








































**D TECHNICAL DATA**




## D.1 CRANE'S TECHNICAL DATA


Versions			E2	E3	E4
Max. net lifting moment		<i>t m</i>	16.4	16.3	16.0
		<i>kNm</i>	161	160	157
Max. dynamic moment		<i>daNm</i>	18890		
		<i>kNm</i>	189		
Capacity at min. hydraulic outreach	hook [S2] 	<i>kg</i>	6500	6235	5940
Max rated capacity	min. outreach 	<i>m</i>	2.53	2.61	2.69
Capacity at max. hydraulic outreach	hook [S2] 	<i>kg</i>	2625	1870	1390
	max. outreach 	<i>m</i>	6.13	8.19	10.25
Stress history class	hook 	-	S2	S2	S2
	forks 	-	S2	S2	S2
	grab 	-	S1	S1	S1
Capacity of 1st man. extension	capacity 	<i>kg</i>	N/A	N/A	N/A
	max. outreach 	<i>m</i>	N/A	N/A	N/A
Max. load height above the base for the last extension	hydraulic 	<i>m</i>	8.4	10.4	12.4
	manual 	<i>m</i>	N/A	N/A	N/A
Weight of crane without stabilizers		<i>kg</i>	1370	1485	1575
Weight of stabilizers	ST-M 	<i>kg</i>	250		
	EX-M 	<i>kg</i>	340		
	EX-H 	<i>kg</i>	375		
	SE-H 	<i>kg</i>	410		
Weight of special attachment		<i>kg</i>	40	37	34
Max. working pressure		<i>bar</i>	290		
Max. oil flow rate		<i>l/min</i>	40		
		<i>l/min</i>	60		
Power needed		<i>kW</i>	25.1		
		<i>kW</i>	37.7		
Oil tank capacity		<i>l</i>	130		
Gross slewing torque		<i>daNm</i>	2170		
		<i>kNm</i>	21.7		
Slewing angle (tolerance for CE/TOP)		°	425° (0°-5°)		
Max. base inclination		°	4°		
		°	3°		
Max boom inclination (tolerance for CE/TOP)		°	80° (0°-5°)		
Max boom inclination for use with CE winch		°	75°		
Max. stabilizer force on the ground with stabilizers fully extended	ST 	<i>daN</i>	9680		
	EX 	<i>daN</i>	7400		
	SE 	<i>daN</i>	6000		
Max. stabilizer pressure on the ground with stabilizers fully extended	ST 	<i>MPa</i>	3.8		
	EX 	<i>MPa</i>	2.9		
	SE 	<i>MPa</i>	2.4		
Lifting conversion factor, k		<i>kgm/bar</i>	64.85		
Position of standard dead point (see D.7)					

## D.2 WINCH SETTINGS

### T11 - SINGLE LINE PULL

Versions			E2	E3	E4
	Max line pull	kg	1000	1000	1000

### T11 - DOUBLE LINE PULL




Versions			E2	E3	E4
	Max line pull	kg	1000	1000	1000



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 ADDITIONAL LIFTING TOOLS

Lifting tools that can be mounted are divided based on their intended use:

Group	Description	Symbol
A	Tools intended not to be pushed to the ground; load laid on the ground (e.g. pallet fork)	
B	Tools intended to be pushed to the ground; slow release of the load at height (e.g. clamshell bucket)	
C	Tools intended not to be pushed to the ground; rapid release of the load at height (e.g. bin lifter)	



Tools intended to be pushed to the ground and with rapid release of the load are not admitted (e.g. logging grapple, magnet).

### GROUP A

If a tool of Group A is mounted, crane performances are not reduced:

- Stress history class: S2
- Maximum working pressure and rated loads are not reduced
- The max. Gross Load to consider when choosing the tool is indicated in D.18.1 and D.18.2

### GROUP B

If a tool of Group B is mounted, crane performances are reduced:

- Stress history class: S1
- Maximum working pressure and rated loads are not reduced
- The tool is not admitted on the versions with more extensions
- The max. Gross Load to consider when choosing the tool is indicated in D.18.3 and D.18.4

### GROUP C

These tools must be considered case by case.

### GROSS LOAD

The gross load is calculated as follows:

$$GL = a + m + \Delta m$$

where:

a : weight of tool attachments (e.g. suspension link, rotator, etc.)

m : tool weight (e.g. pallet fork, clamshell bucket, etc.)

$\Delta m$  : maximum payload: weight of packages (group A), or load obtained multiplying the useful volume of the tool by the density of the material intended to be handled (group B)

Recommended HYVA lifting tools are shown in Annex D.18.

## D.4 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	E2	E3	E4
ST-M	1620	1735	1825
EX-M	1710	1825	1915
EX-H	1745	1860	1950
SE-H	1780	1895	1985

Additional weight for T11 winch: 95 kg

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

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

In the case of a crane without oil tank (SSE), subtract 60 kg.

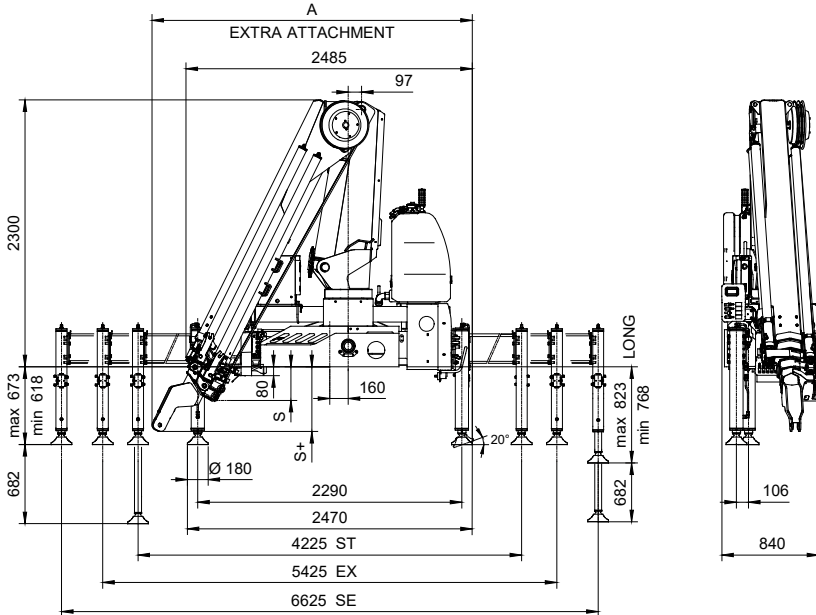
The weights may vary by  $\pm 3\%$

In case of special attachment the total weights are the following:

