

USER MANUAL

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D.1 CRANE'S TECHNICAL DATA

Versions			1S	2S	3S	4S	5S
Max. net lifting moment		$t\ m$ kNm	8.4 82.1	8.1 79.2	7.6 74.8	7.4 72.4	7.0 69.0
Max. dynamic moment		$daNm$ kNm	10940 109				
Capacity at min. hydraulic outreach	hook [S2]	kg	2000	1935	1795	1705	1600
Max rated capacity	grab [S1]	kg	2000	1935	1795	1705	1600
	min. outreach	m	4.17	4.17	4.25	4.33	4.40
Capacity at max. hydraulic outreach	hook [S2]	kg	1400	1015	720	515	355
	grab [S1]	kg	1400	1015	720	515	355
	max.outreach	m	5.98	7.79	9.82	11.85	14.00
Capacity of 1st man. extension	capacity	kg	N/A	720	515	355	280
	max.outreach	m	N/A	9.82	11.85	14.00	16.18
Max. load height above the base for the last extension	hydraulic	m	8.0	9.8	11.9	13.9	16.1
	manual	m	N/A	13.9	16.1	18.2	18.2
Weight of crane without stabilizers		kg	1105	1195	1285	1370	1445
Weight of stabilizers	ST-M	kg	110				
	EX-M	kg	160				
	EX-H	kg	190				
	SE-H	kg	210				
Weight of 1st man ext.		kg	N/A	46	40	34	23
Max. working pressure		bar	315				
Max. oil flow rate		l/min	20				
		l/min	40				
Power needed		kW	13.7				
		kW	27.3				
Oil tank capacity		l	75				
Slewing angle		$^{\circ}$	425				
Gross slewing torque		$daNm$ kNm	1060 10.6				
Max boom inclination for use with CE winch	$^{\circ}$		75				
Max. base inclination		$^{\circ}$	4				
		$^{\circ}$	3				
Max. stabilizer force on the ground with stabilizers fully extended	ST	daN	7370				
	EX	daN	4670				
	SE	daN	3840				
Max. stabilizer pressure on the ground with stabilizers fully extended	ST	MPa	3.66				
	EX	MPa	2.32				
	SE	MPa	1.91				
Lifting conversion factor, k	kgm/bar		31.98				
Distribution factor of dyn. moment on base, β	-		0.7				
Position of standard dead point (see D.6)							

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D.2 WINCH SETTINGS

T11 - SINGLE LINE PULL

Versions	1S	2S	3S	4S	5S
 Max line pull <i>kg</i>	1000	1000	1000	1000	1000 (*)
Start angle - pull% Final angle - pull% 	-	-	-	-	75°-82% 65°-85%

N/A: configuration not available

(*): configuration requiring pull derating: available only for CE/TOP cranes (PCS)

Pull%: pull derating percentage



When the crane is equipped with winch, the max. working pressure and the limiter setting pressure are increased by 10 bar with respect to the standard ones.

D.3 TOTAL WEIGHTS

The table shows the total weights including oil inside the cylinders (fully retracted) and considering oil tank empty.

<i>kg</i>	Crane version				
Type of stabilizers	1S	2S	3S	4S	5S
ST-M	1215	1305	1395	1480	1555
EX-M	1265	1355	1445	1530	1605
EX-H	1295	1385	1475	1560	1635
SE-H	1315	1405	1495	1580	1655

Additional weight for T11 winch: 95 kg

Additional weight of 1st extra function activated with slides: 8 kg pro hydraulic extension

Additional weight of 2nd extra function activated with slides: 2 kg pro hydraulic extension

Additional weight of 1st extra function activated with hose reel: 20 kg

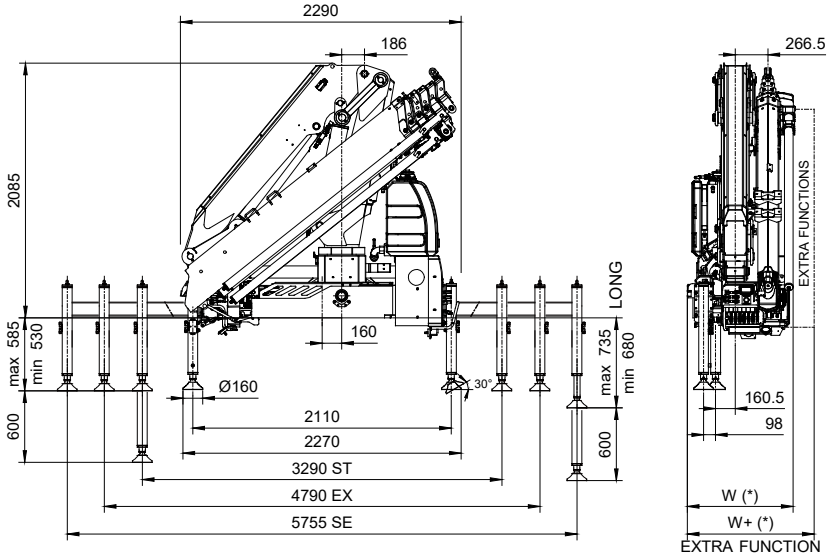
Additional weight of 2nd extra function activated with hose reel: 10 kg

The weights may vary by $\pm 3\%$

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D.4 OVERALL DIMENSIONS

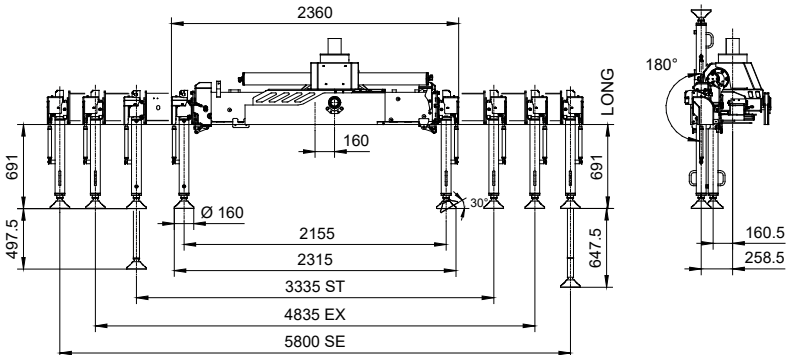
FIXED STABILIZERS LEGS



		1S	2S	3S	4S	5S
W (*) (mm)		840	840	840	840	885
	Compact	840	840	N/A	N/A	N/A
W+ (*) (mm)	Slides	885	885	885	885	N/A
	Hose reel	N/A	N/A	N/A	950	950

(*) The width has to be decreased by 40 mm in case of ST stabilisers.

