Kellfri

TECHNICAL MANUAL

Support for using your Kellfri equipment

Technical manual

We would like to start out by thanking you for buying our product. We hope it serves you well.

This manual aims to provide you with fundamental knowledge of some mechanical terms and procedures. Our goal is to provide you with the information you need to optimally use our products and equipment.

Before using your purchased product/equipment, please read the safety information in your product's instruction manual. We also offer a separate folder, General Safety Information, which talks about what you should think about before starting your task.

Instruction and product/equipment manuals can be found at http://manual.kellfri.co.uk/

Kellfri is not liable for errors in this document.

Threaded fasteners

There are various types of threaded fasteners. One thing that all types have in common is a male thread that needs to fit into a female thread. Not only do diameters vary, but there are also varying standards and measuring methods. We will describe the most common types and the types used at Kellfri.

Threads
The threads are the vital part of threaded fasteners. It is what makes screwed joints possible. Since 1947, metric threads (e.g. the M12 screw) are the ISO standard. However, there are also screws measured in inches (e.g. 3/4"), referred to in terms of UNC (course) and UNF (fine) threads.

Screws
On the topic of screws, there are machine screws which are intended for threading into an existing thread (e.g. a nut). Aside from there being many different sizes, there are also different types of heads. The most common are the hexagonal head and socket cap head.

Washers
There are different washers depending on what they are used for. Some distribute pressure from the threaded fastener, some provide a level surface for the nut to be tightened against and some lock the nuts in place. Mainly, there are two types: the flat washer, which distributes load and provides a level surface, and the spring/tooth washer, which locks the fastener.

Nuts
There are really only two types of nuts: those that lock and those that do not. There are varying types of locking nuts, the most common of which is the Nylock nut which has a nylon insert that compresses against the screw thread.

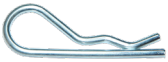
Torque

It is important to torque your fastener properly, preferably using a calibrated torque wrench. You will find a general table below. Ensure that the threads are in good shape and that they are lubricated with e.g. copper paste, if applicable, for proper torque.

Bolt diameter	Bolt size	Torque	Lever arm	Applied force
7 mm	M4x0.5	3 - 4 Nm	250/500 mm	> 1 kg
8 mm	M5x0.5	7 - 8 Nm	250/500 mm	> 3/1.5 kg
10 mm	M6x0.75	10 - 12 Nm	250/500 mm	4 - 5/2 - 2.5 kg
13 mm	M8x1	25 - 30 Nm	500/1,000 mm	5 - 6/2.5 - 3 kg
16 mm	M10x1.25	50 - 60 Nm	500/1,000 mm	10 - 12/5 - 6 kg
18 mm	M12x1.5	90 - 100 Nm	500/1,000 mm	18 - 20/9 - 10 kg
21 mm	M14x1.5	130 - 150 Nm	500/1,000 mm	26 - 30/13 - 15 kg
27 mm	M18x1.5	300 - 340 Nm	500/1,000 mm	60 - 68/30 - 34 kg
30 mm	M20x1.5	400 - 440 Nm	500/1,000 mm	80 - 88/40 - 44 kg
34 mm	M22x1.5	500 - 560 Nm	500/1,000 mm	100 - 112/50 - 56 kg
36 mm	M24x1.5	600 - 660 Nm	500/1,000 mm	120 - 132/60 - 66 kg

Pin fasteners

Pins are commonly used in agricultural machines. They come in different shapes and sizes. They are convenient in that they are easy to assemble and maintain. Here are a few pin types:



R clip (spring clip/locking clip)

Split pin (cotter pin)

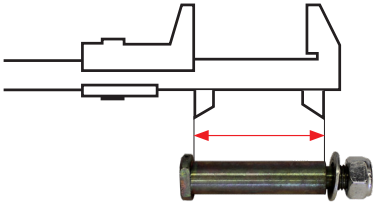
Linchpin

Hitch pin

L pin L pin

Joint pin

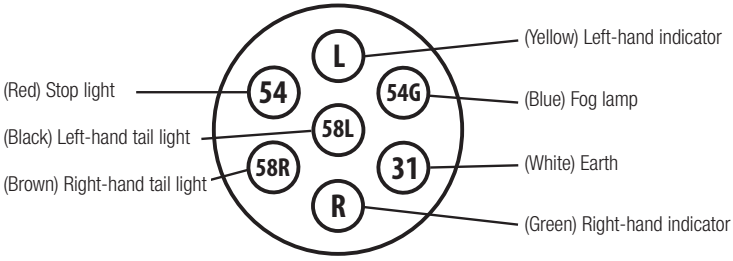
Spring pin

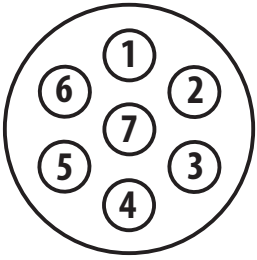


measuring pin length

7 pin trailer connector

This is a diagram showing a Bosch trailer connector. NOTE: The illustration is seen from the back of the tractor/vehicle/ATV doing the pulling. Kellfri's vehicles are connected this way.

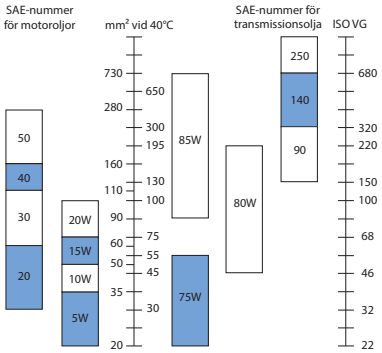




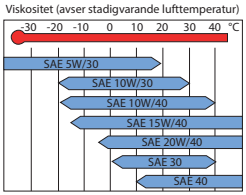
1	(Yellow) Left-hand indicator
2	(Blue) Fog lamp
3	(White) Earth
4	(Green) Right-hand indicator
5	(Brown) Right-hand tail light
6	(Red) Stop light
7	(Black) Left-hand tail light

Oils and fluids

Because of their complexity, we will only give a brief overview of engine oil, transmission fluids and hydraulic oil in this section.



Jämförelse mellan viskositetsklasser enligt SAE och ISO



Viscosity and grades

A 10w-40 oil has a viscosity of 10 at 40°C and 40 at 100°C according to ISO 3448. The “w” stands for winter.
A 10w-40 full synthetic oil is actually a straightforward 40 oil but with attributes enabling it to handle very low temperatures, approx. -45°C to -60°C.

Engine oils

The main purpose of engine oil is to:
1. Lubricate to reduce friction between the engine’s moving parts
2. Cool parts by carrying heat away
3. Protect from corrosion as the oil covers the parts
4. Reduce vibration and noise
5. Clean by removing sludge that gets caught by the filters

We recommend the following Kellfri oils:

T720 15W-40 UHPD engine oil for petrol/diesel agricultural machines
T520 SAE 10W-30 engine and hydraulic oil for petrol/diesel agricultural machines
T750 SAE 15W-40 SHPD long-life engine oil for petrol/diesel agricultural machines

Groups/classifications

The API and ACEA classification systems rate the quality of oils. Refer to the instruction manual to know what you need.

