnet's coil is damaged.	1.2 Check coil's resistance and compare the result to the value indicated in the table thereinafter. Check also coil's inductance if possible.
	1.3 220 VDC voltage does not come from the control unit to magnet's terminals.	1.3 Contactor's **K1** breaker points are worn. Check their resistance when the contactor is engaged. Correct value is 0,2 Ohm. Rectifier's diode bridges (HMG3 kW) or diodes (HMG6 -...) short-circuited or blown. Check diode bridges / diodes. Proceed as follows (ref. to electric diagram) : + diodes: K1/L1 - K2/L1; K1/L2 - K2/L1; K1/L3 - K2/L1. - diodes: K1/L1 - K2/L3; K1/L2 - K2/L3; K1/L3 - K2/L3. **ATTN** ! When checking diodes, generator must be stopped. Measuring procedure does not require detaching diodes from a control unit. Replace damaged components. Magnet's cable damaged.
	1.4 AC-voltage does not come from generator to the control unit.	1.4 Check whether there is a 3-phase voltage 150 - 180 VAC on terminals T1, T2 and T3 of contactor K1. Potential malfunction in hydraulic system. Potential failure in AC-generator's windings, brush gear, excitation rectifier or voltage regulator. Ref. to the attached troubleshooting for AC-generator.
	1.5 Malfunction in contactor' **K1** and **K2** control. The contactors must be engaged.	1.5 Check control wiring, especially magnet's push-button and generator's starting switch. Check the PCI-card, replace the fuse if blown. Test contactor' operation: press the magnet's control push-button and follow LEDs sequence (ref. to the item OPERATION). Replace the PCI-card if damaged. **Ref. also to the attached instructions for PCI-card.**
	1.6 Contactor's **K2** breaker points are worn.	1.6 Check resistance of breaker points when the contactor is engaged. Correct value is 0,2 Ohm.

2. **IRON DOES NOT GET RELEASED FROM A MAGNET** (DEMAGNETISATION DOES NOT WORK)	2.1 Contactor's **K1** and **K3** do not operate in correct sequense.	2.1 Test contactor' operation: press the magnet's control push-button and follow LEDs sequence (ref. to the item OPERATION). Replace the PCI-card if damaged. **Ref. also to the attached instructions for PCI-card.**
	2.2 Contactor's **K3** breaker points are worn.	2.2 Check resistance of breaker points when the contactor is engaged. Correct value is 0,2 Ohm.

3. **MAGNET MALFUNCTIONS.**	3.1 Magnet keeps working only a short time.	3.1.1 Magnet's power demand exceeds HMG's output. Generator gets overloaded and stopped by an automatic circuit breaker. Choose magnet according to HMG's power output. 3.1.2 Magnet's cable's short-circuit. Automatic circuit breaker stops the generator. Unplug the magnet; if circuit breaker does not trip shortly after starting the generator, cable is damaged. 3.1.3 Control unit overheated. Control unit's thermostat switch tripped by reason of L-resistor's failure. Insufficient cooling.
	3.2 Low magnet's power.	3.2 Magnet's voltage too low: Does DC-voltage come to magnet's terminals ? Does AC-voltage comes to the control unit ? Check AC-generator according the attached instructions; Check actuating hydraulics.
	3.3 Magnet's power consumption excessive, automatic circuit breaker stops the generator.	3.3 Generator's output voltage too high causing overloading. Check AC-generator according the attached instructions; Check actuating hydraulics. Adjust the output voltage to proper level. **ATTN ! High voltage is hazardous to a generator. Rectify a malfunction immediately.**

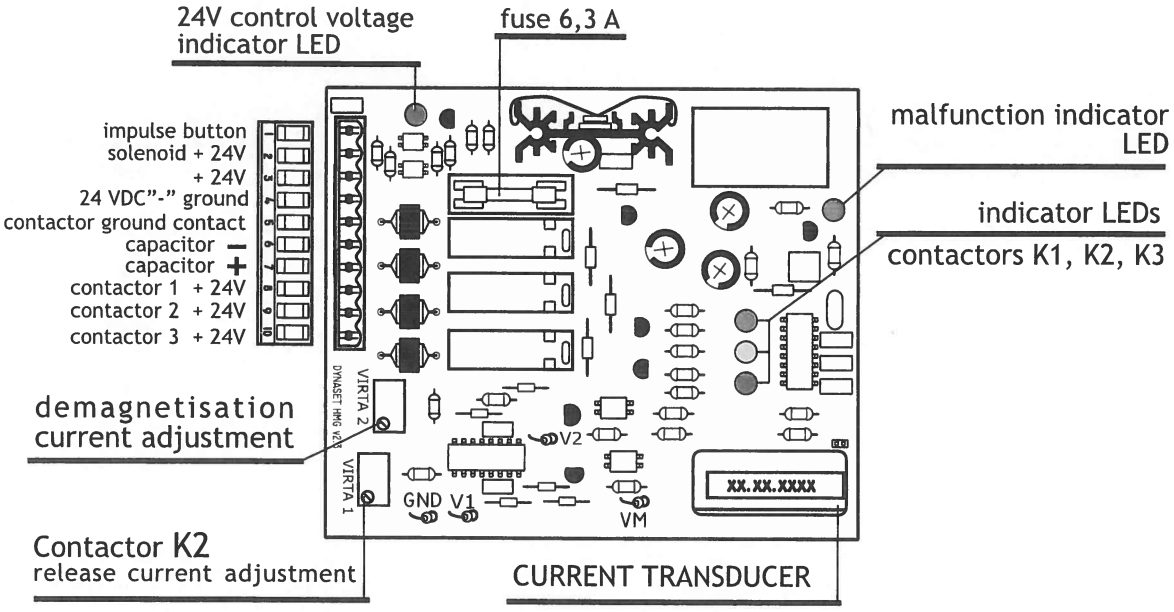
MAGNET'S RESISTANCE



Ω (Ohm)

	min	max
HMG 3 kW	15	50
HMG 6 kW	8,8	20
HMG 10,0 kW	5,4	15
HMG 12,0 kW	4,5	10
HMG 15,0 kW	3,6	8
HMG 20,0 kW	2,6	6
HMG 30,0 kW	1,7	5

PCI - CONTROL CARD



1.
CONTROL VOLTAGE LED 24 V (GREEN) activates when the main switch is turned ON.

If the LED is off, either the control wire is damaged or the fuse (6,3 A) has blowed.

2.

LED indicators for contactors K1, K2 and K3.

Contactor K1	Colour RED
Contactor K2	Colour YELLOW
Contactor K3	Colour GREEN

When contactor is engaged, the corresponding LED is ON.

If LED is ON, but the contactor still disengaged, whether contactor's coil or wire is damaged.

If LEDs are off constantly, the PCI-card does not work properly.

3.

MALFUNCTION INDICATOR LED Colour RED

The concerned LED indicates control voltage failure and malfunction of magnet current metering circuit.
If LED is continuously ON when working:

3.1 Magnet cable is disconnected or damaged.
3.2 Current metering circuit of PCI-card damaged or the PCI-card is not adjusted properly (check the set value of potentiometers VIRTA1 and VIRTA2).
3.3 If led keeps flashing after working cycle, the wire of 24V has poor contact.

The LED starts flashing when 24V voltage cuts off for longer time than 0,2 s.

SAFE MODE

PCI CONTROL CARD runs in safe mode when a failure occurs. MALFUNCTION INDICATOR LED is ON continuously, but the job can be continued without immediate tracing and rectifying the failure. In SAFE MODE fixed demagnesation time is 6 sec, however magnet's considerable inductance may extend the above time with 1 - 3 seconds.

The PCI card runs in SAFE MODE when the HMG-generator is ON, but the magnet cable is disconnected.

ADJUSTING THE INDUCTION CURRENT ON MAGNET TO DISENGAGE CONTACTOR K2
POTENTIOMETER **VIRTA1**

PCI-card measures automatically the inductive current and disengages the contactor K2 at the right time without arcing, regardless of magnet inductance (0 - 20 H) and power.

Adjusted induction current value can gauged with mV-meter (1 mV = 0,001 V) between measure points V1- and GND of the card, when the control voltage 24V is ON.
On condition that 1 A = 40 mV and factory default of +400 mV, current value makes 10 A.

To speed up the opening time of contactor K2, V1-value can be increased to 440 mV (= 11 A) by setting the potentiometer VIRTA1 counter-clockwise (max. 1 rev. = 30 mV).
DO NOT increase too much because that reduces the service life of contactor K2.

ADJUSTING THE DEMAGNESATION CURRENT
POTENTIOMETER **VIRTA2**

Adjusted demagnetising current value can be gauged with mV-meter between measure points V2- and GND of the card, when the control voltage 24V is ON.

Factory default is -100 mV (= 2,5 A). Demagnetising can be increased upto -130 mV (=3,25 A) by setting the potentiometer VIRTA2 clockwise (1 round = 30 mA).

GAUGING THE MAGNET'S CURRENT

When the magnet is connected and energised, the current can be gauged between measure points VM- and GND of the card.
Factory default scale is 1A = 40 mV (i.e. magnet current of 10A is gauged as 400 mV).

AC-GENERATOR'S TROUBLESHOOTING

1. **LOW OUTPUT VOLTAGE AT NO LOAD**	1.1 Too low rotation speed of generator.	1.1.1 Check first the output frequency. If the frequency is out of range, hydraulic system failure is concerned. 1.1.2 Check whether the hydraulic fluid flow and pressure are sufficient. Adjust when necessary. 1.1.3 Check the hydraulic motor for possible leakage. Replace motor if necessary.
	1.2 Excitation rectifier's failure.	1.2 Trace the failure and replace the rectifier.
	1.3 Poor contact in electric system.	1.3 Check all internal contacts and wiring of the generator. Check and clean brushes and slip ring (HMG6 – HMG20 kW).
	1.4 Voltage regulator's failure.	1.4.1 Replace the capacitor (HMG 3 kW). 1.4.2 Check the compound regulator. Replace if broken (HMG6 – HMG20 kW). 1.4.3 Check and adjust or replace the electronic regulator (HMG30 kW).
	1.5 Winding failure.	1.5 Check the condition of winding; verify winding's resistance with parameters shown in technical specification and replace if damaged. **ATTN !** **To avoid damaging the control unit set the overload protection switch to OFF-opsition prior to measuring winding's insulation resistance.**
2. **LOW OUTPUT VOLTAGE AT LOAD,** WHILE NO-LOAD VOLTAGE IS CORRECT	2.1 The generator is being overloaded.	2.1 Reduce the load and check the current I (A) to ensure that the proper load is being applied.
	2.2 Too low rotation speed of generator.	2.2.1 Hydraulic pressure insufficient. 2.2.2 Hydraulic system failure to be traced and cleared. 2.2.3 Hydraulic motor worn out. Replace hydraulic motor.
	2.3 Voltage regulator's failure.	2.3.1 Replace the capacitor (HMG 3 kW). 2.3.2 Check and adjust or replace the compound regulator. (HMG6 – HMG20 kW). Check resistors of rotor's current circuit (2 pcs). 2.3.3 Check and adjust or replace the electronic regulator (HMG30 kW).

AC-GENERATOR'S TROUBLESHOOTING

3. **EXCITATION FAILURE**	3.1 Rectifier's failure.	3.1 Trace the failure and replace the rectifier.
	3.2 Voltage regulator's failure.	3.2.1 Replace the capacitor (HMG3 kW). 3.2.2 Check and adjust or replace the compound regulator (HMG6—HMG20 kW). 3.2.3 Check and adjust or replace the electronic regulator (HMG30 kW).
	3.3 Winding failure.	3.3 Verify the winding resistance with parameters shown in technical specification and replace if damaged.
	3.4 Poor contact in electric system.	3.4 Check all internal contacts and wiring of the generator. Check and clean brushes and slip ring (HMG6 — HMG20 kW).
	3.5 Insufficient residual magnetism.	3.5 Use external battery of 12 V for 1 - 2 sec to magnetise the rotor.

4. **OUTPUT VOLTAGE INSTABILITY**	4.1 Instable rotation speed of generator.	4.1.1 Check generator's hydraulics, including automatic frequency control valve. Make an adjustment, replace RPM-cartridge if necessary. 4.1.2 Check whether the hydraulic fluid flow and pressure are excessive. Adjust when necessary. 4.1.3 Check the hydraulic motor for possible leakage. Replace motor if necessary.
	4.2 Electronic voltage regulator's failure (HMG30 kW).	4.2 Adjust stability of the regulator. Replace if broken.
	4.3 Poor contact in electric system.	4.3 Check all internal contacts and wiring of the generator. Check and clean brushes and slip ring (HMG6 — HMG20 kW).

AC-GENERATOR'S TROUBLESHOOTING

5. **ABNORMAL NOISE LEVEL**	5.1 Bearing failure.	5.1 Replace broken bearing.
	5.2 Generator is being overloaded.	5.2 Reduce the load to proper level.
	5.3 Short circuit in powered unit.	5.3 Check powered unit. Rectify a defect.
	5.4 Foreign items in generator's casing.	5.4 Stop generator and hydraulic system. Remove foreign item from unit.
	5.5 Extremely fluctuating load.	5.5 Can it be fixed ?

