WITH CARE OF FUTURE

ELECTRIC DRIVEN WIDE-LEVEL IRRIGATION MACHINES

Partnership with the company «Fregat» is a sure guarantee
of risk reduction and increase of the profitability of crop production

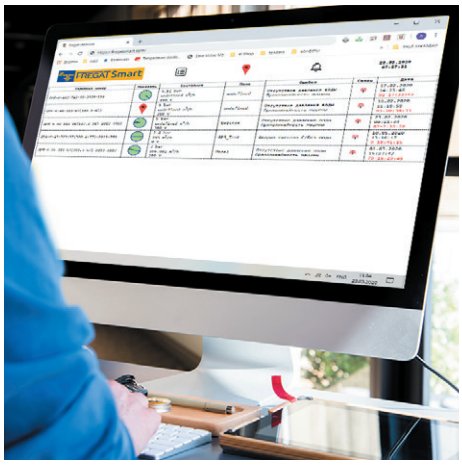
PrJSC «The Plant «Fregat», following up upon its modernization and development of the «Fregat» irrigation machines, has developed and is at the present moment implementing the **FregatSmart** system. The **FregatSmart** remote monitoring and control system is designed for both pivot, frontal and hippodrome machines.

Its operation is executed via the controller, using a monitor with a touch screen. The machine condition readings – such as irrigation rate, operation of the end gun, sector of work, weather information, soil moisture, other information – are then transmitted for analysis and decision-making on operation of the machine, either onto a smartphone, a tablet or a workstation. In a machine emergency situation, an automatic SMS message about the emergency situation will be sent.

The **FregatSmart** remote monitoring and control system for irrigation machine, in addition to the controller with a touch screen, may also have a GPS receiver for locating the irrigation machine, as well as a GSM modem with GPRS data transmission to communicate with the data server.

The data transfer between the irrigation machine and the server shall be implemented in a way that is able to provide data protection, and it also may be performed even with a very weak GSM signal.

The server may be accessed via FregatSmart.com and FregatSmart.com.ua sites, after every agricultural enterprise entering its own login and password.



The **FregatSmart** remote monitoring and control system provides the following readings, in case all relevant sensors and equipment are available:

- visual and graphical display of machine location in the field
- irrigation rate
- irrigation machine's water pressure
- availability of electric power
- the total volume of water getting through the machine's meter
- the flow of water getting through the machine's meter at the moment
- the machine's progress with / without water
- carts' directness malfunction
- central cart overload malfunction
- furrow guide malfunction
- machine's perpendicularity malfunction

FERTILIZING AGGREGATE UNIT

The fertilizing aggregate unit is based on the Seko Spring PS2 (Italy) plunger-type dosing pump.

The fertilizing aggregate unit is manufactured in two versions: 1 – for the relay control system; 2 – for controller-relay control system. Both aggregate units are almost indistinguishable from each other. The only difference is in the principle of regulation of the fertilizer input.

1 RELAY CONTROL SYSTEM

The tuning of the performance of the dosing pump is executed manually, by using a fine-adjustment screw changing the length of stroke of the plunger (piston). Performance control may be performed during pump operation.

2 CONTROLLER-RELAY CONTROL SYSTEM

The tuning of the performance of the dosing pump is executed by means of pair of proportional valves regulating the input of fertilizer flow from the dosing pump set to 100% performance and controlled by the on-line controller.

Dosing accuracy is ensured by the machine controller, through the controlling the flow of fertilizers and monitoring the water discharge by a pulse meter. Such method provides a given rate of input of liquid and water-soluble fertilizers.

The fertilizing aggregate unit consists of the Seko Spring PS2 (Italy) plunger-type dosing pump, the PoWoGas (Poland) pulse fertilizer meter, the Arag (Italy) electric proportional valve, the Zilmet Ultra-Pro (Italy) pulsation dampener tank, and the electric control panel. It is all mounted on a separate frame, ensuring the mobility of the aggregate unit. Additionally, the aggregate unit must be equipped with a fertilizer tank, depending on both the type of irrigation machine and the customer's needs (supplied separately).

Performance of the standard fertilizing aggregate unit is set to be 505 l/h (the pressure in the irrigation machine may reach up to 10 bar) (on customer's request, the performance settings may be customized), the application rate is set on the touchscreen – for example, 150 l/ha, the controller, with the help of the set irrigation rate (for example, 100 m^3/ha) may then calculate the required concentration and then maintain it by receiving flow data from pulse water and fertilizer meters. The fertilizer flow may be set by means of proportional valves.

FREGAT Smart

«IRRIGATION ONLINE» IRRIGATION CONTROL SYSTEM

- Online instrumental monitoring of meteorological indicators, soil moisture and moisture supply of plants.
- Control of the actual irrigation rate with the help of automatic precipitation gauges.
- Calculation and forecasting of terms and norms of irrigation, through the use of the moisture transfer equation, with the subsequent generation of recommendations for the next 5 days (this accuracy of determining the terms and norms of irrigation is the highest among the existing methods).
- Remote monitoring of the state of moisture supply and development of plants via the Internet, by using satellite images.

Developer: Institute of Water Problems and Land Reclamation of the National Academy of Agrarian Sciences of Ukraine (NAAS), www.iwpim.org.ua

CENTER-PIVOTS

PrJSC «The Plant Fregat» is the sole manufacturer of wide-level irrigation machines DMF Fregat and DMU Fregat in Ukraine and CIS. From 1970s to 1990s Fregat has produced and supplied more than 47 thousands of DMU Fregats to many countries.

In the mid-2000s, Fregat began developing a DMF-type irrigation machine. Since 2010, the DMF Fregat is mass-produced and undergoes all necessary standardization and certification, both in Ukraine and in the countries of its export.

DMF Fregat is a modern energy-efficient irrigation machine, absorbing the world's best achievements in the field of modern irrigation, adapted to the agro-climatic conditions of Ukraine.

PrJSC «The Plant Fregat» supplies the DMF Fregat machines on a «plug-and-produce» basis, with the provision of all necessary services and options – both during delivery and operation.

The DMF Fregat irrigation machines of pivot modification are able to execute the automated irrigation via the dynamic revolving movement around a stationary support.

The machine may change its norm of irrigation in wide limits, practically in any soil and climatic areas.

The optimum constructive scheme of the machine shall also provide reliability and durability in any operating condition.

DMF Fregat is able to operate on sites with a complex terrain, with the maximum general slope of a field both in the direction of movement of carts and along the machine amounting to +5%.

All metal elements of a design are protected by a method of hot dip galvanizing providing reliable protection against corrosion and the long performance.

The most important components of the machine (control system, sprinklers, carts' wheel drives) are represented by the products of the world's leading manufacturers of relevant equipment.

Wide-profile pneumatic tires provide low specific pressure on the ground, as well as high passability. Intermediate carts are equipped with a "dry wheels" system with the outflow points of the area of the carts removed back along the path of the cart with the help of part-circle sprinklers.

DMF Fregat is equipped with installation hardware and a model of a gearbox designed for the 90 degree wheel turn for a possibility of transfer of the assembled machine between positions. If necessary, the machine can be used in two or more positions.

The high degree of uniformity of droplet distribution allows to apply liquid and soluble mineral fertilizers along the irrigation.

On the console of DMF Fregat, the part-circle end-gun sprinkler is installed, which gets automatically powered on exclusively when approaching the corners of an irrigated site of a field of a rectangular profile.

