Katav-Ivanovsk
Instrument Making Plant

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Katav-Ivanovsk Instrument Making Plant

Product Reference Handbook

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Transliteration Of Russian Symbols When Ordering Parts
Russian - English
КБ - KB
КШ - KSH
КШЗ - GSHZ
ГНЗП - GNZP

Introduction

Modern marine magnetic compass is highly technological, dependable, durable and none the less very accurate device, that requires expert approach when considering one for a vessel. Whether it's a vessel that is being built or currently in service, crucial factors such as type of compass, sitting of the compass, required optional components, as well as further maintenance schedule are something that can't be neglected.

When it comes to high quality equipment, professional installation and maintenance, Katav-Ivanovsk instrument making plant has all that it takes to provide first class products and services. Accustomed to perfection that has developed for the past 70 years, our plant provides extensive training program for existing and new technical specialists, emphasizing on unprecedented skills in compass calibration, deviation procedures, proper selection of the sitting of the compass, as well as maintenance and repair in dry docks and while at sea. Given the strict requirements of the training program, our specialists will ensure that your magnetic compass provides years of accurate and trouble free functionality in all types of operational conditions.

Even though equipment manufactured by Katav-Ivanovsk instrument making plant during the Soviet era has been long ago upgraded, some older magnetic compass models such as KMO-T, UKPM-M, and KM-100 are still in operation

Definitions

Standard Compass: is an independent magnetic compass that does not rely on electric power supply of the vessel, where its main function is to determine accurate course of the vessel and relay this data to the bridge of the vessel.
Emergency compass (Compass Bowl): an additional compass that is able to perform same functions of standard compass and can be easily substituted with the standard compass when situation requires so.
Steering Compass: is a compass by which vessel is steered.

General Marine Regulation

Today, marine regulations thoroughly define necessary set of equipment, tools, and instruments that must be present on any vessel of any size, where standard magnetic compass is the number one device on the list of required equipment. Standard magnetic compass must be an independent device that is neither electromagnetic nor electric and does not depend on the vessels power supply. Vessels with gross weight of 150 tons or more in addition to standard magnetic compass must be equipped with the steering compass which in part can be substituted by remote device that is able to relay accurate course of the vessel from the standard compass. If steering compass or remote device is unavailable, then emergency compass must be present.

Installation Recommendations

It is recommended that the place of sitting for magnetic compass should be chosen as close as possible to diametral plane of the vessel where magnetic screening is the least. Another rule of thumb that should be kept in mind is that rotating antennas, lifting equipment and electric cables can cause changes in magnetic field, thus installing a magnetic compass near these objects is highly inadvisable.

Equipment recommended for installation on the bridge should always conform to the minimal magnetic compass distance guidelines that are specific for each model of magnetic compass. If these guidelines are not met, then proper operation and functionality of magnetic compass will be compromised.

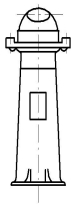
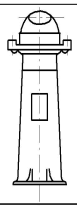
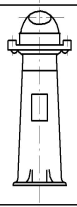
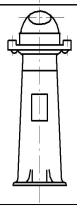
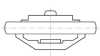
When exact data for minimal distance for KM-145 and UKPM-M series of magnetic compass is unavailable, please refer to the chart provided. This chart offers data on recommended minimum distances from the center of the compass card to ferromagnetic objects, thus ensuring accurate course reading and trouble free calibration.

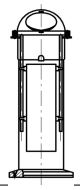
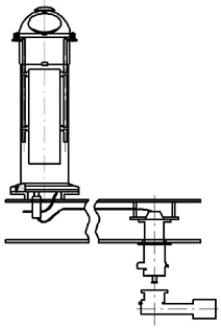
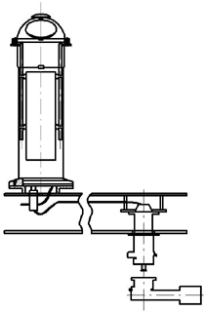
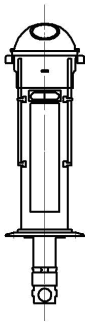
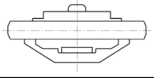
Vessel Size (meters)									
Up To 30	40	50	60	70	80	90	100	110	120
Distance to the fixed objects that made from magnetic materials in meters									
1,5	1,75	2,1	2,3	2,7	2,9	3,0	3,0	3,0	3,0
Distance to the moving objects that made from magnetic materials in meters									
2,0	2,2	2,4	2,6	2,9	3,1	3,4	3,5	3,7	4,0

Compass Application Reference Chart

When considering a magnetic compass for a small vessel such as yacht, motorboat, or recreational watercraft, it is necessary to establish magnetic composition of the hull in order to determine whether a deviation compensation device is necessary. If hull of the watercraft contains large metal objects, then course readings could be false or inaccurate without additional deviation compensating device.

For larger vessels, we recommend using the following chart.

Equipment Type		*Gross Vessel Capacity*						
Brief Description	*Visual reference*	*Up To 150*	*From 150 Up To 300*	*From 300 Up To 500*	*From 500 Up To 3000*	*From 3000 Up To 10000*	*From 10000 Up To 5000*	*Over 50000*
5 Inch Magnetic Compass								
UKPM-M1 (MMMM.462512.005) Visual compass		✦						
UKPM-M2 (MMMM.462512.005-01) Visual, dashboard mounted compass		✦						
5 Inch Standard Compass:								
UKPM-M4 (MMMM.462512.005-03) Electronic course transmission system. High binnacle mount		✦	✦	✦				
UKPM-M4 (MMMM.462512.005-03) Electronic course transmission system and longitude compensator. High binnacle mount		✦	✦	✦	✦	✦	✦	✦
UKPM-M5 (MMMM.462512.005-04) Electronic course transmission system, longitude and electromagnetic deviation compensator		✦	✦	✦	✦	✦	✦	✦
UKPM-M7 (MMMM.462512.005-06) Electronic course transmission system, Short binnacle mount		✦	✦	✦				
Emergency Compass "Bowl" (MMMM.462124.005)		✦	✦	✦	✦	✦	✦	✦

Equipment type		*Gross Vessel Capasity*						
Brief Description	*Visual Reference*	*Up to 150*	*From 150 To 300*	*From 300 To 500*	*From 500 To 3,000*	*From 3000 To 10,000*	*From 10000 To 50,000*	*Over 50,000*
Main Compass **KM-145 Series**								
KM 145-M1 (M2) (КБ1.150.131-09(10)) Electronic course transmission system.					✦	✦	✦	✦
KM-145-M3 (M4) (КБ1.150.131-11(12)) Electronic course transmission system or optical (fiber-optic) extension.					✦	✦	✦	✦
KM-145-5 (6) (КБ1.150.131-05(06)) Optical (fiber-optic) course transmission extension					✦	✦	✦	✦
KM-145-C1 (C2) (КБ1.150.154(-01)) with optical (periscope) course transmission extension					✦	✦	✦	✦
Emergency compass(bowl)-with ECTS (КШ32.510.028 (-01)					✦	✦	✦	✦

Note: In order to ensure accurate course reading on vessels that perform long distance journeys and subject to latitudinal position changes, a latitude deviation compensator is required.

KM-145 Magnetic Compass Series

KM-145 magnetic compass series is our top of the line product that offers complete set of optional instruments and devices, which makes these series applicable to any type of the vessel regardless of size, weight, and distance of travel. Primary function of KM-145 magnetic compass series is to provide accurate and continuous magnetic course readings from the card dial of the compass. These series of magnetic compass can be optionally equipped with optical or fiber-optic devices that allow accurate card dial readings at the preferred location on the helm, thus eliminating need for steering compass.

Models with designation M equipped with remote transmission device, which allows for remote magnetic course readings by analog-to-digital converter, which automatically compensates for residual deviation, and inclination, with further transmission of collected data to analog or digital repeaters as well as other output devices. Additionally, data transmitted from magnetic compass can be relayed to on board navigation systems complex that operates in IEC1162-1 format, transmission is performed via interface RS422 and RS232 respectively. As of 2010 remote magnetic course transmission device was upgraded to automatically adjust for magnetic deviation by utilizing data from GPS/GLONASS or onboard navigation system complex.

