

**CHART I International Protection (IP) Ratings to IEC 529**

Protection Modes to EN 60529 DIN VDE 0470 Part 1			Second Digit – Degree of Water Protection								
First Digit	Person touching	Protection against penetration of foreign bodies	IP X0	IP X1	IP X2	IP X3	IP X4	IP X5	IP X6	IP X7	IP X8
			No Protection	Protection against dripping water falling vertically	Protection against dripping water even when tilted 15° vertically	Protection against dripping water even when tilted 60°	Protection against splashing water from any direction	Protection against water jets from any direction	Protection against heavy seas from any direction	Protection against effects of immersion	Protection against submersion
IP 0X	No protection	No protection	IP 00								
IP 1X	Protection against touching with the hand	Protection against large solid bodies > 50mm Ø	IP 10	IP 11	IP 12						
IP 2X	Protection against touching with the finger	Protect. against med., solid bodies > 12.5 mm Ø	IP 20	IP 21	IP 22	IP 23					
IP 3X	Protection against touching with tools, wires, etc., > 2.5 mm Ø	Protection against small, solid bodies > 2.5 mm Ø	IP 30	IP 31	IP 32	IP 33	IP 34				
IP 4X	Protection against touching with tools, wires, etc., > 1 mm Ø	Protection against small, solid bodies > 1 mm Ø	IP 40	IP 41	IP 42	IP 43	IP 44				
IP 5X	Protection against touching with tools, wires, etc., > 1 mm Ø	Protection against internal dust accumulation	IP 50				IP 54	IP 55			
IP 6X	Protection against touching with tools, wires, etc., > 1 mm Ø	Protection against all dust penetration	IP 60					IP 65	IP 66	IP 67	IP 68



In some countries a third digit is added. It gives information about the mechanical properties of the equipment. This designation has not yet been standardized according to current DIN and IEC regulations. Devices in this catalogue correspond to digit IP .7.

**CHART II NEMA / IP Cross Reference**

The chart below provides a cross-reference from NEMA to International Protection (IP) Ratings. This cross-reference is an approximation based on the most current information available. It is not sanctioned by NEMA, IEC, or any other regulatory body. This chart should be used only as a guideline.

IEC 529 Protection Ratings	NEMA Ratings									
	1	2	3	3R	4	4X	5	6	12	13
IP 00	↓									
IP 10		↓								
IP 11										
IP 20										
IP 21										
IP 22										
IP 23										
IP 30										
IP 31										
IP 32				↓						
IP 33										
IP 40										
IP 41										
IP 42										
IP 43										
IP 50										
IP 51										
IP 52										
IP 53										
IP 54										
IP 55							↓			
IP 56										
IP 60										
IP 61										
IP 62										
IP 63			↓							
IP 64										
IP 65					↓	↓				
IP 66										
IP 67										
IP 68										

Properties of used Materials							
Material	Product	Temperature Resistance			Flammability Rating acc. to		Halogen Content
		Short-Term	Constant	Min. Temp.	UL 94	VDE 0471	
Polystyrene, flame resistant, impact resistant	TK//AK/AKL and Abox series	80° C 176° F	70° C 158° F	-40° C -40° F	V - 2	960° C 1760° F	none
Polycarbonate, glass fibre reinforced, flame-impact resistant	TK/AK-i/AKL/EK and Abox-i series	130° C 266° F	120° C 248° F	-35° C -31° F	V - 2 (5V) <sup>1</sup>	960° C 1760° F	none
Polycarbonate, transparent	TK/EK/AK/AKL hinged door and transparent lid	130° C 266° F	120° C 248° F	-35° C -31° F	V - 2 (5V) <sup>1</sup>	850° C 1562° F	none
Thermoplastic Elastomer	Membrane plugs, membranes Abox 025/040	110° C 230° F	80° C 176° F	-30° C -22° F	HB	750° C 1382° F	none
Polyethylene, flame resistant	Entry Spouts	100° C 212° F	70° C 158° F	-40° C -40° F	HB	960° C 1760° F	none
Aluminum Al 12Si	AL series	130° C 266° F	100° C 212° F	-40° C -40° F	--		none
Polypropylene, flame resistant	HP series	120° C 248° F	100° C 212° F	-30° C -22° F	V-2	960° C 1760° F	none*

All data given according to specifications of manufacturers; no guarantee from Altech/Spelsberg can be claimed.  
<sup>1</sup> Approved for TK enclosures.  
 \* The basic material is halogen-free. Small amounts of halogen are contained in the flame proof finish of which approximately 6% is added to the materials.

