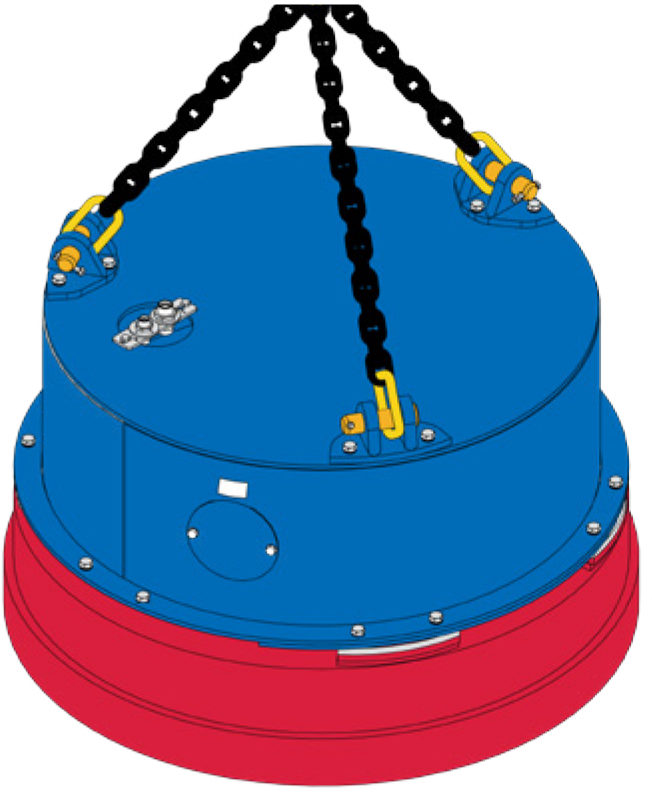
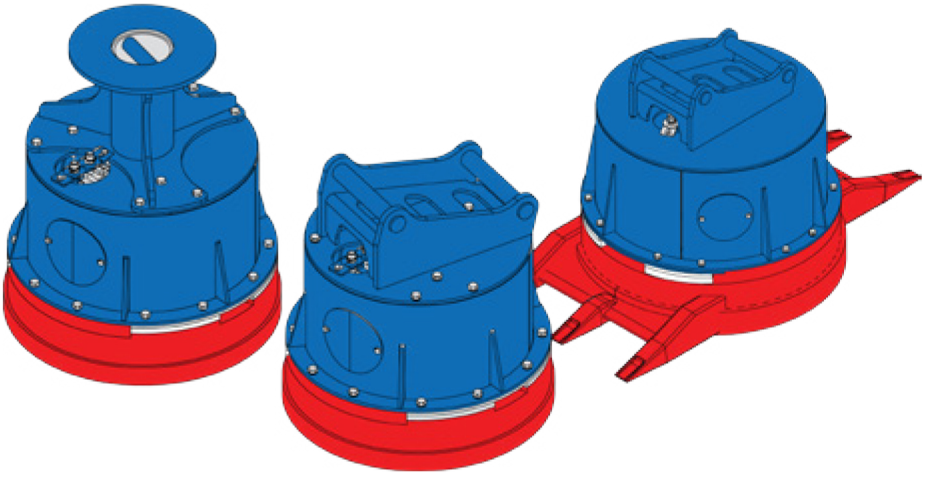
DYNASET

POWERED BY HYDRAULICS

GENSCO





USER MANUAL

HYDRAULIC MAGNET

HMAG PRO 700 - 21
HMAG PRO 900 - 34
HMAG PRO 1200 - 49
HMAG PRO 1400 - 57

Congratulations!

You have just purchased DYNASET hydraulic equipment!

The equipment allows you to maximize the productivity and efficiency of your mobile machine. Read this User Manual before using your new equipment. It contains important information that will help you to take the full advance of the technical features avaible in your equipment.

Please contact us for any feedback you might have on our products. Your feedback is important to us for improving our products and customer service.

We are constantly developing and releasing new innovations. Please visit on our website and social media channels for the latest news and updates.

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1. GENERAL

This manual contains general information about assembly, installation, operation and maintenance of the DYNASET HMAG PRO hydraulic magnet.

Regarding information about HMAG PRO's magnet generator, please refer to the DYNASET HMG/CMG PRO hydraulic magnet generator user manual provided with HMAG PRO user manual.

⚠ ATTENTION!

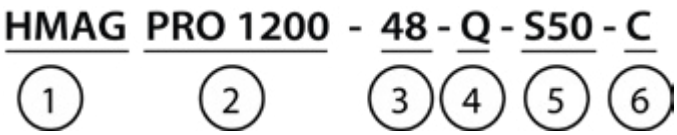
Read this user manual before installation, use or maintenance of the HMAG PRO hydraulic magnet to ensure proper handling, operation and maintenance right from the beginning. Pay attention to warnings and safety instructions. READ CHAPTER "2. SAFETY" for more information.

1.1. PRODUCT INFORMATION

HMAG PRO hydraulic magnet transforms the hydraulic power of the base machine into a high quality electricity (DC) to power the magnet. HMAG PROs are compact and integrated all-in-one attachment units for gathering and sorting scrap and metals. The HMAG hydraulic magnet is designed as an attachment for the material handling machines (hydraulic excavators, heavy trucks with hydraulic cranes etc.).

1.2. PRODUCT IDENTIFICATION KEY

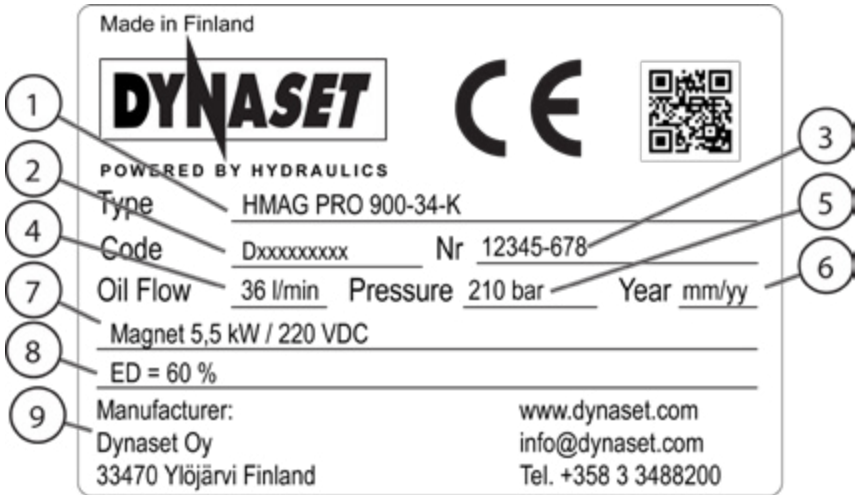
All the HMAG PRO are identified by an identification key. The key can be found from the products type plate which is attached onto the HMAG PRO.



Picture 1: HMAG PRO Identification key

1. Product Group HMAG PRO Hydraulic Magnets.
2. Magnet model
3. Nominal hydraulic flow. Theoretical hydraulic flow required for the HMAG PRO to work.
4. Attachment method to the base machine's boom. More information on the attatchments on chapter 1.7.
5. Quick coupler options. Describes the quick coupler model if they are used as an attachment.
6. Describes other options if included to the HMAG PRO.