KM-145 Series General Technical Data

Compass Card Diameter (mm)	145
Value of Card Degree Segmentation (Degrees)	1
Friction Error (Degrees)	±0,3
Half-period (Sec)	12
Course Transmission Error (Degrees)	0,6
KM-145 series is equipped with deviation correction device, which eliminates semicircular, quarter, latitude, and heeling deviation. Some models equipped with electromagnetic deviation compensator.	
Power supply: 24V or 220V 50Hz (models equipped with electronic course transmission device provide automatic electric current switching capability)	

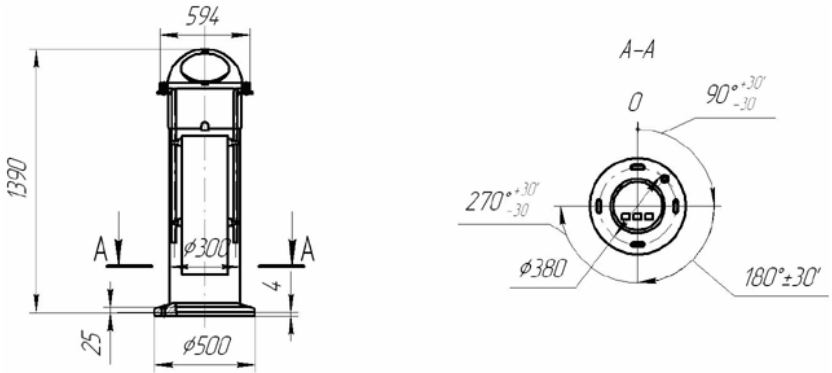
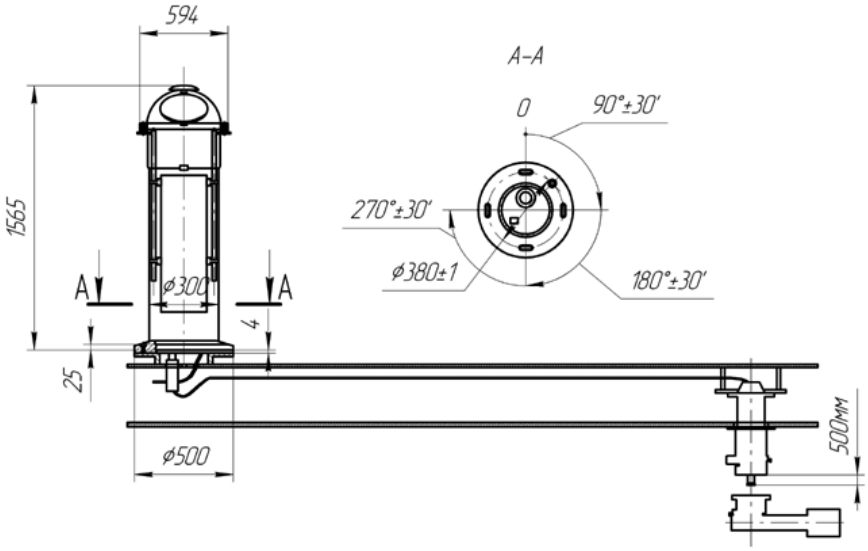
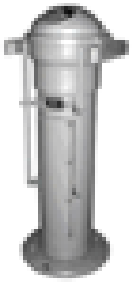
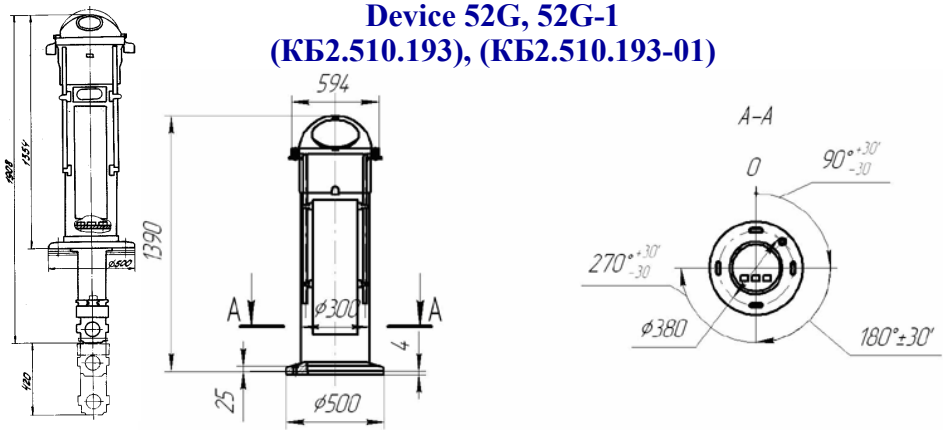
KM-145 Series Optional Equipment Reference Chart

Compass Model	*Device 52*	*Device 10*	*Power Supply*	*Analogue Repeater (AR)*	*Digital Repeater (DR)*	*Device 54*	*Azimuth Sight*	*Magnifying Lens*
Model KM-145-1 **(КБ1.150.131)** Most basic version of KM-145 series. This model does not include electric or optical course transmission system. Supplied for repair purposes only.	 Device 52-1 (КБ2.510.157)		 Device 3A (КБ3.101.058)				 (КБ2.512.006)	 (КШ3.805.002)
Model KM-145-2 **(КБ1.150.131-01)** In addition to standard features of KM-145-1, equipped with additional electromagnetic deviation compensator powered by Device 3	 Device 52 (КБ.510.158(-01))		 Device 3A (КБ3.101.058)  Device 3 (КБ3.101.055) (1 or 2 units)				 (КБ2.512.006)	 (КШ3.805.002)
Model KM-145-5 **(КБ1.150.131-05)** In addition to standard features of KM-145-1, equipped with optical course transmission system (fiber-optic), fiber lengths of 1400mm or 2800mm	 Device 52B-1 (КБ2.510.161)		 Device 3A-1 (КБ.3.101.059)			 (КБ.2.529.146)	 (КБ2.512.006)	 (КШ3.805.002)

Compass Model	*Device 52*	*Device 10*	*Power Supply*	*Analog Repeater (AR)*	*Digital Repeater (DR)*	*Device 54*	*Azimuth Sight*	*Magnifying Lens*
Model КМ-145-6 **(КБ1.150.131-05)** In addition to standard features of KM-145-5, equipped with additional electromagnetic deviation compensator powered by Device 3	 Device 52B (КБ2.510.162-01)		 Device 3A (КБ3.101.058)  Device 3 (КБ3.101.055) (1 or 2 units)			 (КБ.2.529.146)	 (КБ2.512.006)	 (КШ3.805.002)
Model КМ-145-C1 **(КБ1.150.154)** Visual compass equipped with optical (prism) course transmission system. Replaces older KMO-T series.	 Device 52G-1 (КБ.2.510.193-1)		 Device 3B-1 (КБ3.201.068)			 (КВ.5.947.034"35")	 (КБ2.512.006)	 (КШ3.805.002)
Moel КМ-145-C2 **(КБ1.150.154-01)** In addition to standard features of KM-145-C1, equipped with additional electromagnetic deviation compensator powered by Device 3. Replaces older KMO-T series.	 Device 52G (КБ.2.510.193)		 Device 3B (КБ3.101.057)  Device 3 (КБ3.101.055) (1 or 2 units)			 (КВ.5.947.034"35")	 (КБ2.512.006)	 (КШ3.805.002)
Model КМ-145-M1 **(КБ1.150.131-09)** Basic model of the 2nd generation KM-145 magnetic compass series. Equipped with electronic course transmission system. Data transmission based on NMEA (IEC 1162-1) standard via RS232/RS42 interface.	 Device 52A-1 (КБ2.510.159)	 Device 10 (ММММ.408112.002)	 Device 3I (ГН3П.0105.000.00.000)	 AR (ММММ.408112.003) Up to 3 Units	 DR (ММММ.408112.001) Up To 3 Units		 (КБ2.512.006)	 (КШ3.805.002)
Model КМ-145-M2 **(КБ1.150.131-10)** In addition to standard features of KM-145-M1, equipped with electromagnetic deviation compensator powered by Device 3.	 Device 52A-1 (КБ2.510.159)	 Device 10 (ММММ.408112.002)	 Device 3I (ГН3П.0105.000.00.000) Device 3 (КБ3.101.055) (1 or 2 units)	 AR (ММММ.408112.003) Up to 3 Units	 DR (ММММ.408112.001) Up To 3 Units		 (КБ2.512.006)	 (КШ3.805.002)
Model КМ-145-M3 **(КБ-1.150.131-11)** In addition to standard features of KM-145-M1, equipped with optical course transmission system (fiber-optic), fiber lengths of 1400mm or 2800mm	 Device 52V-1 (КБ.2.510.163)	 Device 10 (ММММ.408112.002)	 Device 3I (ГН3П.0105.000.00.000)	 AR (ММММ.408112.003) Up to 3 Units	 DR (ММММ.408112.001) Up To 3 Units	 (КБ.2.529.146)	 (КБ2.512.006)	 (КШ3.805.002)
Model КМ-145-M4 **(КБ1.150.131-12)** In addition to standard features of KM-145-M3, equipped with electromagnetic deviation compensator powered by Device 3	 Device 52V (КБ2.510.164)	 Device 10 (ММММ.408112.002)	 Device 3I (ГН3П.0105.000.00.000) Device 3 (КБ3.101.055) (1 or 2 units)	 AR (ММММ.408112.003) Up to 3 Units	 DR (ММММ.408112.001) Up To 3 Units	 (КБ.2.529.146)	 (КБ2.512.006)	 (КШ3.805.002)

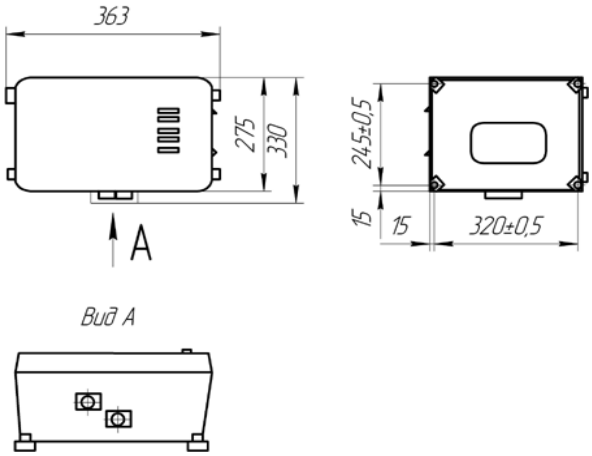
Note: Military or dual purpose vessels that carry demagnetizing device, must be equipped with compass that has optional electromagnetic deviation compensator. Number of compensating coils should be noted when placing an order.