Maximum permissible number of terminals and conductors to DIN 57606/VDE 0606									
The table below indicates the numbers of terminals and conductors which can be used in the respective Altech/Spelsberg junction box:									
Box Size Rated Cross-Section mm <sup>2</sup>	Minimum Box Volume cm <sup>3</sup>	Applies to Altech/Spelsberg Box Models	Number of Terminals and Conductors	Conductor cross section mm <sup>2</sup>					
				1.5	2.5	4	6	10	16
2.5 mm <sup>2</sup>	115 cm <sup>3</sup>	HP 70/80 Abox 025	Terminal Conductor	6 20	5 15				
4 mm <sup>2</sup>	200 cm <sup>3</sup>	HP 90 Abox 040	Terminal Conductor	8 24	6 20	5 15			
6 mm <sup>2</sup>	300 cm <sup>3</sup>	HP 100 Abox 060	Terminal Conductor	10 30	8 24	6 20	5 15		
10 mm <sup>2</sup>	500 cm <sup>3</sup>	Abox 100	Terminal Conductor	12 36	10 30	8 24	6 20	5 15	
16 mm <sup>2</sup>	825 cm <sup>3</sup>	Abox 160	Terminal Conductor	18 54	15 45	12 36	8 24	6 20	5 15

Chemical Resistance Materials														
Material	Product	water	weak acid	strong acid	weak alkali	strong alkali	alcohol	petrol	benzene	mineral oil	diesel	vegetable fat	animal fat	Ammonia
		Polystyrene, flame resistant, impact resistant	TK/AK/AKL and Abox series	●	●	◐	●	●	●	⊗	⊗	◐	⊗	◐
Polycarbonate, glass fibre reinforced, flame-, impact resistant	TK/AK-i/AKL/EK and Abox-i series	●	●	●	⊗	⊗	●	●	⊗	●	◐	●	●	⊗
Polycarbonate, transparent	TK/EK/AK/AKL hinged door and transparent lid	●	●	●	⊗	⊗	◐	◐	⊗	●	◐	●	●	⊗
Thermoplastic Elastomer	Membrane plug, membranes Abox 025/040	●	●	◐	●	◐	●	◐	◐	◐	◐	●	●	◐
Polyethylene, flame resistant	Entry Spouts	●	●	●	●	●	●	◐	⊗	◐	◐	●	●	●
Polyurethane	Lid seals for all models	●	◐	◐	◐	◐	◐	◐	◐	●	◐	●	●	◐
Aluminum Al 12 Si	AL series	●	●	◐	●	●	◐	●	⊗	●	●	◐	◐	●
Polypropylene, flame resistant	HP series	●	●	◐	●	◐	●	◐	◐	●	◐	●	●	●
		● = resistant	◐ = limited resistance			⊗ = non-resistant								

### UV - Resistance

The degree of weather resistance given by the polycarbonate enclosures used is generally adequate. The enclosures have been tested under practical conditions in tropical regions for many years. If transparent lids are used, it is recommended to protect them against the direct effects of sun radiation.

The American UL testing laboratories have approved several types of the PC series. A part of this examination is the test for UV resistance (UL 746 C).

The weather proof test according to DIN 53 387 / 1000 hours was conducted at the "National Materials Testing Authority" in Dortmund.