1.3. TYPE PLATE



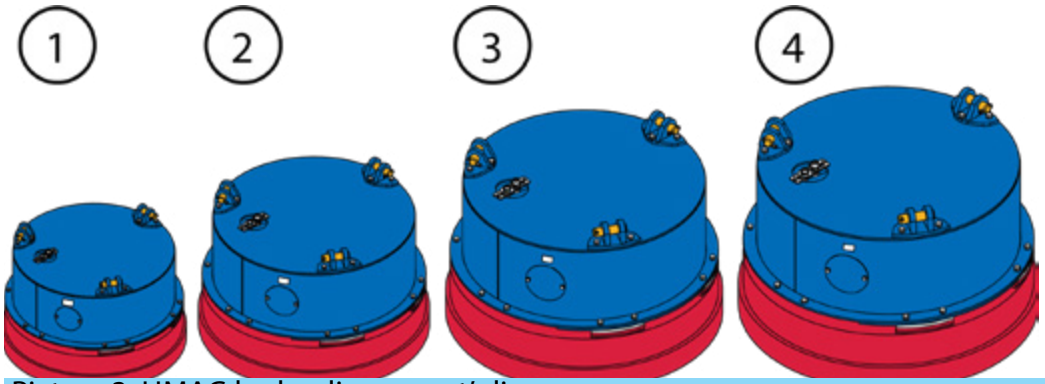
Picture 2: Type plate

Type plate is found above and on the backside of the service hatch.

1. Product identification key
2. Product code
3. Serial number
4. Minimum hydraulic flow
5. Maximum hydraulic pressure
6. Production month / year
7. Magnetizing power/ magnetizing voltage
8. Maximum continuous power load to the magnet
9. Manufacturer's contact information

1.4. HMAG PRO'S LINE-UP

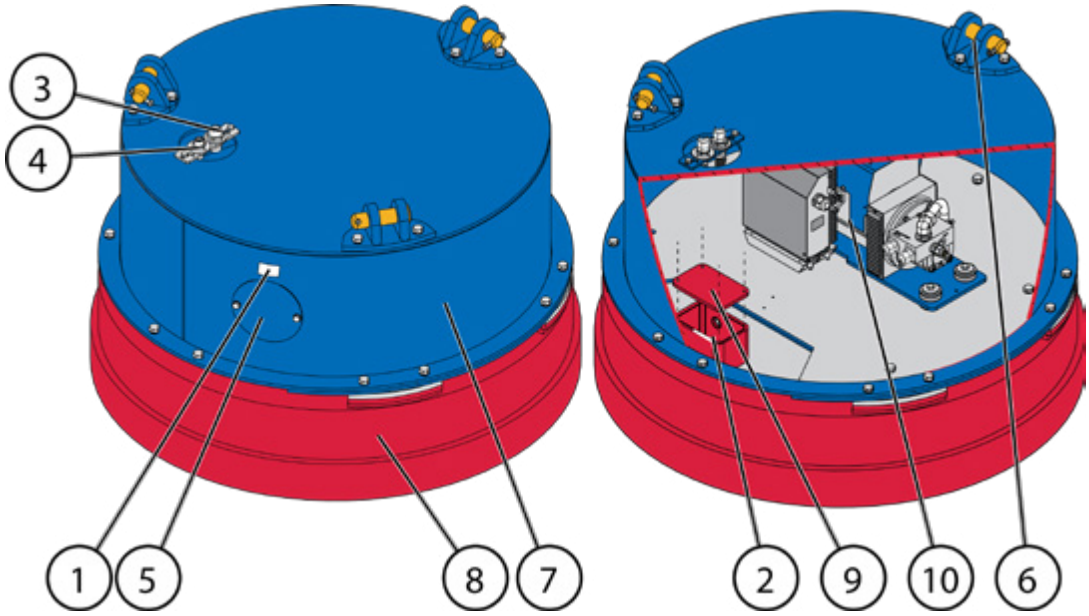
HMAG PRO comes in four standard models. Models are shown in the picture 3.



Picture 3: HMAG hydraulic magnet's lineup

1. HMAG PRO 700 - 21
2. HMAG PRO 900 - 34
3. HMAG PRO 1200 - 49
4. HMAG PRO 1400 - 57

1.5. MAIN COMPONENTS OF THE HMAG PRO



Picture 4: HMAG' PROs main components

1. Type plate (also behind the service hatch)
2. Serial number
3. Hydraulic pressure line (P)
4. Hydraulic return line (T)
5. Service hatch
6. Lifting hooks
7. Magnet generator's cover
8. Magnet coil assembly
9. Magnet socket's cover
10. DYNASET CMG PRO magnet generator

1.6. IP(Ingress Protection) CLASSIFICATION

HMAG PRO hydraulic magnets are IP classified according to the IEC standard 60529 for the degrees of the protection of the electrical equipment. The protection class of a standard HMAG PRO hydraulic magnet complies with the specifications of the IP23.

From the IP classification guide you can check your IP class information.

IP Ingress Protection Classification guide

SOLIDS

1	Protected against a solid object greater than 50 mm³ such as a hand.
2	Protected against a solid object with greater than 12.5 mm diameter, such as a finger.
3	Protected against a solid object with greater than 2.5 mm diameter such as a screwdriver.
4	Protected against a solid object with greater than 1 mm diameter such as a wire.
5	Dust protected. Limited ingress of dust permited i.e. no harmful deposit.
6	Totally dust protected. No ingress of dust.

Rating example:

IP 23

WATER

1	Protected against vertically falling drops of water.
2	Protected against direct sprays of water with up to 15 degrees from vertical.
3	Protected against direct sprays of water up to 60 degrees from vertical.
4	Protected against water sprayed from all directions. Limited ingress permitted.
5	Protected against low pressure jets of water from all directions. Limited ingress permitted.
6	Protected against strong jets of water from all directions. Limited ingress permitted
7	Protected against the effects of immersion in water between 15 cm and 1 m for 30 min.
8	Protection against the effects of immersion in water under pressure for long periods.
9	Protection against high pressure, high temperature jets of water from multiple directions.

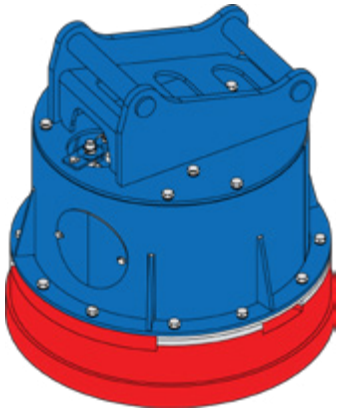
1.7. ATTACHMENTS

CHAINS (K)

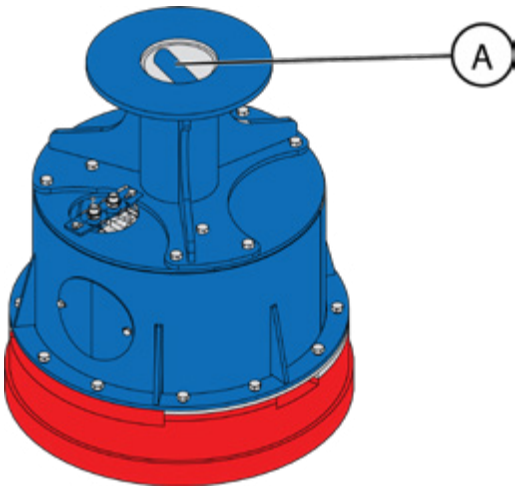
Chains come as standard attachment with the HMAG PRO. Chains are not provided if other lifting adapter is chosen instead.

LIFTING ADAPTERS(Q/G)

DYNASET offers two optional lifting adapters for the HMAG PRO, a quick attach plate (Q) for an excavator mount and a lifting adapter for a grapper (G). The adapters are optional and available by request.



Picture 5: Quick attach plate (Q) for excavator mount



Picture 6: Lifting adapter (G) for grapper

ATTENTION!

Always secure HMAG PRO with the grapper lifting adapter to the grapper tool with chains. Secure spot for attaching the chains to the HMAG PRO is shown in the picture 6 spot A.