KM-145 Series Component Composition

	Device 52: Serves a purpose of measuring magnetic course and consists of magnetic sensor, series of deviation devices, illumination system and a compass bowl.
 Weight: 105 Kg	**Device 52, 52-1, 52A, 52A-1** **(КБ2.510.158-01), (КБ2.510.159), (КБ2.510.160), (КБ2.510.160-01)** 
 Weight: 105 Kg	**Device 52B. 52B-1, 52V, 52V-1** **(КБ2.510.162), (КБ2.510.161), (КБ2.510.164), (КБ2.510.164-01)** 
 Weight: 110 Kg	**Device 52G, 52G-1** **(КБ2.510.193), (КБ2.510.193-01)** 

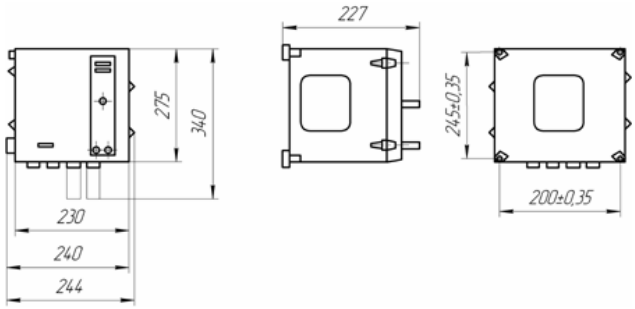
Device 3
(КБ3.101.055)

Power supply for magnetic deviation compensator.



Device 3A / 3A-1
(КБ3.101.058) / (КВ3.101.059)

Illumination system power supply



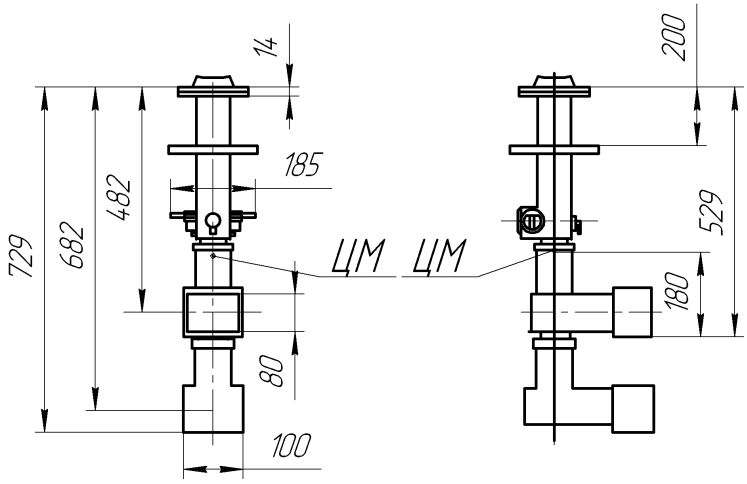
Device 54
Optical Course Transmission System
(Fiber-Optic) (КБ2.512.006)

Provides course readings from compass card dial with further transmission of the image via optical fiber.
Measures: 390x150x529mm (boom-729mm)
Weight 6,8 Kg

Optical Course Transmission System
(Mirror Reflectors)(КБ.5.947.034”35”)

Provides course readings from compass card dial with further transmission of the image via mirror reflection system.

Measures: 210x515mm
Weight: 10,5 Kg



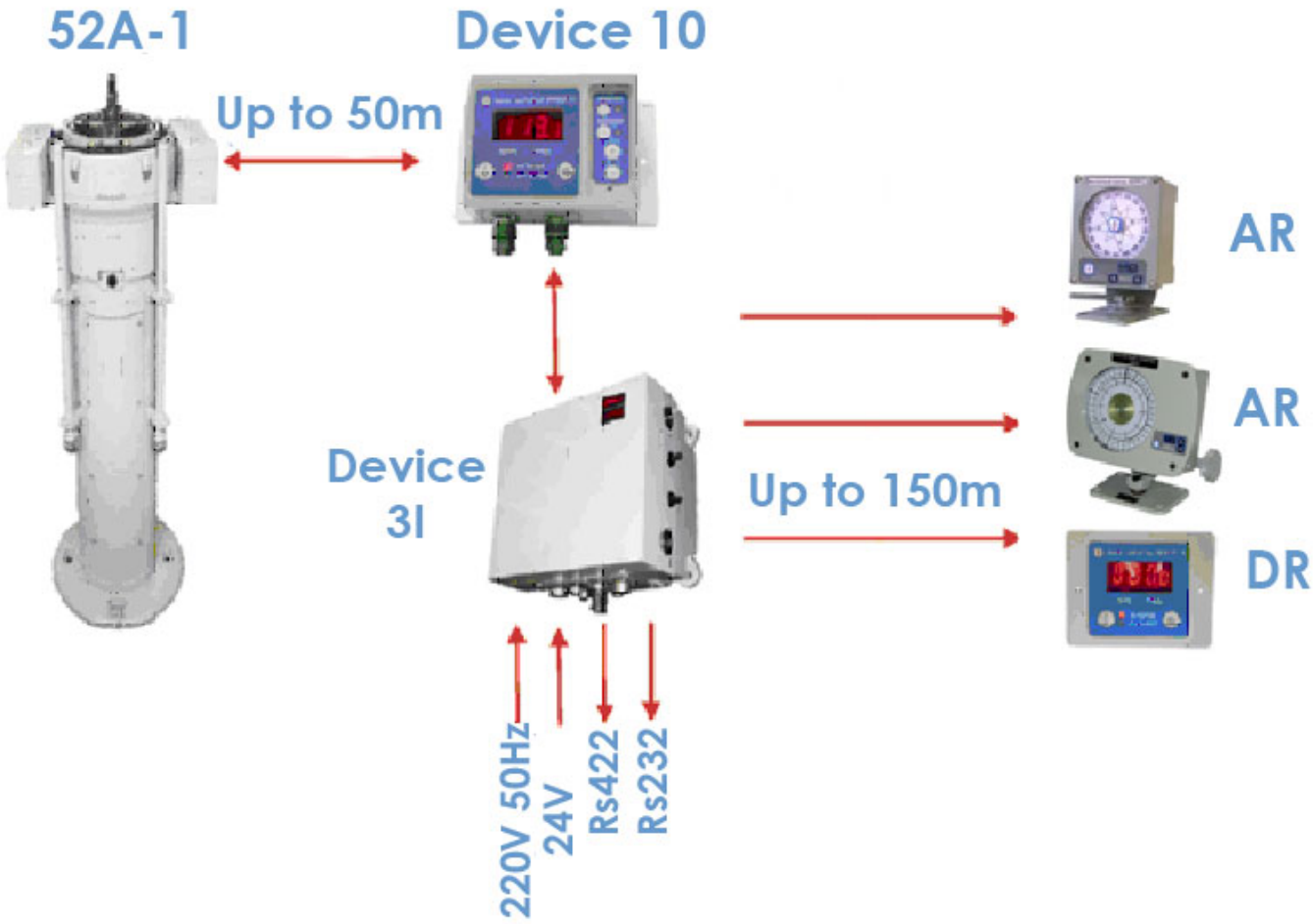
Electronic Course Transmission System For KM-145 And UKPM-M

Modern KM and UKPM-M series of magnetic compasses are equipped with remote course transmission system. Backbone of the system is a hard mounted magnetic course sensor (UPK) which provides factual readings of magnetic course, conversion of reading in to digital format (NIMEA-0183 “IEC-1162”), and further transmission of obtained data via RS232/RS422 interface to connected analog or digital repeaters as well as other output devices. Reading of the compass card by the sensor occurs in a contactless manner, by means of measuring magnetic field of the compass card needles. Calibration of the sensor and compass bowl occurs at the factory, where each paired unit supplied with individual calibration chart, which allows for an easy replacement of the compass bowl by the crew of the vessel.

