

USER AND INSTALLATION MANUAL

(Rev. 1.0 - June 2023)

Rotating electromagnets

Model: CR



WARNING:

- *Read the user and installation manual carefully.*
- *It is forbidden to use the equipment in any other way than as set forth in this manual.*
- *Before performing any routine or extraordinary maintenance work, disconnect the equipment from the power supply, as indicated in this document.*
- *Only use the external power supply unit specified by the manufacturer.*

1. GENERAL INFORMATION ON THE MANUAL



1.1 PURPOSE AND CONTENT

The document provides information for the transport, installation, commissioning, and correct use and maintenance of the equipment.

This manual is intended for authorised users.

Before carrying out any operation on the equipment, please read the instructions in this manual carefully. If there is any doubt as to the correct interpretation of the instructions, contact the manufacturer for clarification.



It is forbidden to carry out any operation without having read and understood the contents of this manual. Non-compliance, even partial, with the recommendations contained therein may result in danger to the user, abnormal operation of the equipment and possible damage to the equipment. The manufacturer is not liable for damage to property or persons resulting from failure to observe this prohibition. The manufacturer reserves the right to make any changes to the equipment and the manual without prior notice.

1.2 CONSERVATION

The manual is an integral part of the product. It must always accompany the equipment even in the event of future transfers. This document must be available to the technician authorised to install and commission the equipment and to operators authorised to use it.

It must be stored in the immediate vicinity of the equipment.

The document must be preserved intact and easily readable.

The following warnings are recommended to ensure continued safekeeping of the document:

- Store the manual in a place protected from heat and moisture and away from liquids.
- Handle the document in such a way as not to damage its contents.
- Do not remove, tear or rewrite the manual in whole or in part.

If the manual is damaged in such a way as to impair readability, or if it is lost, a replacement copy should be requested immediately from the manufacturer or authorised distributor, or a copy should be obtained directly from the manufacturer's website www.systemrosati.com in the product section.

2. DESCRIPTION OF EQUIPMENT

2.1 FUNCTION AND INTENDED USE

The electromagnet takes the form of an electrotechnical element consisting of a core of ferromagnetic material which a solenoid is wound on.

Its basic components are:

- External metal casing
- Electric coil
- Sliding inner core
- Attraction pad
- Electrical connections

When the coil is energised, the current flowing through its wire generates a magnetic field that attracts the sliding inner core, made of a metal material, to the attraction pad.

The force of attraction is proportional to the core stroke, coil size, duty cycle and ambient operating temperature.

In particular, it is necessary to adequately size the choice of electromagnet according to the ambient operating temperature, especially in the specific cases of ambient temperatures close to the maximum ambient operating temperature (T_a) of the equipment.

The functional characteristics of each electromagnet are dependent on its specific electrical and mechanical construction specifications.

The purpose of the rotating electromagnet is to generate a magnetic field from an electric current, capable of moving a drive shaft in a rotary manner. External actuators are connected to the rotating shaft of the electromagnet in order to create the desired final movement and finalise the movement created by the electromagnet to the desired use.

The rotating electromagnet model CR from SYSTEM di ROSATI is a rotating electromagnet, with a maximum rotation of 45° , capable of high duty cycles in its normal use.

It only comes in the single-coil version, for cyclic or intermittent use of the drive. The energised coil moves the drive shaft, which is recalled by the internal spring when the electromagnet is de-energised.

Depending on the maximum torque and the frequency of rotation, the electromagnet is produced in the following types:

CR35; CR42; CR50; CR60

CR electromagnets are intended to be integrated into drive and transmission systems that can be installed in domestic and similar environments, as well as in a commercial and industrial environments.

In view of their electrical and mechanical characteristics, they are configured as equipment of a fixed nature. They must be installed in areas that are not accessible to unauthorised people, through the adoption of guards and safeguards that ensure the necessary electrical and mechanical isolation, according to the prescriptions provided in this document.

The installation and commissioning of electromagnets is reserved for experienced personnel only, having the necessary qualifications required by the national legislation of the country where the product is installed.

The subsequent use of electromagnets is intended for ordinary, qualified or experienced persons, depending on the end application and the auxiliary equipment connected to them by the user.

Their use is in any case subject to the adoption of the necessary technical knowledge to ensure their normal operation in accordance with all applicable safety requirements.

