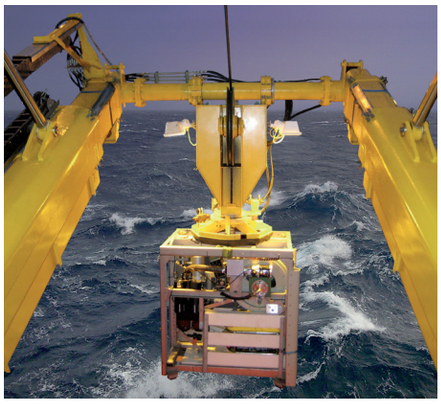
MACGREGOR

Offshore, Advanced Load Handling

Launch and Recovery Systems for ROV/Ts



TECHNICAL INFORMATION

Deck/skid-mounted overside LARS
Overhead-mounted overside LARS
Moonpool-based LARS

Operational profitability

through pioneering technology, reliability and lifelong sustainable performance.

Cargotec is the world-leading provider of comprehensive market-driven engineering solutions for installation on offshore vessels and rigs under the respected MacGregor brand. It is our strategic aim to benefit our customers by driving innovation and taking the lead in further developing the industries we are in.

Optimising long-term safety and efficiency of your offshore operations is best attained when your specific operational requirements are the primary focus. We are commited to leveraging our expertise and in-depth understanding of your business processes to design comprehensive solutions for your type of vessel and its specific operational requirements.

We understand the offshore industry's ever growing demand for operational flexibility and increased equipment reliability. Cargotec offers MacGregor solutions designed to expand the operational envelop on all fronts. That means longer hours, more days, in more demanding conditions, while maintaining safety, reliability and efficiency with top precision.

Your success is our mission

MACGREGOR

Offshore, Advanced Load Handling

Launch and Recovery Systems for ROV/Ts

Cargotec offers a full range of MacGregor Launch and Recovery Systems (LARS) for all types of ROV/Ts in service today. Our LARS portfolio includes overhead and deck-mounted A-frames and moonpool-based systems.

Safeguarding critical operations in adverse condition Cargotec equips vessels that regularly operate in extreme environments such as the North Sea, where heavy weather is common and operational continuity essential. Adverse weather conditions and high sea states demand special design considerations and MacGregor equipment has been specifically developed to fulfil such rigorous operational requirements.

Going to extremes

MacGregor launch and recovery systems are designed to make critical subsea operations safe and effective in the harshest of environments worldwide, expanding the operational weather window for robots and tools of work, survey or observation types.

MacGregor LARS systems are exceptionally reliable and precise, and are designed to withstand extreme dynamic forces and are supplied with dynamic factor of 3.

These robust and accurate systems enable safe operation of heavy systems in adverse weather conditions of -20°C to +40°C and sea states up to Hs6 at unlimited depths (exceeding 6,000m).

Enhancing operability with integrated sub-systems

MacGregor LARS is typically delivered as a complete self-contained system, consisting of an A-frame or cursor, umbilical winch, control system, electric or hydraulic power pack and operating console.

Umbilical winches are equipped with CTS (constant tension system) that ensures tension in the umbilical when operating LARS in/out of the hangar.

The standard MacGregor electrically-driven umbilical winches have active heave compensation system, which ensures substantially better performance than conventional hydraulic winch applications.

In addition, Cargotec offers a wide range of optional equipment and provides tailor-made solutions for LARS systems in accordance with client's specifications to accommodate any ROV/T.

