



**UPCC**

# ELEMENTS OF TRANSMISSIONS AND CHASSIS

**AUTOMOTIVE DIVISION**



UPEC is one of the leading CIS manufacturers of bearings, electric motors, pumps, CNC grinding machines, transmissions and chassis, air-cycle climate control systems, trailed agricultural machinery, as well as other machines, equipment, units and components for railway, automotive, agricultural, power and electric machinery, defense, metallurgical and other industries.

UPEC was established in 1995, and today it unites a number of leading manufacturing companies and engineering centres with more than half a century of history.

#### The main manufacturing capacities of the UPEC Industrial Group:



Kharkov Bearing Plant (**HARP**) — manufacture of energy-efficient bearing units and “cartridge” bearing products;

Oskol Bearing Plant **HARP** — international localization of **HARP**, manufacture of a new generation of bearing products;



Lozova Forging-Mechanical Plant (**LKMZ**) — manufacture of cold- and hot-forged components, transmissions and trailed agricultural machinery;



Kharkov Electro-Technical Plant Ukrelectromash (**HELZ**) — manufacture of induction electric motors, a wide range of electric pumps and other consumer products;



Kharkov Machine-Tool Plant (**Harverst**) — manufacture and refurbishment of roll and cylindrical grinding machines, as well as special-purpose grinding machines for the bearing industry;



Ukrainian Casting Company (**ULK**) — manufacture of steel and iron castings.

The products of the UPEC Industrial Group are presented on the market by the divisions united in **UPEC TRADING**: Railway, Automotive, Electro-Technical, Machine-Tool and Agricultural.

The **Automotive Division** presents to the market the products of three companies – Kharkov Bearing Plant, Lozova Forging-Mechanical Plant and Ukrainian Casting Company.

The division provides a wide range of products – bearings, forgings, castings, components, complex units and assemblies for automotive industry manufacturers, motor builders, agricultural and transport machine builders. It also supplies components and assemblies to the aftermarket.

*We are focusing on the individual needs of our customers and offering technical solutions with maximum efficiency. We are fulfilling orders in accordance with the customers' drawings.*

# JOINT ENGINEERING CENTRE

*The main company's know-how is created in the Joint Engineering Centre of the company, which also includes a number of specialized engineering centres and departments.*

The Joint Engineering Centre (JEC) was established to implement a new strategy of the UPEC Industrial Group, focusing on the priority of engineering knowledge, development and manufacture of innovative products with a high intellectual level.

The JEC performs the most complex calculations and studies, mathematical simulation and optimal design for all of the Industrial Group's product areas, taking designs to the commercial prototypes together with the UPEC specialized engineering centres.



## UKRAINIAN TRANSMISSION AND CHASSIS DESIGN BUREAU (UKBTSh)

UKBTSh provides engineering support to the mass production of LKMZ.

UKBTSh develops agricultural machines and tools for the optimal land cultivation, aiming to provide farmers with a full range of tillage machinery.

UKBTSh also develops parts for transmissions and chassis, including a new line of axles for a wide range of automobiles and tractors, construction and special-purpose machinery.

Together with the Department of Hybrid Transmissions, the JEC is working on an innovative project for the optimal design of continuously variable hydrostatic-mechanical transmissions for a new generation of automobiles and tractors.

# LOZOVA FORGING-MECHANICAL PLANT (LKMZ)



**LKMZ**  
[www.lkmz.com](http://www.lkmz.com)

*The Lozova Forging-Mechanical Plant (LKMZ) is the largest manufacturer of cold- and hot-forged components in Ukraine and the CIS, as well as transmissions, armoured vehicles and trailed agricultural machinery.*

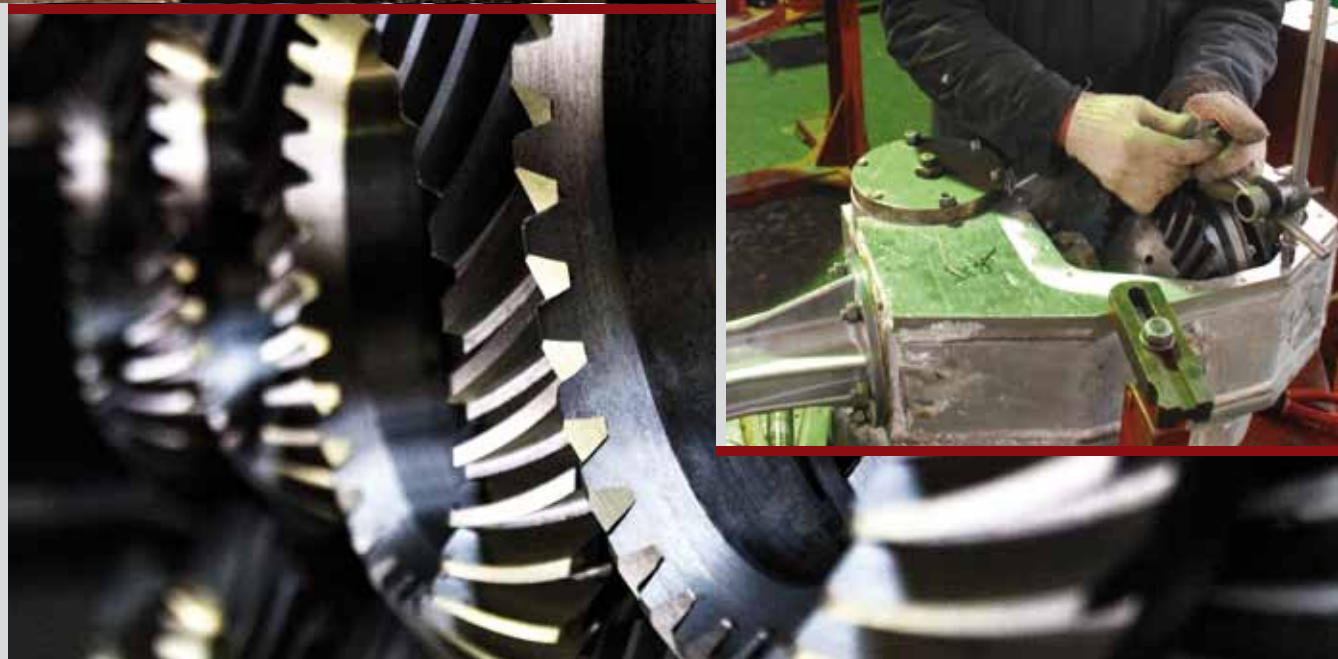
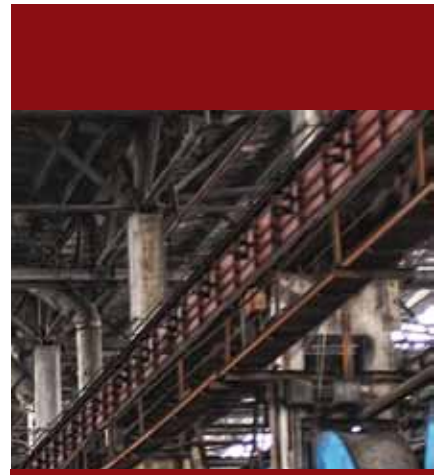
LKMZ specializes in the high-volume production of about 300 different forgings for railway transport, tractor, automotive and agricultural machinery.

