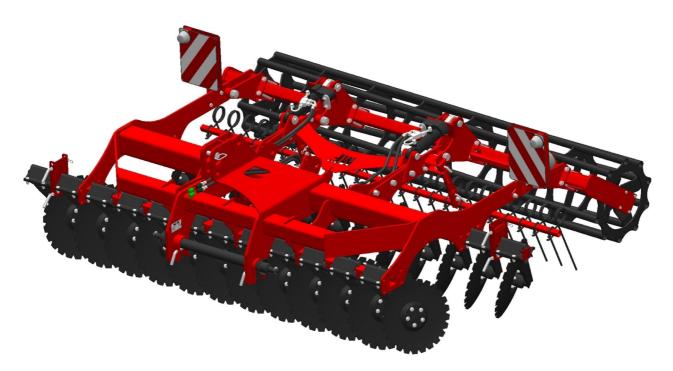


METAL-FACH Sp. z o.o. 16-100 Sokółka, ul. Kresowa 62 Tel: (0-85) 711 98 40 Fax: (0-85) 711 90 65

OPERATING INSTRUCTIONS "KRUK" CULTIVATOR

Type U-740



Edition no. 03 Year of issue 2012 Original Operating Instructions

CE DECLARATION OF CONFORMITY FOR THE MACHINE

Manufacturer: METAL-FACH Sp. z o.o. ul. Kresowa 62 16-100 SOKÓŁKA, Machine:

"KRUK" Cultivator

type/model: U7400..... serial number:....

year of manufacture:.....

Function/ intended use: soil cultivation before sowing

We declare that the machine which this declaration concerns meets the following requirements:

- Directive 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL dated May 17th 2006 on machines and the **Resolution of the Minister of Economy** of October 21st 2008 concerning general requirements for machinery (Journal of Laws, issue 199 item 1228);

Compliance has been evaluated with the following harmonised standards:

PN-EN ISO 4254-1:2009 + AC:2010

PN-EN ISO 13857:2010

PN-EN ISO 12100:2011

- and the following standards: PN-ISO 3600:1998, PN-ISO 11684:1998; and the Resolution of the Ministry of Infrastructure of 31.12.2002 on the technical requirements for vehicles and the scope of their necessary equipment (Journal of Laws 2003, issue 32 item 262 as amended).

Safety Test Report No. MF/1/2012

Person authorised to prepare the technical documentation: Metal-Fach Technical Department

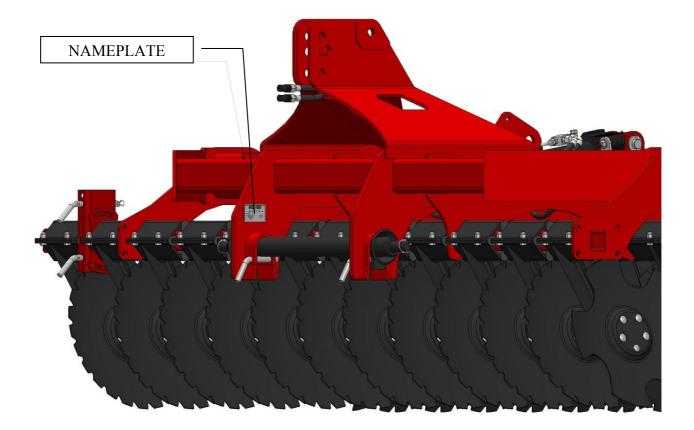
This Declaration of Conformity becomes void and null if the machine's design is changed or modified in any manner without prior consent from the manufacturer.

Sokółka

President of the Management Board Jacek Marek Kucharewicz

Nameplate

Please state the type and identification number of the machine in all communications, questions and warranty issues.



• M	ETAL		CH®	•	
tel.: +4	ul.Kresowa 62, 16-100 Sokółka, Poland tel.: +48 (85) 711 98 40-45, fax: +48 (85) 711 90 65 Agregat uprawowo-siewny KRUK				
Symbol	U-740	Тур]	
Rok prod.	20	Masa		kg	
Nr fabr.		KJ]	
				•	

The identification data of the machine can be found on the nameplate located on the left wall of the frame near the lower strings beam of the three point hitch.