Transmission fluids

Transmission fluids differ somewhat because of their purpose. Kellfri recommends T55 SAE 80W-90 transmission fluid for hypoid gears in agricultural machines.

Hydraulic oils

Hydraulic oils differ markedly from the above oils/fluids in that their main purpose is to convey power. The most commonly used hydraulic oils in Sweden are the ISO VG 32 and ISO VG 46 viscosities. ISO VG 32 is the less dense of them and should only be used when needed. Keep in mind that the higher viscosity, the better.

We carry the following:

Q8 Handel 32 “year round oil”, ISO VG 32, contains zinc wear protection additives (AW)
Q8 Handel 46 “year round oil”, ISO VG 46, contains zinc wear protection additives (AW)

Multi-purpose fluids

There are fluids that can be used for multiple purposes, occasionally for all three purposes above. It can be useful to have this type of fluid when you have low consumption. Kellfri’s T1000 SAE 10W-30 engine, transmission and hydraulic fluid for petrol/diesel agricultural machines is a good example.

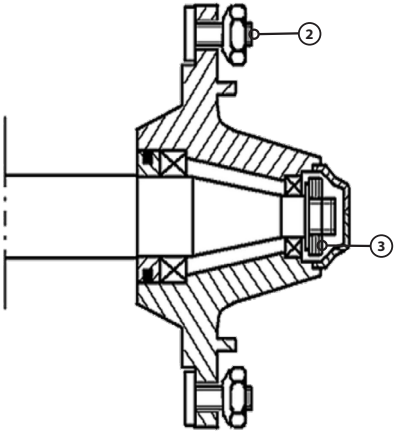
General maintenance

To ensure a long service life and low cost of ownership of your product/equipment, you must maintain it. Kellfri recommends that you make a habit of visually inspecting your product/ equipment before each use to discover any defects or deficiencies before they cause problems. For the best service life, store your equipment and machines under cover.

Service	Interval	Measure.
Tyres	Before use	Check the air pressure in the tyres. It must always at least be the recommended pressure (see labelling on tyres or the table). Pay attention to tyre damage.
Cables and hoses	Before use	Check that all cables and hoses are intact.
Wheel nuts	Perform an initial check after 2-3 hours of operation, and subsequently 2-3 times a year	Retighten all the wheel nuts, see the table.
Vehicle parts	Regularly, at least 3 times a year	check by performing a visual inspection of any brakes, lights, SMV signs, tow bar eyes, axles, bogie eyes, hinges and turntable bearings (if installed). Replace worn and damaged parts.
Vehicle	After use	Wash down with water if required.
Hydraulic oil	Regularly - Change after the first 10 hours Subsequently every 50 hours Or once a year	Always check the oil level and quality. Do not use dirty oil! Refill hydraulic oil when necessary.
Engine oil	According to the instruction manual, regularly	Always check the oil level and status. Refill as needed.
Transmission fluid	According to the instruction manual	Refill transmission fluid when necessary.
Grease nipples	According to the instruction manual, regularly	It is better to lubricate grease nipples too often than too little. Ensure that the grease seeps through to ensure you have used enough. Wipe excess grease off to avoid the grease collecting dirt.
Hydraulic hoses and couplings	Before use	Check that your hoses are not leaking or cracked. Replace as necessary. Check that the couplings are intact.
Warning labels	Regularly	Replace damaged or missing warning labels.
Safety fixtures	Regularly	Ensure that safety fixtures such as the emergency stop are functioning.
Vehicle battery	When infrequently used	Float/maintenance charge the battery for quick starting and to increase its service life.
Moving parts	After use	Lubricate moving parts regularly. Replace wear parts before they break.
Combustion engines	According to the instruction manual, regularly	Check the fuel, coolant and oil levels regularly. Clean the filters as necessary. Follow the service types and intervals in the instruction manual.

Wheels

It is important to also maintain the wheels on your Kellfri product/equipment to keep operating costs down and service life up.



1. Do not overload the rig. Overloading significantly decreases the service life of your equipment.

2. After wheel replacement, check that the wheel nuts are tightened after a stable period of operation. Use copper paste or similar on threads to facilitate future maintenance. Torque according to the instruction manual. If possible, use a torque wrench.

3. Check that the wheel bearing tension is correct to prevent abnormal wear of the wheel bearings. Tighten the threaded nut until no bearing play is detected, then loosen the nut by 1/8 to 1/4 of a turn. Lock the nut with a split pin.

Tyre pressure

Always make a habit of inspecting the wheels on your equipment to ensure the right air pressure. Increase your equipment's service life and reduce operational costs by having the right tyre pressure. Adjust the tractor's tyre pressure according to the mounted equipment.

Wheel size	Bearings	Recommended air pressure	Max load at max 40 km/h
11.5/80 - 15.3”	10	2.5 bar	2,300 kg
23x10 - 12.0”	6	2.1 bar	800 kg
400/60 - 15.5”	14	4.9 bar	3,875 kg
400/60 - 15.5”	18	5.0 bar	2,725 kg
500/50 - 17.0”	18	4.4 bar	4,175 kg
520/50 - 17.0”		4.4 bar	4,175 kg
550/45 - 22.5”		2.8 bar	4,375 kg
600/50 - 22.5”	12	2.5 bar	4,375 kg
710/50 - 22.5”		1.8 bar	4,500 kg

NOTE: These tyre pressures and max loads are approximations. Refer to the tyre section for exact numbers.

Wheel maintenance

- Wheel repairs and replacements are to be done by trained professionals with appropriate tools.
- While mounting/removing wheels, the trailer must be protected from unintentional movement.
- After wheel changes, tighten the nuts after 10 km and again after 50 hours.
- Regularly check and maintain the correct wheel pressure according to the wheel specifications.
- Do not exceed the vehicle's/equipment's speed limit.
- Avoid driving over holes and reduce your speed when turning.
- Overloading the trailer will drastically reduce the service life of the wheels.

General troubleshooting of DIESEL ENGINES

These are general recommendations that may not apply to all engine types. Use this as an indication of what may need to be done. Feel free to contact us at Kellfri for tips and advice.

1. The engine won't start

Possible cause	Measure
a) The key has not been fully turned to start	Turn the key to the start position.
b) The battery is discharged/insufficiently charged	Charge the battery or replace it.
c) Faulty battery contact	Clean the terminals and posts. Grease them with battery terminal grease. Clean corrosion off the battery terminals.
d) The starting engine is "clicking"	Fault in the starting engine or solenoid. Disassemble the solenoid and lubricate. If this does not work, take it to a professional.
e) Fuel tank is empty	Fill the tank and bleed the fuel system.
f) Air in the fuel system	Bleed the fuel system and replace all gaskets.
g) Stop switch not fully retracted	Push the stop switch back in.

