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DL320(A)-7M/DL420-7M REVIEW

건설기계 사업본부 마케팅 담당
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 **HYUNDAI**
DOOSAN INFRACORE

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1. Walk Around
2. Product Competitiveness
3. Line Up
4. Sales Feature
5. Standard & Option List

Walk Around

Performance

- ✓ Increased Standard Bucket capacity(DL320(A)-7M)
- ✓ Increased Front Hinge Height (DL320(A)-7M)
- ✓ Increased Engine Power(DL420-7M only)
- ✓ Steering controllability improvement
- ✓ LIS performance improvement

Comfort

- ✓ New Cluster
- ✓ New Keypad
- ✓ Improved Cabin Visibility
- ✓ More legroom
- ✓ More storage space
- ✓ USB charge port
- ✓ New HVAC
- ✓ New Brake Pedal

Quality

- ✓ Improved durability of T/M Damper
- ✓ Propeller Shaft Balance
- ✓ Reinforced Structure
- ✓ LIS Valve leakage improvement

Styling

- ✓ New Cabin
- ✓ New Engine Room Cover
- ✓ New Grille
- ✓ New Tail pipe
- ✓ New Counterweight
- ✓ Color Contrast Balance



Daily Fuel Consumption

- DL320A-7M Up to 2.5% ↑
- DL320-7M Up to 23% ↑
- DL420-7M Up to 20.0% ↑
- ✓ LS System(T3 models only)
- ✓ Electronic Variable Fan Option (T3 models only)
- ✓ Lock-Up Option (T3 models only)
- ✓ SAT2.0 (DL420-7M only)

Versatility

- ✓ Enhanced Axle Capacity → HD Axle Option
- ✓ Aggregate Bucket Option
- ✓ Diversification of Additional C/W options
- ✓ LED Working Lamp Option

Maintainability

- ✓ Automatic Reverse Radiator Fan Option
- ✓ Full Fender Catch
- ✓ Extend Front Fender length
- ✓ Wider & Longer Mud Guard
- ✓ Increased durability of GET
- ✓ New Toolbox
- ✓ New Elec box
- ✓ Sintered type Axle DISC applied
- ✓ Water Separator applied
- ✓ AGS Option
- ✓ TMS – Fuel Consumption Data, Error Codes..

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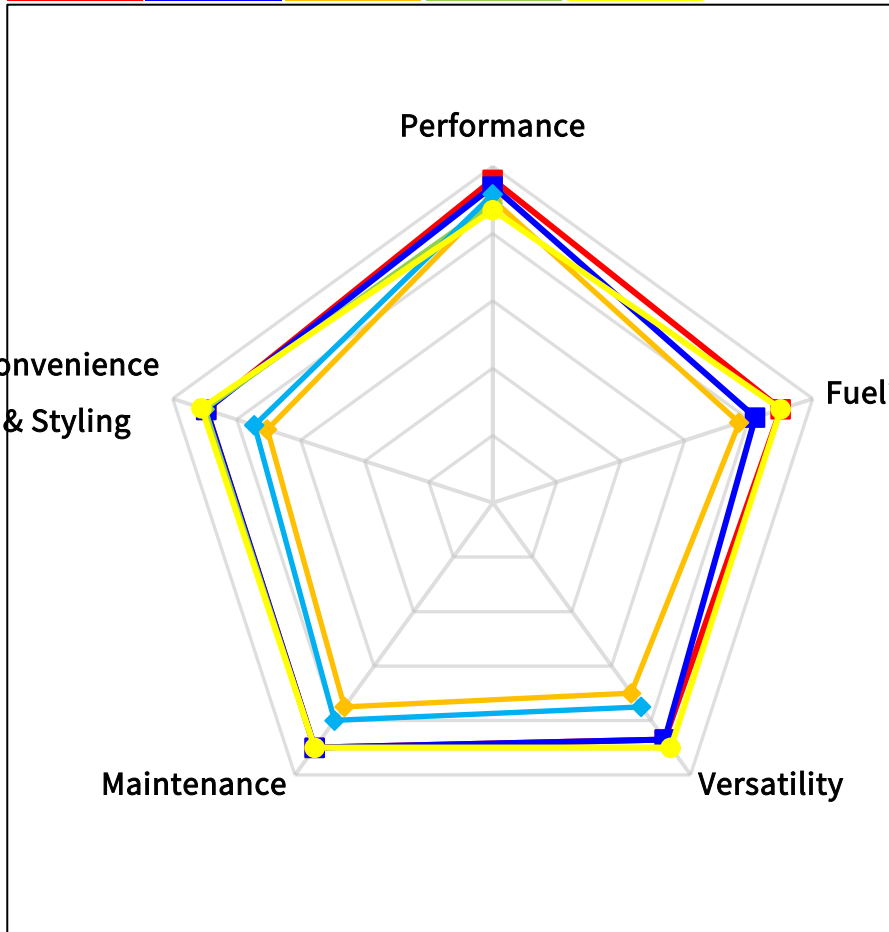
1. Walk Around
2. Product Competitiveness
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Product competitiveness_ DL320A-7M

Differentiating Point : Increase GP bucket capacity and the scope of work, Improve maintainability

Key development Point : Add various options and bid specs, Convenience & Styling Enhancement

Differentiating Point
 Key development Point



ITEMS	Importance	Development Direction
Performance	<i>Very High</i>	<ul style="list-style-type: none"> Increase GP bucket capacity (BOT: 3.0 → 3.3m³) Improve pedal operability Increase the working range by increasing the front hinge height Increase bucket breakout force
Fuel	<i>Low</i>	<ul style="list-style-type: none"> Apply variable fan(opt.) (EPPR Relief Sol. V/V) Fuel efficiency(m³/l) increased by 6% compared to DL300A
Versatility	<i>High</i>	<ul style="list-style-type: none"> Add heavy duty axle (opt.) Make 3.7m³ MH bucket (opt.) Add various options and bid specs Add various additional C/W (0.2/0.3/0.4ton) Increase visibility on right and left front (cabin)
Convenience & Styling	<i>Low</i>	<ul style="list-style-type: none"> LCD Cluster, large Storage, USB charging socket etc. Increase HVAC performance Change exterior design: Cover, Grille, C/W etc. Upgraded cabin interior
Maintenance	<i>High</i>	<ul style="list-style-type: none"> Apply mechanic E/G(T2) Apply DISC Sinter axle Apply Water separator Std. Apply Reverse (opt.)/ Add TMS feature Apply AGS (opt.) Improve HVAC serviceability

* Fuel efficiency (m³/L)/ Cat 950L(T3, Electric E/G)

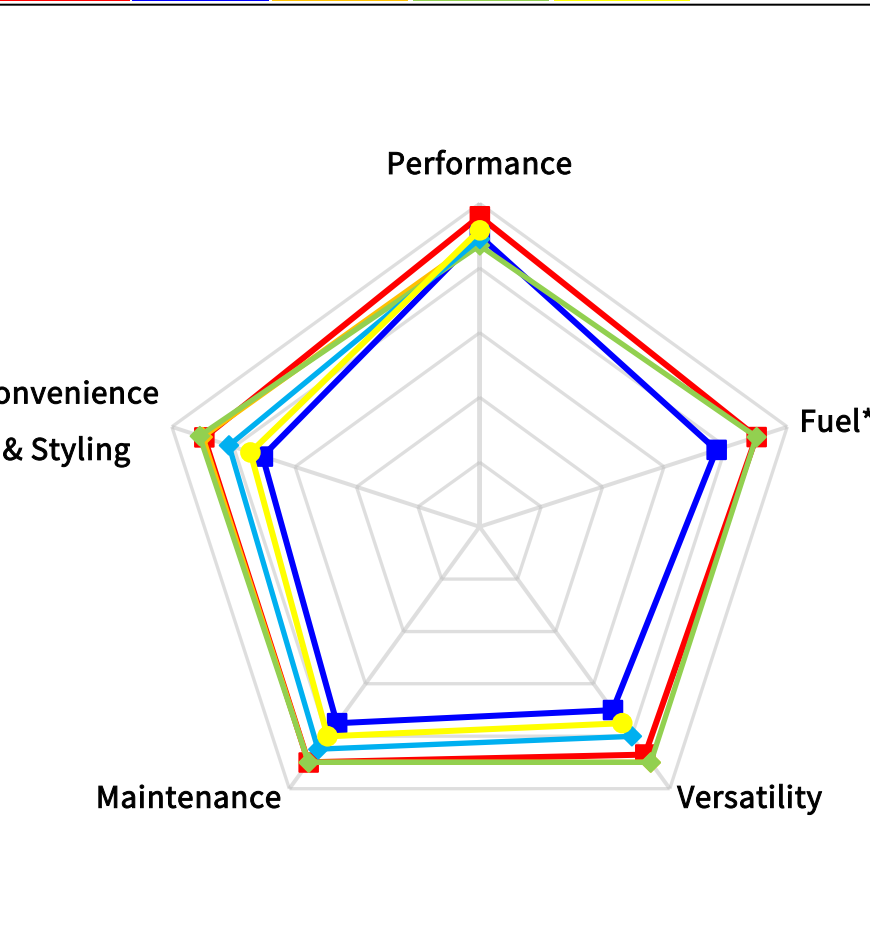
Product competitiveness_ DL320-7M

Differentiating Point : Increase GP bucket capacity and the scope of work, Improve maintainability

Key development Point: Improve fuel performance,

Add various options and bid specs, Convenience & Styling Enhancement

Differentiating Point
 Key development Point



ITEMS	Importance	Development Direction
Performance	<i>Very High</i>	<ul style="list-style-type: none"> • Increase GP bucket capacity (BOT: 3.0 → 3.3m³) • Improve pedal operability, Steering control & travel performance • Increase the working range by increasing the front hinge height • Increase work stability
Fuel	<i>Mid</i>	<ul style="list-style-type: none"> • Apply LS , Electric variable Fan, Lock-Up(Opt.) • Improve by 10.4% (m³/l) compared to DLA • Improve by 23% (daily fuel consumption(L/h) compared to DLA
Versatility	<i>High</i>	<ul style="list-style-type: none"> • Add heavy duty axle(Opt.) • Make 3.7m³ MH bucket (Opt.) • Add various options and bid specs • Add various additional C/W (0.2/0.3/0.4ton) • Increase visibility on right and left front (cabin)
Convenience & Styling	<i>Mid</i>	<ul style="list-style-type: none"> • LCD Cluster, large Storage, USB charging socket etc. • Increase HVAC performance • Change exterior design: Cover, Grille, C/W etc. • Upgraded cabin interior
Maintenance	<i>High</i>	<ul style="list-style-type: none"> • Apply DISC Sinter axle • Apply Water separator Std. • Apply Auto Reverse Fan/ Add TMS feature • Apply AGS (Opt.) • Improve HVAC serviceability

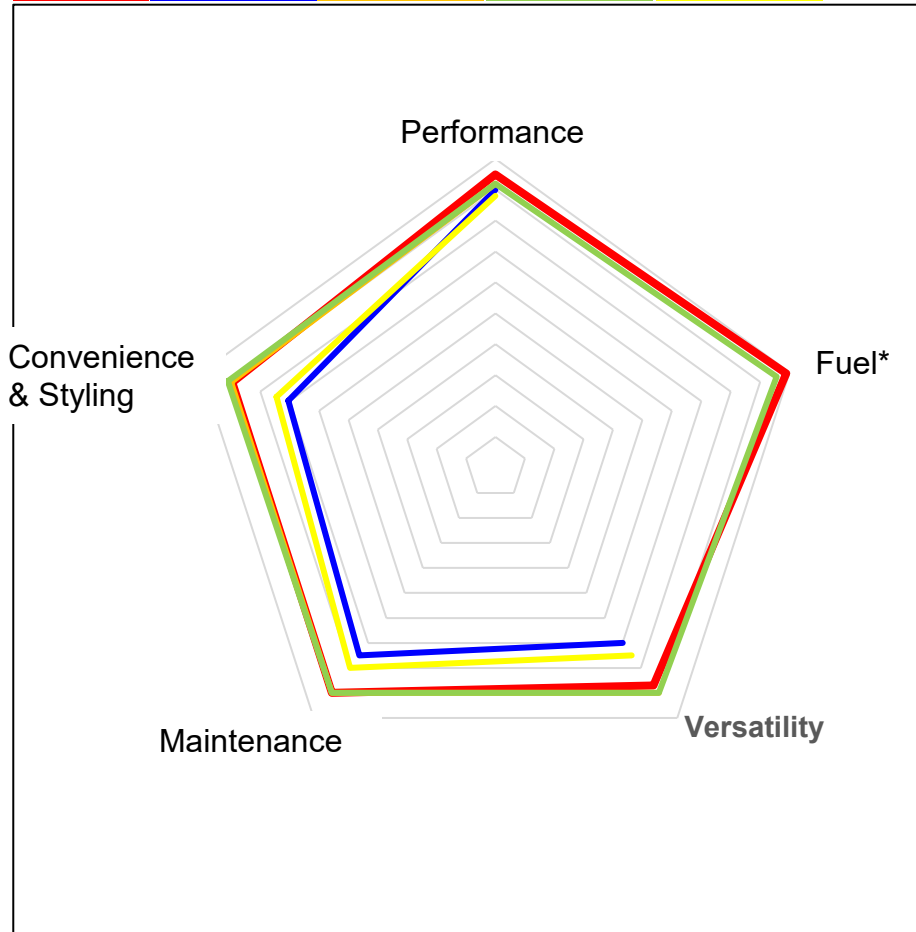
* Fuel efficiency (m³/L)

