

CA.TI.
CARNICA TIRANTI SRL

**ANCHORS
AND POST TENSIONING
SYSTEM**





COMPANY PROFILE

Ca.Ti. Carnica Tiranti Srl is an Italian company founded in 1982 in Pordenone. Established with the goal of providing high-quality and reliable solutions, Ca.Ti. has become a leading reference in the geotechnical and construction sectors thanks to its extensive experience and continuous commitment to innovation.

A key strategic factor in the company's success has always been its exceptional technical expertise. This expertise has enabled Ca.Ti. to develop, design, and manufacture its own products, a capability that continues to distinguish the company today. Its in-house knowledge and know-how remain a fundamental asset, recognized and appreciated worldwide. Ca.Ti. serves a broad range of customers, from small and medium-sized enterprises to large multinational corporations. The company has a strong presence in both domestic and international markets, supplying its products to more than 35 countries through a well-established distribution network.



CERTIFICATIONS

Ca.Ti. Carnica Tiranti Srl has always operated under a quality management system and has held the UNI EN ISO 9001 Certification since 1998. This certification ensures high quality standards for the end customer, achieved through careful monitoring and analysis of every stage of the production process.

The outstanding quality of its products has enabled the company to obtain several technical certifications recognized both nationally and internationally. These approvals demonstrate Ca.Ti.'s expertise and ability to provide innovative, high-quality solutions that meet the requirements of different countries and standards. In addition, Ca.Ti. holds ETA Certification No. 22/0764 in accordance with EAD 160004-00-0301 for post-tensioning anchors, as well as ETA Certification No. 25/0326 in accordance with EAD 160071-00-0102 for geotechnical anchors. These certifications further confirm the company's commitment to quality, reliability, and technical excellence.



EQUIPMENT SERVICES AND ACCESSORIES

Ca.Ti. supplies all tension systems and equipment, such as hydraulic pumps and jacks (single and multi-strand and hollow jacks for bars or for lifting test), besides the whole range of accessories related to the lock-off and anchor protection (anchor plates, anchor heads, protective caps, seals etc.).

Furthermore Ca.Ti. is able to supply equipments for tensioning/monitoring like re-tensioning systems, chairs, lift-of system, elongation measuring instruments, hydraulic and electric load cells with PC readers or with a GPRS remote monitoring etc.

On the range of products offered, Ca.Ti. also offers many products to assist customers during anchor's injections; injection pumps, couplings / connectors, packers, injection pipes etc.

As regards on-site tensioning of anchoring and their final testing, the company has a technical team qualified to carry out all kinds of test on the anchors; our team has the official AICAP tensioning qualification. Ca.Ti. constantly collaborates with designer, supervisors and construction management companies, ensuring maximum support for the final customer.

In addition to the above mentioned equipment, Ca.Ti. manufactures and markets a wide range of products for geotechnical applications (caps, trumpets, centralizers, spacers, greases, gels, drainage tubes, etc.); all products have been subjected to mechanical tests, hydraulic and physical test, to ensure the highest possible quality and efficiency for the customer.



CENTRALIZERS



SPACERS



GEOTEXTILE SACS



LOAD CELLS



SMOOTH AND CORRUGATED TUBES



POST GROUTING TUBES



CARPENTRY ON CUSTOMER SPECIFICATION DETAILS



PROTECTION CAPS

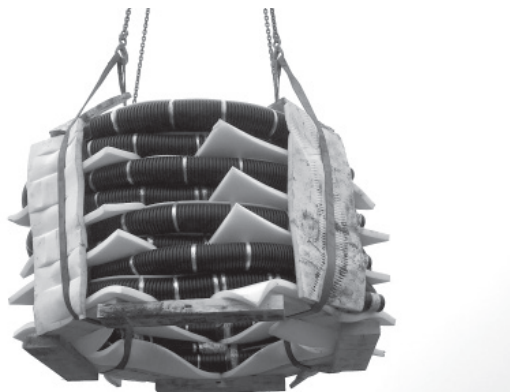
TRANSPORT AND PACKAGING

Besides the quality of the products and the process, Ca.Ti. also pays particular attention to the services. Our products are packaged with the utmost care, paying great attention to their packaging and transport.