TURNING STABILIZERS LEGS

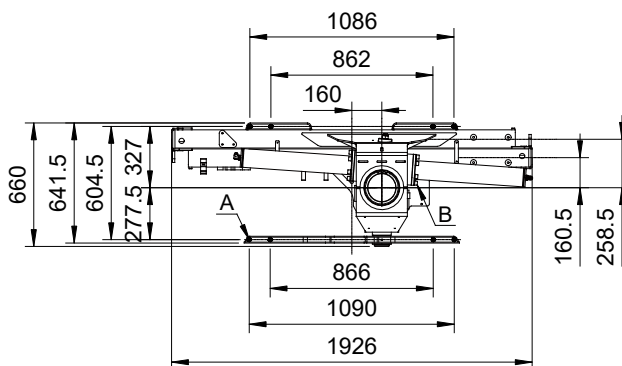


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D.5 BASE DIMENSIONS AND MOUNTING BOLTS

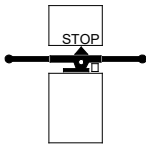
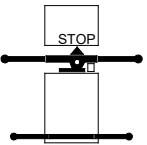
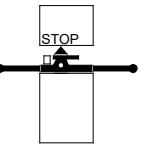
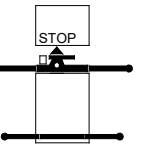
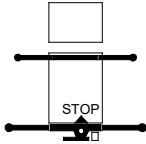
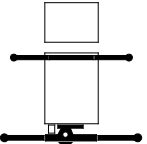
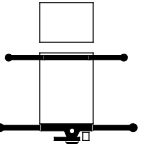
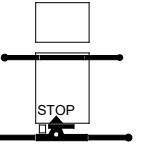
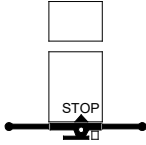
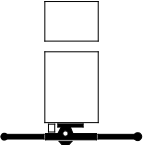
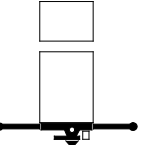
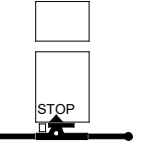
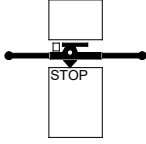
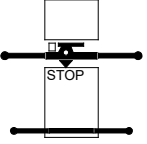
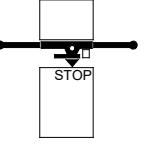
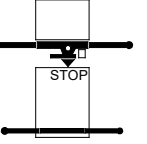


Ref.	Description	Q.ty	Material Grade	Size	Tightening torque
A	Kit with 8 crane mounting bolts	8	42CrMo4+QT EN 10083-3	M20x1.5 L=900	250 Nm
	Kit with 4 crane mounting bolts	4	39NiCrMo3+QT EN 10083-3	M24X2 L=520	400 Nm
B	Fixing bolts for each slewing cylinder	6	8.8	M14x2 L=65	80 Nm

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D.6 INSTALLATION TYPE NUMBER

Installation types numbers (ITN) for cranes with standard dead point (STOP) toward swing bridge.

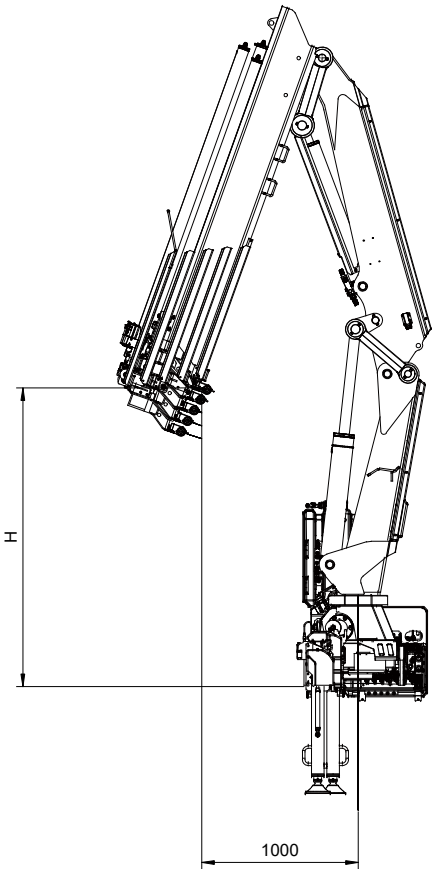
OPPOSITE DEAD POINT		STANDARD DEAD POINT	
1 	2 	3 	4 
5 	6 	7 	8 
9 	10 	11 	12 
13 	14 	15 	16 

Legend:

- ▲ : position of dead point (STOP)
- : position of main manual controls (on column side)

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D.7 LIFTING HEIGHT CLOSE TO THE COLUMN



Version	H mm
1S	1636
2S	1545
3S	1467
4S	1384
5S	1302

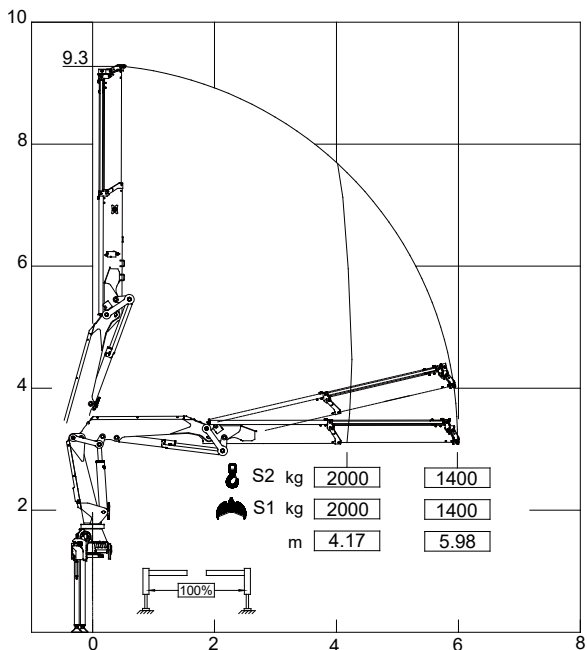
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D.8 LOAD CHARTS FOR USE WITH HOOK/TOOL