6. **OIL LEAKAGES**	6.1 Failure of axial sealing of generator's hydraulic motor. External indication– ydraulic oil outflow from ventilation grids.	6.1 Axial sealing of hydraulic motor broken by reason of EXCESSIVE PRESSURE IN RETURN LINE. Rebuild the return line. Maximum allowed pressure in return line is 5 bar. Replace axial sealing of generator's motor.
	6.2 Oil leakage from hydraulic motor.	6.2 Hydraulic motor worn out and should be replaced.

PARAMETERS		PCI-MODELS						
		HMG 3 kW 20 VDC-17	HMG 6 kW 220 VDC-30	HMG 10 kW 220 VDC-44	HMG 12 kW 220 VDC-52	HMG 15 kW 220 VDC-65	HMG 20 kW 220 VDC-86	HMG 30 kW 220 VDC-120
POWER CHARACTERISTICS								
Generator power, max.	kW	3,0	6,0	10,0	12,0	15,0	20,0	30,0
Magnet coil power, max.	kW	3,0	5,5	9,5	11,5	14,5	19,5	29,5
Operation voltage	V±%	220±%5	220±%5	220±%5	220±%5	220±%5	220±%5	220±%5
AC-voltage regulator	AUTOMATIC	C/I-regulator			COMPOUND-REGULATOR			ELECTRONIC
AUXILIARY ELECTRICITY		STANDARD			OPTIONAL			
1~/230 VAC	kVA	3,5	(3,5)	(3,5)	(3,5)	(3,5)	(3,5)	(3,5)
3~/400 VAC	kVA	NO	(5,0)	(9,0)	(9,0)	(9,0)	(9,0)	(9,0)
CONTROL VOLTAGE	V DC	12/24 V	24 V	24 V	24 V	24 V	24 V	24 V
DEMAGNETISATION	AUTOMATIC	PCI-CONTACTOR CONTROL 24 V DC						
HYDRAULIC CONNECTIONS								
Pressure line	P	BSP 1/2"	BSP 1/2"	BSP 1/2"	BSP 1/2"	BSP 3/4"	BSP 3/4"	BSP 3/4"
Return line	T	BSP 1/2"	BSP 1/2"	BSP 1/2"	BSP 1/2"	BSP 1"	BSP 1"	BSP1"
Serial connection	S	BSP 3/8"	BSP 3/8"	BSP 3/8"	BSP 3/8"	NO	NO	NO
HYDRAULIC REQUIREMENTS								
Minimal flow	l/min	20	33	47	56	69	91	126
Maximum flow	l/min	30	62	66	65	95	110	150
Pressure at nominal power	bar	190	190	190	190	190	190	190
Maksimum pressure	bar	250	250	250	250	250	250	250
Idle run pressure	bar	50	50	50	40	40	30	30
HYDRAULIC FLUID REQUIREMENTS								
Viscosity	cSt	10 - 200 / optimum 25 - 35						
Temperature	°C	max. 70 **						
Filter ratio, recommendation	um	min. 25						
OUTLINE DIMENSIONS								
Length	mm	420	475	485	540	790	790	1070
Width	mm	290	365	390	390	430	430	550
Height	mm	250	310	360	360	450	450	600
WEIGHT	kg	28	49	63	76	110	160	210

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HYDRAULIC MAGNET GENERATOR HMG

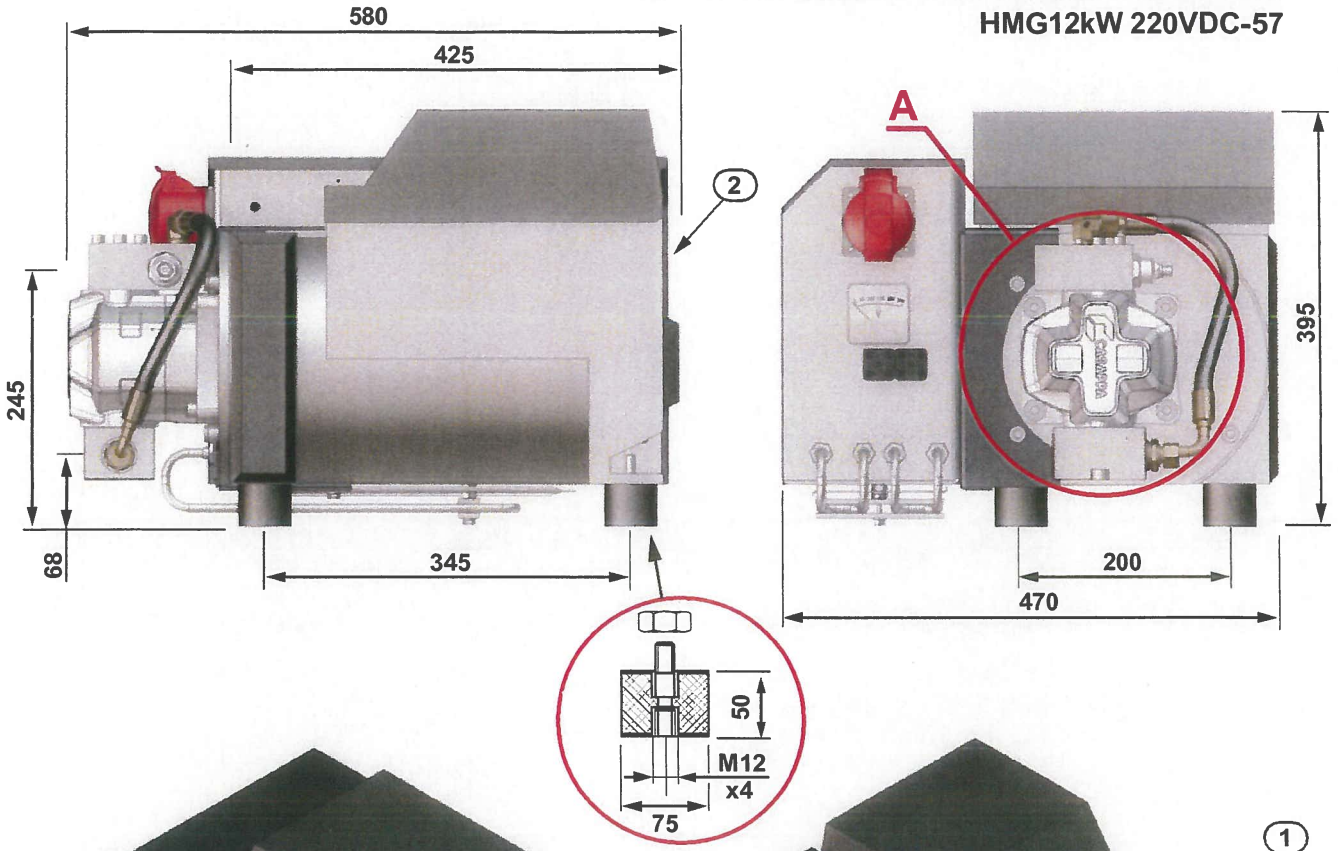
HMG12kW 220VDC-57

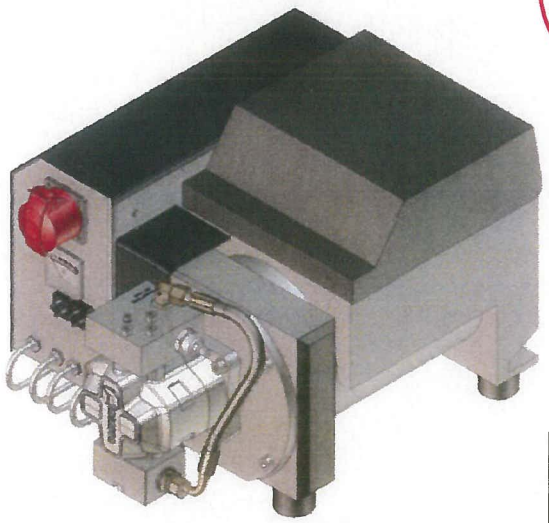
Dynaset hydraulic magnet generator HMG can be used in various applications; Recycling, cleaning and handling of scrap metal, castings, bars, plates, swarf, slag, etc.

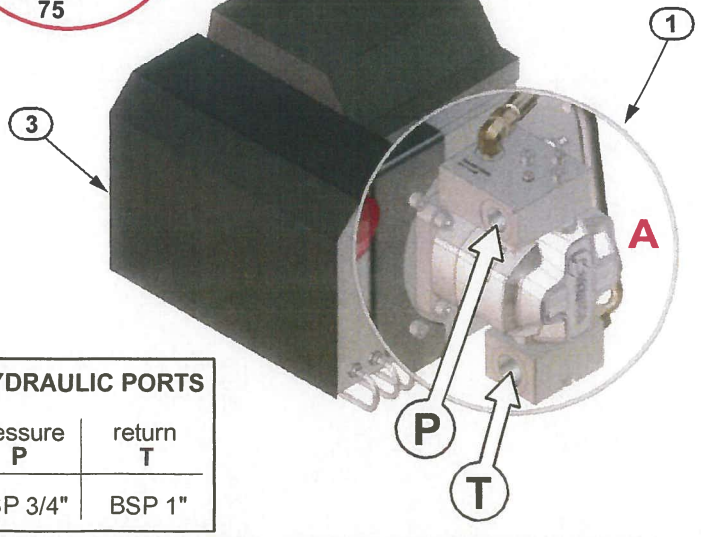
Dynaset hydraulic magnet generator transforms the hydraulic power of a working machine into high quality magnet power effectively to any magnet available. Working machine is always ready to lift and handling accurately ferrous materials. Automatic speed control with quick demagnetization guarantee safe working and long maintenance intervals.

MAIN ASSEMBLY AND SPECIFICATIONS

HMG12kW 220VDC-57







HYDRAULIC PORTS	
pressure P	return T
BSP 3/4"	BSP 1"

	HYDRAULIC FLOW l/min		MAGNET COIL POWER kW max.	VOLTAGE (V) +/- %	WEIGHT kg
	min	max			
HMG12kW 220VDC-57	61	70	11,5	220 +/- 5%	100

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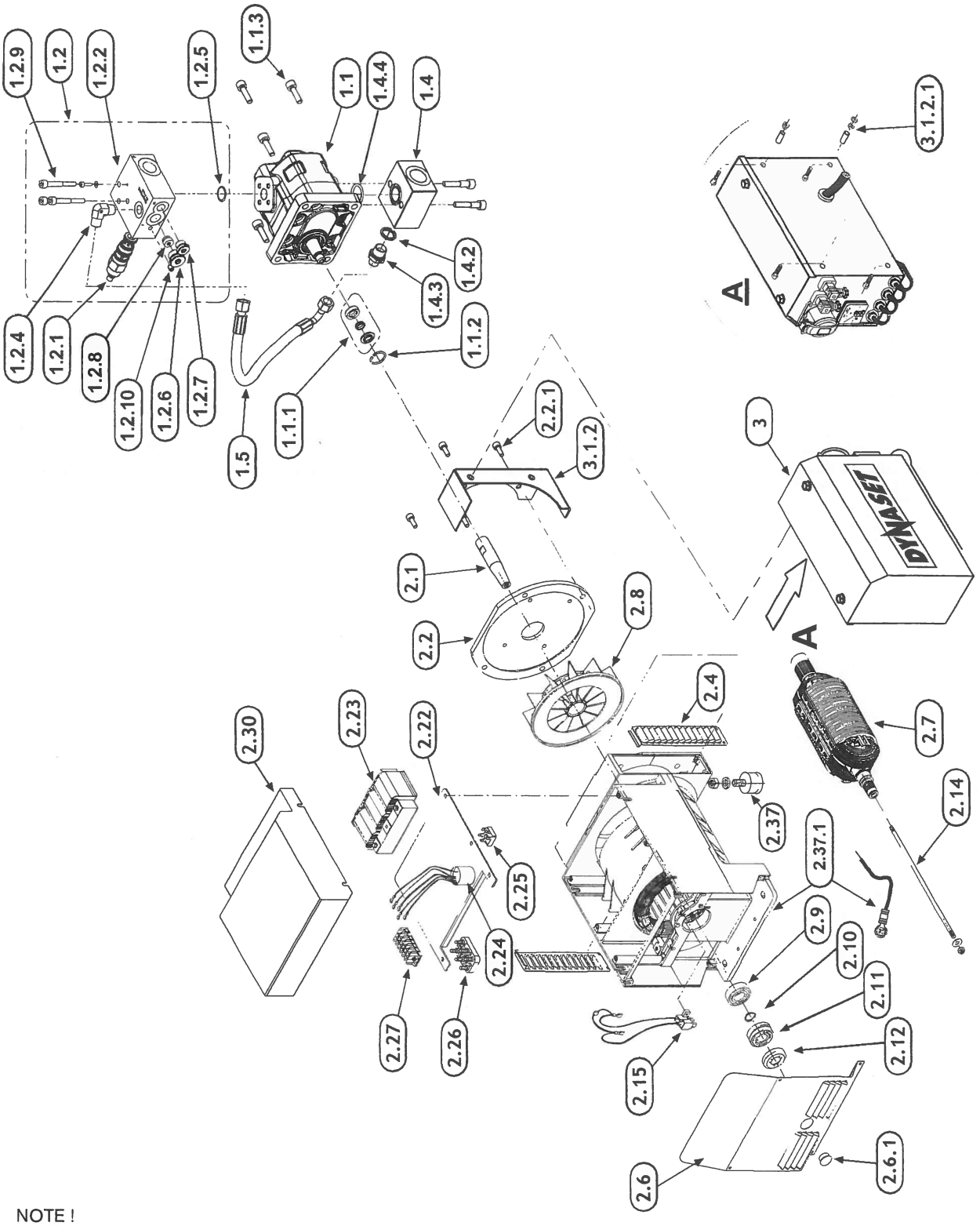
HYDRAULIC MAGNET GENERATOR HMG

HMG12kW 220VDC-57

BASIC ASSEMBLY



NOTE !
WHEN ORDERING SPARE PARTS, UNIT'S TYPE, MODEL AND SERIAL NUMBER SHOULD BE QUOTED.