Materials tested:	Polyethylene gray + black	Polycarbonate, 15% GV, gray
	Polypropylene gray	Polycarbonate, transparent
	TPE gray	Polycarbonate, smoky topaz
	FS 131 gray	

Note: The test reports can be obtained from us free of charge.

### Shock-Testing by the Federal Office for Civil Defense

For installation in air raid shelters in accordance with standard test class RK 0.63/6.3, safety degree A. Devices up to an allowable weight of 2 kg are not subject to compulsory testing.

Of the larger enclosures, the following types have been tested and approved:

- TK 2518, TK 3625 as empty enclosure
- RK 2518, RK 3625 as serial terminal enclosure
- EK 12, EK 24 as distribution box
- AK 12, AK 24 as distribution board (Application certificate 023/95)

### Approval through «Bureau Veritas»

The following program series have been approved (Nr. 2661/2869/BO/OD) and are consequently suitable for installation in ships and shipyards:

- EK- Series distribution boards
- Nautic- Series junction boxes
- RK- Series terminal boxes
- TK- Series empty enclosures

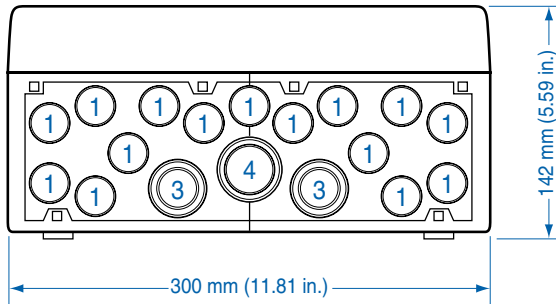
### Polyurethane - sealing material

All enclosure types utilize a seal composed of a dual-component, specialty mixture. The seals are halogen-free, chemically resistant (see summary on pg. 120) and especially temperature resistant. The seals are inserted by robots, are exactly evenly distributed, and have a solid grip on the upper section of the enclosure. Consequently, a secure and safe respect reliable function of the seals is guaranteed.

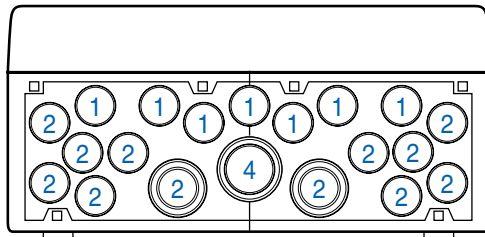
Clearance Installation Heights for Spelsberg Enclosures				
<p>A) from base bottom B) from standoffs in base C) from top of mounting rail NS 35 (mounted on base standoffs) D) from top of mounting plate</p> <p>[all dimensions in mm (in)]</p>				
Series	A	B	C	D
HP- Series				
HP 70/80	38.5 (1.52)	31.5 (1.24)		
HP 90	40 (1.57)	33 (1.30)		
HP 100	52.5 (2.07)	46.5 (1.83)		
Abox/Abox-i - Junction boxes				
Abox/Abox-i 025	42 (1.65)	36 (1.42)	34 [TS 15] (1.34)	
Abox/Abox-i 040	45 (1.77)	39 (1.54)		
Abox/Abox-i 0	49 (1.93)	49 (1.93)	41.5 (1.63)	38.5 (1.52)
Abox/Abox-i 100	60 (2.36)	60 (2.36)	52.5 (2.07)	49.5 (1.95)
Abox/Abox-i 160	71 (2.80)	71 (2.80)	63.5 (2.50)	60.5 (2.38)
Abox/Abox-i 350	92 (3.62)	92 (3.62)	84.5 (3.33)	81.5 (3.21)
AK/AKi - Distribution Boxes				
AK/AKi03	85 (3.35)	79 (3.11)	71.5 (2.81)	
AK/AKi05 to 24	111 (4.37)	105 (4.13)	98.5 (3.88)	
AK/AKi14 to 70	117.5 (4.63)	114 (4.49)	96 (3.78)	
AKL/AKi - Enclosures				
AKL/AKi 1 to 4	117.5 (4.63)	114 (4.49)	106.5 (4.19)	110 (4.33)
AKL/AKi 2-h to 4-h	194.5 (7.66)	191 (7.52)	183.5 (7.22)	187 (7.36)
EK- Distribution boxes				
EK 002	69 (2.76)	69 (2.76)	63.5 (2.50)	
EK 004/008/012/024	103 (4.06)	97 (3.82)	89.5 (3.52)	
TK- Enclosures - low cover				
TK 77/97/99/1309/1809	45 (1.77)	45 (1.77)	40 (1.57)	36 (1.42)
TK 1111	53 (2.09)	53 (2.09)	45.5 (1.79)	44 (1.73)
TK 1313	63 (2.48)	63 (2.48)	55.5 (2.19)	54 (2.13)
TK 1811/1818/2518	81 (3.19)	75 (2.95)	67.5 (2.66)	72 (2.83)
TK 3625	103 (4.06)	97 (3.82)	89.5 (3.41)	94 (3.70)
TK- Enclosures - high cover				
TK 77/97/99/1309/1809	69 (2.72)	69 (2.72)	64.0 (2.52)	60 (2.36)
TK 1111	77 (3.03)	77 (3.03)	69.5 (2.74)	68 (2.68)
TK 1313	87 (3.43)	87 (3.43)	79.5 (3.13)	78 (3.07)
TK 1811/1818/2518	103 (4.06)	97 (3.82)	89.5 (3.52)	94 (3.70)
TK 3625	156 (6.14)	150 (5.90)	142.5 (5.61)	147 (5.79)
TK- Enclosures - extra high cover				
TK 1811/1818/2518 – 16	156 (6.14)	150 (5.90)	142.5 (5.61)	147.5 (5.81)