2. The engine starts but only stops again

Possible cause	Measure
a) Air in the fuel system	Bleed the fuel system and replace all gaskets.
b) Pre filter is clogged	Change out the filter.
c) Fine filter is clogged	Change out the filter.
d) The feed pump is ineffectual	Replace the feed pump or change the diaphragm.
e) The tank's vent pipe/valve is clogged	Clean out the vent pipe/valve.

3. The engine does not give full power

Possible cause	Measure
a) Clogged air cleaner/filter	Clean the air cleaner and/or air filter.
b) The fuel system's pressure lines are leaking	Tighten the screws, change the gaskets.
c) Black exhaust	Test injector nozzle pressure, change faulty tips, shim to the right back pressure.
d) Test injector incorrectly calibrated	Hire a mechanic to fix.
e) Feed pressure too low due to clogged filter or ineffectual feed pump	Investigate - repair or replace.
f) Insufficient compression +/ leaking valves	Grind the valves. Consider a rebuild.
g) Cylinder head gasket is leaking	Tighten cylinder head nuts/bolts using the appropriate torque. If this is not enough, replace the gasket.

4. The engine is knocking - combustion knocking

Possible cause	Measure.
a) Test injector incorrectly calibrated	Hire a mechanic to fix.
b) Faulty injector	Test injector nozzle pressure, change faulty tips, shim to the right back pressure.
c) Poor compression causing late ignition	See 3.f and 3.g.

5. The engine is knocking - mechanical knocking

Possible cause	Measure.
a) Too much play in piston pins, rod bearings or main bearings	Replace faulty parts.

6. The engine is giving off smoky (black) exhaust

Possible cause	Measure
a) Air cleaner/filter is clogged	Clean or change.
b) Test injector incorrectly calibrated	Hire a mechanic to fix.
c) Injector with damaged tip	Change faulty tips, shim to the right back pressure.
d) Injector with insufficient back pressure	Shim to the right back pressure.
e) Exhaust valve is damaged or burnt	Replace the exhaust valve.
f) Insufficient compression	See 3.f and 3.g.

7. The engine is running unevenly

Possible cause	Measure
a) Clogged fuel filter	Replace with a new one.
b) Feed pump is working incorrectly	Replace the feed pump or change the diaphragm.
c) Air in the injection pump	Bleed the injection pump.
d) Controls are loose	Identify and tighten the gap.
e) Injection pump is working unsatisfactorily	Have it repaired at a diesel workshop.

8. The engine does not go up to full speed

Possible cause	Measure
a) Air cleaner/filter is clogged	Clean or replace.
b) The throttle is not opening fully	Check that the control rods are not bent.

9. The engine speed goes up too high

Possible cause	Measure
a) Air leak at the injection pump	Check the connectors, change the gaskets.
b) Faulty governor	Have checked by a mechanic.

10. The engine overheats

Possible cause	Measure
a) Too little fluid in the cooling system	Fill with fluid.
b) Faulty thermostat	Replace with a new thermostat.
c) Coolant channels are clogged	Clean and flush out rust.

General troubleshooting of DIESEL ENGINES

11. High oil consumption

Possible cause	Measure
a) Leak at e.g. oil pan, crankshaft seal, etc.	Change gaskets and seals.
b) Clogged air cleaner/filter	Clean/replace.
c) Worn piston rings	Measure compression pressure. If too low, replace the piston rings.

12. Oil pressure too low

Possible cause	Measure.
a) Oil level too low	Fill with oil.
b) Faulty sensor or instrument	Check using a manometer. Change if faulty.
c) The oil pump's pressure relief valve is worn/damaged	Replace with a new one.
d) Clogged oil filter	Replace with a new one.
e) Worn parts, such as oil pump, main bearings and crankshaft bearings	Investigate. Rebuild oil pump, change bearings.
f) The crankcase is taking in air	Change the oil dipstick gasket and check other crankcase gaskets.

General troubleshooting of PETROL ENGINES

These are general recommendations that may not apply to all engine types. Use this as an indication of what may need to be done. Feel free to contact us at Kellfri for tips and advice.

1. The engine won't start

Possible cause	Measure
a) The key has not been fully turned to start	Turn the key to the start position.
b) The battery is discharged/insufficiently charged	Charge the battery or replace it.
c) Faulty battery contact	Clean the terminals and posts. Grease them with battery terminal grease. Clean corrosion off the battery terminals.
d) The starting engine is "clicking"	Fault in the starting engine or solenoid. Disassemble the solenoid and lubricate. If this does not work, take it to a professional.
e) Fuel tank is empty	Fill the tank.
f) Air in the fuel system	Bleed the fuel system.

2. The engine starts but only stops again

Possible cause	Measure
a) Air in the fuel system	Bleed the fuel system.
b) Fuel filter is clogged	Change the fuel filter.
c) The fuel pump is ineffectual	Replace with a new fuel pump.
d) The tank's vent pipe/valve is clogged	Clean out the vent pipe/valve.

3. The engine does not give full power

Possible cause	Measure
a) Clogged air cleaner/filter	Clean the air cleaner and/or air filter.
b) The fuel system's pressure lines are leaking	Tighten the screws, change the gaskets.
c) Black exhaust	Test injector nozzle pressure, change faulty tips.
e) Fuel pressure too low due to clogged filter or ineffectual fuel pump	Investigate - repair or replace.
f) Insufficient compression +/ leaking valves	Grind the valves. Consider a rebuild.
g) Cylinder head gasket is leaking	Tighten cylinder head nuts/bolts using the appropriate torque. If this is not enough, replace the gasket.

4. The engine is knocking - combustion knocking

Possible cause	Measure
a) Test injector incorrectly calibrated	Hire a mechanic to fix.
b) Ignition incorrectly set	Set the ignition correctly or change the sensor.
c) Faulty injector	Test injector nozzle pressure, change faulty tips, shim to the right back pressure.
c) Poor compression causing late ignition	See 3.f and 3.g.

5. The engine is knocking - mechanical knocking

Possible cause	Measure
a) Too much play in piston pins, rod bearings or main bearings	Replace faulty parts.

6. The engine is giving off smoky (black) exhaust

Possible cause	Measure
a) Air cleaner/filter is clogged	Clean or change.
b) Exhaust valve is damaged or burnt	Replace the exhaust valve.
c) Insufficient compression	See 3.f and 3.g.

7. The engine is running unevenly

Possible cause	Measure
a) Clogged fuel filter	Replace with a new one.
b) Fuel pump is working incorrectly	Replace with a new fuel pump.
c) Controls are loose	Identify and tighten the gap.