909NG 1S



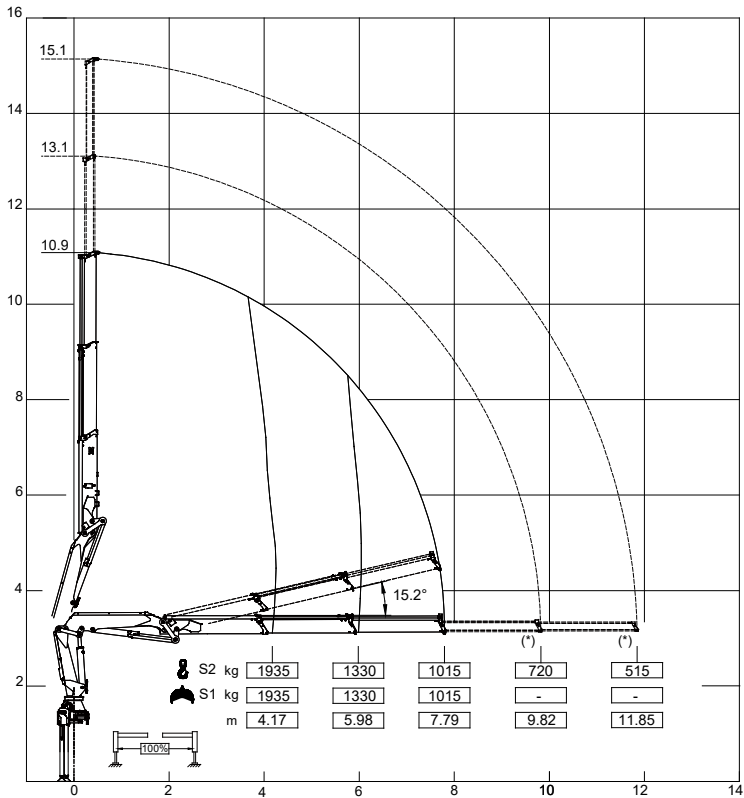
If an additional lifting tool is mounted, the rated capacities shall be reduced by the tool's weight

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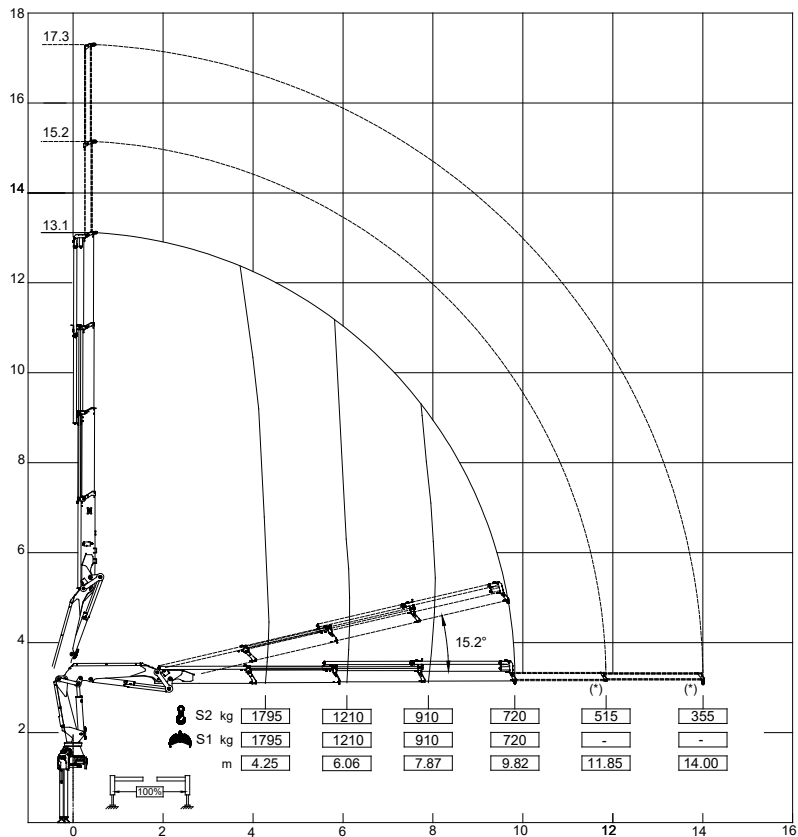
LOAD CHARTS FOR USE WITH HOOK/TOOL 909NG 2S



(*) Manual extensions (optional): these cannot lift additional hydraulic tools
If an additional lifting tool is mounted, the rated capacities shall be reduced by the tool's weight

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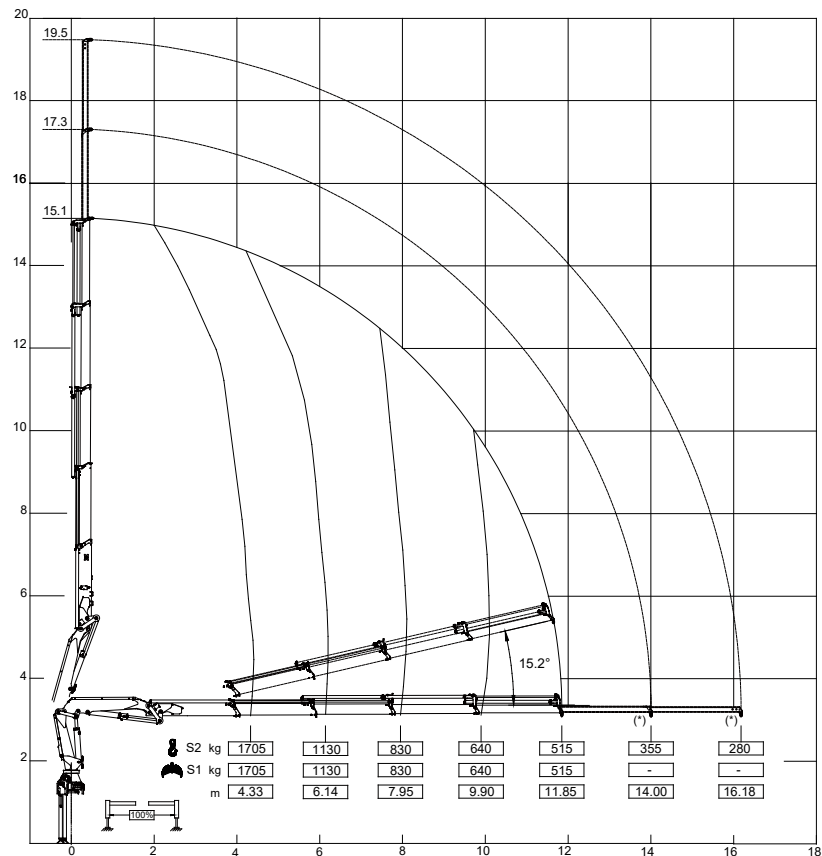
LOAD CHARTS FOR USE WITH HOOK/TOOL
909NG 3S