The manual is a part of the machine's base equipment.

Identification data

Machine type:		cultivator
Commercial designation:		KRUK
Type / Code:		U-740
Serial no.:		
Machine manufacturer:		"METAL-FACH" Sp. z o.o. 16-100 Sokółka ul. Kresowa 62 Tel: (0-85) 711 98 40 Fax: (0-85) 711 90 65
Seller:		
	Address:	
	Tel./Fax:	
Date of delivery:		
Owner / User:	Name:	
	Address:	
	Tel./Fax:	

HINT: Note down the type and serial number of your machine. Please give this number every time you contact your supplier.

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13.2 ORDERING PARTS

<u>1. INTRODUCTION</u>

The following instruction manual describes the use and operation of the U-740 machine. If particular problems arise during the operation of the machine which were not discussed in detail in the operating instructions the customer may request supplementary information from the manufacturer or the supplier. The crucial obligations of the manufacturer are stated in the warranty document which specifies the complete and current regulations for warranty services.

META-FACH Sp. z o.o. reserves the right to introduce changes without prior notice and without assuming any obligations resulting from those changes.

The design of the machine allows for safe operation on condition that it is are used according to the operating instructions. Therefore before starting the machine we request that the users read the following manual and familiarise themselves with the safe operation conditions.

<u>All operator of this machine must familiarise themselves with the contents of the operating</u> <u>instructions before commencing works.</u>

This is to make sure the user knows how to operate the machine properly and safely. This also conditions that your warranty rights are maintained.

The manual is part of the machine's equipment.

2. INTENDED USE

The compact KRUK disc harrow is a universal tool for the cultivation of the top layer of soil to the depth of 5 cm to 15 cm. It is designed for use after harvest and before sowing following ploughing or in soil cultivation without ploughing, when the vegetation remains are not covered but mixed with the top soil layer (i.e. mulched). It may be used on all types of soils including those with stones thanks to the use of elastic suspension of the harrow discs. The harrow allows for opening and mixing of the soil and in connection with the packer also for packing and compressing of soil. Due to the resistance to clogging the harrow is well suited for the cultivation of tall stubbles which remain after the harvest of crops and corn and for cultivation of aftercrops intended to be used as fertiliser.

2.1 OPERATION ACCORDING TO THE INTENDED USE

The machine may be started, operated and repaired only be persons who are familiarised with its operation and the operation of the tractor as well as with the rules of safe use of the machine.

The manufacturer does not assume responsibility for any changes made by the user without permission. During the service life of the machine only original parts manufactured by METAL-FACH may be used.

REMEMBER - The machine is designed to be used only in agricultural applications. Any use of this machine other than specified in section 2 is considered improper use. Improper use also includes using the machine in work conditions other than those specified by the manufacturer, improper repair and maintenance.

The manufacturer does not assume any responsibility for any damage resulting from improper use of the machine.

3. USER SAFETY

REMEMBER - Before starting the maintenance or use of the machine the user should familiarise himself with these operating instructions and know the design of individual assemblies and their functions, scopes and means of adjustment paying particular attention to the information regarding safe operation. It is too late to learn that during work.

3.1 GENERAL SAFETY REGULATIONS

The safety regulations given below apply to the machine. Regardless of those regulations the user must also follow the general safety and accident prevention regulations and the traffic code.