2.2

TECHNICAL DATA



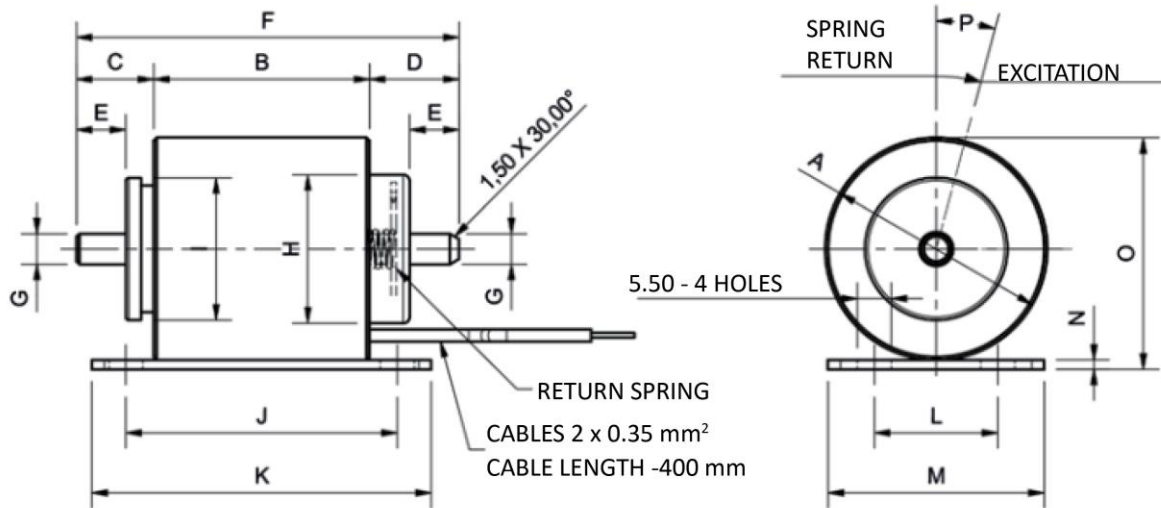
Rotating electromagnet type CR with single coil with 45° max. rotation angle, high rotation frequency max. 20 Hz. This high-frequency rotating electromagnet can be used for continuous ED duty=100% or for customised duty cycles.

Recommended use in the following sectors: industrial diesel engines and general handling.

- Power supply = 12/24 Vdc
- Rotation at max. angle 45°
- Single coil
- ED% duty = intermittent
- High rotation frequencies, max. 20 Hz
- Shaft mounted on bearings
- Dimensions (diameter) = 35, 42, 50, 60 mm
- ENCAPSULATED version (IP67) available on request
- Possible product customisations available upon customer request

SYSTEM DI ROSATI®

**TYPE CR
ELECTROMAGNET**



THE TORQUES INDICATED REFER TO A SINGLE WORK CYCLE AT A TEMPERATURE OF 20°C THE DATA LISTED ARE STRICTLY NOMINAL VARYING ANY ONE DATA VARIES ACCORDINGLY. SYSTEM DI ROSATI RESERVES THE RIGHT TO CHANGE THE QUOTAS AND CHARACTERISTICS DESCRIBED IN THIS SHEET WITHOUT PRIOR NOTICE






DIMENSIONS																
MODEL	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
CR35	Ø36	35	12.5	14.5	8	62	Ø4.98	Ø24	Ø23	44	55	20	35	1.5	37.5	15°
CR42	Ø42	43.5	28	28.5	22	100	Ø4.98	Ø24	Ø22	52	63	29	42	2	44	15°
CR50	Ø50	44	20.5	20.5	13.5	85	Ø6	Ø26.5	Ø25	48	60	35	50	2	52	15°
CR60	Ø60	51	23	22	13	96	Ø6	Ø26.5	Ø28	58	70	45	60	3	63	45°