(*) Manual extensions (optional): these cannot lift additional hydraulic tools
 If an additional lifting tool is mounted, the rated capacities shall be reduced by the tool's weight

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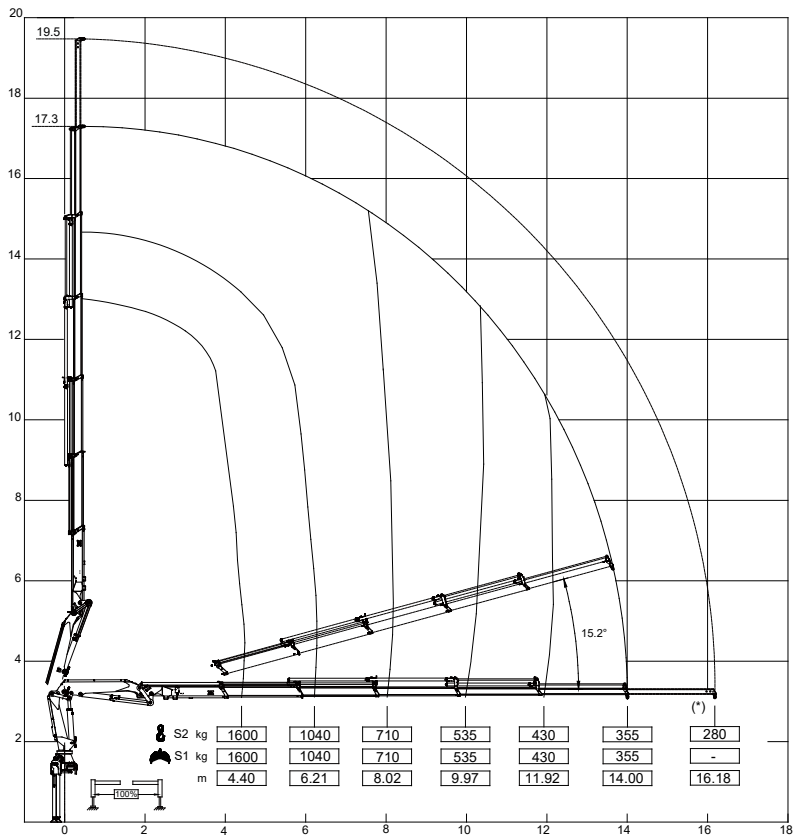
LOAD CHARTS FOR USE WITH HOOK/TOOL
909NG 4S



(*) Manual extensions (optional): these cannot lift additional hydraulic tools
If an additional lifting tool is mounted, the rated capacities shall be reduced by the tool's weight

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LOAD CHARTS FOR USE WITH HOOK/TOOL
909NG 5S



(*) Manual extensions (optional): these cannot lift additional hydraulic tools
If an additional lifting tool is mounted, the rated capacities shall be reduced by the tool's weight

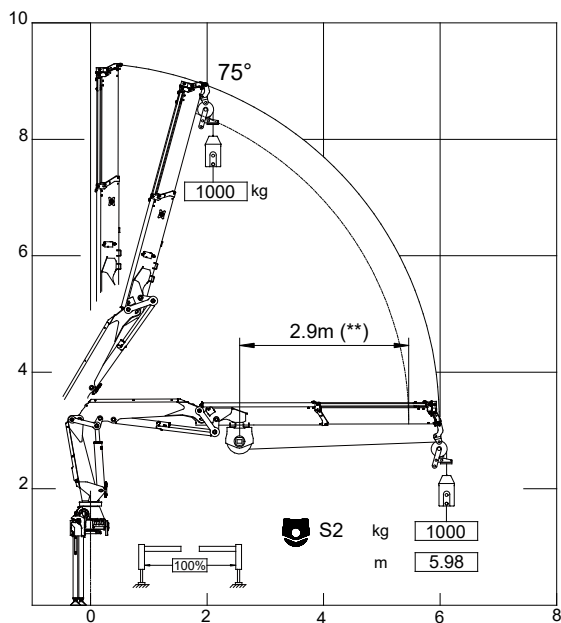
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D.9 LOAD CHARTS FOR T11 WINCH IN SINGLE LINE

909NG 1S + T11 SINGLE LINE



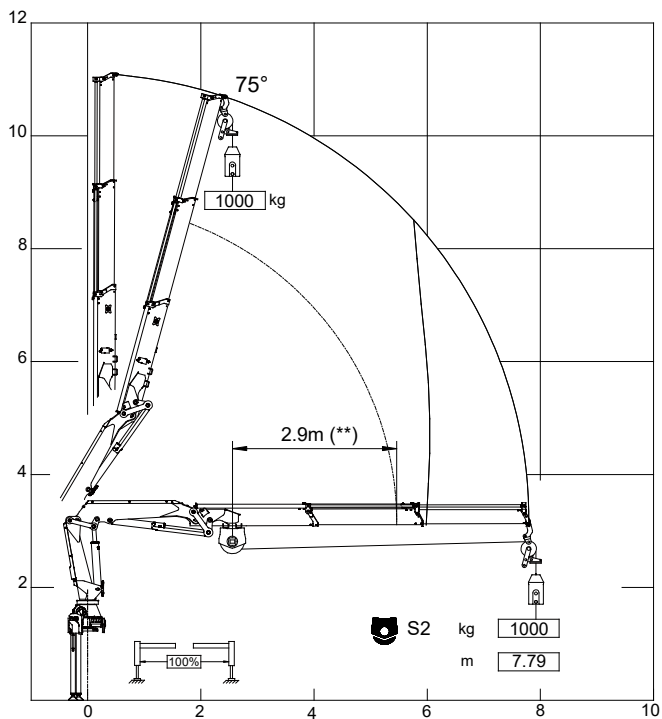
(**) Minimum distance winch - pulley
Winch max. pull: 1000 kg