Product competitiveness_ DL420-7M

Differentiating Point : Improve steering & travel performance, pedal operability & maintenance

Key development Point: Improve fuel performance, convenience & styling/ Add various options and bid specs

Differentiating Point
 Key development Point



ITEMS	Importance	Development Direction
Performance	<i>Very High</i>	<ul style="list-style-type: none"> Improve driving dynamics by increasing engine power Improve pedal operability, Steering control & travel performance
Fuel	<i>Mid</i>	<ul style="list-style-type: none"> Apply LS , Electric variable Fan, Lock-Up(Opt.) & SAT Improve by 23.6% (daily fuel consumption(L/h)) compared to DLA
Versatility	<i>High</i>	<ul style="list-style-type: none"> Add heavy duty axle(Opt.) Make 5.0m³ MH bucket an option Add various options and bid specs Add various additional C/W (0.3/0.4/0.5ton) Increase visibility on right and left front (cabin)
Convenience & Styling	<i>Mid</i>	<ul style="list-style-type: none"> LCD Cluster, large Storage, USB charging socket etc. Increase HVAC performance Change exterior design: Cover, Grille, C/W etc. Upgraded cabin interior
Maintenance	<i>High</i>	<ul style="list-style-type: none"> Apply Water separator Std. Apply Auto Reverse Fan/ Add TMS feature Apply AGS (Opt.) Improve HVAC serviceability

* Daily fuel consumption(L/h) idle: travel: work_ 2:3:5

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1. Walk Around

2. Line Up

3. Sales Feature

4. Standard & Option List

Line Up

Model	Specs	Configuration	Sales Point
DL320-7M	<ul style="list-style-type: none"> - Engine 172 kW - Loading Height on pin 4.17m - Bucket 3.3m³ - Weight 18,940kg 	<ul style="list-style-type: none"> - Z-BAR - ZF-Axles with LSD - Mech. Suspension Seat - Automatic Reverse Fan 	<ul style="list-style-type: none"> - Increased standard bucket capacity - Increased front hinge height - Highest fuel efficiency (LS system, 5 Gear Lock-up option) - TMS - New Styling(Exterior and cabin)
DL320A-7M	<ul style="list-style-type: none"> - Engine 156 kW - Loading Height on pin 4.17m - Bucket 3.3m³ - Weight 18,590kg 	<ul style="list-style-type: none"> - Z-BAR - ZF-Axles with LSD - Mech. Suspension Seat - Automatic Reverse Fan(Optional) 	<ul style="list-style-type: none"> - Tier 2 engine - Increased standard bucket capacity - Increased front hinge height - TMS - New Styling(Exterior and cabin)
DL420-7M	<ul style="list-style-type: none"> - Engine 257 kW - Loading Height on pin 4.27m - Bucket 3.9m³ - Weight 22,742kg 	<ul style="list-style-type: none"> - Z-BAR - ZF-Axles with LSD - Mech. Suspension Seat - Automatic Reverse Fan 	<ul style="list-style-type: none"> - Highest engine power in this class - Highest fuel efficiency (LS system, SAT2, Lock-up option) - TMS - New Styling(Exterior and cabin)

DL320-7M Specification comparison

ITEMS			DOOAN		CAT	VOLVO	KOMATSU	HYUNDAI
			DL320-7M	DL300	950GC	L110H	WA380-6	HL760-9S
Weight (GP_BOT)	Operating Weight	kg	18,940	17,300	18,676	18,360	17,510	17,600
	Tipping load_straight	kg	14,710	14,500	12,759	12,780	14,740	13,950
	Tipping load_full turn	kg	12,990	12,100	11,197	10,900	12,780	12,060
	ROC	kg	6,663	6,050	5,599	5,450	6,390	6,030
Engine	Emission	-	T3	T3	T3	S5	T3	T2
	Model	-	DL08	DL08	C7.1 ACERT	D8J	SAA6D107E	HM 8.3
	Rated power	kW	172	162	168	191	143	160
	Displacement	Liter	7.64	7.64	7.01	7.8	6.69	8.3
Front	Bucket capacity(BOT)	m ³	3.3	3.0	3.1	3.0	3.1	3.1
	Bucket capacity(BOC)	m ³	3.5	3.2	3.3	3.4	3.3	3.1
	Bucket capacity(AGG)	m ³	3.7					
	Tractive effort (BOT)	kN	170	167	152	175.8	170	156
	Boom up	sec	5.9	6.1	6.1	5.4	5.9	6.2
	Cycle time	sec	10.6	11.7	10.1	10.0	11.0	10.6
	Bucket hinge height	mm	4,170	4,000	4,188	4,030	4,095	4,105
Travel	T/M type	-	HDT	HDT	HDT	HDT	HDT_LU	HDT
	Axle type (STD)	-	LSD	LSD	OPEN	DHL/OPEN	OPEN	OPEN
	Tire	-	L3(TRI)	Bias(16PR)	TRI(L3)	L3	L3	L3
	Travel speed 4 th (5 th)	KPH	34.1(40)	34.0	34.0	40.0	34.0	38.4
Dimension	Overall Length	mm	8,385	8,150	8,412	8,120	8,365	8,065
	Overall Width(BOC)	mm	3,000	2,920	2,927	2,880	2,905	2,900
	Overall Height(CAB)	mm	3,511	3,438	3,458	3,380	3,390	3,485
	Wheel Base	mm	3,300	3,200	3,300	3,200	3,300	3,300
	Thread	mm	2,150	2,150	-	2,070	2,160	-
Hyd.	Type	-	LS	Open	LS	LS	LS	OPEN
	Main pressure	bar	230(200)	200	279	270	314	206
Structure	Fuel tank	Liter	291	326	290	270	300	263
	Oil tank	Liter	193	190	120	133	139	163

DL320A-7M Specification comparison

구분			DOOAN		CAT	VOLVO	KOMATSU	HYUNDAI
			DL320A-7M	DL300A	950L	L110F	WA380-6	HL760-9S
Weight (GP_BOT)	Operating Weight	kg	18,590	17,640	18,136	18,430	17,510	17,600
	Tipping load_straight	kg	14,900	13,670	13,314	12,650	14,740	13,950
	Tipping load_full turn	kg	13,160	11,880	11,624	10,840	12,780	12,060
	ROC	kg	6,555	5,940	5,812	5,420	6,390	6,030
Engine	Emission	-	T2	T2	T3	T3	T3	T2
	Model	-	DE08TIS	DE08TIS	C7.1 ACERT	D7E LB E3	SAA6D107E	HM 8.3
	Rated power	kW	156	156	195	170	143	160
	Displacement	Liter	8.07	8.07	7.01	7.11	6.69	8.3
Front	Bucket capacity(BOT)	m ³	3.3	3.0	3.1	3.0	3.1	3.1
	Bucket capacity(BOC)	m ³	3.5	3.2	3.1	3.4	3.3	3.1
	Bucket capacity(AGG)	m ³	3.7					
	Tractive effort (BOT)	kN	169	167	151	147	170	156
	Boom up	sec	6.4	6.3	5.3	5.4	5.9	6.2
	Cycle time	sec	11.6	11.4	9.5	10.0	11.0	10.6
	Bucket hinge height	mm	4,170	3,980	3,995	4,020	4,095	4,105
Travel	T/M type	-	HDT	HDT	HDT_LU	HDT	HDT_LU	HDT
	Axle type (STD)	-	LSD	LSD	OPEN	DHL	OPEN	OPEN
	Tire	-	L3(TRI)	Bias(16PR)	XHA2(L3)	L3	L3	L3
	Travel speed 4 th	KPH	36.7	32.3	39.5	37.0	34.0	38.4
Dimension	Overall Length	mm	8,447	8,240	8,243	8,240	8,365	8,065
	Overall Width(BOC)	mm	3,000	2,920	2,927	3,000	2,905	2,900
	Overall Height(CAB)	mm	3,511	3,435	3,446	3,360	3,390	3,485
	Wheel Base	mm	3,300	3,200	3,350	3,200	3,300	3,300
	Thread	mm	2,150	2,150	2,140	2,070	2,160	-
Hyd.	Type	-	Open	Open	LS	LS	LS	OPEN
	Main pressure	bar	206	200	279	236	314	206
Structure	Fuel tank	Liter	291	304	275	269	300	263
	Oil tank	Liter	173	210	125	133	139	163

DL420-7M Specification comparison

구분			DOOAN		CAT	VOLVO	KOMATSU	HYUNDAI
			DL420-7M	DL420	966M	L150H	WA470-6	HL770-9S
Weight (GP_BOT)	Operating Weight	kg	22,742	22,300	23,220	24,090	22,880	22,500
	Tipping load_straight	kg	17,952	18,190	17,828	18,100	18,370	17,400
	Tipping load_full turn	kg	15,837	15,780	15,822	15,970	15,795	14,950
	ROC	kg	7,919	7,890	7,911	7,985	7,898	7,475
Engine	Emission	-	T3	T3	T3	T2	T3	T3
	Model	-	DC13	QSM11	C9.3 ACERT	D13F	SAA6D125E-5	HE8.9
	Rated power	kW	257	209	230	220	204	209
	Displacement	Liter	12.7	10.8	9.3	12.8	11.04	8.9
Front	Bucket capacity(BOT)	m ³	3.9	4.0	4.0	4.0	3.9	4.0
	Bucket capacity(BOC)	m ³	4.1	4.2	4.2	4.4	4.2	4.0
	Bucket capacity(AGG)	m ³	4.7	NA	4.8	5.2	5.2	NA
	Tractive effort (BOT)	kN	197	208	183	202	207	204
	Boom up	sec	6.3	5.8	6.1	5.9	5.4	5.7
	Cycle time	sec	11.3	10.2	10.1	11.6	10.7	9.8
	Bucket hinge height	mm	4,265	4,300	4,235	4,340	4,360	4,310
Travel	T/M type	-	HDT	HDT	HDT_LU	HDT_LU	HDT	HDT
	Axle type (STD)	-	LSD	LSD	DHL/OPEN	DHL/OPEN	OPEN	OPEN
	Tire	-	L3	Bias(20PR)	XHA2(L3)	L3	Bias(16PR)	Bias(20PR)
	Travel speed 5 th	KPH	40.0	38.0	39.5	38.0	36.2	38
Dimension	Overall Length	mm	9,553	8,880	8,888	8,790	8,980	8,650
	Overall Width(BOC)	mm	3,200	3,270	3,271	3,200	3,170	3,100
	Overall Height(CAB)	mm	3,658	3,522	3,587	3,580	3,500	3,590
	Wheel Base	mm	3,525	3,500	3,550	3,550	3,450	3,440
	Thread	mm	2,300	2,300	2,230	2,280	2,300	-
Hyd.	Type	-	LS	LS	LS	LS	LS	OPEN
	Main pressure	bar	315	245	310	290	343	206
Structure	Fuel tank	Liter	316	367	302	366	413	362
	Oil tank	Liter	230	230	125	156	173	295

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② Styling

③ Main Component

④ Maintainability

⑤ Useful Function

4. Standard & Option List

DL320(A)-7M Main component & performance

		DL300	DL320-7M	DL300A	DL320A-7M
Engine	Model	DL08	←	DE08TIS	←
	Capacity	7.6L	←	8.07L	←
	Power(PS)	220@2,000rpm	234@2,000rpm	212@2,100rpm	←
	Torque	1,029N.m	1,157N.m	902N.m	←
	Air-cleaner	Pre-cleaner	←	Pre-cleaner	←
	Others	Turbocharger	←	Turbocharger	←
Transmission	Model	ZF(4WG 210)	ZF(4/5WG 210)	ZF(4WG 210)	←
	Gear(Opt.)	4F/3R-Auto	4(5)F/3R-Auto	4F/3R-Auto	←
	Speed(Opt.)	Max 34.0km/h	Max 34.1(40)km/h	Max 32.3km/h	Max 36.7km/h
Bucket	Type	Mono tooth	←	Mono Tooth	←
	Size	3.0m ³	3.3m ³	3.0m ³	3.3m ³
Axle	Model	ZF MT-L3095II/3085II	ZF MT-L3095II/3085II	ZF MT-L3095II/3085II	←
	Type	Wet-type	←	Wet-type	←
Performance	Breakout force(kN)	159	170	168	169
	Tipping load(tons)	14.5	14.7	13.4	14.9
	Payload(tons)	5.4	5.9	5.4	5.9
	Traction force(tons)	18.2	18.6	17.7	18.1
	MAX. Steering Angle(°)	40	←	40	←
	Pin height(mm)	4,000	4,170	3,980	4,170
	Dump height(mm)	2,780	2,940	2,780	2,866
	Ground clearance(mm)	465	400	460	400
Total cycle time(sec)	11.5	10.6	11.1	11.6	

