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Lowara

8" Submersible Electric Pumps

6Z855, 6Z875

6Z895, 6Z8125 Series

60 Hz



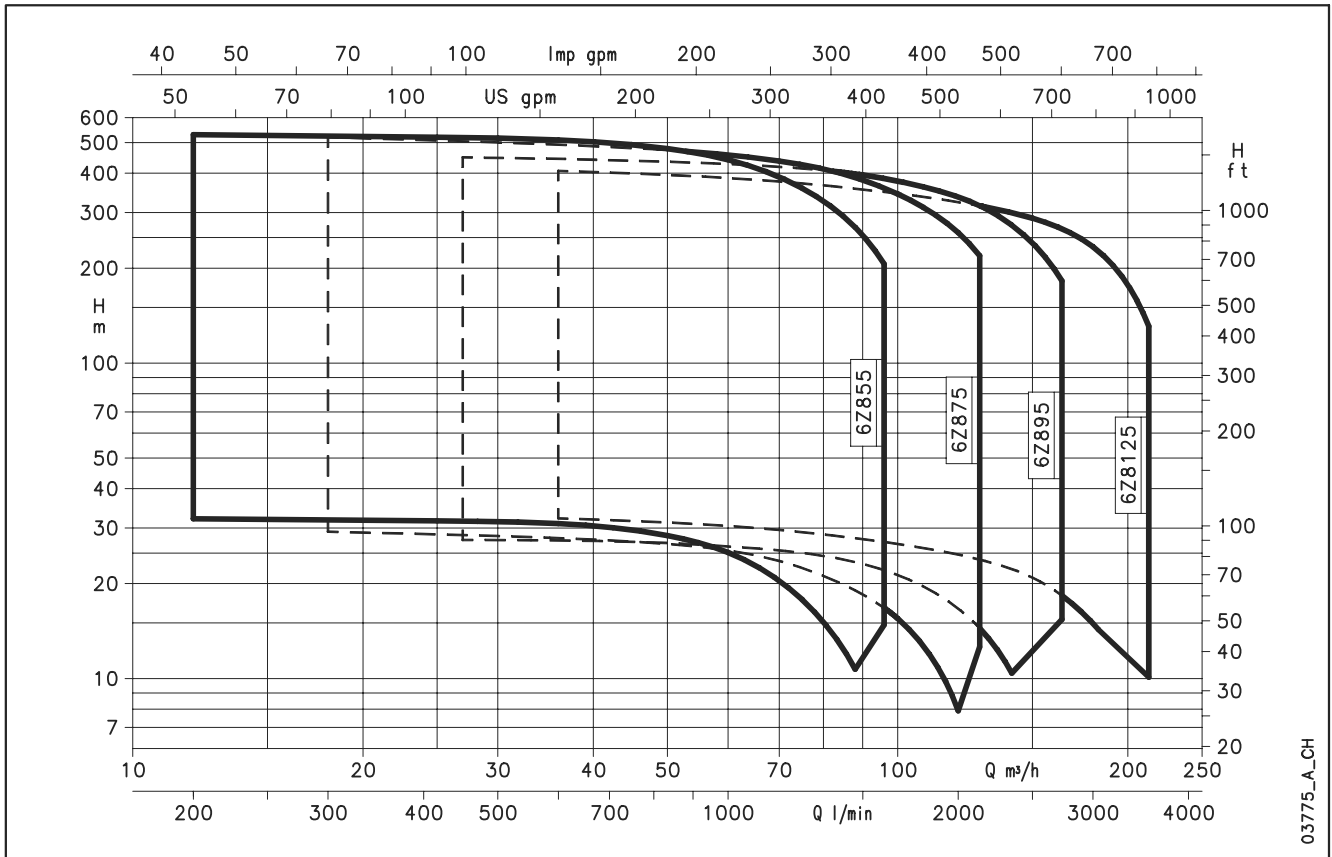
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6Z855, 6Z875, 6Z895, 6Z8125 SERIES HYDRAULIC PERFORMANCE RANGE AT 60 Hz



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Lowara

8" Submersible Electric Pumps

**6Z855
6Z875
6Z895
6Z8125
Series**



MARKET SECTORS

AGRICULTURAL, INDUSTRIAL.

APPLICATIONS

- Water supply from deep wells.
- Pressure boosting and water distribution in civil and industrial systems.
- Supply of surge tanks and reservoirs.
- Firefighting and washing systems.
- Water level control.
- Irrigation.
- Mining.

SPECIFICATIONS

PUMP

- **Delivery:** up to 210 m³/h.
- **Head:** up to 550 m.
- Maximum pump overall diameter (2 cable covers included): 198 mm. for all versions.
- Maximum electric pump immersion depth:
250 m with L6C motors,
40 m with MC8 and MC10 motors,
standard configuration (with lip seal);
version with mechanical seal
available on request (max. immersion
depth 350 m).
- Maximum permissible quantity of
suspended sand: 100 g/m³.
- Standard delivery outlet:
Rp 5" for all versions.
- Motor power: from 5,5 to 150 kW.

MOTOR

- L6C motor: three-phase water-filled asynchronous motors with hermetically sealed stator.
- MC8, and MC10 rewindable three-phase asynchronous motors with water-bath windings.
- Three-phase version:
L6C:
from 4 to 37 kW 230, 380 V 60 Hz.
MC8:
from 30 to 92 kW 380, 460 V 60 Hz.
MC10:
from 92 to 150 kW 380, 460 V 60 Hz.
- Maximum supply voltage variations:
L6C +5% -10%.
MC8, MC10 +6% -10%.
- PVC windings for MC8 and MC10 motors.
- Horizontal operation:
L6C up to 37 kW provided that the associated pump can apply an axial thrust of at least 250 N on the entire operating field.

MC8 and MC10 available on request for all versions.

- Maximum number of starts per hour: 25 (L6C), 15 (MC8) and 10 (MC10).
- Maximum temperature of water in contact with motor: 35°C (L6C), 25°C (MC8 and MC10).

CONSTRUCTIONS FEATURES

PUMP

- Robust and lightweight, easy to maintain and corrosion resistant in non-aggressive environments.
 - **Impellers and diffusers** made of **stainless steel**.
 - **Delivery casing** made of **stainless steel**.
 - **Non-return valve** made of **stainless steel, with integrated spring**.
 - **Suction support** made of **stainless steel**.
 - **Shaft made of stainless steel**.
- The guide bearings and wear rings ensure high resistance to wear and guarantee the **constant and long-lasting performance of the hydraulic characteristics**.
- Coupling and flange mounting dimensions meet **NEMA** standards.
- 6ZR8 version in **DUPLEX stainless steel** is also available.

OPTIONAL FEATURES

MOTOR

- Different voltages and frequencies.
- High temperature versions.
- MC8 and MC10 for horizontal installation.

ACCESSORIES

- Coupling flange.
- Panels.
- Cables.



TABLE OF MATERIALS 6Z8

COMPONENT	MATERIAL	DESIGNATION	
		EUROPE	USA
Delivery head / Valve Casing	Stainless steel	EN 10213-4-GX5CrNi19-10 (1.4308)	A744-CF 8
Valve	Stainless steel	EN 10213-4-GX5CrNi19-10 (1.4308)	A744-CF 8
Valve seat	NBR 90		
Valve spring	Stainless steel	EN 10088-1-X5CrNiMo17-12-2 (1.4401)	AISI 316
Diffuser / Bowl	Stainless steel	EN 10213-4-GX5CrNi19-10 (1.4308)	A744-CF 8
O-Ring diffuser	NBR 70		
Impeller	Stainless steel	EN 10213-4-GX5CrNi19-10 (1.4308)	A744-CF 8
Taperlock	Duplex stainless steel	EN 10088-1-X2CrNiMoN22-5-3 (1.4462)	A276/A790-S31803
Wear ring	POM (DELFIN [®])		
Lower support / Suction Casing	Stainless steel	EN 10213-4-GX5CrNi19-10 (1.4308)	A744-CF 8
Suction strainer	Stainless steel	DIN 17440-X6CrNiMoTi17-12-2 (1.4571)	AISI 316Ti
Pump shaft	Stainless steel	EN 10088-1-X17CrNi16-2 (1.4057)	AISI 431
Coupling	Stainless steel	EN 10088-1-X17CrNi16-2 (1.4057)	AISI 431
Bearing bush	EPDM + LOXAMID [®]		
Thrust Bearing	PTFE + 25% carbon		
Screw, stud, nut	Stainless steel	ISO 3506-1/2 A4-70	AISI 316
Cable protection	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304