<i>kg</i>	Crane version		
Type of stabilizers	E2	E3	E4
ST-M	1675	1790	1875
EX-M	1765	1880	1965
EX-H	1800	1915	2000
SE-H	1835	1950	2035

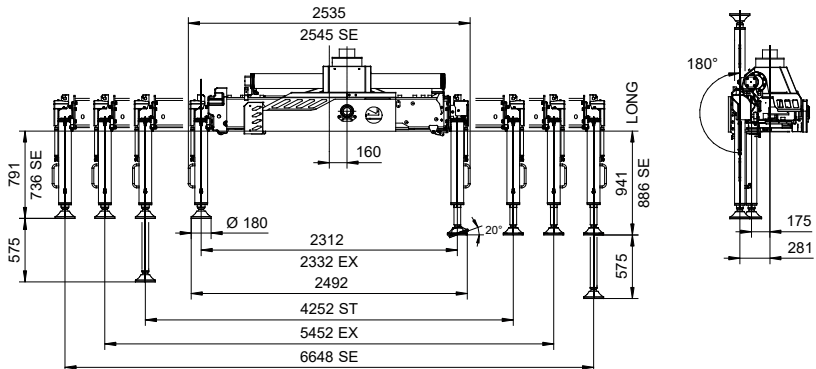
## D.5 OVERALL DIMENSIONS

### FIXED STABILIZERS LEGS

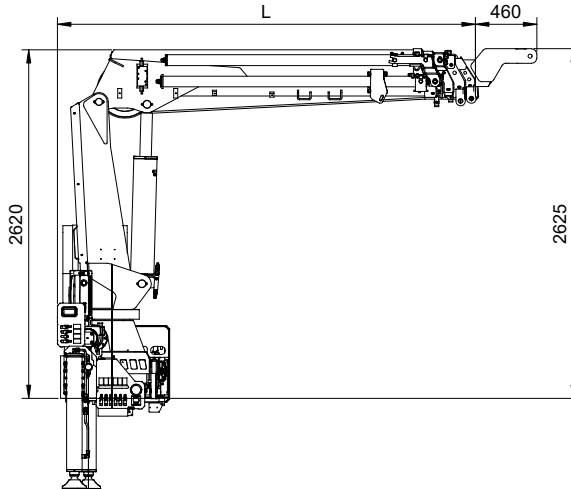


	E2	E3	E4
A (mm)	2670	2725	2780
S (mm)	160	225	290
S+ (mm)	430	495	560

### TURNING STABILIZERS LEGS

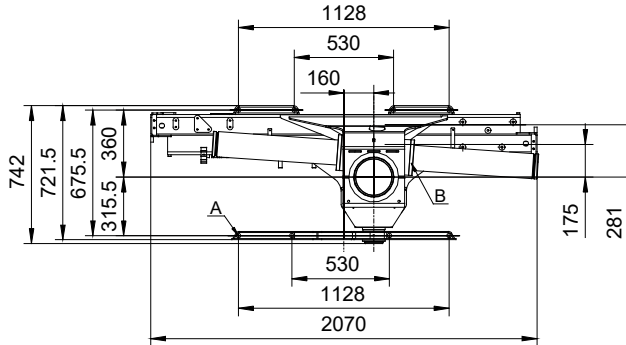


## OVERALL DIMENSIONS



Version	L mm
E2	2970
E3	3050
E4	3130

## D.6 BASE DIMENSIONS AND MOUNTING BOLTS



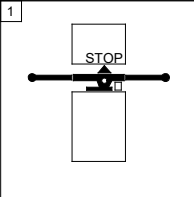
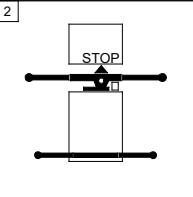
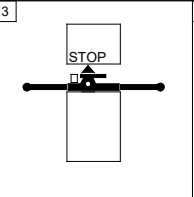
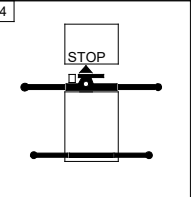
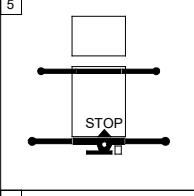
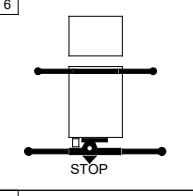
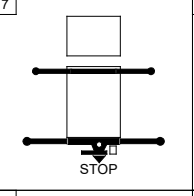
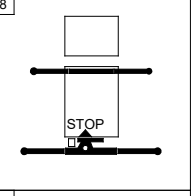
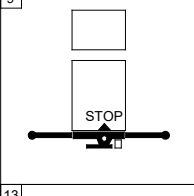
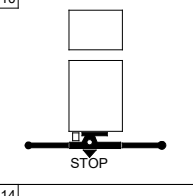
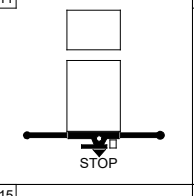
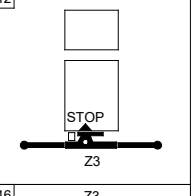
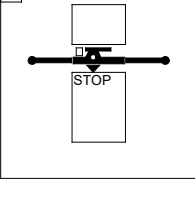
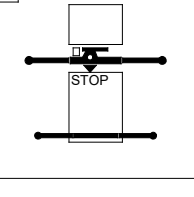
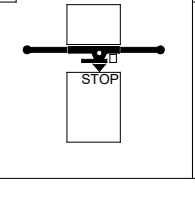
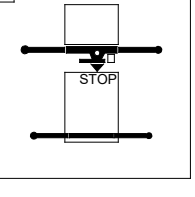
Ref.	Description	Q.ty	Material Grade	Size	Tightening torque
A	Kit with 8 crane mounting bolts	8	42CrMo4+QT EN ISO 683-2	M24x2 L=1100	400 Nm
	Kit with 4 crane mounting bolts	4	42CrMo4+QT EN ISO 683-2	M30x2 L=600	700 Nm
B	Fixing bolts for each slewing cylinder	10	8.8	M14x2 L=65	80 Nm