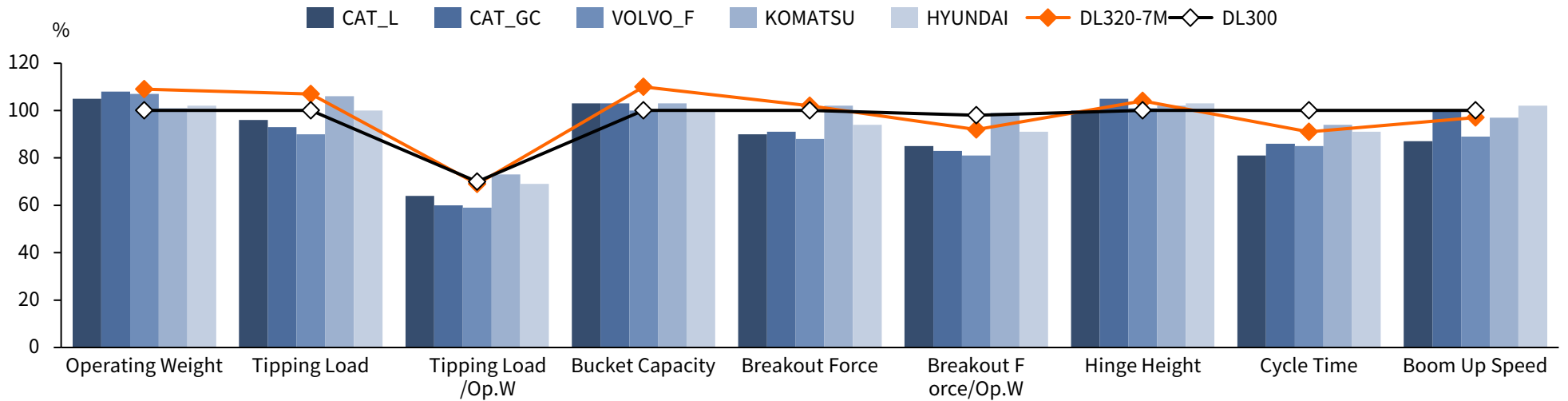
DL420(A)-7M Main component & performance

		DL420	DL420-7M	DL420A	DL420A-7M
Engine	Model	QSM11	DC13	DE12TIS	DX12
	Capacity	10.8L	12.7L	11.05L	11.05L
	Power(PS)	284@2,000rpm	349@1,800rpm	286@2,100rpm	296@2,000rpm
	Torque	1,450N.m	1,664N.m	1,275N.m	1,300N.m
	Air-cleaner	Pre-cleaner	←	←	←
	Others	Turbocharger	←	←	←
Transmission	Model	ZF(4WG 260)	←	←	←
	Gear(Opt.)	4F/3R-Auto	4(5)F/3R-Auto	4F/3R-Auto	←
	Speed(Opt.)	Max 38.0km/h	Max 37.1(40)km/h	Max 38.0km/h	Max 40km/h
Bucket	Type	Mono tooth	←	←	←
	Size	3.9m ³	←	←	←
Axle	Model	ZF MT-L3105II/3095II	←	←	←
	Type	Wet-type	←	←	←
Performance	Breakout force(kN)	208	198	197	198
	Tipping load(tons)	18.2	19.0	17.8	17.1
	Payload(tons)	7.9	8.5	7.7	7.6
	Traction force(tons)	23.8	22.0	21.5	23.8
	MAX. Steering Angle(°)	40	←	←	←
	Pin height(mm)	4,300	4,265	4,295	4,265
	Dump height(mm)	2,960	2,950	2,960	2,950
	Ground clearance(mm)	510	495	510	495
Total cycle time(sec)	10.2	10.6	11.5	10.7	

Project Target_DL320-7M

Category	Requirements	Development Target	Action Plan
Regulation	<ul style="list-style-type: none"> • Tier 3 (Elec. Controlled E/G) 	<ul style="list-style-type: none"> • Tier 3 	<ul style="list-style-type: none"> • Install DL08 engine
Performance	<ul style="list-style-type: none"> • Improve travel performance • Apply SDK platform • Request bid spec 	<ul style="list-style-type: none"> • Acceleration performance superior to DL300 • Increase hinge height • Increase digging force • Add various options and bid specs 	<ul style="list-style-type: none"> • Apply lock-up option & engine dynamic characteristics • Increase hinge height (SDK C/O): by 170mm • Secure the best against the competitors by improving bucket cyl • LED working Lamp, Spark Arrestor, wet-type cleaner, E/G shutdown etc.
Fuel	<ul style="list-style-type: none"> • Superior to DL300 model 	<ul style="list-style-type: none"> • Daily fuel consumption (Heavy load) SMK320: improve by 18% compared to DLA • Productivity(m³/h) SMK320: improve by 5.9% compared to DLA 	<ul style="list-style-type: none"> • Apply LS system/ Lock-Up/ electronic fan of variable pitch • Increase GP bucket capacity compared to old model (3.0=>3.3m³) Make 3.7m³ MH bucket an option
Quality	<ul style="list-style-type: none"> • Durability equivalent to that of competitor models 	<p>Equivalent level to SDK320</p> <ul style="list-style-type: none"> • Enhance bucket durability • Enhance axle durability • Enhance front pin durability • Enhance durability of key parts/machine 	<p>Key machine/parte: SDK C/O</p> <ul style="list-style-type: none"> • Apply MH tungsten coated bucket/ Newly develop tooth & adaptor • Improve rear axle: 3085-> 3095 option Change in axle disc material: Paper-> Sinter • Improve bucket dump shock • C/O of key parts that have already been validated
Comfort	<ul style="list-style-type: none"> • Improve cabin visibility • Improve convenience for maintenance • Request information (fuel economy, maintenance, etc.) 	<ul style="list-style-type: none"> • Improve visibility of right and left bottom front • Apply reverse fan system/ SDK platform • Add TMS feature 	<ul style="list-style-type: none"> • Increase glass area on right and left front • Apply manual reverse fan/ SDK platform • Ad TMS feature (provide information of fuel economy and parts replacement schedule)
Design	<ul style="list-style-type: none"> • Competitive exterior design • Upgraded cabin interior 	<ul style="list-style-type: none"> • Apply a new competitive design • Upgrade interior to competitors' level 	<ul style="list-style-type: none"> • Change exterior design • Apply economic type new cabin

DL320-7M Performance Curve Comparison



ITEMS			Doosan				CAT		VOLVO	KOMATSU	HYUNDAI
			DL320A-7M	DL320-7M	DL300A	DL300	950L	950GC	L110F	WA380-6	HL760-9S
Weight	Operating Weight (EWW)	kg	18,590	18,939	17,640	17,300	18,136	18,676	18,430	17,510	17,600
	Tipping Load_Straight	kg	14,900	14,710	13,670	14,500	13,314	12,759	12,650	14,740	13,950
	Tipping Load_Full Turn	kg	13,160	12,990	11,880	12,100	11,624	11,197	10,840	12,780	12,060
PowerTrain	Transmission	-	HDT	HDT	HDT	HDT	HDT_LU	HDT	HDT	HDT_LU	HDT
	Engine Power	kW	156	172	156	162	195	168	170	143	160
Front	Bucket Capacity (BOT)	m ³	3.3	3.3	3.0	3.0	3.1	3.1	3.0	3.1	3.0
	Breakout Force	kN	169	170	167.0	167.0	151.0	152.0	146.8	170.0	156.4
	Boom Up speed	sec	6.4	5.9	6.3	6.1	5.3	6.1	5.4	5.9	6.2
	Hinge Height	mm	4,170	4,170	3,980	4,000	3,995	4,188	4,020	4,095	4,105

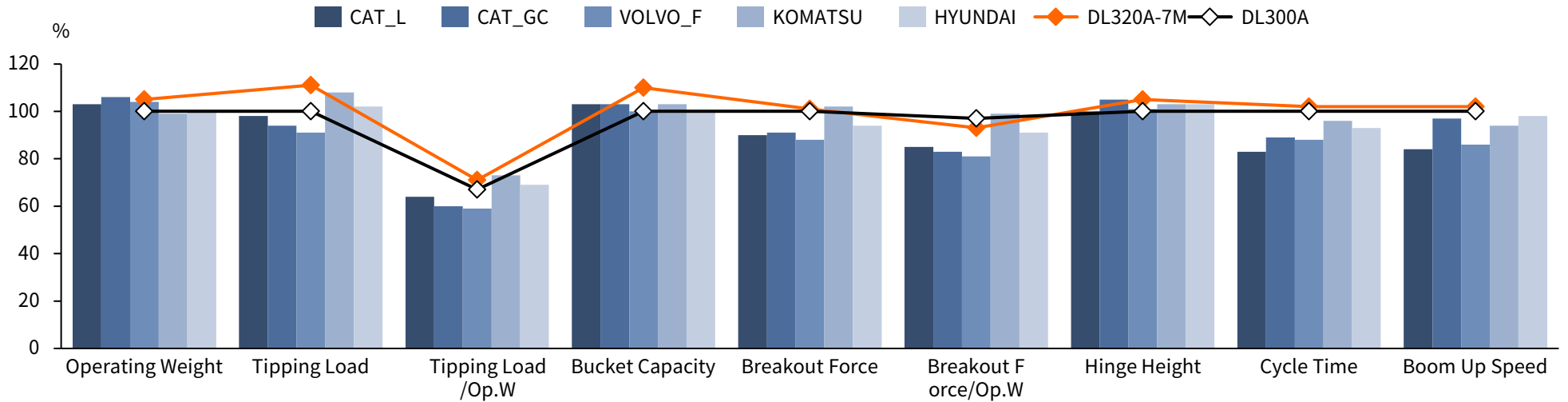
Project Target_DL320A-7M

Category	Requirements	Development Target	Action Plan
Regulation	<ul style="list-style-type: none"> • Tier 2 	<ul style="list-style-type: none"> • Tier 2 	<ul style="list-style-type: none"> • Install DE08 engine
Performance	<ul style="list-style-type: none"> • Equivalent to DL300A - Apply SDK platform - Request bid specs 	<ul style="list-style-type: none"> • Equivalent to DL300A - Increase hinge height - Improve digging force - Add various options and bid specs 	<ul style="list-style-type: none"> • Key parts/machine DL300A C/O - Increase hinge height (SDK C/O): increase by 195mm - Secure the best against the competitors by improving bucket cyl. - LED working Lamp, Stark Arrestor, Wet-type cleaner, E/G shutdown
Fuel	<ul style="list-style-type: none"> • Equivalent to DL300A 	<ul style="list-style-type: none"> • Daily fuel consumption (L/hr)* on the equivalent level to that of DL300A** • Productivity(m³/h) increased by 9.8% compared to DL300A 	<ul style="list-style-type: none"> • Key machines/parts: DL300A C/O • Increase GP bucket capacity compared to old model (3.0=>3.3m³) Make 3.7m³ MH bucket an option
Quality	<ul style="list-style-type: none"> • Durability equivalent to that of competitor models 	<ul style="list-style-type: none"> • Equivalent level to DL300A - Improve bucket durability - Improve axle durability 	<ul style="list-style-type: none"> • Key machines/parts: DL300A C/O - Apply MH tungsten coated bucket/ Newly develop tooth & adaptor - Improve rear axle: 3085-> 3095 option Change in axle disc material: Paper-> Sinter
Comfort	<ul style="list-style-type: none"> • Improve cabin visibility • Improve convenience for maintenance • Request information (fuel economy, maintenance, etc.) 	<ul style="list-style-type: none"> • Improve visibility of right and left bottom front • Apply reverse fan system/ SDK platform • Add TMS feature 	<ul style="list-style-type: none"> • Increase glass area on right and left front • Apply manual reverse fan/ SDK platform • Ad TMS feature (provide information of fuel economy and parts replacement schedule)
Design	<ul style="list-style-type: none"> • Competitive exterior design • Upgraded cabin interior 	<ul style="list-style-type: none"> • Apply a new competitive design • Upgrade interior to competitors' level 	<ul style="list-style-type: none"> • Change exterior design • Apply economic type new cabin

*Daily fuel economy (idle :travel :V-shape_2:3:5)

**Equivalent level when using the same bucket with the old model; if increased the bucket capacity(3.3m³), inferior by -1.0%

