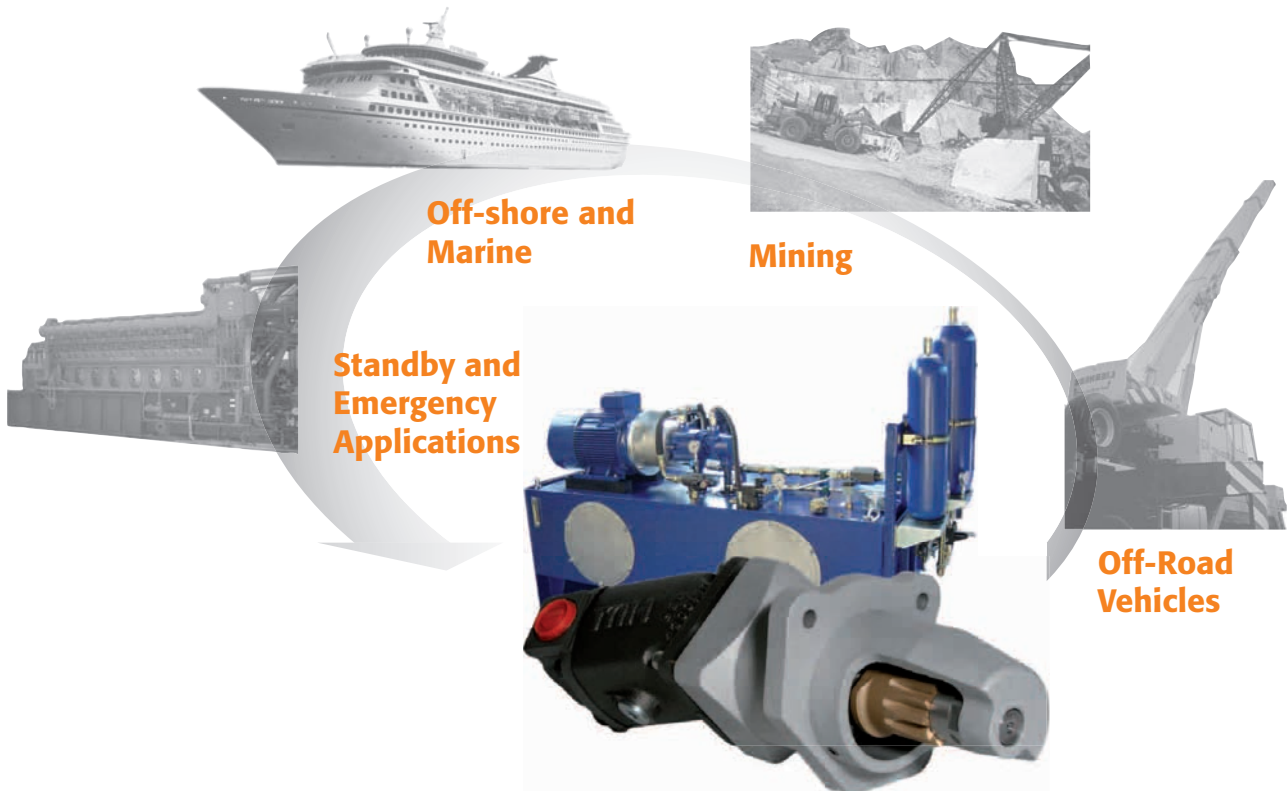


# TRITON III

## Hydraulic Cranking Systems *for engine applications*



- ✓ Reliable, instant cranking power
- ✓ Cranking up engines from 100 kW to 5 MW
- ✓ Wide operating temperature range down to -40 °C
- ✓ Ex-proof and marine classification versions
- ✓ Worldwide support



## **TRITON III**

### **Hydraulic Cranking Systems**

In cooperation with Longday, HEINZMANN has developed hydraulic powered cranking systems that are designed to provide instant and reliable high cranking speeds for the fast and secure start-up of engine applications, under the harshest environmental conditions.

Unlike electrical or air starting systems, the hydraulic system is unrivalled in the cranking of engine applications in terms of reliability, instant torque and durability. It provides a much higher torque, which ensures cranking even at temperatures as low as -40 °C. Neither a flat battery nor a failed electrical system will affect the hydraulic cranking system's operation.

The accumulator stores hydraulic power for a long period of time, which can be released immediately upon a request to power the hydraulic cranking motor for attempted start-up. The hydraulic power itself is supplied either by an engine-powered, electrical or air-driven pump. For the purpose of redundancy, each system is equipped with a manual charging hand pump, which enables the system to be started manually if all other means have failed.

The TRITON III systems are modular in design to meet each customer's individual requirements, and are supplied fully assembled and tested. Furthermore, the hydraulic cranking motors can also be integrated in existing applications in closed-loop systems.