Distribution factor of dynamic moment on the base:  $\beta = 0.70$



## D.7 INSTALLATION TYPE NUMBER

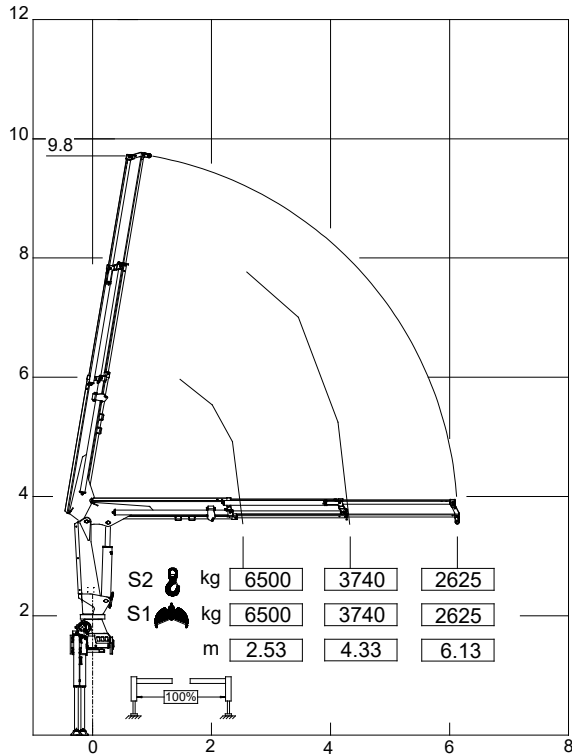
Installation types numbers (ITN) for cranes with standard dead point (STOP) toward swing bridge.

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

**Legend:**

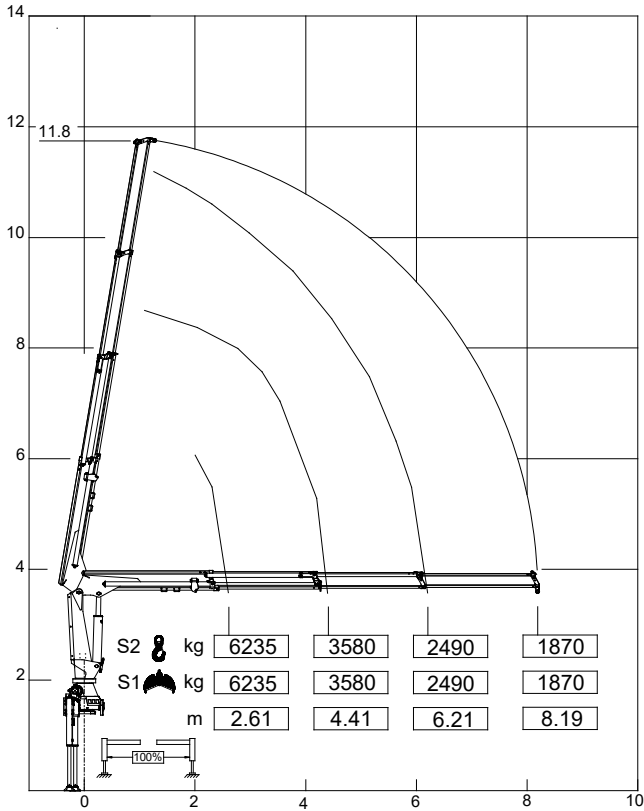
- ▲ : position of dead point (STOP)
- : position of main manual controls (on column side)

## D.8 LOAD CHARTS FOR USE WITH HOOK/TOOL HT162 E2



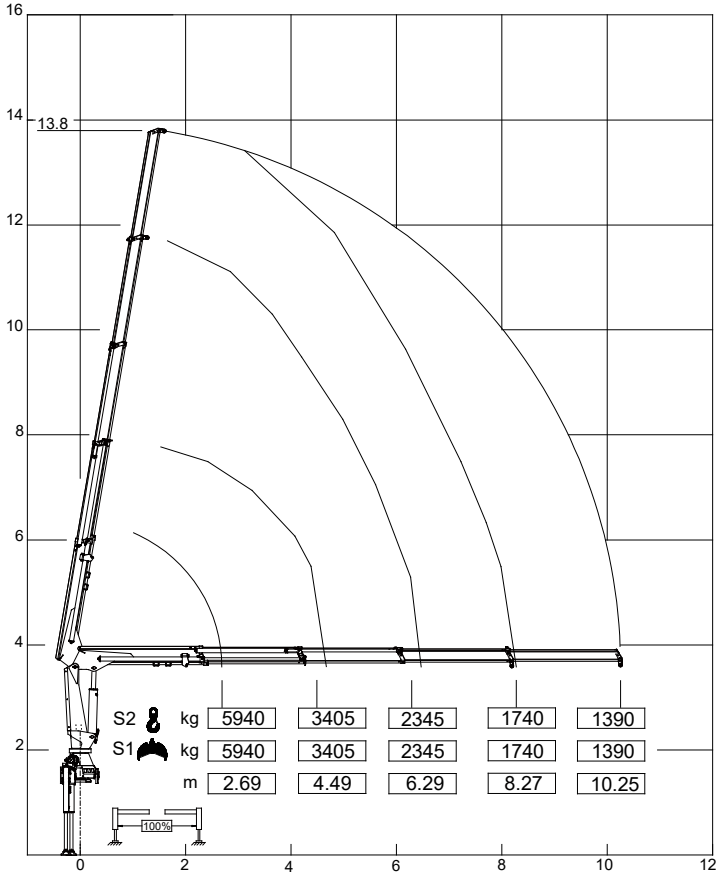
If an additional lifting tool is mounted, the rated capacities are reduced by the tool's weight.