The machine (cultivator + tractor) should be operated maintaining all rules of safe operation, in particular:

- every time before start-up check the machine and the tractor whether they are in condition which guarantees safety during movement and operation;
- to maintain steerability the machine may only be coupled to a tractor with a full set of weights on the front axle. When the machine is coupled the load on the tractor's front axle must be at least 20% of the tractor's own weight;
- the user must make sure to follow the maximum allowable axle loads and transport dimensions;
- when coupling the machine to the tractor, raising and lowering the machine using the tractor's hydraulic system, unfolding the machine to its transport or working position and on headlands the operator must ensure that there are no bystanders nearby, especially children;
- when the engine is running no person is allowed between the tractor and the machine;
- noise the equivalent sound pressure emission corrected by A characteristics (L_{pA}) does not exceed 70 dB;
- when connecting the hydraulic lines to the tractor's hydraulic system the operator must make sure that the system is not under pressure. The operator must check the positions of the tractor hydraulic system control levers;
- it is only allowed to operate the hydraulic elements when no person is nearby;
- the hoses and pipes in the hydraulic lines must be checked on a regular basis and replaced with new ones it they are damaged;
- all hydraulic lines must be replaced every 6 years;
- raising, lowering, folding and unfolding and movements of the machine should be done slowly without jerking movements;
- it is forbidden to reverse the tractor and make turns when the machine is lowered to its working position;
- when making turns bear in mind that there are protruding elements in the machine, the use of tractor's independent brakes must be avoided;
- the user must check the tyre pressure in the tractor and in the machine;
- during transport no person should be allowed to stand on the machine nor any load may be placed on it;
- any repairs, lubrication or cleaning of the working elements required during work may only be performed with the engine turned off and the machine lowered;

- only uncouple the machine when its discs rest on stable firm ground, the hook support is unfolded and the engine is turned off;
- the machine may only be stored in its unfolded position, resting on all working components;
- when not in use the machine should be stored in places where it cannot be accessed by unauthorised persons and animals;

3.2 MAINTENANCE AND SERVICING

The technical maintenance may be performed when the machine is lowered to the ground. If the machine is coupled with a tractor it must be turned off and the brakes must be engaged.

Only use tools and instruments that are in good condition and original materials and spare parts.

Use standard pins and safety devices to lock the machine's bolts in place. It is forbidden to use make-shift safety devices such as bolts, rods, wires etc. which may be the cause of damage to the tractor or the machine during operation and may reduce safety.

3.3 TRAVELLING ON PUBLIC ROADS

According to the road travel safety rules /Regulation by the Minister of Infrastructure of 31.12.2002 Journal of Laws no. 32 of 2002, item 262/

A unit consisting of a tractor with a coupled farming machine must meet the same requirements as an individual tractor.

WARNING - The machine (part of the unit consisting of the tractor and machine) is a part protruding outside the outline of the vehicle and obstructing the tractor's rear lights and as such it poses a threat to other vehicles travelling on the road.

REMEMBER - It is forbidden to travel on the roads with the unit (tractor + machine) without appropriate marking.

While travelling on public roads with a unit consisting of the tractor and the machine all rules of the Traffic Code specific to vehicles of this type apply, in particular:

- the side sections of the machine must be folded to the transport position and secured with bolts against unfolding during transport (see. fig. 1).
- during transport on the road the cultivators coupled to a tractor require:
 - marking with warning plates with red and white stripes,
 - lights:
 - elements protruding to the side of the tractor (front marker lights white),
 - repeated rear lights of the tractor (combined lights + reflective lights),
 - marking with a triangle plate indicating a slow moving vehicle,
- do not exceed the maximum allowable transport speed, which is:
 - on paved roads up to 20 km/h,
 - on dirt roads or cobblestone -6 10 km/h
 - on uneven roads 5 km/h maximum

The speed must be adapted to road conditions and the condition of the road surface.

• special care must be taken while passing or overtaking other vehicles and on corners. The maximum permissible width of the machine which is allowed on a public road is 3.0 m.

