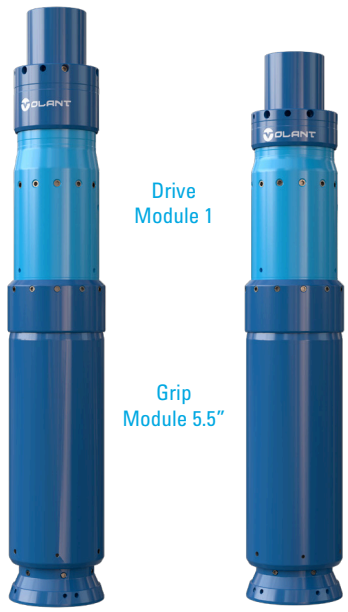
CRTe® External Grip Casing Running Tool

Volant's CRTe® casing running tool is fully mechanical and designed for casing running or drilling with top drive equipped rigs to makeup, breakout, reciprocate, rotate, fill, circulate and cement casing and liner strings, reducing non-productive time and associated costs. This tool is mechanically activated in tension and both rotational directions solely by top drive control using TAWG™ wedge grip technology.

This patented architecture puts control in the hands of the driller, reducing the need for third party support to run casing. Intuitive operations for pipe engagement and release closely emulate the familiar make and break steps used to run drill pipe – stab, rotate to the right to engage and reverse to disengage. Similarly, rig-in and rig-out steps are simple, intuitive and efficient.

Starting from the base bell diameter, selectable sizes of jaws/dies are used to configure the CRTe to support gripping casing of decreasing external diameter.

CRTe-1.0 with Grip Module 5.5"
CRTe-1.0GM5.5



CRTe-1.0 with Grip Module 7.75"
CRTe-1.0GM7.75

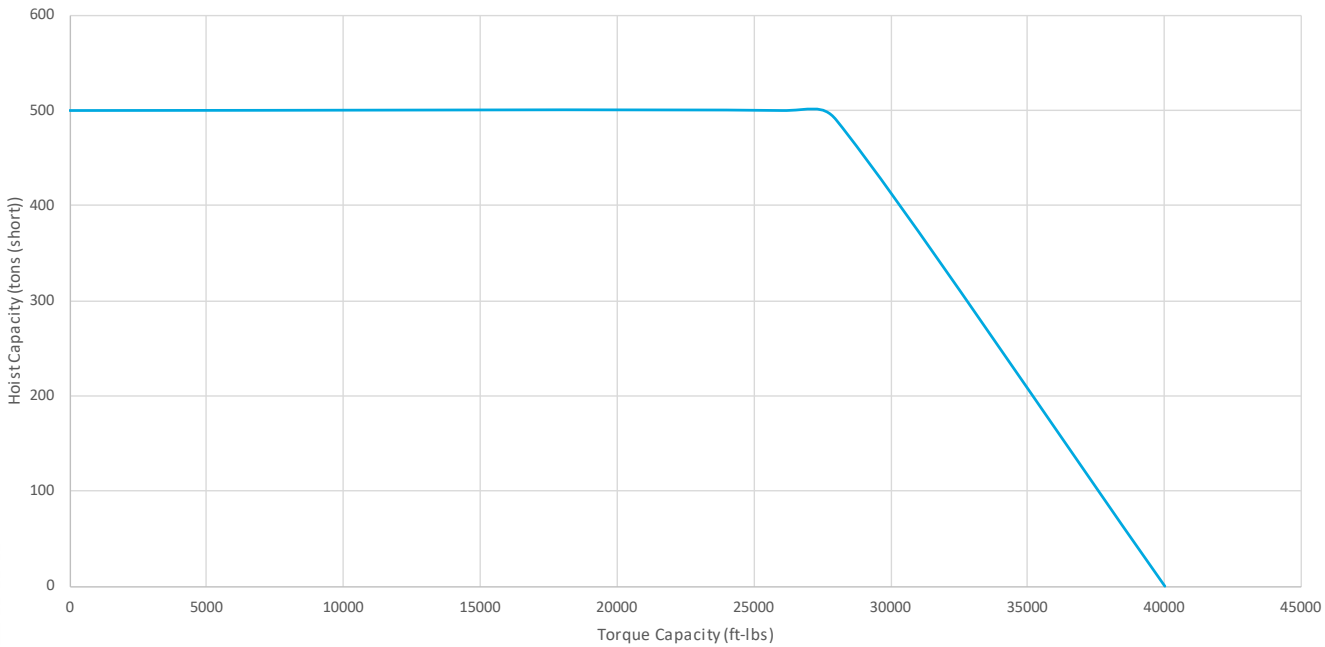
Drive Module I

CRTe Rated Load Capacity	Hoist[1]	ton (tonne)	500 (453)
	Torque[2]	ft.lbs (N.m)	40,000 (54,200)
Combined Load Capacity	Refer to Combined Load Operating Curve on page 2		
Set-Down Load Capacity[3]		ton (tonne)	200 (181)
Typical Circulation Pressure Limit[4,5]		psi (MPa)	5,000 (34.4)
Maximum Pressure End Load[5]		ton (tonne)	150 (136)
Maximum Pressure End Load with Retractable Stinger[5]		ton (tonne)	50 (45)
Float Length (Float Tool Only)		in (mm)	6.0 (155)
Through Hole		in (mm)	1.25 (32.0)
Maximum Flow Rate[6]		gpm (m^3/min)	449 (1.70)
Tool Joint			NC50
Turns to Stroke Out			1.75

