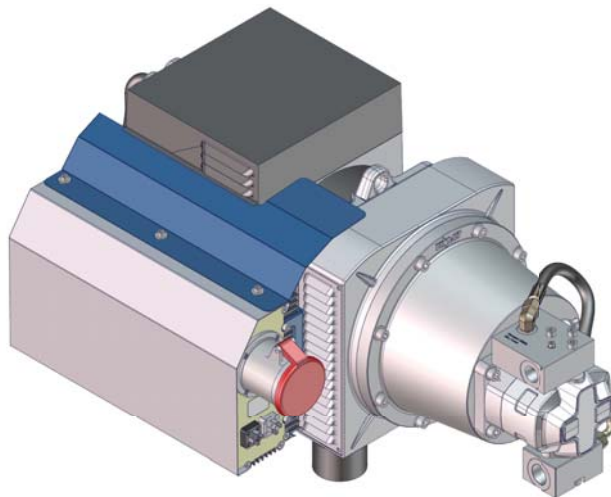
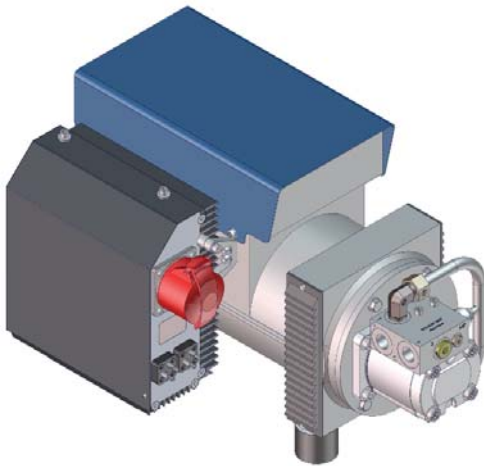


# HMG PRO

## HYDRAULIC MAGNET GENERATORS



<b>HMG PRO 6 kW</b>	
<b>HMG PRO 10 kW</b>	
<b>HMG PRO 15 kW</b>	
<b>HMG PRO 20 kW</b>	

## OPERATING INSTRUCTIONS

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## SAFETY PRECATIONS

Operating voltage of HMG PRO-unit varies 110 - 415V depending on generator type.  
The hydraulic system is usually pressurised up to 210 (420) bar.

In order to avoid damages and accidents operator and maintenance personal must act in compliance with the laws, regulations and recommendations issued by local authorities in electricity and high pressure hydraulics.  
Prior to detaching a magnet from a carrier, unplug it from a generator's socket !

Control unit capacitors can develop discharge voltage over 200VDC even the equipment stands still. Wait at least half an hour (0,5) since capacitors are properly discharged.

**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 should be maintained, tight and clean as well as kept under constant observation. Leaks in the hydraulic system must be fixed immediately to avoid injuries caused by high pressure and oil blowouts.

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



**PACEMAKER MINIMUM  
SAFETY DISTANCE 5m**

Wearers of pacemakers must avoid being magnetic fields in all possible means. The magnetic fields surrounding a permanent magnet on all sides can affect and even destroy sensitive electronic and mechanical measuring equipment. Please observe sufficient distance (greater than 5 m) from equipment of this type (including computers, screens, disks, credit cards, etc.).



**BEWARE  
MAGNETIG FIELD**

When operating or maintaining in the immediate vicinity of DYNASET hydraulic generator unit or accessories, appropriate protective clothing, safety goggles, gloves, ear and eye protection should be worn. Do not touch parts heated by hydraulic oil.

**EXTERME CLEANLINESS MUST BE MAINTAINED WHEN CARRYING OUT ANY DISASSEMBLING OR REPAIR OF DYNASET UNIT AND HYDRAULIC SYSTEM. THIS IS IMPORTANT TO ENSURE SAFE, RELIABLE AND LONG-LIFE OPERATION OF YOUR EQUIPMENT.**

All installation and service of both hydraulic and electric equipment must be performing experienced personnel only.

**NEVER GO UNDER THE LOAD!**

**AVOID STOPPING MAGNET GENERATOR WHILE LOAD IS ATTACHED TO THE LIFT MAGNET!**

## WARNING STICKERS

Dynaset dispatch department includes one (1) warning sticker bag per one (1) main product.  
Product recipient is obligated to fix determinate warning sticker to Dynaset product.  
Attach sticker to visible and appropriate place or close to Dynaset product where it is easily seen.  
Before attaching sticker clean surface with solvent detergent.



READ OPERATING INSTRUCTIONS.



GENERAL CAUTION.  
BEWARE OF PRESSURE AIR.



BEWARE OF HOT SURFACE.



USE EAR PROTECTOR AND  
GLOGGLES

## GENERAL NOTES

DYNASET hydraulic magnet generator of HMG PRO-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 high quality electricity, which is used for energising metal handling magnet. HMG PRO generator is provided with a control unit which allows to use either hydraulic (= HMG PRO-generator in CMG-mode) or alternatively external electric control (= HMG PRO-generator in HMG-mode).

An automatic demagnetisation ensures fast disengagement of a picked and moved metal off from a magnet. DYNASET HMG PRO-generators operate 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 the modern construction. Depending on the type and size, generator might be designed whether as a single bearing unit or as a bi-bearing machine.

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 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 with protection class IP 54 are available by request. AC-auxiliary electricity is optional.

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, several types of voltage regulator are applied.

HMG PRO-units are equipped with a compound voltage regulator:

Compound regulator is connected to the auxiliary winding and maintains the output voltage constant through the entire load range with accuracy of  $\pm 5\%$ . 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.

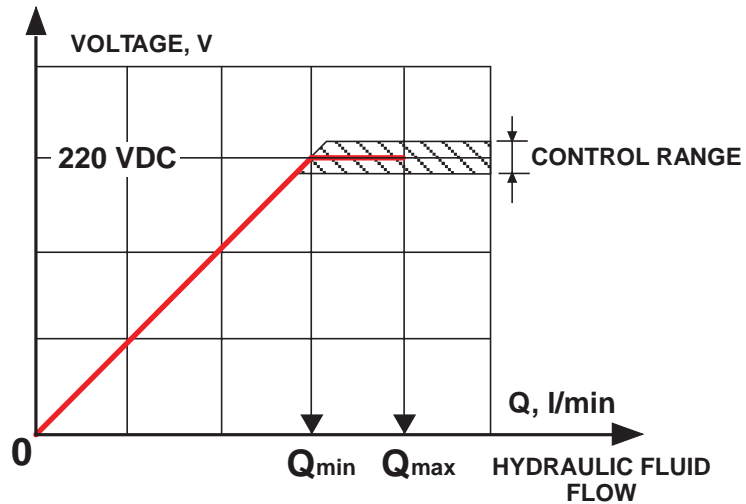
Performance speed of a compound voltage controls is less than 0,1 sec.

**AUTOMATIC VOLTAGE CONTROL**

Automatic frequency control valve is to keep rotation speed constant ( $\pm 5\%$ ) 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.