Meeting all standards

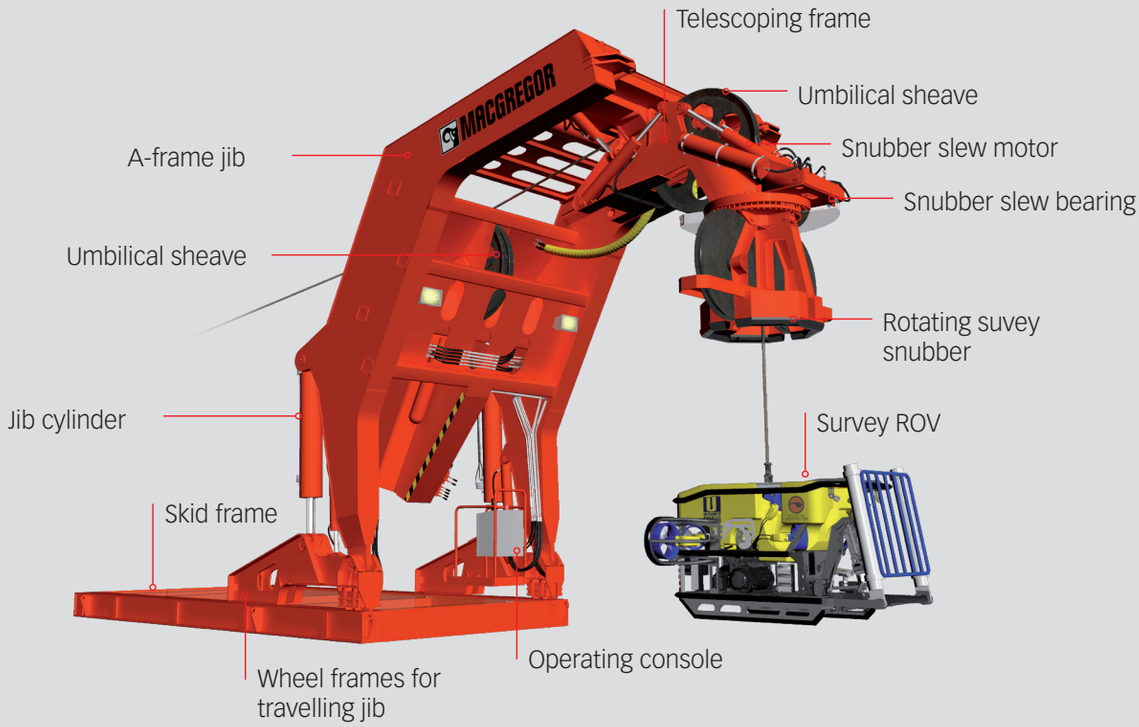
All MacGregor LARS systems are tested and certified in accordance with Standard for Certification of Lifting Appliances No. 2.22 of October 2011.

Deck/skid-mounted overside LARS

MacGregor deck/skid-mounted overside LARS is a flexible and compact modular A-frame based system for precise ROV/T control during launch and recovery.

As an option, the overside LARS may be delivered with an articulated and fully damped snubber, which allows increased security and full rotation of the load while additional snubber sheaves allow for offlead umbilical angles during surveys.

The A-frame can be retracted to free the maintenance area around the ROV/T when parked.