## LOAD CHARTS FOR USE WITH HOOK/TOOL HT162 E3



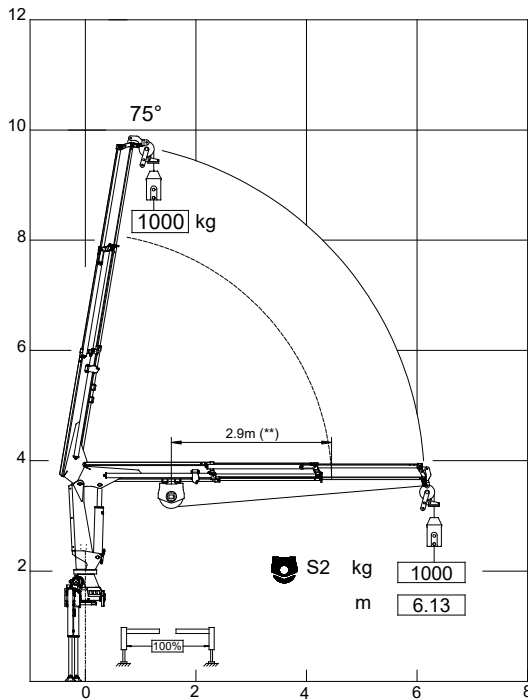
If an additional lifting tool is mounted, the rated capacities are reduced by the tool's weight.

## LOAD CHARTS FOR USE WITH HOOK/TOOL HT162 E4



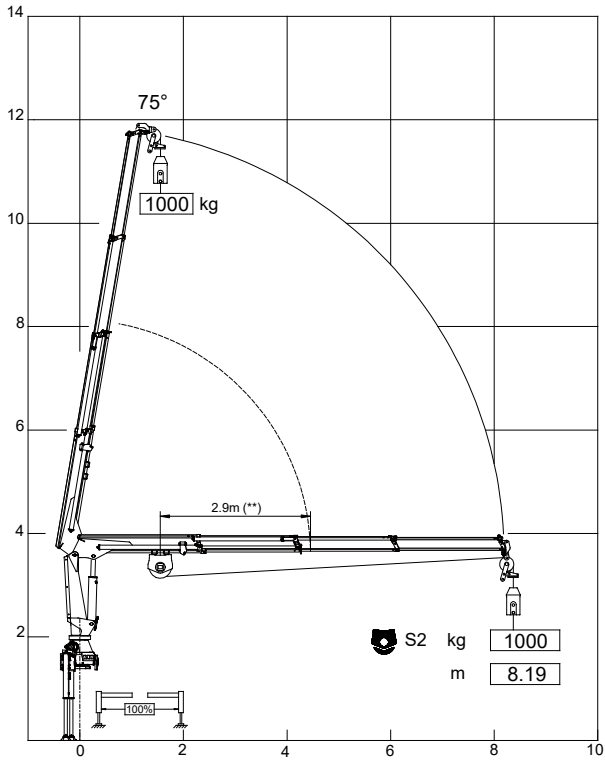
If an additional lifting tool is mounted, the rated capacities are reduced by the tool's weight.

**D.9 LOAD CHARTS FOR T11 WINCH IN SINGLE LINE  
HT162 E2 + T11 SINGLE LINE**



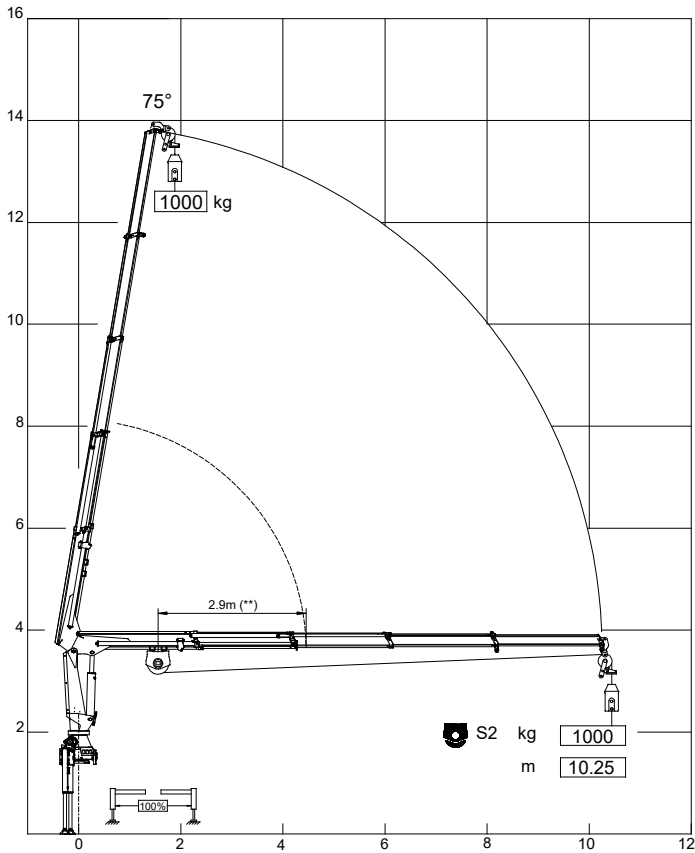
(\*\*) Minimum distance winch - pulley  
Winch max. pull: 1000 kg