The plant is the leading manufacturer of complex-shaped and high-precision forgings, grader tandem axles, components of transmissions and chassis for tractors and road-building machinery, as well as axles for buses, components and units for tractors and railway rolling stock. It is the largest Ukrainian manufacturer of hulls and transmissions for light armoured vehicles.

Applying of the unique technology makes it possible to produce parts of non-standard shapes with a high level of precision and reduced steel consumption.

In recent years, the company has successfully completed the development of mass production of a new line of tillage equipment for modern energy-efficient and soil-preserving agriculture.

The company has introduced the ISO 9001:2008 quality management system. The Lozova Forging-Mechanical Plant is an official supplier of components for SKF.

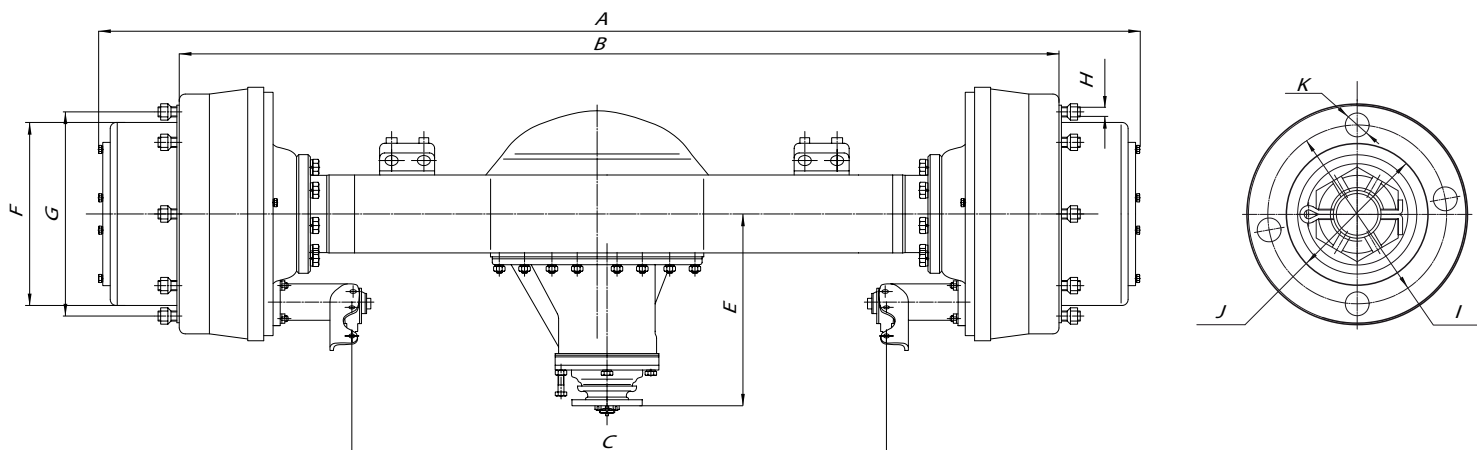


# LKMZ PRODUCT APPLICATION

Products manufactured by Lozova Forging-Mechanical Plant find a wide application range in various industries.