8. The engine does not go up to full speed

Possible cause	Measure
a) Air cleaner/filter is clogged	Clean or replace.
b) The throttle is not opening fully	Check that the control rods are not bent. Adjust to obtain full throttle.

General troubleshooting of PETROL ENGINES

9. The engine overheats

Possible cause	Measure.
a) Too little fluid in the cooling system	Fill with fluid.
b) Faulty thermostat	Replace with a new thermostat.
c) Coolant channels are clogged	Clean and flush out rust.

10. High oil consumption

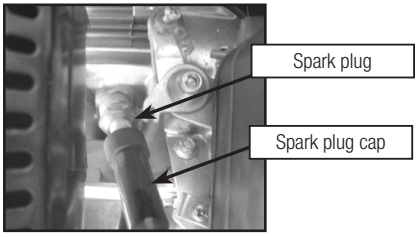
Possible cause	Measure.
a) Leak at e.g. oil pan, crankshaft seal	Change gaskets and seals.
b) Clogged air cleaner/filter	Clean/replace.
c) Worn piston rings	Measure compression pressure. If too low, replace the piston rings.

11. Oil pressure too low

Possible cause	Measure.
a) Oil level too low	Fill with oil.
b) Faulty sensor or instrument	Check using a manometer. Change if faulty.
c) The oil pump's pressure relief valve is worn/damaged	Replace with a new one.
d) Clogged oil filter	Replace with a new one.
e) Worn parts, such as oil pump, main bearings, crankshaft bearings, etc.	Investigate. Rebuild oil pump, change bearings.
f) The crankcase is taking in air	Change the oil dipstick gasket and check other crankcase gaskets.

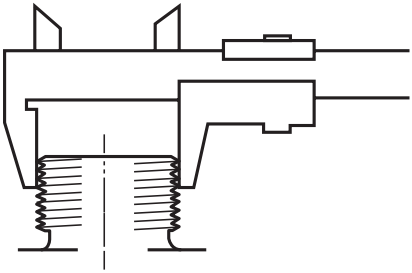
Inspection, cleaning and replacement of spark plugs

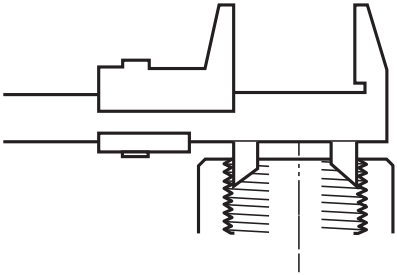
1. Pull out the spark plug cap and unscrew the spark plug using a spark plug socket wrench.
2. Clean the spark plug and measure the distance of the spark gap (distance between the electrodes).
   Generally, the correct distance is between 0.8 mm and 1.0 mm. See the instruction manual for exact numbers.
3. Screw the spark plug back in place.
   When fitting a new spark plug, tighten by hand without a ratchet + 1/2 turn.
   When fitting a used spark plug, tighten by hand without a ratchet + 1/8 - 1/4 turn.



Measuring hydraulic threads

To replace a hydraulic hose, you need to know what kind of connection the hose/coupling has before contacting Kellfri. Use a caliper to measure. The following table describes measuring outer and inner diameters to help you determine the connection you have.



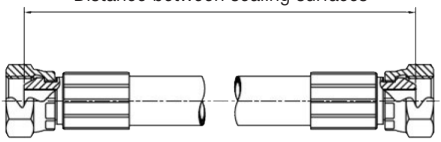


External diameter	Pitch	BSP KP R	Metric	NPTF NPSM	Inner diameter
12.9 - 13.1 mm	18 threads/inch			1/4”	11.4 - 11.9 mm
15.6 - 15.9 mm	1.5 mm/thread		M16x1.5		14.2 - 14.6 mm
16.3 - 16.6 mm	18 threads/inch			3/8”	14.9 - 15.4 mm
17.6 - 17.9 mm	1.5 mm/thread		M18x1.5		16.2 - 16.6 mm
19.6 - 19.9 mm	1.5 mm/thread		M20x1.5		18.2 - 18.6 mm
20.5 - 20.9 mm	14 threads/inch	1/2”		1/2”	18.6 - 19.0 mm
21.6 - 21.9 mm	1.5 mm/thread		M22x1.5		20.2 - 20.6 mm
23.6 - 23.9 mm	1.5 mm/thread		M24x1.5		22.2 - 22.6 mm
26.1 - 26.4 mm	14 threads/inch	3/4”		3/4”	24.1 - 24.5 mm
32.9 - 33.4 mm	11.5 threads/inch			1”	30.3 - 30.8 mm
41.4 - 42.0 mm	11.5 threads/inch			1 1/4”	39.2 - 39.6 mm

Measuring hydraulic hose length

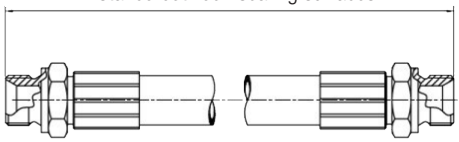
Knowing how to measure hose length is vital. Take care to stretch the hose when measuring!
We at Kellfri can provide you with a new hose if you measure so you know exactly
what you need. Otherwise, please contact your nearest Hydroscand shop.

Distance between sealing surfaces



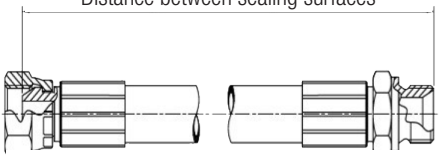
Swivel internal connectors

Distance between sealing surfaces



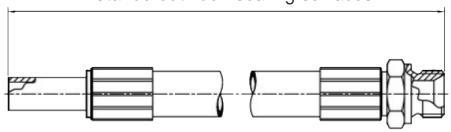
Fixed external connectors

Distance between sealing surfaces



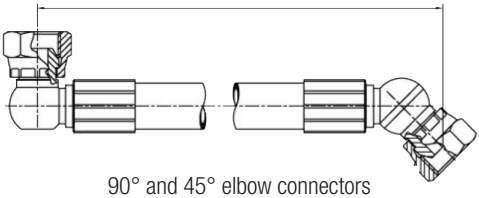
Swivel internal and fixed external connectors

Distance between sealing surfaces



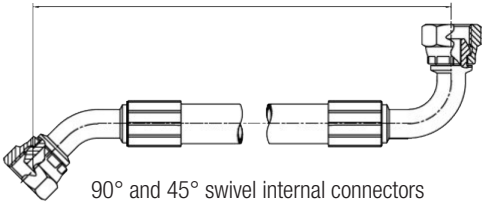
Straight stand pipe and fixed external connectors