DL320A-7M Performance Curve Comparison

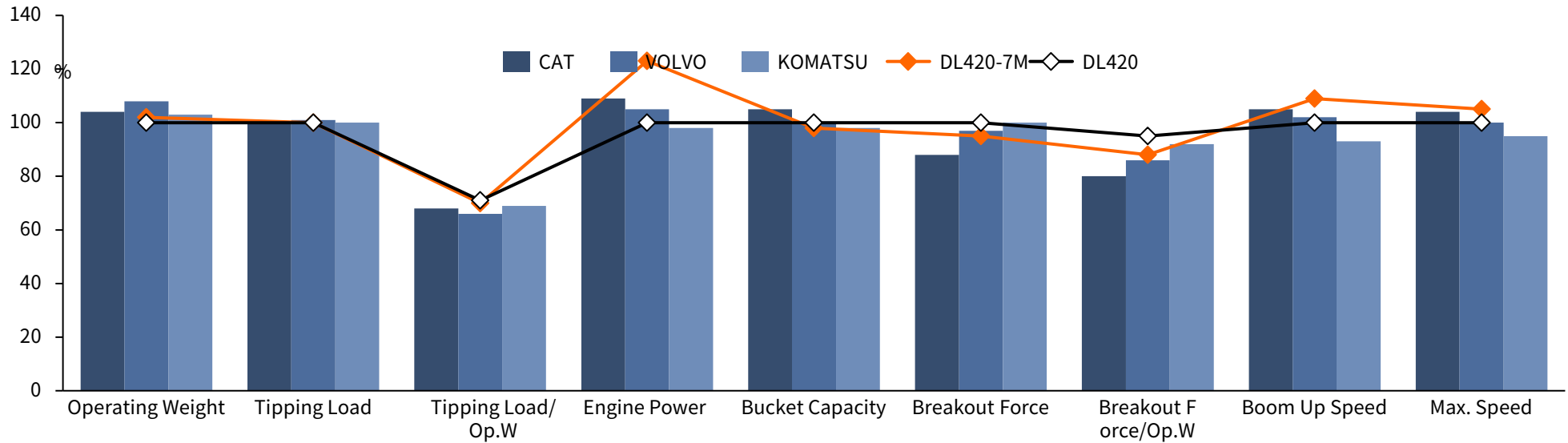


ITEMS			Doosan			CAT		VOLVO	KOMATSU	HYUNDAI	
			DL320A-7M	DL320-7M	DL300A	DL300	950L	950GC	L110F	WA380-6	HL760-9S
Weight	Operating Weight (EVW)	kg	18,590	18,939	17,640	17,300	18,136	18,676	18,430	17,510	17,600
	Tipping Load_Straight	kg	14,900	14,710	13,670	14,500	13,314	12,759	12,650	14,740	13,950
	Tipping Load_Full Turn	kg	13,160	12,990	11,880	12,100	11,624	11,197	10,840	12,780	12,060
Powertrain	Transmission	-	HDT	HDT	HDT	HDT	HDT_LU	HDT	HDT	HDT_LU	HDT
	Engine Power	kW	156	172	156	162	195	168	170	143	160
Front	Bucket Capacity (BOT)	m ³	3.3	3.3	3.0	3.0	3.1	3.1	3.0	3.1	3.0
	Breakout Force	kN	169	170	167.0	167.0	151.0	152.0	146.8	170.0	156.4
	Boom Up speed	sec	6.4	5.9	6.3	6.1	5.3	6.1	5.4	5.9	6.2
	Hinge Height	mm	4,170	4,170	3,980	4,000	3,995	4,188	4,020	4,095	4,105

Project Target_DL420-7M

Category	Requirement	Development Target	Action Plan
Regulation	<ul style="list-style-type: none"> • Tier 3 	<ul style="list-style-type: none"> • Tier 3 	<ul style="list-style-type: none"> • Install SCANIA DC13 engine
Performance	<ul style="list-style-type: none"> • Improve travel performance • Apply SDK platform • Request bid spec 	<ul style="list-style-type: none"> • Acceleration performance superior to DL420 • Apply SDK platform • Add various options and bid specs 	<ul style="list-style-type: none"> • Increase E/G power (209kW → 257kW) & apply 5th Lock-up Option • Spark Arrestor, wet-type cleaner, EG shutdown
Fuel	<ul style="list-style-type: none"> • improve by 20% compared to DLA 	<ul style="list-style-type: none"> • improve by 23.6% compared to DLA* • Increase Productivity (m³/h) 	<ul style="list-style-type: none"> • SAT / DC13 EG / Main, Separate steering system/ High pressure of front/ electronic fan of variable pitch • Apply MH bucket Option : 4.7/5.0 m³ Improve rear axle option : 3095 → 3105
Quality	<ul style="list-style-type: none"> • Durability equivalent to that of SDK420 	<ul style="list-style-type: none"> • Equivalent level to SDK420 	<ul style="list-style-type: none"> • Apply SDK Frame & Tank C/O of key parts(SDK that have already been validated)
Comfort	<ul style="list-style-type: none"> • Improve cabin visibility • Improve convenience for maintenance • Request information (fuel economy, maintenance, etc.) 	<ul style="list-style-type: none"> • Improve visibility of right and left bottom front • Apply reverse fan system/ SDK platform • Add TMS feature 	<ul style="list-style-type: none"> • Increase glass area on right and left front • Apply Auto Reverse Fan Opt./ SDK platform • Add TMS feature (provide information of fuel economy and parts replacement schedule)
Design	<ul style="list-style-type: none"> • Competitive exterior design • Upgraded cabin interior 	<ul style="list-style-type: none"> • Apply a new competitive design • Upgrade interior to competitors' level 	<ul style="list-style-type: none"> • Change exterior design • Apply economic type new cabin

DL420-7M Performance Curve Comparison

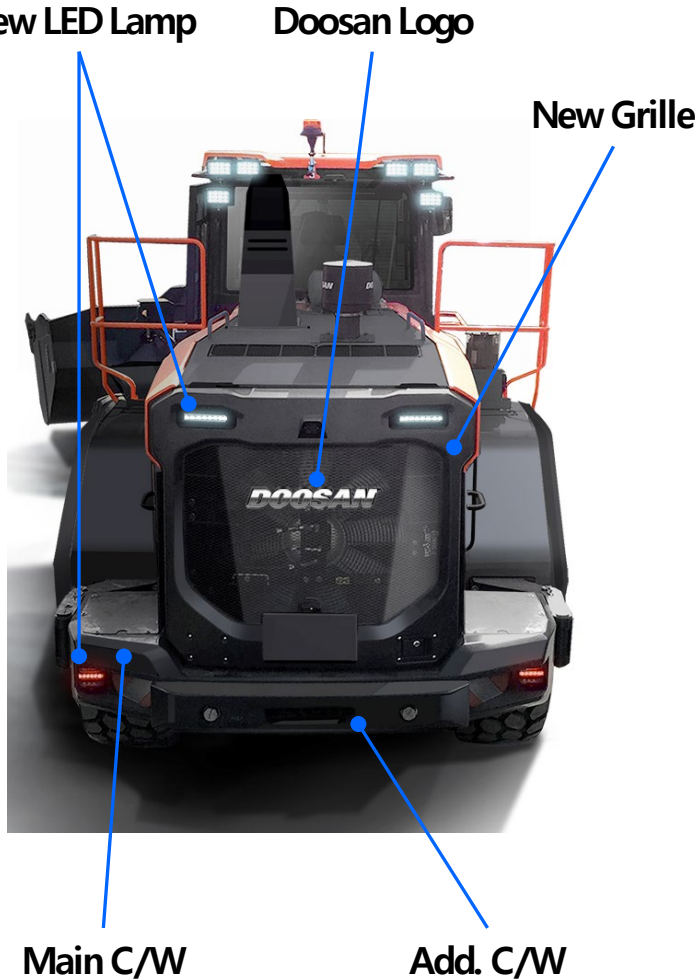
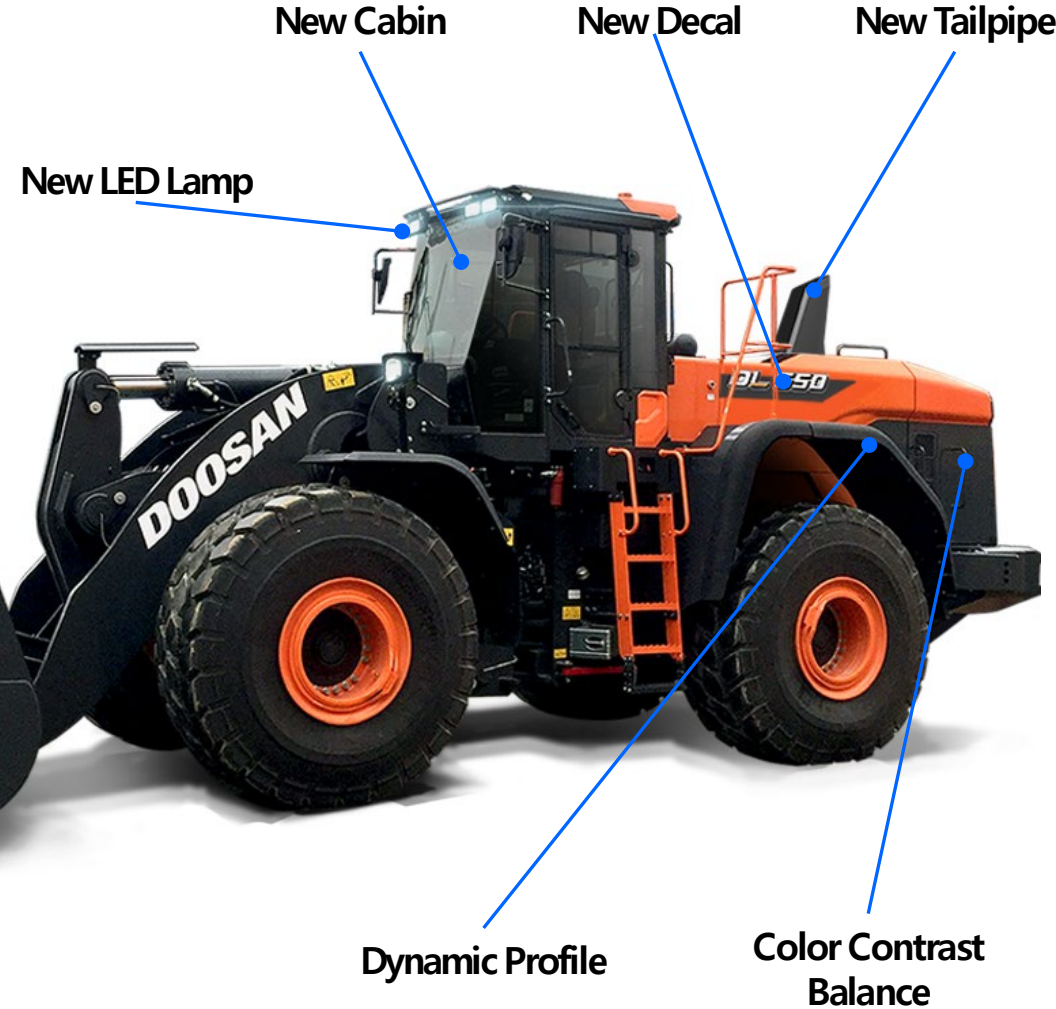


ITEMS			Doosan				CAT	VOLVO	KOMATSU
			DL420A-7M	DL420-7M	DL420A	DL420	966L	L150H	WA470-6
Weight	Operating Weight (EVW)	kg	22,181	22,742	21,915	22,300	23,220	24,090	22,880
	Tipping Load_Full Turn	kg	15,172	15,837	15,135	15,780	15,822	15,970	15,795
Powertrain	Transmission	-	HDT	HDT	HDT	HDT	HDT	HDT	HDT
	Engine Power	kW	218	257	210	209	227	220	204
Front	Bucket Capacity (BOT)	m ³	3.9	3.9	3.9	4.0	4.2	4.0	3.9
	Breakout Force	kN	198	197	197	208	183	202	207
	Boom Up speed	sec	6.0	6.3	6.0	5.8	6.1	5.9	5.4
	Max. speed	sec	40.0	40.0	40.0	38.0	39.5	38.0	36.2

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Styling - Exterior



Styling – Exterior

Before(Mass production)

After(DL(A)-7M Model)

Rear view



Side view



Styling - New Cabin



Styling - New Cabin_ Product improvement items(1/2)

Items	System	Content	DL200A-7M	DL250A-7M	DL320(A)-7M	DL420-7M
SDK Base New Cabin	Cabin C&l(Interior)	Upgrade cabin interior, Apply TMS(Opt.) & various Storage switch position integration /Improved driver convenience by developing RH Stand	○	○	○	○
	Cabin C&l(Exterior)	Increase ROPS tolerance , Improve cabin visibility & HVAC serviceability	○	○	○	○
	Cabin HYD	Improve Brake Pedal operability , Add Joystick Thumbwheel (3SP opt.)	○	○	○	○
	Cabin E&E	Add VCU/ Improve operator operability convenience by changing Gauge Panel/Keypad	○	○	○	○
	Cabin PTI	Improve HVAC system	○	○	○	○
SDK Exterior New Design	Exterior Full Change	Side Door/Top Cover/Guard/Grill/Fender	○	○	○	○
SDK Frame	Frame Ass'y	Apply SDK Front/Rear Frame (increased durability)	○	○	○	○
SDK Front Linkage	Front Ass'y	Apply SDK Front Linkage (increased durability)	○	○	○	○
Improve maintenance	Radiator	Apply SDK Rad. (Stacked structure- easy to clean, increased durability)	○	○	○	○
	TM gauge	Dip stick → Level gauge	○	○	○	○
	Reverse fan	Reverse fan	○	○	○	○
Improve convenience	Arm Kick Out	Proximity sensor → Angle Sensor(Kick out height adjustment from driver's seat)	○	○	○	○
Improve quality	Main Harness ㉔	Apply waterproof connector/Improve assembly, Increase battery cable	○	○	○	○
	Fuel Filter	Change E/G main fuel filter/Apply water separator	○	○	○	○
	Surge Tank	Add surge tank for engine protection	○	○	○	○
Improve productivity	Bucket	Increase GP bucket capacity compared to old model	X	X	○	X
	Axle	Apply HD axle (OPT)	X	X	○	○
	TM Thermostat	TM Thermostat(OPT) – Improve winter drivetrain efficiency	○	○	○	○
Improve fuel consumption	Hyd. system	Apply electronic fan of variable pitch (OPT)	○	○	○	○
		Apply Main LS system	X	X	X	○

Styling - New Cabin_ Product improvement items(2/2)

Before(Mass production)

After(DL(A)-7M Model)

Overview



Gauge panel



Keypad



- Upgrade
 - Improved driver satisfaction through interior luxury
- Convenience of operation
 - Improved operation convenience through Gauge panel, keypad & thumbwheel joystick application
- Safety
 - Increased driving stability by securing the lower right & left view