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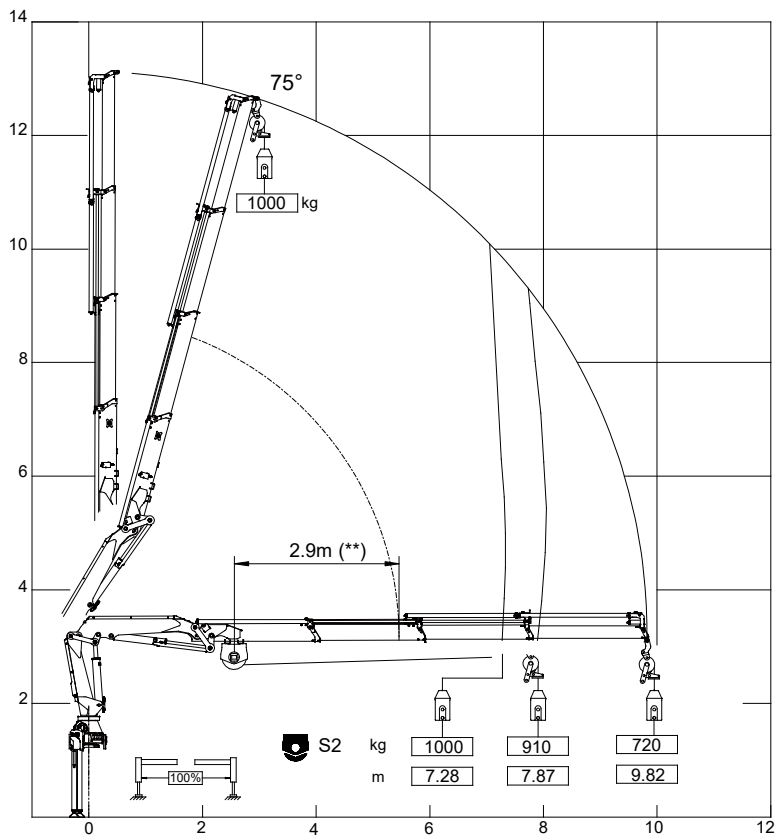
LOAD CHART FOR WINCH T11 IN SINGLE LINE 909NG 2S + T11 SINGLE LINE



(**) Minimum distance winch - pulley
Winch max. pull: 1000 kg

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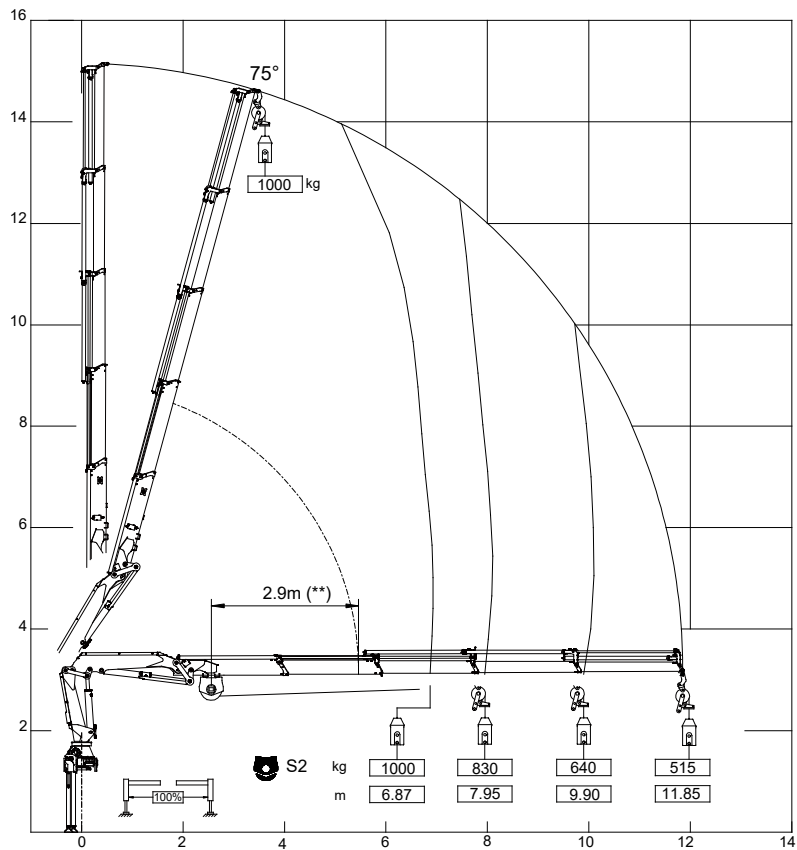
LOAD CHART FOR WINCH T11 IN SINGLE LINE
909NG 3S + T11 SINGLE LINE