## LOAD CHART FOR WINCH T11 IN SINGLE LINE HT162 E3 + T11 SINGLE LINE



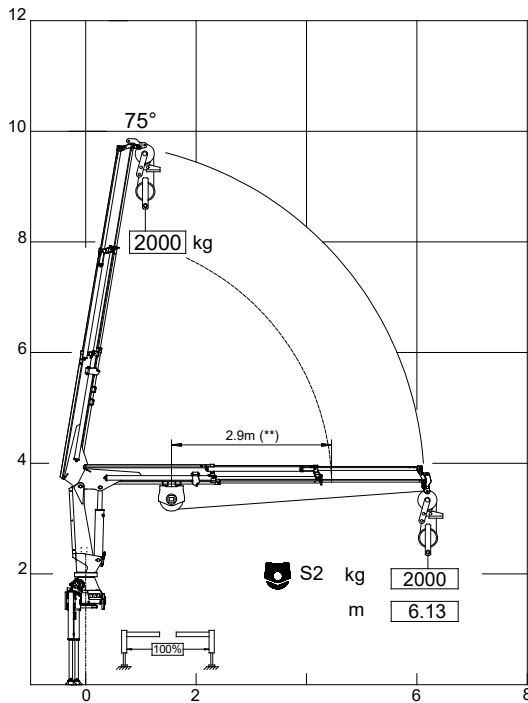
(\*\*) Minimum distance winch - pulley  
Winch max. pull: 1000 kg

## LOAD CHART FOR WINCH T11 IN SINGLE LINE HT162 E4 + T11 SINGLE LINE



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

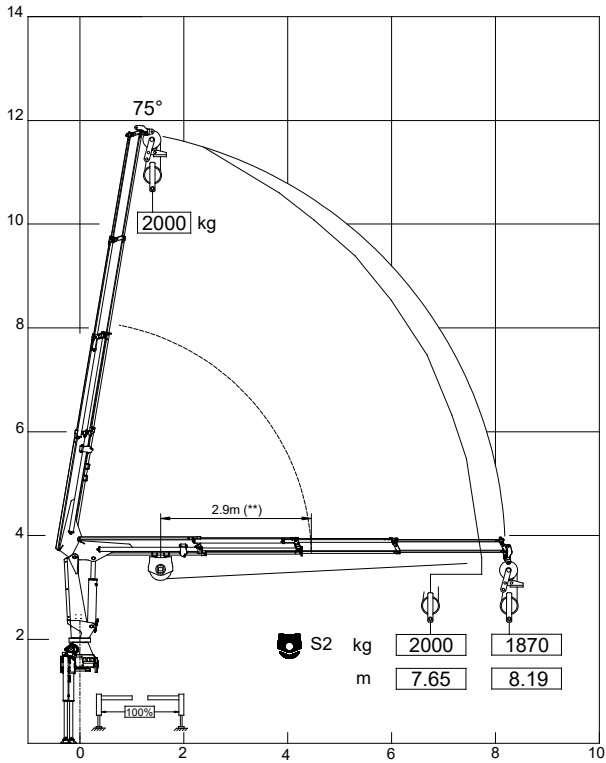
**D.10 LOAD CHARTS FOR T11 WINCH IN DOUBLE LINE  
HT162 E2 + T11 DOUBLE LINE**



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

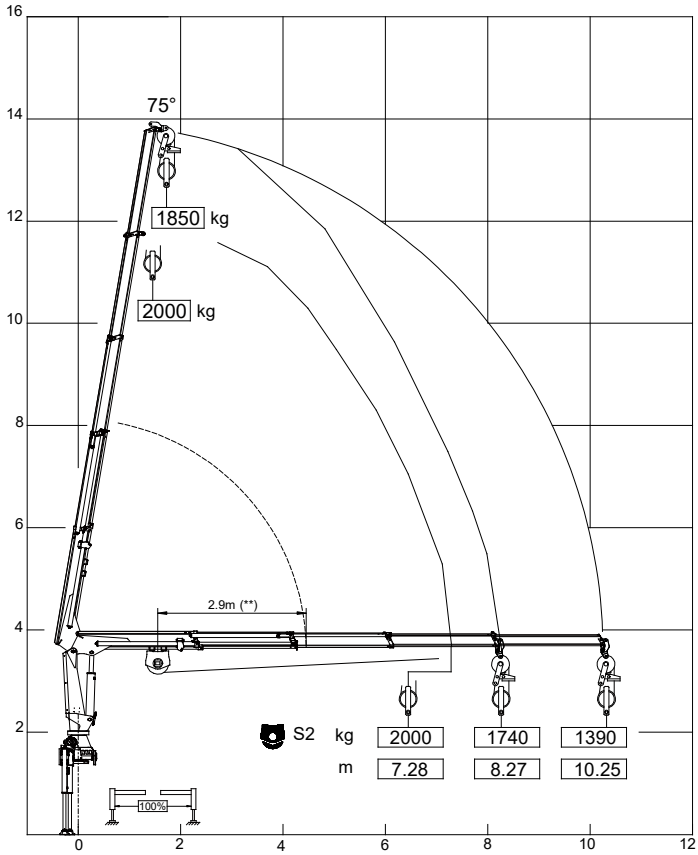


**LOAD CHART FOR WINCH T11 IN DOUBLE LINE  
HT162 E3 + T11 DOUBLE LINE**



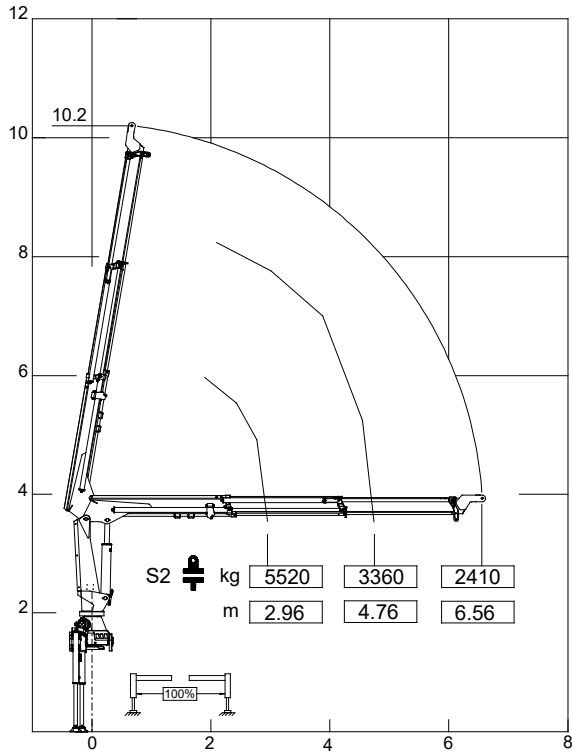
(\*\*) Minimum distance winch - pulley  
Winch max. pull: 1000 kg