In addition to the single task of reading and transmitting the course, each of the sensors can be accessed via RS232 interface for remote programming of additional functions. After completing deviation calibration procedure, data from residual deviation table can be programmed in to the sensor, allowing UPK to transmit either true or magnetic course of the vessel. Furthermore magnetic deviation data can be programmed in manually or automatically from GPS / GLONASS receivers or navigation complex of the vessel.

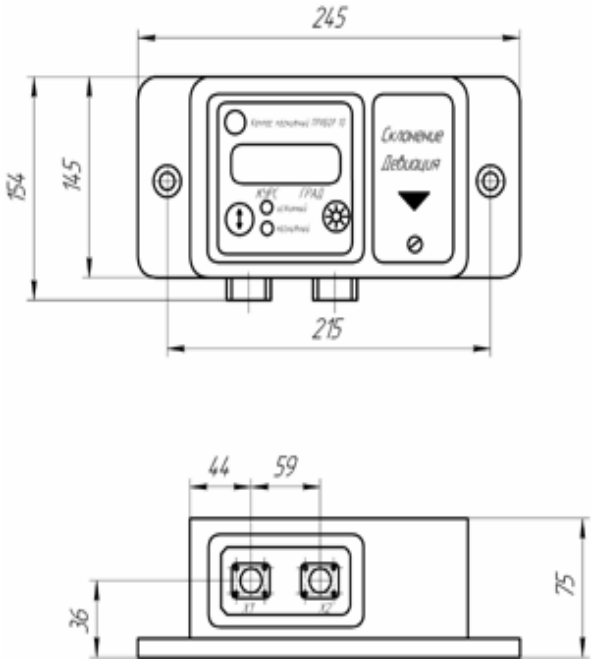
As of 2011, we found it necessary to expand capabilities of the UPK, and went further by adding functionality that allows for remote control of device 10 duplicating its keypad. Given this new capability, magnetic deviation as well as residual deviation table can be corrected remotely via integrated on board systems.
Given all the capabilities of remote course transmission system, it can be a great addition to any navigation complex providing extraordinary benefits of on demand functionality, independence from electric source and low cost of operation.

ECT System Connections Chart



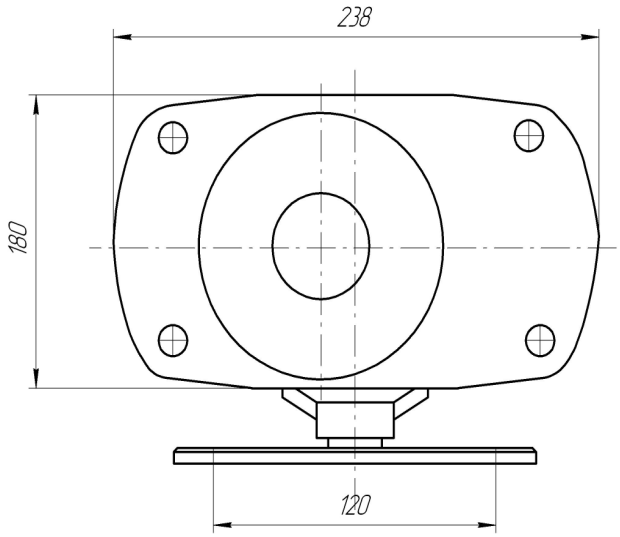
Device 10
(MMMM.408112.002)

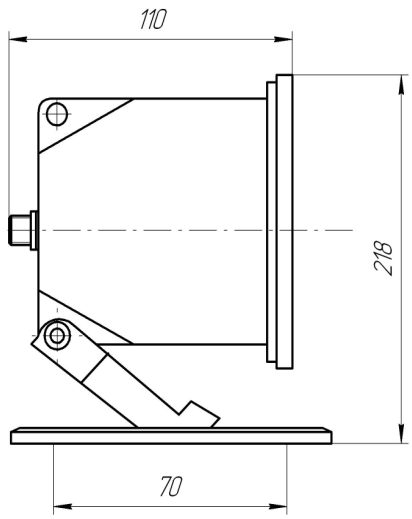
Main function of this device is to receive course data from the compass, convert this data in to digital format and transmit converted data to other output devices. This device can be mounted on the wall or dashboard.
Measurments: 245x154x75 мм
Weight: 2,6 Kg.



AR - Analog Repeater With Dual Dial
(MMMM.408112.003)

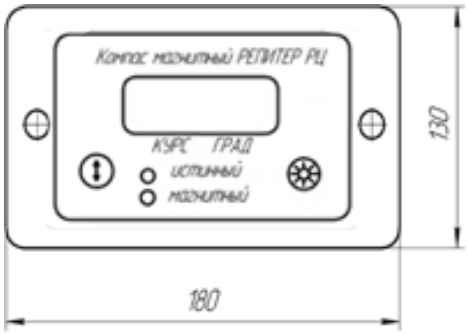
Provides readings from compass via Rs232 and Rs422 interface with NMEA 0183 (IEC 1162-1) protocol. Features dual dial read outs (rough dial with 1 degree segments and precision dial with 0.1 degree segments). Tthis device is compatible with products from other manufacturers.
Multi mounting system allows placement of the device on any suitable location, providing 2 axis pivoting action for adjustments.
Power Supply: 24V
Measurements: 200x205x131 мм
Weight: 3 кг.

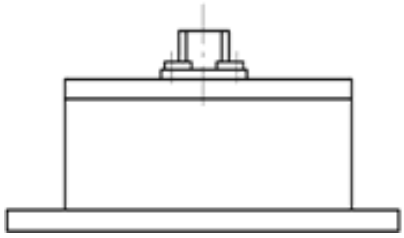


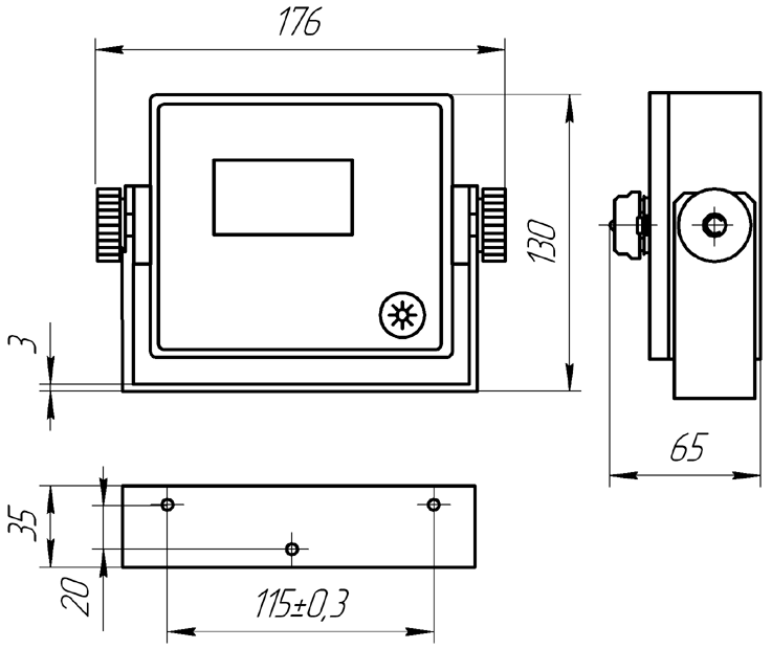


DR - Digital Repeater
(MMMM.408112.001)

Provides repeating function of course data from device 10 via NMEA 0183 (IEC 1162-1) protocol.
Reading discrepancy is -0.1 degrees.
Comes with a bracket with a single axis pivoting action or can be mounted in to dashboard.
Measurements: 176x133x77
Weight: 1,1 Kg.