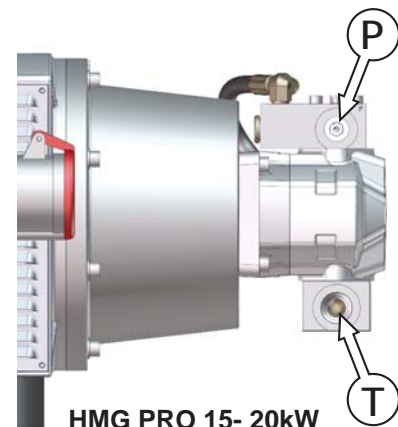
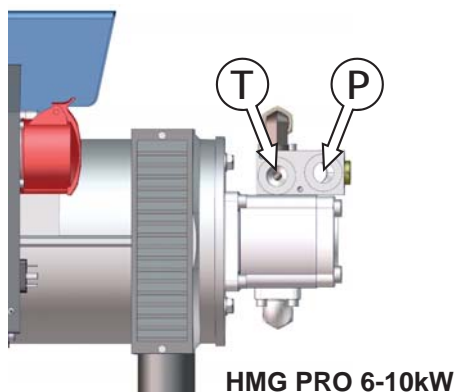
**INSTALLATION**

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 horizontally. 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.

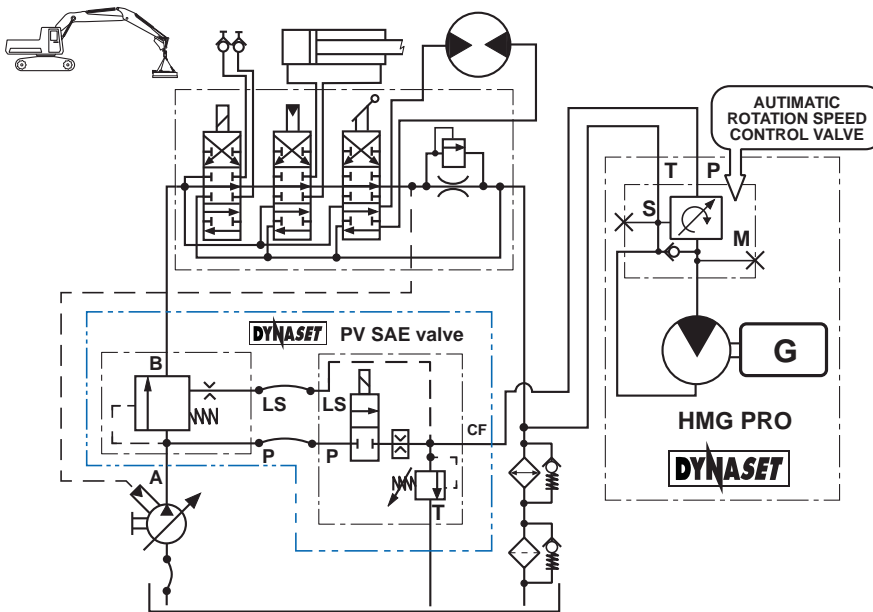
Cooling capacity of hydraulic system, designed for continuous operation (an excavator), is generally sufficient under proper installation of HMG PRO-generator. An additional oil cooler is required when HMG PRO-unit is installed to a truck with and hydraulic hoist.

Ensure that the filtration capacity of a hydraulic system is sufficient.



**INSTALLATION****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.

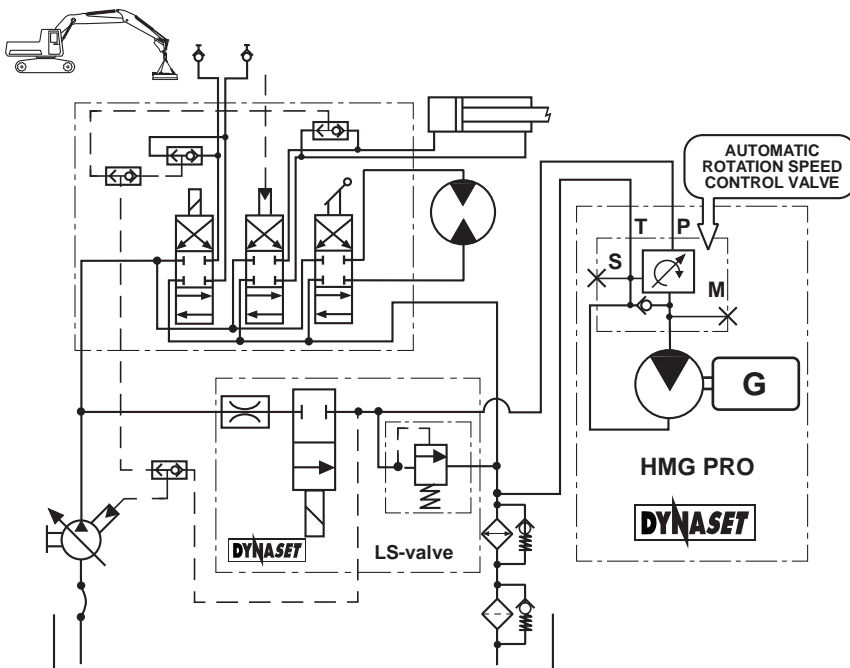
PV SAE priority valve is designed for the installation to main pressure line between SAE-flanges of main hydraulic pump. Pre-adjusted, independent from other functions and prioritised hydraulic flow for DYNASET-unit comes from the solenoid valve. The rest of hydraulic pump's capacity is available for 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 SAE 3/4 - 1 1/4 - 12/24 V**.

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

**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, LSV 60, LSV 95 and LSV 150**  
LS-connection, pressure relief, max. hydraulic flow 40, 60, 95 ja 150 l/min respectively.

DYNASET FLOW LIMITERS to the pressure line:

**VR 40 PK - 1/2**, max. 35 l/min, with pressure compensation;

**VR 95 PK - 3/4**, max. 95 l/min, with pressure compensation.

**VRD 180 PK - 1**, 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.

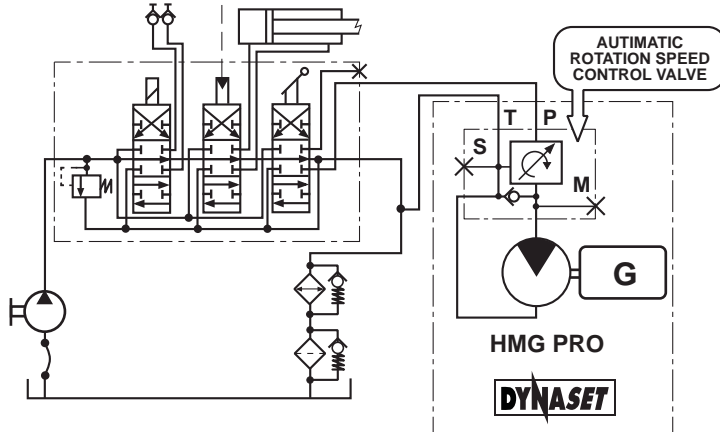
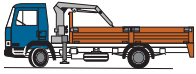
**SV 70 NC - 1/2 - 12 / 24 V** max 70 l/min with LS -connection;

**SV 150 NC - 1 - 12 / 24 V** max 150 l/min with LS -connection.



## INSTALLATION

### 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.

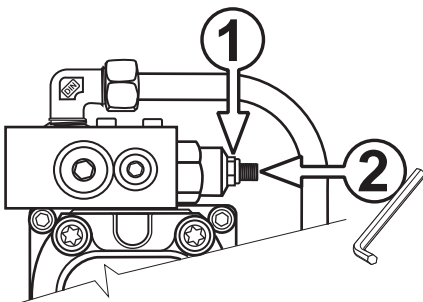
Installation with a standard pressure compensated 3-way valve should be avoided in order to close off potential waving in hydraulic system.