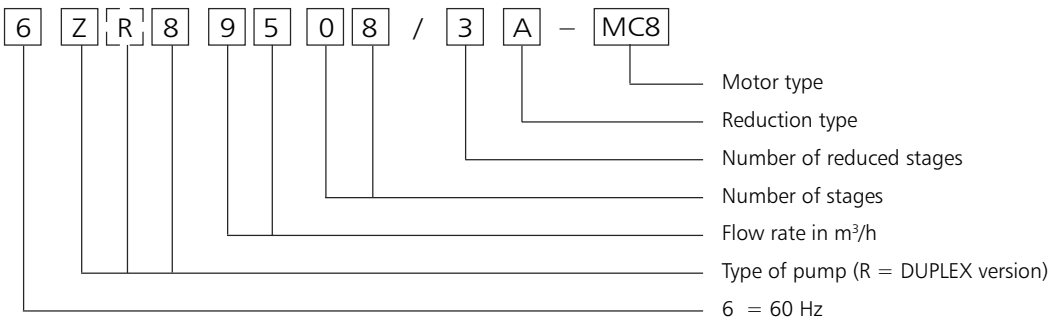
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TABLE OF MATERIALS 6ZR8

COMPONENT	MATERIAL	DESIGNATION	
		EUROPE	USA
Delivery head / Valve Casing	Duplex stainless steel	EN 10213-4-GX2CrNiMoCuN25-6-3-3 (1.4517)	
Valve	Duplex stainless steel	EN 10213-4-GX2CrNiMoCuN25-6-3-3 (1.4517)	
Valve seat	NBR 90		
Valve spring	Hastelloy C4	DIN17744-NiMo16Cr16Ti (2.4610)	N06455
Diffuser / Bowl	Duplex stainless steel	EN 10213-4-GX2CrNiMoCuN25-6-3-3 (1.4517)	
O-Ring diffuser	NBR 70		
Impeller	Duplex stainless steel	EN 10213-4-GX2CrNiMoCuN25-6-3-3 (1.4517)	
Taperlock	Duplex stainless steel	EN 10088-1-X2CrNiMoN22-5-3 (1.4462)	A276/A790-S31803
Wear ring	POM (DELFIN [®])		
Lower support / Suction Casing	Duplex stainless steel	EN 10213-4-GX2CrNiMoCuN25-6-3-3 (1.4517)	
Suction strainer	Stainless steel	EN 10088-1X1NiCrMoCu25-20-5 (1.4539)	AISI 904L
Pump shaft	Duplex stainless steel	EN 10088-1-X2CrNiMoN22-5-3 (1.4462)	A276/A790-S31803
Coupling	Duplex stainless steel	EN 10088-1-X2CrNiMoN22-5-3 (1.4462)	A276/A790-S31803
Bearing bush	EPDM + LOXAMID [®]		
Thrust Bearing	PTFE + 25% carbon		
Screw, stud, nut	Duplex stainless steel	EN 10088-1-X2CrNiMoN22-5-3 (1.4462)	A276/A790-S31803
Cable protection	Stainless steel	EN 10088-1X1NiCrMoCu25-20-5 (1.4539)	AISI 904L

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IDENTIFICATION CODE



EXAMPLE : 6ZR8 9508/3A - MC8

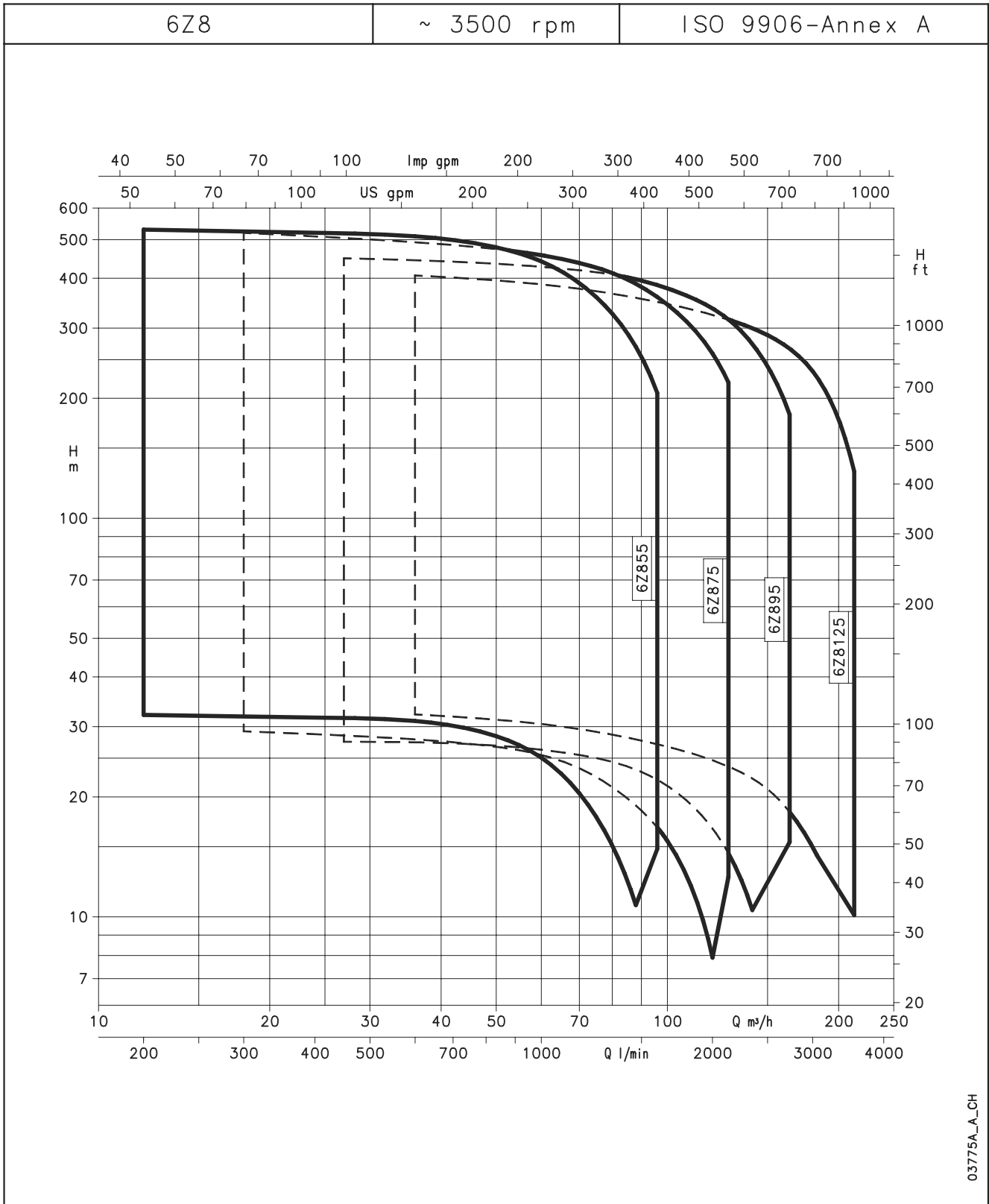
8" electric pump at 60 Hz, made of DUPLEX, flow rate 95 m³/h, 10 stages including 3 reduced ones, coupled to an 8" MC8 motor.