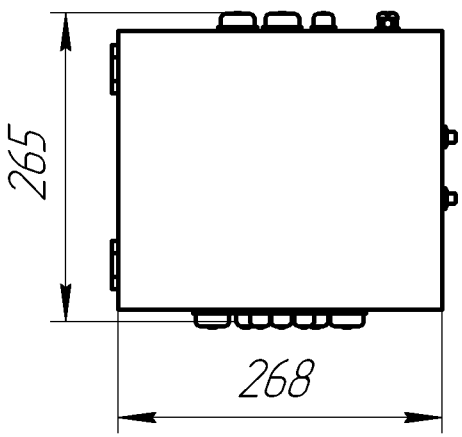


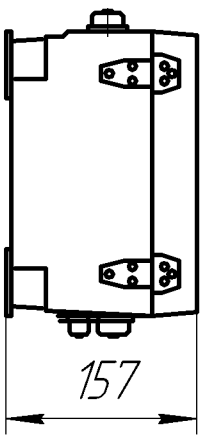


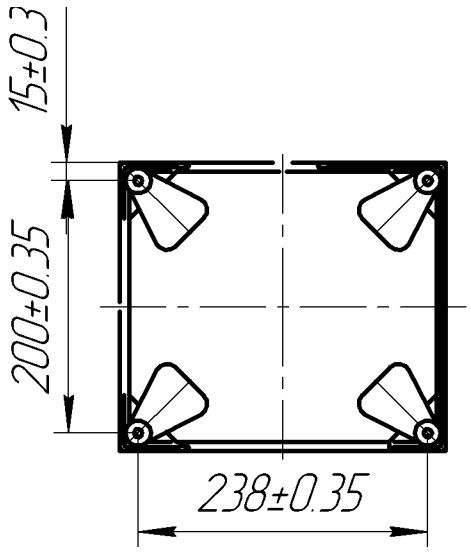
Device 3I (Coupling Power Supply)
(ГНЗП.0105.000.00.000)

Provides voltage conversion from on board power supply (220V, 24W) in to necessary voltage to power Device 10, with further distribution to AR, DR, and other connected devices.

Measurements: 290x274x157
Weight: 7,6 кг.







UKPM-M Magnetic Compass Series

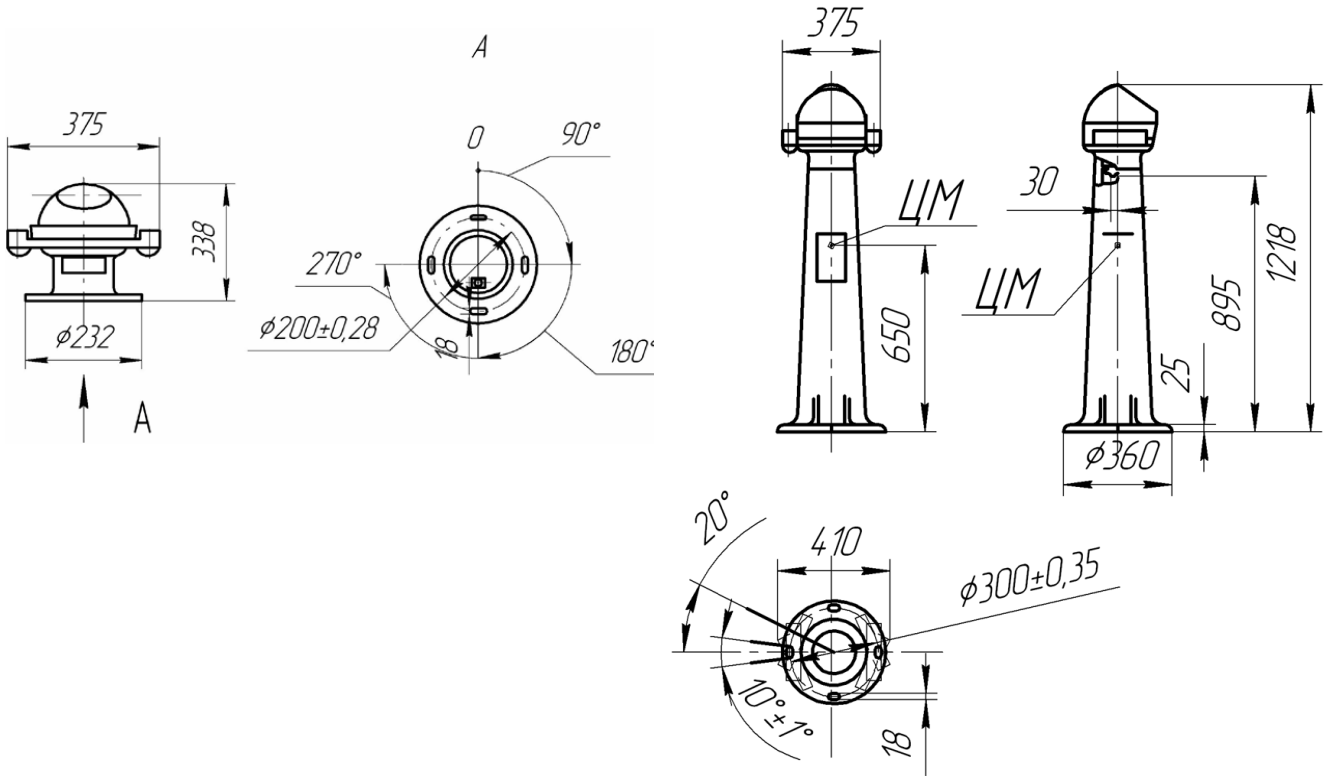
UKPM-M magnetic compass series is our least expensive but fully functional substitution version for KM-145 series.
Primary function of UKPM-M magnetic compass series is to provide accurate and continuous magnetic course readings by visually observing card dial of the compass. These series equipped with stationary magnifying glass, which makes it easier to read compass card dial compared to other compasses with close diameter of the card dial. Models 4 and 7 equipped with remote transmission device, which allows for remote magnetic course readings by analog-to-digital converter, which automatically compensates for residual deviation, and inclination, with further transmission of collected data to analog or digital repeaters as well as other output devices. Additionally, data transmitted from model 4 and 7 magnetic compasses can be relayed to on board navigation systems complex that operates in IEC1162-1 format, transmission is performed via interface RS422 and RS232 respectively. As of 2010 remote magnetic course transmission device was upgraded to automatically adjust for magnetic deviation by utilizing data from GPS/GLONASS or onboard navigation system complex.
As of 2010 remote magnetic course transmission device was upgraded to automatically adjust for magnetic deviation by utilizing data from GPS/GLONASS.
As of 2011, we found it necessary to expand capabilities of the UKPM-M series, and went further by adding functionality that allows for remote control of device 10 duplicating its keypad. Additionally, unified mounting system allows for an easy replacement of older KM-100 and UKP-M series.
UKPM-M magnetic compass series that equipped with remote course transmission system carries necessary certification that allows for complete elimination of gyrocompass for vessels with gross weight of up to 500 tons. In addition, models equipped with course transmission system in tandem with latitude compensator carry necessary certification that allows its use on any vessel without restrictions and provides the same functionality as the most expensive versions.

Compass Card Diameter (Mm)	127
Value of Card Degree Segmentation (Degrees)	1
Friction Error (Degrees)	±0,3
Half-period (Sec)	12
Course Transmission Error (Degrees)	0,6
UKPM-M series is equipped with deviation correction device, which eliminates semicircular, quarter, and heeling deviation. Some models equipped with latitude deviation compensator.	
Power supply: 24V or 220V 50Hz (electric current switching capability is automatic)	

UKPM-M Series Optional Equipment Reference Chart

Compass Model	*Device 52*	*Device 10*	*Power Supply*	*Analog Repeater (AR)*	*Digital Repeater (DR)*	*Azimuth Sight*
Model UKPM-M-1 **(MMMM.462512.005)** Visual compass. High Binnacle Mount	 Device 52 (КБ2.510.158)					 КШ2.512.004
Model UKPM-M-2 **(MMMM.462512.005-01)** Same as UKPM-M-1 mounted on a short binnacle	 Device 52A-2 (КШ2.510.151-01)					 КШ2.512.004

Compass Model	*Device 52*	*Device 10*	*Power Supply*	*Analog Repeater (AR)*	*Digital Repeater (DR)*	*Azimuth Sight*
Model UKPM-M4 **(MMMM462512.005-03)** Visual compass equipped with remote bearing transmitter mounted on high binnacle.	 Device 52-1 (КШ2.510.150-01)	 Device 10 (MMMM.408112.02)	 Device 3I (ГН3П.0105.000 .00.000)	 AR (MMMM.408112 .003) Up to 3 Units	 DR (MMMM.408112 .001) Up to 3 Units	 (КШ2.512.004)
Model UKPM-M4 **with longitude compensator** **(MMMM.462512.005-03)** In addition to standard features of UKPM-M4, equipped with longitude deviation compensator and can be installed on vessel of any type and size	 Device 52A-1 (КШ2.510.150)	 Device 10 (MMMM.408112.02)	 Device 3I (ГН3П.0105.000 .00.000)	 AR (MMMM.408112 .003) Up to 3 Units	 DR (MMMM.408112 .001) Up to 3 Units	 (КШ2.512.004)
Model UKPM-M5 **(MMMM.462512.005-04)** In addition to standard features of UKPM-M4, equipped with additional electromagnetic deviation compensator powered by Device 3	 Device 52-1 (КШ2.510.150-01)	 Device 10 (MMMM.408112.02)	 Device 3I (ГН3П.0105.000 .00.000)  Device 3 (КБ3.101.055)	 AR (MMMM.408112 .003) Up to 3 Units	 DR (MMMM.408112 .001) Up to 3 Units	 (КШ2.512.004)
Model UKPM-M7 **(MMMM.462512.005-05)** Same as UKPM-M4 Short binnacle mount	 Device 52A-2 (КШ2.510.151-01)	 Device 10 (MMMM.408112.02)	 Device 3I (ГН3П.0105.000 .00.000)	 AR (MMMM.408112 .003) Up to 3 Units	 DR (MMMM.408112 .001) Up to 3 Units	 (КШ2.512.004)



Magnetic compass for small vessels

Katav-Ivanovsk instrument making plant has a large selection of magnetic compasses that will suite any vessel of a smaller size. Many production models are certified by river and sea registry.