QUICK ATTACHMENT PLATE OPTIONS

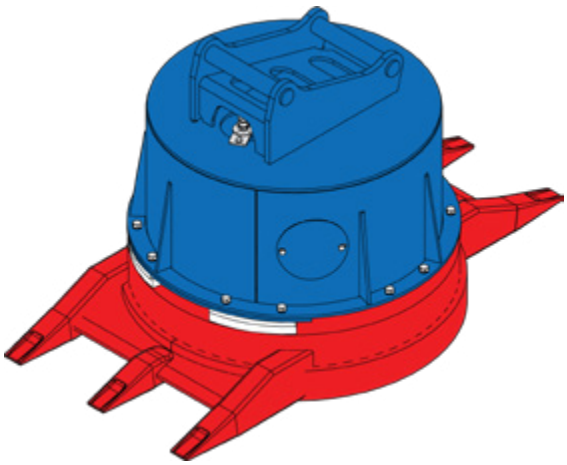
Quick attachment plate (Q) is available for the excavators accordind to the standard S. The standard S specifications are described in the following table.

HMAG PRO MODEL	QUICK ATTACHMENT	WIDTH (mm)	SHAFT C-C (mm)
700	S40	200	300
700	S40/240	240	300
700/ 900	S45	290	430
700/ 900	S50	270	430
700/ 900/1200	S60	340	480
900/1200	S70	450	600
1200	S80	590	670

1.8. OTHER OPTIONS

CLAW (C)

HMAG PRO can also be ordered with claw.



Picture 7: HMAG PRO with claw

ED100%

HMAG PRO are also available as an ED100% model. This model can work on full power all the time without overheating in the constant use.

ED100% is recomended when the metal collecting is made in longer seqments and the magnetizations is on all the time, e.g. cleaning the railtracks.

2. SAFETY

2.1. SAFETY PRECAUTIONS

⚠ ATTENTION!

Operator and maintenance personnel must act in compliance with the laws, regulations and recommendations issued by the local electricity and work safety authorities.

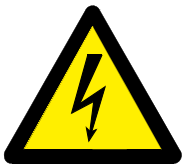
⚠ ATTENTION!

All installations and maintenance must be performed according to this manual. All electrical installations and maintenance that is not shown in this manual should only be performed by qualified electrician.

⚠ WARNING

RISK OF ELECTRIC SHOCK!

Risk of electric shock. Do not remove any covers when operating. All the repairs must be done by a qualified electrician.



RISK OF ELECTRIC SHOCK.

Operating voltage of the HMAG PRO hydraulic magnet is 220 VDC .

⚠ WARNING

HIGH PRESSURE OIL!

Can cause severe injuries. Always wear appropriate clothing and safety equipment.

The hydraulic system is pressurized up to 350 bar.

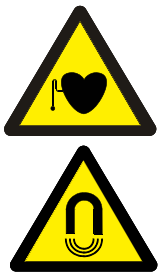
The pressure in the hydraulic circuits of the HMAG PRO hydraulic magnet is considerably high. Therefore the technical condition of your equipment must be kept under constant observation.

All couplings, valves and hoses should be maintained tight and kept clean. Leaks in the hydraulic system must be fixed immediately to avoid injuries caused by high pressure and oil blowouts.

⚠ WARNING

MAGNETIC FIELD INTERFERENCE

Magnetic field may interfere and damage electronics near by. Do not use near medical implants or electronics. Keep the safe distance of the base machine or at least 5m to the HMAG magnet.



HMAG PRO hydraulic magnet produces a strong magnetic field that might interfere with electronic devices. Ensure also that the magnetic field does not interfere and damage other electrical and electronic equipment or any other sensitive equipment such as credit cards or watches.

When using the magnet, switch off and unplug all sensitive electric and electronic devices nearby. Such units are e.g. AC-chargers, electronic sensors, control and measurement instruments.

After shutting the HMAG PRO system the magnet holds magnetization before it complately discharges.

⚠ ATTENTION!

All installations and maintenance must be performed according to this manual. All electrical installations and maintenance that is not shown in this manual should only be performed by a qualified electrician.

2.2. SAFETY EQUIPMENT

When operating in the immediate vicinity of the HMAG PRO hydraulic magnet or accessories, wear the appropriate protective clothing, safety goggles, gloves and ear protection.

2.3. OPERATING SAFETY

⚠ WARNING

RISK OF BURNS!

The unit parts and oil can be hotter than 80°C!

Wear personal safety equipment!

⚠ ATTENTION!

Maximum load must never be exceeded.

⚠ WARNING

DO NOT GET UNDER THE LOAD!

Danger of getting crushed. Stay clear from the magnet and the base machine's reach. Check base machine's manual for safety area details.

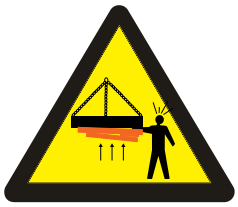
Never get under the magnet. The collected metals might drop due to a failure in the base machine or in the HMAG PRO system. Remember to keep the safe distance of the base machine and stay outside of its reach.

HMAG PRO magnet has two temperature switches that cut off the magnetization if the temperature raises too high. In this case the collected metals will eventually drop unexpectantly.

⚠ WARNING

DANGER OF GETTING CRUSHED!

Magnet will draw ferrous material around it to itself when magnetized. Do not put yourself between magnet and object that it can draw to itself. Stay clear from the magnet and the base machine's reach.



Do not lift people with the HMAG PRO magnet.

Do not hang or grap the chains while lifting.

Do not let any person or animal get closer than 5 m when operating the HMAG PRO magnet.

Do not drag HMAG PRO along the ground. Draging it might damage the magnet.

Do not release the scrap from HMAG PRO by swinging the unit.

When picking and moving scrap, twitches, sudden moves and reversals must be avoided. Prior to starting to operate the HMAG PRO ensure clear visibility to the magnet and its surroundings.

Do not cool the HMAG PRO magnet with water.

Do not use HMAG PRO magnet under water.

2.4. MAINTENANCE SAFETY

NOTE!

Keep the components of the system clean when carrying out any maintenance to the HMAG PRO. This is to ensure safe, reliable and longlife operation of your equipment.

Hydraulic system of the base machine must be maintained according to the machines service program. READ CHAPTER "6.1. Maintenance Intervals" for more information

⚠ WARNING

RISK OF ELECTRIC SHOCK!

Wait until the charge of the electric parts is completely discharged before removing any covers.

Stop and wait at least 30 minutes for a proper discharge.

RISK OF ELECTRIC SHOCK.

Base machine has to be stopped and hydraulic circuit depressurized prior to maintenance, detaching HMAG PRO from a base machine or disassembling HMAG PRO.

2.5. WARNING LABELS

Warning labels are included with each main product.

Product recipient is obligated to place warning labels on the DYNASET product. Attach labels to visible and appropriate place on or close to DYNASET product where its easily seen. Clean surface with solvent detergent before attaching labels.