## LOAD CHART FOR WINCH T11 IN DOUBLE LINE HT162 E4 + T11 DOUBLE LINE



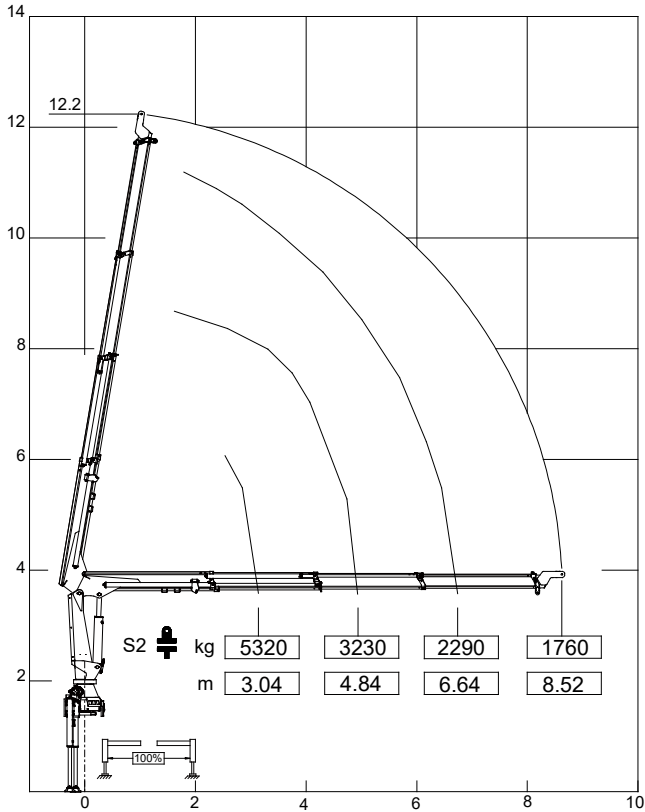
(\*\*) Minimum distance winch - pulley  
Winch max. pull: 1000 kg

**D.11 LOAD CHARTS FOR USE WITH SPECIAL ATTACHMENT  
HT162 E2**



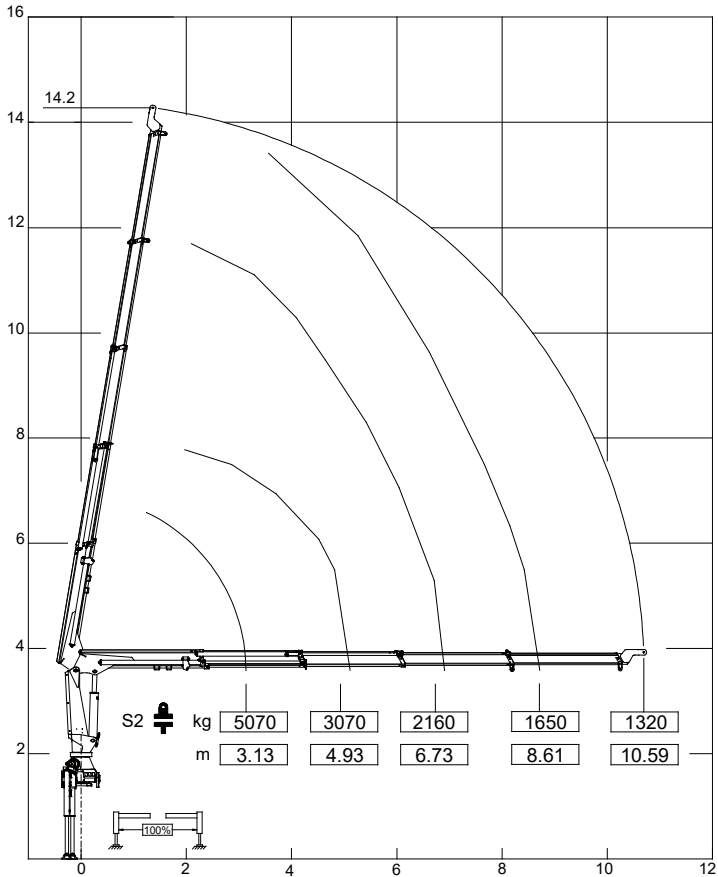
If an additional lifting tool is mounted, the rated capacities are reduced by the tool's weight.

## LOAD CHARTS FOR USE WITH SPECIAL HOOK HT162 E3



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

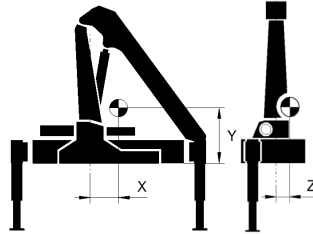
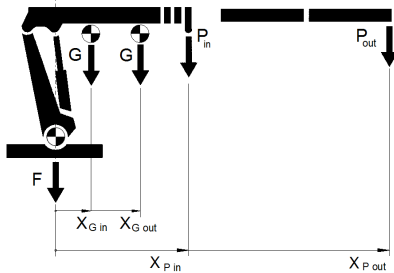
## LOAD CHARTS FOR USE WITH SPECIAL HOOK HT162 E4



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

## D.12 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: STANDARD CRANE

HT162	F Kg	G Kg	$X_G$ in / out m	P in / out kg	$X_P$ in / out m	TL (TL2) kg	X	Y	Z
							mm		
E2	ST-M : 1160 EX-M : 1250 EX-H : 1285	460	1.36	6500	2.53	3281	267	702	-35
			2.83	2625	6.13				
E3	SE-H : 1320	575	1.39	6235	2.61	2338	306	715	-20
			3.58	1870	8.19				
E4		665	1.43	5940	2.69	1738	333	720	-8
	4.33		1390	10.25					