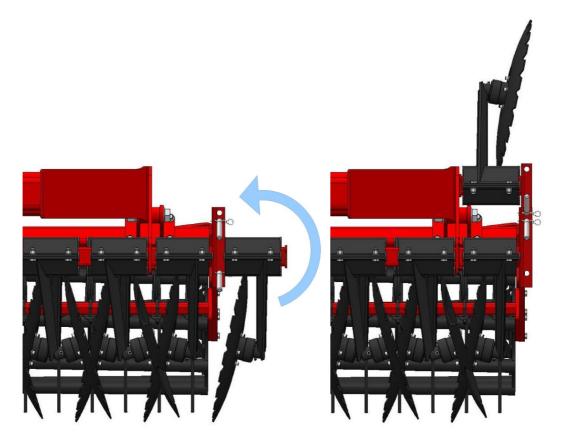
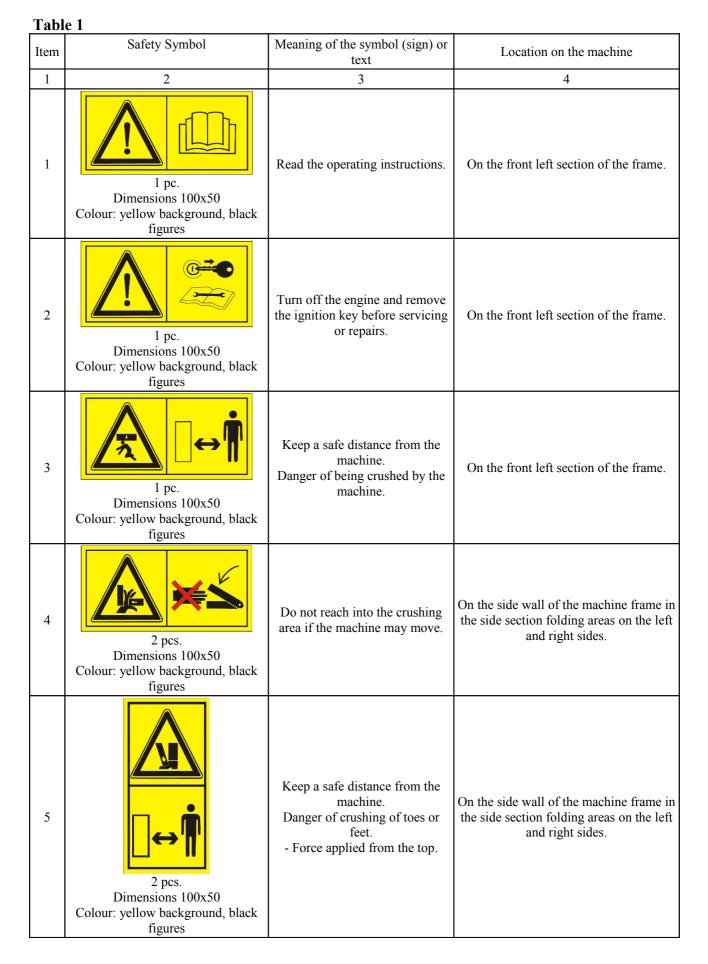


Fig. 1 Working and travelling positions of the machine (side sections folded).

3.4 SAFETY SIGNS



Item	Safety Symbol	Meaning of the symbol (sign) or text	Location on the machine
1	2	3	4
6	Dimensions 50x50 Colour: white background, black figures	Pictogram indicating attachment points for loading the machine on means of transport.	On both sides of the main frame near the attachment point of the upper hitch of the 3-point hitch and near the carriage attachment plate.

4. DISMANTLING AND DISPOSAL

The cultivator is made of materials which do not pose a threat to the environment. After its service life expires, i.e. when further operation is no longer justified, the machine must be dismantled.

Due to the heavy weight of the parts it is required to use lifting devices such as a gantry crane or a forklift during the dismantling process.

The metal parts must be transferred to a scrap metal collection point and the rubber elements must be taken to a collection point for waste of this type. Used oil from the hydraulic system should be collected in sealed containers and transferred to a point which collects such waste.

5. LIGHT SIGNALS (OPTIONAL)

Before entering public roads a warning plate with red and white stripes, signal lights and a bracket for a plate indicating slow moving vehicles must be installed (the means for installation as specified in fig. 2). The power supply shall be connected with the tractor's electric system, and a triangle plate must be installed in the bracket. A warning plate with lights is an optional part of the machine and is supplied on request.