FREGAT

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ADVANTAGES OF DMF FREGAT

MODERN ENERGY-EFFICIENT ELECTRIC DRIVE AND LOW WATER PRESSURE AT THE MACHINE INPUT

HIGH IRRIGATION RATES

MAXIMUM DROPLET INTENSITY FOR THE UKRAINIAN SOILS* – PREVENTION OF SEWAGE EFFECTS

*about 0,65 mm / min along the length of the machine

TECHNICAL PARAMETERS OF PIVOT-TYPE DMF FREGAT

Machine type	center-pivot, transportable, reversible, electric drive on each cart
Pivot span design	truss-type
Fixed support	Ø 219 mm
Pivot span length, m	pipeline Ø 168 mm — 59,90; 54,05; 48,20; 42,35 pipeline Ø 219 mm — 48,20; 42,35
Console length, m	29,25; 23,40; 17,55; 11,70; 5,85; without console
Clearance, m	3,1
Main pipeline	Ø 168 mm; Ø 219 mm; wall thickness – either 3 mm or 4 mm
Average droplet intensity along the machine, mm/min	from 0,45 to 0,65
Type of sprinklers	I-Wob UP3 Standart («Senninger», USA), segmental sprinklers PC-S3000 («Nelson», USA), the part-circle end gun «Komet» TwinMax (Nozzle 24 mm, 2 atm, 8,69 l / sec, 34,4 m), by Austria or others
Speed of movement, m/h	10-90 – while irrigating, 144 – maximum speed without irrigating

Drive type	gearmotor and 2 worm gearboxes on each cart
Wheel type	pneumatic wheels, 2 on each cart, 14.9-24 R1; galvanized wheel disks
Gearmotor type	UMC Power Saver 3,5 40:1, 0,55 kW (USA) or others
Gearbox type	UMC 740, 765, TNT-2 (USA) or others
Operating voltage, V/Hz	380/50
Power supply	either diesel generator or mains supply
Center pivot machine alignment system	lever-multiplicative, high accuracy (up to 630 m), precision cable system along the machine (up to 900 m)
Control system	electromechanical, automatic, American, European components
Remote control and monitoring system	via smartphone, tablet or computer through the DMF Fregat-installed controller, touch screen, GPS and GSM modem

MACHINE MODIFICATION	Number of pivot spans	Length of the machine, m	Water consumption, l/s	Water pressure at the machine input, kgf/cm^2	Irrigation area, ha	Irrigation radius, m	Average daily irrigation rate, mm	Minimum time of one rotation, hours	Minimum rate of irrigation per one rotation, m^3/ha	Water consumption with the end gun, l/s	Water pressure at the machine input with the end gun, kgf/cm^2	Irrigation area with the end gun, ha	Irrigation radius with the end gun, m
DMF-K-A3-203-36	3	203,6	36	1,9	14,1	211,6	22,0	12,6	115	45	3,1	17,8	238,0
DMF-K-A4-263-46	4	263,5	46	2,1	23,2	271,5	17,2	16,8	120	55	3,4	27,9	297,9
DMF-K-A5-323-57	5	323,4	57	2,4	34,5	331,4	14,2	20,9	124	65	3,8	40,2	357,8
DMF-K-A6-383-67	6	383,3	67	2,9	48,1	391,3	12,0	25,1	126	76	4,4	54,8	417,7
DMF-K-A7-443-77	7	443,2	77	3,5	64,0	451,2	10,4	29,3	128	86	5,1	71,7	477,6
DMF-K-A8-503-88	8	503,1	88	4,3	82,1	511,1	9,2	33,5	129	90	5,6	90,8	537,5
DMF-K-A9-563-90	9	563,0	90	4,8	102,4	571,0	7,6	37,7	119	90	6,0	112,1	597,4
DMF-K-A10-622-90	10	622,9	90	5,1	125,0	630,9	6,2	41,9	108	90	6,3	135,7	657,3
DMF-K-A11-682-90	11	682,8	90	5,4	149,9	690,8	5,2	46,0	99	90	6,7	161,6	717,2
DMF-K-A12-742-90	12	742,7	90	5,7	177,0	750,7	4,4	50,2	92	90	7,0	189,7	777,1
DMF-K-B6-348-61	6	348,2	61	2,2	39,9	356,2	13,2	22,7	125	70	3,4	46,0	382,6
DMF-K-B7-396-69	7	396,4	69	2,3	51,4	404,4	11,6	26,0	126	78	3,6	58,3	430,8
DMF-K-B8-444-78	8	444,6	78	2,4	64,4	452,6	10,4	29,4	128	86	3,8	72,1	479,0
DMF-K-B9-492-86	9	492,8	86	2,6	78,8	500,8	9,4	32,8	129	95	4,0	87,3	527,2
DMF-K-B10-541-94	10	541,0	94	2,8	94,7	549,0	8,6	36,1	130	103	4,2	104,0	575,4
DMF-K-B11-589-103	11	589,2	103	3,0	112,0	597,2	7,9	39,5	130	111	4,5	122,2	623,6
DMF-K-B12-637-111	12	637,4	111	3,3	130,9	645,4	7,3	42,9	131	120	4,8	141,8	671,8
DMF-K-B13-685-119	13	685,6	119	3,6	151,1	693,6	6,8	46,2	131	128	5,1	162,9	720,0
DMF-K-B14-733-128	14	733,8	128	4,0	172,9	741,8	6,4	49,6	132	136	5,5	185,4	768,2
DMF-K-B15-782-136	15	782,0	136	4,4	196,1	790,0	6,0	53,0	132	145	6,0	209,4	816,4
DMF-K-B16-830-144	16	830,2	144	4,8	220,7	838,2	5,7	56,3	133	150	6,3	234,8	864,6
DMF-K-B17-878-150	17	878,4	150	5,2	246,8	886,4	5,3	59,7	131	150	6,5	261,8	912,8

Notes:

1. The "A" modifications of machines consist of Ø 168 mm / 59,90 m pivot spans and a console with a length of 23,40 m.
2. The "B" modifications of machines consist of Ø 219 mm / 48,20 m pivot spans, the last three spans of Ø 168 mm / 59,90 m, and a console with a length of 23,40 m.
3. For adaptations to specific operating conditions, it may also be possible to replace any span with the spans of Ø 219 mm / 48,20 m; Ø 219 mm / 42,35 m; Ø 168 mm / 59,90 m; Ø 168 mm / 54,05 m; Ø 168 mm / 48,20 m; Ø 168 mm / 42,35 m and consoles with a length of 17,55 m; 11,70 m; 5,85 m; without console.
4. The end gun: Komet TwinMax (Nozzle 24 mm, 2 bar, 8,69 l/sec, 34,4 m).
5. It may be possible to reduce the water pressure at the input of machine with the end gun by 1 atm, in case of equipping it with a booster pump installed before the end gun.
6. It may also be possible to equip the machines with «Nelson» (USA), «Komet» (Austria), «Yuzuak» (Turkey) sprinklers.

FREGAT

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LINEAR IRRIGATION MACHINES

WITH HYDRANT IRRIGATING DRAFT

The linear irrigation machine allows to carry out effective irrigation of rectangular fields in the automatic mode.

The main controls and automation elements are located on the central cart of the irrigation machine.