### WEIGHTS AND COG: CRANE WITH SPECIAL ATTACHMENT

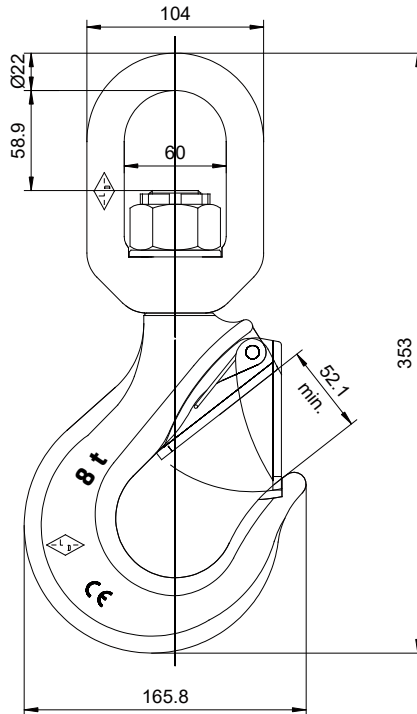
HT162	F kg	G kg	$X_G$ in / out m	P in / out kg	$X_P$ in / out m	TL kg	X	Y	Z
							mm		
E2	ST-M : 1160 EX-M : 1250 EX-H : 1285	515	1.36	5520	2.96	3013	241	592	-51
			2.83	2410	6.56				
E3	SE-H : 1320	630	1.39	5320	3.04	2200	294	605	-36
			3.58	1760	8.52				
E4		715	1.43	5070	3.13	1650	317	586	-24
	4.33		1320	10.59					

The data are relating to crane configuration with horizontal booms.

**D.13 HOOK DATA**

**HOOK MOUNTED ON STANDARD BOOM  
VERSIONS: E2, E3, E4**

**DIMENSIONS**

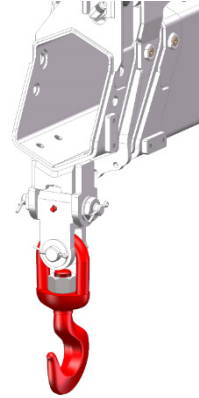
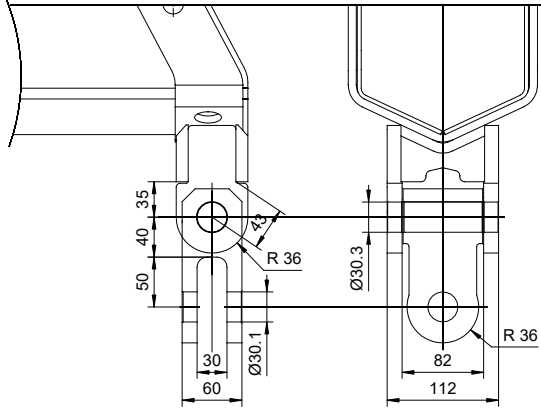


**TECHNICAL PROPERTIES**

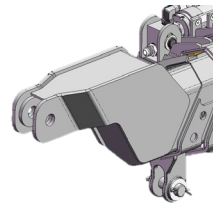
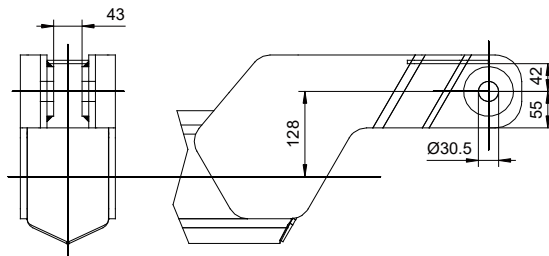
Working load limit (WLL) : 8000 kg  
Material: alloy steel  
Weight: 6.2 kg  
Swivel hook  
Reference standard: DIN 15401

**D.14 LOAD ATTACHMENT**

**ATTACHMENT FOR HOOK AND LIFTING TOOL**



**SPECIAL ATTACHMENT FOR ROADSIDE ASSISTANCE EQUIPMENT**

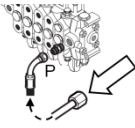


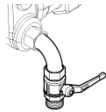


7800437 for E2  
7800438 for E3  
7800439 for E4



## D.15 HYDRAULIC SYSTEM

### FITTINGS FOR CONNECTION TO PUMP

HT162	NO X	X
Control valve pressure line	 M 7/8"-14 JIC	 M 1"1/16-12 JIC
Tank suction line	 M 1"1/2 BSP	 M 1" 1/2 BSP

### EXTENSION TIMES OF HYDRAULIC CYLINDERS

HT162	Extension time s	Retraction time s
Slewing (180°)	12	12
2.boom cylinder	17	30
boom extension E1	5	7
boom extension E2	10	13
boom extension E3	14	18
boom extension E4	20	25

Times are indicative and referring to the following operating conditions:

- unloaded crane operated with a single control lever
- oil flow rate recommended for NO X 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.

HT162	Time interval min.	Max. load descent mm
E2	10	307
E3	10	410
E4	10	513

### CAPACITY OF HYDRAULIC SYSTEM

HT162	Cylinders extended ℓ	Cylinders retracted ℓ
E2	53	37
E3	60	42
E4	68	47

Capacities do not include the oil tank.