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HYDRAULIC MAGNET GENERATOR HMG
HMG12kW 220VDC-57

PART LIST

No	STOCK NUMBER	DESIGNATION	DETAILS	QUANTITY
1.1	0700110140	HYDRAULIC MOTOR	38	1
1.1.1	V100103250	SHAFT SEAL, COMPLETE	24x40x7	1
1.1.3	8500415400	ALLEN SCREW	M10x35	4
1.2	0700031523	RPM-VALVE BLOCK, COMPLETE		1
1.2.1	0700001512	RPM-CARTRIDGE	FLC2	1
1.2.2	0700031799	VALVE BLOCK	10265L	1
1.2.4	1702365000	ELBOW FITTING	R3/8xRK3/8	1
1.2.5	2204109000	O-RING 21		1
1.2.6	1702715000	PLUG	HF R1/2	1
1.2.7	1702705000	PLUG	HF R3/8	1
1.2.8	0700001525	CHECK VALVE	R3/8 0,5 bar	1
1.2.9	8500412900	ALLEN SCREW	M8x60	3
1.2.10	1702787000	TUBE PLUG	MK8x1	1
1.4	0709010040	RETURN LINE BLOCK, COMPLETE	1"	1
1.4.1	8500463900	ALLEN SCREW	M10x55	2
1.4.2	1702190000	SEAL	USIT 1/2"	1
1.4.3	1702295000	MALE STUD CONNECTOR	R1/2-R3/8	1
1.4.4	2204360000	O-RING 29		1
1.5	1803490000	RETURN HOSE ASSEMBLY, COMPLETE	R3/8-400/1-R3/8	1
2	4104816080	**ALTERNATOR ASSEMBLY**	SFT	
2.1	0100030480	HG CONE COUPLING	1:5,333	1
2.14		STUD BOLT		1
2.2	8109010240	MOTOR FLANGE	3r-SAE J609b	1
2.2.1	8500062700	HEX SCREW	M8x35	4
	8500905800	NUT NYLOC	M8	4
2.4		SIDE SCREEN IP23	SFT	1
2.6		AIR DIFFUSER	SFT	1
2.6.1		PLUG	SFT	1
2.7		ROTOR ASSEMBLY	SFT	1
2.8		FAN	SFT	1
2.9		REAR BEARING	SFT	1
2.10		LOCKING RING		1
2.11		SLIP RING		1
2.12		END COVER	SFT	1
2.13		DIODE BRIDGE BOARD	SFT	1
2.15		BRUSH GEAR	SFT	1
2.20				
2.21				
2.22		COMPONENT CHASSIS	SFT	1
2.23		VOLTAGE REGULATOR	SFT	1
2.24		CAPACITOR	SFT	1
2.25		DIODE BRIDGE	SFT	1
2.26		TERMINAL BOARD	SFT	1
2.27		BLOCK CONNECTOR	SFT	1
2.30	0300001826	COVER	SFT	1
2.37	8307580000	RUBBER CUSHION	75/50 M12	4
		NUT M12 + WASHER		4 + 4
2.37.1		GROUNG WIRE	4 m2	1 kit

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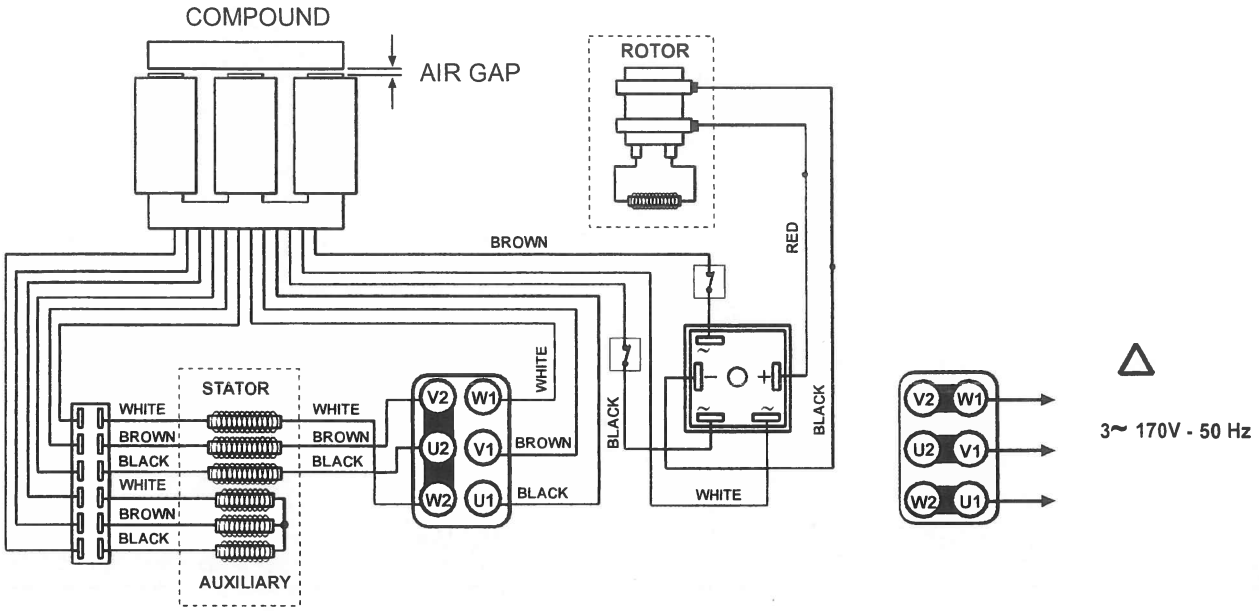
HYDRAULIC MAGNET GENERATOR HMG
HMG12kW 220VDC-57

ALTERNATOR'S WIRING DIAGRAM



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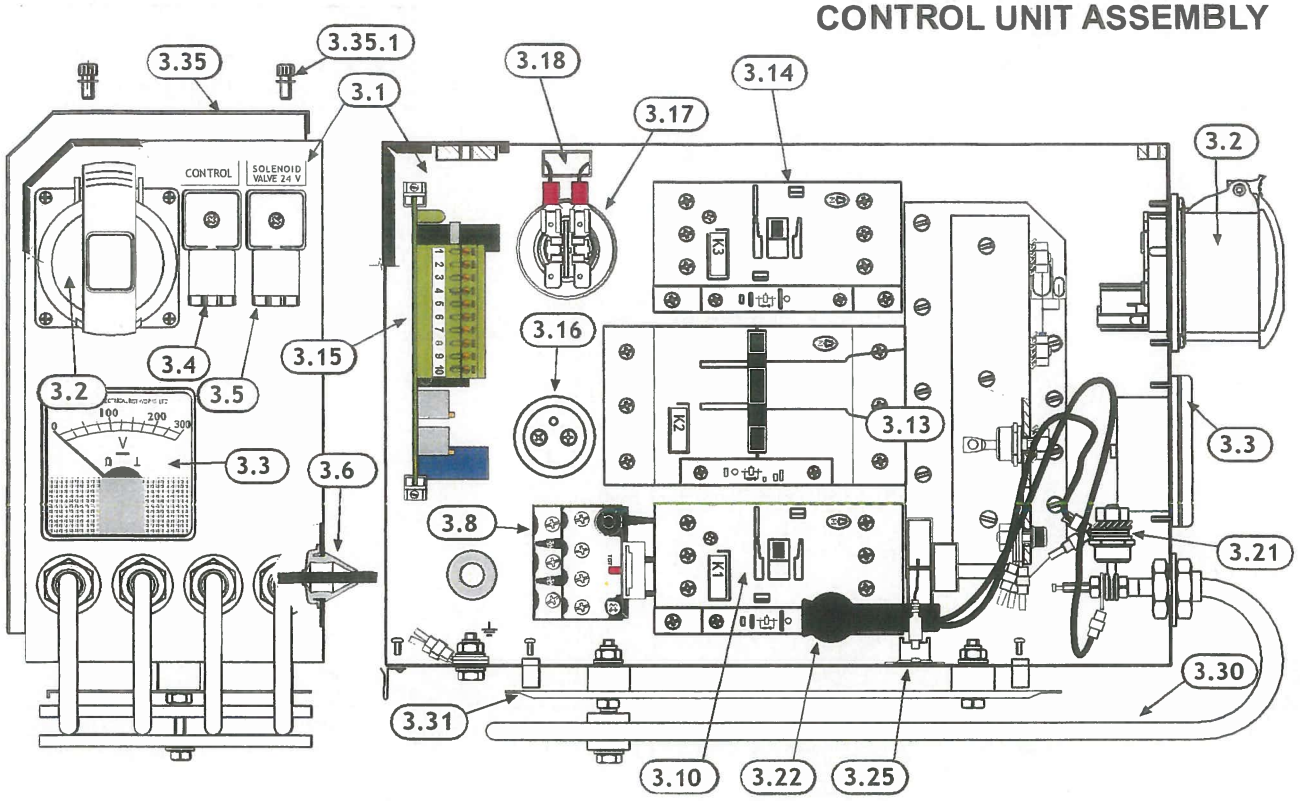
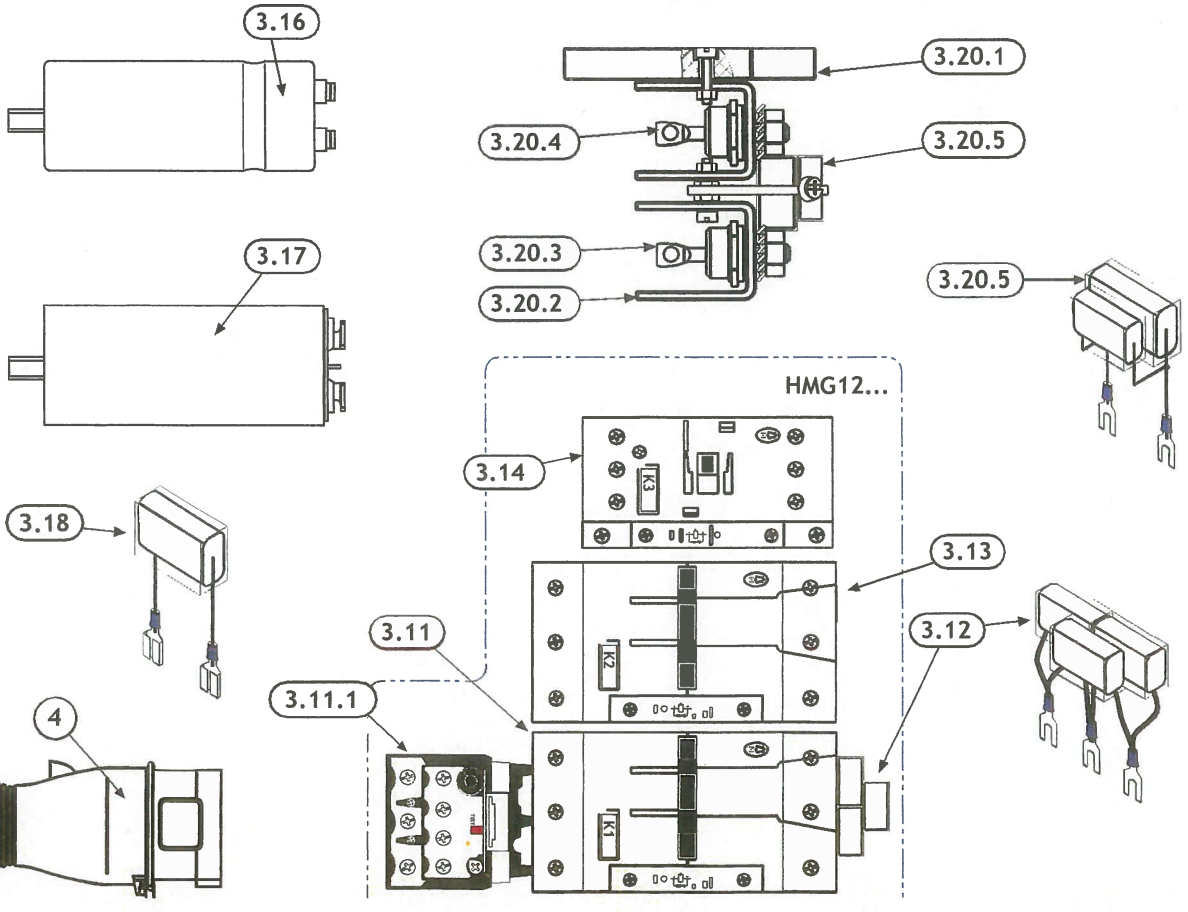
HMG12kW 220VDC-57