The direction of movement is maintained along the tracking groove/cable.

Water input is supplied through a flexible pipe connected to hydrants located along the field.

The wheels both on the center cart and intermediate carts may be rotated 90 degrees against their operating position, making the transposition of the machine possible. The transfer between positions is carried out by a tractor-tow truck.

Additionally, the linear irrigation machines with hydrant irrigating drafts may be equipped with a reversal unit installed on the central cart, allowing a circular motion while performing irrigation / without irrigation (similar to hippodrome-type machines).

TECHNICAL PARAMETERS OF LINEAR DMF FREGAT MACHINES WITH HYDRANT IRRIGATING DRAFT

Machine type	linear, transportable, reversible, electric drive on each cart
Irigating draft	from hydrants, through flexible hoses
Working pressure in a hydraulic piping, kgf/cm^2	not less than 3,0-3,5 (inside the hydrant) in case of flexible hoses
Type of central cart	2/4-wheeled
Machine alignment system	precision cable system along the machine
Control system	electric, automatic with European- and American-manufactured components
Rremote control and monitoring system	via smartphone, tablet or computer through the DMF Fregat-installed controller, touch screen, GPS and GSM modem
Type of guide	along the tracking groove (optionally – along a cable)

TECHNICAL PARAMETERS OF LINEAR DMF FREGAT MACHINES WITH HYDRANT IRRIGATING DRAFT
SINGLE-WING MACHINES* | DOUBLE-WING SYMMETRIC MACHINES**

	MACHINE MODIFICATION	Number of spans	Length of the machine, m	Water consumption, l/s	Water pressure at the machine input, kgf/cm^2	Average droplet intensity along the length of the machine, mm/min	Irrigation area at an average daily irrigation rate of 9 mm, ha	Irrigation area at an average daily irrigation rate of 5 mm, ha	Irrigation width, m	Irrigation length (9 mm), m	Irrigation length (5 mm), m	Minimum time of one run (9 mm), hours	Minimum time of one run (5 mm), hours	Minimum irrigation rate for one run, m^3/ha	Komet TwinMax Nozzle end gun, mm	Water pressure at the machine input with the end gun, kgf/cm2	Irrigation width, with the end gun, m	Irrigation length with the end gun (9 mm), m	Irrigation length with the end gun (5 mm), m
*	DMF-F-A3-203-75	3	203,1	75	2,2	1,33	72,0	129,6	211,1	3 410,7	6 139,3	37,9	68,2	142	24	3,3	237,5	3 031,6	5 456,8
	DMF-F-A4-263-75	4	263,0	75	2,3	1,04	72,0	129,6	271,0	2 656,8	4 782,3	29,5	53,1	111	22	3,5	295,9	2 433,3	4 379,9
	DMF-F-A5-323-75	5	322,9	75	2,5	0,85	72,0	129,6	330,9	2 175,9	3 916,6	24,2	43,5	91	20	3,6	354,2	2 032,7	3 658,9
	DMF-F-A6-383-75	6	382,8	75	2,6	0,72	72,0	129,6	390,8	1 842,4	3 316,3	20,5	36,8	77	18	3,8	412,3	1 746,3	3 143,3
	DMF-F-A7-443-75	7	442,7	75	2,8	0,62	72,0	129,6	450,7	1 597,5	2 875,5	17,8	32,0	67	16	3,9	470,4	1 530,6	2 755,1
	DMF-F-A8-503-75	8	502,6	75	3,0	0,55	72,0	129,6	510,6	1 410,1	2 538,2	15,7	28,2	59	15	4,1	529,3	1 360,3	2 448,5
	DMF-F-A9-563-75	9	562,5	75	3,1	0,49	72,0	129,6	570,5	1 262,1	2 271,7	14,0	25,2	53	14	4,2	588,4	1 223,7	2 202,6
	DMF-F-A10-622-75	10	622,4	75	3,3	0,45	72,0	129,6	630,4	1 142,1	2 055,8	12,7	22,8	48	13	4,4	647,1	1 112,7	2 002,8
	DMF-F-A11-682-75	11	682,3	75	3,4	0,41	72,0	129,6	690,3	1 043,0	1 877,4	11,6	20,9	43	12	4,5	706,1	1 019,7	1 835,4
	DMF-F-A12-742-75	12	742,2	75	3,6	0,37	72,0	129,6	750,2	959,7	1 727,5	10,7	19,2	40	11	4,7	764,8	941,4	1 694,6
	DMF-F-A13-802-75	13	802,1	75	3,7	0,35	72,0	129,6	810,1	888,8	1 599,8	9,9	17,8	37	11	4,8	824,7	873,0	1 571,5
	DMF-F-A14-862-75	14	862,0	75	3,9	0,32	72,0	129,6	870,0	827,6	1 489,7	9,2	16,6	34	10	5,0	883,6	814,8	1 466,7
	DMF-F-A15-922-75	15	921,9	75	4,0	0,30	72,0	129,6	929,9	774,3	1 393,7	8,6	15,5	32	10	5,1	943,5	763,1	1 373,6
	DMF-F-A16-982-75	16	981,8	75	4,2	0,28	72,0	129,6	989,8	727,4	1 309,4	8,1	14,5	30	10	5,3	1 003,4	717,6	1 291,6
	DMF-F-A17-1042-75	17	1 041,7	75	4,3	0,27	72,0	129,6	1 049,7	685,9	1 234,6	7,6	13,7	29	10	5,5	1 063,3	677,1	1 218,8
	DMF-F-B6-348-110	6	347,7	110	2,4	1,16	105,6	190,1	355,7	2 968,8	5 343,8	33,0	59,4	124	24	3,6	382,1	2 763,7	4 974,6
	DMF-F-B7-396-110	7	395,9	110	2,4	1,02	105,6	190,1	403,9	2 614,5	4 706,1	29,1	52,3	109	22	3,6	428,8	2 462,7	4 432,8
	DMF-F-B8-456-110	8	455,8	110	2,7	0,89	105,6	190,1	463,8	2 276,8	4 098,3	25,3	45,5	95	20	3,8	487,1	2 167,9	3 902,3
	DMF-F-B9-504-110	9	504,0	110	2,7	0,81	105,6	190,1	512,0	2 062,5	3 712,5	22,9	41,3	86	20	3,8	535,3	1 972,7	3 550,9
	DMF-F-B10-564-110	10	563,9	110	2,9	0,72	105,6	190,1	571,9	1 846,5	3 323,7	20,5	36,9	77	18	4,0	593,4	1 779,6	3 203,2
	DMF-F-B11-612-110	11	612,1	110	2,9	0,67	105,6	190,1	620,1	1 703,0	3 065,3	18,9	34,1	71	17	4,0	640,7	1 648,2	2 966,8
	DMF-F-B12-672-110	12	672,0	110	3,1	0,61	105,6	190,1	680,0	1 552,9	2 795,3	17,3	31,1	65	16	4,3	699,7	1 509,2	2 716,6
	DMF-F-B13-720-110	13	720,2	110	3,1	0,57	105,6	190,1	728,2	1 450,2	2 610,3	16,1	29,0	60	15	4,3	746,9	1 413,8	2 544,9
	DMF-F-B14-780-110	14	780,1	110	3,3	0,52	105,6	190,1	788,1	1 339,9	2 411,9	14,9	26,8	56	15	4,5	806,8	1 308,9	2 356,0
	DMF-F-B15-828-110	15	828,3	110	3,3	0,49	105,6	190,1	836,3	1 262,7	2 272,9	14,0	25,3	53	14	4,5	854,2	1 236,2	2 225,2
	DMF-F-B16-888-110	16	888,2	110	3,6	0,46	105,6	190,1	896,2	1 178,3	2 121,0	13,1	23,6	49	13	4,7	912,9	1 156,8	2 082,2
	DMF-F-B17-936-110	17	936,4	110	3,6	0,44	105,6	190,1	944,4	1 118,2	2 012,7	12,4	22,4	47	13	4,7	961,1	1 098,7	1 977,7
	DMF-F-B18-996-110	18	996,3	110	3,8	0,41	105,6	190,1	1 004,3	1 051,5	1 892,7	11,7	21,0	44	12	4,9	1 020,1	1 035,2	1 863,3
**	DMF-F-2A3-406-110	6	406,2	110	2,2	0,98	105,6	190,1	422,2	2501,2	4502,2	27,8	50,0	104	24	3,3	475,0	2223,2	4001,7
	DMF-F-2A4-526-110	8	526,0	110	2,3	0,76	105,6	190,1	542,0	1948,3	3507,0	21,6	39,0	81	22	3,5	591,8	1784,4	3211,9
	DMF-F-2A5-646-110	10	645,8	110	2,5	0,62	105,6	190,1	661,8	1595,7	2872,2	17,7	31,9	67	20	3,6	708,4	1490,6	2683,2
	DMF-F-2A6-766-110	12	765,6	110	2,6	0,53	105,6	190,1	781,6	1351,1	2432,0	15,0	27,0	56	18	3,8	824,6	1280,6	2305,1
	DMF-F-2A7-885-110	14	885,4	110	2,8	0,45	105,6	190,1	901,4	1171,5	2108,7	13,0	23,4	49	16	3,9	940,8	1122,4	2020,4
	DMF-F-2A8-1005-110	16	1 005,2	110	3,0	0,40	105,6	190,1	1 021,2	1034,1	1861,3	11,5	20,7	43	15	4,1	1 058,6	997,6	1795,6