(**) Minimum distance winch - pulley
Winch max. pull: 1000 kg

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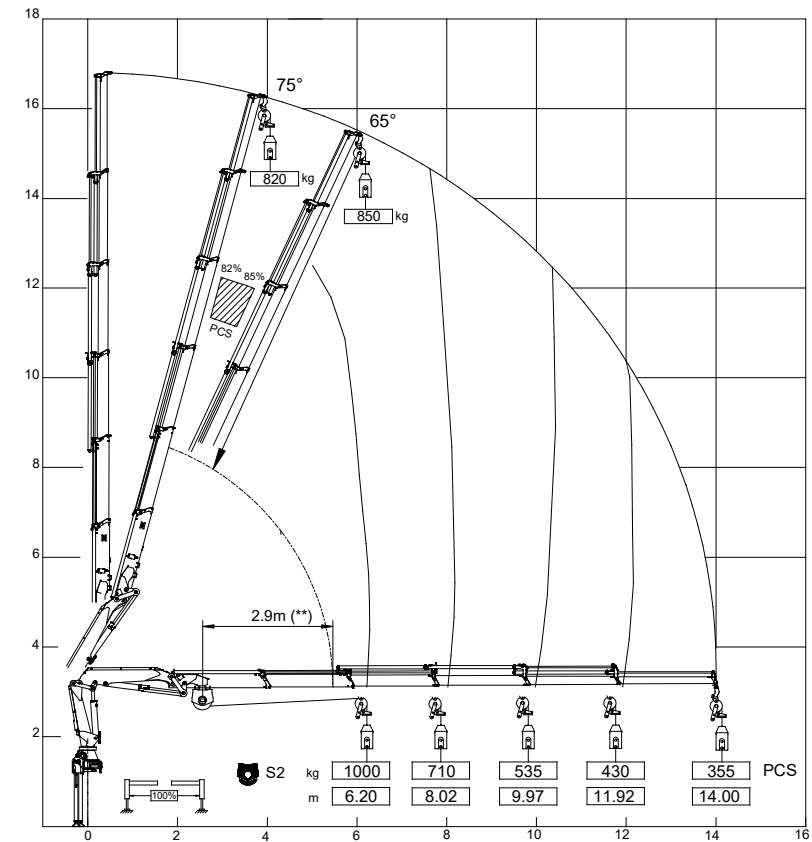
LOAD CHART FOR WINCH T11 IN SINGLE LINE
909NG 4S + T11 SINGLE LINE



(**) Minimum distance winch - pulley
Winch max. pull: 1000 kg

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LOAD CHART FOR WINCH T11 IN SINGLE LINE
909NG 5S + T11 SINGLE LINE



(**) Minimum distance winch - pulley
Winch max. pull: 1000 kg

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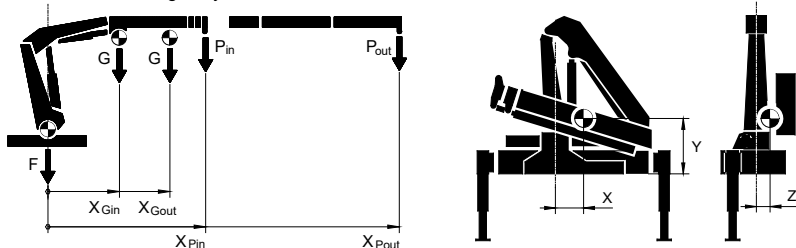
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D.10 CENTERS OF GRAVITY AND TEST LOADS

This annex contains the data needed for the stability test in accordance with EN 12999.

Loads and centers of gravity



Hooking point for the test load



Key:

F = weight of fixed parts (stabilizers, base, column, 1st boom cylinder)

G = weight of booms

X_G = distance between G and column axis

P = rated capacity

X_P = distance between P and column axis

TL = test load, to be hooked to the last hydraulic extension

X, Y, Z = coordinates of center of gravity for whole crane folded in transport position (EX-H version)

in = configuration with all hydraulic extensions fully retracted

out = configuration with all hydraulic extensions fully extracted

WEIGHTS AND CENTERS OF GRAVITY

909NG	F kg	G kg	X_G in / out m	P in / out kg	X_P in / out m	TL kg	X	Y	Z
1S	ST-M : 795 EX-M : 845 EX-H : 875 SE-H : 895	415	2.06 2.38	2000 1400	4.17 5.98	1750	162	702	14
2S		510	2.23 3.09	1935 1015	4.17 7.79	1269	159	726	35
3S		600	2.36 3.84	1795 720	4.25 9.82	911	150	746	52
4S		680	2.45 4.60	1705 515	4.33 11.85	671	142	762	62
5S		760	2.53 5.65	1600 355	4.40 14.00	487	134	778	77

The data are relating to crane configuration with horizontal booms.

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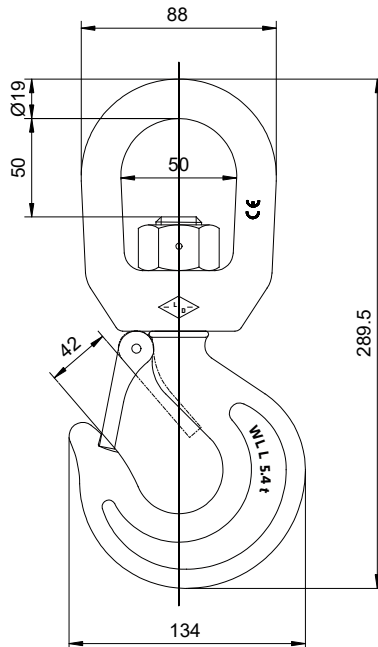
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D.11 HOOK DATA

HOOK MOUNTED ON STANDARD BOOM
VERSIONS: 1S, 2S, 3S, 4S, 5S

DIMENSIONS



TECHNICAL PROPERTIES

Working load limit (WLL) : 5400 kg

Material: alloy steel

Weight: 3.2 kg

Swivel hook

Reference standard: DIN 15401

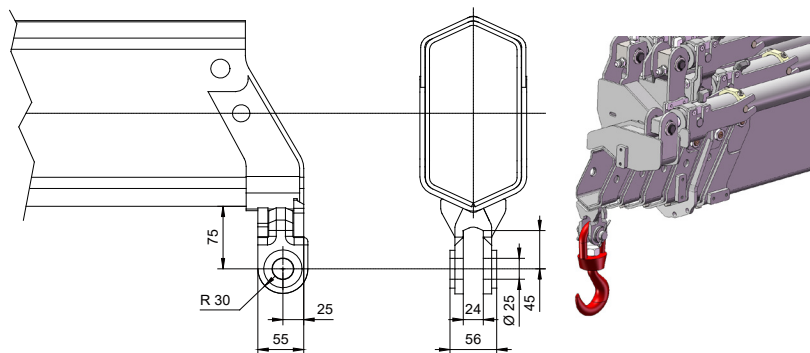
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D.12 LOAD ATTACHMENT

ATTACHMENT FOR HOOK



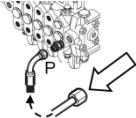
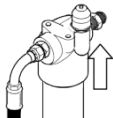
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D.13 HYDRAULIC SYSTEM

FITTINGS FOR CONNECTION TO PUMP

909NG	NO RDC	RDC
Control valve pressure line	 M 7/8"-14 JIC	 M 3/4"-16 GAS
Tank suction line	 M 1"1/2 BSP	 M 1" 1/2 BSP

EXTENSION TIMES OF HYDRAULIC CYLINDERS

909NG	Extension time s	Retraction time s
Slewing (180°)	20	20
1.boom cylinder	19	23
2.boom cylinder	22	15
boom extension 1S (SGS active)	5	7
boom extension 2S (SGS active)	8	13
boom extension 3S (SGS active)	19	22
boom extension 4S (SGS active)	22	31
boom extension 5S (SGS active)	N/A	N/A

Times are indicative and referring to the following operating conditions:

- unloaded crane operated with a single control lever
- oil flow rate recommended for NO RDC crane
- ISO VG 46 oil at a temperature of 50°C

MAX. ALLOWABLE SINK RATE FOR THE LOAD

The sink rate is the uncontrolled descent of the load in a given time interval due to internal leakage of hydraulic components. The table below shows the maximum permitted descent of the rated load, at the max. hydraulic outreach and in the given time interval.