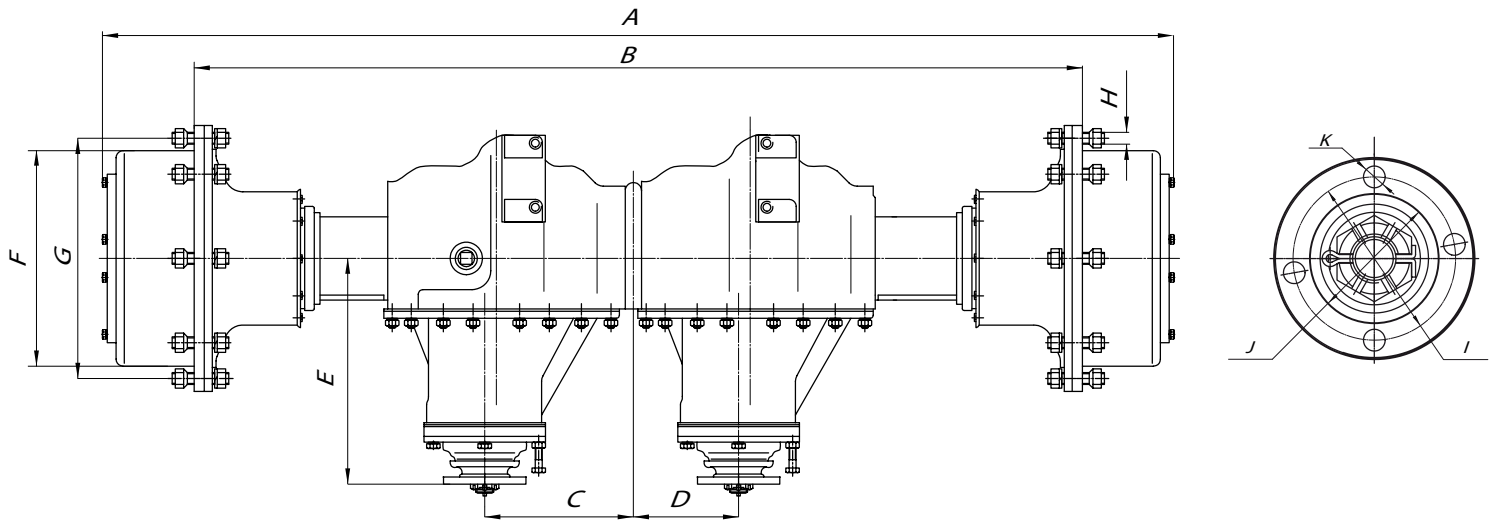


# AXLES FOR AGRICULTURAL WHEELED TRACTORS



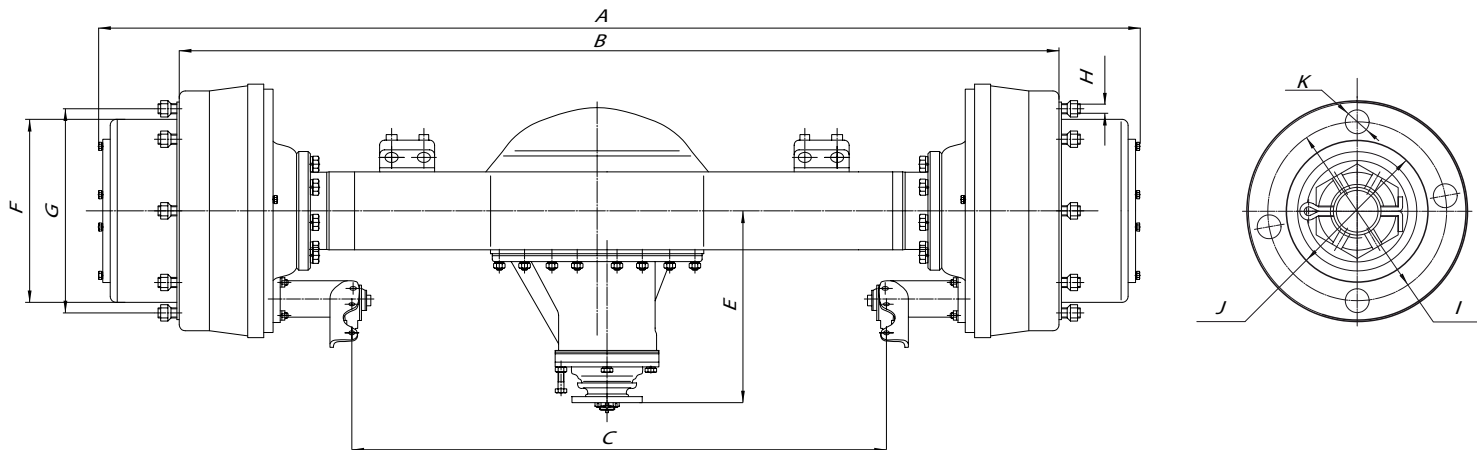
Parameter	Axle designation				
	L151.72.005A	L151.73.005A	120.73.005-2	470.72.005A	470.73.005A
Static axle load, kN	150	150	150	200	200
Working axle load, kN	80	80	80	80	80
Torque output, kNm	77	77	77	77	77
Reduction ratio					
— total:	20.389	20.389	20.389	20.389	20.389
— final drive:	4.444	4.444	4.444	4.444	4.444
— wheel reduction gear:	4.588	4.588	4.588	4.588	4.588
A, mm	2115	2115	2115	2115	2115
B, mm	1769	1769	2120	1769	1769
C, mm	1169	1169	1520	1169	1169
D, mm	90	30	30	90	30
E, mm	403	403	403	403	403
F, mm	370	370	370	370	370
G, mm	415	415	415	415	415
H	8xM22	8xM22	8xM22	8xM22	8xM22
I, mm	120	120	120	120	120
J, mm	95	95	95	95	95
K	4x16	4x16	4x16	4x16	4x16
Weight, kg	685	694	730	700	710

# AXLES FOR AGRICULTURAL CRAWLER TRACTORS



Parameter	Axle designation
	L150.72.004
Static axle load, kN	150
Working axle load, kN	90
Torque output, kNm	77 / 77
Reduction ratio	
— total:	20.389 / 20.389
— final drive:	4.444 / 4.444
— wheel reduction gear:	4.588 / 4.588
A, mm	1868
B, mm	1494
C, mm	235
D, mm	175
E, mm	403
F, mm	370
G, mm	415
H	8xM22
I, mm	120
J, mm	95
K	4x16
Weight, kg	570

# AXLES FOR FRONTAL LOADERS

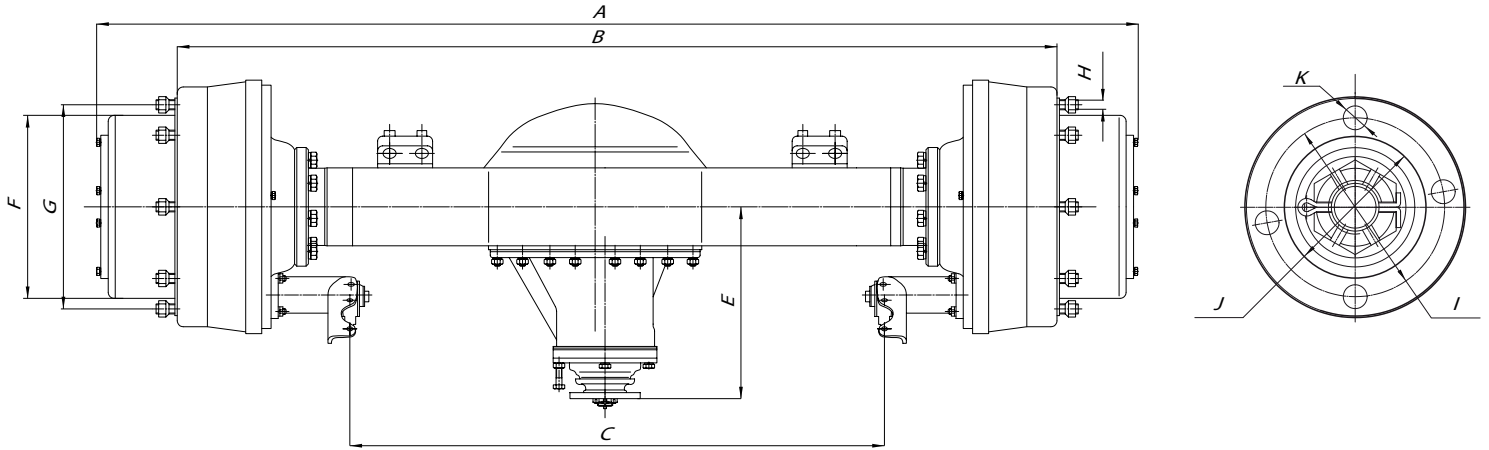


Parameter	Axle designation										
	ODM.73.001	ODM.73.001-1	ODM.73.001-1-10	ODM.73.001-1M	ODM.73.001-1 ODM.73.001-1 M-10	ODM.73.001-4	ODM.73.001-4A	ODM.73.001-6	ODM.73.001-7	L156.72005	L156.73005
Static axle load, kN	185	200	200	210	210	200	200	200	185	150	150
Working axle load, kN	110	125	125	125	125	125	125	125	110	80	80
Torque output, kNm	58	64	77	64	85	64	64	85	58	77	77
Reduction ratio — total: — final drive: — wheel reduction gear:	15.292 3.333 4.588	15.292 3.333 4.588	20.389 4.444 4.588	15.292 3.333 4.588	20.389 4.444 4.588	15.292 3.333 4.588	15.292 3.333 4.588	20.389 4.444 4.588	15.292 3.333 4.588	20.389 4.444 4.588	20.389 4.444 4.588
A, mm	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115	2115
B, mm	1769	1769	1769	1769	1769	1769	1769	1769	1769	1769	1769
C, mm	1059	1169	1169	1169	1169	1169	1169	1169	1169	1169	1169
D, mm	30	30	30	30	30	30	30	30	30	30	30
E, mm	403	403	403	403	403	403	403	403	403	403	403
F, mm	370	370	370	370	370	370	370	370	370	370	370
G, mm	415	415	415	415	415	415	415	415	415	415	415
H	8xM22	12xM22	12xM22	12xM22	12xM22	8xM22	12xM22	12xM22	12xM22	8xM22	8xM22
I, mm	155	155	155	155	155	120	120	155	155	120	120
J, mm	132	132	132	132	132	95	95	132	132	95	95
K	8x10	8x10	8x10	8x10	8x10	4x14	4x14	8x10	8x10	4x16	4x16
Weight, kg	703	712	712	747	747	712	713	712	703	697	685



