

Industrial Solutions

Gyratory crushers

State-of-the-art technology
with throughput rates of up
to 14,000 t/h



thyssenkrupp



Our solutions for the hardest jobs

When it comes to the crunch, crushing systems from thyssenkrupp Industrial Solutions offer the ultimate in performance, reliability and cost-effectiveness. With us as your partner, you can expect the optimum, customized solution for even the most demanding of jobs.

Call on our services and you can count on a wealth of experience and constant innovative drive. As a leading manufacturer of machines and plants for the aggregates and mining industry, we supply well-engineered crushing systems that have stood the test of time in the hardest service conditions. At the same time, we invest in intensive research and development work to make proven solutions even better and to adapt to changing demands.



KB 63-89 for iron ore. Capacity: 6,200 t/h

Whether a standard or special design thyssenkrupp Industrial Solutions can provide the optimum solution to meet your needs. Our flexibility is a major plus: We act on your specific requirements and adapt our systems to suit the material to be crushed and the product size required, optimizing proven technology according to your specifications. The benefits of our systems are numerous: high throughput coupled with low costs, minimum maintenance, ease of operation and maximum reliability.



KB 63-75 for aggregates. Capacity: 2,600 t/h

Fields of application and design characteristics

When it comes to crushing blasted hard rock in ore and natural stone mining, the efficiency of thyssenkrupp gyratory crushers in primary crushing is second to none.

With crushing chambers of varying designs, these machines have either a high crushing ratio for preparing raw materials for secondary crushing or a low crushing ratio for reducing overburden for transportation by belt conveyors.

The design of our gyratory crushers and jaw gyratory crushers is based on over one hundred years of experience gained by thyssenkrupp in the manufacture of these machines. Changing mining and processing techniques demand, besides new materials and design methods, continuous development of the products. thyssenkrupp gyratory crushers represent today's state-of-the-art. They are designed for high performance and, at the same time, cost-effective operation, i.e. low servicing and maintenance costs.



thyssenkrupp, range of gyratory crushers

Applications

- Large ore mines
- Limestone and cement industries
- Open pit and underground mining
- Aggregates industry

Features

- Cyclo-paloid spiral bevel gear
- Higher-capacity drive motors if required
- Rugged design
- Direct feed possible
- High throughput rate
- Optimum degree of comminution
- Stroke can be changed by adjusting the eccentricity
- High starting torque makes it easier to start the crusher under load (emergency case)
- Hydraulic main shaft adjustment for overload protection and to adjust the crushing gap to compensate for wear
- Low operating and maintenance costs
- Includes "Gyramatic" control system



KB 54-75 for iron ore

Gyratory crushers – design and operating principle

The main shaft (B) of the crusher is journaled in the spider bearing (A) in the spider bushing and in the eccentric bearing (G) in the inner bushing. The step bearing (J) located on the piston of the hydraulic cylinder (K) provides axial support for the main shaft.

The rotational movement of the drive motor is transferred to the eccentric bushing in the eccentric bearing (G) via the countershaft assembly (H). This rotating eccentric bushing imparts an eccentric motion to the main shaft (B), a characteristic of the gyratory crusher.

In this way the crushing gap located between the fixed concaves in the crusher shell and the eccentrically gyrating mantle continuously changes.

The feed material that is fed into the crushing chamber from above is progressively crushed between the crushing elements (C), finally exiting the crushing chamber at the bottom (F) under the influence of gravity.

The crushing gap is adjusted by hydraulically lifting or lowering the main shaft. This hydraulic shaft adjustment is used mainly when crushing abrasive material and when the gap frequently needs to be corrected.

It also serves as overload protection when uncrushable tramp material enters the crushing chamber.