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

### 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 no hydraulic fluid leakages detect..
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 (digital display at control unit's socket side). 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:

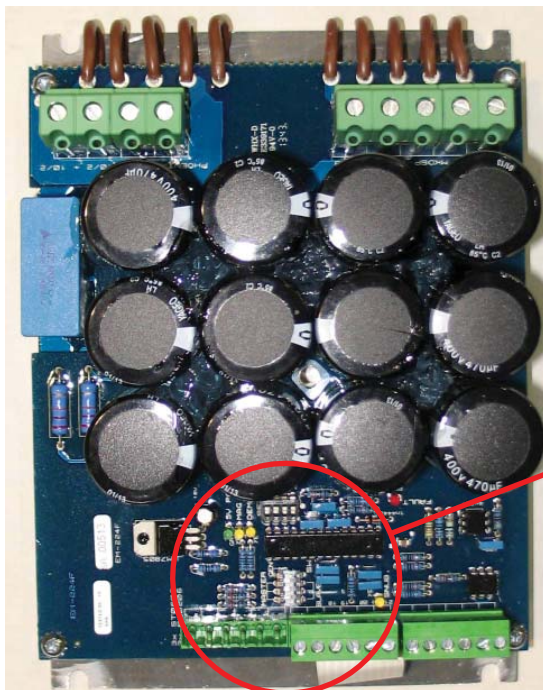
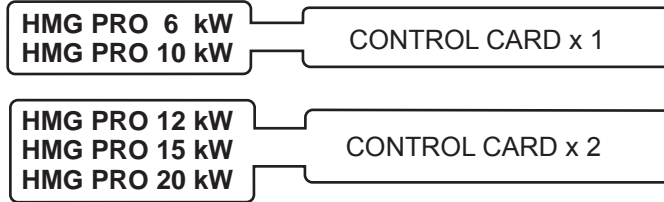
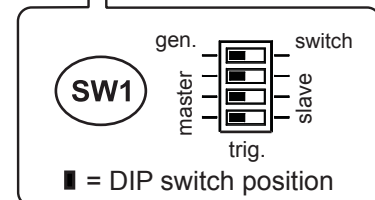
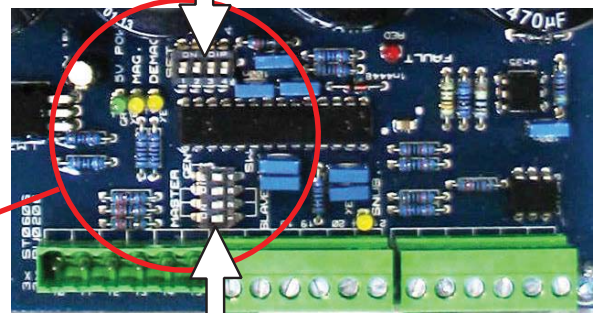
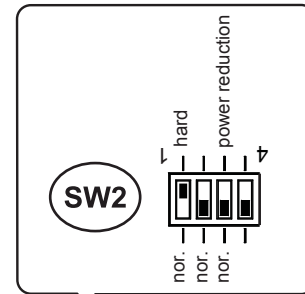


Loosen the locknut (1), make an adjustment (2) with adjusting screw according to the readings of an instrument and then tighten the locknut

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

**INSTALLATION****HMG PRO CONTROL CARD SETTINGS**

Depending on size of a generator, Pro-control unit can be equipped with more than one control card.  
Coil card is used for connection of multiple control cards.

**HMG PRO CONTROL CARD**

Settings related to the control mode are made with DIP-switches SW1 and SW2, both located on a control card(s).

**DIP switch SW1:**

Switches 1 - 3 selects master or slave mode.

Switch 4 selects triggering source: button (external control - HMG) or voltage level (hydraulic control - CMG)

SINGLE CARD / FIRST OF MULTIPLE CARDS - switches 1 - 3 in MASTER-position.

OTHER CARDS - switches 1 - 3 in SLAVE-position.

**DIP switch SW2:**

Switch 1 enables normal and hard demagnetization (giving 30% more efficient, but is slower).

Switch 3 enables power reduction function

SWITCH SW2 SHOULD BE SET TO A SAME POSITION IN ALL CONTROL CARDS

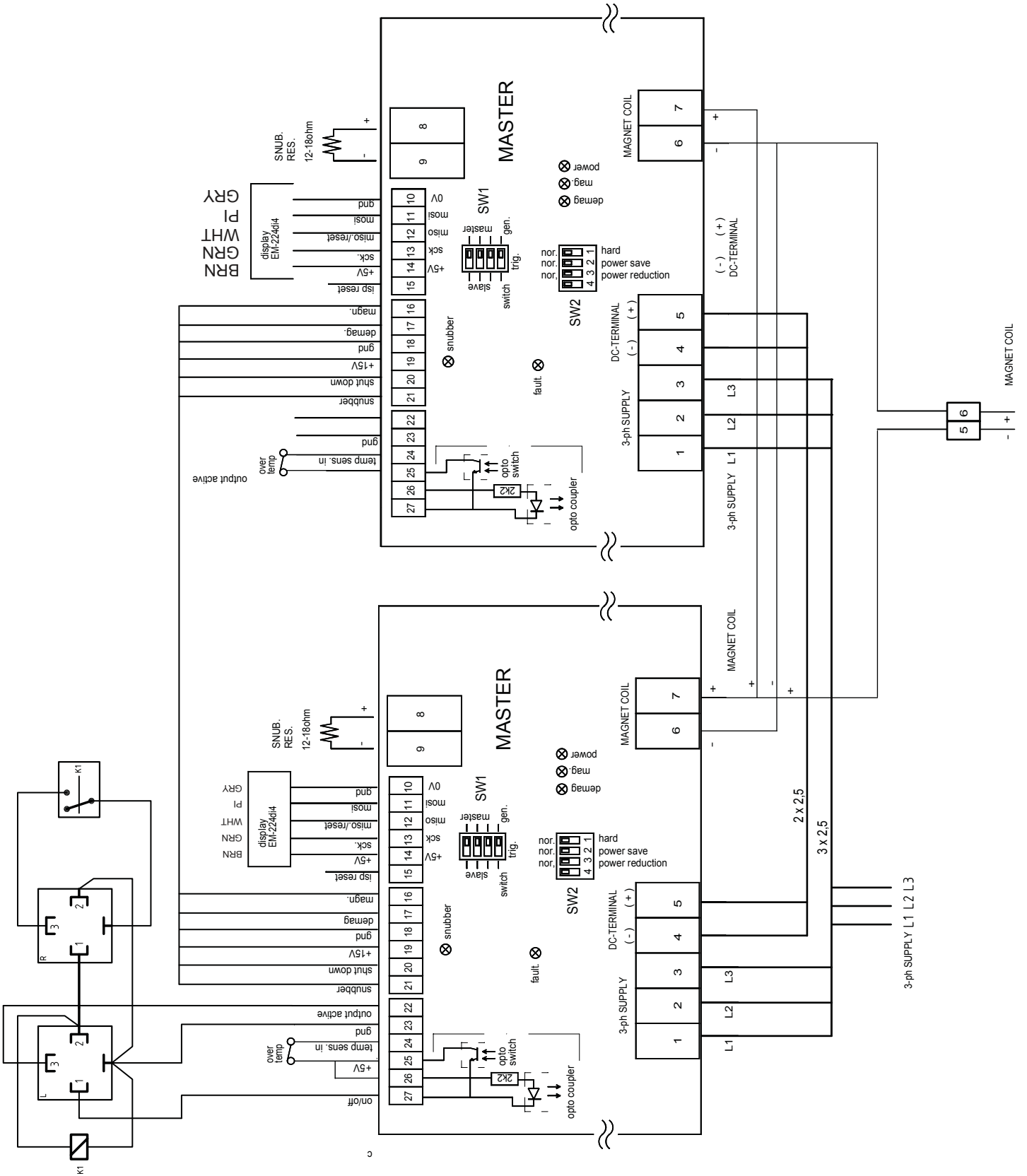
**ATTENTION !**

When HYDRAULIC CONTROL (DIP Switch SW1, switch 4) has been chosen, both hard demagnetization and power reduction functions are kept disabled.