Notes*:

1. The "A" modifications of machines consist of Ø 168 mm / 59,90 m spans, a console with a length of 23,40 m and a 2-wheel central cart.
2. The "B" modifications of machines consist of an equal number of Ø 219 mm / 48,20 m (one more of the former for an odd number) and Ø 168 mm / 59,90 m spans, a console with a length of 23,40 m and a 4-wheel central cart.
3. For adaptations to specific operating conditions, it may also be possible to replace any span with spans of Ø 219 mm / 48,20 m; Ø 219 mm / 42,35 m; Ø 168 mm / 59,90 m; Ø 168 mm / 54,05 m; Ø 168 mm / 48,20 m; Ø 168 mm / 42,35 m and consoles with a length of 17,55 m; 11,70 m; 5,85 m; without console, additional equipment with a 4-wheel central cart, as well as with the second unit of water input (at the console end).
4. It may be possible to install the central cart at each position of the intermediate carts, and to equip the machine with the second console. The distribution of the water flow into two wings shall reduce the water pressure requirements (down to the lesser figures than those of the corresponding DMF machine spans) / increase the possibility of water discharge (up to the level of the DMF machine figures for each wing).
5. The end gun: Komet TwinMax (Nozzle 10-24 mm, 2 bar, 1,51-8,69 l / sec, 21,6-34,4 m).
6. It may be possible to reduce the water pressure at the input of machine with the end gun by 1 atm, in case of equipping it with a booster pump installed before the end gun.
7. It may also be possible to equip the machines with «Nelson» (USA), «Komet» (Austria), «Yuzuak» (Turkey) sprinklers.

Notes:**

1. The "A" modifications of machines consist of two symmetrical wings, consisting of Ø 168 mm / 59,90 m spans and a console with a length of 23,40 m, as well as a 4-wheel central cart.
2. For adaptations to specific operating conditions, it may also be possible to replace any span with the spans of Ø 168 mm / / 54,05 m; Ø 168 mm / 48,20 m; Ø 168 mm / 42,35 m and consoles with a length of 17,55 m; 11,70 m; 5,85 m; without console.
3. The end gun: Komet TwinMax (Nozzle 15-24 mm, 2 bar, 3,39-8,69 l/sec, 26,7-34,4 m).
4. The machines are also equipped with a non-standard irrigation draft unit / flexible hose of Ø 200 mm with a discharge of 110 l/sec.
5. Supply of machines with a standard irrigation draft unit / flexible hose of Ø 150 mm with a discharge of 75 l / sec may also be possible. The technical parameters may change accordingly.
6. Supply of asymmetric two-winged machines with an irrigation draft from hydrants may also be possible.
7. Technical parameters of asymmetric two-wing machines shall fall into the average figures of the parameters of two-wing DMF machines of the relevant span or elsewise correspond to the single-wing DMF machines' figures for each individual wing.
8. It may be possible to reduce the water pressure at the input of machine with the end gun by 1 atm, in case of equipping it with a booster pump installed before the end gun.
9. It may also be possible to equip the machines with «Nelson» (USA), «Komet» (Austria), «Yuzuak» (Turkey) sprinklers.

The water is supplied to the machine through an open canal, via an irrigating draft device.

The central cart (DMF-Fk) is equipped with the DEUTZ diesel engine (Germany), the ABB generator (Germany), the Caprari pump (Italy), the TwinDisc Techno-Drive coupling (Italy), the Robuschi vacuum pump (Italy). The irrigating draft device is equipped with a purification system.

Two modifications of DMF-Fzk irrigation machines with a capacity of 50 and 100 l/sec are designed for irrigation of fields through the hydraulic piping, with temporary sprinklers (unlined canals), located at a distance of about 110 m from each other.

The DMF-Fzk machines are equipped with an operator's workstations, a diesel generator, electric pumps Caprari (Italy), smooth release devices, the Robuschi vacuum pump (Italy), the UMC (USA) gearboxes and gearmotors of the increased power (1,1 kW) and speed on each wheel (288 m/h).

The DMF-Fzk modification with a capacity of 100 l/sec may have two independent irrigating draft systems of 50 l/sec (diesel generator, electric pump, smooth release device, irrigating draft device), providing increased operational reliability and the ability to operate on any system of 50 l/sec capacity.

The transition of the DMF-Fzk machine into the over-the-road position is carried out either through using the electric drive of each wheel or manually. The machine is then transported either by an electric drive or by a tractor-tow truck.