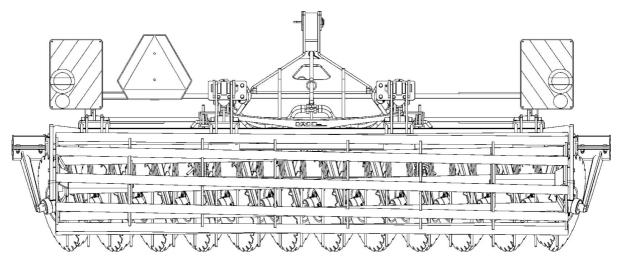


Fig. 2 Installation of warning signals on the machine.

6. MACHINE DESIGN

The suspended KRUK - 3 m type cultivator consists of the following assemblies and subassemblies:

- main frame with a 3 point suspension system, to which two folding external plate supports are attached, and the harrow disks are attached to the frame;
- beams for lower hitches;
- packer brackets with hydraulic or mechanical adjustment of operating depth which allow for compacting of the opened soil to obtain the optimum soil structure for sowing;
- beams with spring-held teeth with operating depth and inclination angle adjustment;
- double acting hydraulic cylinders with cables (for the hydraulic operation adjustment variant).

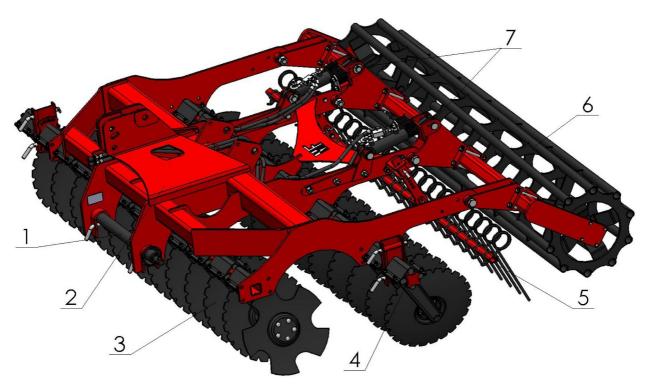


Fig. 3 KRUK Cultivator

1 - beam for lower hitches, 2 - machine frame, 3 - harrow disks, 4 - folding support for external plate, 5 - tines, 6 - round Packer, 7 - working depth adjustment (hydraulic or mechanical).

6.1 TECHNICAL CHARACTERISTICS OF THE KRUK U-710 AND U-710/1 CULTIVATORS

Item	Parameters	Unit	Cultivator type
			KRUK U-740
1	Cultivator type	-	suspended
2	Service width	m	3
3	No. of discs	pcs	24
4	Packer type		- pipe (Ø600)
			- Packer (Ø500)
5	Disc diameter	mm	Ø560
6	No. of scrapers	pcs	24
7	Depth adjustment range	cm	from 5 cm to 15 cm
8	Disc pitch	mm	250

9	Working speed	km/h	8-13
10	Efficiency	ha/h	3.0-5.0
11	Power demand	HP	110-130
		kW	81-96
12	Operation	persons	operator
13	Dimensions	mm	2765/1380/3430
	Length/Width/Height		
14	Weight /with packer/	kg	1800
15	Hitch category	-	3

7. DELIVERY AND LOADING ON MEANS OF TRANSPORT

The machine is supplied to the user partially disassembled. How much the machine is disassembled depends on the used mean of transport. While loading and unloading the machine, parts of the frame indicated as lifting points with appropriate pictograms should be used for lifting the machine see section 3.4.

8. OPERATION AND USE

8.1 **PREPARATION OF THE MACHINE**

While preparing the machine to work it is required to check its technical condition, most importantly the condition of the working elements.

- In addition it is required to:
- check the condition of the bolted joints,
- check the folding and unfolding of the machine,
- check the condition of the hydraulic lines and actuators whether there are any leaks,
- check whether the discs and packer rotate freely by rotating them by hand,
- lubricate the elements of the machine in accordance with the guidelines specified in section 8.5.

The machine's hydraulic system is filled with Renolin VG46 hydraulic fluid manufactured by FUCHS. It is allowed to mix it with the hydraulic liquid with the oil from the tractor's hydraulic system.

8.2 COUPLING THE MACHINE TO THE TRACTOR

To safely and securely couple the machine to the tractor it should be placed on a firm and level ground.