READ OPERATING INSTRUCTIONS

USE EAR PROTECTION AND SAFETY GOGGLES

WEAR GLOVES

WEAR SAFETY BOOTS

RISK OF ELECTRIC SHOCK

BEWARE THE HOT SURFACE

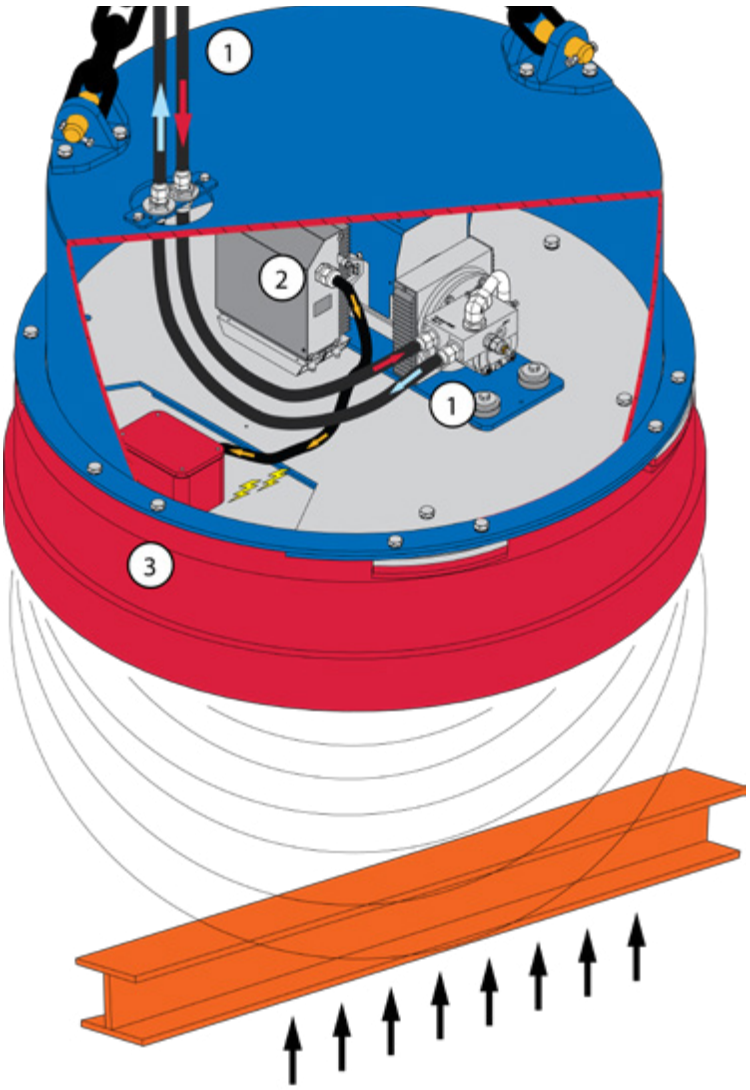
BEWARE THE MAGNETIC FIELD

RISK OF MEDICAL EQUIPMENT FAILURE

HIGH PRESSURE OIL

3. OPERATING PRINCIPLES

3.1. OPERATING DESCRIPTION



Picture 8: Operating principle of HMAG PRO

1. When the hydraulic flow is swithced on and is directed to the HMAG PRO's generator, the base machine's hydraulic flow is automatically leveled to the correct level. Generator's RPM-valve block keeps the flow constant and controls the speed of the hydraulic motor through a RPM-cartridge.

2. Hydraulic motor connects directly to the alternator's rotor. When the rotor spins it produces a changing magnetic flux that generates electricity.

3. The generator produces 220 VDC voltage that activates the magnet's coils and produces magnetic field that lifts ferrosious metals.

3.2. MAGNETIZATION AND DEMAGNETIZATION

Magnetization and demagnetization of the HMAG PRO is controlled electronically by CMG PRO control unit. The electronic control enables the magnet to demagnetize in 0,8s. Delay for the demagnetization is adjustable for occations when slower demagnetizing time is required.

Please take contact to DYNASET if in need for more information about adjusting demagnetisation delay.

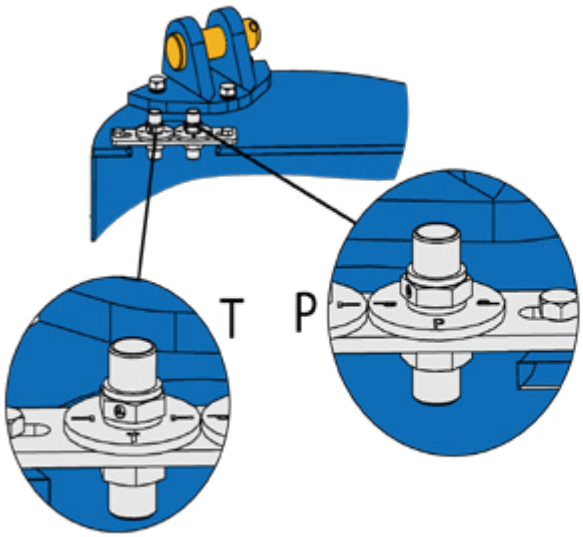
4. INSTALLATION OF THE HMAG PRO

4.1. INSTALLATION TO A HYDRAULIC TOOL LINE

The HMAG PRO is recommended to be installed into the base machine's existing hydraulic tool line. Usually other installations are not required and the HMAG PRO can be operated from the existing controls.

Install the hydraulic tool lines **pressure (P)** and **return (T)** to their correct places on the HMAG PRO.

Ensure that the hydraulic flow of the base machine is sufficient to run the unit. At least the minimal flow must be available. READ CHAPTER "10. TECHNICAL SPECIFICATIONS" for more information.

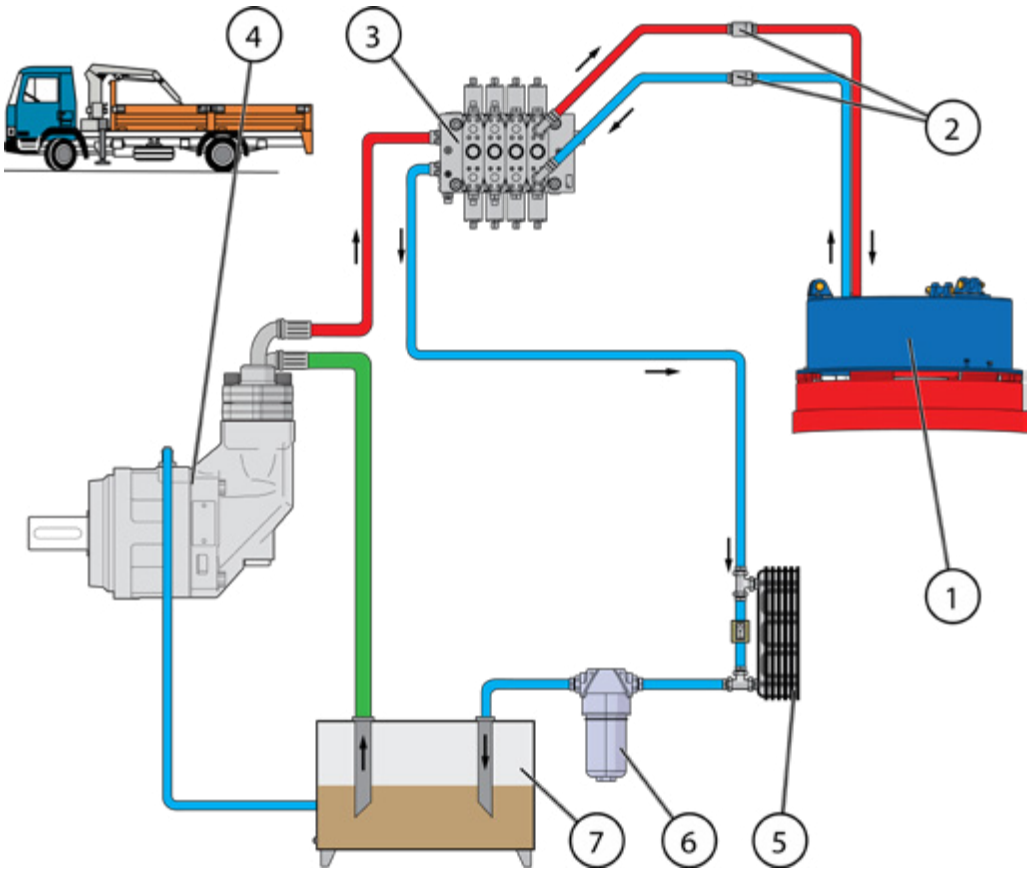


Picture 9: Couplers of the HMAG PRO

⚠ ATTENTION!

Ensure that the filtering degree and cooling capacity of the hydraulic system are sufficient. READ CHAPTER "10. TECHNICAL SPECIFICATIONS" for more information.