CONTROL UNIT ASSEMBLY





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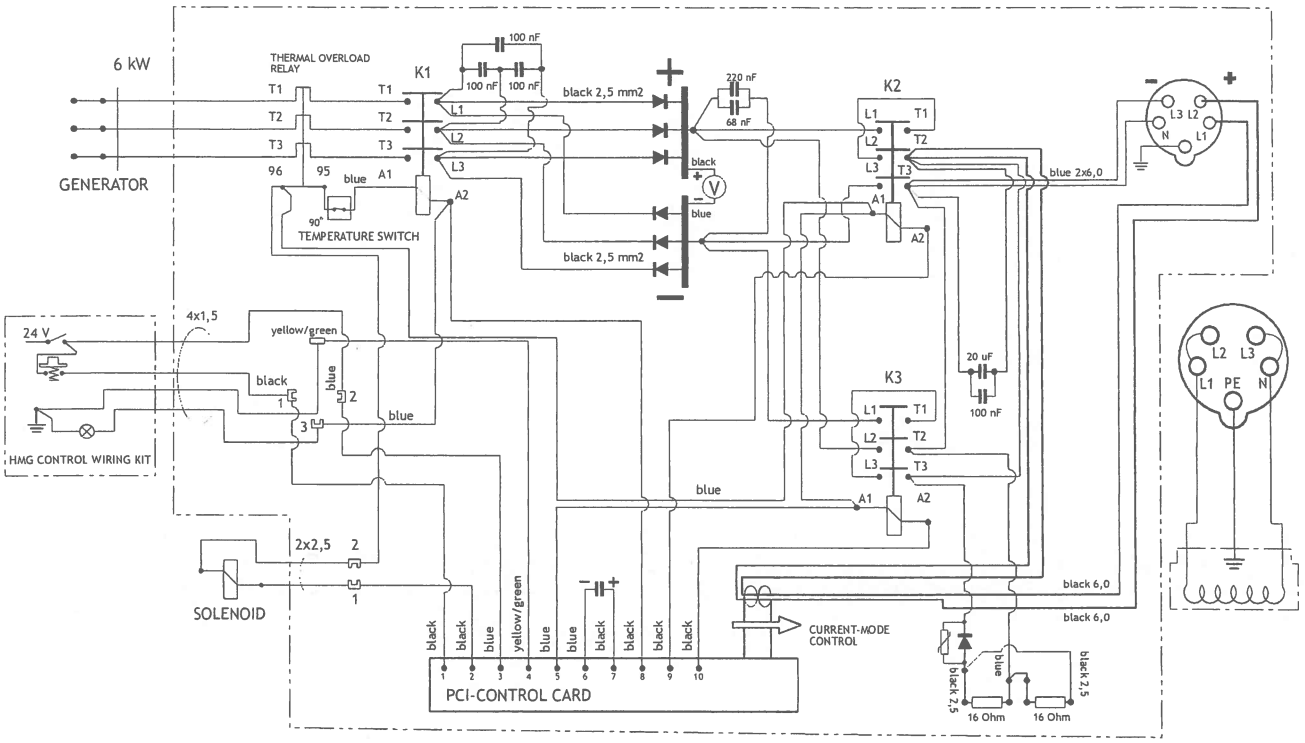
HYDRAULIC MAGNET GENERATOR HMG

HMG12kW 220VDC-57

CONTROL UNIT



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HYDRAULIC MAGNET GENERATOR HMG
HMG12kW 220VDC-57

CONTROL UNIT

No	STOCK NUMBER	DESIGNATION	DETAILS	QUANTITY
3	D120105180	CONTROL UNIT	12 kW	1
3.1	0309010330	UNIT ENCLOSURE, COMPLETE	HMG 12	
3.1.1	0309010318	COMPONENT CHASSIS, COMPLETE		1
		GASKET		1
3.1.2	0309015778	MOUNTING BRACKET	HMG 12	1
3.1.4	0300001826	COVER	HMG 12-20	1
3.1.4.1		ALLEN SCREW M6x10+WIDE WASHER + GASKET		2+2+2
	0300001825	BASE	HMG 12-20	1
	0300001827	THERMAL SHIELD	HMG 12-20	1
3.2	4805859000	SOCKET 16A	3P+N+E	1
3.2.1	4806183020	SOCKET SHIELD		1
3.3	4405172000	VOLTAGE METER	300 VDC	1
3.4	4805961000	CONTROL VOLTAGE CONNECTOR, COMPLETE	Hirschmann	1
3.5	4805961000	SOLENOID VALVE CONNECTOR, COMPLETE	Hirschmann	1
	4805962000	CONNECTOR SEAL	Hirschmann	2
	4805963000	CONNECTOR BODY 4 POLE	Hirschmann	2
	4805964000	CONNECTOR BODY SEAL	Hirschmann	2
3.6	4806087000	CABLE GROMMET	TET 10-14	1
3.10	4405159000	THERMAL OVERLOAD RELAY	Z5-100	1
3.11	4405140000	CONTACTOR	K1 (DIL M40)	1
3.9	4405151000	AUXILIARY CONTACTS		1
3.12	0300021500	CAPACITOR BLOCK		1
3.13	4405146000	CONTACTOR	K2 (DIL M80)	1
3.14	4405138000	CONTACTOR	K3 (DIL M32)	1
3.15	0309010318	PCI-CONTROL CARD		1
		INSTALLATION KIT		1
	4605843000	PCB RAIL	14x16	1
3.16	4605803000	CAPACITOR	10000 uF 63 V	1
3.17	4605768000	CAPACITOR	20 uF 450 V	1
3.18	0300021510	CAPACITOR		1
3.20	0300001079	RECTIFIER UNIT		
3.20.1	0300001414	CHASSIS PLATE	PE	1
3.20.2	0300001079	RECTIFIER / COOLER BAR	AL	2
3.20.3	4605651000	DIODE -70A UNF ¼	70 HFR 120	3
3.20.4	4605648000	DIODE +70A UNF ¼	70 HF 120	3
3.20.5	0300021490	CAPACITOR BLOCK		1
3.21	4605660000	DIODE + 85A UNF ¼	85 HF 120	1
3.22	V100105560	DIODE PROTECTION	HMG	1
	4605661000	DIODE PROTECTION VARISTOR	300 VAC	1
3.25	4405162000	TEMPERATURE SWITCH	90 °C	1
3.30	V100105100	HMG-RESISTOR R16	16 Ohm	2
3.31	0300001880	HEAT REFLECTIVE SHIELD	12-20kW	1
3.32	0300001317	RESISTOR HOLDER	HMG 6-20	2
		FASTENERS		1 kit
		WIRING KIT	NOT AVAIL.	1 kit
4	4805859000	PLUG	3P+N+E	1

MAGNET OPERATION INSTRUCTIONS

DON'T:

- ***NEVER ATTEMPT TO OPERATE THE MA GNET UNTIL YOU READ AND UNDERSTAND THE MAINTENANCE INSTRUCTION MANUAL.***

- ***NEVER STAND NEAR LOAD.*** Any load can potentially drop unexpectedly due to power loss or some other system failure.

- ***NEVER LIFT LOADS OVER PEOPLE OR IN CLOSE PROXIMITY TO PEOPLE.***

- ***DO NOT USE THE MAGNET AS A BATTERING RAM.*** Remember, magnets are made for lifting only. They'll last for years when treated properly. Using a magnet as a battering ram may cause damage to the coils or insulation.

- ***DO NOT USE THE MAGNET AS A DROP BALL.*** If you want to break up big pieces of scrap or slag, use a drop ball. Careless use of a magnet means unnecessary repair bills, lost production and lost time.

- ***DO NOT GREASE THE CHAIN.*** If there are abrasive particles in the air, such as foundry sand or slag dust, the grease will cause it to adhere to it. This dust will then act like a grinding compound and soon wear away at the chain material. If there is no way around greasing the chain, use graphite grease only, just grease lightly and wipe of any excess.

- ***NEVER PERFORM MAINTENANCE ON ANY PORTION OF THE MAGNET SYSTEM WITHOUT INSURING THAT POWER HAS BEEN COMPLETELY TURNED OFF AND THE MAGNET HAS BEEN PROPERLY DISCHARGED.***

DO:

√ Keep the power "OFF "until magnet is in contact with the pile. Small pieces won't jump up and prevent the magnet from getting full load. This also helps to prevent the magnet from overheating. Remember, "a hot magnet will not lift as much and won't last as long".

√ Work on deep piles. Let the magnet settle on the deepest part of the pile. Then, switch the magnet "ON". To let the magnet get a good bite, leave the power on for approximately 3 s for magnets up to a 50 A, 5 s for magnets up to 100 A and 8 s from magnets larger than 100 A.

√ Make big piles. When you are almost done cleaning up your piles, use the magnet to "sweep up" the smaller piles that have been left, into one big pile. A good magnet operator will get the largest load possible on every lift.

√ Set the magnet down easy. Set your magnet down gently and you will save money on repairs, parts and time. Our magnets are built to withstand the gaff but don't handle them carelessly.

√ Keep the bolts tight. Check your bolt tightness periodically. Bolts can become stretched, allowing the center pole shoe to come away from the face of magnet core. This will cause reduced lift and a dangerous situation. The bolts can snap allowing the center pole shoe to fall off

√ Keep the magnet dry. When you are through with the magnet, store the magnet where it is dry. Leave it off the ground, on the pile of scrap, a pile of tires or on a pallet. Letting it cool off on the ground may cause it to absorb moisture. NEVER cool a magnet with water. Rapid cooling may cause the steel section or welds to crack.

√ Watch the magnet temperature Remember to monitor your duty cycle and voltage. If you are exceeding the recommended duty cycle of the design or voltage for the unit, the magnet will overheat. When handling hot slabs or ingots, watch the temperature carefully. If it gets too hot, switch to a spare magnet to finish the job. *DO NOT LEAVE THE POWER ON WHEN THE MAGNET IS NOT IN USE*

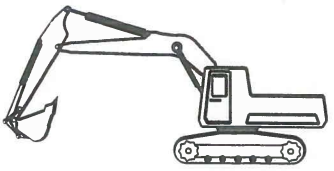
Gensco Magnet Maintenance

For Optimal Magnet Performance

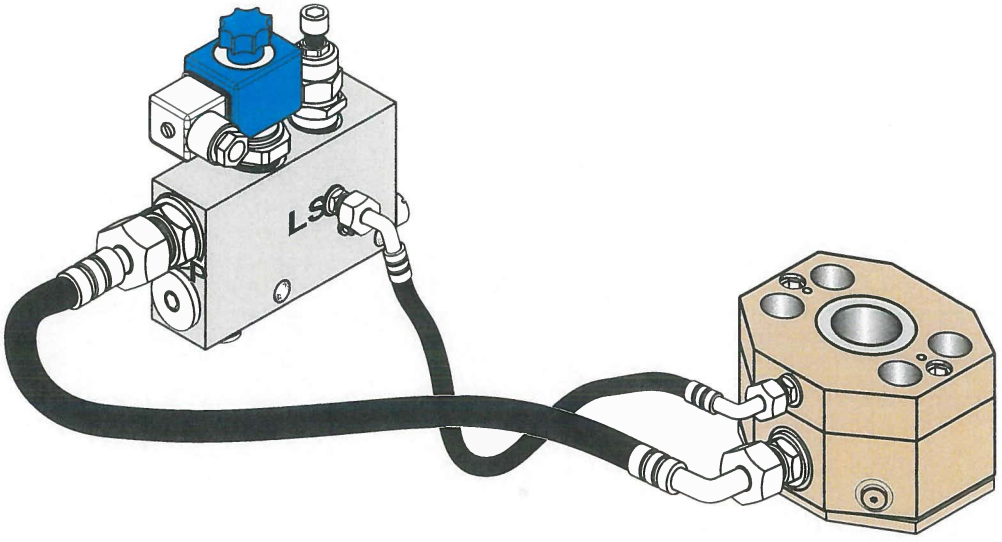
- Operating within specific duty cycle range
- Turn off magnets when not in use
- Use magnets only for their intended purpose
- Avoid lifting very hot material unless magnet is designed for it
- DO NOT exceed recommended voltages
- Inspect for shorted or grounded coils
- Rotate magnets with spares if possible
- Repair cracked casings or damage connectors
- Repair or replace faulty controllers
- Don't use the magnet as a drop ball or wrecking ball
- Store magnets off the ground (not in a puddle)

What causes scrap magnets to fail?

* HEAT
  - Excessive Duty Cycle
  - External Heat
  - Exceeded Voltages
  - Shorted or Grounded Coils
* System failures
* Moisture
* Abuse



DYNASET PRIORITY VALVE
PV-SAE 3/4" - 1 1/4"



DYNASET PRIORITY VALVES OF **P- SAE SERIES** ARE ESPECIALLY DESIGNED TO ENABLE EASY AND RELIABLE INSTALLATION OF DYNASET HYDRAULIC GENERATOR TO A HYDRAULIC SYSTEM OF ANY TYPE.

DYNASET PRIORITY VALVE ENABLES TO OPERATE YOUR DYNASET-UNIT SIMULTANEOUSLY WITH OTHER HYDRAULIC EXECUTORS.

DYNASET PRIORITY VALVE ENSURES THE PRIORISED AND NON-FLUCTUATING HYDRAULIC FLUID FLOW TO YOUR DYNASET-UNIT.