DATA SHEET						
		CR35	CR42	CR50	CR60	
RATED POWER SUPPLY	V	12	12	12	12	
ELECTRIC COIL ABSORPTION AT 20°C	A	1.41	1.5	3	3	
ELECTRIC COIL POWER AT 20°C	W	16.9	18	36	36	
RATED POWER SUPPLY	V	24	24	24	24	
ELECTRIC COIL ABSORPTION AT 20°C	A	0.68	0.72	2.5	1.3	
ELECTRIC COIL POWER AT 20°C	W	16.3	17.2	60	31.2	
TYPE OF POWER SUPPLY		VDC	VDC	VDC	VDC	
ELECTRIC COIL DUTY AT 20°C	ED%	INTERMIT.	INTERMIT.	INTERMIT.	INTERMIT.	
ELECTRIC COIL INSULATION	CLASS	H	H	H	H	
ANGLE OF ROTATION	DEGREES	15	15	15	45	
STROKE STARTING TORQUE WITH SPRING AT 20°C	Ncm	6	7	13	17	
STROKE END TORQUE WITH SPRING AT 20°C	Ncm	11	12	20	30	
REACTIVE TORQUE OF SPRING AT START OF STROKE	Ncm	4	5	7	9	
REACTIVE TORQUE OF SPRING AT END OF STROKE	Ncm	5	8	9	11	
ELECTROMAGNET PROTECTION RATING	IP	40	40	40	40	
TOTAL ELECTROMAGNET WEIGHT	Kg	0.270	0.460	0.640	1.240	

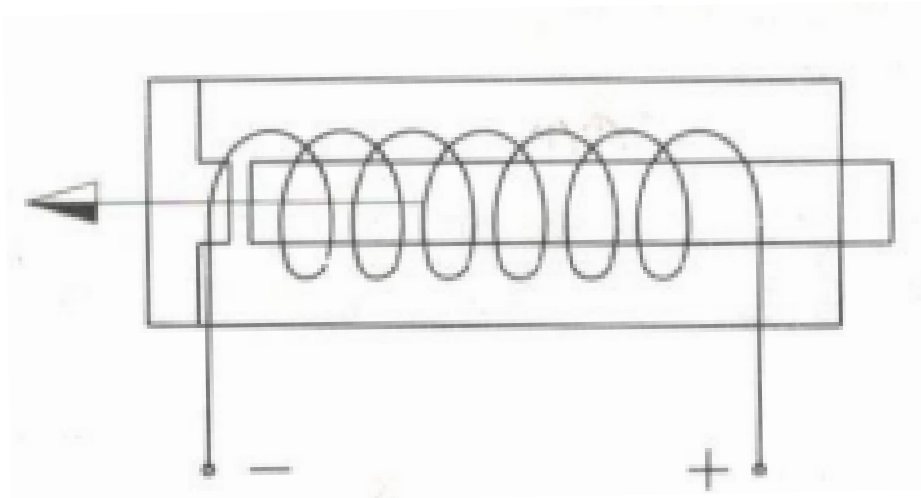
cod. SY112T rev.0

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2.3 RATING PLATE DATA SYMBOLS

	<p>Indicates the need to read the manual, the attached documentation, and the relevant safety and function requirements</p>		<p>Class III equipment</p>
	<p>Separate collection obligation under the WEEE Directive</p>		<p>CE Marking</p>
	<p>General danger</p>		

2.4 WIRING DIAGRAMS



3. SAFETY AND CONTRAINDICATIONS

3.1 GENERAL SAFETY RULES



- Read the user and installation manual carefully.



- Installation should only be carried out by experienced personnel who have the necessary qualifications according to the legislation of the country where it is installed.
- The equipment must be installed in rooms not accessible to the ordinary user, with suitable guards ensuring double insulation against access to live parts, in accordance with EN 60335-1.
- The connection to the mains supply must be made in accordance with the safety regulations in force in the country of use, with voltage and rated frequency compatible with those declared on the equipment's rating plate.



Very low voltage 12/24 Vdc powered equipment:

- Connect the device to a power supply unit or linear transformer that complies with the manufacturer's declared rating plate values.
- Use a power supply unit capable of delivering an extra-low safety voltage.
- In the case of connection to the mains via a linear transformer, the transformer must be safe and comply with EN 61558-2-6.



- The device's power cable must not:
 - Be wrapped around the device;
 - Be placed in positions where the transit of people or animals could cause traction or damage to the cable
 - Come into contact with any kind of liquid
 - Be close to moving parts of the equipment or other equipment in the vicinity
 - Be crushed and/or come into contact with sharp surfaces;
 - Be used if damaged;
 - Be handled with damp or wet hands;
 - Be coiled when the equipment is in operation;

- Be tampered with or replaced by the user. In case of damage, send the device to a service centre authorised by the manufacturer.
- Come into contact with or be near heated surfaces
- System di Rosati electromagnets are equipment of a fixed nature.
 - Secure the device by the fasteners provided on the product.
 - Use surfaces suitable for the purpose, capable of withstanding the expected mechanical stresses.