# AXLES FOR SPECIAL-PURPOSE MACHINERY

(skidders, snow removal machinery)



Parameter	Axle designation		
	L157.72.005	L157.73.005	TM-3.73.005
Static axle load, kN	150	150	150
Working axle load, kN	80	80	110
Torque output, kNm	77	77	77
Reduction ratio			
— total:	20.389	20.389	20.389
— final drive:	4.444	4.444	4.444
— wheel reduction gear:	4.588	4.588	4.588
A, mm	2115	2115	2115
B, mm	1769	1769	1769
C, mm	1169	1169	1059
D, mm	90	30	30
E, mm	403	403	403
F, mm	370	370	370
G, mm	415	415	415
H	8xM22	8xM22	8xM22
I, mm	120	120	120
J, mm	95	95	95
K	4x16	4x16	4x14
Weight, kg	697	697	701

# CARDAN SHAFTS

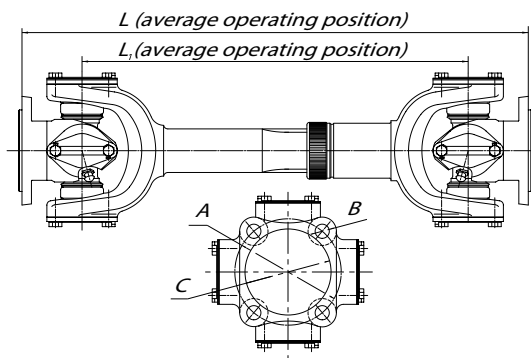


Fig. 1

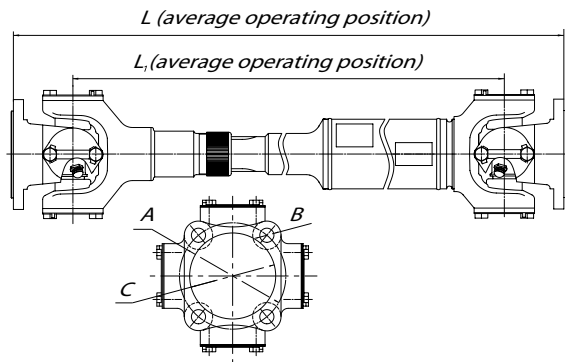


Fig. 2

Designation	Parameter								
	Fig.	A, mm	B, mm	C, mm	L, mm	L1, mm	Torque rating, kN·m	Imbalance, N·m	Weight, kg
120.36.011	1	120	16	95	1100	960	2.0	0.7	29.5
150.36.011-2B	1	120	16	95	1094	954	2.0	0.7	29.5
151.36.011	1	120	16	95	574	434	2.0	0.7	22.8
180R.36.011	1	120	16	95	1344	1204	2.0	0.7	29.5
120.41.019	2	120	14	95	1217	1087	1.5	0.5	18.5
150.41.013-3	2	120	14	95	1285	1155	1.5	0.5	21.6
151.41.019-1	2	120	14	95	1089	959	1.5	0.5	18.1
151.41.019-1-01	2	120	14	95	1024	894	1.5	0.5	17.5
151.41.019-1-02	2	120	14	95	897	767	1.5	0.5	16.4
180R.41.013	2	120	14	95	1535	1405	1.5	0.5	23.5

# DOUBLE CARDAN YOKE

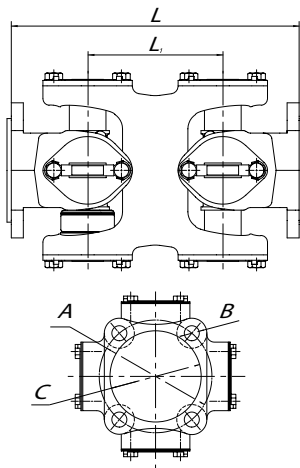


Fig. 1

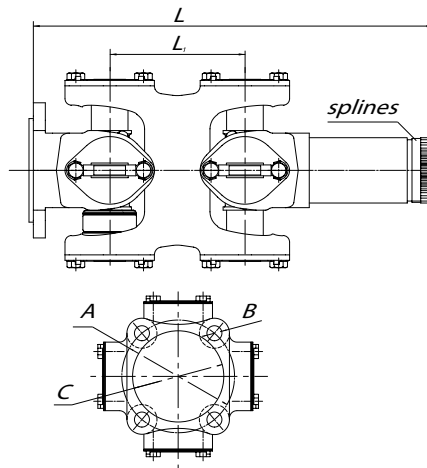


Fig. 2

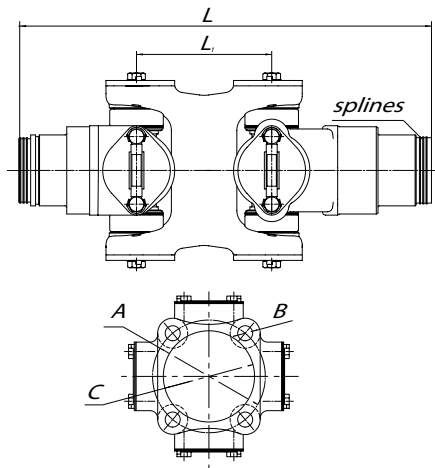
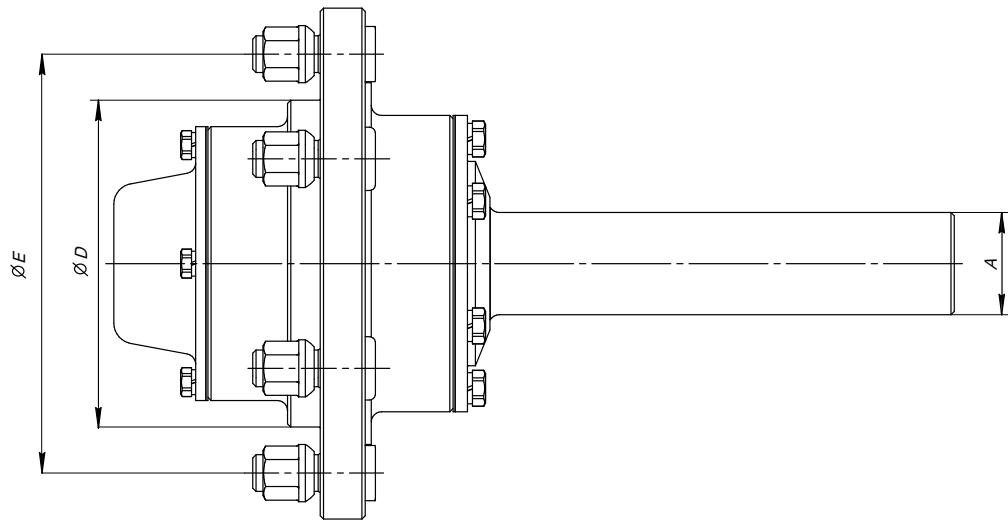