DYNASET PRIORITY VALVE IS DESIGNED TO OPERATE TOGETHER WITH HYDRAULIC PUMP'S CONTROL IN HYDRAULIC SYSTEM OF ANY TYPE.

DYNASET PV-SAE priority valve includes following components:

1.
Sandwich-mounted **PRESSURE COMPENSATOR (PC-SAE)** with SAE-flange specification;
Pressure compensator includes one seal flange (1.20) as standard.

2.
LS-VALVE

2.2
Solenoid valve 12/24V;

2.3
Flow limiting valve.

2.4
Pressure relief valve.

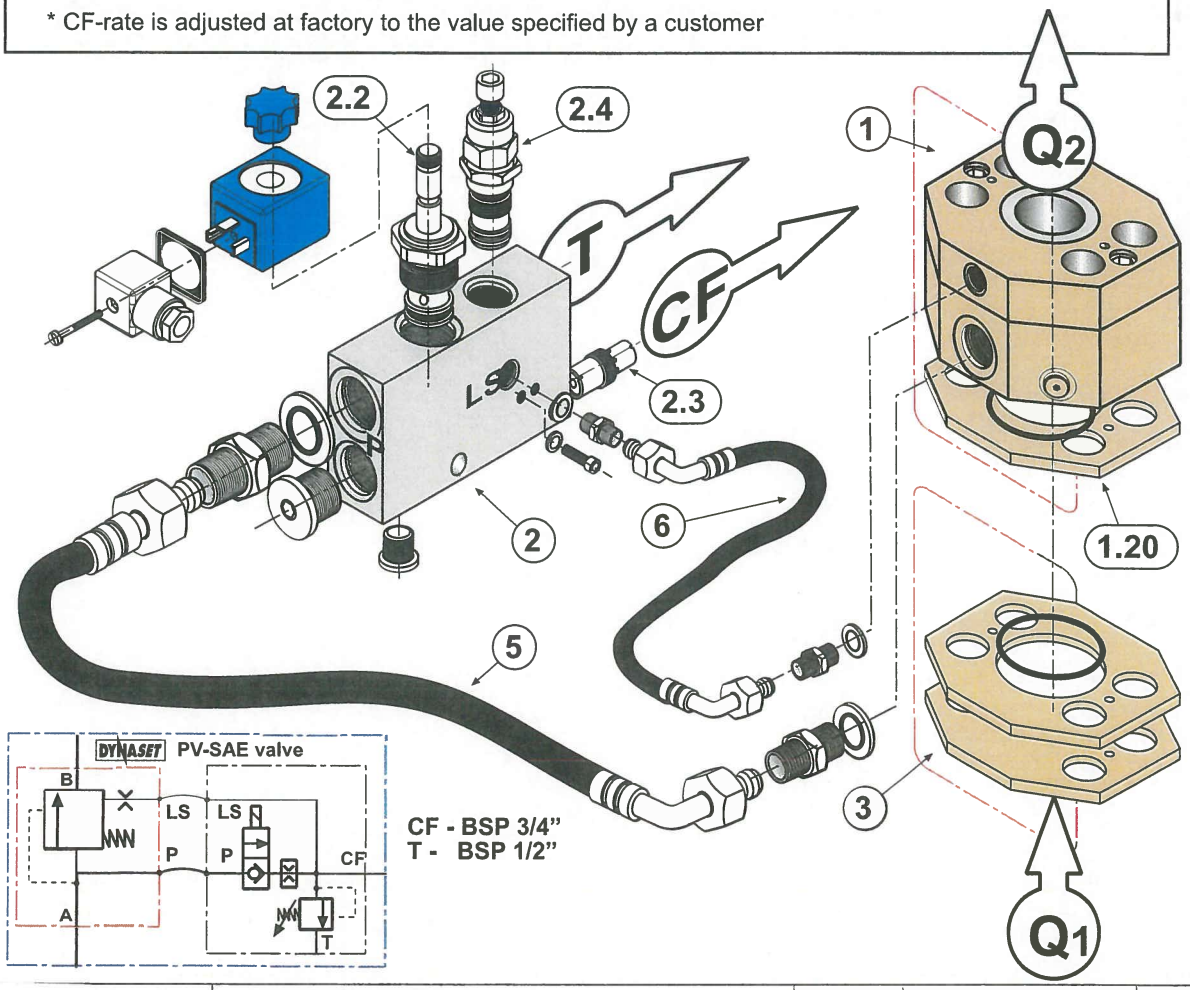
3.
AN OPTIONAL height adjustment kit.

5-6.
HYDRAULIC HOSES.

CONSTRUCTION I

VALVE MODEL	PC-SAE size	LSV model	p max bar	Q CF, max * l/min
PV-SAE 3/4-40-xx lpm-12/24 V	**3/4 "**	**LSV 40**	**350**	**35**
PV-SAE 3/4-60-xx lpm-12/24 V	**3/4 "**	**LSV 60**	**350**	**55**
PV-SAE 1-40-xx lpm-12/24 V	**1 "**	**LSV 40**	**350**	**35**
PV-SAE 1-60-xx lpm - 12/24 V	**1 "**	**LSV 60**	**350**	**55**
PV-SAE 1 1/4-40-xx lpm -12/24 V	**1 1/4"**	**LSV 40**	**350**	**35**
PV-SAE 1 1/4 -60-xxx lpm -12/24 V	**1 1/4"**	**LSV 60**	**350**	**55**

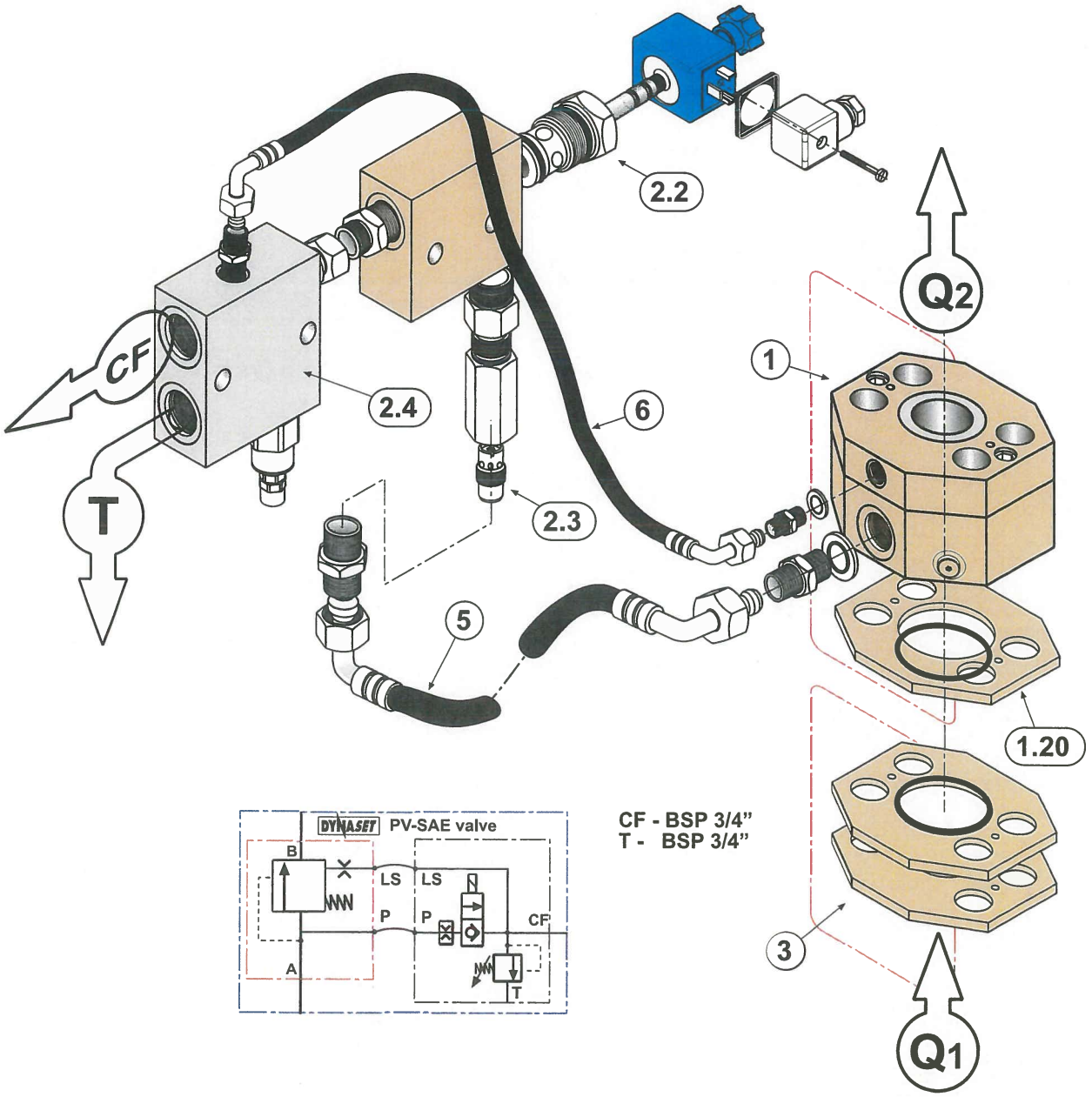
* CF-rate is adjusted at factory to the value specified by a customer



CONSTRUCTION II

VALVE MODEL	PC-SAE size	LSV model	P max bar	Q CF, max * l/min
PV-SAE 3/4-95-xxx lpm-12/24 V	3/4 "	LSV 95	350	85
PV-SAE 1-95-xxx lpm - 12/24 V	1 "	LSV 95	350	85
PV-SAE1 1/4 -95-xxx lpm-12/24 V	1 1/4"	LSV 95	350	85

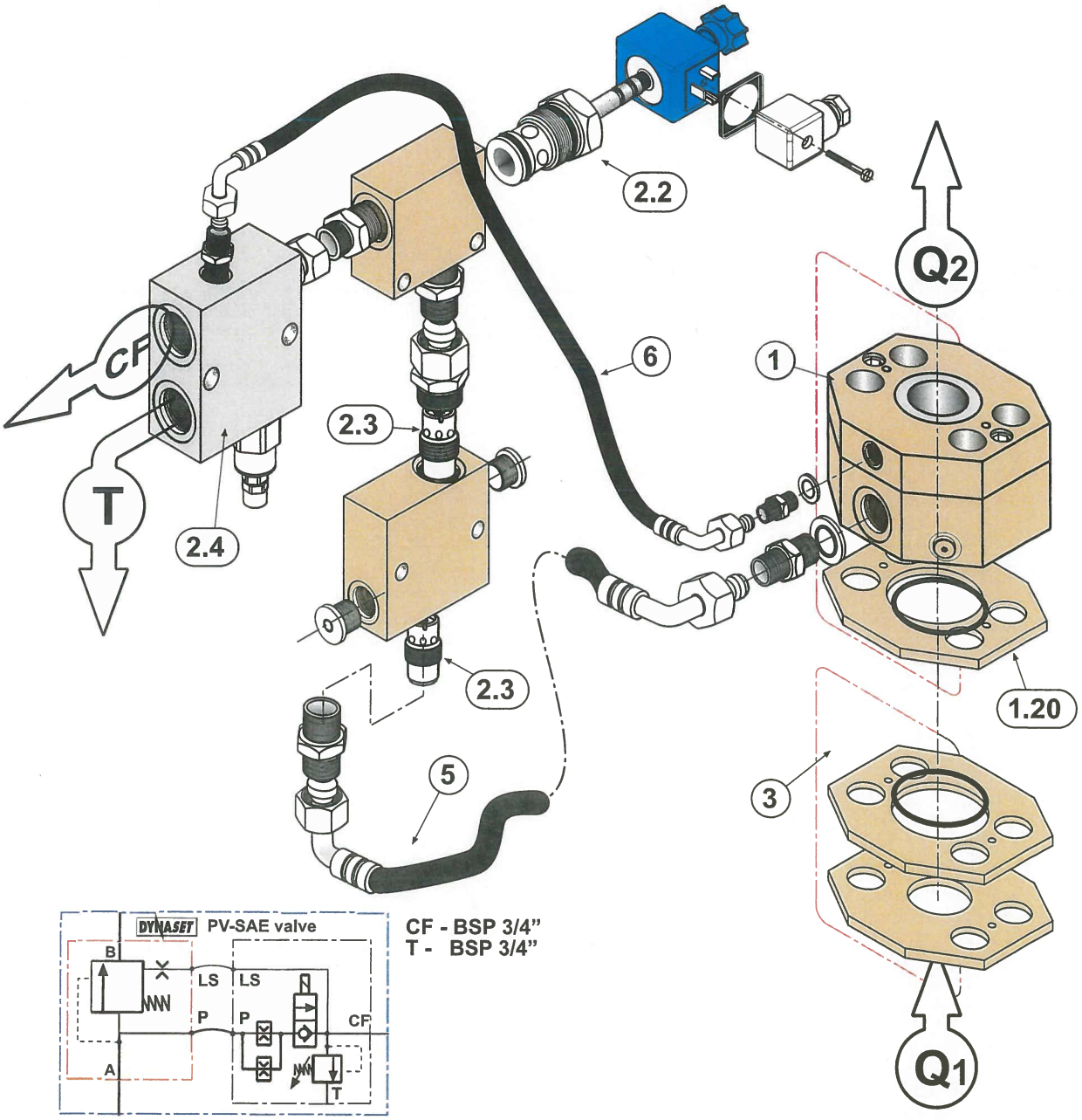
* CF-rate is adjusted at factory to the value specified by a customer