# INSTALLATION

## HMG PRO CONTROL CARD SETTINGS



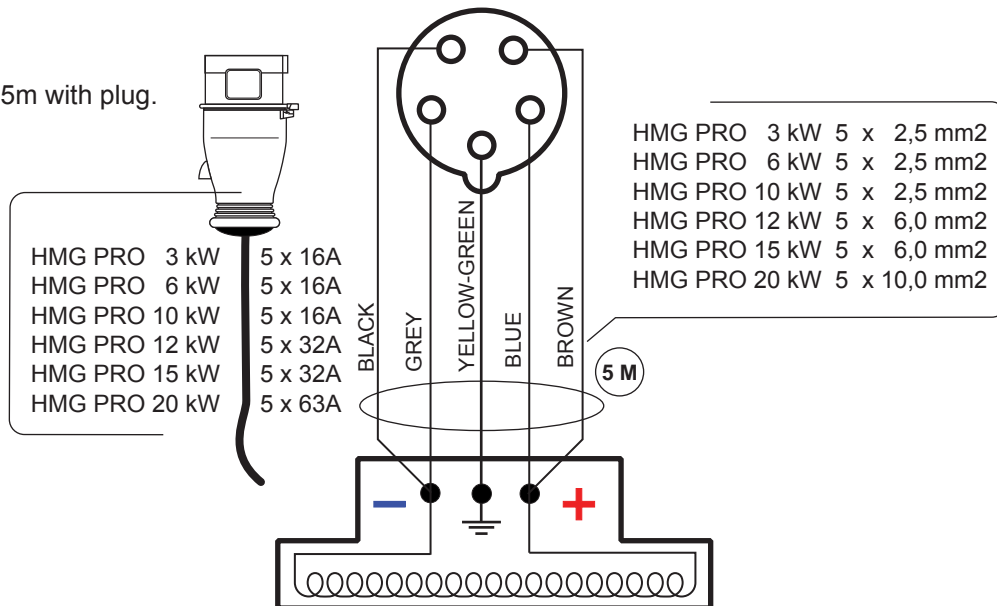
## ELECTRIC INSTALLATION KITS TO HMG PRO MAGNET GENERATORS

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

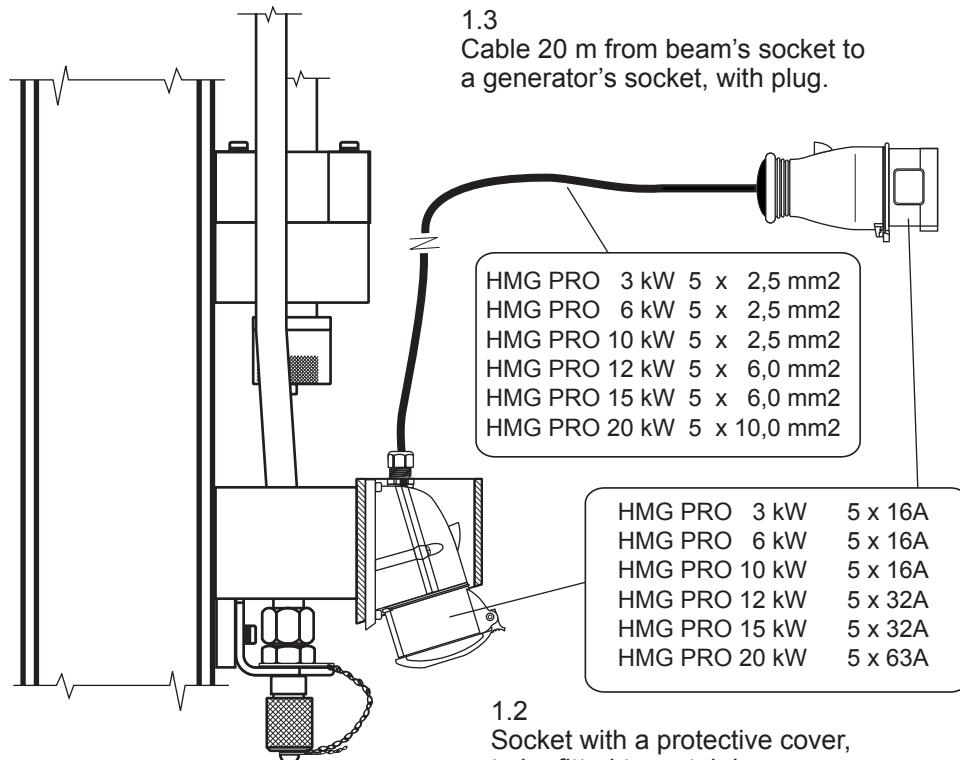
1. MAGNET CABLE KIT - suitable for all HMG PRO units.
2. HMG PRO CONTROL WIRING KIT - for units working under electric control.

### 1. MAGNET CABLE KIT

1.1 Magnet's cable 5m with plug.



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

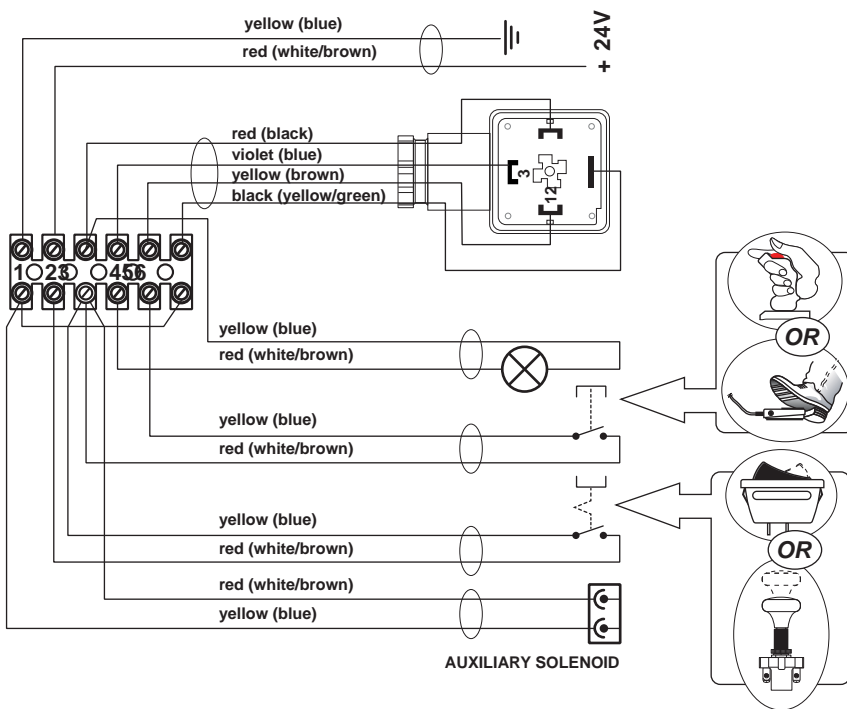
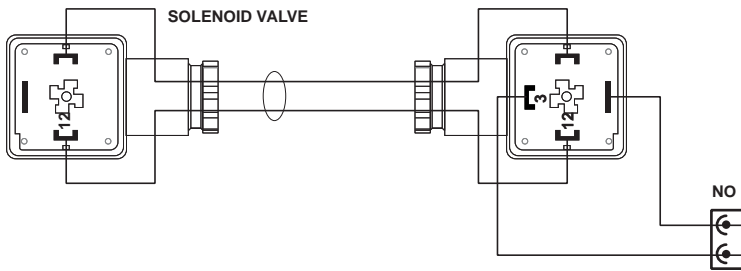


1.2 Socket with a protective cover, to be fitted to a stub boom.

WHEN USED AS HYDRAULICALLY CONTROLLED UNIT, DYNASET HMG PRO GENERATOR DOES NOT REQUIRE ANY ELECTRICAL CONNECTIONS.