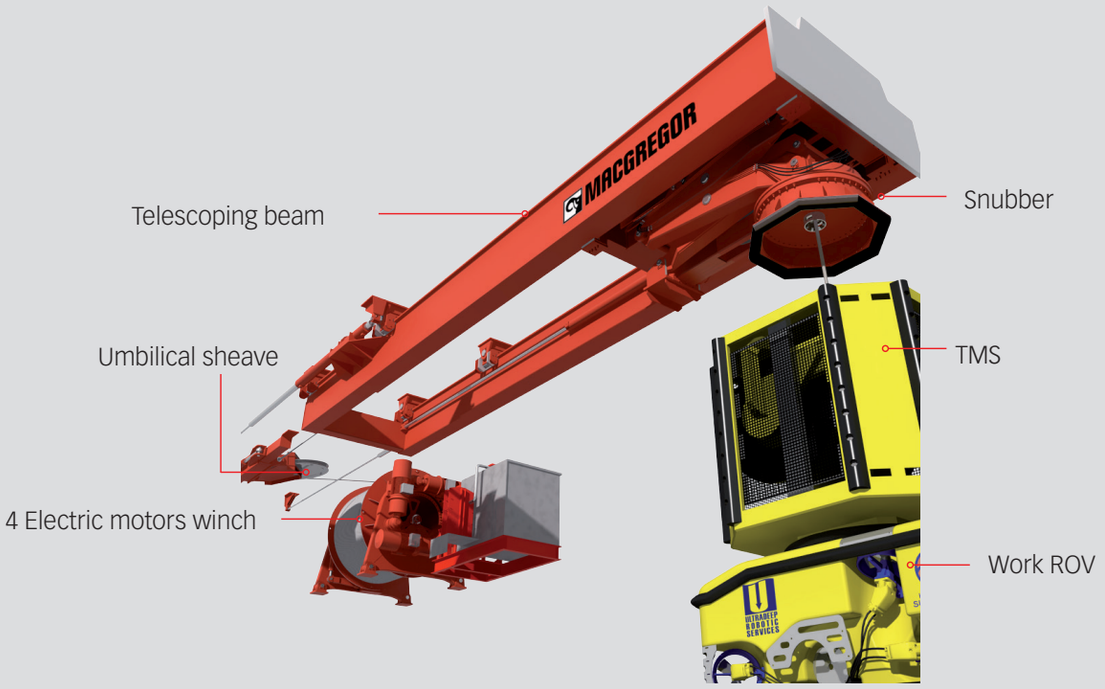


Overhead-mounted overside LARS

MacGregor overhead-mounted overside LARS utilizes extremely precise, electrically-driven heave compensated umbilical winch for safe launch and recovery of various types of TMS/ROVs. An extendible, telescoping snubber reduces pendulum motions and allows locking and rotating of the load.

The compact telescoping design and overhead placement of the LARS ensure safety and allow for considerable free work space in the ROV hangar.

Crew safety and comfort may be further enhanced by placing the side hangar door tops below the LARS. This allows the hangar doors to be closed even when the ROV is deployed.