Thanks to the high user friendliness, reliability and economy of our TRITON III cranking systems, as well as our worldwide service network, we are a key supplier in the market for hydraulic cranking systems.

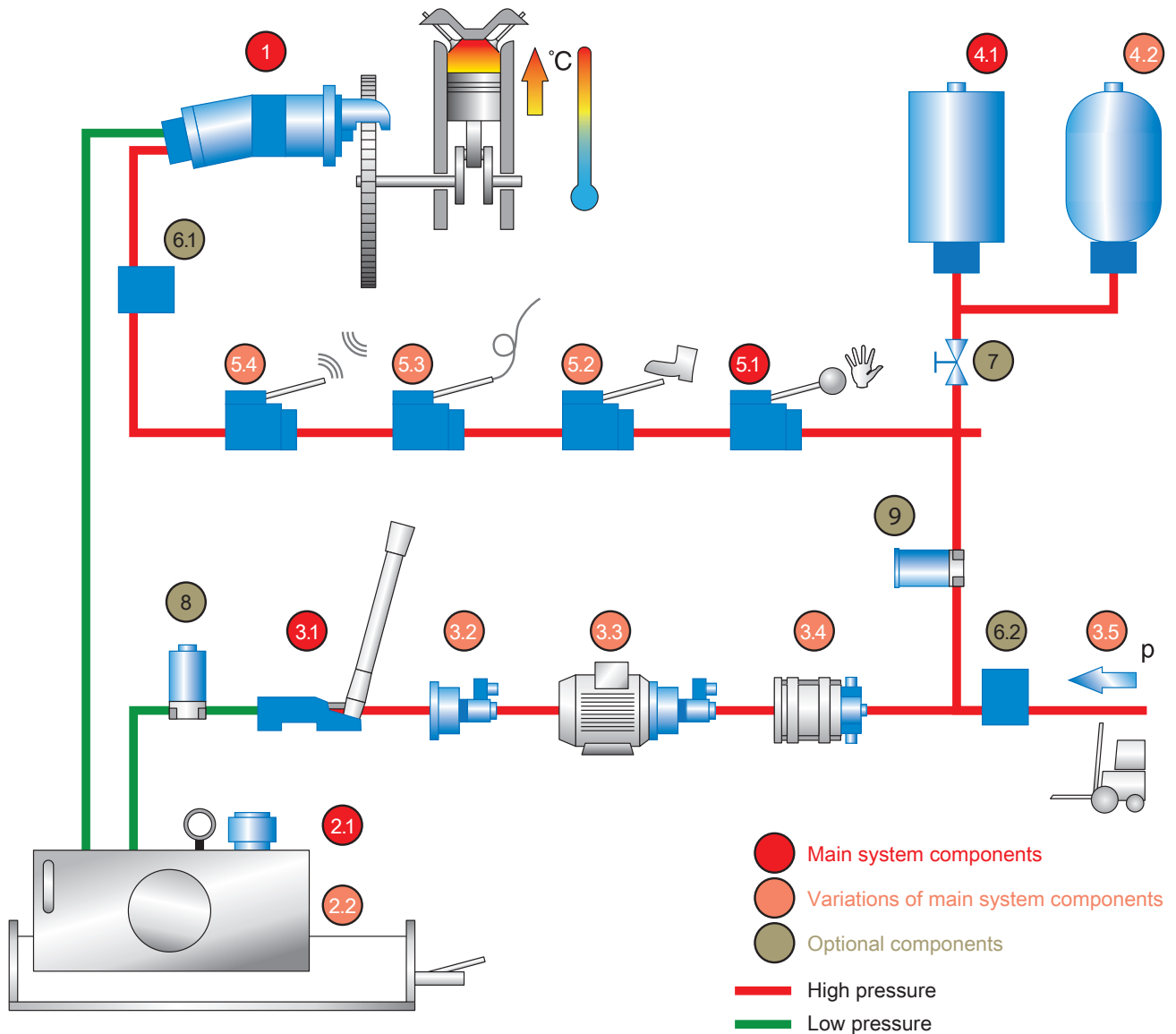


## **TRITON III Features**

- ✓ **Enhanced hydraulic cranking motor (bend axis piston motor) permitting high torque and speed for fast cranking at temperatures as low as -40 °C**
- ✓ **Hydraulic cranking motor range covers engine sizes from 100 kW to 5 MW**
- ✓ **Safe and reliable cranking of engines in hazardous areas**
- ✓ **Black start**
- ✓ **System assemblies, which meet ex-proof and marine classification requirements**
- ✓ **3 system pressure levels – 280 / 350 / 400 bar**
- ✓ **Long lifecycle and virtually maintenance-free**
- ✓ **Sturdy, compact design**
- ✓ **Wide range of system features**
- ✓ **Built and engineered by experts in hydraulic power units**
- ✓ **Worldwide support**