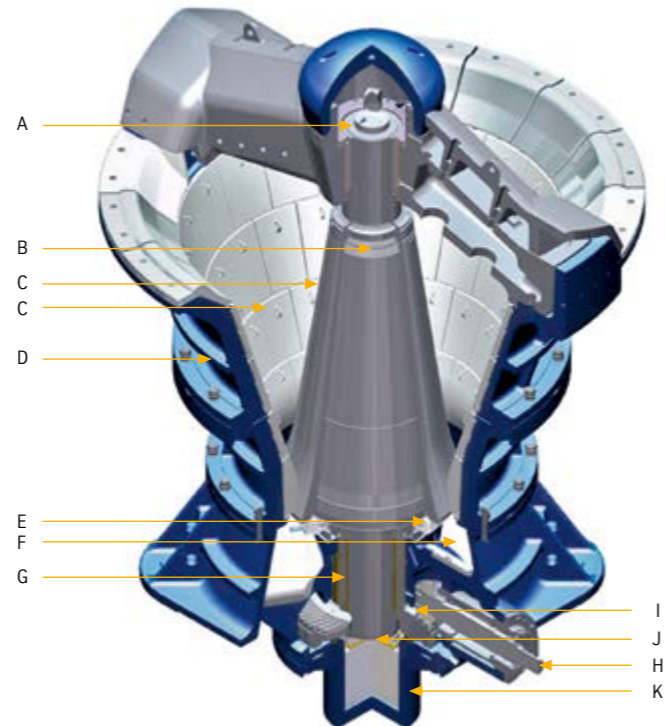
Moreover, the main shaft hydraulics make it easier to restart the crusher in an emergency when the crushing chamber is full by adjusting the height of the shaft. The use of a cyclo-paloid spiral bevel gear set allows the installation of higher-capacity drive motors if required.

A pre-pressurized hydraulic system (balance unit) ensures continuous contact between the individual step bearing discs and prevents the main shaft from lifting off of the step bearing under adverse crushing conditions.

The bevel gear and pinion of the crusher are both of a cyclo-paloid spiral type, which allows greater forces to be absorbed and greater drive power to be installed.

Design

- A Spider bearing in two-armed spider ensures spacious feed opening, automatic lubrication with electronic and visual level control
- B Main shaft
- C Crushing elements made of high-wear-resistant material
- D Cast steel shell sections; weight-optimized by means of FEA
- E Low-maintenance dust seal that is highly efficient as it is pressurized
- F Large material discharge openings thanks to three-armed bottom shell
- G Eccentric bearing assembly with inner bushing that can be replaced, or in some models turned, to adjust the stroke, integrated counterweight to correct imbalances
- H Countershaft assembly with a device for adjusting the backlash, reliable lubrication thanks to hermetically sealed splash lubrication, electronic and visual oil level and temperature control Option: vibration monitor
- I Bevel gear and pinion of a cyclo-paloid spiral type ensures extremely smooth running
- J Step bearing
- K Hydraulic cylinder for easy main shaft adjustment under load