Model, and Description	Visual reference
UKPM-M3 Card diameter 127mm. Illumination is available from 24V power supply .	
KM-69 M-2 Equipped with semicircular as well as heeling deviation compensator . Card diameter 69 мм. Requires 24V or 12 V power supply power	 
KM-69 M-3 Without Illumination Card Diameter 69 мм.	
KMS 90-1. Coil Diameter 69 мм. features spherical dial. Illumination requires 24 or12 V power supply. Mounting bracket allows easy installation	 
KMS 90 Card diameter 69mm. Features skirt type dual read compass card. Illumination requires 24 or 12V power supply.	 
KMS 55-1 Card diameter 40mm. Equipped with dual deviation compensator. Illumination requires 24 or 12V power supply.	
KMS 55-2 Card Diameter 40mm. Illumination requires 24 or 12V power supply	
KMS 55-3 Card Diameter 40mm No illumination option	
Device PN-1 Combination device that includes a compass with card diameter of 40mm equipped with magnifying lens for an easier readout as well as mechanically winding(1 week) clock with seconds hand	
KM40-1 Spherical dial with illumination element installed. Can be easily read from the top as well as from the side.	

Model, and description	Visual Reference
KM40-2 Equipped with dual deviation compensator.	
KM40-3 Recommended for in dash installation and equipped with dual deviation compensator	
KM40-4 This compass is certified and meets all the guidelines for installation on rescue craft. Includes deviation compensator as well as integrated illumination powered by lithium element.	
KM40-H Individual diving compass	
KM40-H1. Individual diving compass with velcro wrist strap. Features smaller size than KM40-H	

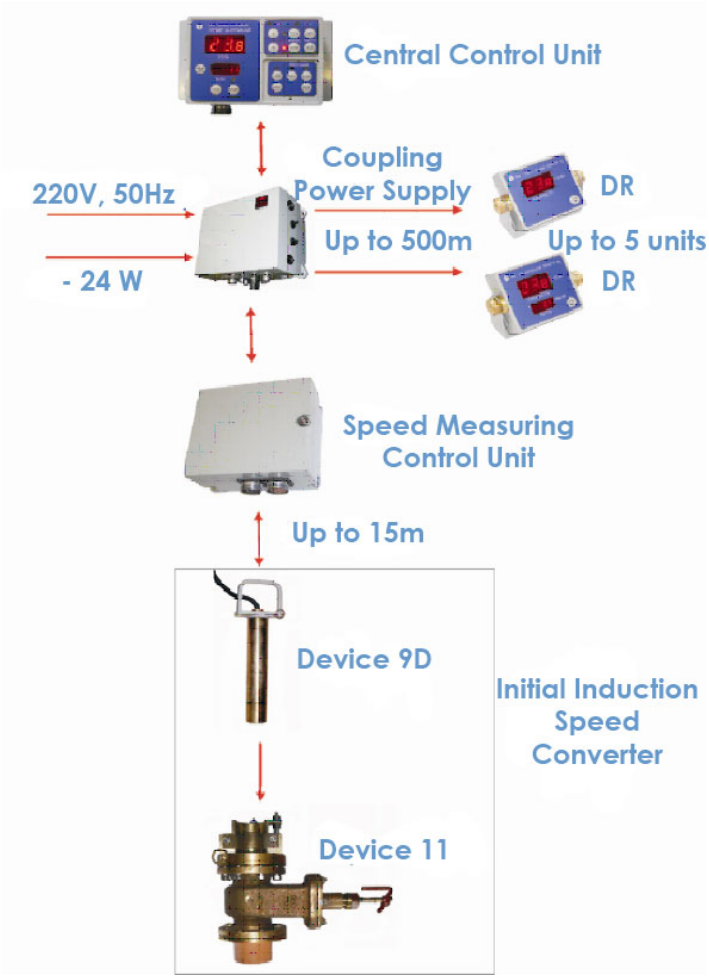
Electromagnetic Induction Log IEL-3 / IEL-2M2

Provides accurate readings, of speed and distance traveled, relative to the water surface. Data output is performed in IEC 1161-1 format via RS422 and RS232 interface. This device is also compatible with older equipment and provides data in 200 impulses per mile format if necessary.
Replacement of older logs such as IEL-2 and logs from other manufacturers by Log IEL-3 (IEL-2M2) on an active vessels, can be performed without docking, replacement of bottom hull constructions, and unnecessary cable modifications. Model IEL-3 is compatible with older induction sensors such as device 9 and 9D. As of 2011, we found it necessary to expand capabilities of the central control unit, and went further by adding functionality that allows for remote control of the unit by duplicating its keypad.

Technical Data

Speed measurement range , (knots)	From -10 Up to +60
Transmission Error, (knots)	From 0 To +55°C: ±0,15 From 0 To -15°C: ±0,20
Distance traveled error (%) From 0 to 9,999.9 Nm	0,1
Power Supply, V	~220, =24
Energy consumption	Not more than 45 Watt, 40 V + 3,5 V на 1 PA

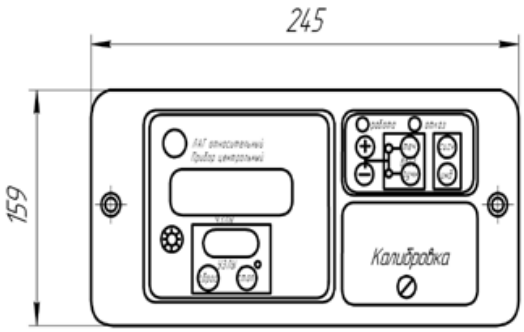
Equipment Connection Chart

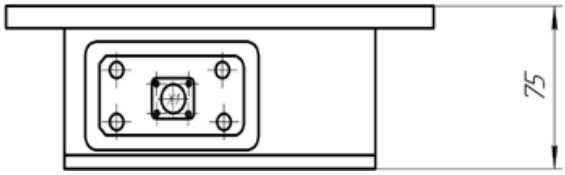


Component Composition Of IEL-3 / IEL-2M2 Logs

Central Control Unit (CCU)

Preforms receipt of the signal from (SMCU), calculates output data for speed and distance traveled, with further transmission to the (CPSU) for further distribution to output devices. Includes two operating panels, one for calibration purpose and another for Log operation.
Size: 230×180×150 мм.
Weight: 2,6 кг.

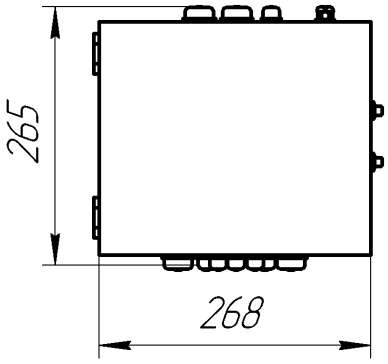


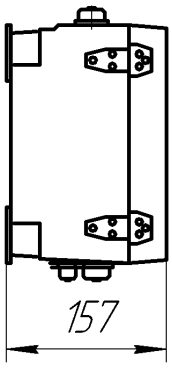


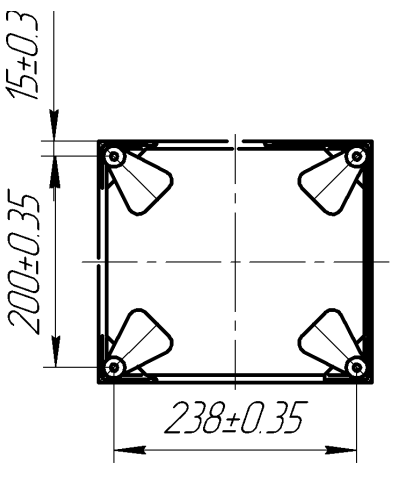
Power Supply & Coupling Unit

Performs conversion of on board power for further power feed to Log, CCU and other connected output devices.

Size: 290×274×157 мм
Weight: 7,6 кг.