# TRITON III SYSTEM OVERVIEW



## Key to system diagram

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1. Hydraulic cranking motor – optional Beryllium pinion for ex-proof applications</li> <li>2.1 Hydraulic tank – standard or customised; available in different materials</li> <li>2.2 Hydraulic tank with drip pan</li> <li>3.1 Manually operated hand pump – always included</li> <li>3.2 Engine-powered pump via V-belt</li> <li>3.3 Electrical pump – ex-proof or 1-phase as options</li> <li>3.4 Pneumatic pump</li> <li>3.5 Hydraulic power comes directly from the application - CMI</li> <li>4.1 Piston accumulator – optional marine approval</li> <li>4.2 Bladder accumulator – optional marine approval</li> <li>5.1 Hand-operated start valve</li> <li>5.2 Foot-operated start valve</li> </ul> | <ul style="list-style-type: none"> <li>5.3 Bowden wire-operated valve</li> <li>5.4 Remotely operated (solenoid) valve – ex-proof as an option</li> <li>6.1 Soft-start valve</li> <li>6.2 Pressure reducing regulator - CMI</li> <li>7. Accumulator shut-off safety valves – manual or remote-controlled</li> <li>8. Low-pressure oil filter</li> <li>9. High-pressure oil filter</li> </ul> <p>Standard accessories such as hydraulic hoses, manometer, oil level gauges, etc., are part of the system. Special features such as hydraulic oil cooler/heater, accurate oil level and leakage safety switch are available as well as the full range of loose hydraulic components.</p> |
|---|---|

# TRITON III SYSTEM TYPES

## CMI - Cranking Motor Integrated



Integration of the cranking motor in existing hydraulic applications in closed-loop systems.

- Hydraulic power comes directly from the application
- Compact individual solutions
- Enhancement by additional components according to demand
- Main or back-up cranking system

Applications for larger engines or off-road vehicles with existing hydraulic systems.

## Complete cranking package combinations



Each TRITON III system consists of three selectable main modules to meet application demands.

### 1. Accumulator recharge selection

The main difference in the systems is the way in which the hydraulic power is recharged after start-up attempts.

Each system is equipped as a minimum with a manual recharge hand pump for emergency operation.

- Manually operated hand pump – Type M. Used mainly for emergency (black start), redundancy, or for applications that are remotely situated and very seldom used.

- Direct engine-powered pump, type D. Suitable for frequently used applications with longer periods of operation, to ensure the correct recharge time for accumulators for subsequent start-up attempts.
- Automatic electric motor-powered pump, type E. Used for main cranking system. The electric motor recharges the accumulators automatically in line with a preset pressure level. The system is always ready for start-up attempts.
- Automatic air motor-powered pump, type A. Same as type E, but used where sufficient air pressure is available.

### 2. Start release valve selection

- Manually operated valve, either by hand (H), foot (F) or by Bowden wire (B)
- Remotely (R) operated solenoid valve activated by a binary control signal

### 3. System assembly types

- Compact (C) assembly  
One unit – All components mounted on tank, including accumulators.
- Split (S) assembly

All components mounted on tank, accumulators separately located.

Each TRITON III system combination is also available in ex-proof or marine classification versions.

The system can be made of special materials such as aluminium, stainless steel, etc. and comes fully assembled, factory tested and painted (powder coating) according to the customer's RAL specifications.

Complete cranking systems are easily transported, installed and maintained on site.

## MARKETS

- Industrial
- Marine
- Off-shore, pipeline
- Mining, construction
- Military, rescue
- Infrastructure

## APPLICATIONS

- Power generators
- Pumps (cargo)
- Compressors

- Auxiliary, emergency generators
- Propulsion, thrusters
- Rescue boats
- Fire-fighting equipment
- Radar, antenna
- Off-road vehicles
- Logistics and special-purpose vehicles
- Locomotives



## Technical information

SIZE				H1	H2	H3	H6
Displacement		V <sub>g</sub>	cm <sup>3</sup> /rev	10.3	16	32	160.4
Max. speed	motor	n <sub>0max</sub>	rpm	8000	8000	6300	3600
Max. pressure	cont. System	p <sub>nomsys</sub>	bar	280	280	280	280
Max. pressure	cont. motor	p <sub>nom</sub>	bar	350	350	350	350
Max. pressure	peak motor	p <sub>max</sub>	bar	400	400	400	400
Max. flowmotor		q <sub>max</sub>	l/min	82	128	201	577
Power at p = 280 bar	motor	P	kW	38.5	58	93	268
Power at p = 350 bar	motor	P <sub>max</sub>	kW	47	73	117	335
Torque at p = 280 bar		M <sub>280</sub>	Nm	46	70	142	711
Torque at p = 350 bar	cont. (pnom)	M <sub>nom</sub>	Nm	57	88	178	889
Max. torque at p = 400 bar	peak (pmax)	M <sub>max</sub>	Nm	65	100	204	1016
Moment of inertia		J	kg m <sup>2</sup>	0.0004	0.0004	0.0012	0.022
Weight		m	kg	5.4	5.4	9.5	45
For engines with power up to*		P <sub>eng</sub>	kW hp	500 680	1000 1360	2000 2720	5000 6800