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6Z8 SERIES HYDRAULIC PERFORMANCE RANGE AT 60 Hz



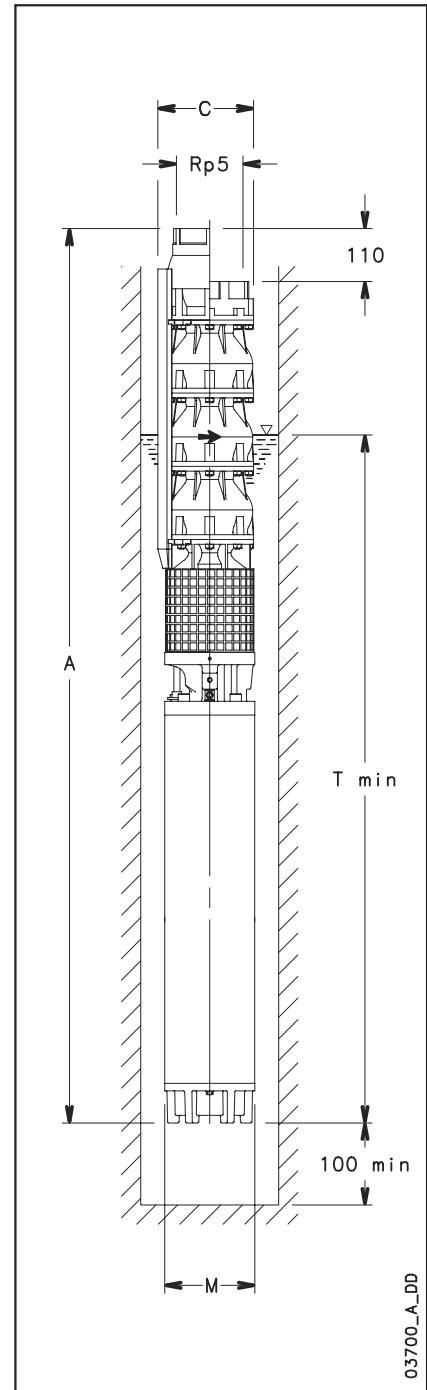
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6Z855 SERIES, 1 TO 4 STAGES OPERATING CHARACTERISTICS AT 60 Hz

PUMP TYPE	MOTOR * POWER		Q = DELIVERY						
			l/min	0	200	600	1000	1467	1600
			m ³ /h	0	12	36	60	88	96
			H = TOTAL HEAD METERS COLUMN OF WATER						
6Z855 01/1A	5,5	7,5	33	32,1	31	25,1	10,7		
6Z855 01	7,5	10	41,3	40,2	38,5	33	19,6	14,8	
6Z855 02/2A	11	15	66	64,2	62,1	50	21,3		
6Z855 02/1A	15	20	74,6	72,7	70,1	58,7	31		
6Z855 02	15	20	82,8	80,8	77,3	66,1	39,3	29,6	
6Z855 03/3A	15	20	98,7	95,9	92,3	74	31,3		
6Z855 03/1A	18,5	25	115,4	112,3	107,4	90,3	49,7		
6Z855 03	22	30	123,8	120,7	115,4	98,5	58,2	43,7	
6Z855 04/2A	30	40	147,7	143,6	137,3	113,3	59,4		
6Z855 04	30	40	165,9	161,7	154,9	133,1	79,8	60,4	

* SERVICE FACTOR = 1.15

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DIMENSIONS AND WEIGHTS

PUMP TYPE	DIMENSIONS (mm)				WEIGHT kg ⁽³⁾
	A ⁽⁴⁾	C ⁽¹⁾	M	Tmin ⁽²⁾	
6Z855 01/1A-L6C	1191	200	140	1631	69,8
6Z855 01-L6C	1220	200	140	1660	71,8
6Z855 02/2A-L6C	1425	200	140	1730	88
6Z855 02/1A-L6C	1480	200	140	1785	94,2
6Z855 02-L6C	1480	200	140	1785	94,2
6Z855 03/3A-L6C	1615	200	140	1785	102,9
6Z855 03/1A-L6C	1690	200	140	1860	110,3
6Z855 03-L6C	1750	200	140	1920	116,3
6Z855 04/2A-L6C	2015	200	140	2050	135,5
6Z855 04-L6C	2015	200	140	2050	137,5

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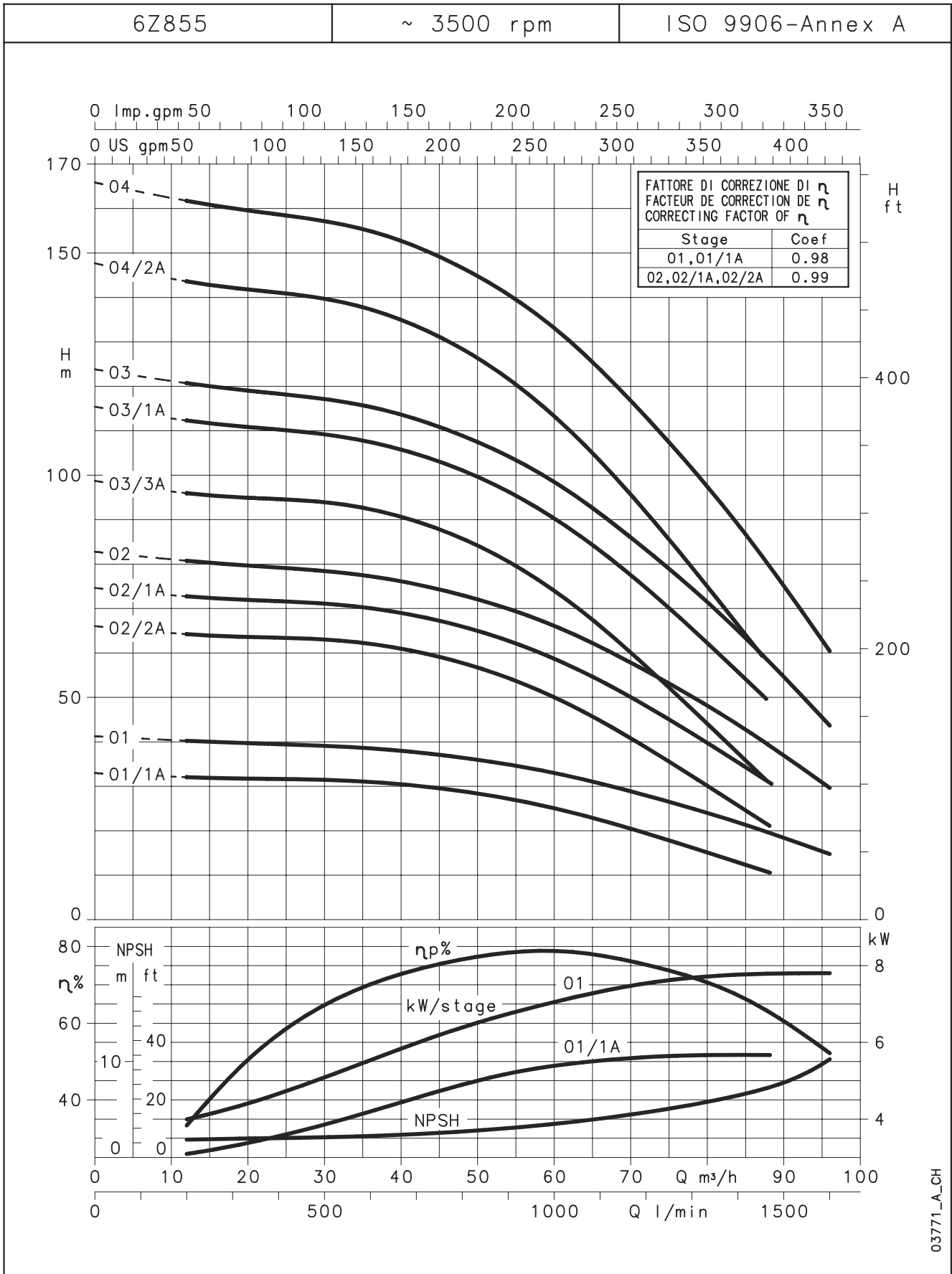
- 1) Max electric-pump diameter with 2 motor cables included.
In case of 1 motor cable C = 198 mm with L6C motor.
- 2) T min valid only for max. flow speed of 4,2 m/s.
For higher speeds, please contact our sales network.
- 3) Without cables.
- 4) For pumps without non-return valve, reduce dimension A by 110 mm, and reduce weight by 4 Kg.