In order to guarantee suitable storage and transport and to prevent damage or warping, Ca.Ti. offers various packaging solutions for its anchoring systems.

Packaging can be on sturdy 200x200 or 230x230 pallets, special wood packaging, or on steel structures specifically created for the purpose.

Furthermore, hoisting belts of various sizes and capacity can be supplied, per single anchor and/or for entire coils/bundle of bars.



RESEARCH AND DEVELOPMENT

Research and Development are at the core of Ca.Ti's activities and growth. Always committed to innovation and optimization of its products, the company aims to respond to the needs of an ever-changing market.

A highly qualified team of experts works to develop customized and advanced solutions that meet the specific requirements of customers and designers. Through the use of state-of-the-art technologies and an efficient in-house laboratory, Ca.Ti. invests in research projects that allow to improve the performance, quality and sustainability of its products.

There are numerous collaborations with external Accredited Institutions, such as the Polytechnic of Milan, the University of Trento, the Giordano Institute, the Geotechnical Laboratory of the Province of Trento, the Swiss Empa, the ZAG laboratory etc. With all these institutes we perform tests of all kinds, as hydraulic seals of smooth and corrugated tubes, pressure test on corrugated tubes, UV tests and mechanical tests on different materials, tests on anchor heads and wedges, pressure tests on injection pipes, tests on anticorrosive products, dielectric tests, and much more.

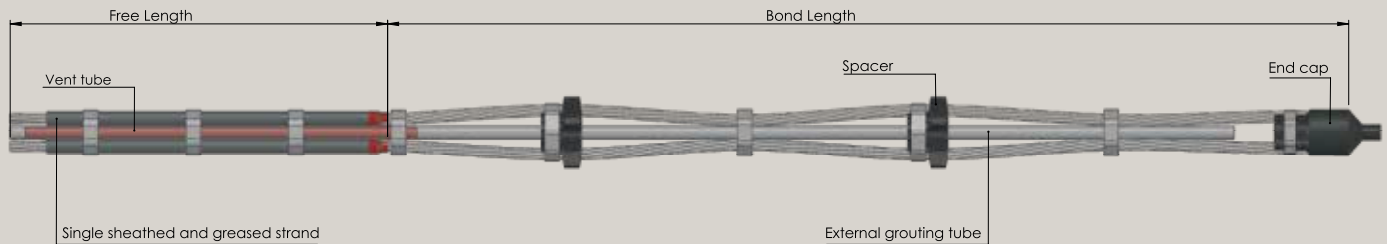


TEMPORARY STRAND ANCHOR

According to European Norm EN 1537:2013 and EAD 160071-00- 0102, an anchor is temporary when it is intended to carry out his function for a period equal or less than two years. The standard temporary anchor of Ca.Ti. is the type **RCS**: made up of steel wire strand. Free part with single-sheathed (PE pipe with thick.1,5mm) and greased strands, naked strands in bond length. Single seal buffer between free length and bond length on each strand. Primary grouting pipe and vent pipe. The spacers/ centralizers are placed each 1,5m in the bond length. The end cap of the anchor is made in HDPE.

PRODUCT RANGE

- **RCS**: Standard temporary anchor with LDPE grout tube and vent tube.
- **RCS +**: Temporary anchor with extended working life up to 7 years.
- **RCS V**: Temporary anchor equipped with a 27 x 34 mm PVC sleeve valve pipe (SVP) for IRS (Repeated Grouting System) injections.
- **RCS VirU**: Temporary anchor equipped with an HDPE sleeve valve pipe, available in 16/10 mm, 13/9 mm, or 21/15 mm sizes, for repeated high-pressure grouting complete with bend section and return tube for flushing operations.
- **RCS S**: Temporary anchor equipped with a geotextile packer bag.
- **RCS P**: Temporary through-type anchor, single-sheathed along its entire length.
- **RCS G Rem**: Partially removable temporary anchor (only the free length can be removed from the ground at a later stage).