### ADDITIONAL CAPACITY FOR HYDRAULICALLY OPERATED STABILIZER EXTENSIONS

EX-H	+4.0	+2.5
SE-H	+5.5	+3.5

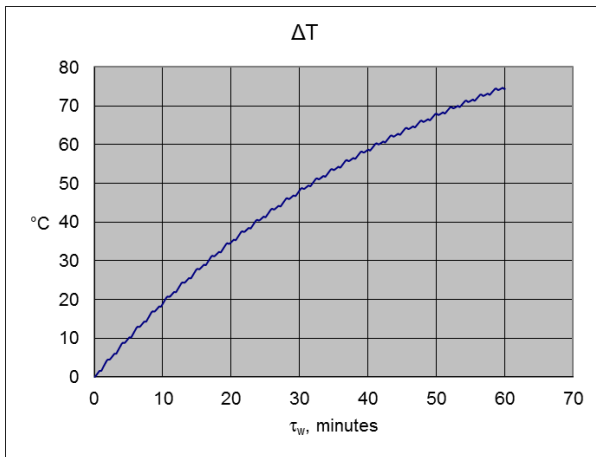
**D.16 OIL COOLER**



**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)

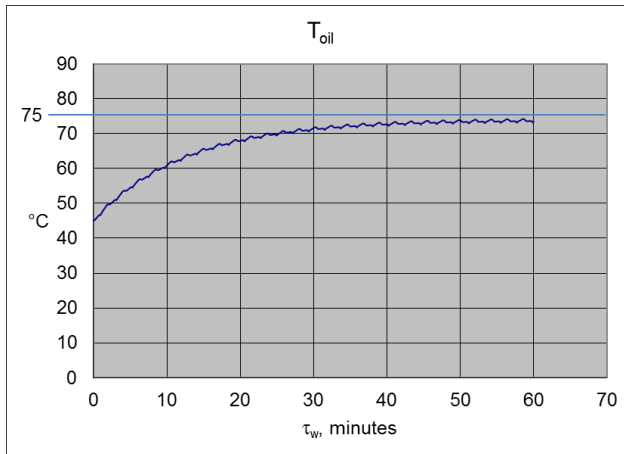
$\Delta T$  : difference in temperature between the oil and the environment (°C)

$\tau_w$  : working time (minutes)

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)	$\tau_w$ 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.

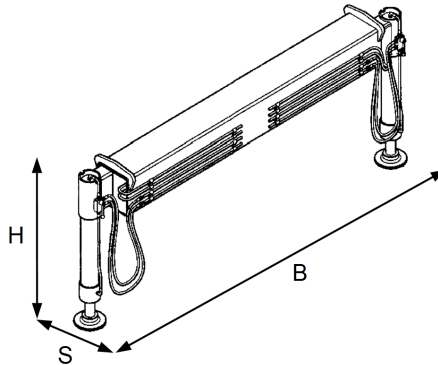


**Notes:**

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.)

## D.17 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,  $R_{max}$ .

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

where:

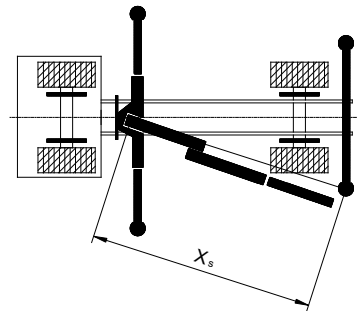
$M_{dyn}$ : max. dynamic moment of the crane

$X_s$ : 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)
H7850088	2.00	155	6250	2160x770x190
H7850086	3.32	220	6250	2285x780x240
H7850087	3.32	235	6250	2285x780x240

For further information see the User Manual for outriggers.

## D.18 RECOMMENDED ADDITIONAL LIFTING TOOLS

### D.18.1 PALLET FORK



Stress history class: S2

Version	Max. recomm. Gross Load kg	Tool attachment kg	Recommended tool			Payload kg
			HYVA model	weight kg	capacity kg	
E2	2360	50	H 415-2500 500	180	2500	2130
E3	1680	50	H 415-2000 500	155	2000	1475
E4	1250	50	H 415-1500 500	135	1500	1065

**Notes:**

- The max. recommended Gross Loads given above are lower than the rated capacities at the maximum hydraulic outreach so that the crane can always operate at maximum working speed.
- The Payload is calculated as Gross Load minus the total weight of tool + attachment
- This tool may be installed only on the versions listed in the table

## D.18.2 BRICK STACK GRAPPLE



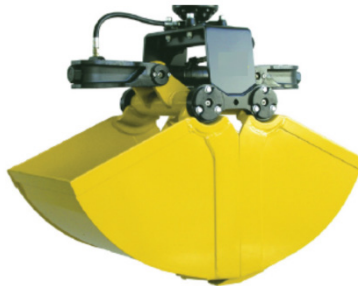
Stress history class: S2

Version	Max. recomm. Gross Load kg	Tool attachment kg	Recommended tool			Payload kg
			HYVA model	weight kg	capacity kg	
E2	2360	50	H 332-850	245	2200	2065
E3	1680	50	H 332-1300	275	1600	1355
E4	1250	50	H 332-1300	275	1600	925

**Notes:**

- The max. recommended Gross Loads given above are lower than the rated capacities at the maximum hydraulic outreach so that the crane can always operate at maximum working speed.
- The Payload is calculated as Gross Load minus the total weight of tool + attachment
- This tool may be installed only on the versions listed in the table

## D.18.3 CLAMSHELL BUCKET



Stress history class: S1

Version	Max. recomm. Gross Load kg	Tool attachment kg	Recommended tool			Payload kg
			HYVA model	weight kg	volume dm <sup>3</sup>	
E2	2360	50	H 602-1000	585	1000	1725
E3	1680	50	H 605-650	410	650	1220
E4	1250	50	H 605-450	340	450	860

**Notes:**

- The max. recommended Gross Loads given above are lower than the rated capacities at the maximum hydraulic outreach so that the crane can always operate at maximum working speed.
- When the tool is filled, it can handle bulk material with a density of 1.5 kg/dm<sup>3</sup>
- The Payload is calculated as Gross Load minus the total weight of tool + attachment
- This tool may be installed only on the versions listed in the table

## D.18.4 ORANGE PEEL GRAPPLE



Stress history class: S1

Version	Max. recomm. Gross Load kg	Tool attachment kg	Recommended tool			Payload kg
			HYVA model	weight kg	volume dm <sup>3</sup>	
E2	2360	50	H 651-5-500	635	500	1675
E3	1680	50	H 651-5-500	635	500	995
E4	1250	50	H 651-5-350	545	350	655

**Notes:**

- The max. recommended Gross Loads given above are lower than the rated capacities at the maximum hydraulic outreach so that the crane can always operate at maximum working speed.
- When the tool is filled, it can handle bulk material with a density of 1.5 kg/dm<sup>3</sup>
- The Payload is calculated as Gross Load minus the total weight of tool + attachment
- This tool may be installed only on the versions listed in the table