CONSTRUCTION III

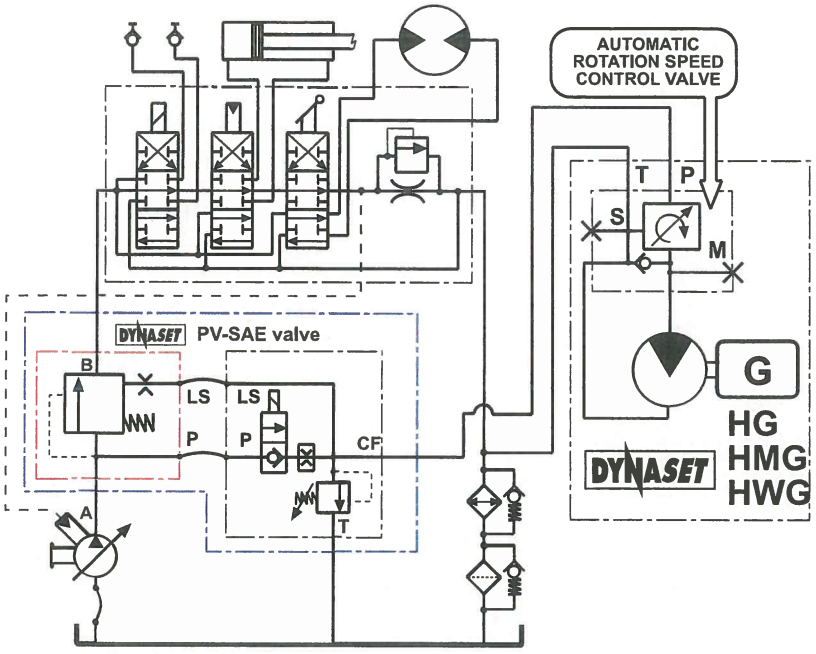
VALVE MODEL	PC-SAE size	LSV model	P max bar	Q CF, max * l/min
PV-SAE 3/4-150-xxx lpm-12/24 V	3/4 "	LSV 150	350	140
PV-SAE 1-150-xxx lpm - 12/24 V	1 "	LSV 150	350	140
PV-SAE 1 1/4 -150-xxx lpm -12/24V	1 1/4"	LSV 150	350	140

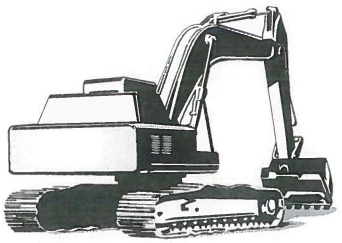
* CF-rate is adjusted at factory to the value specified by a customer



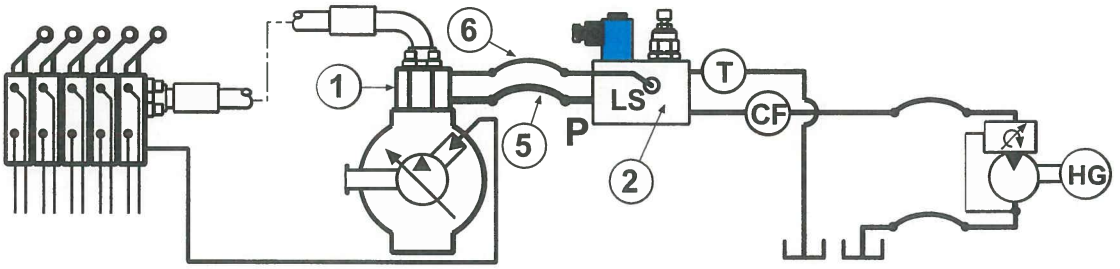
CF - BSP 3/4"
T - BSP 3/4"

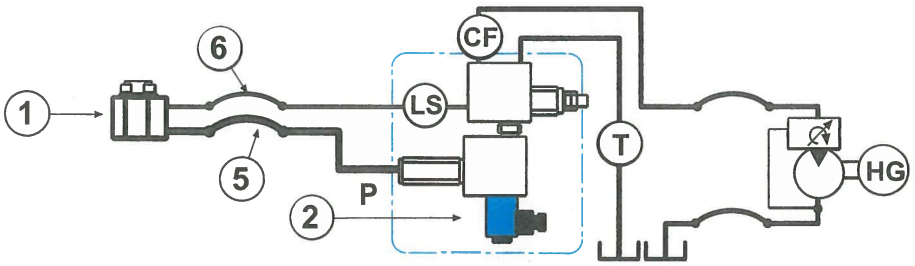
1. OPEN CENTRE HYDRAULIC SYSTEM WITH VARIABLE DISPLACEMENT PUMP



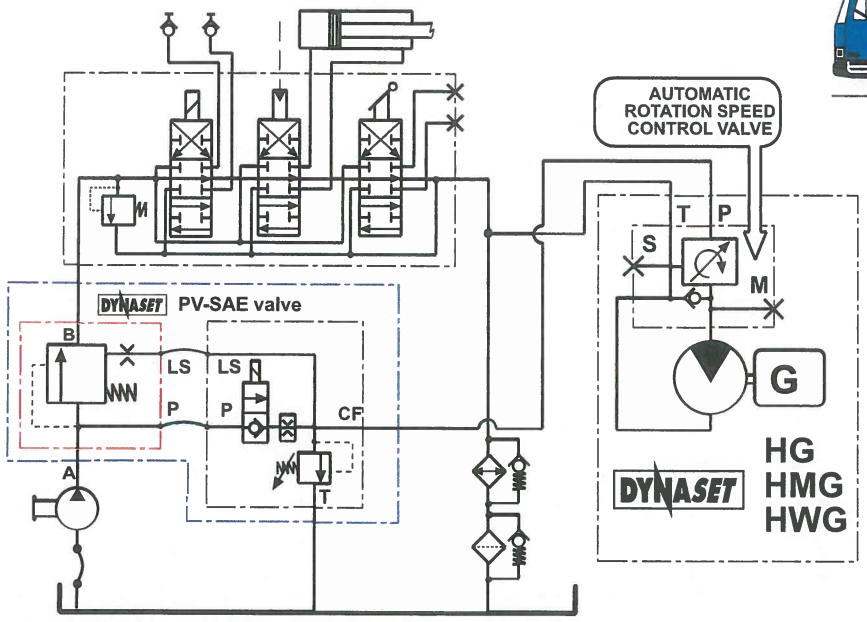


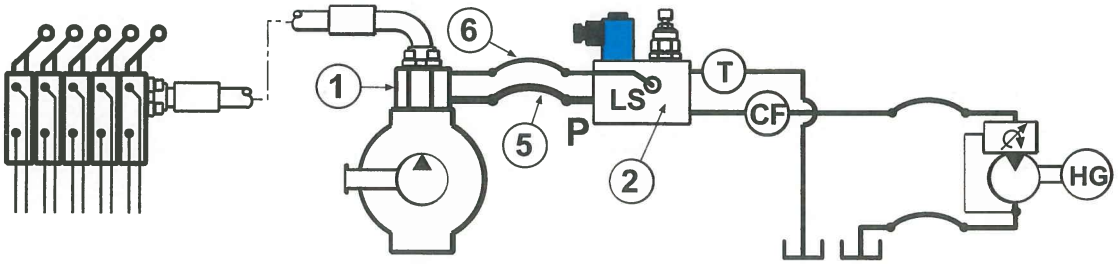
PV-SAE priority valve is designed for the installation to a main pressure line (ref. to pages 5 - 7).
Pre-adjusted, independent from other functions and priorised hydraulic flow for DYNASET-unit comes from the solenoid valve.

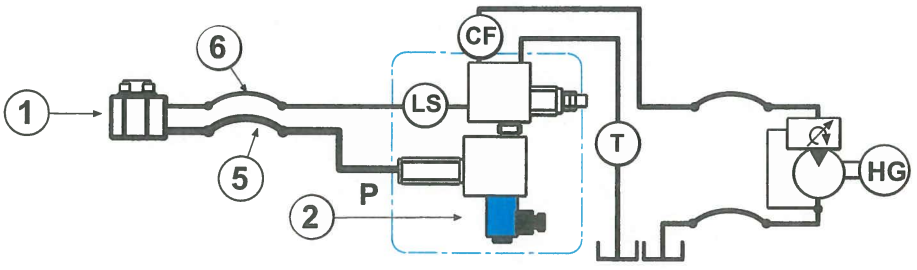




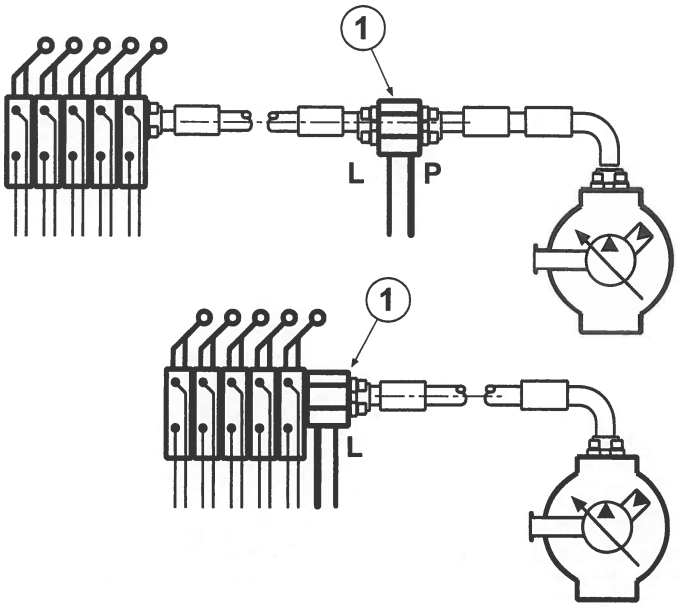
2. HYDRAULIC SYSTEM WITH CONSTANT DISPLACEMENT PUMP