- It is forbidden:
 - To install the equipment outdoors or in places without protection against dust, atmospheric agents, possible jets of water and in the presence of explosive atmospheres
 - To use accessories not intended by the manufacturer.
 - To place the device close to possible heat sources.
 - To carry out cleaning operations on the device only with the device disconnected from the power supply.



- Children must not play with the device.
- Cleaning and maintenance, intended to be carried out by the user, must not be performed by unsupervised children.
- The use of the equipment in places where children or persons with reduced physical, mental or sensory capabilities are likely to be present, requires the presence of an adult and the use of the equipment under adult supervision. The appliance may be used by children older than 8 years of age and by persons with reduced physical, sensory or mental capabilities, or lack of experience or the necessary knowledge, provided that they are supervised or have received instructions concerning the safe use of the appliance and understanding of the dangers involved.
- In the event of possible damage or faults on the equipment, disconnect the equipment from the power supply and request the intervention of a qualified expert operator or call the manufacturer's service centre.

4. INSTALLATION AND MODE OF USE

4.1 STORING AND MOVING THE EQUIPMENT

Handling and storage of the equipment must be carried out with extreme caution.

Any shocks, caused by the possible dropping of the equipment or interaction with external blunt objects, can cause damage to both the internal moving mechanical parts and the wiring and electrical components.

The equipment must always be stored and handled in its packaging. Each storage operation must comply with the following environmental criteria:

- Storage temperature: [-20; + 60] °C
- Storage relative humidity: [10; 80] %

4.2 INSTALLATION AND COMMISSIONING

Installation and subsequent commissioning must only be carried out by experienced personnel, who have the necessary qualifications according to the legislation of the country where it is installed, and the appropriate technical skills to limit the occurrence of any mechanical and electrical safety hazards.

The equipment must be installed and used in closed rooms, protected from the weather, which comply with the following conditions:

- Ambient temperature for use: [-5; +60] °C
- Relative humidity of operating environment: [+20; +90] %;
- Avoid direct exposure to sunlight, chemicals, vibration and heat sources;

Fastening the equipment

Fastening must be carried out using fastening means suitable for the purpose, based on the surface concerned.

Before any installation, the qualified expert installer must check the technical characteristics of the support that the equipment will be fastened to. Depending on the type of support, the installer must identify the appropriate fastening medium to be used.

The supporting surface must have mechanical and physical properties suitable for the purpose and able to withstand the possible stresses caused by the movement of the moving parts of the equipment and any actuators connected to them.

The equipment must be secured through the holes or threads provided for this purpose.

Use appropriate protective devices against the possible loosening of fastenings as a result of vibrations and stresses produced by the equipment in its normal operation.

Each equipment is set up for attachment by the following means:

- Bracket attached to the equipment with holes prepared for the purpose
- Use screws, or bolts with nuts in accordance with the available holes.

- In order to limit vibration hazards, use locking devices suitable for the purpose, such as locking washers.
- Use only metal-type fasteners, avoiding the use of plastic material. Proceed with screwing, taking care not to use excessive torque



Connection to the power mains

Before connecting the device to the mains, ensure that the characteristics of the available power supply meet the rating plate data given in this document.

Installation should only be carried out by experienced personnel who have the necessary qualifications according to the legislation of the country where it is installed.

The equipment must be installed in rooms not accessible to the ordinary user, with suitable guards ensuring double insulation against access to live parts, in accordance with EN 60335-1.

The connection to the mains supply must be made in accordance with the safety regulations in force in the country of use, with voltage and rated frequency compatible with those declared on the equipment's rating plate

Very low voltage 12/24 Vdc powered equipment:

- Connect the device to a power supply unit or linear transformer that complies with the manufacturer's declared rating plate values.
- Use a power supply unit capable of delivering an extra-low safety voltage.
- In the case of connection to the mains via a linear transformer, the transformer must be safe and comply with EN 61558-2-6.
- Connect the equipment using properly insulated power cables.
- Use cables with a minimum nominal gauge of 0.75 mm²

External actuator connections to the moving parts of the equipment

The end user can connect any external actuators or auxiliary parts to the piston of the equipment. They can be connected to the movable shaft of the electromagnet by direct attachment to it with a grub screw or fixing screw.

Use only metal screws, avoiding the use of plastic screws.

Proceed with screwing, taking care not to use excessive torque that could damage the internal threading.

Check that the load connected to the piston conforms to the maximum power output of the device.

4.3 COMMISSIONING, SWITCHING ON AND OPERATION OF THE EQUIPMENT

The equipment must be commissioned by an expert qualified for the purpose according to the national legislation where the equipment is installed.