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6Z855 SERIES, 1 TO 4 STAGES OPERATING CHARACTERISTICS AT 60 Hz



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The head loss of the non-return valve is included.
 These performances are valid for liquids with density $\rho = 1,0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.



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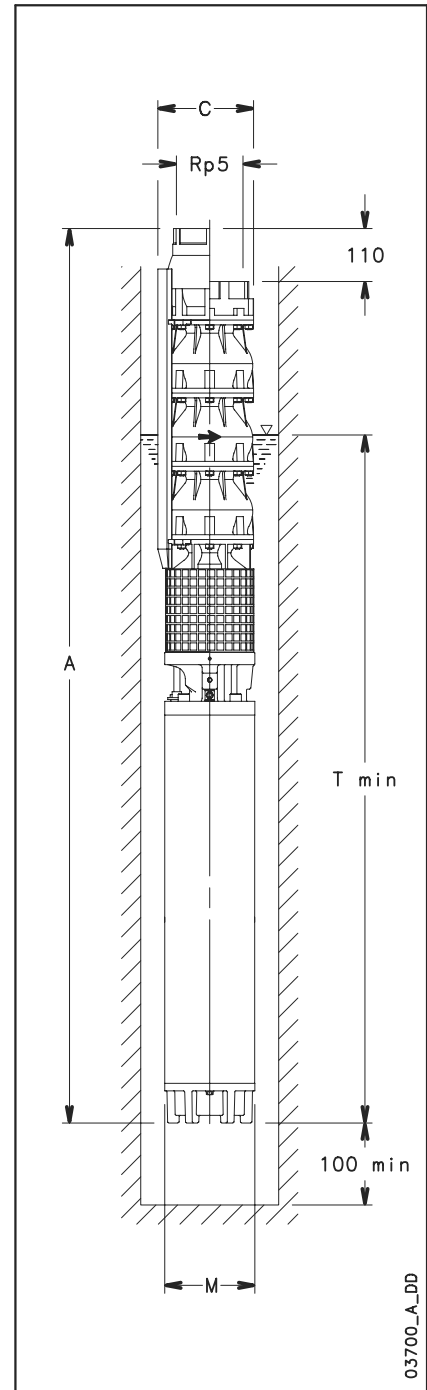
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6Z855 SERIES, 5 TO 13 STAGES OPERATING CHARACTERISTICS AT 60 Hz

PUMP TYPE	MOTOR * POWER		Q = DELIVERY						
			l/min	0	200	600	1000	1467	1600
			m ³ /h	0	12	36	60	88	96
		H = TOTAL HEAD METERS COLUMN OF WATER							
6Z855 05/2A	30	40	189,9	184,8	177,3	148,6	80		
6Z855 05	37	50	206,9	201,6	192,5	164,5	97,5	73,3	
6Z855 06/2A	37	50	230,7	224,4	214,4	179,5	98,8		
6Z855 06	44	60	250,3	244,4	235,1	203,2	123,7	94,5	
6Z855 07	52	70	294,2	287,5	277,8	242,4	150,9	116,8	
6Z855 08	59	80	336	328,3	317,1	277	172,4	133,5	
6Z855 09	66	90	378	369,4	356,7	311,2	193,5	149,7	
6Z855 10	75	100	417,6	407,7	392,4	339,9	207,7	159,1	
6Z855 11	75	100	458,5	447,5	430,3	371,8	225,8	172,4	
6Z855 12	92	125	500	488,1	469,4	405,4	246,1	187,8	
6Z855 13	92	125	542,7	529,8	509,8	441,3	269,4	206,2	

* SERVICE FACTOR = 1.15

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DIMENSIONS AND WEIGHTS

PUMP TYPE	DIMENSIONS (mm)				WEIGHT kg ⁽³⁾
	A ⁽⁴⁾	C ⁽¹⁾	M	Tmin ⁽²⁾	
6Z855 05/2A-L6C	2150	200	140	2050	146,2
6Z855 05-L6C	2280	200	140	2180	159,2
6Z855 06/2A-L6C	2415	200	140	2180	167,8
6Z855 06-MC8	2430	203,3	192	2195	249,8
6Z855 07-MC8	2655	203,3	192	2285	277,8
6Z855 08-MC8	2880	203,3	192	2375	303,5
6Z855 09-MC8	3105	203,3	192	2465	330,1
6Z855 10-MC8	3330	203,3	192	2555	355,8
6Z855 11-MC8	3465	203,3	192	2555	364,4
6Z855 12-MC8	3800	303,3	192	2755	411,1
6Z855 13-MC8	3935	203,3	192	2755	419,7

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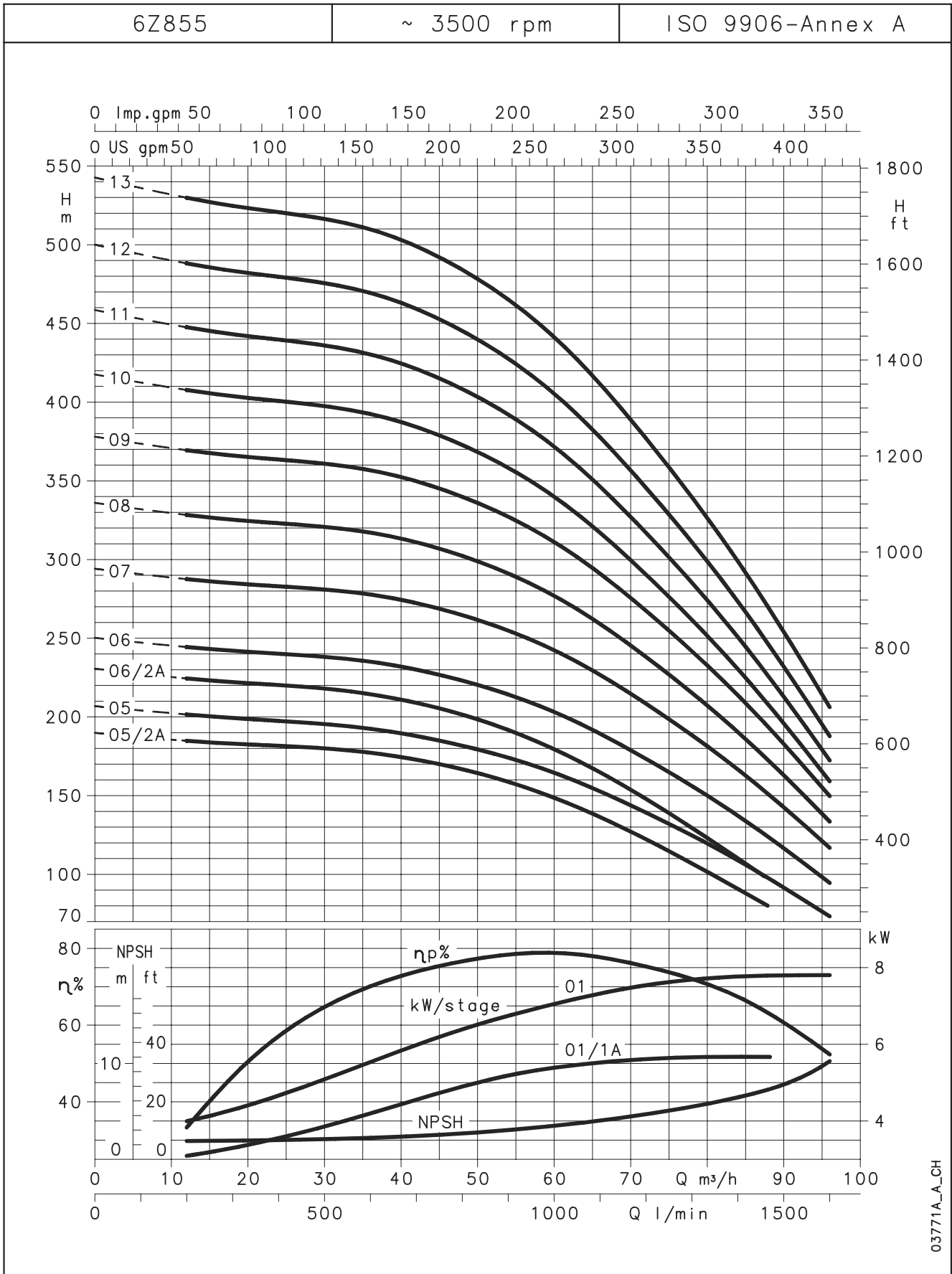
- 1) Max electric-pump diameter with 2 motor cables included.
In case of 1 motor cable C = 198 mm with L6C motor.
C = 201,5 mm with MC8 motor.
- 2) T min valid only for max. flow speed of 4,2 m/s.
For higher speeds, please contact our sales network.
- 3) Without cables.
- 4) For pumps without non-return valve, reduce dimension A by 110 mm, and reduce weight by 4 Kg.