Joystick



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Main Components

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

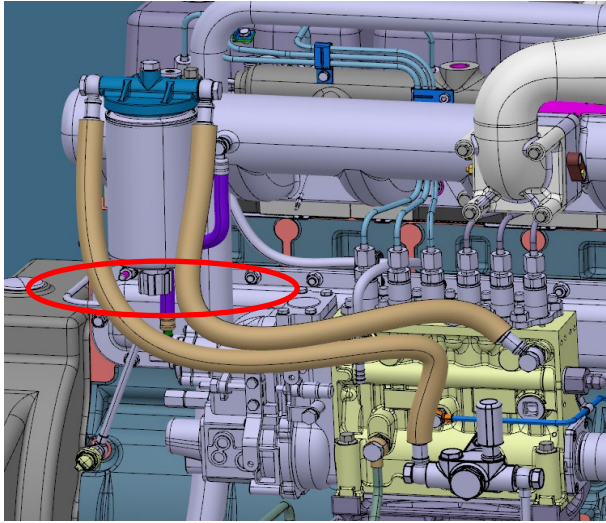
Group	Main Components	DL320-7M	DL320A-7M	DL420-7M	
Powertrain	Engine	Doosan DL08	Doosan DE08TIS	Scania DC13	
	Transmission	ZF 4/5WG 210	ZF 4WG 210	ZF 4/5WG 260	
	Axle (F/R)	MT 3095 II / 3085 II	MT 3095 II / 3085 II	ZF 3105 II / 3095 II	
	Axle (HD option, F/R)	MT 3095 II / 3095 II	MT 3095 II / 3095 II	ZF 3105 II / 3105 II	
	Axle Oil Cooler	X	X	O	
Hydraulic	Main Pump	Flutek K3VL80	Parker T67CCAY	Flutek K3VL140	
	Steer Pump	Flutek K3VL80	Parker T67CCAY	Flutek K3VL100	
	Fan(Brake, Pilot) Pump	BR A10VO28	Parker T67CCAY	BR A10VO28	
	MCV	Husco SCX300	Kayaba KVML-270	Parker M420LS	
	Steering Unit	Sinjin AL01483	Sinjin AL01483	Sinjin JH6032	
	Fan Motor	Casappa PHM20.31	Haldex WM09A1	Casappa KM30.34	
	Pilot Control	Load Sensing	Open	Load Sensing	
	Brake Pedal Valve	Dukin	Dukin	Dukin	
	LIS Valve	HF51023	HF51023	HF 44850	
	Accumulator	Hydac SK280-4	Hydac SK280-4	Hydac SK280-6	

Main Components-Powertrain(Fuel filter)

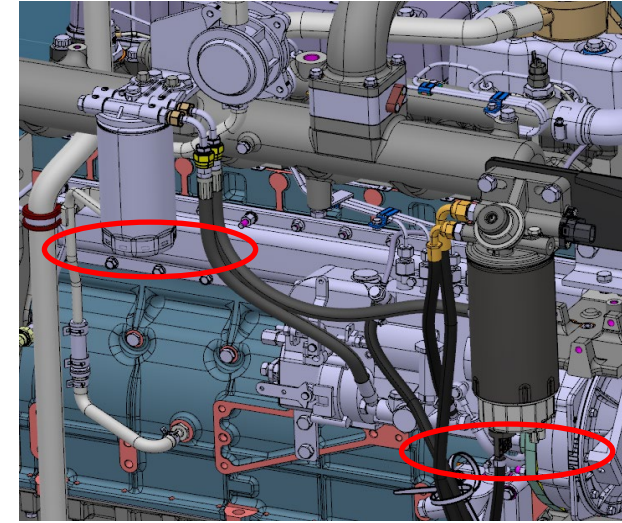
DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Before(Mass production)

Design



After(DL(A)-7M Model)



Description

- Fuel is filtered with one filter with water separation function and filter function.

- Improved engine durability by changing the fuel filter to a high-efficiency filter and adding a water separator

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Main Components-Powertrain(Axle Option)

◆ DHL option : Not Available

Component	Option	DL320-7M	DL320(A)-7M	DL420-7M	
Axle	Housing	STD axle HD axle (Only for Rear)	←	←	
	Differential (Front / Rear)	LSD / LSD	←	←	
	Gear ratio	23.333	←	←	
	Brake disc	Sinter	←	←	

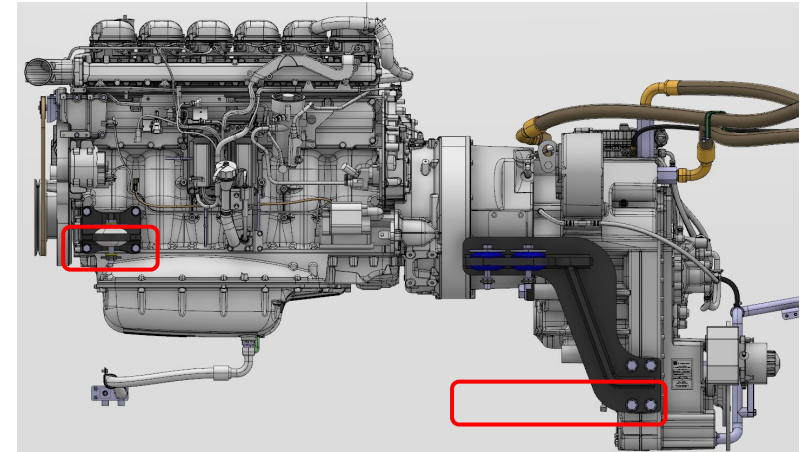
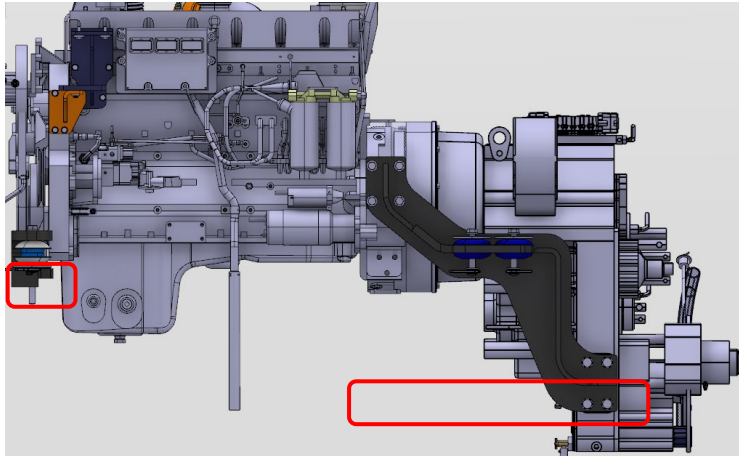
Main Components-Powertrain(T/M Bracket)

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Before(Mass production)

After(DL(A)-7 Model)

Design



Description

- Fixed to T/M Bracket on F/W housing

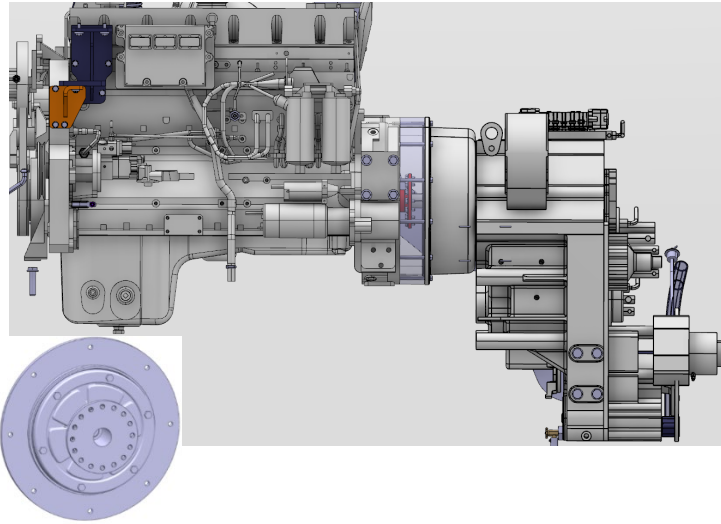
- T/M Bracket fixed at T/M only
 - Bracket shape optimization , Reduced weld strain
 - Eliminates the risk of applying FWH stress due to misalignment during assembly
- Front/Rear sandwich type rubber mounting structure applied
 - As engine vibration is not transmitted to the frame, there is no need to separate the plate nut from the frame during assembly.

Main Components-Powertrain(Damper)

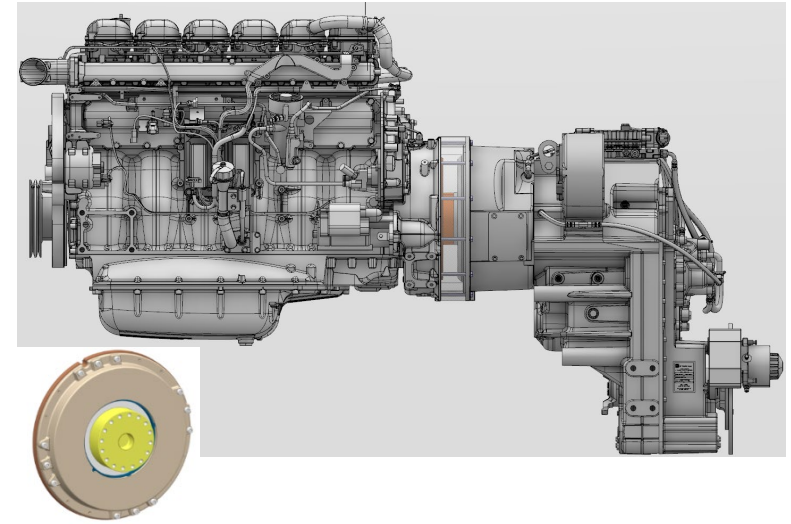
DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Before(Mass production)

Design



After(DL(A)-7M Model)



Description

- Apply the same damper as SDK (S5)
- Increased damper specifications, maximum allowable torque: 2166 → 4,500Nm
Increase Safety margin

Main Components-Powertrain(Shaft)

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Before(Mass production)

After(DL(A)-7M Model)

Design

1차 개선	현상	개선 방안	개선 전	개선 후																
축력 발생	<table border="1"> <tr> <td>실차 샤프트 축력 비교 시험</td> <td>확인</td> <td>중도</td> <td>종주</td> </tr> <tr> <td></td> <td></td> <td>Ver(회)</td> <td>Ver(회)</td> </tr> <tr> <td>C/Shaft축 입장력 (N)</td> <td>3000</td> <td>4000</td> <td>11000</td> </tr> <tr> <td>크릭부위 용력(Ch#6, Mpa)</td> <td>1100</td> <td>106</td> <td>143</td> </tr> </table>	실차 샤프트 축력 비교 시험	확인	중도	종주			Ver(회)	Ver(회)	C/Shaft축 입장력 (N)	3000	4000	11000	크릭부위 용력(Ch#6, Mpa)	1100	106	143	[실계] 양방향 에어브리더 (Open type)		
실차 샤프트 축력 비교 시험	확인	중도	종주																	
		Ver(회)	Ver(회)																	
C/Shaft축 입장력 (N)	3000	4000	11000																	
크릭부위 용력(Ch#6, Mpa)	1100	106	143																	
앞스플라인 돌림		[실계] 앞스플라인 경도 증대	HB201~269	HB240~269																
샤프트 기어면 손상(용질) 현상	[DFSS 산출물] 유호 스플라인과 샤프트 스플라인 상대 길이 이에 따른 샤프트 저점 	[실계] 스플라인 돌림량 증대 압축강 유호 스플라인 5mm 확보																		
샤프트 기어부 배부름 현상		[제조용질] Deburring 작업																		
샤프트 기어부 배부름 현상		[제조용질] No-Go Gauge 추가																		
스플라인 윤활 부족 발생		[제조용질] 샤프트 스플라인부 그리스 도포																		



Description

- Center shaft noise and T/M output flange bolt damage

- Add brown coating to all C/Shaft models
- More than equal to or greater than the blue coating applied by previous shaft company (Manufacturer, properties are mostly similar, but brown coating is superior in abrasion resistance)
- OP manual update : C/Shaft feed cycle 250hr content added