To couple the machine to the tractor it is required to perform the following actions:

- reverse the tractor to a distance which allows to couple the machine with the tractor's lower hitch,
- attach the upper hitch of the 3 point hitch to the machine and remove any play,
- attach the hydraulic lines of the machine to the tractor's external hydraulic system,
- raise the machine,
- check the leaktightness of the machine's hydraulic system, the hydraulic lines may not be bent or damaged,

8.3 MACHINE ADJUSTMENT

8.3.1 ADJUSTMENT OF THE HARROW DISKS' WORKING DEPTH

The working depth of the harrow disks may be adjusted using the tractor's three point hitch or the mechanical or hydraulic shaft adjustment mechanism.

In case of the mechanical adjustment the depth is adjusted by changing the length of the turnbuckles.

In case of hydraulic depth control the adjustments are made using the hydraulic control levers inside the tractor's cabin by changing the number of pressure plates of the actuators placed on the piston rod (fig. 4 - item A).

8.3.2 WORKING DEPTH AND TINE ANGLE ADJUSTMENT

The adjustment of the tine working depth is performed using pins placed in appropriate openings in the plough frog secured with a cotter pin (fig 4. - **item B**).

The angle may be adjusted using the lower scraper attachment pins (fig. 4 - item C).

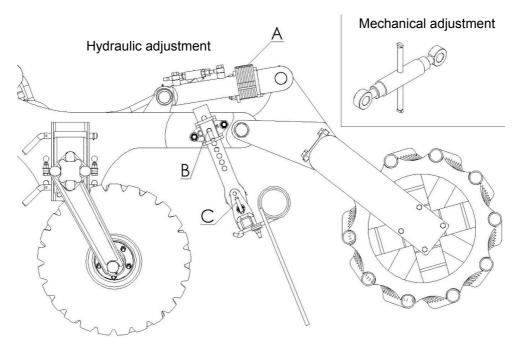


Fig. 4. Machine operation adjustment.

WARNING - Remember to always check the positioning of unused pressure plates of the hydraulic actuator to avoid damaging the hydraulic adjustment system.

8.4 **OPERATION OF THE MACHINE**

Before commencing fieldwork using the machine it is required to:

- remove the warning markings,
- unfold the machine to its working position (external disks),
- set the machines working depth,
- lower the tractor hitch and set it to floating mode.

If during operation the machine becomes clogged with vegetation remains it must be cleared by raising the machine for a moment using the tractor's hydraulic system.

The machine should be adjusted during the first pass. If the machine is properly levelled the frame is parallel to the field's surface.

WARNING	-	Avoid jerky movements while using the machine.
	-	Make turns gently with the machine raised in the transport position.
	-	Do not reverse or turn the tractor around with the machine in the working
		position as it may cause damage to the machine.

8.5 LUBRICATION AND STORAGE

The durability and efficiency of the machine depends to a large degree on systematic lubrication. Use mineral oils for lubricating the machine. Before adding grease clear the lubrication points. The lubrication should be performed according to fig. 5.

Use the **LT-4S-3** once per season.

The hubs of the harrow disks must be lubricated twice per year:

+ before the spring season,

+ before the autumn season.