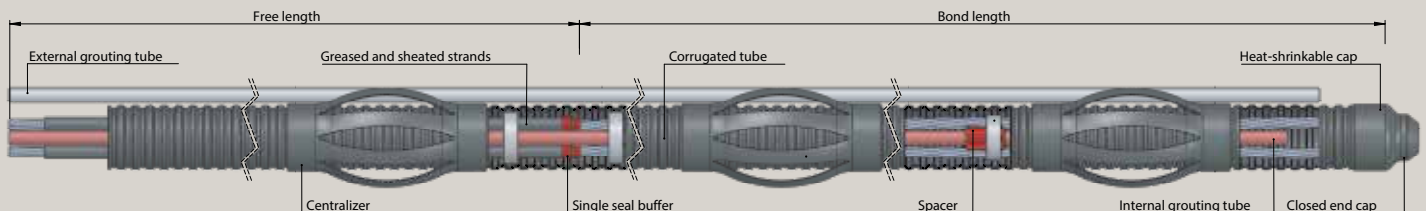


PERMANENT STRAND ANCHOR

According to European Norm EN 1537:2013 and EAD 160071-00-0102, an anchor is considered permanent when it is intended to perform its function for a period of two years up to 100 years. The standard permanent anchor of Ca.Ti. is the type **RCP1**: made up of steel wire strand. Free part with single-sheathed (PE pipe with thick.1,5mm) and greased strands, naked strands in the bond length. The whole length of the anchor is protected by a HDPE corrugated tube. Single seal buffer between free length and bond length on each strand. The bond length is equipped with spacers/centralizers each 1,5m. The anchor is equipped with 1 external injection pipe installed over the corrugated tube and 1 internal injection pipe. The end cap of the anchor is close, made in HDPE, complete of a heat shrink cap to guarantee hydraulic and electrical isolation.

PRODUCT RANGE

- **RCP1**: Standard permanent anchor with internal and external LDPE grouting tubes.
- **RCP**: Permanent anchor with a smooth sheath in the free length and a corrugated sheath in the bond length.
- **RCP1 V**: Permanent anchor equipped with a 27 x 34 mm PVC sleeve valve pipe (SVP) for IRS (Repeated Grouting System) injections.
- **RCP1 VirU**: Permanent anchor equipped with an HDPE sleeve valve pipe, available in 16/10 mm, 13/9 mm, or 21/15 mm sizes, for repeated high-pressure grouting, complete with bend section and return tube for flushing operations.
- **RCP1S**: Permanent anchor equipped with a geotextile packer bag.
- **RCP P**: Permanent through-type anchor, single-sheathed along its entire length and further protected by a corrugated or smooth HDPE tube.



TECHNICAL SPECIFICATION STRAND

CHOICE NUMBER OF STRANDS DEPENDING ON MAXIMUM LOAD
Comparison between strand 0,6" Ø15,2 mm / 0,6"S Ø15,7 mm

N° of strands	A 06"	A 06"S	B 06"	B 06"S	C 06"	C 06"S	D 06"	D 06"S	E 06"	E 06"S
	mm ² ±2%		Kg/m		N/mm2		kN		kN	
1	139	150	1,1	1,2	1670/1860		232	251	259	279
2	278	300	2,2	2,4	1670/1860		464	501	517	558
3	417	450	3,3	3,6	1670/1860		696	752	776	837
4	556	600	4,4	4,8	1670/1860		929	1002	1034	1116
5	695	750	5,5	6,0	1670/1860		1161	1253	1293	1395
6	834	900	6,6	7,1	1670/1860		1393	1503	1551	1674
7	973	1050	7,7	8,3	1670/1860		1625	1754	1810	1953
8	1112	1200	8,8	9,5	1670/1860		1857	2004	2068	2232
9	1251	1350	10,0	10,7	1670/1860		2089	2255	2327	2511
10	1390	1500	11,1	11,9	1670/1860		2321	2505	2585	2790
11	1529	1650	12,2	13,1	1670/1860		2553	2750	2844	3069
12	1668	1800	13,3	14,3	1670/1860		2786	3006	3102	3348
13	1807	1807	14,4	15,5	1670/1860		3018	3257	3361	3627
14	1946	2100	15,5	16,7	1670/1860		3250	3507	3620	3906
15	2085	2250	16,6	17,9	1670/1860		3482	3758	3878	4185