Length between the centre lines of the angles



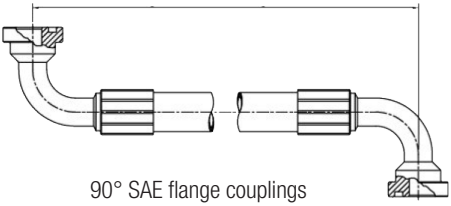
90° and 45° elbow connectors

Length between the centre bends of the pipe



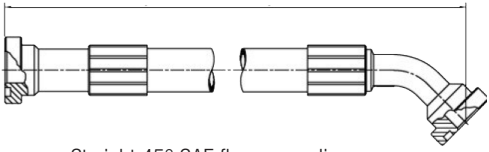
90° and 45° swivel internal connectors

Length between the centre bends of the pipe



90° SAE flange couplings

Length between the centre bends of the pipe
and the flange sealing surface



Straight 45° SAE flange couplings

Tolerance of installed hoses

Hose length	Tolerance
0 - 300 mm	± 3 mm
300 - 1,000 mm	± 6 mm
1,000 -	± 1 %, e.g. 40 mm for 2,000 mm long hose

UF = Fixed external thread
IR = Swivel internal thread
IF = Fixed internal thread

General hydraulic symbols used on Kellfri's products

Direction of current.

Variability or adjustability.

Rotating axle.

Flexible line, hose.

Plugged port.

Socket with connected cable, normally plugged.

Quick coupler with valve.

Manual controls: general, push knob, lever and pedal.

Electrical solenoid with one winding.

Pump, fixed displacement, one and two flow directions.

Single-acting cylinder.

Examples of flow direction symbols.

Check valve with small opening pressure.

Check valve with resistor.

Pressure control valve.

Manual restrictor.

General electrical symbols used on Kellfri's products

Wire.

Wire with current direction.

Bulb.

Battery.

Earth.

100 Ω

Resistor with 100 ohm resistance.

Switch.

Fuse.

Material weight

Below is a table developed by Kellfri with the approximate weights of material and crops.
Remember to avoid overloading as it significantly decreases the service life of the product/equipment.

Materials	kg/m^3	Materials	kg/m^3
Alfalfa	256	Fertiliser - Hydrogen phosphate	961
Ash - wet	730-890	Flour - Wheat	593
Ash - dry	570-650	Waste - Household waste	481
Bark, wood chips	240	Glass - Broken or shattered glass	1,290-1,940
Beans - Ricin	577	Granite - Quarried	1650
Beets	721	Corn - Maize	760
Bricks - normal red	1,922	Grains - Barley	600
Tile - clay	2,403	Grains - Millet	760-800
Tile - Silicon	2,050	Grains - Wheat	780-800
Buckwheat	657	Gravel - Unpacked, dry	1,522
Slag - metal	913	Gravel with sand	1,922
Slag - coal, ash	614	Fertiliser	400
Clay - dry/excavated	1,089	Oats	432
Clay - wet/excavated	1,826	Potatoes	769
Clay - wet/clods	1,602	Sand - Wet	1,922
Clover seed	769	Sand - Dry	1,602
Concrete - Asphalt	2,243	Saw dust	210
Concrete - Gravel	2,403	Sewer sludge	721
Corn on the cob	721	Silage - fresh pasturage	590
Earth - clay, dry	1,249	Corn silage	690
Earth - damp	1,442	Stone	2,515
Earth - wet	1,602	Turf	400
Earth - soft unpacked clay	1,730		

Greasing and degreasing

To maximise the service life of a product/equipment, maintenance - and not least preventive maintenance - is important, and this is largely what greases and oils do. Carefully read the instruction manuals for your new products or equipment to ensure correct maintenance and service life and that the warranty remains valid!

Grease
Much of the products/equipment for agriculture have grease nipples. It is vital that these are used, and used correctly! Before using the product/equipment, read the instruction manual and ensure that all grease points are greased. Be sure to obtain a grease gun.

Greasing can have a number of purposes: lubricating joints to work without friction, preventing corrosion, simplifying assembly/disassembly, reducing friction to keep fuel consumption low, and so on.

Kellfri provides the following lubricants and grease guns:

- “00” central lubrication grease, 18 kg bucket for general use
- “Premium Hi-temp” grease with high heat tolerance, 1 screw cartridge
- “Universal” grease, without screw threading, lithium soap mineral oil-based grease, box
- “Extreme Heavy 2” grease with screw threading, for the most extreme situations, box
- Grease set combo: 1 grease gun, one-handed + 2 “Extreme Heavy 2” cartridges
- Grease set combo: 1 grease gun, two-handed + 2 “Universal” grease cartridges
- Swedish-made one-handed grease gun for easy handling
- Two-handed grease gun for standard cartridges with flexible hose

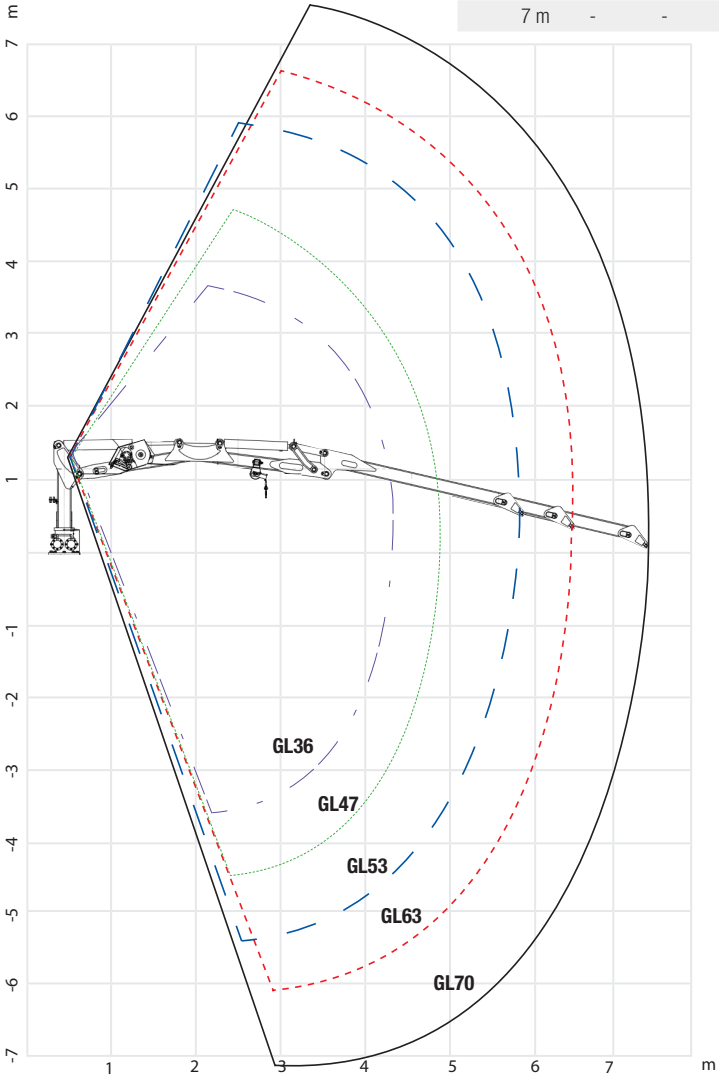
Degreasing
To ensure the best lubricating effect, you need to clean parts of the product or equipment from time to time. We recommend degreasing to achieve thorough cleaning and to remove all residues of old lubricant, which may contain destructive particles.