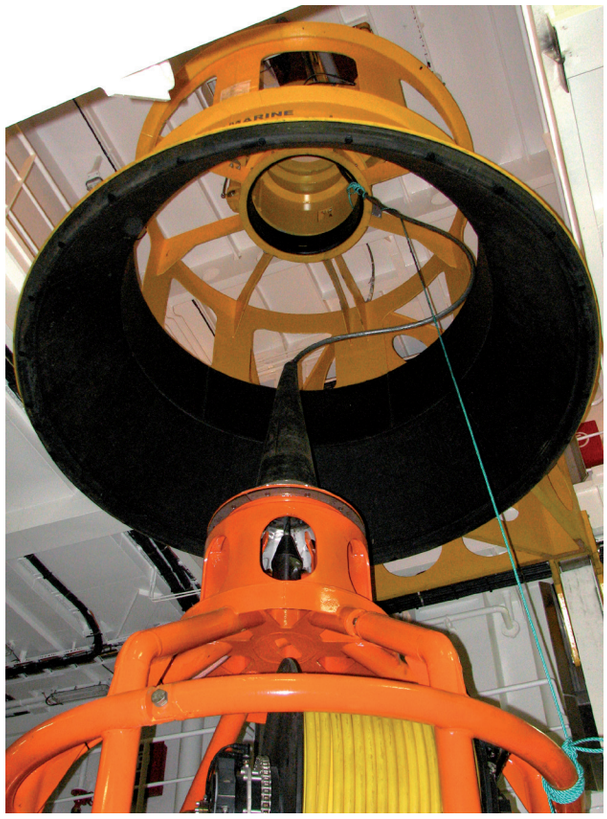


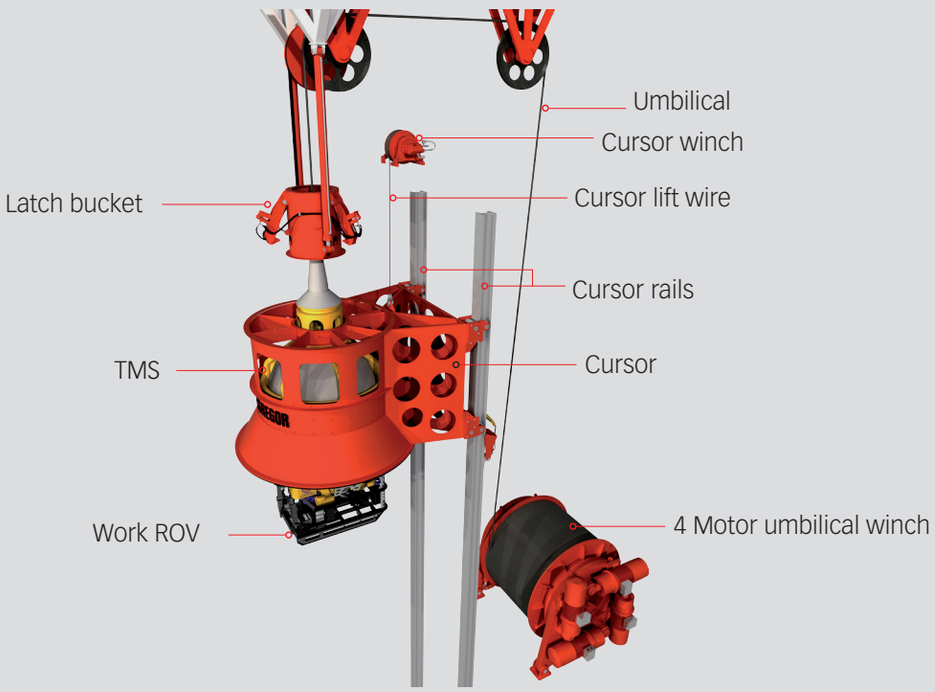
Moonpool-based LARS

MacGregor moonpool LARS is designed to accommodate safe handling of large TMS and work ROVs.

The vertical LARS system is delivered with a vessel-integrated and rail-mounted guide cursor and highly accurate hydraulic or electric active heave compensated umbilical winch, large screen-based control panel and moonpool door system.

Cursor locks allow secure and convenient parking at heights ideally suited to maintenance or traffic around or under the ROV.





Integrated door systems

MacGregor LARS systems may be delivered as part of integrated package, coupled with access doors with main and remotely-operated controls that operate both the opening/closing of the doors and the moving in/out of the LARS. MacGregor door design is reliable, safe and secure and of well-proven structural integrity, particularly in respect to high sea loads. They retain weather tightness when closed and secured; a combination of operating systems is available using hydraulic cylinders or hydraulic motors.

Doors can be partially opened, to provide operator protection, or fully opened depending upon the end users operational requirements. ROV side-hangar doors are specifically designed to function in heavy weather ensuring continuity of ROV operations.

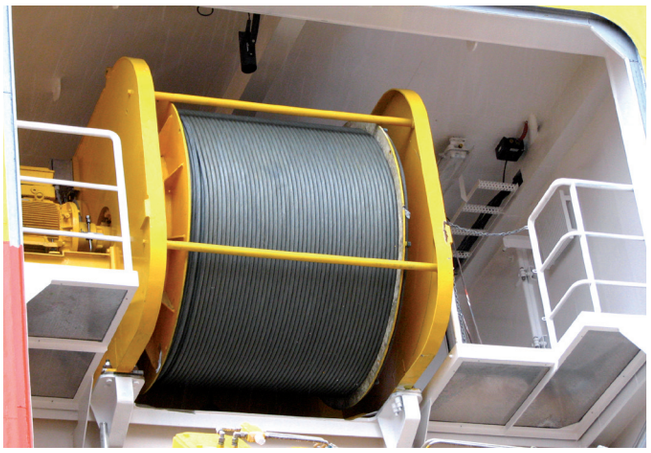
Various design configurations are available, including top or side-hinged or side-sliding, according to the specific requirements of the ship's structural design and nature of the overside work.