Before switching on the equipment and commissioning it, carefully check all electrical connections and mechanical fastenings made.

In particular, check that the load connected to the electromagnet is appropriate for the technical characteristics of the electromagnet, in order to carry out the normally assigned operation.

To switch the device on, connect the power supply unit that it is connected to, to the mains.



Connection to the mains power supply will immediately start-up the device. It is not equipped with switches that can disconnect the power supply.

When the device is started up, the piston supplied with the device starts its stroke in accordance with the manufacturer's specifications in the relevant data sheet.



Before starting up the equipment, ensure that all safeguards against possible mechanical hazards due to handling the moving part of the equipment have been taken.

4.4 DISCONNECTING THE EQUIPMENT

To shut down the device, disconnect it from the power supply via the disconnecting device adopted by the installer.

4.5 SAFETY STOP

The equipment is a device with moving parts and no specific end use. The technical and mechanical characteristics associated with handling, and the safety requirements introduced in this manual, indicate that

the equipment can be used with acceptable residual risks even without the introduction of an emergency stop button.

If the end user connects any actuators to the piston of the equipment, this can introduce more complex movements related to the moving parts of the electromagnet, resulting in a change of mechanical hazards.



If the end user introduces any actuators or other mechanical parts connected to the moving parts of the electromagnet, they must assess all mechanical, electrical and other risks introduced by this operation, and carry out an appropriate risk analysis in order to make the necessary safety prescriptions for the use of the end-user equipment.

Based on this analysis, it may be necessary to introduce an appropriate safety shutdown device in accordance with EN 60204-1.

5. MAINTENANCE

Before carrying out any maintenance and cleaning of the equipment, it is necessary to disconnect the equipment from the power supply by disconnecting the external power supply unit.

Such operations may only be carried out by experienced personnel with the necessary technical skills in order to safeguard the equipment from possible damage that could lead to the degradation of its safety measures.

Perform the following steps:

- Clean the outside of the appliance: this should only be done with a soft, dry or slightly moistened cloth.
- Do not use detergents or other chemicals that could damage the product and cause electrical damage.
- Avoid unintentionally spraying cleaning agents directly or indirectly on the equipment.
- Check that the electromagnet core is periodically cleaned. Never lubricate the core itself.
- Periodically check the integrity of electrical connections and cables.

6. ASSISTANCE

In the event of equipment malfunction, contact the authorised dealer that the equipment was purchased from. If this is not possible, contact the manufacturer's technical support service directly, who will provide all the necessary service information.



It is forbidden to access the internal parts of the device by opening the casing with tools or other similar means. Danger of access to live parts.

7. DISPOSAL

INFORMATION TO USERS pursuant to Legislative Decree 14 MARCH 2014, no. 49 "Implementation of Directive 2012/19/EU on waste electrical and electronic equipment (WEEE)"

The crossed-out wheellie bin symbol on the equipment or its packaging indicates that the product at the end of its useful life must be collected separately from other waste.

The separate collection of this end-of-life equipment is organised and managed by the manufacturer. The user who wishes to discard this equipment should therefore contact the manufacturer and follow the system the manufacturer has adopted to enable separate collection of end-of-life equipment.

Appropriate separate collection for the subsequent forwarding of discarded equipment to recycling, treatment and environmentally sound disposal helps to avoid possible negative effects on the environment and health, and promotes the reuse and/or recycling of materials that the equipment is made from.

Unauthorised disposal of the product by the holder entails the application of administrative sanctions as provided for by the legislation in force



8. WARRANTY

The manufacturer guarantees the quality of its equipment when used in accordance with the instructions provided in this manual,

The manufacturer guarantees the quality of the materials and production system in the manufacture of the equipment for a period of two years from the date of delivery. During this period, the manufacturer agrees to repair those components that will be recognised as factory defective by the manufacturer's after-sales service. Repairs or replacements of parts damaged as a result of the defects described above are included in the warranty.

Work carried out under warranty shall under no circumstances lead to any modification or extension of the warranty expiry date.

The warranty does not cover malfunctions or damage resulting from:

- Inadequate placement, installation and commissioning;
- Incorrect use or use not in accordance with the requirements of this manual;
- Improper or inadequate maintenance by the user;
- Operation not in accordance with the environmental specifications indicated for the product;
- Unauthorised opening of outer casings;
- Unauthorised tampering and/or modifications;
- Use of non-original accessories

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