Fig. 3

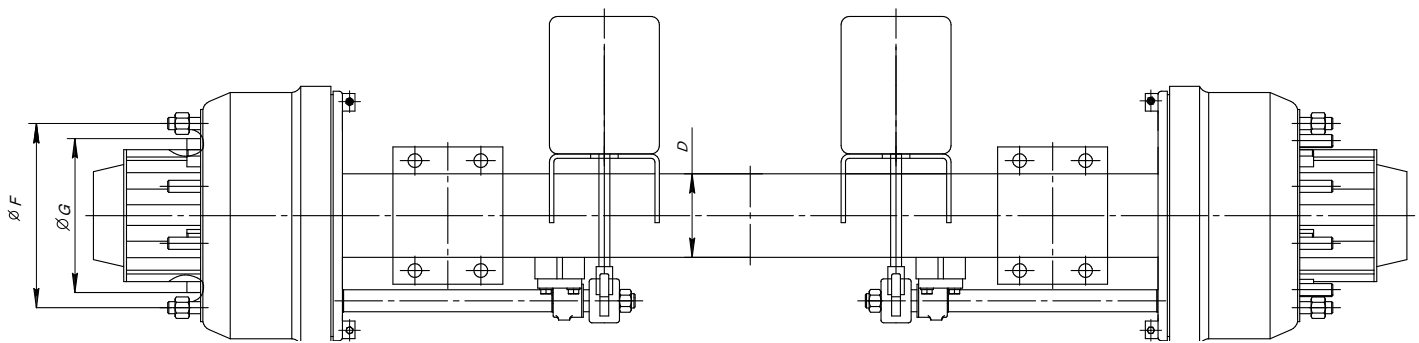
Designation	Parameter									
	Fig.	A, mm	B, mm	C, mm	L, mm	L1, mm	Torque rating, kN·m	Splines	Splines1	Weight, kg
151.36.016	1	120	16	95	264	124	2.0	-	-	17.6
151.36.023-2	2	120	16	95	382	124	2.0	straight-sided 16x43x50x5	-	15.5
151.41.021-1	2	120	14	95	323	100	1.5	involute 38x2x18	-	10.1
120.39.023A	3	-	-	-	374	-	4.4	straight-sided 16x43x50x5	involute 50x2.5x18	15.5

# HUBS FOR VARIOUS TYPES OF MACHINERY



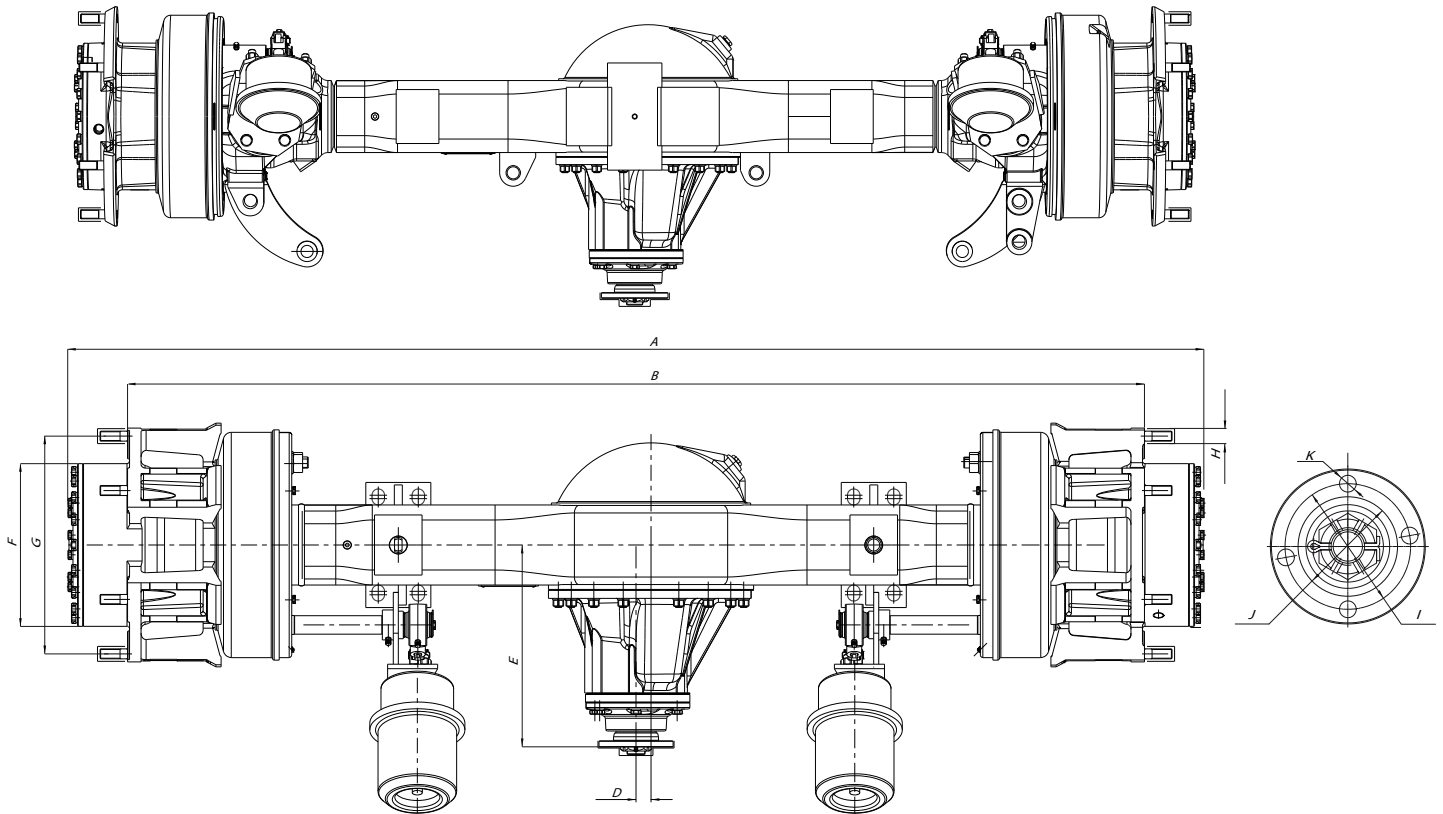
Designation	Static load capacity, kg	Diameter of wheel stud position, E, mm	Diameter of collar for wheel disk, D, mm	Number of wheel studs	Wheel studs	Bar cross-section on outer surfaces, A, mm	
						■	●
8395.0,5K35.S100	500	100	60	4	M12x1.25	35	
8395.0,5D40.S100							40
8395.0,75K40.S100	750	100	60	4	M12x1.25	40	
8395.0,75D45.S100							45
8395.1K40.S140	1000	140	94	5	M12x1.25	40	
8395.1D45.S140							45
8395.1,25K45.S140	1250	140	94	5	M12x1.25	45	
8395.1,25D50.S140							50
8395.1,5K50.S140	1500	140	94	5	M12x1.25	50	
8395.1,5D50.S140							50
8395.2K55.S205	2000	205	160	6	M18x1.5	55	
8395.2D60.S205							60
8395.2,5K60.S205	2500	205	160	6	M18x1.5	60	
8395.2,5D70.S205							70
8395.3K65.S205	3000	205	160	6	M18x1.5	65	
8395.3D80.S205							80
8395.3,5K70.S205	3500	205	160	6	M18x1.5	70	
8395.3,5D80.S205							80
8395.3,5K75.S275		275	220	8	M20x1.5	75	
8395.3,5D80.S275							80
8395.4K80.S275	4000	275	220	8	M20x1.5	80	
8395.4D90.S275							90
8395.4,5K80.S275	4500	275	220	8	M20x1.5	80	
8395.4,5D90.S275							90
8395.5K90.S275	5000	275	220	8	M20x1.5	90	
8395.5D100.S275							100
8395.5K100.S335	7500	335	280	10	M22x1.5	100	
8395.7,5K100.S275		275	220	8	M20x1.5	100	
8395.7,5K110S335		335	280	10	M22x1.5	110	
8395.10K125.S335		335	280	10	M22x1.5	125	