In the picture 10 is an example of installing the HMAG PRO into a existing tool line.



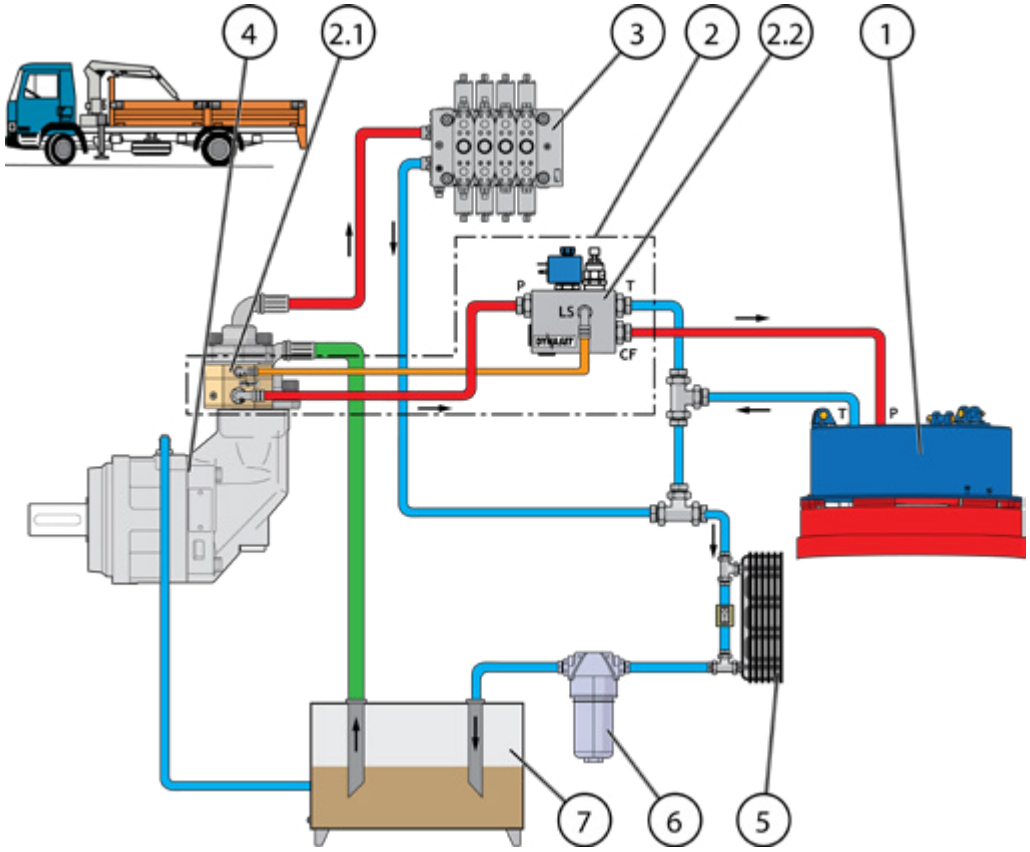
Picture 10: Exaple of existing tool line installation

1. DYNASET HMAG PRO
2. Quick couplers
3. Open centre directional control valves
4. Base machines discplacement pump
5. Oil cooler
6. Oil filter
7. Oil tank

4.2. INSTALLATION TO A HYDRAULIC PRESSURE LINE

Additional hydraulic valves are needed when installing the HMAG PRO to a base machine that does not have an existing hydraulic tool line. All the needed valves for the installation can be purchased from DYNASET.

In the picture 11 is an example of installing the HMAG PRO into a open centre hydraulic system.



Picture 11: Example of installing the HMAG PRO to a open centre hydraulic system with needed valves.

1. DYNASET HMAG PRO
2. DYNASET Priority valve PV-SAE
   - 2.1. DYNASET PC-SAE pressure compensator
   - 2.2. DYNASET LSV Load Sensing valve
3. Open centre directional control valves
4. Base machines fixed displacement pump
5. Oil cooler
6. Oil filter
7. Oil tank

4.3. HYDRAULIC FLUIDS

To use proper hydraulic fluid READ CHAPTER "6.2. Hydraulic fluids" for more information.

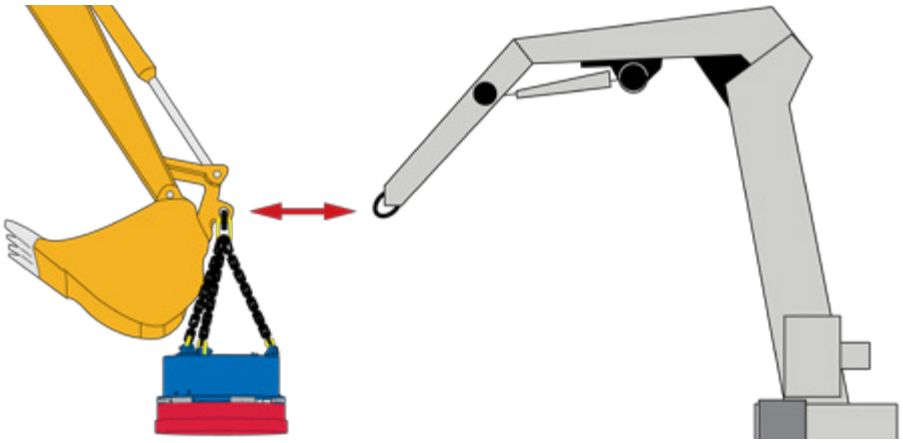
4.4. ATTACHING THE HMAG TO THE BOOM

DYNASET HMAG PRO has chains as standard for the connection to the base machine's boom.

Attach the HMAG PRO hydraulic magnet to a designed lifting spot on the boom. Example of lifting spots are presented in picture 12.

NOTE!

Check chain's condition before every work shift. Only use stamped chains.



Picture 12: HMAG PRO's chains attach point example

5. OPERATION

After having ensured the proper mechanical and hydraulic installation of the HMAG PRO unit it is ready for use.

ATTENTION!

Ensure that the hoses are both connected correctly!

5.1. OPERATING THE HMAG PRO

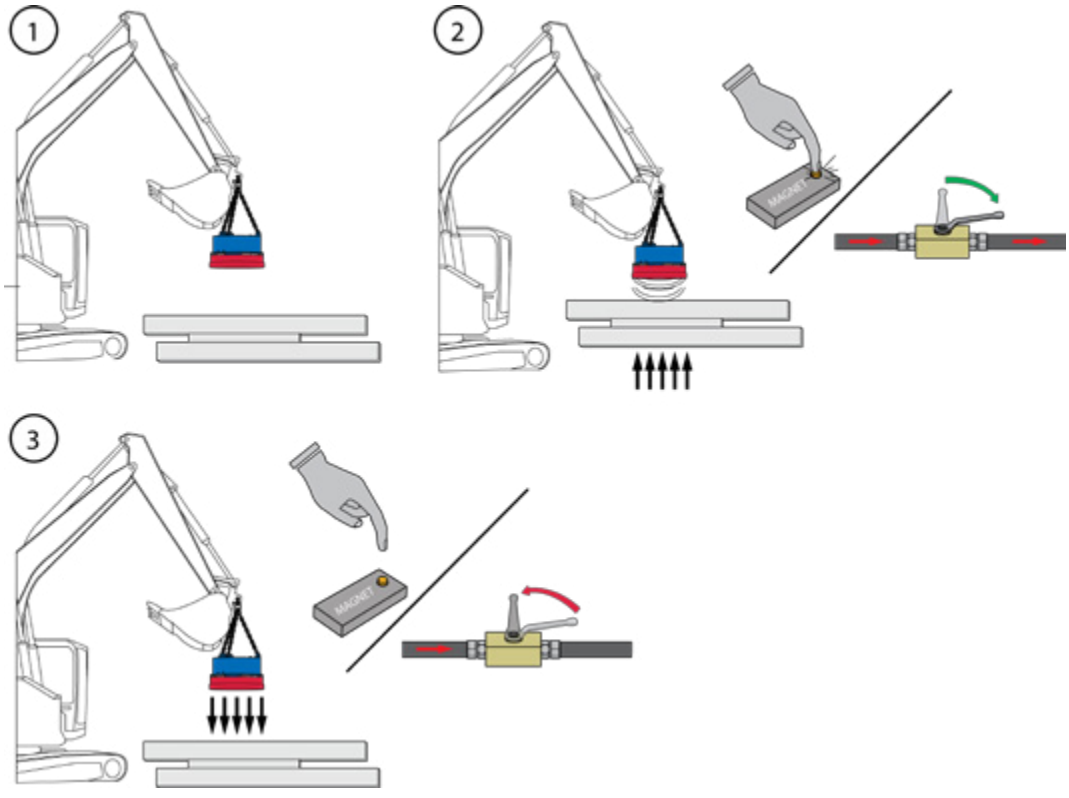
1. Start base machine's engine and move the magnet on the scrap or metals.
2. Start the HMAG PRO with an assigned switch to enable hydraulic flow and to begin magnetization.