Configuration Characteristics[7]

		CRTe-1.0GM5.5		CRTe-1.0GM7.75	
		Float	Non-Float	Float	Non-Float
Overall Tool Length with Retractable Stinger	in (mm)	87.6 (2,230)	75.6 (1,925)	95.5 (2,430)	83.5 (2,125)
Overall Tool Length with Fixed Mandrel Extension	in (mm)	95.5 (2,430)	83.5 (2,125)	103.4 (2,630)	91.4 (2,325)
Min. Recommended Stump Height with Retractable Stinger	in (mm)	42.0 (1,067)		46.0 (1,169)	
Min. Recommended Stump Height with Fixed Mandrel Extension	in (mm)	50.0 (1,270)		56.0 (1,423)	
Maximum Tool Diameter	in (mm)	13.7 (350)		16.3 (415)	
Approximate Tool Weight	lbs (kg)	1,900 (870)	1,750 (800)	2,400 (1,090)	2,200 (1,000)
Diametrical Stroke	in (mm)	1.37 (34.5)		1.4 (35.5)	

Combined Load Operation Curve



Summary of Selected Die Sizes[6]

CRTe-1.0GM5.5

Die P/N[8]	Nominal Pipe Size		Max. Coupling Diameter		Max. Coupling Length		Slip to Pipe Body Load Efficiency	Torque Factor (K_{torque})	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(% Fy)	(ft.lbs/psi/ppf)	(N.m/MPa/(kg/m))
102965	3.5	88.9	4.64	118.0	13.5	345	80%	0.04007	5.295
82155	4.5	114.3	5.64	143.5	13.5	345	80%	0.03467	4.581
82408	5.0	127.0	6.16	156.5	13.5	345	80%	0.03081	4.071
81813	5.5	139.7	6.60	168.0	13.5	345	80%	0.02812	3.716

CRTe-1.0GM7.75

Die P/N[8]	Nominal Pipe Size		Max. Coupling Diameter		Max. Coupling Length		Slip to Pipe Body Load Efficiency	Torque Factor (K_{torque})	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(% Fy)	(ft.lbs/psi/ppf)	(N.m/MPa/(kg/m))
102965	3.5	88.9	4.93	125.5	13.5	345	80%	0.04007	5.295
82155	4.5	114.3	5.93	151.0	15.4	395	80%	0.03467	4.581
82408	5.0	127.0	6.42	163.5	15.4	395	80%	0.03081	4.071
81813	5.5	139.7	6.92	176.0	15.4	395	80%	0.02812	3.716
101730	6.0	152.4	7.29	185.5	15.4	395	80%	0.0306	4.044
101373	6.63	168.4	7.91	201.0	15.4	395	80%	0.0262	3.467
82854	7.0	177.8	8.19	208.5	15.4	395	80%	0.02577	3.405
81839	7.63	193.7	9.01	229.0	15.4	395	80%	0.02371	3.133

1. Tool hoist rating is based on API Specification 8C; however, load capacity is further constrained by local interaction of the slip dies with the casing which must not exceed the efficiency indicated for individual slip die sizes to avoid excess deformation. The slip to casing interaction hoist limit is calculated by multiplying the slip to pipe body load efficiency number by the casing axial yield load. The casing axial yield load is obtained from formulae provided in API Technical Report 5C3, assuming a uni-axial load. For example, from 5C3 the pipe body yield for 5.5 in x 20.0 ppf L80 (139.7 mm x 29.76 kg/m L80) casing is calculated to be 466,000 lbs (211.3 tonne). The slip efficiency for die 81813 used to run this casing is 80%. Therefore, the casing hoist limit is 80% x 466,000 lbs = 372,800 lbs (186.4 tons) or 80% x 211.3 tonne = 169.0 tonne.
2. Torque capacity may be limited by slip die/casing interaction. Multiply torque factor by the desired casing weight in ppf (kg/m) then multiply the result by the casing yield strength to determine the slip die/casing interaction torque limit. For example, for die 81813 to run 5.5 in x 20.0 ppf L80 (139.7 mm x 29.76 kg/m L80) casing, the die torque limit is: 0.02812 ft.lbs/psi/ppf x 80,000 psi x 20.0 ppf = 44,992 ft.lbs or 3.716 N.m/MPa/(kg/m) x 551.6 MPa x 29.76 kg/m = 61,000 N.m.
3. Maximum allowable set-down load applied to the tool. Some set-down load may be reacted through the coupling. This rating does not take into account bearing load limitations of the coupling.
4. CRTe circulation pressure capacity can be limited by packer cup pressure capacity and pressure end load. Circulation pressure capacity may be less than indicated if alternative seal arrangements are used or if it surpasses the maximum allowable pressure end loads.
5. CRTe pressure end load depends on the type of casing seal arrangement. It is calculated by taking internal cross-sectional area of the casing bore and subtracting 2.0 in^2 (representing the swept area of bore seal) and multiplying the result by the circulating pressure. The result must not exceed the stated maximum pressure end loads.
6. Maximum flow rate is based on managing erosion rates when using typical fluids. Erosion rates may vary based on fluid contents. Inspect tool bore regularly.
7. Overall tool length and weight will vary depending on configuration used and casing seal arrangement.
8. Values given are valid for all pipe weights specified in API 5CT.