Lifting diagram for Kellfri's grapple loader

Below, you will find a table detailing the lifting capacity of our grapple loader

GL36
GL47
GL53
GL63
GL70

Distance	GL36	GL47	GL53	GL63	GL70
2 m	260 kg	850 kg	1060 kg	940 kg	800 kg
3 m	175 kg	550 kg	707 kg	625 kg	550 kg
4 m	-	400 kg	530 kg	475 kg	420 kg
5 m	-	-	424 kg	380 kg	320 kg
5.3 m	-	-	400 kg	365 kg	300 kg
6 m	-	-	-	320 kg	250 kg
6.3 m	-	-	-	300 kg	240 kg
7 m	-	-	-	-	215 kg



Groundcare machines

Groundcare machines are often frequently for long periods. It is important that it is maintained properly. Remember to use the equipment for the purpose it was intended so as not to overload it.

Cutting performance
Start at low gear and increase to find the correct gear and speed. The machine should be tilted backwards slightly. If there is a high build-up of dust, the machine is operating too close to the ground. Lower the side skids and support roller, and adjust the top link.

Flails
Flails wear down and can break off. Kellfri recommends inspecting the machine before each use and replacing all damaged flails to avoid imbalance in the drum. Imbalance in the drum puts more wear on your flail mower, significantly reducing its service life.

There are various flail types. At Kellfri, we only use hammer flails and Y-flails as standards in our machines. Hammer flails have the advantage of running faster and cutting more precisely whereas Y-flails can take rougher handling, such as running over stones.

Stones and earth
Grassland machinery is not made for operating in stone and earth, just as much as a normal lawnmower is. So, be aware of the surface you are on and the settings of your equipment.

Speed
The speed at which you operate your grassland machinery fully depends on the surface you are running it on, that is, how long the grass to be cut is. As with normal lawnmowers, you can cut at a faster speed if the grass is short.

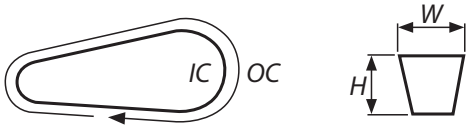
Adjust your speed
Remember to adapt the equipment's speed via the PTO shaft so it does not run too fast. Operating at too high a speed puts your life in danger as the equipment is not made for such speeds and can break down.

Maintenance
Our PTO shafts must be lubricated every 8 hours. Take care to check that there are no cracks in the PTO shaft or equipment.

Belts

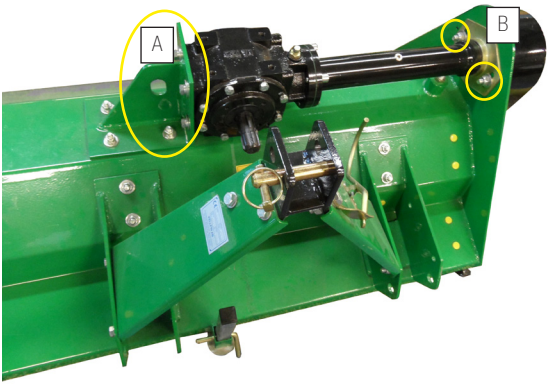
Belts become worn and old and should be replaced before they break. It is so much easier to see, or measure out, which one you need before it is worn out. If you cannot find any labelling on the belt and do not know exactly which machine it should be used for, you can work it out by measuring it. Not only are there different belt lengths/diameters, there are also varying profiles. Use these dimensions to help us find you the right belt:

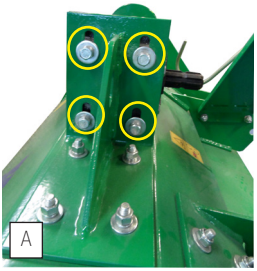
W = belt width
H = belt height
IC = inside circumference
OC = outside circumference

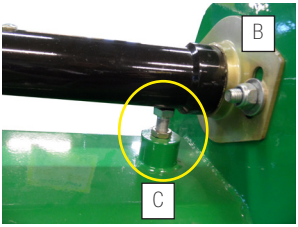


When measuring belts, keep in mind that they may have become worn width (W) and height (H) wise and stretched in circumference (IC and OC). Belts also come with and without ribs and cogs - ensure you get the right belt!

Adjusting belt tension







To adjust the belt tension:

Outer belt on the pulley.
Release bolts on the gearbox, see pictures A.
Tighten the belt = move the gearbox upwards
Loosen the belt's tension = move the gearbox downwards

Inner belt on the pulley.
Release the bolts attached to the drive shaft, see picture B.

Adjust the height of the drive shaft with the bolt, see picture C.
Tighten the belt = higher the bolt
Loosen the belt's tension = lower the bolt

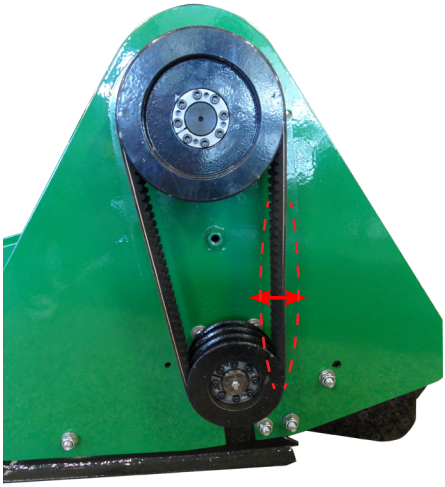
CHECK AND BELT TENSION REGULARLY
For New machine - check and tighten the belts immediately before the first run!

Check the belt tension

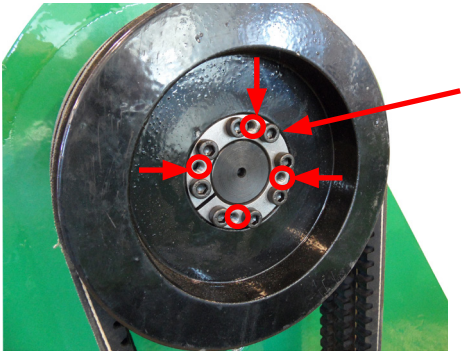
Examples below shows how to check the belt tension on our Flail Mowers.
(To adjust the V-belt on a specific machine, see the product manual.)

IMPORTANT! CHECK AND TIGHTEN V-BELT AFTER 1 HOUR OF DRIVING.