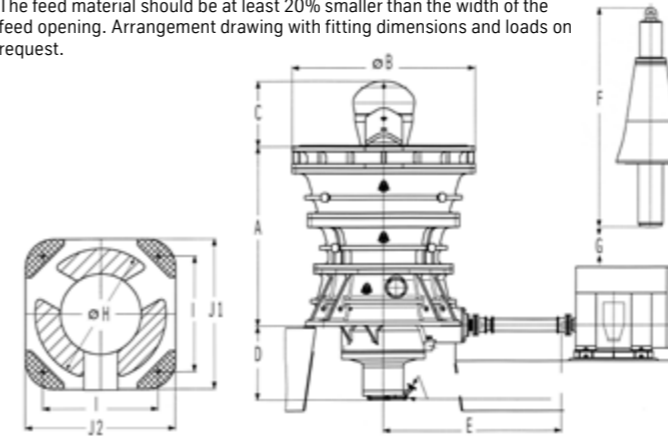


Technical data

Gyratory crusher						Weights ¹⁾						
Type	Feed opening	Mantle diameter (oversized)	Speed of eccentric bushing	Max. motor power	Total weight of gyratory crusher	Spider ²⁾	Heaviest shell	Bottom shell ³⁾	Main shaft ⁴⁾	Eccentric bushing with bottom	Hydraulic cylinder	
	[inch] [mm] / [inch]	[mm] / [inch]	[r.p.m.]	[kW]	[kg]	[kg]	[kg]	[kg]	[kg]	[kg]	[kg]	
KB 54-67	1,370 / 54	1,700 / 67 (1,750 / 69)	137	450	180,000	29,000	30,500	37,100	32,500	7,100	8,100	
KB 54-75	1,370 / 54	1,900 / 75 (1,965 / 77)	137	650	215,000	32,000	33,000	43,500	43,000	8,500	9,500	
KB 63-75	1,600 / 63	2,030 / 80 (2,100 / 83)	137	650	270,000	37,800	66,000	43,500	50,000	9,500	9,500	
KB 63-89	1,600 / 63	2,260 / 89 (2,370 / 93)	130	1,000	332,000	46,500	71,000	53,000	69,500	13,000	14,000	
KB (63-114)*	1,600 / 63	2,900 / 114 (2,985 / 118)	127	1,200	530,000	65,500	73,000	124,000	124,000	16,000	19,000	
KB 63-130	1,600 / 63	3,300 / 130 (3,400 / 134)	125	1,500	495,000	66,000	97,500	85,500	130,000	12,100	13,000	

Gyratory crusher		Throughput [t/h] with open side setting OSS [mm] ⁵⁾																	
Type		130		150		170		185		200		215		240		270		300	
	[inch]	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
KB 54-67	54-67	1,200	2,300	1,500	2,900	1,800	3,700	2,000	4,300										
KB 54-75	54-75	1,300	2,400	1,500	3,200	1,900	4,200	2,100	4,800	2,000	5,300								
KB 63-75	63-75			1,700	3,300	2,000	4,500	2,200	5,100	2,400	5,600	2,600	6,000						
KB 63-89	63-89			2,300	4,500	2,500	5,100	2,700	5,900	3,100	6,700	3,300	7,500	3,500	8,500				
KB (63-114)*	(63-114)*					3,000	5,500	3,400	6,400	3,800	7,300	4,000	8,000	4,700	10,300				
KB 63-130	63-130					3,700	7,900	4,300	9,200	4,700	10,100	5,100	10,900	5,400	12,000	5,800	13,200	6,200	14,400

The feed material should be at least 20% smaller than the width of the feed opening. Arrangement drawing with fitting dimensions and loads on request.



- ¹⁾ Average component weights including internals; safety margins for selecting lifting gear not included
- ²⁾ including wear cap
- ³⁾ excluding hydraulic cylinder
- ⁴⁾ with "oversized" mantle diameter including crushing elements
- ⁵⁾ Min: typical feed material with minimum eccentricity and F80 = 680 mm
Max: typical feed material with maximum eccentricity and F80 = 230 mm
Bulk density: 1,600 kg/m³

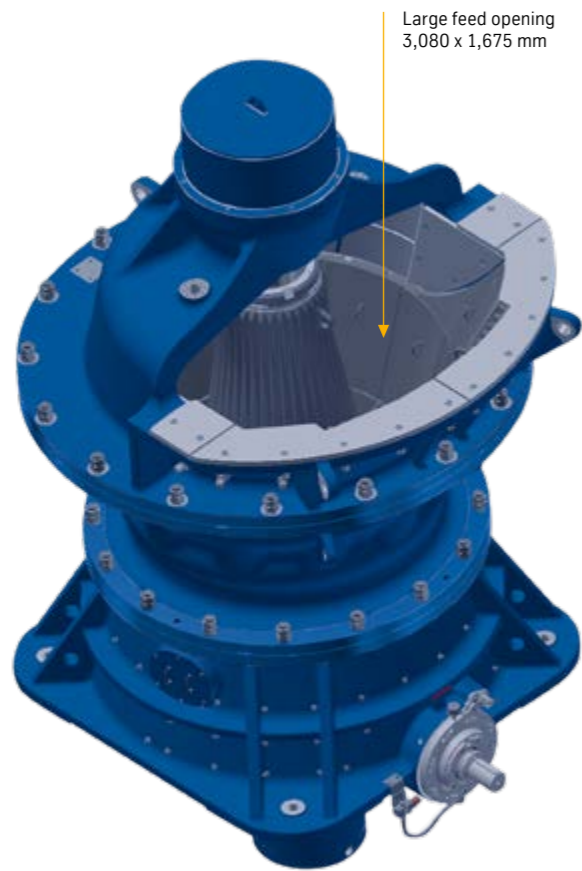
All data should be used as a guide only and are not guaranteed. They depend on the feed characteristics and the crusher configuration.