# AXLES FOR TRAILERS AND VARIOUS TYPES OF AGRICULTURAL MACHINERY



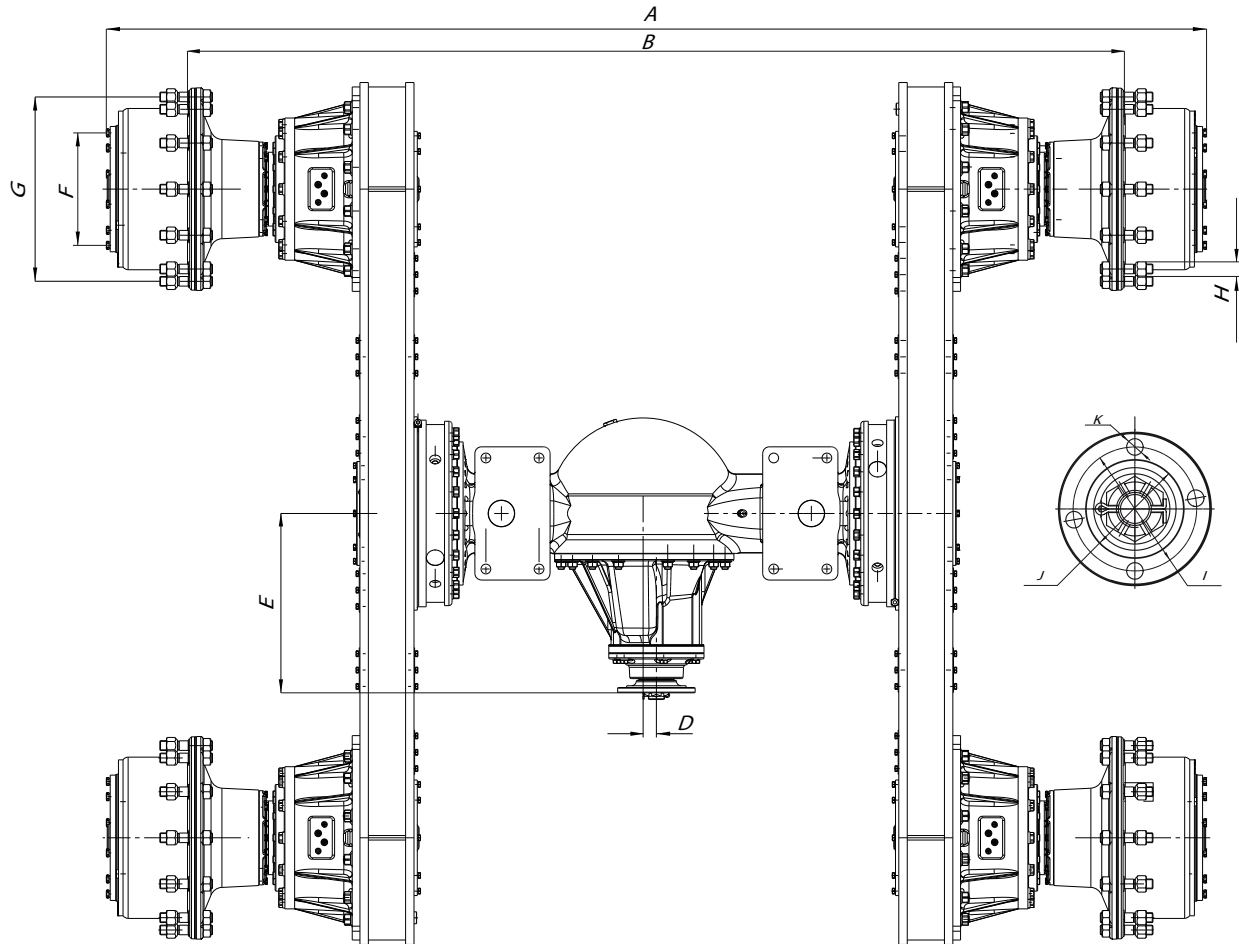
Designation	Static load capacity, kg	Diameter of wheel stud position, F, mm	Diameter of collar for wheel disc, G, mm	Number of wheel studs	Wheel studs	Bar cross-section on outer surfaces, D, mm			
						■	□	●	○
8395.2K40.O140	2000	140	94	5	M12x1.25	40			
8395.2D45.O140								45	
8395.2D80.O140									80
8395.2,5K45.O140	2500	140	94	5	M12x1.25	45			
8395.2,5D50.O140								50	
8395.2,5D80.O140									80
8395.3K50.O140	3000	140	94	5	M12x1.25	50			
8395.3D50.O140								50	
8395.3D80.O140									80
8395.4K55.O205	4000	205	160	6	M18x1.5	55			
8395.4D60.O205								60	
8395.4D100.O205									100
8395.5K60.O205	5000	205	160	6	M18x1.5	60			
8395.5D70.O205								70	
8395.5D100.O205									100
8395.6K65.O205	6000	205	160	6	M18x1.5	65			
8395.6D80.O205								80	
8395.6D120.O205									120
8395.7K70.O205	7000	205	160	6	M18x1.5	70			
8395.7D80.O205								80	
8395.7K75.O275		275	220	8	M20x1.5	75			
8395.7D80.O275								80	
8395.8K80.O275	8000	275	220	8	M20x1.5	80			
8395.8D90.O275								90	
8395.9K80.O275	9000	275	220	8	M20x1.5	80			
8395.9D90.O275								90	
8395.10K90.O275	10000	275	220	8	M20x1.5	90			
8395.10K110.O275								110	
8395.10D100.O275					100				
8395.10K100.O335		335	280	10	M22x1.5	100			
8395.10K120.O335					120				
8395.15K100.O275	15000	275	220	8	M20x1.5	100			
8395.15K130.O275								130	
8395.15K110.O335		335	280	10	M22x1.5	110			
8395.15K150.O335								150	
8395.20K125.O335	20000	335	280	10	M22x1.5	125			
8395.25K140.O335	25000	335	280	10	M22x1.5	140			
8395.30K150.O335	30000	335	280	10	M22x1.5	150			