## AK and AKL Knockout Details

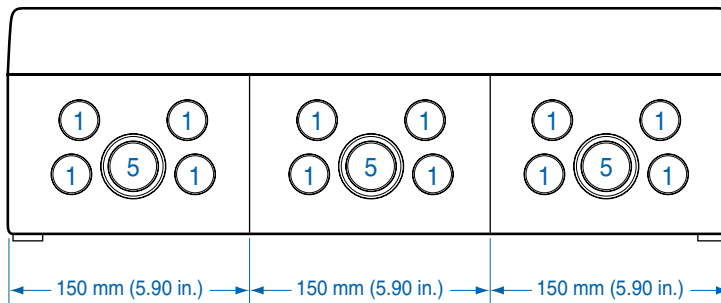
End View  
 AK - Bottom Only  
 AKL - Top and Bottom  
 End View  
 AK / AKL



End View  
 AK - Top Only  
 End View  
 AK - Top Only



Side View  
 AK  
 AKL  
 Side View  
 AKL / AKL



- ① = M20 (Knockout)
- ② = M20 (Installed Double Membrane Seal)
- ③ = M20/M25 (Knockout)
- ④ = M32/M40 (Knockout)
- ⑤ = M25/M32 (Knockout)

<b>Part No.</b>	<b>Page</b>	<b>Part No.</b>	<b>Page</b>	<b>Part No.</b>	<b>Page</b>
104-406	28	107-008	36	111-513	30
104-407	32	107-011	34	112-006	28
104-408	36	107-013	30	112-007	32
104-411	34	109-406	28	112-008	36
104-413	30	109-407	32	112-011	34
105-401	14	109-408	36	112-013	30
105-402	16	109-411	34	120-401	14
105-403	18	109-413	30	120-402	16
105-404	20	110-401	14	120-403	18
105-405	24	110-402	16	120-404	20
105-406	28	110-403	18	120-405	24
105-407	32	110-404	20	120-406	28
105-408	36	110-405	24	120-407	32
105-409	22	110-406	28	120-408	36
105-410	26	110-407	32	120-409	22
105-411	34	110-408	36	120-410	26
105-412	38	110-409	22	120-411	34
105-413	30	110-410	26	120-412	38
105-455	12	110-411	34	120-413	30
105-475	12	110-412	38	120-455	12
105-901	14	110-413	30	120-475	12
105-902	16	110-455	12	120-901	14
105-903	18	110-475	12	120-902	16
105-904	20	110-901	14	120-903	18
105-905	24	110-902	16	120-904	20
105-906	28	110-903	18	120-905	24
105-907	32	110-904	20	120-906	28
105-908	36	110-905	24	120-907	32
105-909	22	110-906	28	120-908	36
105-910	26	110-907	32	120-909	22
105-911	34	110-908	36	120-910	26
105-912	38	110-909	22	120-911	34
105-913	30	110-910	26	120-912	38
106-001	14	110-911	34	120-913	30
106-002	16	110-912	38	121-406	28
106-003	18	110-913	30	121-407	32
106-004	20	111-001	14	121-408	36
106-005	24	111-002	16	121-411	34
106-006	28	111-003	18	121-413	30
106-007	32	111-004	20	127-401	14
106-008	36	111-005	24	127-402	16
106-009	22	111-006	28	127-403	18
106-010	26	111-007	32	127-404	20
106-011	34	111-008	36	127-405	24
106-012	38	111-009	22	127-406	28
106-013	30	111-010	26	127-407	32
106-455	12	111-011	34	127-408	36
106-475	12	111-012	38	127-409	22
106-501	14	111-013	30	127-410	26
106-502	16	111-455	12	127-411	34
106-503	18	111-475	12	127-412	38
106-504	20	111-501	14	127-413	30
106-505	24	111-502	16	127-455	12
106-506	28	111-503	18	127-475	12
106-507	32	111-504	20	127-901	14
106-508	36	111-505	24	127-902	16
106-509	22	111-506	28	127-903	18
106-510	26	111-507	32	127-904	20