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6Z855 SERIES, 5 TO 13 STAGES OPERATING CHARACTERISTICS AT 60 Hz



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The head loss of the non-return valve is included.
 These performances are valid for liquids with density $\rho = 1,0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.



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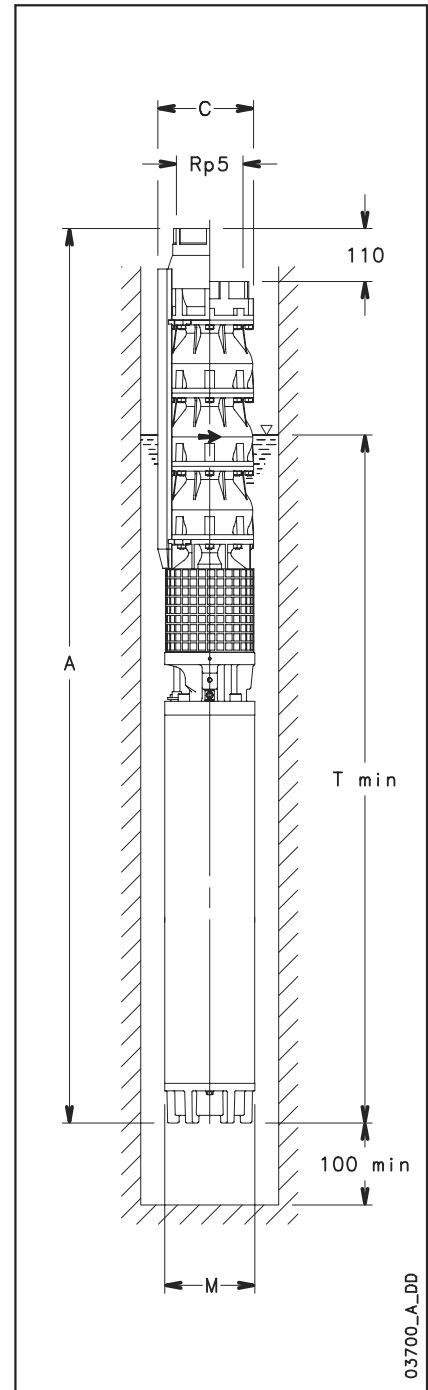
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6Z875 SERIES, 1 TO 4 STAGES OPERATING CHARACTERISTICS AT 60 Hz

PUMP TYPE	MOTOR * POWER		Q = DELIVERY						
			l/min	0	300	800	1400	2000	2133
			m ³ /h	0	18	48	84	120	128
			H = TOTAL HEAD METERS COLUMN OF WATER						
6Z875 01/1B	5,5	7,5	30,5	29,2	26,9	20,1	7,9		
6Z875 01/1C	7,5	10	38,9	36,6	33,3	27,1	15,8	12,6	
6Z875 01	11	15	42,3	39,6	36,2	30,2	19,2	16,1	
6Z875 02/2B	11	15	61,2	58,6	53,7	40,2	15,8		
6Z875 02/1A	15	20	74	69,8	63,7	50,9	27,8		
6Z875 02	18,5	25	84	78,4	71,4	59,3	37,3	31,2	
6Z875 03/2B	18,5	25	102,5	97,2	88,8	69,2	34		
6Z875 03/1A	22	30	115,1	108,2	98,5	79,3	45		
6Z875 03	30	40	126,6	118,4	108	90	57,1	47,9	
6Z875 04/2A	30	40	148,1	139,8	127,8	102,7	56,5		
6Z875 04/1A	30	40	157,6	147,9	134,8	109,9	64,7		
6Z875 04	37	50	167,8	156,8	142,6	118,2	74,1	61,8	

* SERVICE FACTOR = 1.15

6z875-2p60-en_a_th



DIMENSIONS AND WEIGHTS

PUMP TYPE	DIMENSIONS (mm)				WEIGHT kg ⁽³⁾
	A ⁽⁴⁾	C ⁽¹⁾	M	Tmin ⁽²⁾	
6Z875 01/1B-L6C	1208	200	140	1631	70,1
6Z875 01/1C-L6C	1237	200	140	1660	72,1
6Z875 01-L6C	1307	200	140	1730	79,7
6Z875 02/2B-L6C	1459	200	140	1730	89
6Z875 02/1A-L6C	1514	200	140	1785	95,2
6Z875 02-L6C	1589	200	140	1860	102,6
6Z875 03/2B-L6C	1741	200	140	1860	111,8
6Z875 03/1A-L6C	1801	200	140	1920	117,8
6Z875 03-L6C	1931	200	140	2050	130,4
6Z875 04/2A-L6C	2083	200	140	2050	139,6
6Z875 04/1A-L6C	2083	200	140	2050	139,6
6Z875 04-L6C	2213	200	140	2180	152,6

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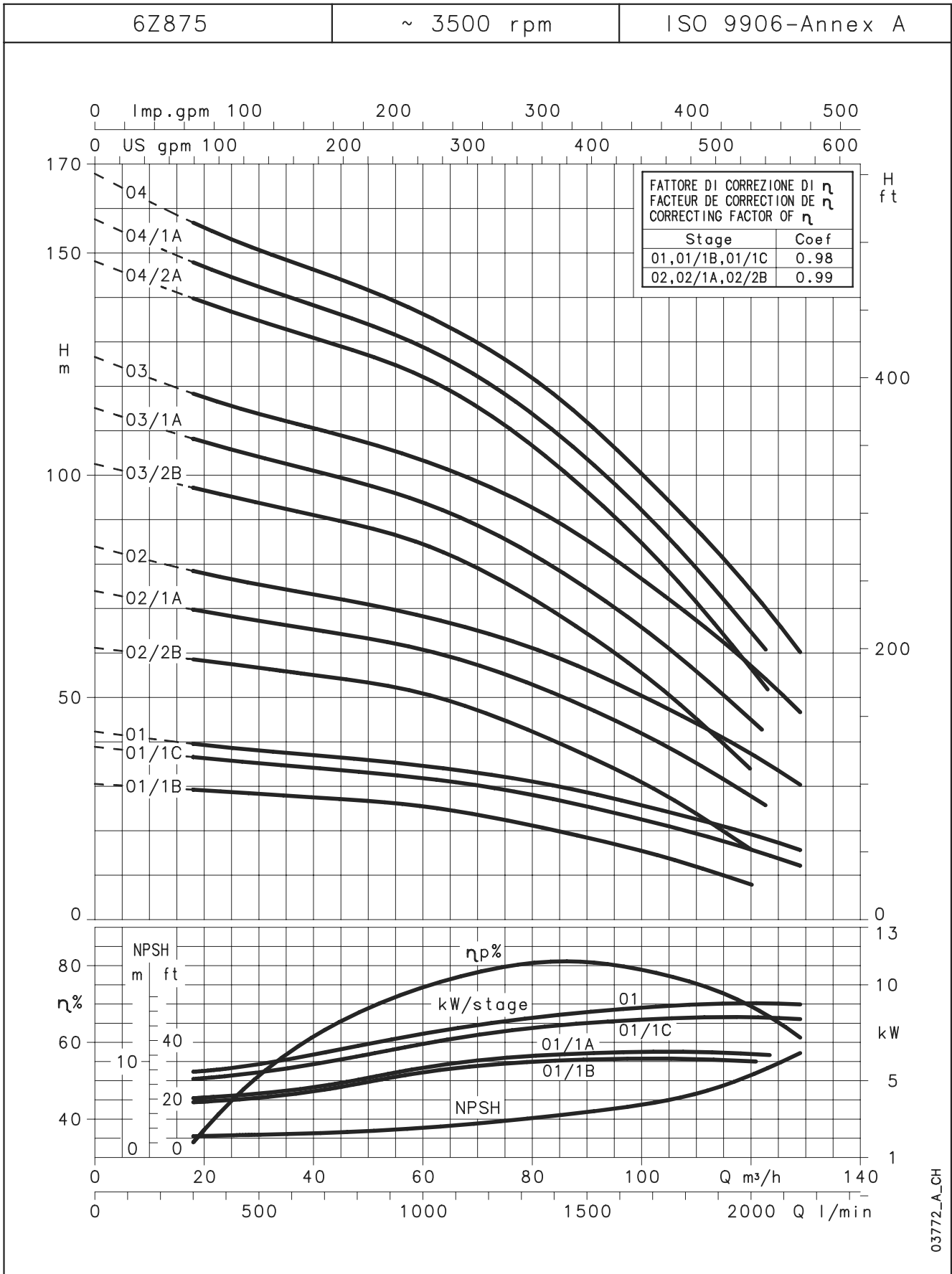
- 1) Max electric-pump diameter with 2 motor cables included.
In case of 1 motor cable C = 198 mm with L6C motor.
- 2) T min valid only for max. flow speed of 4,2 m/s.
For higher speeds, please contact our sales network.
- 3) Without cables.
- 4) For pumps without non-return valve, reduce dimension A by 110 mm, and reduce weight by 4 Kg.