909NG	Time interval min.	Max. load descent mm
1S	10	299
2S	10	390
3S	10	491
4S	10	593
5S	10	280

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CAPACITY OF HYDRAULIC SYSTEM

909NG	Cylinders extended ℓ	Cylinders retracted ℓ
1S	28	19
2S	34	23
3S	41	27
4S	47	32
5S	53	36

Capacities do not include the oil tank.

ADDITIONAL CAPACITY FOR HYDRAULICALLY OPERATED STABILIZER EXTENSIONS

EX-H	+3.5	+2.0
SE-H	+4.5	+3.0

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D.14 OIL COOLER



TECHNICAL SPECIFICATIONS

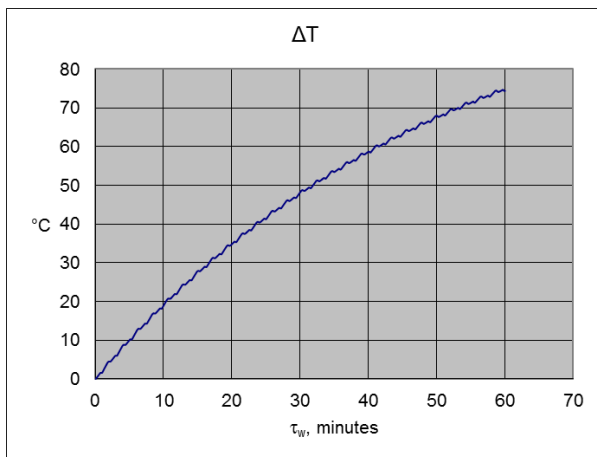
Heat transfer coefficient: 235 W/K (oil flow rate of 40 l/min)

Activation temperature: 48 °C

Weight: 13.5 kg

Capacity: 4 l

For a crane without oil cooler performing a sequence of standard work cycles, the difference in temperature between the oil and the environment is shown in the graph below.



The oil cooler is recommended when

$$T_{env} + \tau_w > 57$$

where:

T_{env} : temperature of the environment (°C)

ΔT : difference in temperature between the oil and the environment (°C)

τ_w : working time (minutes)

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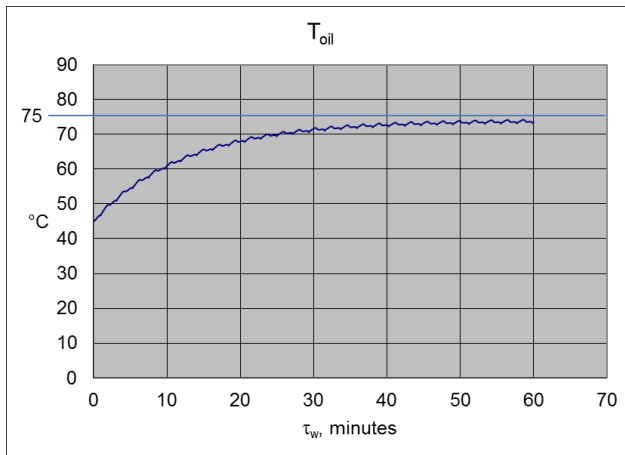
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However, when a crane equipped with oil cooler carries out a sequence of standard work cycles, the oil temperature exceeds 75 °C after the following working times:

T_{env} (°C)	τ_w to exceed 75 °C (minutes)
45	no limit
48	35
50	25
52	20
54	15

The graph below shows the temperature trend (T_{oil}) with oil cooler when $T_{env} = 45$ °C.



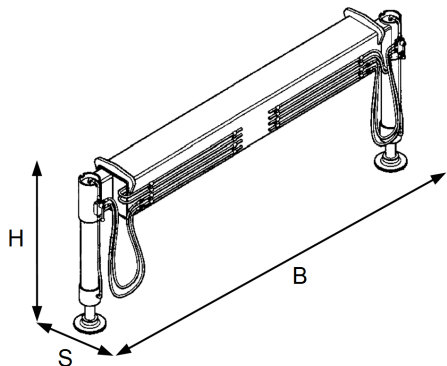
Notes:

The max recommended oil temperature is 75°C (at 80°C you must stop working)

The calculation of the oil temperature is purely indicative and depending on several variables (e.g. working cycle, wind, humidity, weather, etc.)

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D.15 ADDITIONAL STABILIZERS



Additional stabilizers must be chosen so that:

- the installation is stable (see Installer Manual)
- the max. force acting on the additional stabilizers, F_s , is lower than the max. load allowed by the stabilizers itself, R_{max} .

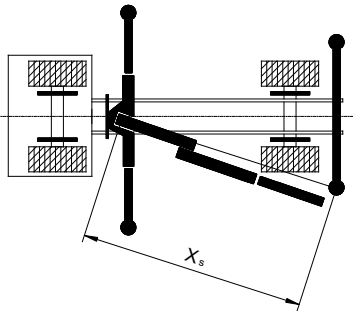
$$F_s = M_{dyn} / X_s \qquad F_s \geq 0.6 F_{sg}$$

where:

- M_{dyn} : max. dynamic moment of the crane
- X_s : distance between column axis - stab. cylinder
- F_{sg} : max force on stabilizer leg

Check that: $F_s \leq R_{max}$

R_{max} is given in the technical specifications of the additional stabilizers.