106-511	34	111-508	36	127-905	24
106-512	38	111-509	22	127-906	28
106-513	30	111-510	26	127-907	32
107-006	28	111-511	34	127-908	36
107-007	32	111-512	38	127-909	22

# Index

---

Part No.	Page	Part No.	Page	Part No.	Page
127-910	26	137-505	24	162-015	117
127-911	34	137-506	28	162-016	117
127-912	38	137-507	32	190-001	118
127-913	30	137-508	36	190-002	118
128-406	28	137-509	22	190-005	118
128-407	32	137-510	26	190-010	118
128-408	36	137-511	34	190-011	118
128-411	34	137-512	38	190-012	118
128-413	30	137-513	30	190-013	118
129-455	12	138-006	28	190-100	118
129-475	12	138-007	32	192-020	117
130-001	14	138-008	36	192-025	117
130-002	16	138-011	34	192-032	117
130-003	18	138-013	30	194-001	119
130-004	20	139-455	12	194-002	112
130-005	24	139-475	12	194-035	117
130-006	28	145-455	12	194-110	112
130-007	32	145-475	12	194-412	117
130-008	36	146-455	12	194-425	117
130-009	22	146-475	12	195-001	118
130-010	26	150-001	42	195-002	118
130-011	34	150-002	43	195-003	118
130-012	38	150-003	44	195-004	118
130-013	30	150-004	45	195-005	118
130-455	12	150-005	46	195-006	118
130-475	12	150-006	47	195-007	118
130-501	14	150-007	48	195-008	118
130-502	16	150-008	49	195-009	118
130-503	18	150-009	50	195-010	118
130-504	20	150-010	51	195-012	118
130-505	24	150-011	52	195-055	118
130-506	28	150-012	53	195-075	118
130-507	32	150-013	54	197-049	117
130-508	36	150-014	55	197-080	117
130-509	22	150-015	56	197-092	117
130-510	26	150-016	57	197-111	117
130-511	34	153-601	115	197-154	117
130-512	38	153-901	115	198-081	117
130-513	30	153-902	115	198-106	117
131-006	28	153-903	115	198-144	117
131-007	32	153-904	115	198-216	117
131-008	36	153-905	115	198-336	117
131-011	34	154-004	119	216-420	119
131-013	30	154-006	119	216-425	119
137-001	14	154-210	118	216-432	119
137-002	16	155-005	119	260-416	119
137-003	18	155-006	119	260-420	119
137-004	20	155-007	119	260-425	119
137-005	24	155-008	119	260-432	119
137-006	28	155-009	119	262-420	119
137-007	32	155-010	119	320-970	108
137-008	36	155-011	119	322-980	109
137-009	22	155-012	119	325-990	110
137-010	26	155-013	119	326-900	111
137-011	34	155-014	119	326-950	112
137-012	38	155-015	119	326-990	113
137-013	30	155-016	119	460-525	108,109
137-455	12	162-009	117	490-402	70
137-475	12	162-010	117	490-404	71
137-501	14	162-011	117	490-406	72
137-502	16	162-012	117	490-410	73
137-503	18	162-013	117	490-416	74
137-504	20	162-014	117	490-435	75