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6Z875 SERIES, 1 TO 4 STAGES OPERATING CHARACTERISTICS AT 60 Hz



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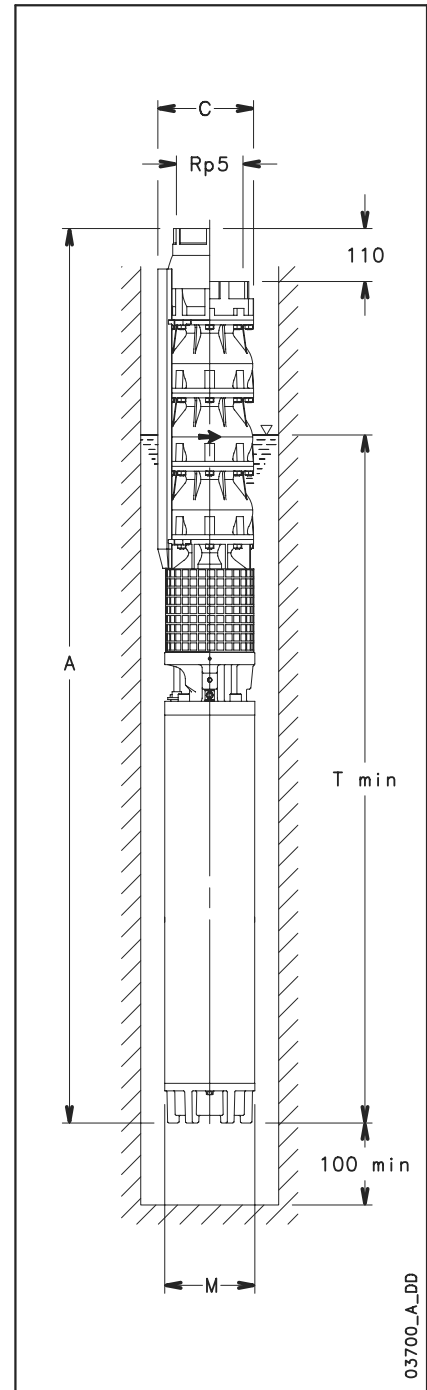
The head loss of the non-return valve is included.
These performances are valid for liquids with density $\rho = 1,0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

6Z875 SERIES, 5 TO 13 STAGES OPERATING CHARACTERISTICS AT 60 Hz

PUMP TYPE	MOTOR * POWER		Q = DELIVERY						
			l/min	0	300	800	1400	2000	2133
			m ³ /h	0	18	48	84	120	128
		H = TOTAL HEAD METERS COLUMN OF WATER							
6Z875 05/2A	37	50	189	177,9	162	130,2	72,8		
6Z875 05/1A	37	50	198,3	185,8	168,4	137,2	80,8		
6Z875 05	44	60	212,3	198,5	181,4	151,6	97	81,5	
6Z875 06/2A	44	60	234	220,2	201,4	164,5	96,4		
6Z875 06	52	70	255,2	238,6	218,3	183	117,7	99,2	
6Z875 07	59	80	299,6	280,2	257	216,8	104,9	119,4	
6Z875 08	66	90	342,3	320,2	293,5	247,3	160,5	136	
6Z875 09	75	100	381,7	356,9	326,2	272,6	174,2	146,5	
6Z875 10	92	125	423,9	393,3	362,1	302,4	192,9	162,2	
6Z875 11	92	125	467	436,7	399,2	334	213,9	180,1	
6Z875 12	110	150	513,9	480,8	440,7	371,2	240,7	204	
6Z875 13	110	150	556	520,1	476,5	400,6	259,1	219,2	

* SERVICE FACTOR = 1.15

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DIMENSIONS AND WEIGHTS

PUMP TYPE	DIMENSIONS (mm)				WEIGHT kg ⁽³⁾
	A ⁽⁴⁾	C ⁽¹⁾	M	Tmin ⁽²⁾	
6Z875 05/2A-L6C	2365	200	140	2180	161,9
6Z875 05/1A-L6C	2365	200	140	2180	161,9
6Z875 05-MC8	2380	203,3	192	2195	243,9
6Z875 06/2A-MC8	2532	203,3	192	2195	252,4
6Z875 06-MC8	2622	203,3	192	2285	272,4
6Z875 07-MC8	2864	203,3	192	2375	298,7
6Z875 08-MC8	3106	203,3	192	2465	325,9
6Z875 09-MC8	3348	203,3	192	2555	352,1
6Z875 10-MC8	3700	203,3	192	2755	399,4
6Z875 11-MC8	3852	203,3	192	2755	408,6
6Z875 12-MC10	3951	236	236	2702	528,8
6Z875 13-MC10	4103	236	236	2702	538