LINEAR IRRIGATION MACHINES

WITH CANAL IRRIGATING DRAFT

TECHNICAL PARAMETERS

Machine type	linear, transportable, reversible, electric drive on each cart
Irrigating draft	from the open canal, via the console irrigating draft device
Type of central cart	4-wheeled (DMF-Fk), 2-wheeled (DMF-Fzk)
Alignment system	precision cable system for leveling carts along the machine (DMF-Fk)
Control system	electric automatic with European- and American-manufactured components
Type of guide	along a cable (DMF-Fk) / along a tracking groove (DMF-Fzk)

LINEAR DMF FREGAT MACHINES WITH UNLINED CANAL IRRIGATING DRAFT

MACHINE MODIFICATION	Length of the machine, m	Water consumption, l/s	Water pressure at the pump, kgf/cm^2	Average droplet intensity along the length of the machine, mm/min	Irrigation area at an average daily irrigation rate of 10 mm, ha	Irrigation area at an average daily irrigation rate of 5 mm, ha	Irrigation width, m	Irrigation length (10 mm), m	Irrigation length (5 mm), m	Minimum time of one run (10 mm), hours	Minimum time of one run (5 mm), hours	Minimum irrigation rate for one run, m^3/ha
DMF-Fzk-A1-107-50	106,7	50	2,4	1,53	43,2	86,4	122,7	3 520,8	7 041,6	12,2	24,4	51
DMF-Fzk-A1-107-100	106,7	100	2,4	3,06	86,4		122,7	7 041,6		24,4		102

Notes: Modifications of machines consist of one Ø 168 mm / 59,90 m span, two consoles with a length of 23,40 m, and two two-wheeled carts.

TECHNICAL PARAMETERS OF LINEAR DMF FREGAT MACHINES WITH CANAL IRRIGATING DRAFT

SINGLE-WING MACHINES* | DOUBLE-WING SYMMETRIC MACHINES**

	MACHINE MODIFICATION	Number of spans	Length of the machine, m	Water consumption, l/s	Water pressure at the pump, kgf/cm^2	Average droplet intensity along the length of the machine, mm/min	Irrigation area at an average daily irrigation rate of 9 mm, ha	Irrigation area at an average daily irrigation rate of 5 mm, ha	Irrigation width, m	Irrigation length (9 mm), m	Irrigation length (5 mm), m	Minimum time of one run (9 mm), hours	Minimum time of one run (5 mm), hours	Minimum irrigation rate for one run, m^3/ha	Komet TwinMax Nozzle end gun, mm	Water pressure on the pump with the end gun, kgf/cm^2	Irrigation width with the end gun, m	Irrigation length with the end gun (9 mm), m	Irrigation length with the end gun (5 mm), m
*	DMF-Fk-A3-203-90	3	203,1	90	2,4	1,60	86,4	155,5	211,1	4 092,8	7 367,1	45,5	81,9	171	24	3,5	237,5	3 637,9	6 548,2
	DMF-Fk-A4-263-90	4	263,0	90	2,6	1,25	86,4	155,5	271,0	3 188,2	5 738,7	35,4	63,8	133	24	3,8	297,4	2 905,2	5 229,3
	DMF-Fk-A5-323-90	5	322,9	90	2,8	1,02	86,4	155,5	330,9	2 611,1	4 699,9	29,0	52,2	109	22	4,0	355,8	2 428,3	4 371,0
	DMF-Fk-A6-383-90	6	382,8	90	3,0	0,86	86,4	155,5	390,8	2 210,8	3 979,5	24,6	44,2	92	20	4,2	414,1	2 086,5	3 755,6
	DMF-Fk-A7-443-90	7	442,7	90	3,2	0,75	86,4	155,5	450,7	1 917,0	3 450,6	21,3	38,3	80	18	4,4	472,2	1 829,7	3 293,5
	DMF-Fk-A8-503-90	8	502,6	90	3,5	0,66	86,4	155,5	510,6	1 692,1	3 045,8	18,8	33,8	71	17	4,6	531,2	1 626,5	2 927,7
	DMF-Fk-A9-563-90	9	562,5	90	3,7	0,59	86,4	155,5	570,5	1 514,5	2 726,0	16,8	30,3	63	16	4,8	590,2	1 463,9	2 635,0
	DMF-Fk-A10-622-90	10	622,4	90	3,9	0,54	86,4	155,5	630,4	1 370,6	2 467,0	15,2	27,4	57	15	5,0	649,1	1 331,1	2 395,9
	DMF-Fk-A11-682-90	11	682,3	90	4,1	0,49	86,4	155,5	690,3	1 251,6	2 252,9	13,9	25,0	52	14	5,2	708,2	1 220,0	2 196,0
	DMF-Fk-A12-742-90	12	742,2	90	4,3	0,45	86,4	155,5	750,2	1 151,7	2 073,0	12,8	23,0	48	13	5,4	766,9	1 126,6	2 027,9
	DMF-Fk-A13-802-90	13	802,1	90	4,5	0,42	86,4	155,5	810,1	1 066,5	1 919,8	11,9	21,3	44	12	5,6	825,9	1 046,1	1 883,0
	DMF-Fk-A14-862-90	14	862,0	90	4,7	0,39	86,4	155,5	870,0	993,1	1 787,6	11,0	19,9	41	12	5,9	885,8	975,4	1 755,7
	DMF-Fk-A15-922-90	15	921,9	90	4,9	0,36	86,4	155,5	929,9	929,1	1 672,4	10,3	18,6	39	11	6,1	944,5	914,8	1 646,6
	DMF-Fk-A16-982-90	16	981,8	90	5,2	0,34	86,4	155,5	989,8	872,9	1 571,2	9,7	17,5	36	11	6,3	1 004,4	860,2	1 548,4
	DMF-Fk-A17-1042-90	17	1 041,7	90	5,4	0,32	86,4	155,5	1 049,7	823,1	1 481,6	9,1	16,5	34	10	6,5	1 063,3	812,6	1 462,6
	DMF-Fk-B6-348-150	6	347,7	150	3,0	1,58	144,0	259,2	355,7	4 048,4	7 287,0	45,0	81,0	169	24	4,2	382,1	3 768,6	6 783,6
	DMF-Fk-B7-396-150	7	395,9	150	3,0	1,39	144,0	259,2	403,9	3 565,2	6 417,4	39,6	71,3	149	24	4,3	430,3	3 346,5	6 023,7
	DMF-Fk-B8-456-150	8	455,8	150	3,4	1,21	144,0	259,2	463,8	3 104,8	5 588,6	34,5	62,1	129	24	4,7	490,2	2 937,6	5 287,6
	DMF-Fk-B9-504-150	9	504,0	150	3,4	1,10	144,0	259,2	512,0	2 812,5	5 062,5	31,3	56,3	117	24	4,7	538,4	2 674,6	4 814,3
	DMF-Fk-B10-564-150	10	563,9	150	3,8	0,98	144,0	259,2	571,9	2 517,9	4 532,3	28,0	50,4	105	22	5,1	596,8	2 412,9	4 343,2
	DMF-Fk-B11-612-150	11	612,1	150	3,8	0,91	144,0	259,2	620,1	2 322,2	4 180,0	25,8	46,4	97	22	5,1	645,0	2 232,6	4 018,6
	DMF-Fk-B12-672-150	12	672,0	150	4,2	0,83	144,0	259,2	680,0	2 117,6	3 811,8	23,5	42,4	88	20	5,4	703,3	2 047,5	3 685,5
	DMF-Fk-B13-720-150	13	720,2	150	4,2	0,77	144,0	259,2	728,2	1 977,5	3 559,5	22,0	39,5	82	20	5,5	751,5	1 916,2	3 449,1
	DMF-Fk-B14-780-150	14	780,1	150	4,6	0,71	144,0	259,2	788,1	1 827,2	3 288,9	20,3	36,5	76	18	5,8	809,6	1 778,7	3 201,6
	DMF-Fk-B15-828-150	15	828,3	150	4,6	0,67	144,0	259,2	836,3	1 721,9	3 099,4	19,1	34,4	72	17	5,8	856,9	1 680,5	3 024,9
	DMF-Fk-B16-888-150	16	888,2	150	5,0	0,63	144,0	259,2	896,2	1 606,8	2 892,2	17,9	32,1	67	17	6,2	916,8	1 570,7	2 827,2
	DMF-Fk-B17-936-150	17	936,4	150	5,0	0,60	144,0	259,2	944,4	1 524,8	2 744,6	16,9	30,5	64	16	6,2	964,1	1 493,6	2 688,5
	DMF-Fk-B18-996-150	18	996,3	150	5,4	0,56	144,0	259,2	1 004,3	1 433,8	2 580,9	15,9	28,7	60	15	6,6	1 023,0	1 407,6	2 533,7
**	DMF-Fk-2A3-406-200	6	406,2	200	2,5	1,78	192,0	345,6	422,2	4 547,6	8 185,7	50,5	91,0	189	24	3,7	475,0	4 042,1	7 275,8
	DMF-Fk-2A4-526-200	8	526,0	200	2,8	1,38	192,0	345,6	542,0	3 542,4	6 376,4	39,4	70,8	148	24	4,0	594,8	3 228,0	5 810,4
	DMF-Fk-2A5-646-200	10	645,8	200	3,1	1,13	192,0	345,6	661,8	2 901,2	5 222,1	32,2	58,0	121	24	4,3	714,6	2 686,8	4 836,3
	DMF-Fk-2A6-766-200	12	765,6	200	3,3	0,96	192,0	345,6	781,6	2 456,5	4 421,7	27,3	49,1	102	22	4,5	831,4	2 309,4	4 156,8
	DMF-Fk-2A7-885-200	14	885,4	200	3,6	0,83	192,0	345,6	901,4	2 130,0	3 834,0	23,7	42,6	89	20	4,7	948,0	2 025,3	3 645,6
	DMF-Fk-2A8-1005-200	16	1 005,2	200	3,8	0,73	192,0	345,6	1 021,2	1 880,1	3 384,3	20,9	37,6	78	18	5,0	1 064,2	1 804,2	3 247,5
	DMF-Fk-2B6-695-300	12	695,4	300	3,0	1,58	288,0	518,4	711,4	4 048,4	7 287,0	45,0	81,0	169	24	4,2	764,2	3 768,6	6 783,6
	DMF-Fk-2B7-792-300	14	791,8	300	3,0	1,39	288,0	518,4	807,8	3 565,2	6 417,4	39,6	71,3	149	24	4,3	860,6	3 346,5	6 023,7
	DMF-Fk-2B8-912-300	16	911,6	300	3,4	1,21	288,0	518,4	927,6	3 104,8	5 588,6	34,5	62,1	129	24	4,7	980,4	2 937,6	5 287,6
	DMF-Fk-2B9-1008-300	18	1 008,0	300	3,4	1,10	288,0	518,4	1 024,0	2 812,5	5 062,5	31,3	56,3	117	24	4,7	1 076,8	2 674,6	4 814,3