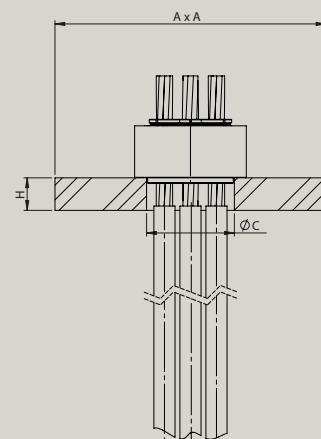
LEGEND

- A - Nom.area
- B - Weight
- C - Steel class
- D - Characteristic value Yield load
- E - Characteristic value Ultimate load

ANCHOR HEAD SYSTEM PROVISIONAL STRAND ANCHOR

ANCHORAGE DIMENSIONS

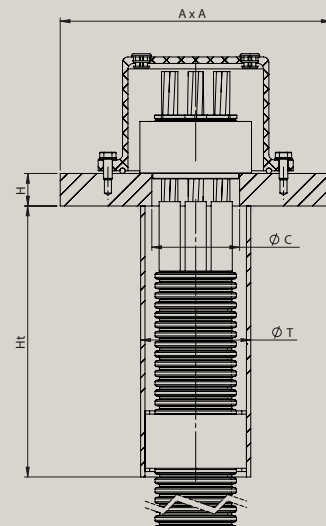
N° of strands	Anchor head type	AxAxH mm	Ø C mm
2	Ctm - 4/0.6" Ø 103x53	250x250x25	81
3			
4			
5	Ctm - 7/0.6" Ø 128x55	250x250x30	106
6			
7		280x280x40	
8	Ctm - 9/0.6" Ø 148x55	320x320x45	126
9			
10	Ctm - 12/0.6" Ø 168x55	320x320x50	140
11			
12			
13	Ctm - 15/0.6" Ø 188x65	350x350x60	150
14			
15			



ANCHOR HEAD SYSTEM PERMANENT STRAND ANCHOR

ANCHORAGE DIMENSIONS

N° of strands	Anchor head type	AxAxH mm	Ø C mm	Ø T mm	Ø Ht mm
2	Ctm - 4/0.6" Ø 103x53	250x250x25	81	100	250
3					
4					
5	Ctm - 7/0.6" Ø 128x55	250x250x30	106	140	330
6					
7		280x280x40			
8	Ctm - 9/0.6" Ø 148x55	320x320x45	126	140	330
9					
10	Ctm - 12/0.6" Ø 168x55	320x320x50	140	160	370
11					
12					
13	Ctm - 15/0.6" Ø 188x65	350x350x60	150	170	490
14					
15					

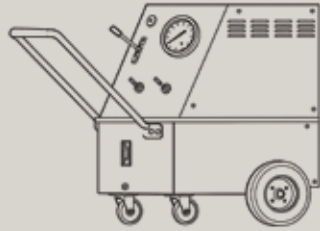


All anchor heads are made of C45 according to EN 10083-2 and tested at the Polytechnic of Milan according to the ETA protocols in reference to EAD 160004-00-0301, as per ETA Ca.Ti. 22/0764.

STRESSING EQUIPMENT

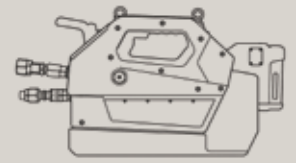
HYDRAULIC PUMP D10

- Engine power: 4,0 KW
- Energy voltage: 380 V
- Weight (oil included): 130 Kg
- Oil quantity: 60 Lt
- Pump capacity: 4 Lt/minute
- Maximum pressure: 700 bar
- Radial manometer: 0-1.000 bar