NOTE!

The switch has to be pressed all the time during the collecting and moving metals to enable magnetisation.

3.Release the control switch to demagnetization and to drop the collected metals.

Switching off the hydraulic flow to the HMAG PRO turns the magnet off.



Pictures 13: Operating HMAG PRO

ATTENTION!

Do not drag the HMAG PRO along the ground. Draging it might damage and cause wearing on the HMAG PRO.

5.2. OVERHEATING AND OVERLOAD SITUATION

HMAG PRO's generator is equipped with a temperature switch (O.HEA on the display). In overheating situations control electronics prevent the HMAG PRO to re-energize magnet until the HMAG PRO has cooled down.

Pictures 14: O.HEA on the Display

When temperature switch trips the magnetisation should be switched off in order to cool HMAG PRO's generator as fast as possible.

After the HMAG PRO has cooled enough the unit automatically switches the overheat alarm off and HMAG PRO is operatable again.

ATTENTION!

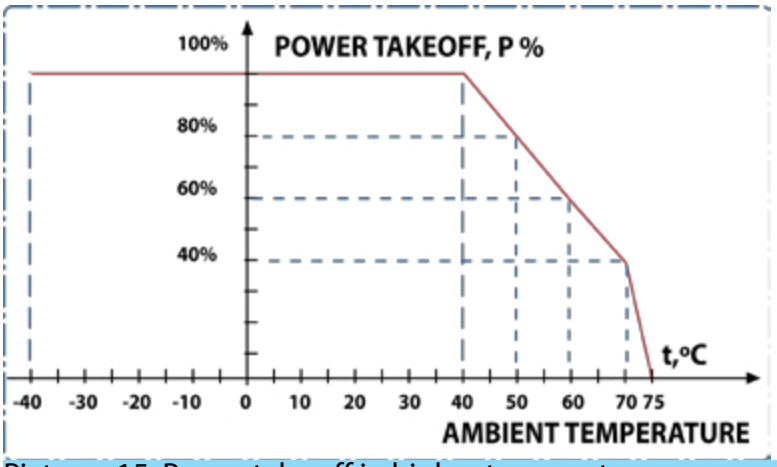
Standard HMAG PRO magnet's load duty is 60%. Exceeding the ED-value causes magnet to heat up faster !

5.3. AMBIENT TEMPERATURE

To avoid power loss, it is not recommended to use HMAG PRO when the ambient temperature exceeds +40 °C. When the ambient temperature exceeds +40 °C power takeoff should be limited in accordance with the diagram,in picture 15. For instance, at the ambient temperature of +50 °C the power takeoff should not be more that 80 % of the maximum.

NOTE!

HMAG PRO ED100% model can handle higher than +40°C ambient temperatures without overheating.



Pictures 15: Power take off in higher temperatures

6. MAINTENANCE

6.1. MAINTENANCE INTERVALS

All maintenance must be performed as they are scheduled in this manual. The following table provides maintenance schedule for DYNASET HMAG PRO.

CHECK POINTS	DAILY
Check if the HMAG PRO's generator needs cleaning and clean it according to the chapter 6.4.	x
Check the condition of the chains before starting the work with HMAG PRO.	x

6.2. HYDRAULIC FLUIDS

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

MINERAL HYDRAULIC OIL	OPERATION TEMPERATURE UP TO
ISO VG 32S	60 °C
ISO VG 46S	70 °C
ISO VG 68S	80 °C

NOTE!

Recommended oil viscosity is between 10 to 35 cSt when operating at normal operating temperature.

Synthetic and bio-oils can also be used if their viscosity characteristics and lubricating efficiency are similar to the 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 base machine.

For the hydraulic fluid change interval follow the base machine's maintenance instructions.

To use special hydraulic fluids with DYNASET equipment, please contact the nearest DYNASET representative for more information.

6.3. ACCESSING THE GENERATOR

Open either the service hatch or remove the entire magnet's cover to access the HMAG PRO's generator.

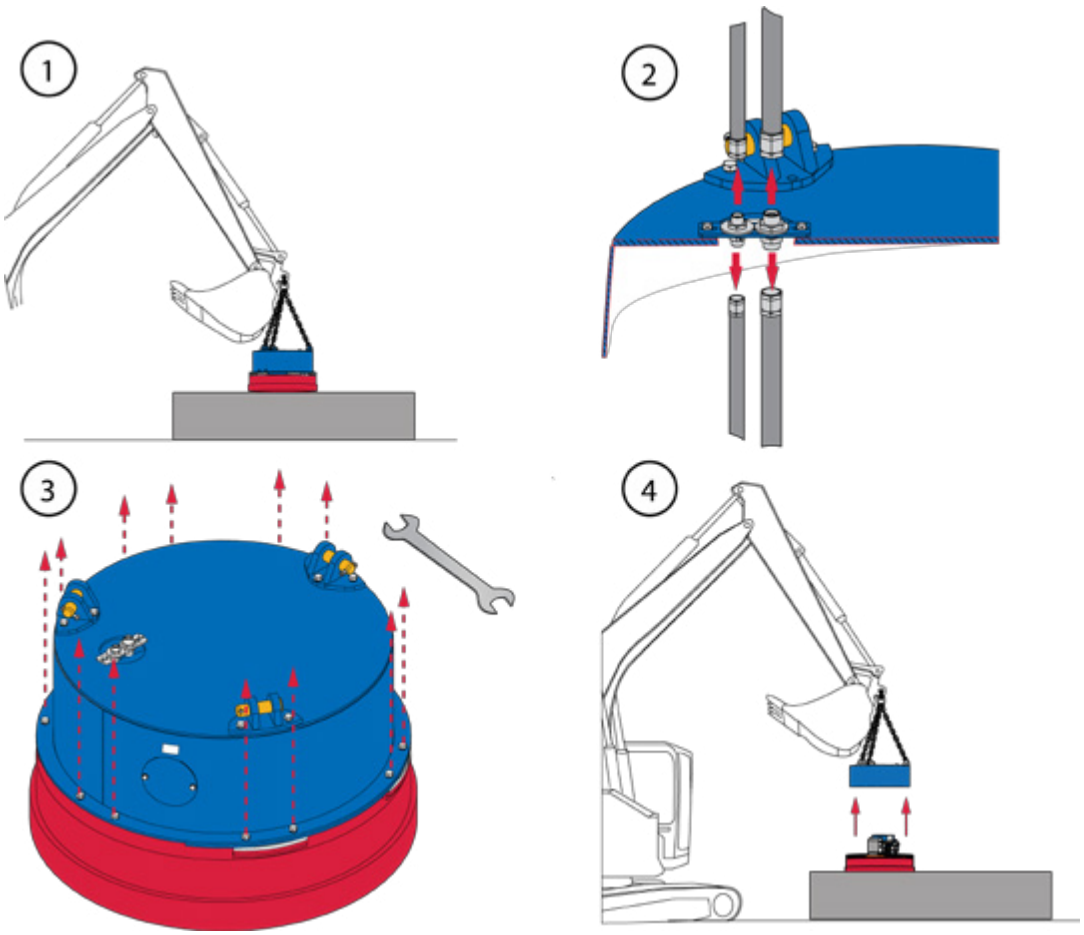
The service hatch can be used when checking hydraulic and electric connection or display's notifications. For maintenance the cover has to be removed.