UNDER EXTERNAL (ELECTRIC) CONTROL, CONTROL VOLTAGE AND POWER SUPPLY FOR SOLENOID ON/OFF VALVE SHOULD BE BROUGHT TO A GENERATOR'S CONTROL UNIT.

## 2. HMG PRO CONTROL WIRING KIT



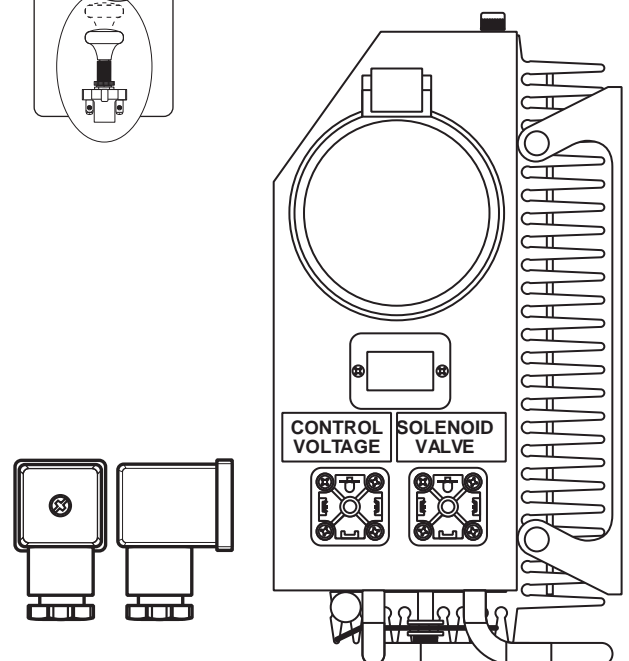
HMG PRO control wiring kit includes magnet's control switch, generator starting switch, plugs for both generator and solenoid valve, magnetisation indicator light and cables (5m). The kit is available by request.

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 place.

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 is available, any other unconnected switches in machine's cab can be applied for the purpose.



## OPERATION

### HYDRAULIC CONTROL

HMG PRO generator is controlled by opening and shutting off the hydraulic flow in the actuating circuit with the assigned switch - either a push-button switch placed on top of a boom's control stick (breaker circuit) or foot switch (tilt bucket circuit).

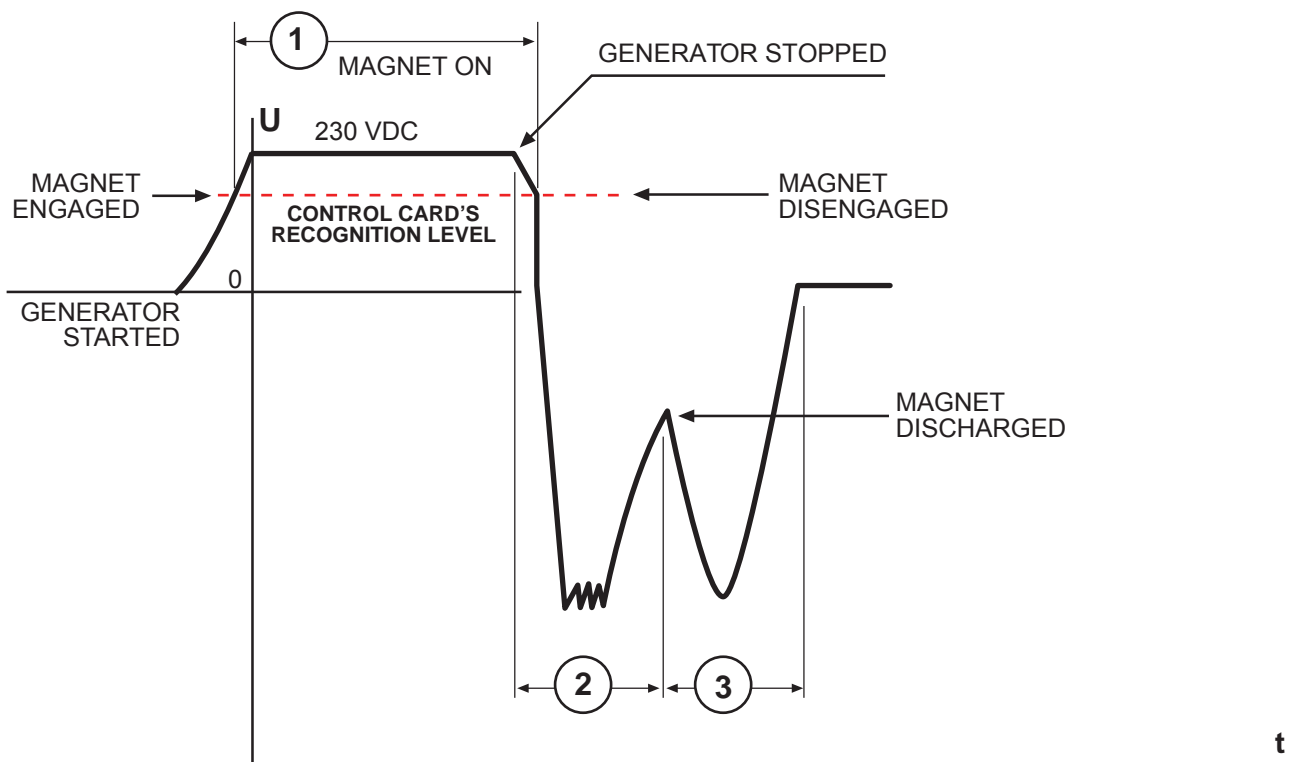
After having ensured the proper mechanical and hydraulic installation of the HMG PRO unit, plug the magnet into the generator's socket with a suitable cable (Dynaset cable kit recommended). Machine's engine can be started and magnet moved to the working area. Start the HMG PRO with an assigned switch. During of generator's acceleration control card monitors increasing output voltage and engages the magnet at preset recognition level - magnetization phase (1) begins.

Now the iron scrap can be sorted and picked. Having picked a sufficient amount of scrap, move it to a dump site (for instance, scrap trailer). HMG's control switch must be kept pressed down during this procedure.

To halt the HMG PRO, cut off the hydraulic flow by releasing the control switch when the unit stops. Control card disengages magnet from power supply (i.e. generator) as generator's output voltage drops to a recognition level - magnetization phase (1) is over and process of dissipation of magnet's residual power (2) with subsequent demagnetization (3) begins.

High voltage capacitors of control unit are charged with a residual energy of magnet and discharged on a control unit's thermistor as many times as necessary to discharge the magnet. Having recognised the status of magnet as discharged, control card changes the polarity of capacitor current executing the demagnetization. Due to demagnetization, all material being kept by a magnet drops down.