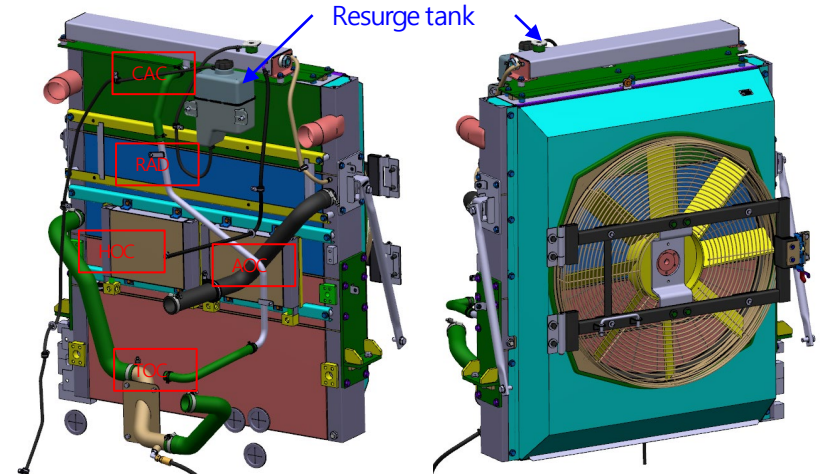
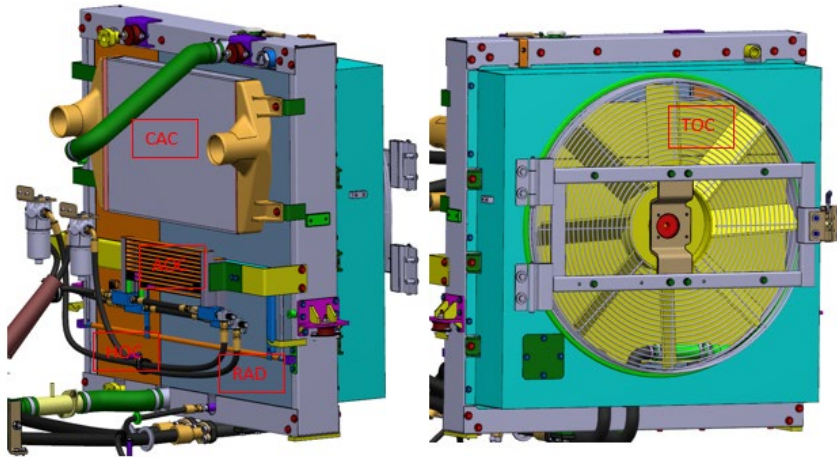
Main Components-Powertrain(Radiator)

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Before(Mass production)

After(DL(A)-7M Model)

Design



Description

- Change Module Core Layout: Clogging Cleaning layer
=> good for core
- Apply Reserve tank + Resurge Tank
=> engine protection

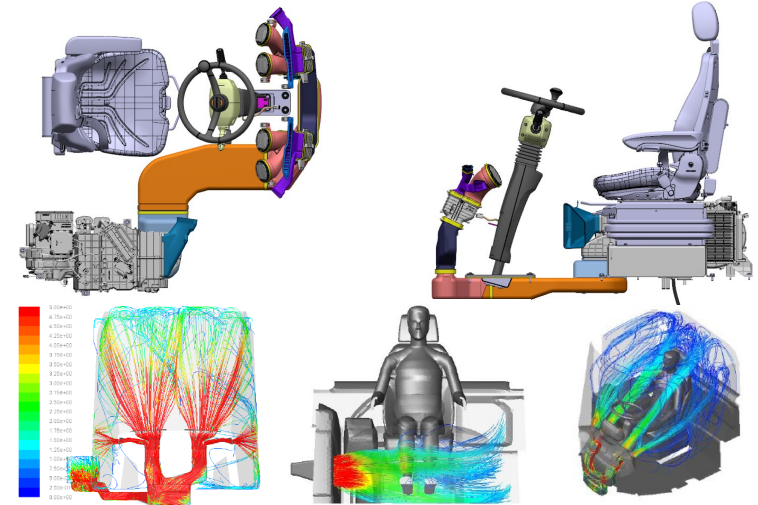
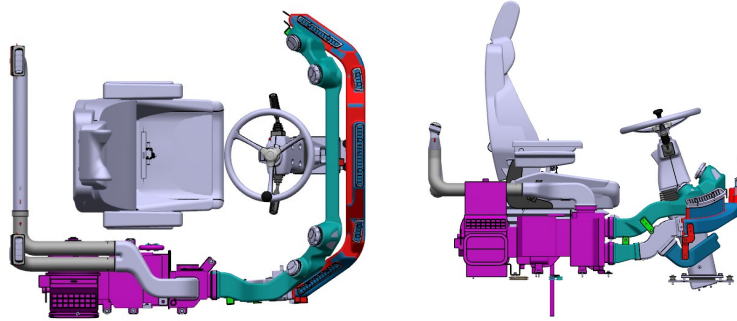
Main Components-Powertrain(HVAC)

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Before(Mass production)

After(DL(A)-7M Model)

Design



Description

- Front nozzle are bigger than DL for relieving heat from front windshield.
- Optimizing duct and nozzle targeting. → Subject feeling is better than DL.
- Increased total air flow.
- Increased AC front air flow.
- Increased heat rejection of heater core with air flow.

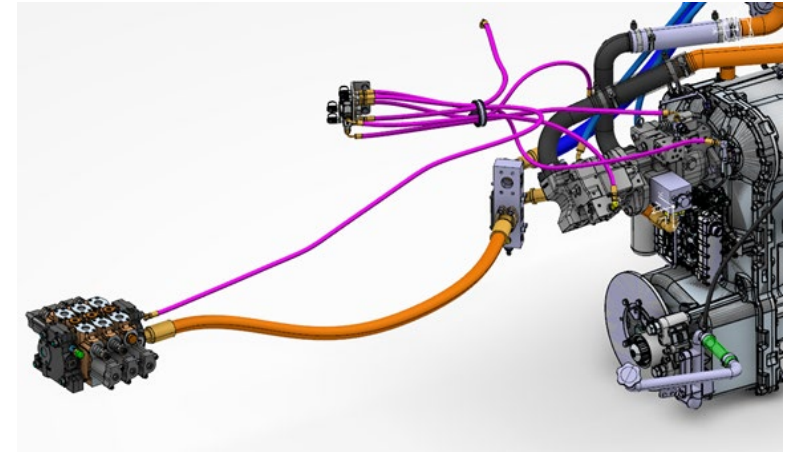
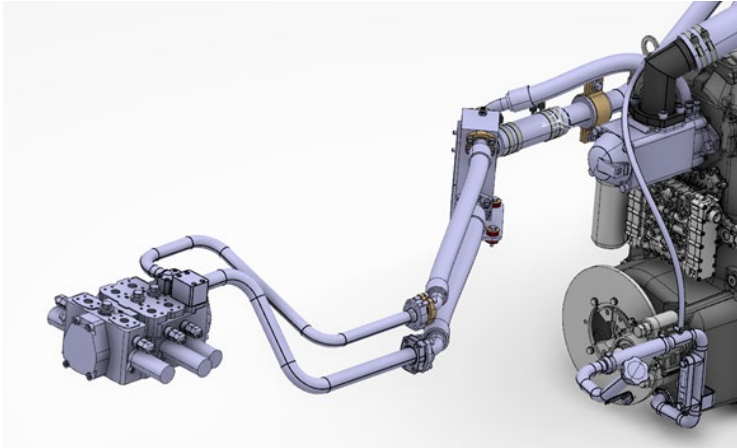
Main Components-LS System(Only for T3 Models)

DL320A-7M	DL320-7M	DL420-7M
	✓	✓

Before(Mass production)

After(DL-7M Model)

Design



Description

- The hydraulic system is changed from Open center to Load sensing.
 - Main/Steer Pump type changed (Gear Pump -> LS Piston pump)
 - Power control was added to the pump to reduce the hydraulic load.
 - Main control valve type changed (Open center -> LS)

Main Components-Fan System

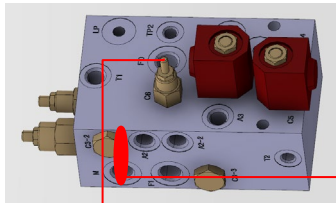
DL320A-7M	DL320-7M	DL420-7M
	✓	✓

Before(Mass production)

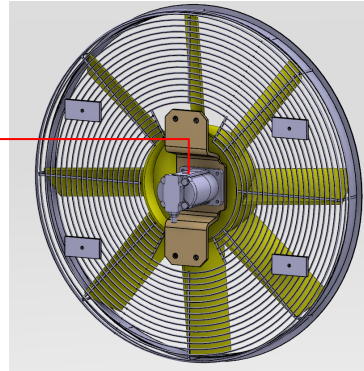
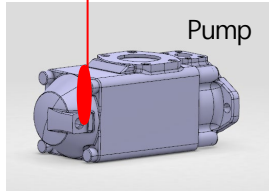
After(DL-7M Model)

Design

Brake&Fan&Pilot supply valve

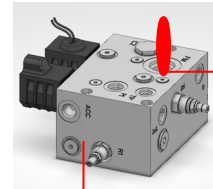


Pump

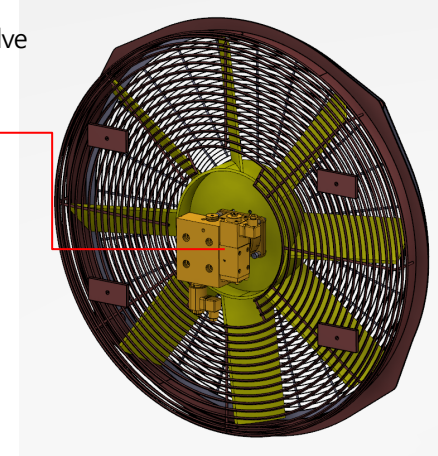
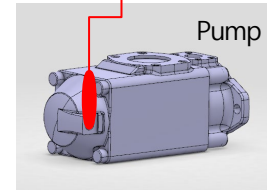


One-directional Fan motor

Brake&Fan&Pilot supply valve



Pump



Bi-directional & EPPR
Fan motor

Description

- The Fan system was changed from fixed speed fan to electronic variable speed & directional changeable fan.
 - Fan reverse rotation function was added as option.

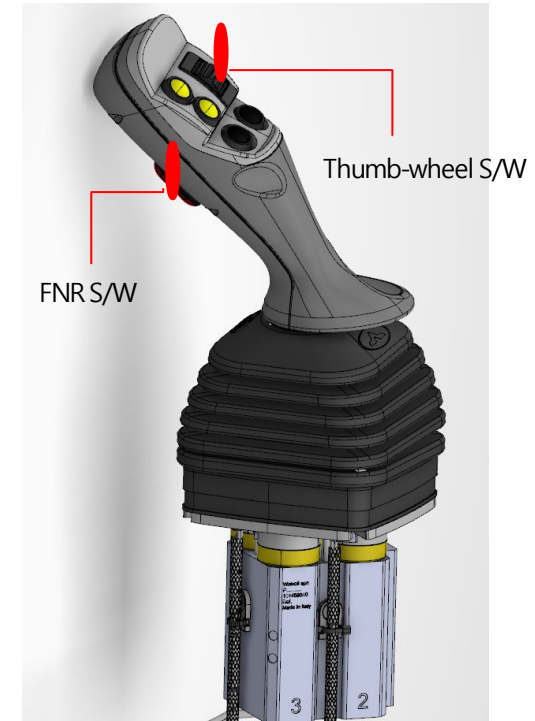
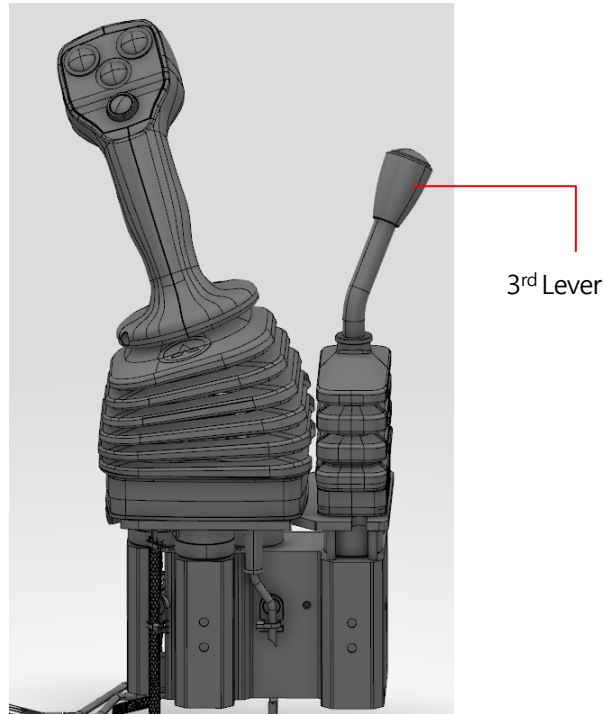
Main Components-Joystick Valve

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Before(Mass production)

After(DL(A)-7M Model)

Design



Description

- Walvoil joystick valve(thumb-wheel switch type) developed in the SDK-model was also applied to the SMK-model .
- MCV 3rd flow can be electrical proportional controlled by operating thumb-wheel switch of joystick.
- FNR function also added at new Joystick.