REMOVING THE COVER

The HMAG PRO's cover is held by 12 bolts. To remove the cover follow these instructions.

1. Set the HMAG PRO on to a steady and flat platform.
2. Disconnect hydraulic hoses from the magnet. Remember to disconnect and plug the hoses inside the cover!
3. Unscrew the bolts(12).
4. Slowly lift the cover off.

To install the cover follow the instructions in reverse order.



Picture 16: Removing the cover of the HMAG PRO

6.4. CLEANING HMAG PRO'S GENERATOR

⚠ ATTENTION!

Depending on the operational environment, clean the HMAG PRO's generator as frequently as necessary to keep it in perfect working condition.

In order to properly clean the generator the HMAG PRO's cover needs to be removed. After removing the cover, follow the instructions given in HMG/CMG PRO user manual's chaper 6.3 cleaning the HMG/CMG PRO.

6.5. TROUBLESHOOTING

For troubleshooting remove the HMAG PRO's cover as shown in the chapter 6.3 and connect the CMG PRO generator to the base machine's hydraulic system to enable the CMG PRO to show notifications on it's display.

Performing these maintenance tasks require a qualified hydraulic mechanic or/ and qualified electrician. Please contact a DYNASET authorized workshop or a DYNASET dealer in case of need for more maintenance information.

HMAG	FAILURE	REASON	CORRECTIVE ACTION
	HMAG PRO WON'T START	HMAG PRO's hoses are cross-connected. Check valve in return line does not allow to start the HMAG PRO's generator.	Check HMAG PRO's connection to the hydraulic circuit and rectify.
	OIL SPILLS FROM THE HMAG PRO'S COVER	The pressure line is connected while the return line is disconnected and the pressure relief valve leaks the oil.	Check the connection and connect the hoses to their correct places. clean the oil.
	MAGNET MALFUNCTIONS	HMAG PRO's hoses are cross-connected. Check valve in return line does not allow to start the unit's generator.	Check HMAG PRO's connection to the hydraulic circuit and rectify.
		Generator unplugged from the magnet or magnet cable is damaged.	Switch off the generator. Check the cable and the connection to the magnet. Change the cable if it is damaged.
		Magnet coil is damaged.	Check the coil's resistance and compare the result to the value indicated in the magnet's manual. Check also coil's inductance if possible.
	 Readout is displayed when magnet current is under 2A.	CMG PRO magnet generator won't produce 220 VDC.	Turn off the generator. Check whether there is a DC voltage between the control card's terminals 6 and 7. If control unit is provided with multiple control cards check the connection between different cards. Check the connection between different card terminals 6 and 7 e.g check if there is a connection between card 1 terminal 6 and card 2 terminal 6 etc. If connection is lost it has to be set back up to clear the problem. If the connection is in order the cotrol card is broken. Defective card(s) must be replaced.

HMAG

FAILURE	REASON	CORRECTIVE ACTION
MAGNET MALFUNCTIONS  O.CUR blinks in turn with time indication countdown from 30 sec to 0 sec. **!WARNING! O.CUR stops the magnet immediately from magnetization. watch out the falling collected metals.**	Magnet shuts down by itself after magnetization is started. Generator's output voltage is too high causing overloading.	CMG PRO generator with multiple control cards: Check first the connection between terminals 6 and 7 between different cards. e.g check if there is a connection between card 1 terminal 6 and card 2 terminal 6 etc. if connection is lost it has to be repaired. If the connection is in order the control card is broken. Defective card(s) must be replaced.
	Magnet's cable shortcircuits. Connections in generators control card short circuit. Problem outside the generator.	To test the cable shut down the generator, unplug the cable and turn on the generator. If the generator's display shows O.CUR, problem is in the control unit's connections. If the generator's display blinks U.CUR/220, the problem is outside the control unit. Then check the frequency (50Hz±5%). Frequency can be measured between terminal 1 and 3 in the control box. If the frequency is ok, then the generator's hydraulics are in order. After this measure the AC voltage between all the phases from terminals 1-2,2-3,1-3. If the Voltage is under 170 VAC the problem is in the voltage regulator system and it needs a repair.
 O.HEA indicated on a digital display.	The Generator is overheating	Stop working with the HMAG PRO and let it cool down. The HMAG PRO resets automatically after it has cooled enough.
 SNUB indicated on a digital display.	Failure on the control unit or in the internal wirings.	Measure resistance between control card terminal 8 and 9. If it is 12 Ohms, the problem is in the control card and it needs to be replaced. If it is not 12 Ohms the problem is in the resistors. If it is 24 Ohms, one resistor is broken. If it is something else both resistors are broken and need replacing.

HMAG

FAILURE	REASON	CORRECTIVE ACTION
MAGNET MALFUNCTIONS	Low magnet power.	Check VDC-voltage on the display. If ok, check magnet's resistance. If VDC is not ok check the frequency and AC voltage (170VAC) between all phases to the control unit between terminals 1-3. If the frequency is out of range, the problem is in hydraulic system. If the frequency is ok and the AC voltage is not, the prolem is in the generator (not in the control box). If the frequency is ok, the problem is in the control card.
MAGNET SUDDENLY DROPS COLLECTED METALS AFTER MOVING IT.	If magnet magnetizes after dropping the load reason is the system hydraulic flow drop when moving the boom.	The demagnetization begins too fast when the system's hydraulic flow to the generator drops. Demagnetization delay has to bee adjusted longer. Contact DYNASET for more information about adjusting the delay.

CMG

FAILURE	REASON	CORRECTIVE ACTION
LOW OUTPUT VOLTAGE AT NO LOAD	Poor contact in electric system.	Check all internal contacts and wirings of the generator. Check and clean brushes and slip ring
OUTPUT VOLTAGE < 20Vac	Excitation rectifiers failure.	Trace the failure and replace the rectifier. (with Compaund or Capasitor voltage regulator)
	Voltage regulators failure.	Replace the capacitor.
		Check and adjust the air gap of the compound regulator. Replace if broken.
		Check and adjust or replace the electronic regulator (CMG PRO with AVR).
	Insufficient residual magnetism.	Use external 12 V DC battery for 1 - 2 sec. to magnetise the rotor.
LOW OUTPUT VOLTAGE AND FREQUENCY AT LOAD	The generator is being overloaded.	Reduce the load and check the current I (A) to ensure that the proper load is being applied.
LOW FREQUENCY AT NO LOAD	Too low rotation speed.	If frequency id out of range, hydraulic system failure is concerned
		Check whether the hydraulic flow and pressure are sufficient. Adjust CMG PROs RPM cartridge when necessary.
		Check the hydraulic motor for possible leakage. Replace motor if necessary
HIGH FREQUENCY AT LOAD	Too high rotation speed.	If frequency id out of range, hydraulic system failure is concerned
		Check whether the hydraulic flow and pressure are sufficient. Adjust CMG PROs RPM cartridge when necessary.