- In addition, CE additional stabilizer must be equipped with safety devices integrated with the crane's stability control system. Therefore we recommend to install the following models designed by the crane's manufacturer:

Code	Spread (m)	Weight (kg)	R_{max} (kg)	Overall dimensions BxHxS (mm)
7850088	2.00	155	6250	2160x770x190
7850086	3.32	220	6250	2285x780x240
7850087	3.32	235	6250	2285x780x240

For further information see the User Manual for outriggers.

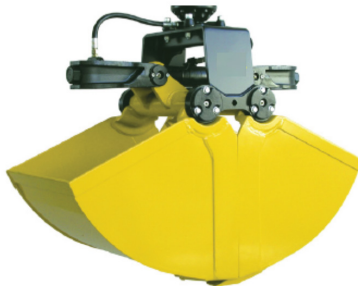
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D.16 RECOMMENDED ADDITIONAL LIFTING TOOLS

CLAMSHELL BUCKET



Crane version	Gross load kg ⁽¹⁾	Data of recommended tool				Payload kg ⁽³⁾	Load ratio	
		HYVA model	weight kg	volume dm ³	capacity kg ⁽²⁾		crane ⁽⁴⁾	tool ⁽⁵⁾
1S	1400	H605-550	375	550	825	1025	86%	100%
2S	1015	H605-450	340	450	675	675	100%	100%
3S	720	H605-250	285	250	375	435	92%	100%
4S	515	H604-200	195	200	300	320	96%	100%
5S	355	H604-150	185	150	225	170	100%	76%

Notes

⁽¹⁾ The gross load is the load capacity of crane at maximum hydraulic outreach

⁽²⁾ The tool's load capacity is calculated multiplying the volume by a density of 1.5 kg/dm³

⁽³⁾ The payload is the gross load of crane minus the tool's weight

⁽⁴⁾ The crane's load ratio is the percentage value of the liftable load with respect to the gross load

⁽⁵⁾ The tool's load ratio is the percentage value of the liftable load with respect to tool's capacity

Stress history class: S1

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RECOMMENDED ADDITIONAL LIFTING TOOLS ORANGE PEEL GRAPPLE



Crane version	Gross load kg ⁽¹⁾	Data of recommended tool				Payload kg ⁽³⁾	Load ratio	
		HYVA model	weight kg	volume dm ³	capacity kg ⁽²⁾		crane ⁽⁴⁾	tool ⁽⁵⁾
1S	1400	H653-4 L	435	500	750	965	85%	100%
2S	1015	H653-4 L	395	350	525	620	91%	100%
3S	720	H652-5 L	250	390	585	470	100%	80%
4S	515	H653-4 S	275	120	180	240	88%	100%
5S	355	H652-5 S	230	120	180	125	100%	69%

Notes

- ⁽¹⁾ The gross load is the load capacity of crane at maximum hydraulic outreach
- ⁽²⁾ The tool's load capacity is calculated multiplying the volume by a density of 1.5 kg/dm³
- ⁽³⁾ The payload is the crane's gross load minus the tool's weight
- ⁽⁴⁾ The crane's load ratio is the percentage value of the liftable load with respect to the gross load
- ⁽⁵⁾ The tool's load ratio is the percentage value of the liftable load with respect to tool's capacity

Stress history class: S1

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RECOMMENDED ADDITIONAL LIFTING TOOLS
LOGGING GRAPPLE



Crane version	Gross load kg ⁽¹⁾	Data of recommended tool			Payload kg ⁽²⁾	Load ratio	
		HYVA model	weight kg	capacity kg		crane ⁽³⁾	tool ⁽⁴⁾
1S	1400	H634-0,25	170	4000	1230	100%	31%
2S	1015	H634-0,25	170	4000	845	100%	21%
3S	720	H634-0,25	170	4000	550	100%	14%
4S	515	H634-0,25	170	4000	345	100%	9%
5S	355	H634-0,25	170	4000	185	100%	5%

Notes

- ⁽¹⁾ The gross load is the load capacity of crane at maximum hydraulic outreach
- ⁽²⁾ The payload is the gross load of crane minus the tool's weight
- ⁽³⁾ The crane's load ratio is the percentage value of the liftable load with respect to the gross load
- ⁽⁴⁾ The tool's load ratio is the percentage value of the liftable load with respect to tool's capacity

Stress history class: S1

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RECOMMENDED ADDITIONAL LIFTING TOOLS BRICK STACK GRAPPLE



Crane version	Gross load kg ⁽¹⁾	Data of recommended tool			Payload kg ⁽²⁾	Load ratio	
		HYVA model	weight kg	capacity kg		crane ⁽³⁾	tool ⁽⁴⁾
1S	1400	H332-1330	265	1600	1135	100%	71%
2S	1015	H332-1330	265	1600	750	100%	47%
3S	720	H332-1330	265	1600	455	100%	28%
4S	515	H332-1330	265	1600	250	100%	16%
5S	355	H332-850	245	2200	110	100%	5%

Notes

⁽¹⁾ The gross load is the load capacity of crane at maximum hydraulic outreach

⁽²⁾ The payload is the gross load of crane minus the tool's weight

⁽³⁾ The crane's load ratio is the percentage value of the liftable load with respect to the gross load

⁽⁴⁾ The tool's load ratio is the percentage value of the liftable load with respect to tool's capacity

Stress history class: S2

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RECOMMENDED ADDITIONAL LIFTING TOOLS PALLET FORK



Crane version	Gross load kg ⁽¹⁾	Data of recommended tool			Payload kg ⁽²⁾	Load ratio	
		HYVA model	weight kg	capacity kg		crane ⁽³⁾	tool ⁽⁴⁾
1S	1400	H415-2000-500	155	2000	1245	100%	62%
2S	1015	H415-2000-500	155	2000	860	100%	43%
3S	720	H415-1500-500	135	1500	585	100%	39%
4S	515	H415-1500-500	135	1500	380	100%	25%
5S	355	H415-1500-500	135	1500	220	100%	15%

Notes

⁽¹⁾ The gross load is the load capacity of crane at maximum hydraulic outreach

⁽²⁾ The payload is the gross load of crane minus the tool's weight

⁽³⁾ The crane's load ratio is the percentage value of the liftable load with respect to the gross load

⁽⁴⁾ The tool's load ratio is the percentage value of the liftable load with respect to tool's capacity

Stress history class: S2