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



MAJOR PHASES DISPLAYED ON CONTROL UNIT'S DIGITAL DISPLAY:

- 1 MAGNETIZATION
- 2 DISSIPATION OF MAGNET'S RESIDUAL ENERGY
- 3 DEMAGNETIZATION

## OPERATION

### EXTERNAL CONTROL

After ensuring the proper installation of the generator, plug magnet's cable into generator's socket.  
Start machine's engine.

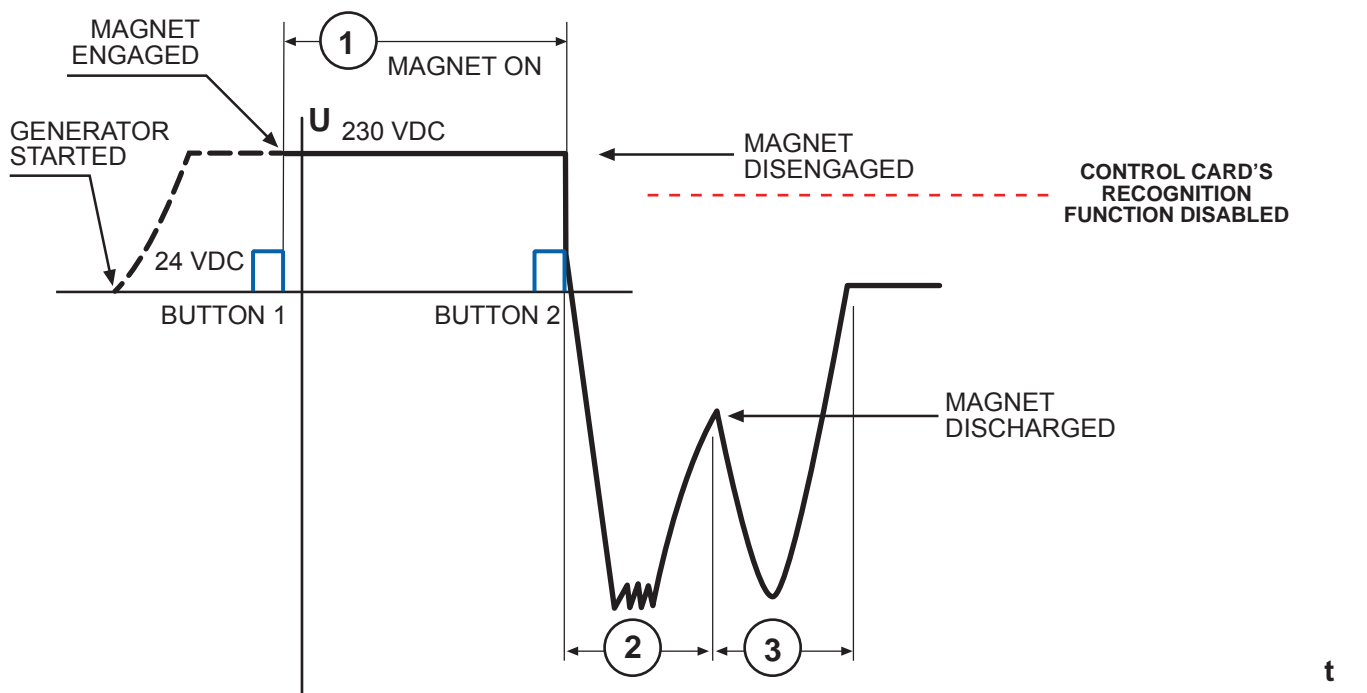
Direct the hydraulic flow to a generator by opening a solenoid valve, when the control voltage 12/24V, brought to the control unit, activates (ref. HMG PRO CONTROL WIRING KIT ). Magnet is ready for use when hydraulic flow achieves a minimal demanded level. GENERATOR ROTATES CONSTANTLY THE PRESSURE LINE BEING OPEN.

Magnet's current is switched on by pressing magnet's control push-button once for less than 0,5 sec, when control card engages the magnet and material is to be picked and moved. Magnetization indicator light is ON.

Press the push-button sequently for less than 0,5 sec to cut-off magnet's current (magnetization indicator light is OFF) and to start dissipation of magnet's residual power (2) with subsequental demagnetization (3). During demagnetization an indication light flashes once.

Magnet's residual power dissipation with demagnetization proceed as described on a previous page.

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

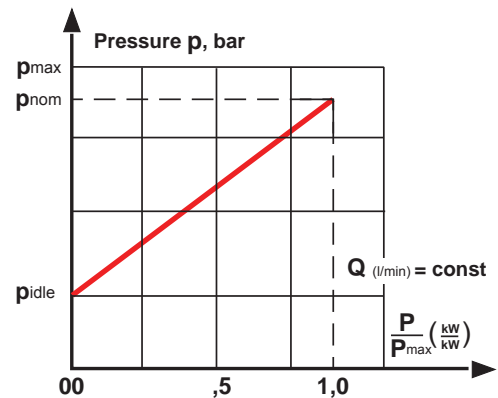


## OPERATION

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.



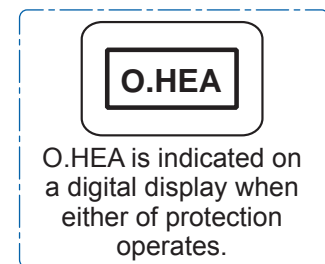
### Attention:

HMG PRO's alternator is equipped with a temperature switch (O.HEA), as well a control card has a temperature measuring circuit, which monitors temperature inside of control unit (max. allowed value 100 °C).

When either of protector operates, control electronics allows to finish working cycle, but prevents to re-energize magnet until the temperature in control unit drops under 90 °C .

When alternator's temperature switch trips, generator should be immediately switched off in order to cool it as fast as possible. The unit being cooled enough, temperature switch closes when the control electronics allows an operator to proceed with his job.

**ATTENTION !** 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.

### ATTENTION !

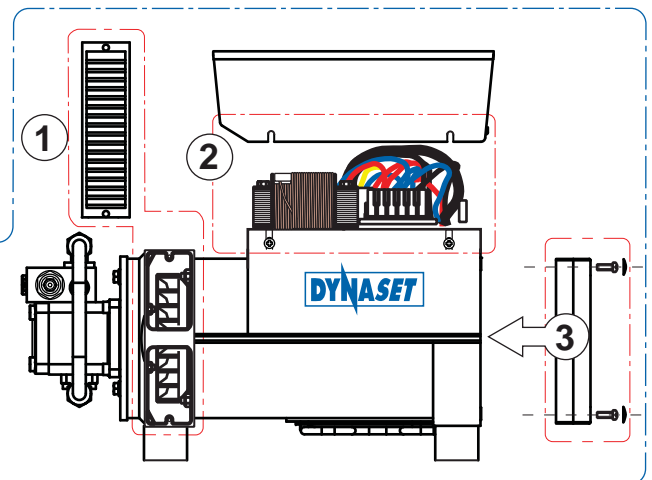
Capacitors in control unit keep the charge for a long time after stopping a generator.

Prior to commence any service:

1. Stop both magnet generator and the carrier
2. Wait at least 10 minutes
3. Ensure with a gauge that capacitors have no charge.



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



### ATTN. !

**CLEANLINESS OF YOUR HMG PRO-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.**

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 PRO-model).



**MAINTENANCE**

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 that 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 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.

**GROUNDING DYNASET EQUIPMENT**

Dynaset equipment has to ground in cases when rubber cushions or plastic pads are installed to the framework. Grounding is also desirable in cases suspected insufficient grounding between working machine and Dynaset equipment.