# AXLES FOR WHEELED EXCAVATORS



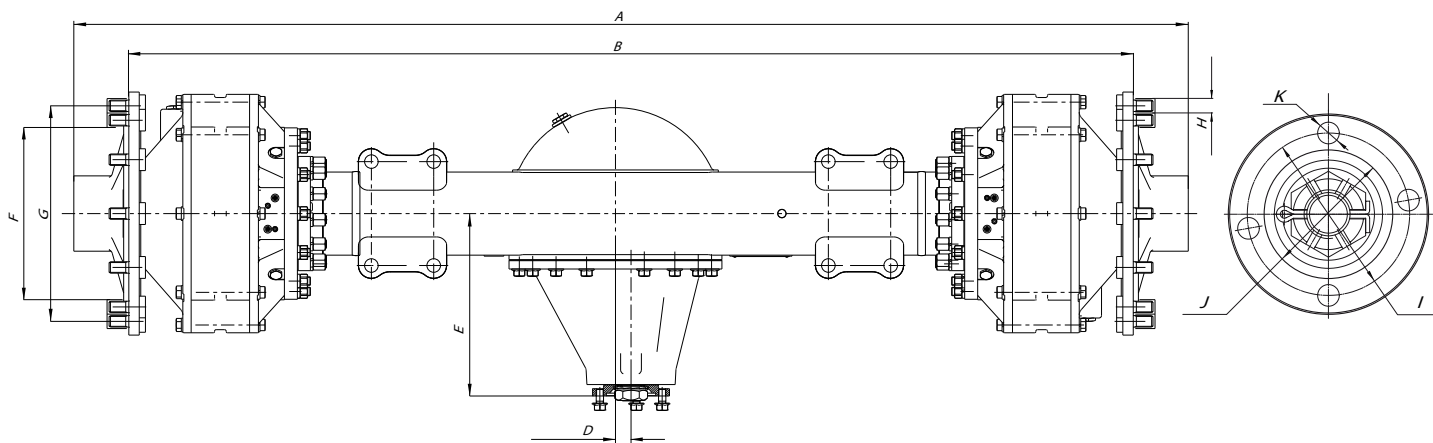
Parameter	Axle designation	
	8395.EK.72.005P	8395.EK.73.005P
Static axle load, kN	200	200
Working axle load, kN	110	110
Torque output, kNm	40.5	40.5
Reduction ratio		
— total:	13.32	13.32
— final drive:	3.333	3.333
— wheel reduction gear:	4.0	4.0
A, mm	2490	2270
B, mm	2352	2052
D, mm	30	30
E, mm	404	404
F, mm	325	325
G, mm	435	435
H	6xM20	6xM20
I, mm	120	155
J, mm	95	132
K	4x14	4x14
Weight, kg	750	720

# GRADER TANDEM AXLES FOR MOTOR GRADERS WITH «WET» BRAKES



Parameter	Axle designation
	8395.G180.00.000-1
Static axle load, kN	185
Working axle load, kN	110
Torque output, kNm	75.5
Reduction ratio	
— total:	17.98
— final drive:	3.333
— wheel reduction gear:	4.588
A, mm	2491
B, mm	2114
D, mm	30
E, mm	403
F, mm	370
G, mm	415
H	12xM22
I, mm	155
J, mm	132
K	8x10
Weight, kg	2211

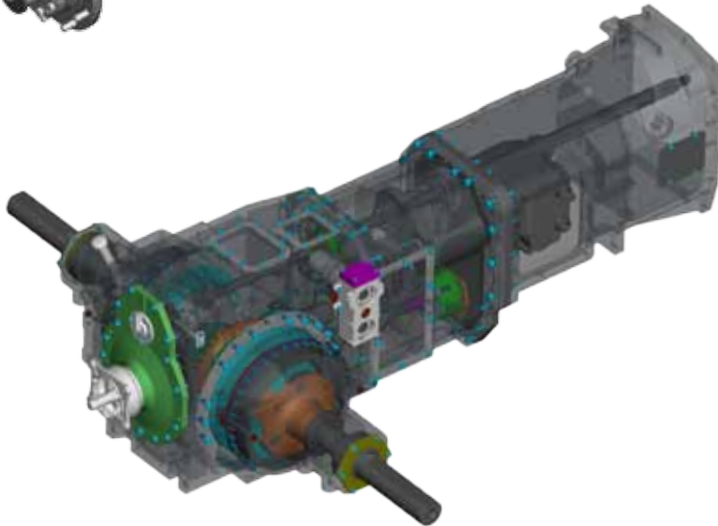
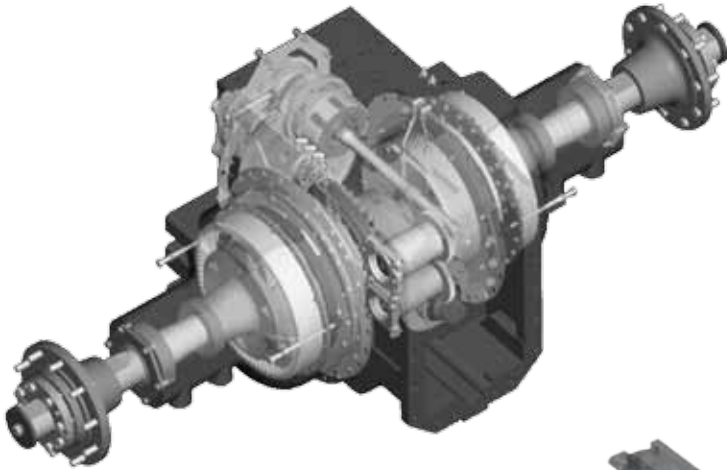
# AXLES FOR FRONTAL LOADERS WITH «WET» BRAKES



Parameter	Axle designation			
	PF200.72.001-1	PF200.72.001-1-01	PF200.72.001-2	PF200.72.001-2-01
Static axle load, kN	200	200	200	200
Working axle load, kN	110	110	110	110
Torque output, kNm	57.5	57.5	57.5	57.5
Parking brake	YES	NO	YES	NO
Reduction ratio				
— total:	15.6	15.6	15.6	15.6
— final drive:	2.6	2.6	2.6	2.6
— wheel reduction gear:	6.0	6.0	6.0	6.0
A, mm	2146	2146	2146	2146
B, mm	1934	1934	1934	1934
D, mm	30	30	30	30
E, mm	351	351	351	351
F, mm	370	370	370	370
G, mm	415	415	415	415
H	12xM22	12xM22	12xM22	12xM22
I, mm	120	120	155	155
J, mm	95	95	132	132
K	4xM14	4xM14	8xM10	8xM10
Weight, kg	697	692	705	701