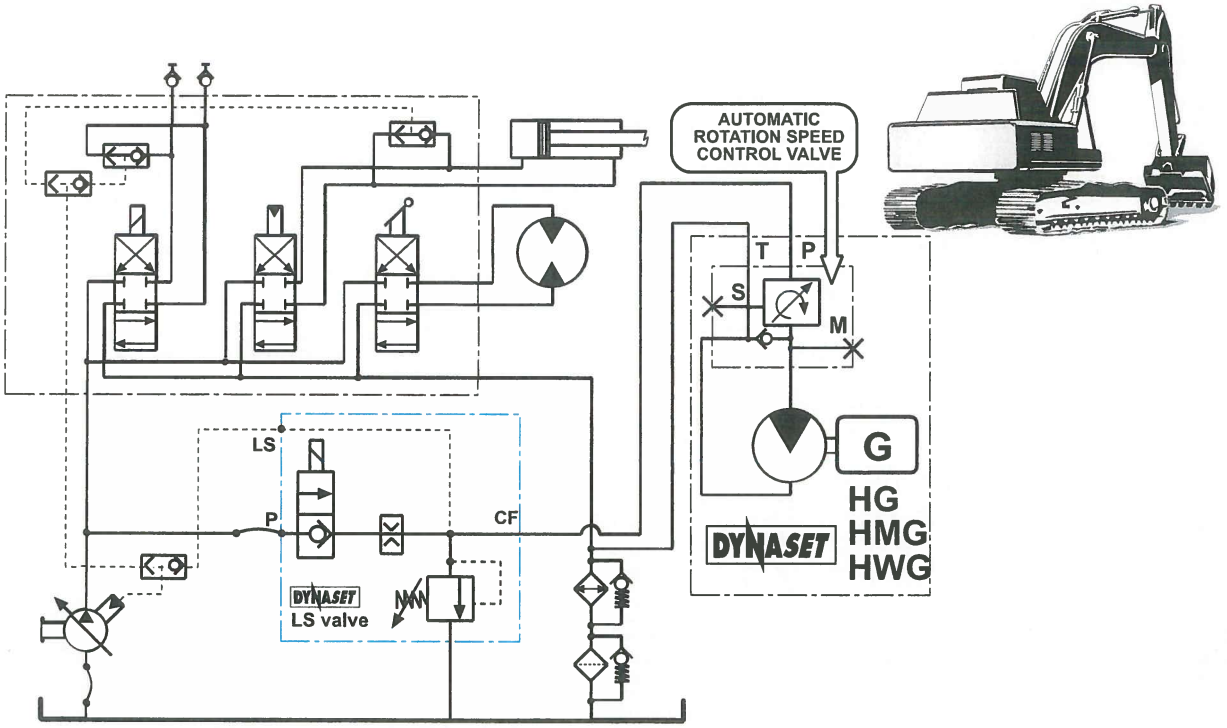




OPTIONS FOR AN INSTALLATION OF PRESSURE COMPENSATOR TO THE OPEN CENTRE HYDRAULIC SYSTEMS

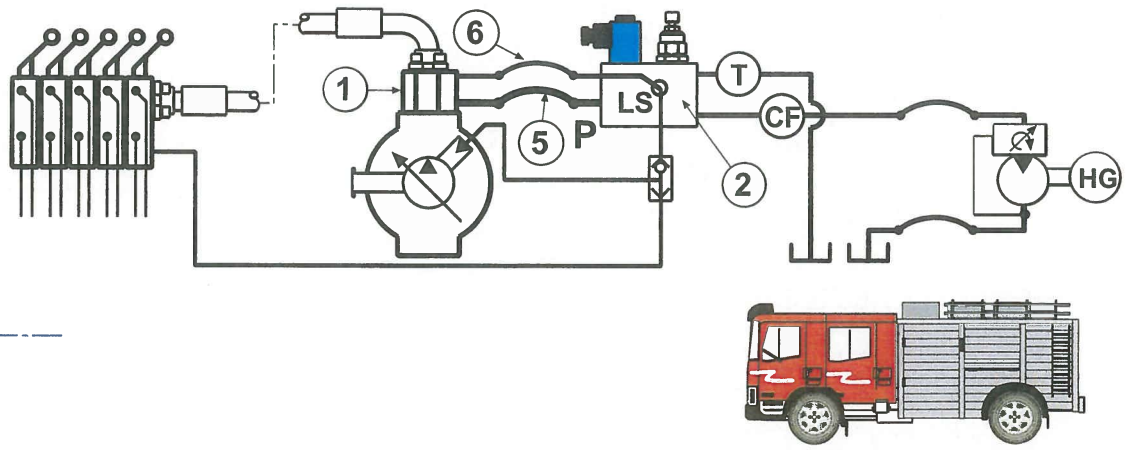


3. CLOSED CENTRE HYDRAULIC SYSTEM WITH VARIABLE DISPLACEMENT PUMP

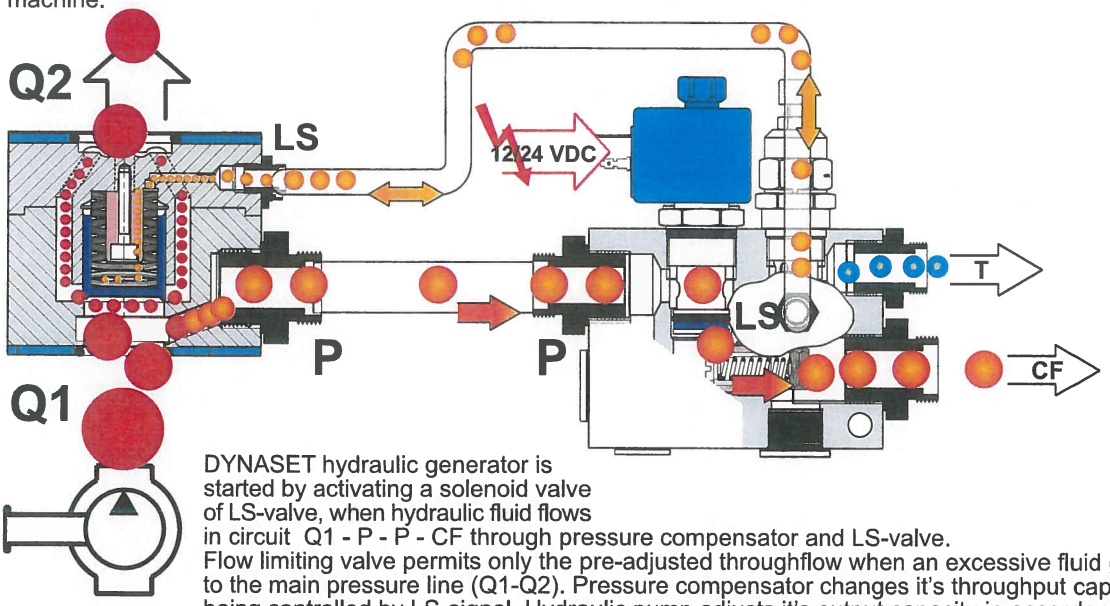


It is recommended to install DYNASET hydraulic generator to a closed centre hydraulic system of an excavator (see diagram above) without pressure compensator, using only a LS-valve of required capacity. Installed to a closed centre hydraulic system of a modern excavator, pressure compensator may cause certain deceleration of machine's movements and functions when the priorised flow to the generator is on - pls. consult DYNASET's experts !

For all other carriers with closed centre hydraulics (fire trucks etc.) an installation of DYNASET hydraulic generator can be made using a complete PV SAE valve .



When an excavator's engine is on without any executor being used, a hydraulic pump levels to the idle mode, producing the flow conditioned by the hydraulic system of a machine.

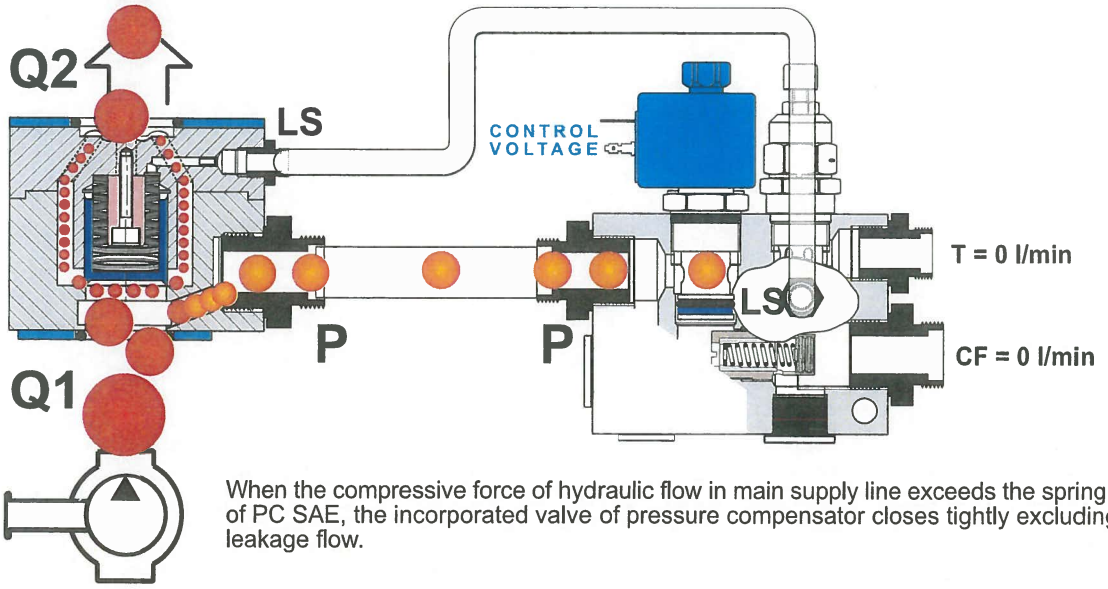


DYNASET hydraulic generator is started by activating a solenoid valve of LS-valve, when hydraulic fluid flows in circuit Q1 - P - P - CF through pressure compensator and LS-valve.
Flow limiting valve permits only the pre-adjusted throughflow when an excessive fluid goes to the main pressure line (Q1-Q2). Pressure compensator changes it's throughput capacity being controlled by LS-signal. Hydraulic pump adjusts it's output capacity in accordance with the mentioned LS-signal as well as with the LS-signal of the machine's hydraulic system.

Pressure relief valve of LS-valve protects the hydraulic generator against damaging by directing the hydraulic fluid to the tank (T) if pressure rises over the limit.

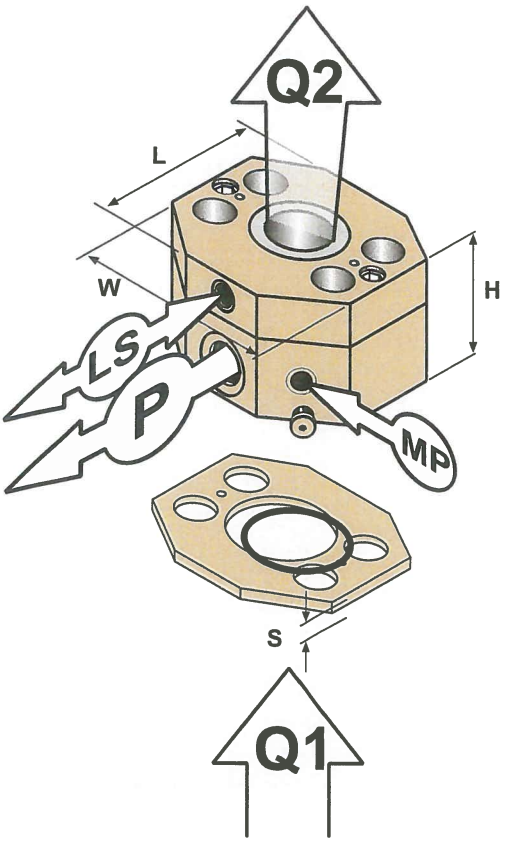
When any other hydraulic operating unit (cylinder, motor, PTO etc.) is being actuated, PC-SAE, having ensured demanded and PRIORISED hydraulic flow to the DYNASET unit (CF), opens main supply line directing requested hydraulic flow for the corresponding function. Operation of a pressure compensator is controlled by a LS-signal according to a current capacity request.

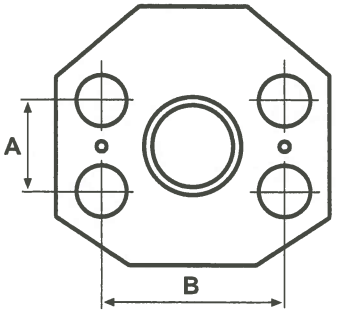
If controlled flow (CF) for DYNASET-unit is not requested, solenoid valve closes corresponding circuit and all the hydraulic flow is at system's disposal.



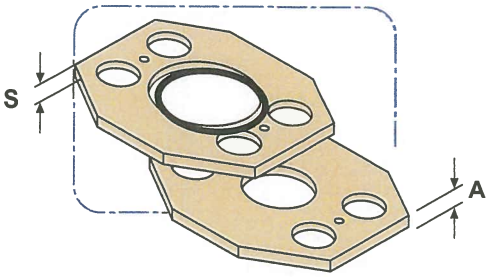
When the compressive force of hydraulic flow in main supply line exceeds the spring force of PC SAE, the incorporated valve of pressure compensator closes tightly excluding leakage flow.

PRESSURE COMPENSATOR DYNASET PC-SAE





		PC-SAE 3/4"	PC-SAE 1"	PC-SAE 1 1/4"
A	mm	23	27,2	31,5
B	mm	49	55,6	63,5
L	mm	68	73	89
W	mm	67,5	82	95
H	mm	63	65	72
P (CF)		BSP 3/4"	BSP 3/4"	BSP 3/4"
LS		BSP 1/8"	BSP 1/8"	BSP 1/8"
MP		BSP 1/4"	BSP 1/4"	BSP 1/4"
SE	mm	3	3	3
AD	mm	6	6	6



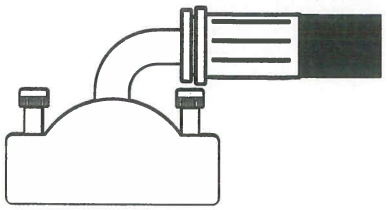
OPTIONS:

1 HEIGHT ADJUSTMENT KIT
SEALING PLATE (SE);
ADAPTER PLATE (AD).

2 BOLTS (4-8 pcs), metric or imperial.

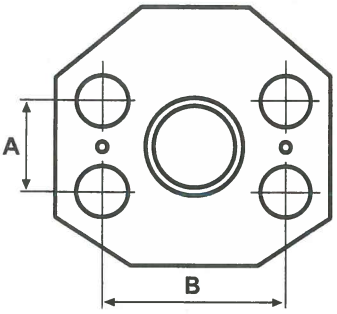
			PC-SAE 3/4"	PC-SAE 1"	PC-SAE 1 1/4"
OPENING PRESSURE		BAR	13,5	14	17,5
MAX. PRESSURE		BAR	350	350	350
MAX. FLOW	Q1 - Q2	L/MIN	200	350	450
MAX. FLOW	Q1 - P	L/MIN	70	100	145
PRESSURE DROP AT MAX. FLOW					
	Q1 - Q2 completely open	BAR	2,9	2,8	3,0
	Q1 - P	BAR	3,0	3,0	3,5
SAE - FLANGE	3000 - 6000 psi		SAE 3/4"	SAE 1"	SAE 1 1/4"
PRESSURE HOSE	LENGTH	mm	800	800	800
	SIZE		R 1/2	R 5/8	R 3/4
CONTROL HOSE	LENGTH	mm	1000	1000	1000
	SIZE		R 1/4	R 1/4	R 1/4

PRESSURE COMPENSATOR DYNASET PC-SAE



Detach the pressure line flange from the hydraulic pump.

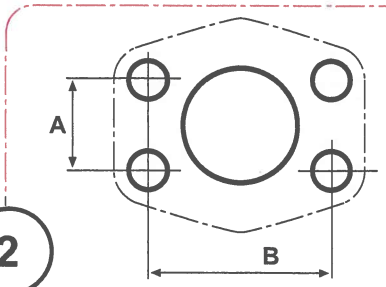
1



Choose an appropriate PC SAE pressure compensator to meet specifications of your machine.

3

A, mm	B, mm	
22,2	47,6	SAE 3000 psi
23,8	50,8	SAE 6000 psi
23	49	PC-SAE 3/4"
26,2	52,4	SAE 3000 psi
27,8	57,2	SAE 6000 psi
27,2	55,6	PC-SAE 1"
30,2	58,7	SAE 3000 psi
31,7	66,7	SAE 6000 psi
31,5	63,5	PC-SAE 1 1/4"



2

Gauge dimensions A and B on the pump's flange.