Notes*:

1. The "A" modifications consist of Ø 168 mm / 59,90 m spans, a console with a length of 23,40 m and a 4-wheel central cart.
2. The "B" modifications consist of an equal number of Ø 219 mm / 48,20 m (one more of the former for an odd number) and Ø 168 mm / 59,90 m spans, a console with a length of 23,40 m and a 4-wheel central cart.
3. For adaptations to specific operating conditions, it may also be possible to replace any span with spans of Ø 219 mm / 48,20 m; Ø 219 mm / 42,35 m; Ø 168 mm / 59,90 m; Ø 168 mm / 54,05 m; Ø 168 mm / 48,20 m; Ø 168 mm / 42,35 m and consoles with a length of 17,55 m; 11,70 m; 5,85 m; without console.
4. Control of linear movement is carried out through a cable along the canal.
5. It may be possible to install the central cart at each position of the intermediate carts, and to equip the machine with the second console. The distribution of the water flow into two wings shall reduce the water pressure requirements (down to the lesser figures than those of the corresponding DMF machine spans) and increase the possibility of water discharge (up to the level of the DMF machine figures for each wing).
6. The end gun: Komet TwinMax (Nozzle 10-24 mm, 2 bar, 1,51 - 8,69 l/sec, 21,6 - 34,4 m).
7. It may be possible to reduce the water pressure at the input of machine with the end gun by 1 atm, in case of equipping it with a booster pump installed before the end gun.
8. It may also be possible to equip the machines with «Nelson» (USA), «Komet» (Austria), «Yuzuak» (Turkey) sprinklers.

Notes:**

1. The "A" modifications consist of two symmetrical wings, consisting of Ø 168 mm / 59,90 m spans, and a console with a length of 23,40 m, as well as a 4-wheel central cart.
2. The "B" modifications consist of two symmetrical wings, consisting of an equal number of Ø 219 mm / 48,20 m (one more of the former for an odd number) and Ø 168 mm / 59,90 m spans, consoles with a length of 23,40 m, and a 4-wheel central cart.
3. For adaptations to specific operating conditions, it may also be possible to replace any span with spans of Ø 219 mm / 48,20 m; Ø 219 mm / 42,35 m; Ø 168 mm / 59,90 m; Ø 168 mm / 54,05 m; Ø 168 mm / 48,20 m; Ø 168 mm / 42,35 m and consoles with a length of 17,55 m; 11,70 m; 5,85 m; without console.
4. Control of linear movement is carried out through a cable along the canal.
5. The end gun: Komet TwinMax (Nozzle 18-24 mm, 2 bar, 4,9 - 8,69 l/sec, 29,5 - 34,4 m).
6. Technical parameters of asymmetric two-wing canal machines shall fall into the average figures of the parameters of two-wing DMF machines of the relevant span or elsewise correspond to the single-wing DMF machines' figures for each individual wing.
7. It may be possible to reduce the water pressure at the input of machine with the end gun by 1 atm, in case of equipping it with a booster pump installed before the end gun.
9. It may also be possible to equip the machines with «Nelson» (USA), «Komet» (Austria), «Yuzuak» (Turkey) sprinklers.

FREGAT

WITH CARE OF FUTURE

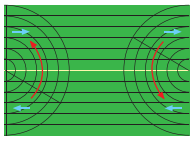
MULTIFUNCTIONAL HIPPODROME

LINEAR-PIVOT IRRIGATION MACHINES

The specifics of the control system, drive and support carts' design provides an opportunity to use the DMF Fregat irrigation machines for irrigation of irregularly shaped fields.

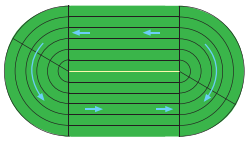
The diesel generator is supplied by the companies that provide operational, service, warranty and post-warranty maintenance in Ukraine, in accordance with the technical requirements of the relevant modification of DMF Fregat irrigation machines.

The flexible hoses of high throughput (with a cross section of 150 mm) are equipped with quick-disconnect connections. Paired installation hardwares of a flexible hose on both sides of the central cart are equipped with valves (of high reliability and capacity) and quick-disconnect connections.



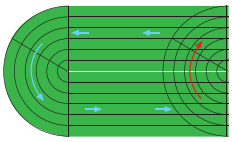
LINEAR MODE WITH INTERNAL IDLE ROTATION

Irrigation of the first half of the field, internal idle rotation, irrigation of the second half of the field.