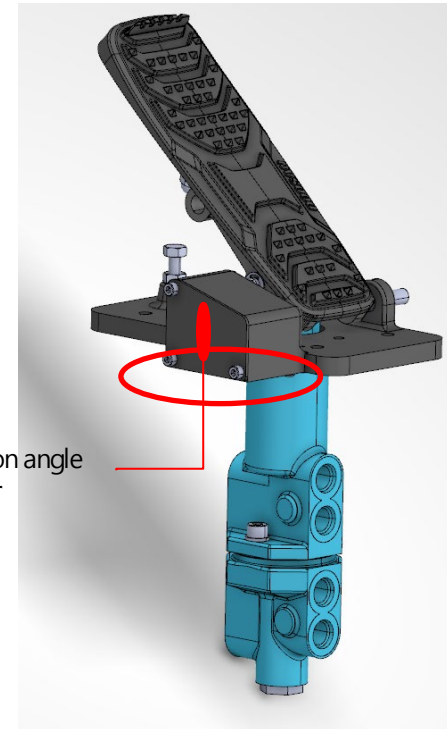
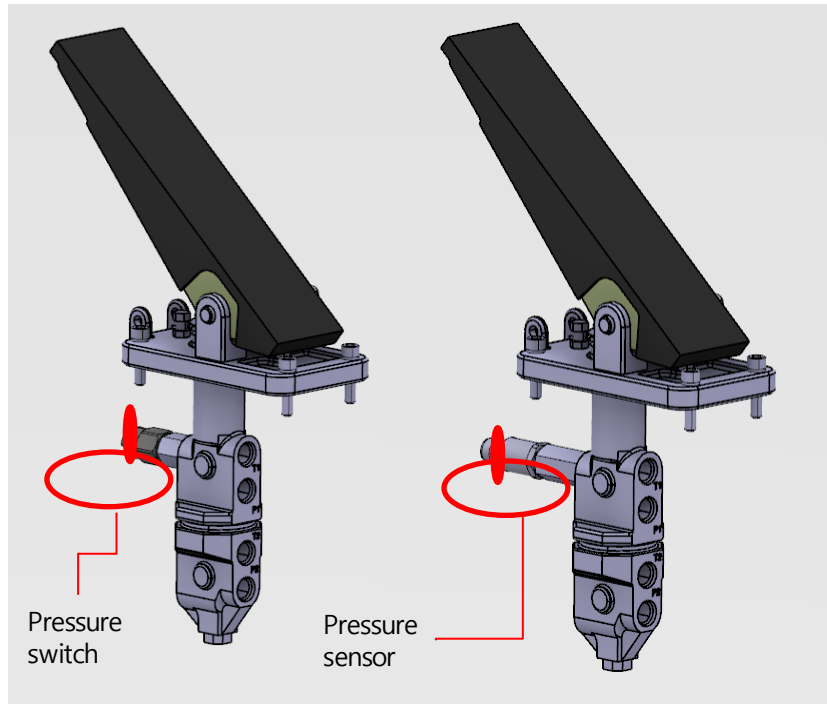
Main Components-Brake Pedal Valve

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Before(Mass production)

After(DL(A)-7M Model)

Design



Description

- Pressure can be affected by heat

- Dukin brake pedal valve developed in the SDK-model was also applied to the SMK-model .
- Brake pedal sensor is changed from pressure(or switch) to position(angle).
- CCO function is improved through low brake pedal effort and position sensor

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3. Sales Feature
 - ① Performance
 - ② Styling
 - ③ Main Component
 - ④ Maintainability
 - ⑤ Useful Function
4. Standard & Option List

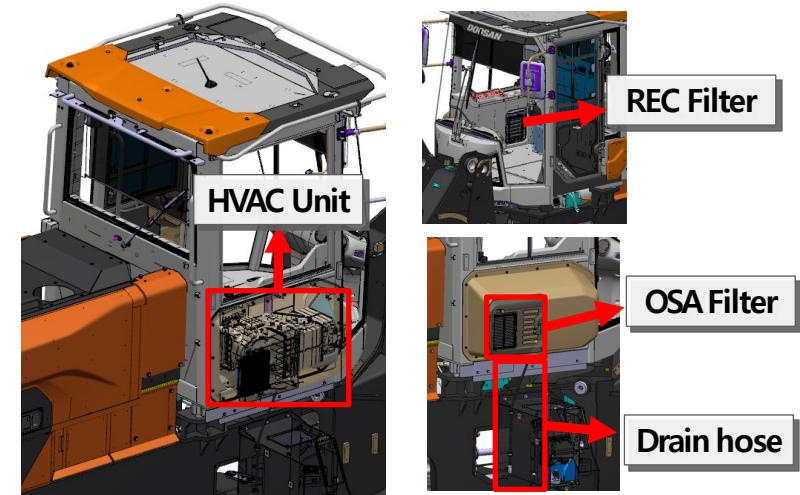
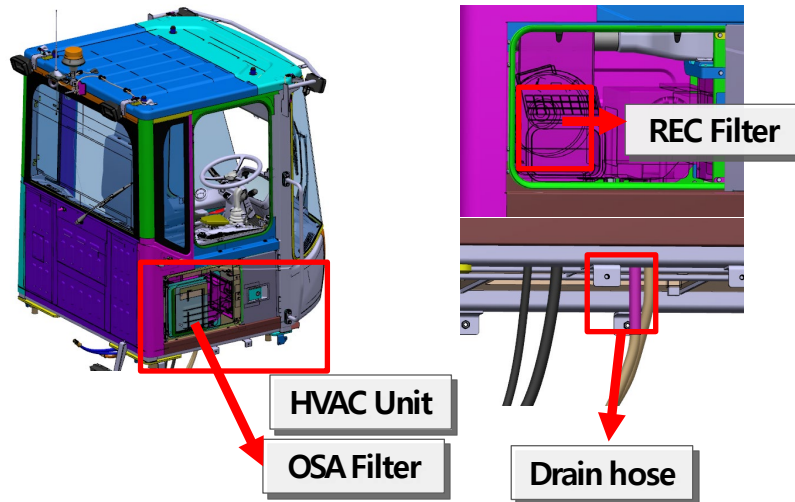
Maintainability_ HVAC System

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Before(Mass production)

After(DL(A)-7M Model)

Design



Description

- HVAC Unit: located on the right side of the cabin
- Filter(OSA/REC)
 - OSA filter: Located on the right side of the cabin cover
 - When repairing OSA filter, it is necessary to remove the plate and 4 grips.
 - When repairing REC filter, it is necessary to remove it from the HVAC unit after opening the cover.
- Drain hose: Drain hose located at the bottom of the cabin

- HVAC Unit
 - located on the right side of the cabin
 - Heater/Eva core: Serviceable from outside
- Filter(OSA/REC)
 - OSA filter: located on the right side of the cabin cover
 - REC filter: Located on the right side of the stand inside the cabin
- Drain hose : Constructed outside the drain hose and fixed to the Tool Box with clips

Maintainability_ T/M oil level gauge

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Before(Mass production)

After(DL(A)-7M Model)

Design



Description

- Using Dip Stick

- By applying a level gauge, it is possible to check the remaining amount of T/M oil quickly and easily

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DL320A-7M	DL320-7M	DL420-7M
		✓

Situation Awareness Technology (SAT) mode reduces unnecessary fuel consumption to keep optimal point during operation.

SAT

Situation Awareness Technology (SAT)

- It limits the engine's output depending on the working conditions not to consume fuel excessively.
- Even when the machine operated by an unskilled operator, the VCU controller regulates the engine output according to specific conditions for high fuel efficiency.
- When the SAT mode selected, the transmission automatically enters the auto 1~4 mode.
- When the SAT mode selected, green light displayed on the monitor as shown on the picture.
- The latest version of S/W 2.0.



Picture: Activate SAT mode

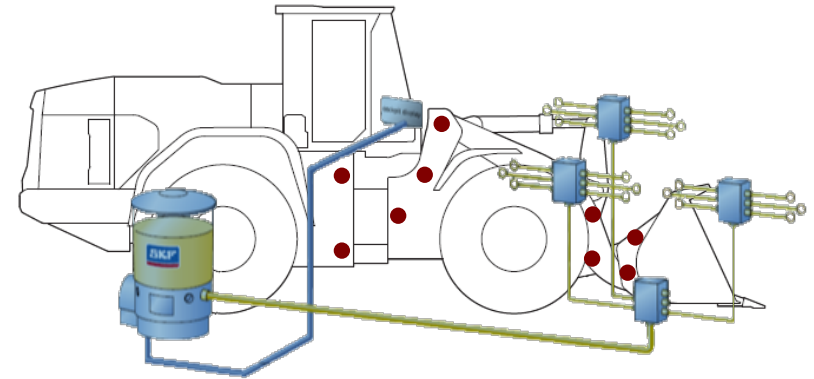
DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Useful Function _ AGS

SKF AGS system is available as an option. The device has been validated by the factory and is a factory option.

Automated Greasing System (Optional)

- SKF, Lincoln affiliated AGS system is available as an optional attachment for wheel loaders. This system provides lubrication to 23 locations and incorporates a 24V pump with a 6-liter grease reservoir and integrated timer that allows the operator to select the grease interval through the information display.
- Once each lubrication cycle is initiated, the pump dispenses grease under pressure through pre-set metering valves that apply the proper amount of grease to each lubrication point.



System Difference and advantages

- *Reduced repair cost from better lubrication*
- *Less chance of machine down time*
- *Precise lubrication of pins and bushings*
- *Time saving = higher productivity*
- *Free from safety concern when climbing on the machine*
- *Free from site / weather condition.*



Automatic Pump
Unit + Reservoir



Proportional
Feeder

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Useful Function_AGS

Automated Greasing System provides cost savings thanks to increased bearing life, increased uptime, less repair and higher resale value.

Manual Lubrication Related Costs for a Midsize Loader

Annual costs to manually lubricate equipment

Labor

30 minutes per 8 hr. shift X \$ 30 / Hour (50wks/yr.) \$3,750

Lost Production

30 minutes per 8 hr. shift X \$90 / Hour (50wks/yr.) \$11,250

Manual Lubrication Cost \$15,000

Auto-Lube Savings

→ 95% Savings = \$14,250

Annual costs to repair failed components

Replacement Pins and Bushings

2 Pins X \$450.00 Each \$ 900

Repair Labor

One Person X \$65.00 X 2 Repairs X 6 Hours Each \$ 780

Lost Production

2 Repairs X 6 Hours Each. X \$90.00/Hour \$1,080

Repair Cost \$ 2,760

→ 50% Savings = \$ 1,380

Total Annual Manual Lubrication Related Cost → **\$ 17,760**

\$15,630

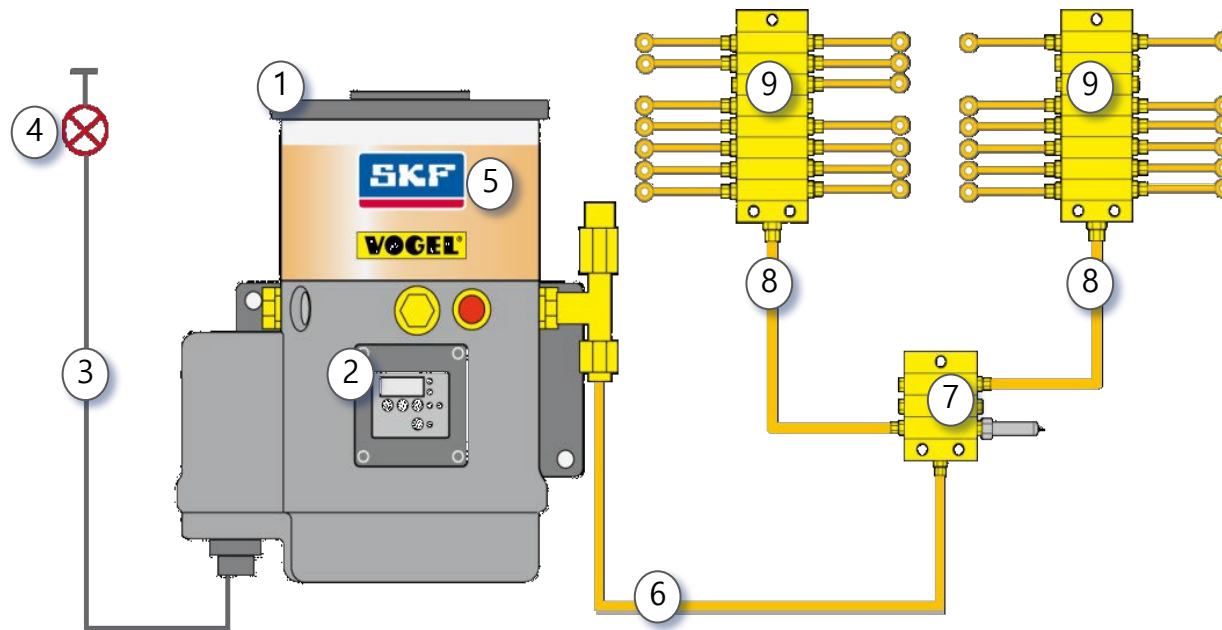
Total Annual Savings

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Useful Function_AGS

Automated Greasing System provides a continuous supply of lubricant at certain intervals, and when the machinery is in operation and all the bearings are moving.

Automated Greasing System – Schematics



1. Automatic Pump Unit + Reservoir
2. Display & Control Unit
3. Power connection
4. Fault and running control lamp (In-Cabin)
5. Pump element with pressure relief valve Main line
6. Main distributor with monitoring sensor
7. Master Feeder
8. Secondary Feeder
9. Lube points

1. Automatic Pump Unit has 6liter, A rocker type low level sensor is normally pressured by grease weight which results in agitator activation agitator driven by the gear motor, if grease level is low , rocker turns back and error signal is generated.
2. Display Unit shows green light when normal, red light when grease is low or with other faults.
3. The progressive feeders divide up the lubricant delivered by the piston pump in exactly the design ratio. So every connected bearing receives exactly the amount of lubricant it needs

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Useful Function_TMS

Doosan Transport Monitoring System (TMS) provides an expert level consulting to dealers and fleet management tool for the customers.