Umbilical winches and sheave systems

MacGregor umbilical winches and sheave systems designed for ROV/Ts of all types utilize direct on-winch active heave compensation technology providing extremely precise position and speed control over an increased lifetime.

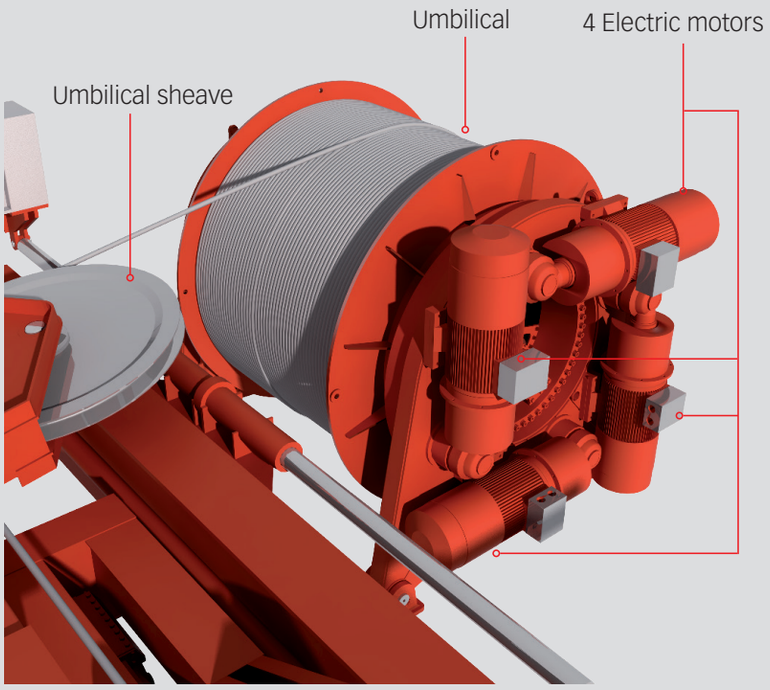
Winches are supplied as compact, electrically driven units with advanced full radius spooling systems. Sheave systems allow for flexible placement of the winch onboard while maintaining umbilical integrity. Hydraulically-driven winches offer a large amount of power with relatively small components. Heave compensation is achieved by the use of nitrogen accumulators.

Electrically-driven winches offer extremely accurate position and speed control due to the use of frequency inverters.



MacGregor winches are supplied with four motors and are redundant in the event of malfunction of one or even two of the motors.

Load recovery would be ensured by the remaining operational motors at a lower speed.



Main technical specifications

Launch and Recovery systems

	Overside systems (deck/skid-mounted or overhead telescoping)			Moonpool systems	
	Observation ROV	Work ROV	Survey ROV	Observation ROV	Work ROV
SWL	5 tons	15 tons	15 tons	5 tons	15 tons
Snubber control	optional	360° rotation	360° rotation / 80° umbilical fleet angle	360° rotation	360° rotation
Power consumption	≈ 125	400	400	≈ 125	400
Voltage	440v / 690 - 60 Hz	440v / 690 - 60 Hz	440v / 690 - 60 Hz	440v / 690 - 60 Hz	440v / 690 - 60 Hz
Dynamic Factor	3	3	3	3	3
Weight	8 tons	28 tons	32 tons	3 tons	3 tons
Latched load extension*	Standard	Standard	Standard	Standard	Standard