Gyratory crusher		A	B	C	D	E	F	G	H	I	J 1	J 2
Type		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
KB 54-67	54-67	4,475	4,430	1,535	1,642	4,352	6,026	200	3,200	2,800	3,660	3,660
KB 54-75	54-75	4,475	4,600	1,630	1,745	4,484	6,295	200	3,400	3,000	3,900	3,900
KB 63-75	63-75	4,950	5,750	1,955	1,745	4,497	6,930	200	3,400	3,000	3,900	3,900
KB 63-89	63-89	4,950	6,020	2,120	1,808	4,900	7,024	200	3,720	3,300	4,290	4,290
KB (63-114)*	(63-114)*	6,250	6,450	2,273	2,270	5,800	8,725	200	5,000	4,500	5,500	5,500
KB 63-130	63-130	5,005	6,370	2,220	2,408	5,800	7,478	200	4,840	4,400	5,250	5,250

* still available on request

Jaw gyratory crushers – design and operating principle

The main characteristic of jaw gyratory crushers is their enlarged feed opening which is located on one side of the crusher only. It is normally serrated and, together with the upper part of the mantle, it forms the initial crushing zone. The coarsely crushed material is then reduced to the desired product size in the crushing chamber below. Jaw gyratory crushers can handle much bigger chunks of material than comparable gyratory crushers of the same mantle diameter. Jaw gyratory crushers feature a higher crushing ratio and less tendency to become clogged in the feed zone as a result of bridging



Large feed opening
3,080 x 1,675 mm

Jaw gyratory crusher with specially designed feed opening

Fields of application

- Coarse feed material
- Block cave mining
- Underground mining



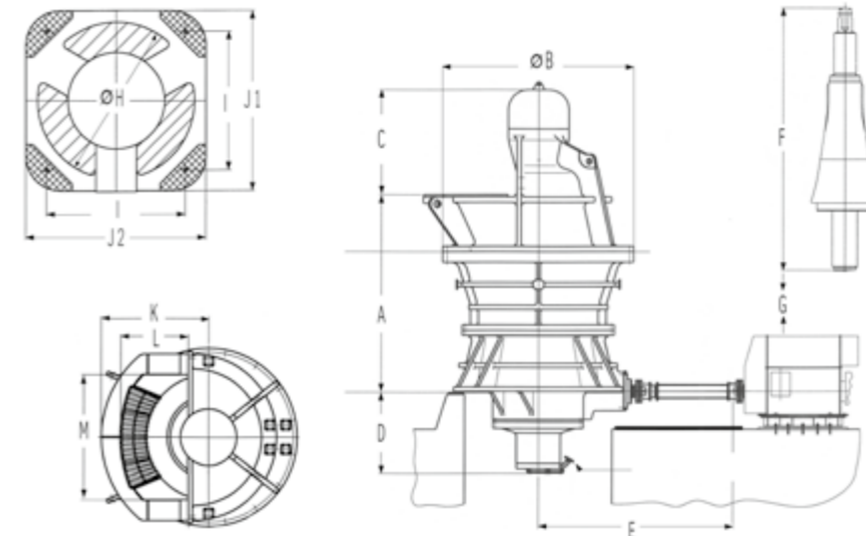
Jaw gyratory crusher for underground iron ore mining and the crushing chamber of a BK 63-75 in a stationary copper ore plant

Technical data

Jaw gyratory crusher		Weights ¹⁾										
Type	Feed opening	Mantle diameter (oversized)	Speed of eccentric bushing	Max. motor power	Total weight of crusher	Spider ²⁾	Heaviest weight	Bottom shell ³⁾	Main shaft ⁴⁾	Eccentric bushing with bottom	Hydraulic cylinder	
	[inch]	[mm] / [inch]	[mm] / [Zoll]	[r.p.m.]	[kW]	[kg]	[kg]	[kg]	[kg]	[kg]	[kg]	
BK	54-67	2,640 x 1,350 / 104 x 54	1,700 / 67 (1,750 / 69)	137	450	175,000	46,000	42,000	36,800	34,000	7,100	8,100
KB	63-75	3,080 x 1,680 / 121 x 66	1,900 / 75 (1,955 / 77)	137	650	209,000	50,400	45,500	43,500	45,000	8,500	9,500

Jaw gyratory crusher		Throughput [t/h] with open side setting OSS [mm] ⁵⁾									
Type		130		150		170		185		200	
	[inch]	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
BK	54-67	900	2,100	1,200	2,500	1,600	3,400	1,800	3,900	1,800	4,000
BK	63-75	1,100	2,400	1,300	3,000	1,800	4,000	1,900	4,600	2,100	4,900

The feed material should be at least 20% smaller than the width of the feed opening. Arrangement drawing with fitting dimensions and loads on request.