Transport Monitoring System (TMS)

- Very useful to manage fleet machines and to promote preventive maintenance that offers a Web-based fleet and asset management solution, enabled by hardware installed on the machine. It will be able to support multiple users in different locations.
- TMS can help dealers business in the following ways and more.
 - To build and strengthen relations with customers through increased contact utilizing machine hour information.
 - To be able to expertly consult with customers in terms of machine utilization rate, fuel consumption which will promote trust.
 - To provide on time servicing to the machine which will help customer stay up time.
 - To efficiently manage parts stock plan.
 - To efficiently manage service staff scheduling and travel logistics.
 - To help get higher parts sales due to on-time servicing and higher capture rate.
 - Asset management in case of dealer rental, dealer financed program
- TMS can help customers, especially fleet owners in the following ways and more.
 - To monitor machine utilization rate, to understand if machine mix is right.
 - To identify where the nearest replacement machine is available for a down machine.
 - To understand and guide the operator to operate the machine with higher efficiency.
 - Anti-theft and theft recovery

Note

- TMS offers updated data transmission approximately every one hour.
- TMS applied as **option** for all -7 series.

Useful Function_TMS

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Doosan Transport Monitoring System (TMS) provides an expert level consulting to dealers and fleet management tool for the customers.

Transport Monitoring System (TMS) - Continued

The screenshot displays the Doosan TMS web interface. At the top, there is a navigation menu with options: Fleet, Utilization Report, Filter / Oil Management, Event Report, e-Ticket, User Setting, Admin, and Logout. The main area features a Google Map of North America. A popup window is open over a location in the central US, displaying the following information:

- Equipment Id : DL-10032
- Latitude : 49.915929
- Longitude : -99.81629
- Location : 10.60mi ENE of Brandon, MB

Below the map is a search and filter section with tabs for 'Equipment' and 'Favorite'. It includes input fields for 'Owner', 'Model' (with a dropdown), and 'Equipment ID', along with 'Search' and 'Clear' buttons. Action buttons for 'Save to Favorites', 'Print Report', and 'Export to Excel' are also present.

Fav.	Organization	Dealer Name	Owner	Make	Model	Equipment ID	Oper.(Hr)	Fuel Consumption (L)	Fuel Efficiency (L/Hr)	Filter/Oil	Fault	Warning
<input type="checkbox"/>	AGCON Equipment	AGCON Equipment	AGCON Equipment	Doosan	DL220-3	DL-10009	44.38	444.00	8.89	(0)	(0)	(1)
<input type="checkbox"/>	AGCON Equipment	AGCON Equipment	AGCON Equipment	Doosan	DL220-3	DL-10013	21.79	197.50	7.23	(0)	(0)	(5)

Picture : TMS Web display

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Useful Function_TMS

Doosan Transport Monitoring System (TMS) provides an expert level consulting to dealers and fleet management tool for the customers.

Transport Monitoring System (TMS) - Continued

The screenshot displays the 'Filter / Oil Management' section of the Doosan TMS web interface. At the top, there is a navigation menu with options: Fleet, Utilization Report, Filter / Oil Management (selected), Event Report, e-Ticket, User Setting, Admin, and Logout. Below the menu, search filters are set for Equipment Type (Select Type), Equipment ID (DC11-SWDX), and a search button. The main content area shows a table with one record for equipment DC11-SWDX, with 6.72 operating hours. Below this, a summary bar shows: Manufacturer: Doosan, Equipment Type: DX, Equipment Number: DC11-SWDX, Model: DX, Oper. Time (Hr): 6.72. The bottom section is a detailed table for Filter/Oil usage:

Division	Interval	Hour used	Hour remained
Fuel Filter	0.00	605.73	-605.73
Air Cleaner	2000.00	605.73	1394.27
Engine Oil Filter	250.00	605.73	-355.73
Return Filter	1000.00	605.73	394.27


Picture : TMS Web display – Filter / Oil Management

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Useful Function_TMS

Doosan Transport Monitoring System (TMS) provides an expert level consulting to dealers and fleet management tool for the customers.

Transport Monitoring System (TMS) - Continued



[Fleet](#) || [Utilization Report](#) || [Filter / Oil Management](#) || [Event Report](#) || [e-Ticket](#) || [User Setting](#) || [Admin](#) || [Logout](#)

Monthly Utilization Report

Year: Category: Model:

Equipment ID: Owner: Serial No:

Org.	Dealer Name	Owner	Make	Model	Equip. Number	Serial No.	Category	Whole Period				January				February				Ma		
								Graph	Operation Time (Hr)	Work Hrs.	Util. (%)	Fuel Efficiency	Operation Time (Hr)	Work Hrs.	Util. (%)	Fuel Efficiency	Operation Time (Hr)	Work Hrs.	Util. (%)	Fuel Efficiency	Operation Time (Hr)	Work Hrs.
Grand Total									4558.50	1955.64	42.90%	0.81	3542.37	1955.64	55.21%	5.69	1016.13	0.00	0.00%	3.98	0.00	0.00
AGCON Equipment	AGCON Equipment	AGCON Equipment	Doosan	DX350LC-3	DX-10071	10071	Excavator		0.00	0.00	0.00%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00
Apprentice & Skill Improvement Program	Apprentice & Skill Improvement Program	Apprentice & Skill Improvement Program	Doosan	DX350LC-3	DX-10084	10084	Excavator		139.21	74.31	53.38%	1.65	139.21	74.31	53.38%	19.81	0.00	0.00	0.00%	0.00	0.00	0.00
Barry Equipment	Barry Equipment	Barry Equipment	Doosan	DX350LC-3	DX-10086	10086	Excavator		86.03	13.40	15.58%	3.62	25.22	13.40	53.13%	17.57	60.81	0.00	0.00%	25.83	0.00	0.00
Barry Equipment	Barry Equipment	Barry Equipment	Doosan	DX350LC-3	DX-10152	10152	Excavator		70.80	35.50	50.14%	3.27	49.76	35.50	71.34%	20.32	21.04	0.00	0.00%	18.87	0.00	0.00
Bestline - Rental	Bestline - Rental	Bestline - Rental	Doosan	DX350LC-3	DX-10065	10065	Excavator		0.00	0.00	0.00%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00
Bobcat Enterprises	Bobcat Enterprises	Bobcat Enterprises	Doosan	DX350LC-3	DX-10027	10027	Excavator		2.32	0.00	0.00%	0.66	0.00	0.00	0.00%	0.00	2.32	0.00	0.00%	7.97	0.00	0.00
Bobcat of Grand Forks	Bobcat of Grand Forks	Bobcat of Grand Forks	Doosan	DX350LC-3	DX-10127	10127	Excavator		0.00	0.00	0.00%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00	0.00%	0.00	0.00	0.00
Bobcat of	Bobcat of	Bobcat of	Doosan	DX350LC	DX-10096	10096	Excavator		64.35	14.88	23.12%	3.30	14.98	14.88	99.33%	27.64	49.37	0.00	0.00%	11.96	0.00	0.00

Picture: TMS Web display – Utilization Report

DL320A-7M	DL320-7M	DL420-7M
✓	✓	✓

Useful Function_Reverse Fan

Automatic Reverse Fan provides airflow in reverse direction to expel debris build up in the radiator cores.

Automatic Reverse Fan

- Fan rotate in CCW direction from rear normally. Reverse fan rotation function is provided as standard which helps in operating in dusty area by expelling debris build up in the cooler cores.
- Default setting is 120 minutes between purge with 60 seconds of reversed mode activation. This setting is adjustable in the step of 30 minutes from 30 minutes to 120 minutes.
- There are 3 ways of fan operation mode selection
 - Light on Right side : As set by operator in Graphical Display
 - No Light : Off – Fan only rotates in CCW direction
 - Light on Left side : Manual operation for 1 minutes.

Table of Contents

1. Walk Around
2. Line Up
3. Sales Feature
4. Standard & Option List

Standard & Option List (1/3)

Option			STD.	BASE	OPT.	X			Remark
Group	Name	Description	DL320A-7M		DL320-7M		DL420-7M		
			EX	RU	EX	BR	EX	BR	
Engine	Emission	Tier 2	S	S					
		Tier 3			S	S	S	S	
	Air-Cleaner	Standard Air Cleaner	B	B	B	B	B	B	
		Ultra Web Air Cleaner	O	O	O	O	O	O	
	Pre-Cleaner	Pre-Cleaner_Dry type	B	B	B	B	B	B	
		Pre-Cleaner_Oil-Bath	O	O	O	O	O	O	PPI - VOC
	Spark Arrestor	Spark Arrestor	O	O	O	O	O	O	PPI - VOC
	Heavy water Separator	Water Separator with Heater	O	B	O	O	O	O	
		Water Separator for Bio Diesel	O	O	O	O	O	O	
		Water Separator without Heater	B	O	B	B	B	B	
Fuel Filler Pump	Fuel Filler Pump	B	B	O	O	O	O		
Muffler	Double Muffler	S	S	B		O	S		
	Double Muffler Without Hole			O	S	B		brazilian regulation (Option)	
Drive Train	Transmission	4 Gear without Lock-up	S	S	B	B	B	B	
		5 Gear with Lock-up			O	O	O	O	PPI - VOC
		Cold: Termostat	O	B	O	O	O	O	cold region (RU)
	Axle Type	Temperate: Non Thermostat	B	O	B	B	B	B	
		LSD	B	B	B	B	B	B	
	Axle	OPEN							
		Heavy Duty	O	O	O	O	O	O	
Axle oil cooler	Standard	B	B	B	B	B	B		
Axle oil cooler	Axle oil cooler					O	O	PPI - VOC	
Tire	STD	TRI(L3)	TRI(L3)	TRI(L3)	TRI(L3)	TRI(L3)	TRI(L3)		
Hyd.	Control Valve	2 Spool MCV	B	B	B	B	B	B	
		3 Spool MCV	O	O	O	O	O	O	
	Lever Type	FNR-2SP	O	O	O	O	O	O	
		FNR-3SP	O	O	O	O	O	O	
		Mono Lever	B	B	B	B	B	B	
	Hydraulic Fan Motor	Non Bidirect. & Non Pro. Fan Drive	B						
		Bidirectional & Pro. Fan Drive	O	S	S	S	S	S	fan noise certification(RU)
LIS	Load Isolation System	O	O	O	O	O	O		
Emergency Steer	Emergency Steer	O	O	O	O	O	O		
Brake Pedal	Additional Brake Pedal	O	O	O	O	O	O		

Standard & Option List (2/3)

Option			DL320A-7M		DL320-7M		DL420-7M		Remark
Group	Name	Description	EX	RU	EX	BR	EX	BR	
Hyd.	Super-tropical specifications	Non Tropical Area Tropical Area							
	Hydraulic Oil	Cold Weather(VG32)	O	B	O	O	O	O	
		Normal(VG46) Tropical Weather(VG68)	O	O	B	O	B	O	
Structure	Fender	Fender with Rubber	O	O	O	O	O	O	
		Full Fender with Rubber	O	O	O	O	O	O	
		Fender	B	B	B	B	B	B	
	Mud Guard	Mud Guard							
	Noise kit	Noise Kit Non Noise Kit	B	S	B	B	B	B	fan noise certification(RU)
Add. C/W	Add. C/W	O	O	O	O	O	O	DL320(A)-7M: 200/300/400kg	
Wheel Chock	Wheel Chock	O	O	O	O	O	O	DL420(A)-7M: 300/400/500kg	
Front	Loader Arm	Standard Arm	B	B	B	B	B	B	
		High Lift Arm	O	O	O	O	O	O	
	Bucket	Non Bucket	O	O	O	O	O	O	
		GP_BOT	B	B	B	B	B	B	3.3/3.9m ³ GP; Mono Tooth
		GP_BOC Aggregate	O	O	O	O	O	O	3.2/ 3.5 / 3.7 (300) 4.2 /4.7 / 5.0 (400) m ³
Quick coupler	QC Piping only	O	O	O	O	O	O		
AGS	Auto grease System	O	O	O	O	O	O		
전장	USIM	2.0 Global(Cell only)	O	O	O	O	O	O	TMS
		2.0 Global(SAT+Cell)	O	O	O	O	O	O	TMS
	Rotating Beacon	Rotating Beacon	O	O	O	O	O	O	
	Camera	Rear Camera	O	O	O	O	O	O	
	Working Lamp (Front+Rear)	LED Lamp; Front only	O	O	O	O	O	O	
		LED Lamp; 4+4	O	O	O	O	O	O	
		Halogen Lamp; 2+2 Halogen Lamp; 4+2	B	B	B	B	B	B	
	Horn	Low Sound Pressure	O	O	O	O	O	O	
		High Sound Pressure	B	B	B	B	B	B	
License Lamp	License Lamp (Plate)	O	O	O	O	O	O		
Audio Equipment	Radio + MP3(STEREO)	O	O	O	O	O	O		

Standard & Option List (3/3)

Option			DL320A-7M		DL320-7M		DL420-7M		Remark
Group	Name	Description	EX	RU	EX	BR	EX	BR	
Cabin	Seat	Air Sus. with heat	O	O	O	O	O	O	
		Mech. Suspension Seat with heat							
		Mech. Suspension Seat	B	B	B	B	B	B	
	Cabin Hand rail	Cabin Top Hand rail	O	O	O	O	O	O	
	Heat Wire For Mirror	Heat Wire	O	B	O	O	O	O	
	Rear Sunvisor	Rear Sunvisor	O	O	O	O	O	O	
Etc.	Product Number	Dom. & Export Product Number	B	B	B	B	B	B	
	Tools	Tools	B	B	B	B	B	B	
	Spare Parts	Spare Parts	B	B	B	B	B	B	
	Engine Oil	Engine Oil	O	O	O	O	O	O	

End of Document