# CONTINUOUSLY VARIABLE TRANSMISSION

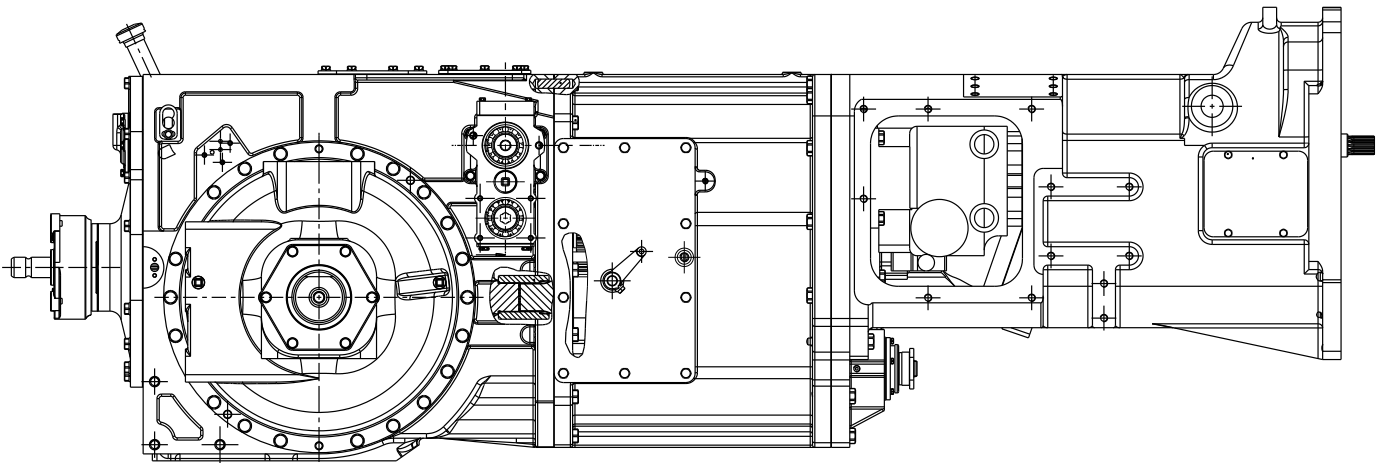
---



- Continuously variable control of tractor operating speed with optimal motor load.
- Automatic maintenance of constant tractor operating speed regardless of the bearing surface relief.
- Reduced fuel consumption due to maximum possible motor operation in the optimal operating mode.
- Significant improvement of the operator's working conditions, enabling labour productivity growth.
- Increased efficiency and reliability of the brake system due to additional kinematical braking with transmission hydraulic system.
- Increased motor reliability due to damping hydraulic fluid of transmission hydraulic system.
- Increased maximum tractor speed up to 60 km/h.

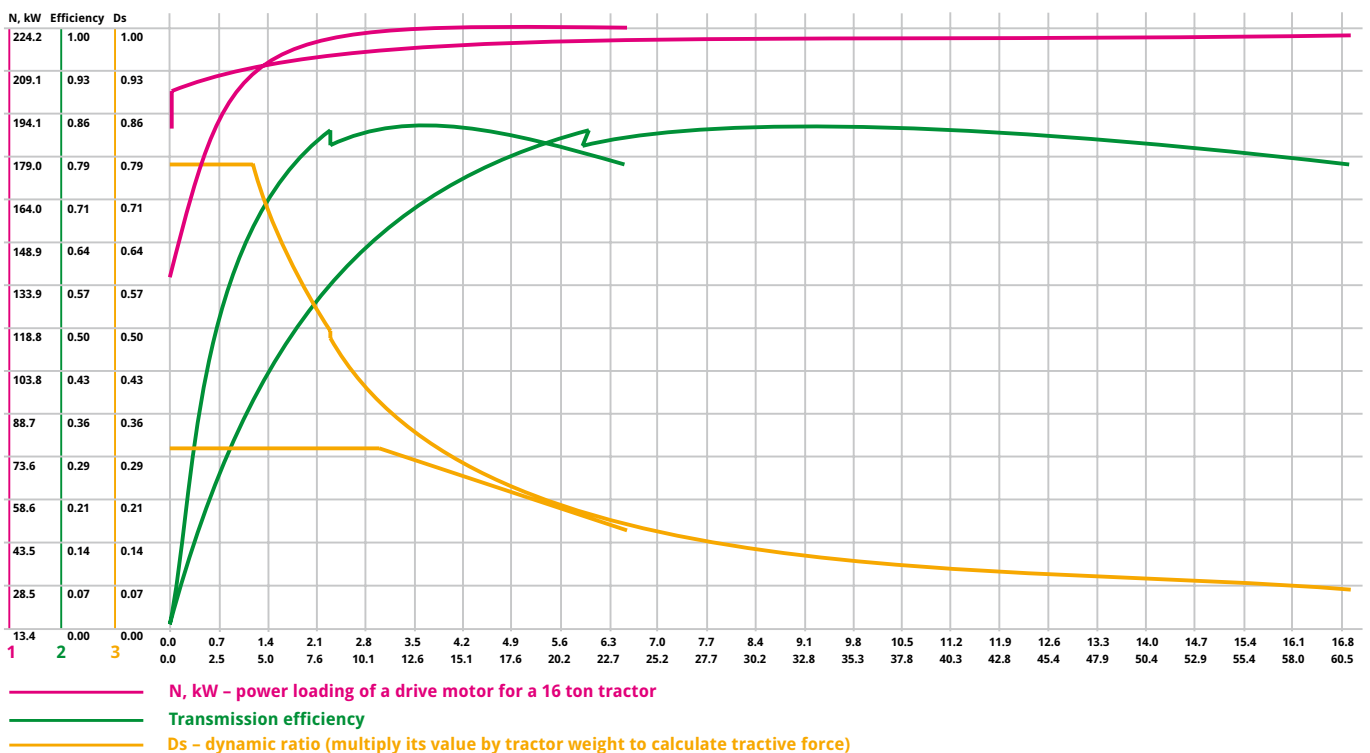






Parameter	Parameter values
Maximum power of drive motor, kW	265
Maximum rotational speed of input shaft, min <sup>-1</sup>	2300
Number of operating ranges	2
Speed control range of output shaft on the first operating range, min <sup>-1</sup>	0...2200
Speed control range of output shaft on the second operating range, min <sup>-1</sup>	0...5750
Type of motion control	Automatic electronic system
Average efficiency in operating area, %	84

Parameters of cultivation efficiency for a tractor with UPEC hydrostatic monoblock unit with tractive force of 60 kN.



# COMPONENTS OF DRIVING AXLES AND SUPPORTS

- 1) Wheel reduction gearbox
- 2) Mounting parts
- 3) Brake
- 4) Final drive
- 5) Intermediate support
- 6) Hub
- 7) Satellite gears
- 8) Ratchet





AUTOMOTIVE DIVISION

**UPEC Industrial Group  
Automotive Division**

UPEC TRADING – official distributor  
Lozova Forging-Mechanical Plant (LKMZ)

4, Marshal Batitskiy Str.  
Kharkov, 61038, Ukraine

office@upec-trading.com  
phone: +38 057 711-60-10  
fax: +38 057 710-10-59  
www.upec.ua  
www.spc.upec.ua  
www.lkmz.com