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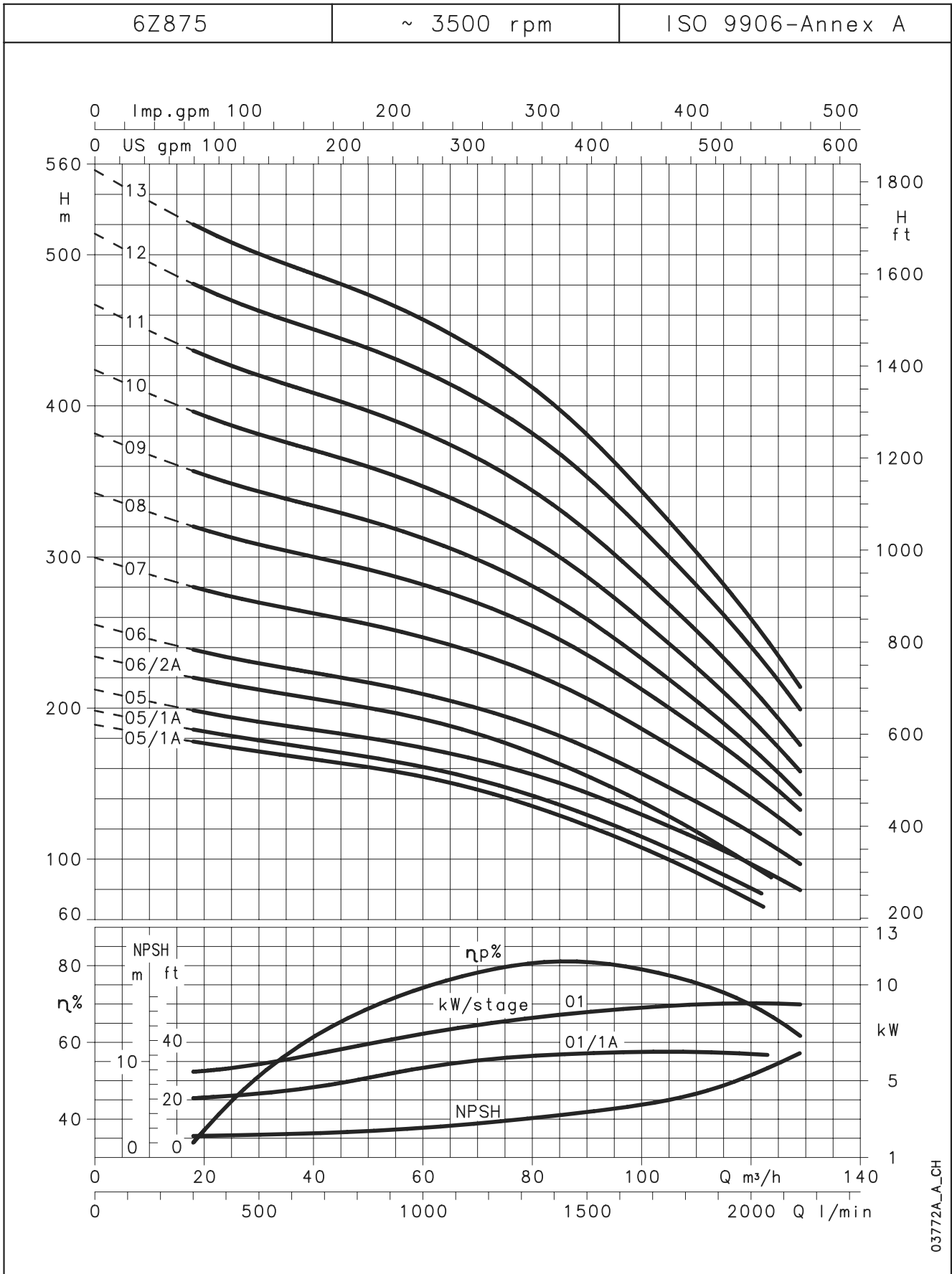
- 1) Max electric-pump diameter with 2 motor cables included.
In case of 1 motor cable C = 198 mm with L6C motor.
C = 201,5 mm with MC8 motor.
C = 236 mm with MC10 motor.
- 2) T min valid only for max. flow speed of 4,2 m/s.
For higher speeds, please contact our sales network.
- 3) Without cables.
- 4) For pumps without non-return valve, reduce dimension A by 110 mm, and reduce weight by 4 Kg.



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6Z875 SERIES, 5 TO 13 STAGES OPERATING CHARACTERISTICS AT 60 Hz



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The head loss of the non-return valve is included.
 These performances are valid for liquids with density $\rho = 1,0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.



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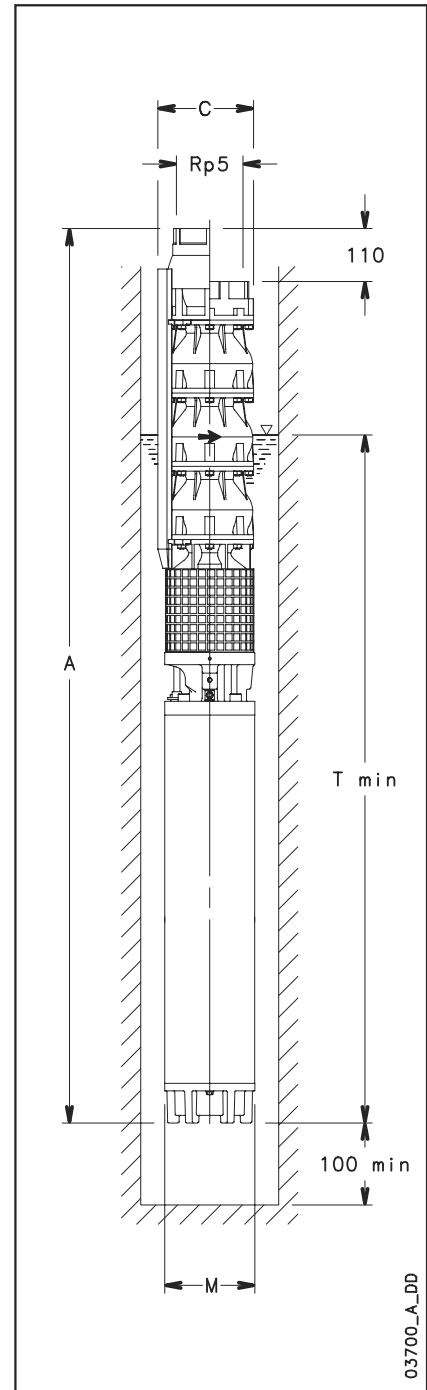
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6Z895 SERIES, 1 TO 4 STAGES OPERATING CHARACTERISTICS AT 60 Hz

PUMP TYPE	MOTOR * POWER		Q = DELIVERY						
			l/min	0	450	1100	1800	2350	2733
			m ³ /h	0	27	66	108	141	164
			H = TOTAL HEAD METERS COLUMN OF WATER						
6Z895 01/1B	11	15	27,7	27,5	25,8	19,6	10,4		
6Z895 01/1A	11	15	34	33,3	31,9	26,1	17,5		
6Z895 01	15	20	41,4	40,3	37,8	32	23,9	15,4	
6Z895 02/2B	15	20	55,6	55,1	51,6	39,3	20,9		
6Z895 02/2A	18,5	25	67,7	66,1	62,9	51,1	33,8		
6Z895 02	30	40	81,9	79,5	74	61,9	45,1	28,1	
6Z895 03/2B	30	40	97,2	95,6	89,8	72,1	45,7		
6Z895 03/2A	30	40	109	106,3	100,5	83	57,4		
6Z895 03	37	50	123,6	120	111,8	94,1	69,3	43,8	
6Z895 04/2B	37	50	137,6	134,6	125,6	101,2	66,4		
6Z895 04/2A	44	60	151,5	148,1	140,3	117,6	84,4		
6Z895 04	52	70	165,9	161,6	151,4	128,4	95,9	62	

* SERVICE FACTOR = 1.15

6z895-2p60-en_a_th



03700_A_DD

DIMENSIONS AND WEIGHTS

PUMP TYPE	DIMENSIONS (mm)				WEIGHT kg ⁽³⁾
	A ⁽⁴⁾	C ⁽¹⁾	M	Tmin ⁽²⁾	
6Z895 01/1B-L6C	1307	200	140	1730	79,7
6Z895 01/1A-L6C	1307	200	140	1730	79,7
6Z895 01-L6C	1362	200	140	1785	85,9
6Z895 02/2B-L6C	1514	200	140	1785	95,2
6Z895 02/2A-L6C	1589	200	140	1860	102,6
6Z895 02-L6C	1779	200	140	2050	121,2
6Z895 03/2B-L6C	1931	200	140	2050	130,4
6Z895 03/2A-L6C	1931	200	140	2050	130,4
6Z895 03-L6C	2061	200	140	2180	143,4
6Z895 04/2B-L6C	2213	200	140	2180	152,6
6Z895 04/2A-MC8	2228	203,3	192	2195	234,6
6Z895 04-MC8	2318	203,3	192	2285	254,6