\* depending upon number of cylinders, speed and torque

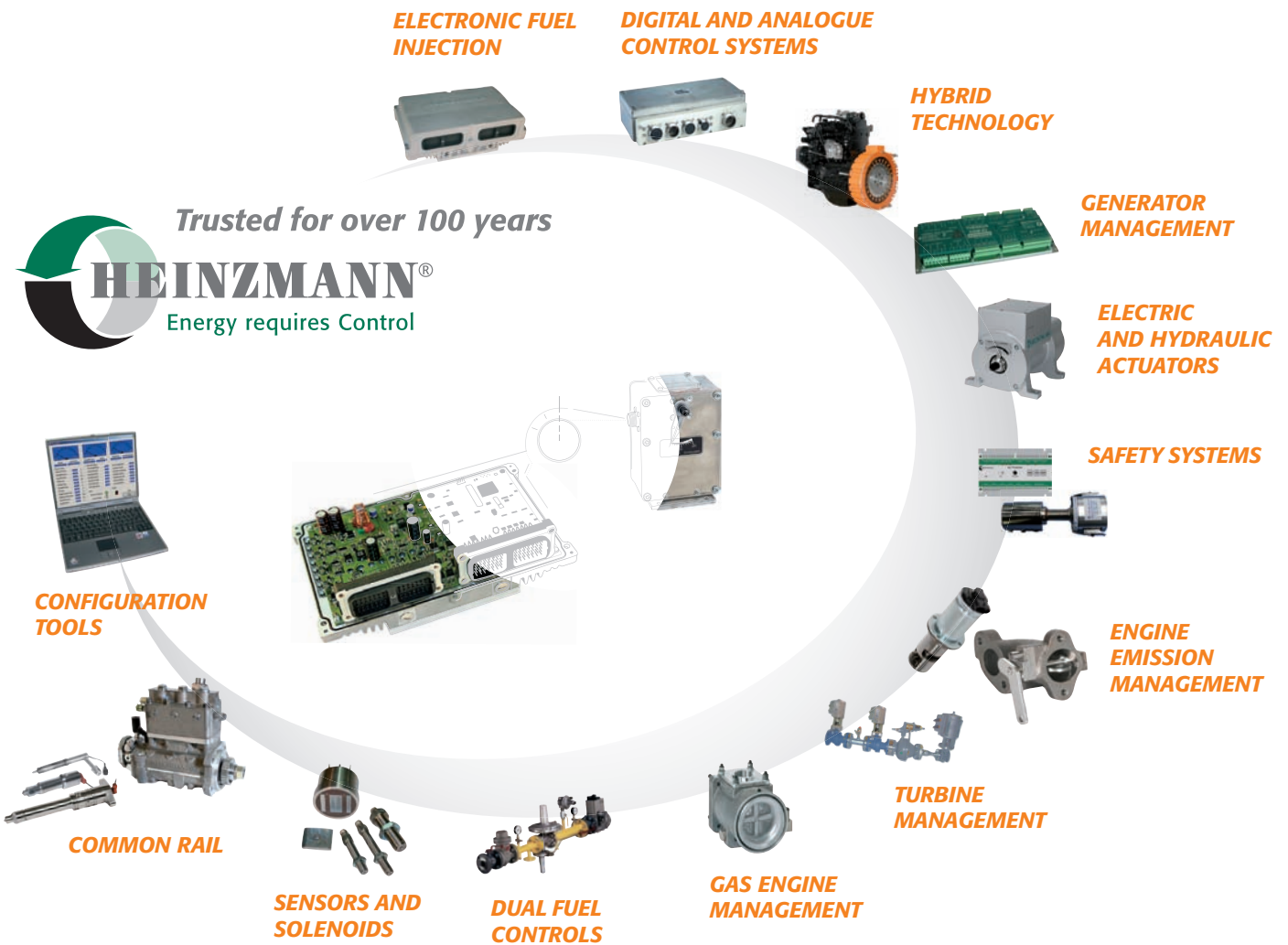
Note: Hydraulic cranking motors for larger engine sizes are available on request.





**Head Office:**

**Heinzmann GmbH & Co. KG**  
 Am Haselbach 1  
 D-79677 Schönau/Germany  
 Phone: +49 7673 8208 - 0  
 Fax: +49 7673 8208 - 188  
 Email: info@heinzmann.de



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