- ¹⁾ Average component weights including internals; safety margins for selecting lifting gear not included
- ²⁾ including wear cap
- ³⁾ excluding hydraulic cylinder
- ⁴⁾ with "oversized" mantle diameter including crushing elements
- ⁵⁾ Min: typical feed material with minimum eccentricity and F80 = 680 mm
Max: typical feed material with maximum eccentricity and F80 = 230 mm
Bulk density: 1,600 kg/m³

All data should be used as a guide only and are not guaranteed. They depend on the feed characteristics and the crusher configuration.

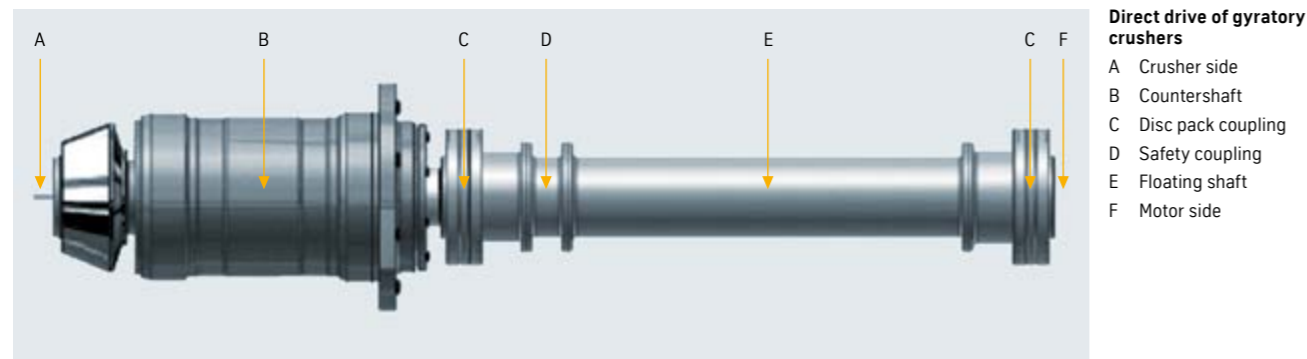
Jaw gyratory crusher		A	B	C	D	E	F	G	H	I	J 1	J 2	K	L	M
Type		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
BK	54-67	4,252	3,400	2,010	1,642	4,352	6,500	200	3,200	2,800	3,660	3,660	2,150	1,350	2,640
BK	63-75	4,252	4,400	2,400	1,745	4,484	7,200	200	3,400	3,000	3,900	3,900	2,640	1,675	3,080

Crusher drives

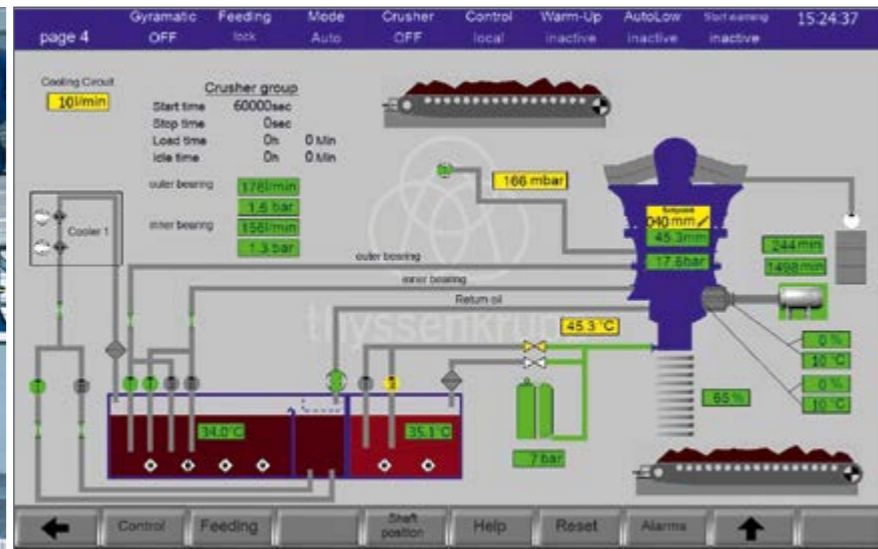
Nowadays, thyssenkrupp gyratory crushers are usually driven directly via a disc-pack coupling with a floating shaft and a safety coupling.