CMG	FAILURE	REASON	CORRECTIVE ACTION
	OUTPUT VOLTAGE INSTABILITY	Instable rotation speed of generator.	Check generator's hydraulics, including automatic frequency control valve. Make an adjustment if necessary.
			Check that the hydraulic oil Flow is constant.
			Check whether the hydraulic fluid flow and pressure are not excessive. Adjust when necessary.
			Check the hydraulic motor for possible leakage. Replace motor if necessary.

HMAG	FAILURE	REASON	CORRECTIVE ACTION
CMG	LOW OUTPUT VOLTAGE AT LOAD	The generator is being overloaded.	Reduce the load and check the current I (A) to ensure that the proper load is being applied.
	GENERATOR CONSUMES ABNORMAL AMOUNT OF HYDRAULIC FLUID	Failure of axial sealing of generator's hydraulic motor. External indication - hydraulic oil outflow from ventilation grids.	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.
		Oil leakage from hydraulic motor.	Hydraulic motor worn out and should be replaced.
		Pressure in tank line is over 5 bar.	Rebuild the return line (T). Maximum allowed pressure in return line is 5 bar. Replace axial sealing of generator's motor.
	GENERATOR CONSUMES ABNORMAL HYDRAULIC PRESSURE AT NO LOAD	Winding failure.	One ore more stator winding is in short circuit. Reblace generator.
	A MILD ELECTRIC SHOCK FROM HYDRAULIC GENERATOR	Poor hydraulic generator grounding.	Ensure proper installation of the grounding cable.
	ABNORMAL NOISE FROM GENERATOR	Bearing failure.	Replace broken/worn bearing.
		Broken fan.	Replace broken/worn fan.

7. 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 Exclusions from warranty.

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:

- 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.
- Cost of maintenance, adjustments, installation or startup.
- Coating, hydraulic oil, quick couplings and interconnection hoses (internal or external to system assemblies).
- Products altered or modified in a manner not authorized by DYNASET OY in writing.
- Products which have been repaired during warranty period by others than DYNASET OY or its authorized workshop.
- 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.
- Telephone or other communications expense.
- Product that is used in exceptional conditions, considered to cause excessive wear and tear.
- Faults caused by nature phenomenon's like flood, thunder, etc.

8. PRODUCT DISPOSAL

Dispose and recycle all the DYNASET products and their packaging environmentally responsible way.

Do not dispose used oils, electrical components, batteries or any other hazardous waste with normal waste. They are harmful for the environment and can be recycled for re-use.

Contact your local waste recycling facility for more information about recycling hazardous waste.

NOTE!

Always act according to the waste legislation, regulations and recommendations in waste disposal and waste recycling issued by your local authorities.

9. DECLARATION OF CONFORMITY

We hereby declare that the design and manufacture of the product stated below are in conformity with the provisions of the European Parliament and Councils on the harmonization of the laws of Member States on the safety of machines.

Machine directive 2006/42/EC

LVD directive 2006/95/EC

EMC directive 2004/108/EC

Applied conformity standards:

CEN EN ISO 4413: EN ISO 4413:2010 Hydraulic fluid power - General rules and safety requirements for systems and their components.

EN60204-1 Safety of machinery – Electrical equipment of machines.

Manufacturer: **DYNASET Oy**
Menotie 3, FI-33470 Ylöjärvi, Finland

Product group: HYDRAULIC MAGNETS

Product: HMAG PRO Hydraulic magnet

If the device has been modified by someone other than the manufacturer or without the manufacturer's permission, this declaration is not valid.

CE

Timo Nieminen
R&D Manager
Ylöjärvi, Suomi, 1.12.2015

10. TECHNICAL SPECIFICATIONS

STANDARD MODELS		HMAG PRO 700 21	HMAG PRO 900 34	HMAG PRO 1200 49	HMAG PRO 1400 57
OUTPUT CHARACHTERISTICS					
Generator power	**kW**	3	6	10	12
Magnet coil power	**KW**	2,7	5,5	9,5	11
Operating voltage	**VDC**	220±5%			
Operation control		Hydraulic			
Magnet coils allowed resistance	**Ohm**	15 - 50	8,8 - 20	5,4 - 15	4,5 - 10
HYDRAULIC CONNECTION					
Pressure line P	**P**	BSP 1/2"	BSP 1/2"	BSP 1/2"	BSP 3/4"
Return line T	**T**	BSP 1/2"	BSP 1/2"	BSP 1/2"	BSP 1"
NOMINAL LIFTING CAPACITY					
Tear-off w/ air gap Ø/300	**kg (lbs)**	5500 (12125)	10500 (23149)	15000 (33069)	18000 (39683)
Slabs, blocks	**kg (lbs)**	2750 (6063)	5250 (11574)	7500 (16535)	9000 (19842)
Cast iron pigs	**kg (lbs)**	105 (231)	230 (507)	410 (904)	580 (1279)
Scrap, kg	**grade 3A, kg (lbs)**	80 (176)	200 (441)	370 (816)	530 (1168)
	grade 24, kg (lbs)	70 (154)	190 (419)	360 (794)	510 (1124)
	grade 40, kg (lbs)	40 (88)	100 (220)	190 (419)	240 (529)
HYDRAULIC POWER REQUIREMENTS					
Flow min.	**l/min (gpm)**	22 (5.8)	36 (9.5)	52 (13.8)	61 (16.1)
Required system pressure min.	**bar (psi)**	190 (2800)	190 (2800)	190 (2800)	190 (2800)
Pressure max.	**bar (psi)**	350 (5000)	350 (5000)	350 (5000)	350 (5000)
HYDRAULIC FLUID REQUIREMENTS					
Viscosity	**cSt**	10-200 / optimum 25-35			
Temperature	**°C (°F)**	max. 70 (158)*			
Filter ratio	**um**	25 or better			
Cooling capacity requirements **	**kW**	1,4	2,4	3,1	3,5
OVERALL DIMENSIONS					
Diameter Ø	**mm (in)**	720 (28.35)	950 (37.40)	1250 (49.22)	1450 (57.10)
Height	**mm (in**	640 (25.5)	780 (31.2)	830 (33.1)	780 (30.7)
Weight (with chains)	**kg (lbs)**	440 (968)	900 (1980)	1550 (3410)	1700 (3740)

Gallons are U.S. liquid gallons.

* Ref. to hydraulic fluids in chapter 6.2

** Cooling capacity for the HMAG PRO taken from the base machine.

DYNASET GENSCO

ELECTRICITY
HG Hydraulic Generator
HGV POWER BOX Variable Hydraulic Generator System
HGV Variable Hydraulic Generator System
HWG Hydraulic Welding Generator
HGG Hydraulic Ground Power Generator

HIGH PRESSURE WATER
HPW Hydraulic High Pressure Water Pump
HPW Hydraulic Power Washer
KPL High Pressure Street Washing Unit
HPW-DUST High Pressure Dust Suppression System
PPL High Pressure Pipe Cleaning Unit
HPW-FIRE High Pressure Firefighting System
FP Fire Fighting Piercing Kit
HDF Hydraulic Drilling Fluid Pump
JPL High Pressure Bin Washing System
HSP Hydraulic Submersible Pump

COMPRESSED AIR
HK Hydraulic Piston Compressor
HKL Hydraulic Rotary Vane Compressor
HKR Hydraulic Screw Compressor

MAGNET POWER
HMG PRO Hydraulic Magnet Generator
MAG Lift Magnet
HMAG PRO Hydraulic Magnet

VIBRATION
HVB Hydraulic Vibra
HVD Hydraulic Directional Vibra
HRC Hydraulic Reversal Cylinder

POWER BOOSTING
HPI Hydraulic Pressure Intensifier
HPI-C Hydraulic Pressure Intensifier for Cylinder

KNOW-HOW
Hydraulic Power Take-off (PTO)
Hydraulic Power Unit Technology
De-Icing Technology
Installation Valves
HHK Hydraulic Grinder
HV/HVY Hydraulic Winch / Winch Unit

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