Remember that the V-belt must be in line between the upper and lower pulley.
If the belts are incorrectly positioned, excessive wear on the V-belt arise. Which can lead to unnecessary break down of the machine.



Check the belt tension regularly and tighten as needed. When pressing/ pulling the belts; the belt should move about 20 mm, see arrow above.
The Width-dimension of the belt determines (see previous page) "BELTS"



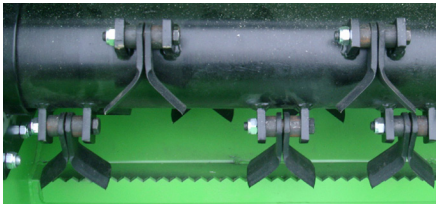
Bolts for pulley must be retightened at regular intervals.

- To keep the clamping bushing in place when changing belts or pulley:
- Loosen and disassemble 4 bolts from the pulley.
- Mount them in the threaded holes on the clamping bush (see marked holes in the picture).
- Then remove the remaining bolts.
- Replace belt / pulley and then refit all bolts.
- Tighten and check the belt tension, adjust if necessary.

Flails and chain links

Y-flail

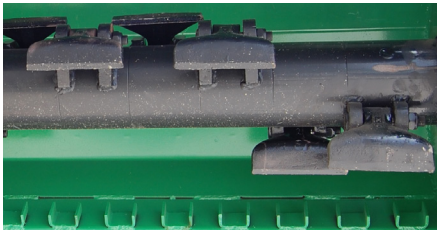
A forged flail which requires less output and has lower cutting power. The flail is less sensitive to stone and is reversible = long service life. The long cutting edge and its design allows it to effectively cut and chop all types of materials. The flail creates less updraught and generates less dust. Cleanly cut grass areas.



Cutting result - Start at low gear and increase to find the correct gear and speed. The machine should be tilted backwards slightly. If there is a high build-up of dust, the machine is operating too close to the ground. Lower the side skids and support roller, and adjust the top link.

Hammer flail

A cast flail which requires more output and has greater cutting power. Performs especially well on saplings, dung and tussocks, but also cuts grass. Breaks the material apart and is more sensitive to stones.



Cutting result - Start at low gear and increase to find the correct gear and speed. The machine should be tilted backwards slightly. If there is a high build-up of dust, the machine is operating too close to the ground. Lower the side skids and support roller, and adjust the top link.

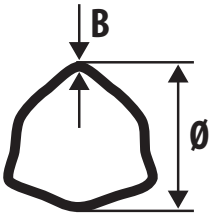
Chain link

Copes with stones and chops grass.

Cutting result - Start at low gear and increase to find the correct gear and speed. The machine should be tilted backwards slightly. If there is a high build-up of dust, the machine is operating too close to the ground. Lower the side skids and support roller, and adjust the top link.

PTO shaft

PTO shafts are common accessories
for tractors in order to operate various equipment. Kellfri recommends that you read our PTO shaft manual before use.



Extension length equals half the shaft tube length. When cutting, it is important to avoid cutting more than half of the tube length and to cut equal amounts on both tubes. It is important to deburr tube ends after cutting. Do not forget to regularly lubricate.

Total dimension = CC dimensions, universal joint - universal joints, uncut.

PTO shafts standard
To be used for standard functions.
The values given apply to 5° deflection angle on the joint and 1,000 hours' service life.

PTO shafts with shear bolt
For use when the rotation of the shaft is subject to blockage. In the event of overloading, the bolt in the coupling is sheared. Resetting is done by replacing the bolt. The values given apply to 5° deflection angle on the joint.

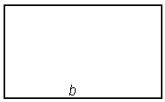
Area of use
PTO shafts are only used to transfer power from the tractor to the connected machines/equipment.

Greasing frequency
Our PTO shafts must be lubricated every 8 hours.

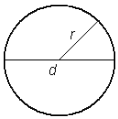
Calculations

At times, it can be useful to have some simple formulas available:
w = width h = height l = length r = radius d = diameter π = pi (~3.14) B = base

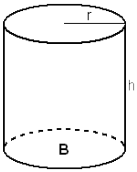
The surface of a rectangle/square = w x h
The surface of a circle = π x r^2
The volume of a cube = w x h x l
The volume of a cylinder = π x r^2 x h



Rektangel



Cirkel



Cylinder

Hydraulic cylinder force
The piston's surface in cm^2 x pressure in bar = force in kg/cm^2
Example: piston diameter: 7.5 cm = piston radius: 3.75 cm, pressure in the hydraulic system: 100 bar
3.75 x 3.75 x 3.14 x 100 = 4,415 kg ~ 4.4 tonnes

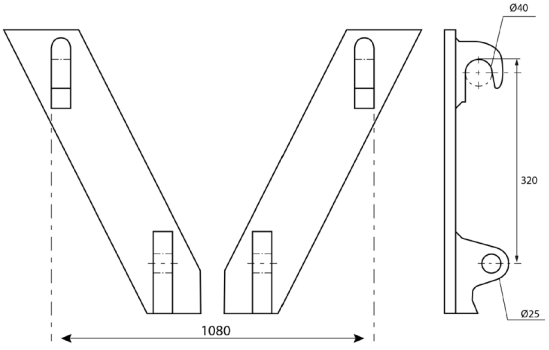
Calculating hydraulic flow and speed
Q = flow D = displacement n = speed V = volumetric efficiency (~ 0.9)
flow = (D x n) / V speed = (Q x V) / D

Conversion table

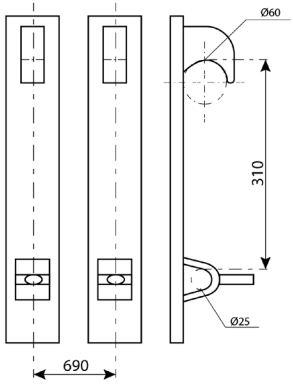
1 oz = 28.35 grammes	1 inch = 25.4 mm	1 bar = 14.5 psi
1 lb = 0.454 kg	1 foot = 30.5 cm	1 lbf ft (foot-pound) = 1.35 Nm
1 st (stone) = 6.35 kg	1 yard = 91.5 cm	1 gallon (USA) = 3.78 litres
	1 mile = 1.6 km	1 gallon (Imperial) = 4.54 litres
		1 in^3 (cubic inch) = 16.38 cm^3

Loader attachment brackets

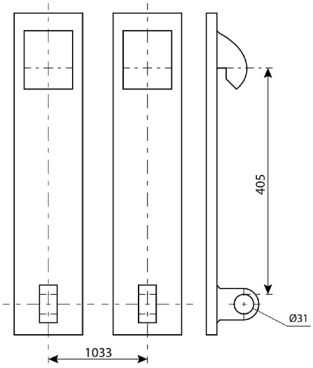
A list of our welded loader attachment brackets with names and dimensions.