Cross section area (S / mm<sup>2</sup>) of outer CU grounding wire:

Phase wire cross section area (S / mm <sup>2</sup> ).	Ground wire cross section area (S / mm <sup>2</sup> ).
S ≤ 16	S
16 < S ≤ 35	16
S > 35	S / 2

Use ground wire size at least phase wire cross section area.

Depending on operation, conditions Dynaset recommend use larger ground wire size than phase wire cross section area.

Pay attention in Dynaset HG, HWG, HMG and CMG models used with rubber cushions or plastic pads enough grounding does not achieve via hydraulic connections. Enough grounding achieves with external galvanic wire. In fixed installation without rubber cushions or plastic pads we recommend grounding, but it's not mandatory. Grounding wire length 500mm ± 100mm, see picture below.

Pay attention in working machine, e.g. a floating electric circuit forms by Dynaset generator installation and grounding to machine framework.

This circuit is not in galvanic connection to real earth potential instead they have their own potential in machine's framework.



## 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, if 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.

## PRODUCT DISPOSAL

Conform to waste legislation, regulations and recommendations in waste disposal and waste recycling issued by local authorities.

### 1. Precondition:

- Product is permanently useless or beyond repair.
- Before transportation get off all used agent (oil, cooling liquid) and dirty filters.

Items requiring special handling can normally be done by authorized waste management facility, if not:

- Separating the base materials, iron, copper, steel, electronics, removing paint, polyester resin, and insulation tape and/or plastics residues from all components.
- This 'waste material' can now be recycled.

### 2. Deliver the recycling and waste material to waste management facility.

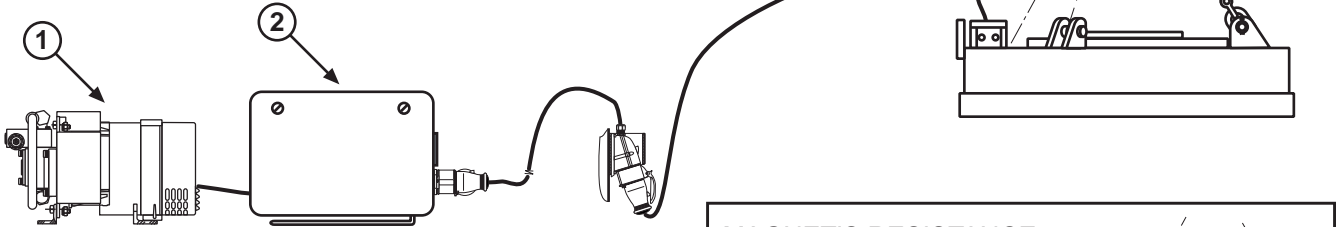
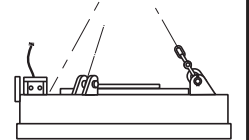
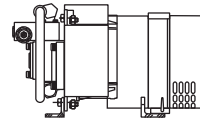
Note! Customer can send the DYNASET equipment for reuse or recycling to the Dynaset Oy or to other location determinate by Dynaset representative.

- Customer pays shipping cost.
- Equipment must be adequately packed for shipment.
- Shipment documents must contain purchaser's name, contact information, equipment type and serial number.




**TROUBLESHOOTING**

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

**MAGNET'S RESISTANCE**

	$\Omega$ (Ohm)	
	min	max
HMG PRO 6 kW	8,8	20
HMG PRO 10,0 kW	5,4	15
HMG PRO 12,0 kW	4,5	10
HMG PRO 15,0 kW	3,6	8
HMG PRO 20,0 kW	2,6	6

**TROUBLESHOOTING**

<p><b>1. MAGNET DOES NOT WORK</b></p>  <p>U.CUR readout is displayed when magnet current is under 2A. U.CUR blinks in turn with voltage readout 225V.</p>	<p>1.1 Magnet unplugged or magnet's cable damaged.</p> <p>U.CUR is indicated on a digital display.</p> <p>1.2 Magnet's coil is damaged.</p> <p>1.3 230 VDC voltage does not come from the control unit to magnet's terminals.</p> <p>1.4 AC-voltage does not come from generator to the control unit.</p> <p>1.5 Damaged control wiring (external control).</p>	<p>1.1 Replug the magnet; change the cable if damaged.</p> <p>1.2 Check coil's resistance and compare the result to the value indicated in the table thereafter. Check also coil's inductance if possible.</p> <p>1.3 Check whether there is a DC voltage on control card's terminals 6 and 7 (single card). If control unit is provided with multiple control cards, gauge DC voltage on both cards as well as on terminals 4 and 5 of coil card. Defective card should be replaced. Magnet's cable damaged.</p> <p>1.4 Check whether there is a 3-phase voltage 150 - 180 VAC on terminals 1 (L1), 2 (L2) and 3 (L3) of control card (cards). 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.</p> <p>1.5 Check control wiring, especially magnet's push-button and generator's starting switch. Replace damaged parts.</p>
<p><b>2. IRON DOES NOT GET RELEASED FROM A MAGNET (DEMAGNETISATION DOES NOT WORK)</b></p>	<p>2.1 Malfunction of control card.</p>	<p>2.1 Defective card should be replaced.</p>

**TROUBLESHOOTING**

<p><b>3. MAGNET MALFUNCTIONS.</b></p> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 5px auto;">O.CUR</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 5px auto;">O.HEA</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 5px auto;">SNUB</div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; width: fit-content; margin: 5px auto;">U.CUR</div>	<p><b>3.1</b> Magnet keeps working only a short time.</p> <p>O.CUR is indicated on a digital display. O.CUR blinks in turn with time indication countdown from 20 sec to 0 sec.</p> <p>O.HEA is indicated on a digital display.</p> <p>SNUB indicated on a digital display</p> <p><b>3.2</b> Low magnet's power.</p> <p><b>3.3</b> Magnet's power consumption excessive, control card stops the generator.</p>	<p><b>3.1.1</b> Magnet's power demand exceeds HMG PRO's output. Generator gets overloaded and stopped.. Choose magnet according to HMG PRO's power output.</p> <p><b>3.1.2</b> Magnet cables short-circuit.</p> <p><b>3.1.3</b> Control unit overheated due to overload or insufficient cooling.</p> <p><b>3.1.4</b> Failure on control unit's thermoresistor or internal wiring.</p> <p><b>3.2</b> Magnet's voltage too low: Does DC-voltage come to magnet's terminals? Does AC-voltage come to the control unit?</p> <p>Check AC-generator according the attached instructions; Check actuating hydraulics.</p> <p><b>3.3</b> Generator output voltage is too high causing overloading. Check AC-generator according the attached instructions; Check actuating hydraulics. Adjust the output voltage to proper level.</p> <p><b>ATTN !</b> High voltage is hazardous to a generator. Remedy a malfunction immediately.</p>
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**AC-GENERATOR TROUBLESHOOTING**