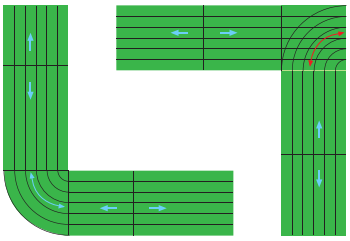
LINEAR MODE WITH EXTERNAL ROTATION WHILE IRRIGATING

Irrigation of the first half of the field, external rotation while irrigating, irrigation of the second half of the field. Change of irrigation mode depending on a mode of movement.



LINEAR MODE WITH EXTERNAL ROTATION WHILE IRRIGATING, AND INTERNAL IDLE ROTATION

Irrigation of the first half of the field, external rotation while irrigating, irrigation of the second half of the field, idle internal rotation. Change of irrigation mode depending on a mode of movement.



LINEAR MODE WITH EXTERNAL ROTATION WHILE IRRIGATING, AND INTERNAL IDLE ROTATION AT ANY ANGLE

Irrigation of one field, external / internal rotation at any angle with / without irrigation, irrigation of another field. Change of irrigation mode depending on a mode of movement.

LINEAR IRRIGATION WITH CIRCULAR ROTATION WITHOUT IRRIGATION*
CIRCULAR ROTATION WITH IRRIGATION**

Machine type	linear, with the option of circular movement along the inner / outer part of the field with / without irrigation (hippodrome type), optional movement of the machine in any direction (multifunctional), transportable / reversible, with electric drive on each cart
Irrigating draft	from hydrants, through flexible hoses
Working pressure in a hydraulic piping, atm	not less than 3,0-3,5 (inside the hydrant)
Type of central cart	4-wheeled
Alignment system	precision alignment system of the machine via the cable along the machine
Control system	electric automatic, American, European components
Type of guide	along the tracking groove

* MACHINE MODIFICATION	Number of spans	Length of the machine, m	Water consumption, l/s	Water pressure at the machine input, kgf/cm^2	Average droplet intensity along the length of the machine, mm/min	Irrigation area at an average daily irrigation rate of 9 mm, ha	Irrigation area at an average daily irrigation rate of 5 mm, ha	Irrigation width, m	Irrigation length (9 mm), m	Irrigation length (5 mm), m	Minimum time of one run (9 mm), hours	Minimum time of one run (5 mm), hours	Minimum irrigation rate for one run, m^3/ha	Minimum rotation time*, hours	Komet TwinMax Nozzle end gun, mm	Water pressure at the machine input with the end gun, kgf/cm^2	Irrigation width with the end gun, m	Irrigation length with the end gun (9 mm), m	Irrigation length with the end gun (5 mm), m
DMF-E-A3-203-75	3	203,6	75	2,2	1,33	72,0	129,6	423,2	1 701,3	3 062,4	18,9	34,0	142	3,9	24	3,3	476,0	1 512,6	2 722,7
DMF-E-A4-263-75	4	263,5	75	2,3	1,04	72,0	129,6	543,0	1 326,0	2 386,7	14,7	26,5	110	5,2	22	3,5	592,8	1 214,6	2 186,2
DMF-E-A5-323-75	5	323,4	75	2,5	0,85	72,0	129,6	662,8	1 086,3	1 955,3	12,1	21,7	91	6,5	20	3,6	709,4	1 014,9	1 826,9
DMF-E-A6-383-75	6	383,3	75	2,6	0,72	72,0	129,6	782,6	920,0	1 656,0	10,2	18,4	77	7,9	18	3,8	825,6	872,1	1 569,8
DMF-E-A7-443-75	7	443,2	75	2,8	0,62	72,0	129,6	902,4	797,9	1 436,2	8,9	16,0	66	9,2	16	3,9	941,8	764,5	1 376,1
DMF-E-A8-503-75	8	503,1	75	3,0	0,55	72,0	129,6	1 022,2	704,4	1 267,9	7,8	14,1	59	10,5	15	4,1	1 059,6	679,5	1 223,1
DMF-E-A9-563-75	9	563,0	75	3,1	0,49	72,0	129,6	1 142,0	630,5	1 134,9	7,0	12,6	53	11,8	14	4,2	1 177,8	611,3	1 100,4
DMF-E-A10-622-75	10	622,9	75	3,3	0,45	72,0	129,6	1 261,8	570,6	1 027,1	6,3	11,4	48	13,1	13	4,4	1 295,2	555,9	1 000,6

** MACHINE MODIFICATION	Water consumption, l/s	Water pressure at the machine input, kgf/cm^2	Average droplet intensity along the length of the machine, mm/min	Rotation irrigation area, ha	Rotation irrigation radius, m	Average daily rate of rotation irrigation, mm	Minimum time of one rotation, hours	Minimum irrigation rate per one rotation, m^3/ha	Water discharge with the end gun, l/sec	Water pressure at the machine input with the end gun, kgf/cm^2	Rotation irrigation area with the end gun, ha	Rotation irrigation radius with the end gun, m
DMF-E-A3-203-75	36	1,9	0,63	7,0	211,6	44,0	6,3	115	45	3,1	8,9	238,0
DMF-E-A4-263-75	46	2,1	0,64	11,6	271,5	34,5	8,4	120	55	3,4	13,9	297,9
DMF-E-A5-323-75	57	2,4	0,64	17,3	331,4	28,3	10,5	124	65	3,8	20,1	357,8
DMF-E-A6-383-75	67	2,9	0,64	24,1	391,3	24,1	12,6	126	75	4,4	27,4	417,7
DMF-E-A7-443-75	75	3,4	0,62	32,0	451,2	20,3	14,7	124	75	4,6	35,8	477,6
DMF-E-A8-503-75	75	3,7	0,55	41,0	511,1	15,8	16,7	110	75	4,9	45,4	537,5
DMF-E-A9-563-75	75	3,9	0,49	51,2	571,0	12,7	18,8	99	75	5,1	56,1	597,4
DMF-E-A10-622-75	75	4,1	0,45	62,5	630,9	10,4	20,9	90	75	5,3	67,6	655,8

Notes:

1. Minimum rotation time is not to be taken into account in other parameters of machine performance due to different effects of this parameter for different modes of operation of the machine.
2. Modifications of machines consist of Ø 168 mm / 59,90 m spans, a console with a length of 23,40 m, and 4-wheel central cart.
3. For adaptations to specific operating conditions, it may also be possible to replace any span with spans of Ø 219 mm / 48,20 m; Ø 219 mm / 42,35 m; Ø 168 mm / 59,90 m; Ø 168 mm / 54,05 m; Ø 168 mm / 48,20 m; Ø 168 mm / 42,35 m and consoles with a length of 17,55 m; 11,70 m; 5,85 m; without console.
4. The end gun: Komet TwinMax (Nozzle 13 - 24 mm, 2 bar, 2,55 - 8,69 l/sec, 24,7 - 34,4 m).
5. The rotation irrigation end gun: Komet TwinMax (Nozzle 24 mm, 2 bar, 8,69 l/sec, 34,4 m for DMF-I-A 10-622-75, Nozzle 22 mm, 2 bar, 7,30 l/sec, 32,9 m).
6. It may be possible to reduce the water pressure at the input of machine with the end gun by 1 atm, in case of equipping it with a booster pump installed before the end gun.
7. It may also be possible to equip the machines with «Nelson» (USA), «Komet» (Austria), «Yuzuak» (Turkey) sprinklers.