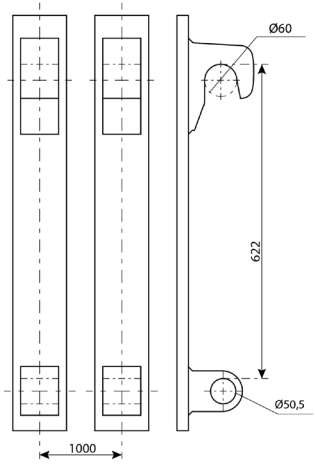
EURO



TRIMA



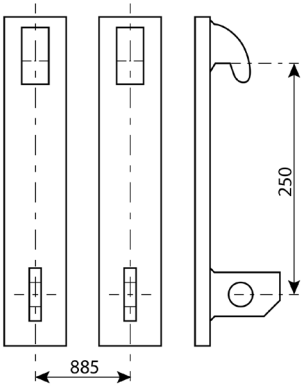
LILLA BM



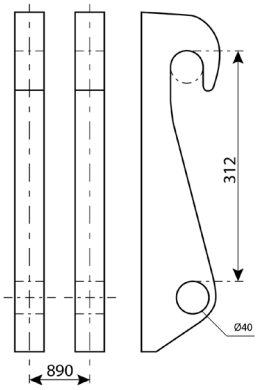
STORA BM

Loader attachment brackets

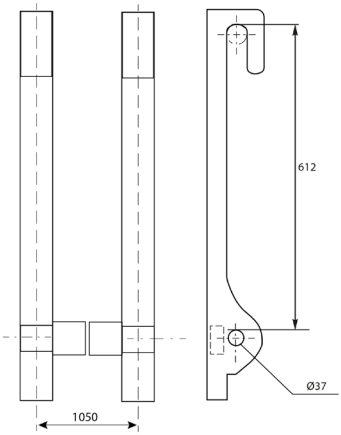
A list of our welded loader attachment brackets with names and dimensions.



ÅLÖ



ZETTELMEYER



JCB

Foderhäckar

Viktigt att tänka på vid val av foderhäck till djur

Olika djur/individer har olika förutsättningar, beteenden och temperament. Vare sig du har häst, nöt eller får så finns det olika rastyper, åldrar, individer och därmed olika beteenden. Du känner dina djur bäst och dess beteende och vi ber dig tänka till kring hur djuren reagerar i olika sammanhang där en foderhäck är inblandad så inga skador uppstår. Är det för många djur runt samma foderhäck ökar konkurrensen och därmed trycket på foderhäcken och skaderisken blir större.

- Du är själv ansvarig för valet av foderhäcksmodell då du känner dina djur bäst. Hur många djur ska samsas kring en foderhäck, hur rangordningen är i flocken är avgörande för storlek av foderhäck och hur många foderhäckar som är lämpligt. När det gäller djur med horn så får man ta det i beaktning när det gäller valet av foderhäck.
- Vid användande av foderhäck i metall så kan det förekomma vassa kanter oavsett typ eller användningsområde. Du som användare är alltid skyldig att kontrollera så det inte finns något som djuret kan skada sig på - ta för vana att kontrollera foderhäcken innan användning och med jämna mellanrum, se till att det inte finns några skarpa kanter och hörn. Du som ägare av djuret har ansvaret för utrustning som används till ditt djur.
- Håll er uppdaterade via jordbruksverkets föreskrifter gällande foderhantering för djur i hagar. Följ alltid gällande regler i djurskyddslagen.
- När misstanke finns att individen kan skadas, skall åtgärd göras före användning för att minimera skaderisk vid användning kombination djur/foderhäck.
- Kontrollera alltid djur och foderhäck kombination som ska användas för att säkerställa säkerhet och funktion.
- Det uppstår ofta ett hårt tryck vid utfodring runt foderhäcken. Kombination vuxna djur / ungdjur medför alltid en ökad risk för unga djur.
- Undvik att ha för få foderhäckar till antal djur.
- Okulärbesiktiga/kontrollera regelbundet konditionen på foderhäcken. Upptäcks sprickor och vridningar, avbryt användningen och åtgärda felet.
- Kontrollera att alla bultar och muttrar är åtdragna. Åtgärda vid behov.
- **VIKTIGT!** Tillsyn ska göras minst en gång per dag under användning.
- Riskområde 5 meter. Ingen annan än operatören får befinna sig inom riskområde under förflyttning med foderhäcken.
- Vid transport följ alltid allmänna trafikregler.
- Det är förbjudet att vistas under foderhäcken när den är upplyft. Ställ foderhäcken på plan och fast mark.
- Foderhäcken skall stå på plant underlag och inte nedsänkt i marken eller foder och snö. För att garantera djurens säkerhet och foderhäckens hållfasthet, se till att markytan i och kring foderhäcken är väl dränerad, torr och ren.
- Se till att djuren alltid har tillgång till foder.

VIKTIGT! När temperaturen sjunker under -25 grader är det viktigt att komma ihåg att stålets hålfastighet försämras. Då är det extra viktigt att kontrollera så att foderhäcken inte fått några sprickor eller spruckit.


FEEDING HORSES IN PASTURES

- If you have more than one horse in the pasture and are feeding with roughage, it is important to have a good distance between the stacks of feed/feeders. It is a good idea to lay out/place more stacks/feeders than there are horses in the pen. That's the safest way. The feeding area should always be clean and dry. Avoid having too few feeders for the number of animals.
- The feeder must not be left empty! Kellfri's feeders are designed to have feed in and nothing else.
- When the feeder is not in use, it must not be left in the pasture.
- Remember that you are responsible for your animals! Make sure that the animals that are to use the feeder are not injured. If there is any suspicion that the animals may be injured, the feeder must not be used. Kellfri AB assumes no responsibility for the animals' behaviour. Bearing in mind the behaviour of horses, they may want to "play" with an empty feeder for which it's not intended. Risk of injury!
- When feeding there is often a great deal of pressure around the feeder. The combination of adult/young livestock always entails an increased risk for young animals.
- Always check that the feeder is intact before use.
- **IMPORTANT!** Inspections should be carried out at least once per day during use. There may be a risk of the animals getting caught in the feeder.
- The feeder must be placed on level ground and not lowered into the ground, feed or snow. In order to guarantee the safety of the animals and the strength of the feeder, there must be clean ground around the feeder.
- Always ensure that there is feed in the feeder. When the feeder is used for horses, they must have free access to roughage.

Important!

The feeding table is subject to corrosion from old feed residues containing acid-treated grain. Old feed should be cleaned from surfaces once a month.

Make sure that the plastic cover or net around the hay bale has been removered before use.

Customer service

You are always welcome to give feedback or ask us about our equipment and products.

Kellfri

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Email: info@kellfri.co.uk

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