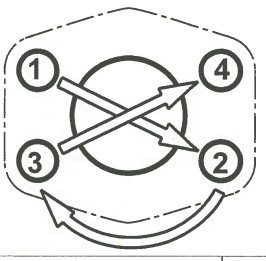
4.

EACH DYNASET PRESSURE COMPENSATOR COVERS TWO SAE-SPECIFICATIONS WITHIN ONE FLANGE SIZE.

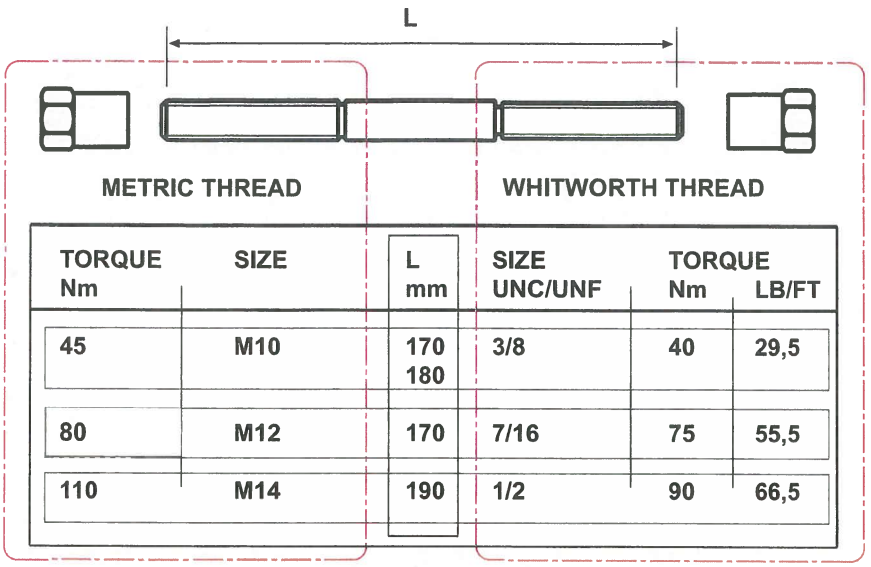
Make an installation of chosen PC-SAE between the pump and pressure line SAE-flange.

NOTE !

When fitting a pressure compensator is ESSENTIAL that the bolts are tightened to the recommended torque value and in the correct sequence. Neglecting this may cause the risk of either the bolts working loose resulting in oil leakage (not tight enough), or damage to and possible shearing of the bolt (over tightened).
The tightening is to be made in two steps according to the sequence sketched below. First tighten all bolts app. to 1/2 of rated torque and then carry out the tightening up to necessary.
Tightening torque values can be found from an engineering hand-book according to the bolt's size, thread type and strength class.
Find referential values on next page.



STUD BOLTS FOR DYNASET PC-SAE

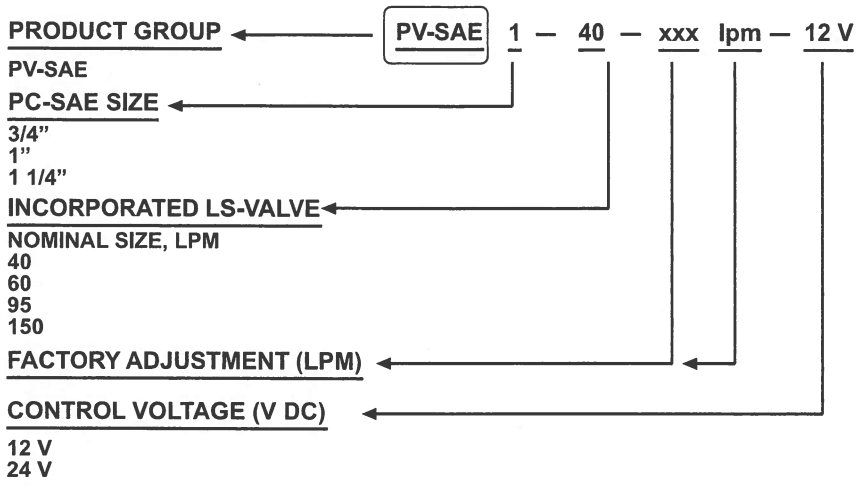


TORQUE Nm	SIZE	L mm	SIZE UNC/UNF	TORQUE Nm	TORQUE LB/FT
45	M10	170 180	3/8	40	29,5
80	M12	170	7/16	75	55,5
110	M14	190	1/2	90	66,5

VALVE MODEL		LSV		PC SAE	
PV-SAE 3/4-40-xx lpm-12 V	9011514-12	LSV 40	07031366-12	3/4“	9010393
PV-SAE 3/4-40-xx lpm-24 V	9011514-24	LSV 40	07031366-24	3/4“	9010393
PV-SAE 3/4-60-xx lpm-12 V	9011515-12	LSV 60	07031365-12	3/4“	9010393
PV-SAE 3/4-60-xx lpm-24 V	9011515-24	LSV 60	07031365-24	3/4“	9010393
PV-SAE 1-40-xx lpm - 12 V	9011516-12	LSV 40	07031366-12	1“	9010406
PV-SAE 1-40-xx lpm - 24 V	9011516-24	LSV 40	07031366-24	1“	9010406
PV-SAE 1-60-xx lpm - 12 V	9011522-12	LSV 60	07031365-12	1“	9010406
PV-SAE 1-60-xx lpm - 24 V	9011522-24	LSV 60	07031365-24	1“	9010406
PV-SAE 1 1/4-40-xx lpm-12V	9011523-12	LSV 40	07031366-12	1 1/4“	9010409
PV-SAE 1 1/4-40-xx lpm-24V	9011523-24	LSV 40	07031366-24	1 1/4“	9010409
PV-SAE 1 1/4-60-xx lpm-12V	9011524-12	LSV 60	07031365-12	1 1/4“	9010409
PV-SAE 1 1/4-60-xx lpm-24V	9011524-24	LSV 60	07031365-24	1 1/4“	9010409
PV-SAE 3/4-95-xx lpm-12V	9011526-12	LSV 95	07031364-12	3/4“	9010393
PV-SAE 3/4-95-xx lpm-24V	9011526-24	LSV 95	07031364-24	3/4“	9010393
PV-SAE 1-95-xx lpm - 12V	9011527-12	LSV 95	07031364-12	1“	9010406
PV-SAE 1-95-xx lpm - 24V	9011527-24	LSV 95	07031364-24	1“	9010406
PV-SAE 1 1/4-95-xx lpm -12V	9011528-12	LSV 95	07031364-12	1 1/4“	9010409
PV-SAE 1 1/4-95-xx lpm -24V	9011528-24	LSV 95	07031364-24	1 1/4“	9010409
PV-SAE 3/4-150-xxx lpm-12V	9011529-12	LSV 150	07031367-12	3/4“	9010393
PV-SAE 3/4-150-xxx lpm-24V	9011529-24	LSV 150	07031367-24	3/4“	9010393
PV-SAE 1-150-xxx lpm-12V	9011530-12	LSV 150	07031367-12	1“	9010406
PV SAE 1-150-xxx lpm-24V	9011530-24	LSV 150	07031367-24	1“	9010406
PV-SAE1 1/4-150-xxx lpm-12V	9011531-12	LSV 150	07031367-12	1 1/4“	9010409
PV-SAE1 1/4-150-xxx lpm-24V	9011531-24	LSV 150	07031367-24	1 1/4“	9010409

HOW TO ORDER:

1. PRESSURE COMPENSATOR is to be chosen according to the main pump's flange size.
2. LS-VALVE is to be chosen according to the required oil flow (CF).
   NOTE ! Flow limiting valve is adjusted at factory to the requested value and can not be re-adjusted !
3. SOLENOID VALVE's COIL is to be chosen according to the on-board voltage of a vehicle (12 or 24 VDC).



PRESSURE COMPENSATOR PC-SAE IS AVAILABLE SEPARATELY:

PC-SAE
- 3/4"
- 1"
- 1 1/4"

HYDRAULIC FLUIDS

Wide range of standard hydraulic fluids can be used with the DYNASET hydraulic equipment. Depending on the operating temperature, following mineral hydraulic oils are recommended:

ISO VG 32S for oil's operation temperature up to 70 °C;
ISO VG 46S for oil's operation temperature up to 80 °C;
ISO VG 68S for oil's operation temperature up to 90 °C.

Synthetic and bio-oils can be used as well if their viscosity characteristics and lubricating efficiency are corresponding to above mineral oils. Automatic transmission fluids and even engine oils can be used, provided that they are allowed to be used in hydraulic system of your carrier machine. To use special hydraulic fluids a with DYNASET equipment, please be kindly requested to contact nearest DYNASET representative for an advice.

SAFETY PRECAUTIONS

The pressure in hydraulic fluid circuit is considerably high. Thereat the technical condition of your equipment should be under constant scrutiny. Especially couplings, valves and hoses should be maintained tight and clean as well as kept under constant observation.
Hydraulic leakages must be rectified immediately to avoid injuries caused by pressure and hot oil blowouts.
Follow all your local safety instructions related to the high pressure hydraulics.
Hydraulic system of a carrier machine should be maintained according to the service program.
In order to exclude possible accidents, it is not allowed to clean or inspect PV SAE valve when hydraulic fluid circuit is pressurised. Prior to any cleaning, inspection and service hydraulic system of your carrier machine must be stopped and all hydraulic fluid circuits dissipated.
Always wear appropriate clothing and safety equipment such as goggles, ear protection and safety shoes at all times when maintaining the PV SAE valve. Beware of machinery parts warmed by hot hydraulic oil.

AN EXTERME CLEANLINESS MUST BE MAINTAINED WHEN CARRYING OUT ANY SERVICE DISSASSEMBLING OR REPAIR OF HRN-TOOL AND HYDRAULIC SYSTEM. THIS IS CRUCIAL TO ENSURE SAFE, RELIABLE AND LONG-LIFE OPERATION OF YOUR EQUIPMENT.

Operators and maintenance personnel must always comply with local safety regulations and precautions in order to close out the possibility of damages and accidents.
All installation and service of both hydraulic and electric equipment must be performed by qualified and experienced personnel only.

MANUFACTURER'S LIMITED WARRANTY

1. Warranty coverage
All hydraulic accessories manufactured by DYNASET OY are subject to the terms and conditions of this limited warranty. Products are warranted to the original purchaser to be free from defects in materials or workmanship. Exclusions from warranty are explained in item 8.

2. Beginning of warranty period
Warranty period begins from the delivery date of the product. Delivery is considered to be done on the date when installation has been accomplished or purchaser has taken the product in use. Product is considered as taken in use at the date when DYNASET OY has delivered the product to purchaser, unless separately agreed otherwise by written agreement.

3. Warranty period
Warranty period is twelve (12) months based on maximum of 2000 hours usage during this time period. In cases where the system is provided complete with certain special components (e.g. drive unit), those components are considered as a subject to their manufacturer's warranty.

4. Warranty procedures
Immediately upon identifying a problem which purchaser believes to be a failure subject to the product's limited warranty, purchaser must contact primary to the seller of the product. Contact must be made as soon as possible, latest thirty (30) days after the problem was identified. Seller and/or manufacturer technical staff determines the nature of the problem primarily by phone or e-mail. Purchaser commits to give necessary information and to perform routine diagnostic procedures in order to determine the nature of the problem and necessary procedures.

5. Warranty repairs
If the product is found to be defective during the warranty period, DYNASET OY will, at its option, either repair the product, author it to be repaired at its authorized workshop or exchange the defective product. If the product must be repaired elsewhere than premises of DYNASET OY or authorized workshop, all costs excluded from this warranty (traveling and waiting hours, daily allowance, traveling expenses and uninstallation/reinstallation costs) will be charged from the purchaser.

If the problem is not covered by this limited warranty, DYNASET OY has the right to charge purchaser of troubleshooting and repairing.

6. Delivery terms of warranty repair
If the product is found possible to be defective under this limited warranty and it needs to be repaired, DYNASET OY gives Warranty Return Number (WRN). Items being returned must be shipped, at the purchaser's cost, adequately packed for shipment, to the DYNASET OY or to other location authored by DYNASET OY.
Shipment documents must contain:
- Purchaser's name and contact information
- Receipt of original purchase
- WRN code
- Problem description

7. Warranty of repaired product
Warranty period of the product repaired under this limited warranty continues to the end of original warranty period.

8. Exclusions from warranty
This warranty shall not apply to:

a. Failures due to normal wear and tear, improper installation, misuse, abuse, negligence, purchaser selection of improper product to intended use, accident, improper filtration of hydraulic oil or intake water or lack of maintenance

b. Cost of maintenance, adjustments, installation or startup

c. Coating, hydraulic oil, quick couplings and interconnection hoses (internal or external to system assemblies)

d. Products altered or modified in a manner not authorized by DYNASET OY in writing

e. Products which have been repaired during warranty period by others than DYNASET OY or its authorized workshop

f. Costs of any other damage or loss, whether direct, indirect, incidental, special or consequential, arising out of the use of, or the inability to use, the product

g. Telephone or other communications expense
h. Product that is used in exceptional conditions, considered to cause excessive wear and tear

i. Faults caused by nature phenomenon's like flood, thunder, etc.