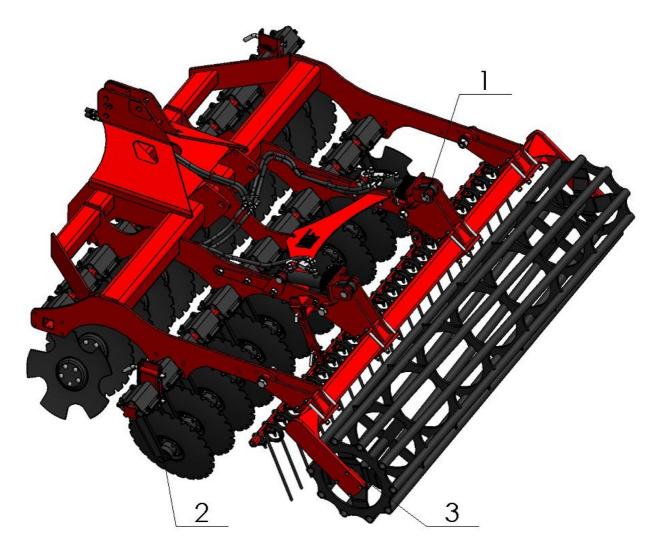


Fig. 5. 1 - hydraulic cylinders / cylinder lug - 4 points (only in the variant with the hydraulic adjustment of working depth), 2 - bearing set of the harrow disks - 24 points, 3 - bearing assembly of the shaft - 2 points.

Before a long period of storage the machine should be cleaned and all malfunctions should be repaired. Protect the machine against weather conditions. The machine should be stored in the unfolded position on a level, hard surface.

9. RESIDUAL RISKS

9.1 DESCRIPTION OF RESIDUAL RISKS

The residual risk results mostly from improper behaviour of the operator caused by lack of knowledge or attention. The highest residual risk occurs in the following situations:

- the machine is operated by minors or persons who are unfamiliar with the operating instructions,
- the machine is operated by persons under the influence of alcohol or other intoxicants,
- the machine is used for purposes other than specified in the operating instructions,
- a person is present between the tractor and the machine with the tractor's engine running,
- bystanders, especially children are present near the working machine,
- the machine is cleaned while working,
- manipulation of the moving elements while the machine is working,
- checking of the machine's technical condition.

While presenting the residual risk the machine is treated as designed according to the state of knowledge in the year of its manufacture and maintaining the basic OH&S rules.

9.2 EVALUATION OF THE RESIDUAL RISK

If the following guidelines are adhered to the occurrence of residual risk may be minimised:

- always follow the safety regulations described in the operating instructions,
- read and fully understand the operating instructions,
- keep your hands out of hazardous spaces;
- it is forbidden to operate the machine in the presence of bystanders and in particular children,
- maintenance and repair of the machine may only be performed by trained personnel,
- the machine may only be operated by persons who were trained in its operation and have familiarised themselves with the operating instructions,
- the machine is protected against access by children,
- the machine is operated by persons in good physical condition who are not under the influence of any intoxicants.

WARNING!

The residual risks are present when the listed rules and indications are not followed.

10. WARRANTY CONDITIONS AND WARRANTY SERVICES

The detailed information on the warranty for agricultural equipment is listed in the Civil Code, Part III, Warranties, art. 577-581. This information should be available at every farming equipment dealership and service workshop.

The organisations responsible for the execution of warranty services (reseller/dealer) should be entered in the warranty card during the sale of the machine.

11. LOCATION OF THE MACHINE'S CENTRE OF GRAVITY

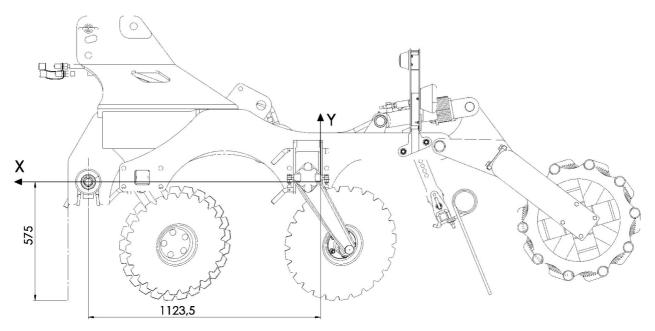


Fig. 6. Location of the machine's centre of gravity.

12. STABILITY OF THE UNIT CONSISTING OF THE TRACTOR AND CULTIVATOR

The tractor should have appropriate ballast at its front end to provide proper steering and braking performance. When the machine is coupled the load on the tractor's front axle must be at least 20% of the tractor's own weight (Fig. 7).

Remember that the road and the coupled machine influence the driving characteristics. The driving style should be adjusted to terrain conditions and type of soil.

While negotiating corners with the coupled or suspended machine it is important to bear in mind the reach and weight of the machine.