The disc-pack coupling compensates for geometric misalignments between the motor shaft and the countershaft while the safety coupling protects the crusher motor from overload when uncrushable tramp material enters the crusher. The floating shaft allows the countershaft to be removed without having to remove the motor.

The "Gyramatic" monitoring and control system for thyssenkrupp Industrial Solutions gyratory crushers ensures easy, safe operation of these crushers in a range of applications. This compact, robust unit consists of a control cabinet with a touch screen terminal. The terminal can be used interactively to input set points and read off operating data.



Gyratory crusher with a disc pack coupling, floating shaft and safety coupling



"Gyramatic" monitoring and control system for gyratory crushers

Customized crusher solutions

thyssenkrupp Industrial Solutions develops tailored plant solutions to meet customer requirements.

In particular, thyssenkrupp has a range of wear-resistant spiders and a special concave design, allowing us to offer the right solution for you, whatever the application.



Our customized spider designs include:

-  Standard ring spider
-  Split ring spider for crushers that are subject to height and/or weight restrictions
-  Bone-type spider for quick removal and larger feed openings
-  Jaw-type spider for extremely large feed openings



Split crusher shell

Examples of crushing plants with a gyratory crusher

The performance and availability of gyratory crushers are optimized by designing and configuring the feed and discharge devices to suit the specific crushing job.



Right: Moving a semi-mobile crushing plant with KB 63-114 gyratory crusher for overburden and copper ore.
Throughput > 10,000 t/h



Above: One of two primary crushing plants for iron ore and overburden with KB 63-75 gyratory crusher. The crushers are directly fed from two sides by means of dump trucks.

Throughput	Ore	3,650 t/h
	Overburden	4,500 t/h
Product P99	Ore	≤ 280 mm
	Overburden	≤ 350 mm
Feed size	max.	1,400 mm

Below: BK 63-75 jaw gyratory crusher installed underground in a copper ore crushing plant.

Throughput	2,000 t/h
Product	P80 ≤ 150 mm
Feed size in block caving	max. 2,000 x 1,500 x 1,000 mm



Our services keep things running smoothly!

We offer our customers not only optimum, customized technical solutions, but also comprehensive, tailored service ranging from the engineering of individual crushers and entire plants to their operation, and modification if needed.

We usually start out by analyzing the storage areas and the feed material. Using state-of-the-art processes we characterize the respective material, which forms the basis for selecting the right crusher and any customer-specific adaptations that may be required. Then we perform testing under field conditions using a clever control and diagnostic system to check the main operating parameters again.

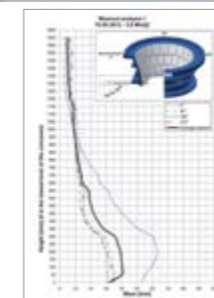
Whenever you need us, the maintenance and repair crews from thyssenkrupp Industrial Solutions are on hand to cater to your needs, from specialist advice, inspections and modifications through modernizations and performance enhancement to damage analyses and repairs, which are performed exclusively by our highly qualified assembly personnel using high-quality, certified spare parts. If necessary, we will maintain and repair your crusher at one of our service centers. You can call on these services not only for crushers from our own production lines, but also for machines manufactured by other suppliers.

Increase the productivity of your machines and plants! Call on our service team today.



From left:

- Teleservices
 - Acquiring, filing and evaluating machine / process data
 - Worldwide access via GSM
- Spare parts service
 - Electronic spare parts catalogue for easy access to crusher components
- Scan service
 - Evaluation of crushing elements through on-site 3D scanning
 - Wear analyses and optimization of crushing elements



One-stop-shop service

- Asset Management
- Spare Parts Supply & Management
- Service Center & Field Services
- Revamps



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