CONTROL SYSTEM

FUNCTIONAL AND RELIABLE SYSTEM FOR IRRIGATION CONTROL OF CENTER-PIVOT, LINEAR AND HIPPODROME MACHINES

Schneider Electric

Honeywell

CONTROL CABINET

The control cabinet provides durability, damp-proofing and electrical safety in operation.

It allows to set various combinations of a mode of movement of the machine and norms of a water discharge.

It provides automatic shutdown of the machine in case of parameters of movement and irrigation falling outside the safe values.

Visual display of information.

COLLECTOR AND PERPENDICULAR ALIGNMENT DEVICE

13 rings under the sealed case.

Triple contact surface.

Mounted on a sealed ball bearing.

Connection terminal block.

Ultraviolet protection.

CART CONTROL UNIT

The unique system of alignment of linear machines along the cable stretched along the machine – from the first cart to the last, providing high reliability of operation of the longest machines.

The linkage assembly system made of stainless steel and polyoxymethylene eliminates the possibility of blocking due to oxidation.

The unit is equipped with an adjustable fuse, as well as with an interference prevention module.

Durable galvanized steel base and polyethylene ultraviolet protector.

At the current moment, the control cabinets are available in two versions: the relay and controller-relay ones for center pivot, linear and hippodrome machines. Later, the third version will be mastered – the controller one, akin to a controller-relay system with a touchscreen, but without manual control with switches, buttons and light bulbs.

RELAY CONTROL SYSTEM CABINET

The relay control system is considered to be the most simple and reliable, and most importantly it is deemed suitable for quick repairs in the field by almost every full-time electrician of an agricultural enterprise operating an irrigation machine. The use of a relay control system shall not require the long-term training, each its function is clear and logical. The irrigation machine operators study it quickly and instantly get to work.

FREGAT Smart

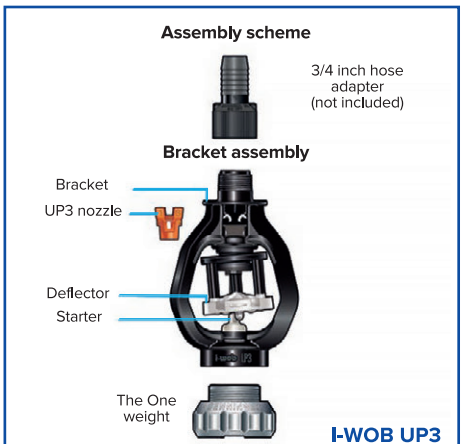
CONTROLLER-RELAY CONTROL SYSTEM CABINET

The main difference from the relay control system is that the cabinets – in addition to the existing relay control system – are equipped with a controller with a touchscreen FregatSmart system making it possible to control the irrigation machine in addition to controlling it with the relay control system, but FregatSmart system opens the following additional possibilities:

- visualization of field irrigation,
- display of irrigation parameters (pressure, machine location, irrigation rate, etc.),
- setting irrigation parameters in a more convenient way, such as calculating irrigation rate either in mm or m^3/ha of precipitation,
- entering separate irrigation parameters (irrigation rate, operation of the end gun, the machine shutdown, etc.) for each section of the field,
- sms — in case of an emergency, the irrigation machine may either stop or continue to operate if necessary, but after sending an SMS message about the emergency,
- the FregatSmart system allows for its wider use through the use of remote monitoring and control of the irrigation machine from a smartphone, tablet or workstation.

SPRINKLERS

I-WOB UP3



I-WOB UP3

The Senninger i-Wob sprinklers used in DMF Fregat are considered the most advanced of the existing sprinklers designed for irrigation machines. The unique rotation function used in their operation – along with the geometry of the tracking grooves – provides a constant droplet size and exceptional uniformity of irrigation over large areas. Such design has an obvious advantage due to the prevention of droplet drifting and soft, natural-like, impact of the droplets on the ground. Unlike other sprinklers, the i-Wob does not destroy the structure of the soil and does not allow excessive irrigation.

The Senninger sprinklers for the self-travelling irrigation machines are designed to achieve maximum performance at ultra-low pressures of 0,69-1,04 atm.

- Operation at low pressure may reduce the power requirements of the pumping station
- Reduces electricity consumption

Maximum performance is based on two main requirements for sprinklers:

- Irrigation with low droplet intensity
- Uniformity and stability of the water distribution scheme during irrigation

If necessary, either the Nelson (e.g., S3030 Spinner) or the Komet (KPT or KPS) sprinklers may be used. Also in DMF Fregat machines, the part-circle end gun by Komet TwinMax or others may be applied.

KOMET KPT

KOMET TWINMAX

KOMET KPS

NELSON SPINNER

UMC 765-U

FREGAT

WITH CARE OF FUTURE

RELIABLE DRIVE SYSTEM

UMC TNT-2-U

UMC GEARMOTOR (USA)

or others

The electric driven motor of the UMC Power Saver 3,5, 40:1 series (20:1 optional), 0,55 kW (1,1 kW optional), 380 V / 50 Hz, with high torque and overload protection fuse. The motor is set in the aluminum case for the best cooling and corrosion protection, and is delivered in water-proof execution, with the isolated electric contacts.

AL

UMC GEARBOX (USA)

or others

The electric driven towable gearbox UMC TNT-2-U, 50:1 for the run-in position (UMC 740-U 50:1 or UMS 765-U 50:1 optional, non-towable, either for stationary machines or mobile ones with a freely rotating nave box) with high-strength hardened parts of the worm gear.

High efficiency,
low energy consumption,
long service life.

COUPLER

Made of high-quality steel, equipped with an elastic UMC towable coupling (USA), providing a smooth start and stop and transfer of the carts into the run-in position.

The coupler is protected against corrosion, providing reliable long-term work.

WHEELS

The 14.9-24 R1 tires with a high degree of passability provide for confident movement on moist soil.
The low specific pressure allows to keep the most of the surface layer intact.
Galvanized wheel disks.

TILLAGE MACHINERY

HEAVY DISK HARROWS
BPD-2.4; BPD-4.2; BPD-4.2-01; BPD-6.01

STAR-WHEELED MODULE MKDSH-4

ROLLER KPF-6KZ

CULTIVATOR APP-6.02-01

DEEP TILLAGE CULTIVATOR KBF-6.2

BPD TECHNICAL PARAMETERS

Item	BPD-2,4	BPD-4,2-01 (hard)	BPD-4,2 (hydraulic)	BPD-6.01
Aggregated with	Tractor 3 cl.	Tractor 5 cl.	Tractor 5 cl.	Tractor 6 cl.
Productivity per hour of main run time, ha	1,9-2,4	2,5-4,2	2,5-4,2	4,8-7,2
Operating speed, km/h	8-10	6-10	8-10	8-12
Coverage width, m	2,4	4,2	4,2	6
Weight, not more than, kg	3 400	5 600	6 000	8 500
Dimensions in run-in / shipping position				
Length, mm	6930 / 6880	7400	7400 / 6910	8500
Width, mm	2500	4400	4550 / 2500	6000 / 4000
Height, mm	1650 / 1880	1650 / 1900	1650 / 2884	1650 / 3000
Disc diameter, mm	800	800	800	800
Operating depth in one path (in two paths), cm	from 16 (25)	from 16 (25)	from 16 (25)	from 16 (25)

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