<b>Part No.</b>	<b>Page</b>	<b>Part No.</b>	<b>Page</b>	<b>Part No.</b>	<b>Page</b>
490-902	70	7211978	120	747-902	78
490-904	71	7211979	120	747-903	79
490-906	72	7211980	120	747-904	80
490-910	73	7211981	120	790-204	92
490-916	74	7211982	120	790-205	93
490-935	75	7211983	120	790-207	94
5308940	120	7211984	120	790-211	95
5308941	120	7211985	120	791-001	117
5308942	120	7211986	120	793-004	119
5308943	120	7211990	120	795-001	119
5308944	120	7211991	120	795-002	119
5308945	120	7211992	120	795-003	119
5308946	120	735-403	92	795-004	119
5308947	120	735-405	93	795-012	78
5308948	120	735-409	94	795-013	79
5308949	120	735-412	95	795-014	80
5308950	120	735-414	96	799-012	92-104
5308951	120	735-428	97	802-107	60
5308952	120	735-442	98	802-407	60
5308953	120	735-456	99	802-607	60
5308954	120	735-470	100	802-907	60
5308955	120	736-403	92	803-107	61
5308956	120	736-405	93	803-407	61
5308957	120	736-409	94	803-607	61
5308958	120	736-412	95	803-907	61
5308959	120	736-414	96	804-107	62
5308960	120	736-428	97	804-407	62
5308962	120	736-442	98	804-607	62
5309612	120	736-456	99	804-907	62
5309615	120	736-470	100	806-407	63
5309616	120	737-414	101	806-907	63
5309619	120	737-428	102	810-410	64
5309620	120	737-442	103	810-910	64
5309624	120	737-456	104	816-410	65
5309625	120	738-414	101	816-910	65
5309632	120	738-428	102	835-410	66
5309640	120	738-442	103	835-910	66
5309650	120	738-456	104	840-004	60-62, 70-71, 110-111
5309663	120	740-401	77	840-006	63, 72
5309712	120	740-402	78	840-010	64, 73
5309715	120	740-403	79	840-016	65, 74
5309716	120	740-404	80	840-035	66, 75
5309719	120	741-401	77	894-016	117
5309720	120	741-402	78	894-035	117
5309724	120	741-403	79	895-006	118
5309725	120	741-404	80	895-010	118
5309732	120	742-902	78	895-016	118
5309740	120	742-903	79	895-035	118
5309750	120	742-904	80	D-409	117
5309763	120	743-902	78	D-413	117
542-502	84	743-903	79	D-417	117
542-504	85	743-904	80	D-428	117
542-508	86	744-001	77	X-573	84
542-512	87	744-002	78	X-575	85
542-524	88	744-003	79	X-578	86
548-102	118	744-004	80	X-583	87
562-035	117	745-001	77	X-721-02	88
562-735	117	745-002	78		
706-102	118	745-003	79		
7211974	120	745-004	80		
7211975	120	746-902	78		
7211976	120	746-903	79		
7211977	120	746-904	80		