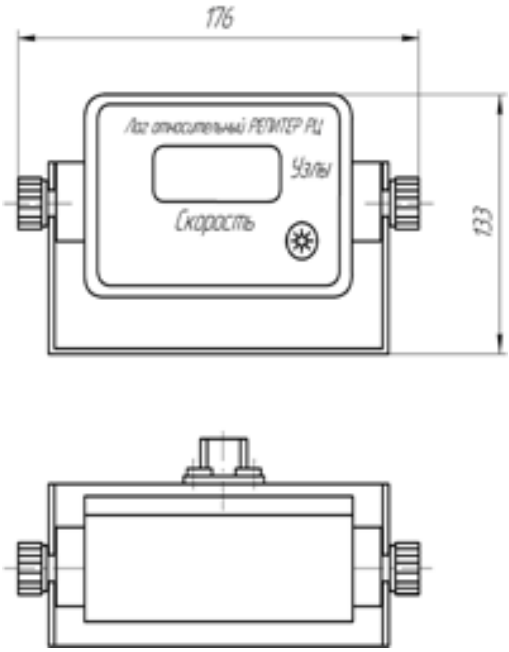
Speed Measuring Control Unit (SMCU)

Performs amplification of data received from sensor with further conversion in to digital format for CCU

Size: 200×172×99 мм
Weight: 3кг

Digital Repeater (DR)

Displays data received from (CCU) and displays speed, distance traveled or both depending on the model.
Displayed information transmission error is within 0.1 knots



IEL-1 & IEL-2 Induction Log Sensor

Sensor КБ2.529.095 and КБ2.529.154 have elliptic cross-section, and extend outside of the hull toward incoming water flow. Main difference is length of extension. Connection cable supplied separately.

Device 9 КБ2.529.095
Size: 1590×142×208 мм Weight: 37 Kg

Device 9 КБ2.529.154
Size: 1180×142×208 мм Weight: 28 Kg

IEL-2M, IEL-2-M2, IEL-3 induction Log Sensor

Sensor КБ2.529.150 has round cross-section, and mounts in to the flush device 11 КБ2.509.077. Includes built in 10m cable that hermetically sealed. Fully interchangeable with КБ2.509.100

Device 9D КБ2.529.150.
Size: 550×207×156 мм Weight: 14Kg

IEL-2M, IEL-2M2, IEL-3 Induction Log Sensor

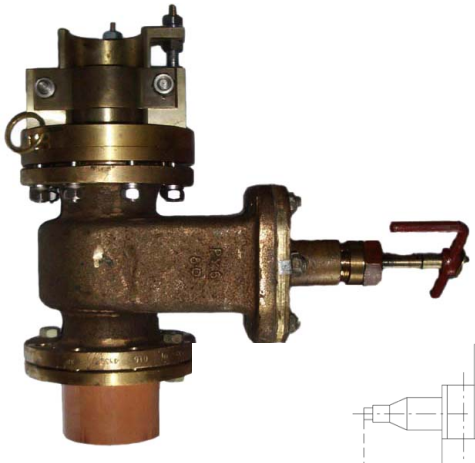
Sensor MMMM.462522.02 has round cross-section and mounts in to the flush device 11 MMMM.301116.006. Fully interchangeable with КБ2.529.150 and КБ.2.259.100 where main difference is a smaller size and construction. Includes built in 10m cable that is hermetically sealed.

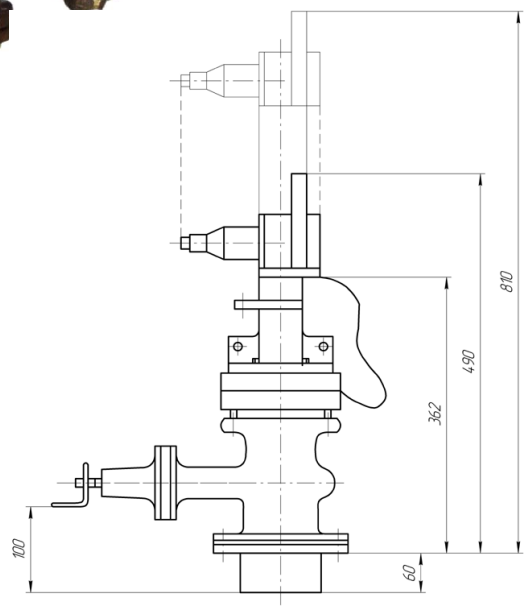
Device 9 MMMM.462522.022
Size: 160×114×337 мм Weighta: 14Kg

Initial Induction Speed Converter (IISC) КБ4.079.058-02

Provides initial generation and conversion of electric signal that is proportional to the speed of incoming water flow, that occurs when vessel is in motion. Includes clinket gate (Device 11) and fixes to the hull and sensor (Device 9D “set of 2”)

Device 11 КВ2.509.077
Size: 495×422×190 мм
Weight: 33 Kg

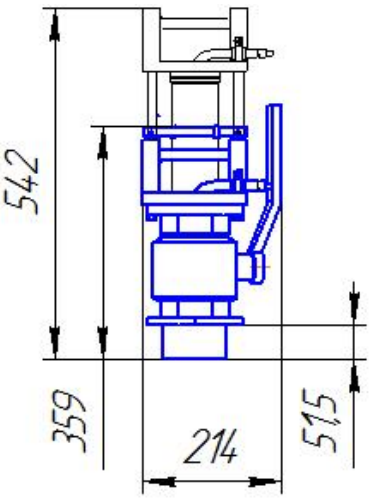




Initial Induction Speed Converter (IISC) MMMM.305324.001

Provides same functionality as КБ4.079.058-02 with the main difference of using ball-lift instead of clinket gate, which in fact reduced overall size, increased durability and cost of production.
Includes device 9 type MMMM.462522.002.

Device 11 MMMM.301116.006
Weight: 12 Kg

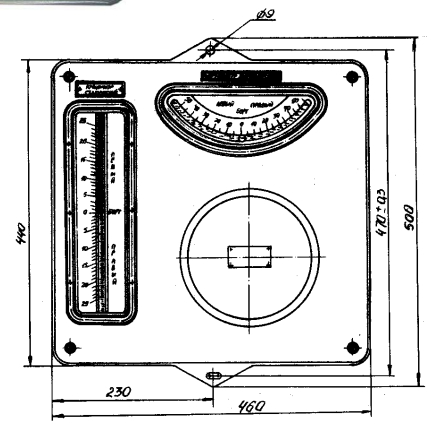


Clinometer SDK-45M

Provides static and dynamic data for the heeling of the vessel
Calculation Limits: 25° static., 55°dynamic.
Scale Segmentation: 1° static., 5° dynamic.
Time to receive data: 80 sec. static., 1sec. dynamic.
Still Error: 0,5°static., 2 ° dynamic.
Operating Temperature Range: -50...+50 °C

Optionally supplied with electronic data output device

Dimentions: 460x500x93mm
Weight: 12 Kg.



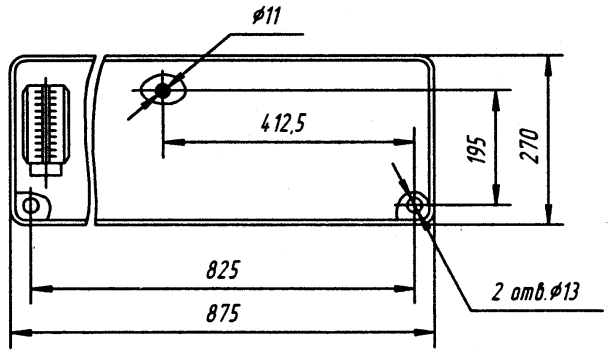
Trim Indicator D-072

Provides trim measurement of the vessel.

Operating Temperature Range: -10...+40°C
Calculation Limits: -5...+5°
Scale Segmentation: 5’
Maximum Calculation Error: 5’
Start up delay: no more than 130 , sec.

Optionally supplied with electronic data output device

Weight: 21 Kg



Navigation Accessories

Map Weights

A true classic item for any navigator. Rubber base with enclosed weight will ensure that no map will slip during a heavy wake.

Navigation Protractor

Navigation protractor is a precision instrument for calculating and measuring angles
This is a high quality precision instrument with inscribed measuring units.

Parallel Ruler

When it comes to problem solving while at sea, then parallel ruler is the instrument of choice. Primarily used to draw straight and parallel lines according to the vessels course. This is a precision instrument, traditionally supplied to Russian navy.

Inclination Measuring Device I

Designed to measure the angle of inclination of the magnetic field vector, during deviation correction procedure.

Marine Deflector DR

Designed to measure horizontal components of inclination of the magnetic field vector that acts on card of the compass, used during deviation correction procedure.