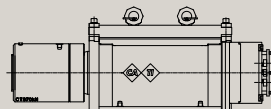
ELECTRICAL HYDRAULIC PUMP C2B

- Engine power: 0,7 KW
- Power supply: battery 4 Ah
- Weight (oil included): 14 Kg
- Oil quantity: 4 Lt
- Pump capacity: 0,33 Lt/minute
- Maximum pressure: 700 bar
- Radial manometer: 0-1.000 bar



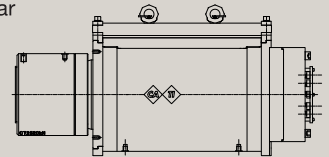
STRESSING JACK CT 870KN

- Area of tensioning piston: 135 cm²
- Maximum pull capacity: 870 kN
- Maximum exercise pressure: 600 bar
- Stroke: 200 or 300 mm
- Pipes length: 5 m
- Weight: 115 kg



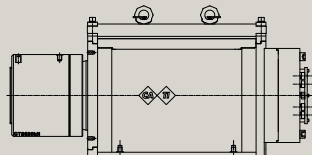
STRESSING JACK CT 1600KN

- Area of tensioning piston: 247,3 cm²
- Maximum pull capacity: 1.600 kN
- Maximum exercise pressure: 600 bar
- Stroke: 300 mm
- Pipes length: 5 m
- Weight: 185 kg



STRESSING JACK CT 2520KN

- Area of tensioning piston: 388,5 cm²
- Maximum pull capacity: 2.520 kN
- Maximum exercise pressure: 600 bar
- Stroke: 300 mm
- Pipes length: 5 m
- Weight: 315 kg



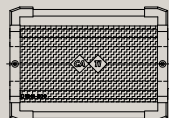
STRESSING CARBON JACK 100t

- Area of tensioning piston: 143 cm²
- Maximum pull capacity: 1.000 kN
- Maximum exercise pressure: 700 bar
- Hole: 83 mm
- Range of use: rod and strand anchors of different measures, micropiles
- Stroke: 200 or 300 mm
- Pipes length: 5 m
- Weight: 28 kg



STRESSING CARBON JACK 140t

- Area of tensioning piston: 200,94 cm²
- Maximum pull capacity: 1.400 kN
- Maximum exercise pressure: 700 bar
- Hole: 105 mm
- Range of use: rod and strand anchors of different measures, micropiles
- Stroke: 300 mm
- Pipes length: 5 m
- Weight: 45 kg



STRESSING JACK T30

- Area of tensioning piston: 47,12 cm²
- Maximum pull capacity: 282,7 kN
- Maximum exercise pressure: 600 bar
- Stroke: 195 mm
- Pipes length: 5 m
- Weight: 23 kg

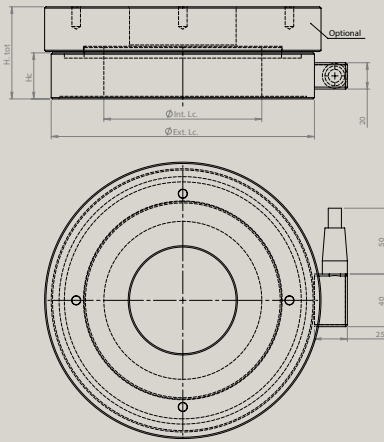


MONITORING SYSTEM

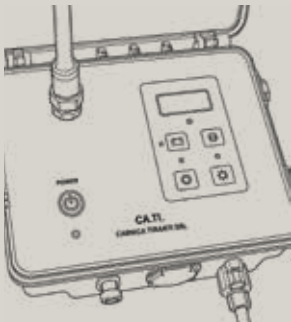
To monitor the anchors within permanent structures over time, it is advisable to combine and place an adequate percentage of load cells, which may be electronic or hydraulic, depending on the type of structure to be monitored. The load cells are installed with adequate protections, the loads can be detected directly by a digital reader or visually for the hydraulic's one; otherwise, they can be remote checked with a GPRS transfer system. On request, Ca.Ti. can supply and install on site the complete monitoring system for anchors.