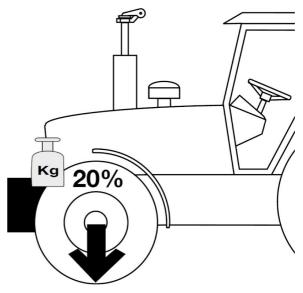


Fig. 7. Minimum load on the tractor's front axle.

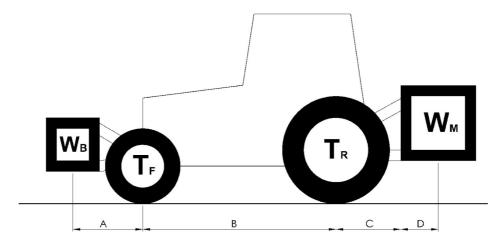


Fig. 8. Static stability.

The following data is required for calculations:

- A [m] distance between the centre of gravity of the front ballast / front mounted equipment and the centre of the front axle;
- **B** [m] distance between the tractor's wheels;
- **C** [m] distance between the centre of the rear axle and the lower hitch ball;
- **D** [m] distance between the lower hitch ball and the centre of gravity of the rear mounted machine.
- Tc [kg] tractor's own weight;
- TF [kg] front axle load of an unloaded tractor;
- **T**R [kg] rear axle load of an unloaded tractor;
- **W**_M [kg] total weight of the machine installed in the rear
- **W**^B [kg] total weight of the front ballast/front mounted machine.

$$W_{B} = \frac{W_{M} * (C+D) - T_{F} * B + 0.2 * T_{C} * B}{A+B}$$



WARRANTY CARD

FOR THE "KRUK" CULTIVATOR U-740

The warranty service is provided on behalf of the manufacturer by:

filled out by the seller

Date of manufacture	9	Serial no.	
Date of sale		Dealer's signature	

Customer name	
Address (Postal code / Post office)	
Street / Number	.Telephone

META-FACH Sp. z o.o. reserves the right to introduce changes to the machine's design without prior notice and without assuming any obligations resulting from those changes. Unauthorised modifications of the machine shall result in the warranty becoming null and void. During the service life of the machine only original parts manufactured by METAL-FACH may be used.

COMPLAINT CA	L NO. DATE
Customer data:	
Customer's name and si	name / Company name
City:	(Postal code / Post office)
Street	Fax
Machine name and code	Z/T
Date of purchase	Serial number Year of manufacture
1. When and under wh	circumstances was the machine's failure discovered?
2. Comprehensive faul	description
3. Customer's propose	mode of complaint call processing
	(legible signature of the customer who filed the complaint)

NOTE: If the complaint is found to be unjustified, all complaint processing costs will be charged to the complaint applicant.

Customer complaint placed by phone

date.....

Legible signature of the Dealership Representative

SERVICE LOG

Item	Date of call	Date of completion	Description of completed service actions and replaced parts	Name and stamp of the mechanic or service station

13. PARTS CATALOGUE

13.1 USING THE PARTS CATALOGUE

Use the Catalogue as follows:

- a) Determine which assembly of the machine houses the part to be replaced.
- b) Find the appropriate assembly drawing with the part number you are looking for.
- c) Using this number found in the drawing as reference, find the appropriate drawing or catalogue number in the table description and the number of items.

13.2 ORDERING PARTS

Spare parts may be ordered by phone or by mail stating:

- a) Address of the buyer,
- b) Name, symbol and serial number of the machine and its year of manufacture,
- c) Name of the part,
- d) Drawing number or standard number from the parts catalogue,
- e) Number of items,
- f) Payment conditions.

The parts shall be sent using a courier service or picked up by the customer from the manufacturer or the nearest Metal-Fach representative.

External Spare Parts Order

3. Telephone.....

(Postal code, city, street, number)

4. Specification of ordered parts:

Item	Machine/equipment name	Part name	Catalogue number	Quantity

(City, date)

(Legible signature of the buyer)

(Company stamp)

5. The order was completed on:

(legible signature of the Service employee)

- value to be invoiced

- invoiced - Invoice no.....