Katav-Ivanovsk Instrument Making Plant Product Certification

Product	Sea administration	Russian Maritime Register Of Shipping	Russian River Register
KM-145-1			292-06-3.10.1
KM-145-2			292-06-3.10.1
KM-145-3	3/1-1482-2002C	03.60055.130	292-06-3.10.1
KM-145-4			292-06-3.10.1
KM-145-5	3/1-1482-2002C	03.60055.130	292-06-3.10.1
KM-145-6			292-06-3.10.1
KM-145-7	3/1-1482-2002C	03.60055.130	292-06-3.10.1
KM-145-8			292-06-3.10.1
KM-145-C1	3/1-1482-2002C	03.60055.130	294-06-3.10.1
KM-145-C2			294-06-3.10.1
KM-145-C3			294-06-3.10.1
KM-145-C4			294-06-3.10.1
KM-145-M1	3/1-1924-2005	05.60054.130	293-06-3.10.1
KM-145-M2			293-06-3.10.1
KM-145-M3		05.60034.134	293-06-3.10.1
KM-145-M4			293-06-3.10.1
UKPM-M1	3/1-1483-2002C	05.02740.11	291-06-3.10.1
UKPM-M2	3/1-1483-2002C	05.02740.11	291-06-3.10.1
UKPM-M3	3/1-1483-2002C	05.02742.011	291-06-3.10.1
UKPM-M4		05.02741.011	291-06-3.10.1
UKPM-M5		6.8.3	291-06-3.10.1
UKPM-M6		6.8.3	291-06-3.10.1
UKPM-M7		05.02741.011	291-06-3.10.1
UKPM-M8			291-06-3.10.1
KM-69-M1		03.60018.130	297-06-3.10.1
KM-69-M2		03.60018.130	297-06-3.10.1
KM-69-M3		03.60018.130	297-06-3.10.1
KMC-90-1		10.51031.130	473-3.10.1-06
KMC-90			296-06-3.10.1
KMC-55-1			295-06-3.10.1
KVC-55-2			295-06-3.10.1
KMC-55-3			295-06-3.10.1
IEL-2M	3/1-1484-2003C	03.60051.130	351-3.10.1-06
IEL-3		05.60062.130	474-3.10.1-06

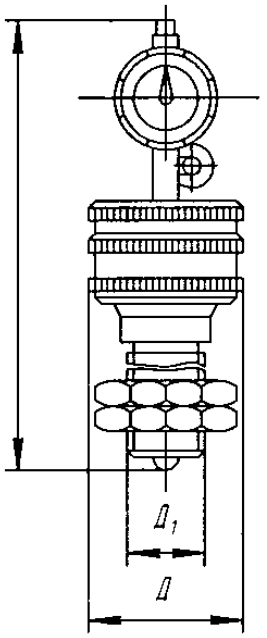
*Products, research and development of products as well as test lab of the factory is certified by Russian Maritime Register Of Shipping (www.rs-head.spb.ru), Russian River Registry (www.rivreg.ru), and Sea Administration Of Russian Federation (www.marsat.ru) . Additional information regarding our certification can be found by visiting provided web sites.

* Products that are not specified in this chart, can be manufactured on the special order basis.

* This chart is subject to change at manufacturers discretion.

Marine Dynamometers (DYNO)

Marine dynamometer designed for use on ship's power plants. Available in various force measurement variations.
Data Receipt: 80sec. Static., 1sec. Dynamic.
Still Error: 0,5° Static., 2 ° Dynamic.
Operating Temperature: -50...+50 °C
Size: 460x500x93mm
Weight: 12Kg.



DYNO Type	Pressure Force H (Kgs)	Height (mm)	Diameter (mm)	Thread D-1	Weight (Kg)
DSP-1	4900 (500)	175	48	TP20x2-8e	1.0
DSP-2	9800 (1000)	199	56	TP24x2-8e	1.5
DSP-3	24500 (2500)	201	56	TP24x3-8g	1.6
DSP-4 Short Version	24500 (2500)	173	56	TP24x3-8g	1.3
DSP-5	44100 (4500)	261	76	TP30x3-8e	3.1
DSP-6	58800 (6000)	289	76	TP36x3-8e	3.8
DSP-7	980000 (10000)	302	96	M42x4,5	7.0

Illumination System Adapter
(MMMM.676251.007)

Adapter designed to replace a fitting for discontinued halogen lamp MG-24/50, on КМ145-5, КМ145-6, КМ145-7, КМ145-8, КМ145-М3, КМ145-М4 models. Replacement set includes an adapter, two halogen bulbs, and replacement manual.

List of Certified Repair Service Centers

JSC "MNS"
19 Promishlennaya Street. St. Petersburg, Russia, 198099
Tel: +7-812-320-3840 Fax:+7-812-320-38-40

"ProfiCom Engeneering" LLC
3 Gaspalskaya Street, St. Petersburg, Russia, 198099
Tel: +7-812-251-1163 Fax: +7-812-380-6028

"BENK" LLC
19A-3 Aleutskaya Street, Vladivostok, Russia, 690091
Tel: +7-423-249-7312 Fax: +7-423-249-6108

JSC "Anadyr Sea Port"
73 Lenina Street, Anadyr, Russia, 689000
Tel: +7-427-222-6231

JSC "Priobrazhensky Trolling Fleet Base"
1 Portovaya Street, Priobrazheniye twn, Lazovsky Region, Primorsky District, Russia 692998
Tel: +7-423-772-4510 Fax: +7-423-772-4191

"PKP Tanker-Service" LTD
2/46 Pushkina Street, Astrakhan, Russia, 414006
Tel: +7-851-256-0616 Fax: +7-851-256-1322

List of Certified Repair Service Center
(Continuation)

PFK "Port" LTD	70 Admiral Nakhimov Street, Astrakhan, Russia, 414028 Tel: +7-851-255-8858 Fax: +7-851-255-8856
"Era-Service" LTD	6 Capt. Egorov Street, Murmansk, Russia, 183038 Tel: +7-815-245-1358 Fax: +7-228-6633
NPO "Dontehcenter" LTD	9 Nizhedonskaya Street, Rostov-on-Don, Russia, 344002 Tel: +7-863-299-0149 Fax:+7-863-299-0150
"ERNK" LTD	120 Sukhumiyskoe pkwy, Novorosiysk, Russia, 353902 Tel: +7-861-776-1099 Fax: +7-861-776-1090
JSC "Volgotanker"	17A Flotskaya Street, Samara, Russia, 443042042 Tel: +7-846-226-3031 Fax: +7-846-226-4814
"Compass DV" LTD	10 Kharkovskaya Street, Ste#11, Vladivostok, Russia, 690012 Tel: +7-423-227-9727
JSC "Radiotekhnika"	30 Kosmonavtov Street, Petropavlovsk-Kamchatsk Russia, 683905 Tel: +7-415-223-8602
"Port Service" LTD	3 Naberezhnaya Street, Kaliningrad, Russia, 236006 Tel: +7-401-235-7065
"SETS" LTD	151 Leninsky Prospect, Ste# 831, St. Petersburg, Russia, 196247 Tel: +7-812-375-9195
"ESSC" LTD	39-10 Kalinina Street, Vladivostok, Russia, 690035 Tel: +7-423-228-7018 Fax: +7-423-228-7216
"KamchatflotService" LTD	11 Ozernaya Kosa Street, Petropavlovsk-Kamchatsky, Russia, 683000 Tel: +7-415-241-2070 Fax: +7-415-241-3007
JSC "Birus"	12 Mashinostroiteley Street, Severodvinsk, Russia, 164509 Tel: +7-818-452-6979 Fax: +7-818-457-4401
JSC " Zelenodolsky Enterprise Era"	30 Stolichnaya Street, Zelenodolsk, Republic Tatarstan, Russia, 422545 Tel: +7-843-713-3747 Fax: +7-843-733-7137
PTF "Shturman" LTD	14 Burova Street, Ste# 2, Astrakhan, Russia, 414000 Tel: +7-851-261-6265 Fax: +7-851-222-1417
"Balance-Service" LTD	44 Kamskaya Street, Kaliningrad, Russia, 263005 E-mail:balans@gazinter.net
"Gerkon-Service" LTD	1 Portovaya Street, Nahodka, 692904 Tel: +7-423-662-9662
'Sigma Plus VO" LTD	1 11th District Ste#5, Aktau, Kazakhstan, 130000 Tel: +7-292-426-873
"POLAMAR" LTD	23 Kildinskaya Street, Ste# 2, Murmansk, Russia, 183036 Tel: +7-815-226-5273 Fax: +7-815-226-5220
"Shkval" LTD	11 Proletarskaya Street, Ste# 312, Magadan, Russia, 685000 Tel: +7-413-262-1504
"Amurskaya Era-CZOR'	189/2 Pushkina Street, Blagoveshensk, Amursk Region, Russia, 675003 Tel: +7-416-223-3400
JSC " Marine Company 'Volzhskoe Parohodstvo'"	15A Markina Street, Nizhniy Novgorod, Russia, 603001 Tel: +7-831-431-3026 Fax: +7-831-434-1432