DIMENSION TABLE ELECTRICAL LOAD CELLS

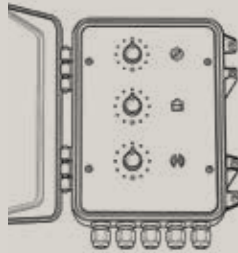
Model	Ø Ext. Lc.	Ø Int. Lc.	Hc	H Tot.	Load
	mm	mm	mm	mm	kN
Elc-750kN	160	60	40	70	750
Elc-1.150kN	200	120	40	70	1.150
Elc-2.000kN	250	150	40	75	2.000
Elc-2.520kN	250	150	55	90	2.520
Elc-3.350kN	260	150	65	100	3.350
Elc-4.200kN	290	161	75	115	4.200
Elc-5.350kN	300	165	75	115	5.350
Elc-6.700kN	430	195	75	115	6.700



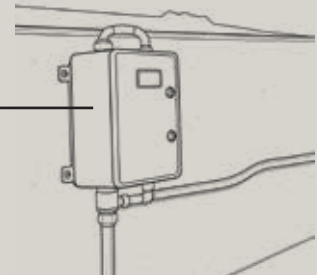
WAYS OF READING LOAD CELLS



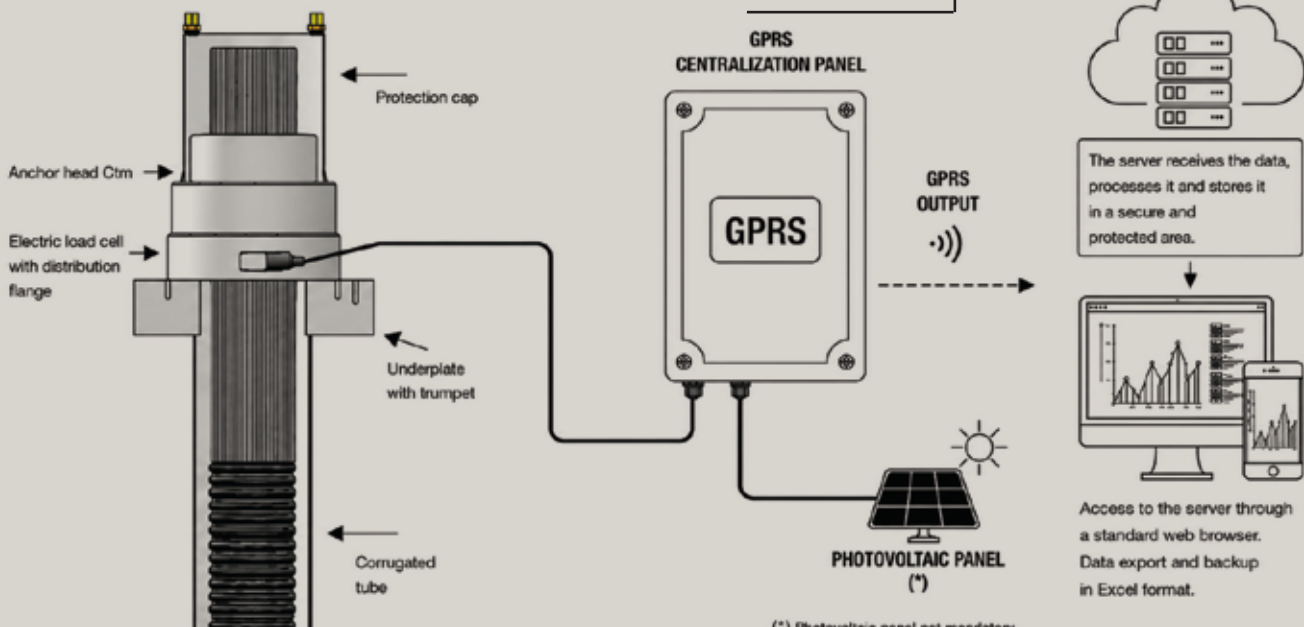
- 1 Load cells can be read directly using a digital reader.



- 2 Up to 36 load cells can be connected to a centralization panel and locally monitored through the digital reader.



- 3 The load cells can be connected to a centralization panel equipped with a data acquisition unit with GPRS transfer system for remote control.



(*) Photovoltaic panel not mandatory. Proposed for installers where mains power is not available on site.