Umbilical winches

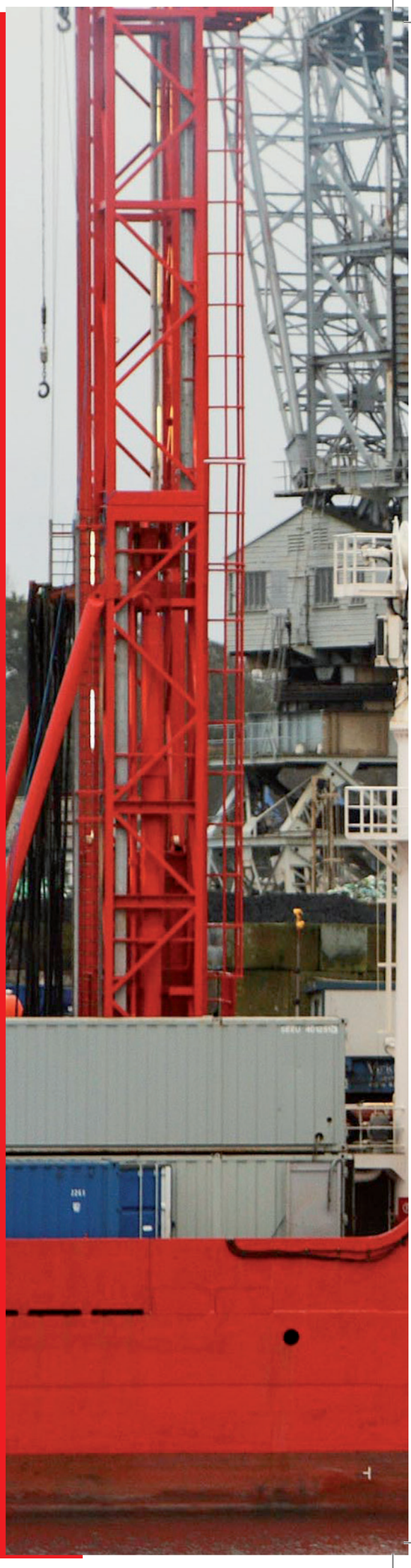
	Observation ROV	Work ROV
Drive system	hydraulic or electric	hydraulic or electric
SWL	5 tons	18,5 tons
Dynamic factor	3	3
Hoisting speed	>2,4 m/s	>2,4 m/s
AHC performance	+/- 0,1m deviation at max speed	+/- 0,1m deviation at max speed
Voltage	440v / 690v = 60 Hz	440v / 690v = 60 Hz
Power consumption	100 kW	400 kW
Number of motors	1	4
Cable length	> 4000 MSW	> 4000 MSW
Cable DIA, Ø	< Ø30	< Ø47
Weight (not including umbilical)	10 tons	25 tons

Unique advantages

- Robust system design
- Hydraulic or electric drive systems to suit vessel and operational needs
- Designs specially suited to vessel or modular packages (hangar or on-deck operations)
- Active Heave Compensation direct on winch
- Constant tension direct on winch
- Designed with a minimum number of wire sheaves to increase lifetime of the umbilical
- State-of-the-art fully integrated, screen based control systems
- Satellite based online support system
- Automatic synchronization of winch systems for moonpool-based LARS
- Local and remote operating locations
- LARS systems are tested and certified in accordance with class authorities
- Fail/safe latch locking system

Custom and optional features

- Separate or integrated umbilical winch
- Radio remote control
- Snubber damping
- Umbilical damping
- Skid-based modular design
- Travelling A-frame
- Fully latched lowering to deck for maintenance
- Complete package with hangar doors or hatches

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MACGREGOR

Global presence and local service bring our solutions closer to our customers.

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Lloyd's Register Quality Assurance certifies that the Quality Management System for Cargotec Marine is ISO 9001:2008 compliant.

Cargotec improves the efficiency of cargo flows on land and at sea - wherever cargo is on the move. Cargotec's daughter brands Hiab, Kalmar and MacGregor are recognised leaders in cargo and load handling solutions around the world.

MacGregor is the global market-leading brand in marine cargo handling and offshore load handling solutions. Customer-driven MacGregor engineering and service solutions for the maritime transportation, offshore load handling and naval logistics markets are used on board merchant and naval ships, on offshore support vessels, and in ports and terminals.