<p><b>1.</b> <b>LOW OUTPUT VOLTAGE AT NO LOAD</b></p>	<p>1.1 Too low rotation speed of generator.</p> <p>1.2 Excitation rectifier's failure.</p> <p>1.3 Poor contact in electric system.</p> <p>1.4 Voltage regulator's failure.</p> <p>1.5 Winding failure.</p>	<p>1.1.1 Check first the output frequency. If the frequency is out of range, hydraulic system failure is concerned.</p> <p>1.1.2 Check whether the hydraulic fluid flow and pressure are sufficient. Adjust when necessary.</p> <p>1.1.3 Check the hydraulic motor for possible leakage. Replace motor if necessary.</p> <p>1.2 Trace the failure and replace the rectifier.</p> <p>1.3 Check all internal contacts and wiring of the generator. Check and clean brushes and slip ring (HMG PRO 6 - 20 kW).</p> <p>1.4.1 Check the compound regulator. Replace if broken (HMG PRO 6 - 20 kW).</p> <p>1.5 Check the condition of winding; verify winding's resistance with parameters shown in technical specification and replace if damaged.</p> <p><b>ATTENTION !</b> <b>To avoid damaging the control unit, set the overload protection switch to OFF-position prior to measuring winding's insulation resistance.</b></p>
<p><b>2.</b> <b>LOW OUTPUT VOLTAGE AT LOAD, WHILE NO-LOAD VOLTAGE IS CORRECT</b></p>	<p>2.1 The generator is being overloaded.</p> <p>2.2 Too low rotation speed of generator.</p> <p>2.3 Voltage regulator's failure.</p>	<p>2.1 Reduce the load and check the current I (A) to ensure that the proper load is being applied.</p> <p>2.2.1 Hydraulic pressure insufficient.</p> <p>2.2.2 Hydraulic system failure to be traced and cleared.</p> <p>2.2.3 Hydraulic motor worn out. Replace hydraulic motor.</p> <p>2.3.1 Check and adjust or replace the compound regulator. (HMG PRO 6 - 20 kW).</p> <p>2.3.2 Check resistors of rotor's current circuit (2 pcs).</p>



**AC-GENERATOR TROUBLESHOOTING**

<b>3. EXCITATION FAILURE</b>	<p>3.1 Rectifier's failure.</p> <p>3.2 Voltage regulator's failure.</p> <p>3.3 Winding failure.</p> <p>3.4 Poor contact in electric system.</p> <p>3.5 Insufficient residual magnetism.</p>	<p>3.1 Trace the failure and replace the rectifier.</p> <p>3.2.1 Check and adjust or replace the compound regulator (HMG PRO 6 - 20 kW).</p> <p>3.3 Verify the winding resistance with parameters shown in technical specification and replace if damaged.</p> <p>3.4 Check all internal contacts and wiring of the generator. Check and clean brushes and slip ring (HMG PRO 6 - 20 kW).</p> <p>3.5 Use external battery of 12 V for 1 - 2 sec to magnetise the rotor.</p>
<b>4. OUTPUT VOLTAGE INSTABILITY</b>	<p>4.1 Instable rotation speed of generator.</p> <p>4.2 Electronic voltage regulator's failure (HMG PRO30 kW).</p> <p>4.3 Poor contact in electric system.</p>	<p>4.1.1 Check generator's hydraulics, including automatic frequency control valve. Make an adjustment; replace RPM-cartridge if necessary.</p> <p>4.1.2 Check whether the hydraulic fluid flow and pressure are excessive. Adjust when necessary.</p> <p>4.1.3 Check the hydraulic motor for possible leakage. Replace motor if necessary.</p> <p>4.2 Adjust stability of the regulator. Replace if broken.</p> <p>4.3 Check all internal contacts and wiring of the generator. Check and clean brushes and slip ring (HMG PRO 6 - 20 kW).</p>
<b>5. ABNORMAL NOISE LEVEL</b>	<p>5.1 Bearing failure.</p> <p>5.2 Generator is being overloaded.</p> <p>5.3 Short circuit in powered unit.</p> <p>5.4 Foreign items in generator's casing.</p> <p>5.5 Extremely fluctuating load.</p>	<p>5.1 Replace broken bearing.</p> <p>5.2 Reduce the load to proper level.</p> <p>5.3 Check powered unit. Rectify a defect.</p> <p>5.4 Stop generator and hydraulic system. Remove foreign item from unit.</p> <p>5.5 Can it be fixed?</p>

**AC-GENERATOR TROUBLESHOOTING**

<p><b>6.</b> <b>OIL LEAKAGES</b></p>	<p>6.1 Failure of axial sealing of generator's hydraulic motor. External indication - hydraulic oil outflow from ventilation grids.</p> <p>6.2 Oil leakage from hydraulic motor.</p>	<p>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.</p> <p>6.2 Hydraulic motor worn out and should be replaced.</p>
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**TECHNICAL SPECIFICATIONS**

PARAMETERS	HMG PRO - MODELS					
	PRO 6 kW 220 VDC-33	PRO10 kW 220 VDC-48	PRO12 kW 220VDC-57	PRO 15 kW 220 VDC-65	PRO20 kW 220 VDC-86	
<b>POWER CHARACTERISTICS</b>						
Generator power, max.	kW	6,0	10,0	12,0	15,0	20,0
Magnet coil power, max.	kW	5,5	9,5	11	14,5	19,5
Operation voltage	V±%	225±%5	225±%5	225±%5	225±%5	225±%5
AC-voltage regulator, automatic	COMPOUND-REGULATOR					
<b>AUXILIARY ELECTRICITY</b>						
OPTIONAL						
1~/230 VAC	kVA	(3,5)	(3,5)	(3,5)	(3,5)	(3,5)
3~/400 VAC	kVA	(5,0)	(9,0)	(9,0)	(9,0)	(9,0)
CONTROL VOLTAGE	VDC	24 V	24 V	24 V	24 V	24 V
DEMAGNETISATION AUTOMATIC	HMG PRO/CMG HYBRID CONTROL (HYDR / 24 V DC)					
<b>HYDRAULIC CONNECTIONS</b>						
Pressure line	P	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"	BSP 1"	BSP 1"
Serial connection	S	BSP 3/8"	BSP 3/8"	BSP 3/8"	NO	NO
<b>HYDRAULIC REQUIREMENTS</b>						
Minimum flow	l/min	36	51	61	69	91
Nominal flow	l/min	33	48	57	65	86
Maximum flow	l/min	62	70	74	95	110
Pressure at nominal power	bar	190	190	190	190	190
Maximum pressure	bar	210	210	210	210	210
Idle run pressure	bar	50	50	40	40	30
<b>HYDRAULIC FLUID REQUIREMENTS</b>						
Viscosity	cSt	10 - 200 / optimum 25 - 35				
Temperature	°C	max. 70 **				
Filter ratio, recommendation	um	min. 25				
<b>OUTLINE DIMENSIONS</b>						
Length	mm	500	560	560	790	910
Width	mm	320	320	460	430	525
Height	mm	380	380	370	450	440
WEIGHT	kg	52	66	100	150	163

**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 twenty four (24) 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.

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## EC DECLARATION OF CONFORMITY

We hereby declare that the below-reference product design and manufacturing are in conformity with the provisions in the Council Directive on mutual approximation of laws of the Member States on the safety of machines.

- Machine directive 2006/42/EC
- LVD directive 2006/95/EC
- EMC directive 2004/108/EC.

Applied harmonized standards:

- EN60204-1 Safety of machinery – Electrical equipment of machines.
- EN ISO 4413: EN ISO 4413:2010 Hydraulic fluid power - General rules and safety requirements for systems and their components.

If device has changed by someone other than at the hands of manufacturer or his permission, this declaration is not valid.

**PRODUCT:** DYNASET HYDRAULIC MAGNET GENERATOR

**ALL TYPE NUMBERS:** HMGxxxxxx-xxxxxx-xxx-xxxx-xxxx

YLÖJÄRVI 31.08.2012

**DYNASET Oy**



Timo Nieminen  
R&D Manager