6z895-2p60-en_a_td

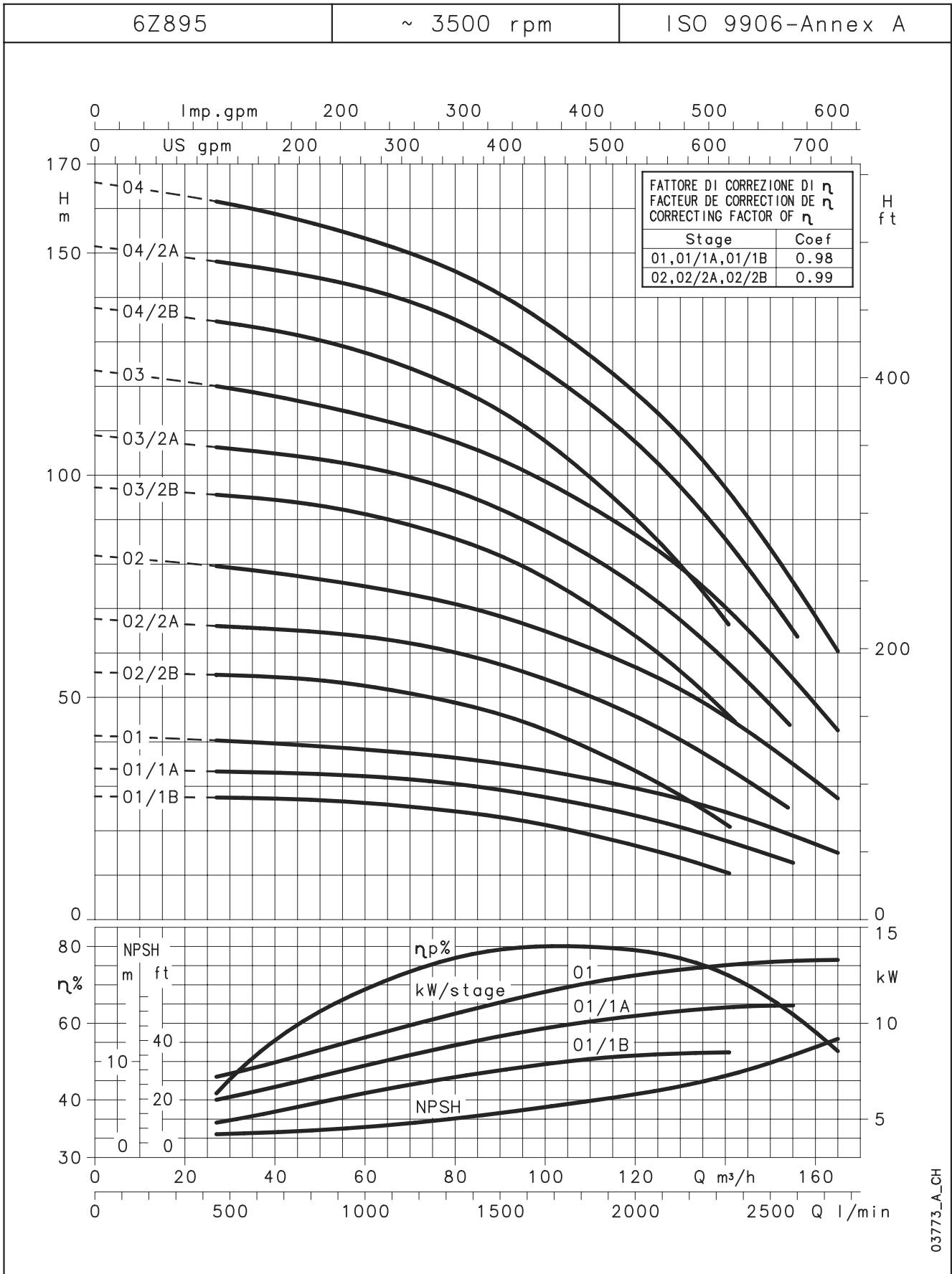
- 1) Max electric-pump diameter with 2 motor cables included.
In case of 1 motor cable C = 198 mm with L6C motor.
C = 201,5 mm with MC8 motor.
- 2) T min valid only for max. flow speed of 4,2 m/s.
For higher speeds, please contact our sales network.
- 3) Without cables.
- 4) For pumps without non-return valve, reduce dimension A by 110 mm, and reduce weight by 4 Kg.



ITT

Lowara

6Z895 SERIES, 1 TO 4 STAGES OPERATING CHARACTERISTICS AT 60 Hz



03773_A-CH

The head loss of the non-return valve is included.
 $\Delta H_v = 0,0000533 \cdot Q^2$ Loss = 0,2 / 0,45 / 0,75 m at 60 / 90 / 120 m³/h
 These performances are valid for liquids with density $\rho = 1,0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.



ITT

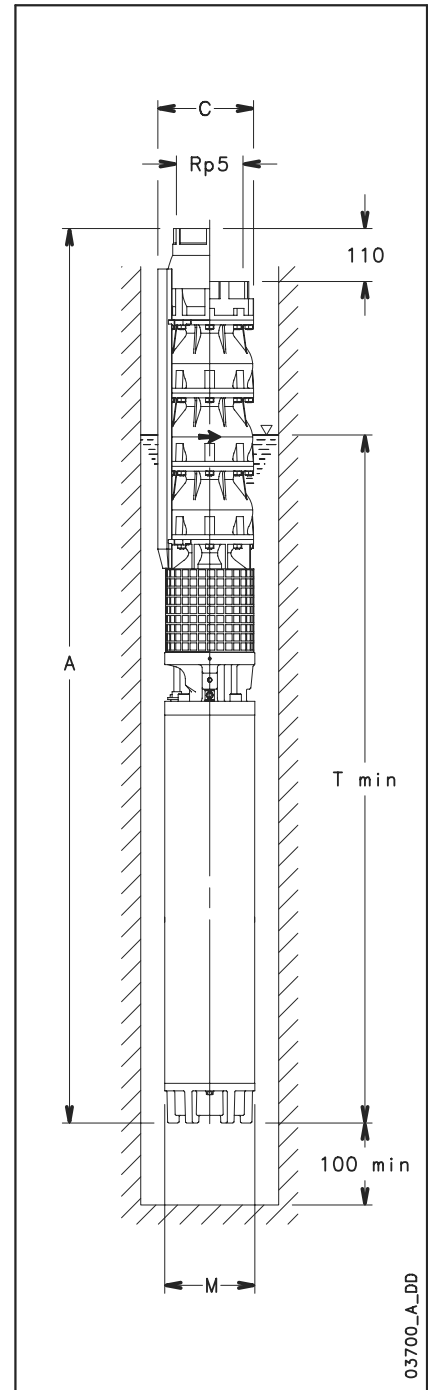
Lowara

6Z895 SERIES, 5 TO 11 STAGES OPERATING CHARACTERISTICS AT 60 Hz

PUMP TYPE	MOTOR * POWER		Q = DELIVERY						
			l/min	0	450	1100	1800	2600	2733
			m ³ /h	0	27	66	108	156	164
			H = TOTAL HEAD METERS COLUMN OF WATER						
6Z895 05/3A	55	75	187	183,2	174,8	147,4	80,9		
6Z895 05	59	80	209,1	204	192,3	165,3	99,3	83,7	
6Z895 06/3A	66	90	228,9	224	213,2	180,4	100,8		
6Z895 06	75	100	249,6	243,3	228,5	194,9	114,6	95,9	
6Z895 07/3A	75	100	268,7	262,5	248,4	208,7	114,5		
6Z895 07	92	125	290,7	283,3	265,9	226,3	132,3	110,4	
6Z895 08/3A	92	125	310,9	303,7	287,4	242,5	135,3		
6Z895 08	92	125	332,5	324	304,1	259,1	151,9	126,9	
6Z895 09	110	150	376,3	367,3	345,9	296,4	177,2	149,1	
6Z895 10	129	175	418,8	408,8	385,1	330,5	198,6	167,3	
6Z895 11	129	175	460,1	449	422,6	362,1	216,5	182,1	

* SERVICE FACTOR = 1.15

6z895a-2p60-en_a_th



DIMENSIONS AND WEIGHTS

PUMP TYPE	DIMENSIONS (mm)				WEIGHT kg ⁽³⁾
	A ⁽⁴⁾	C ⁽¹⁾	M	Tmin ⁽²⁾	
6Z895 05/3A-MC8	2510	203,3	192	2325	269,9
6Z895 05-MC8	2560	203,3	192	2325	280,9
6Z895 06/3A-MC8	2802	203,3	192	2465	308,1
6Z895 06-MC8	2892	203,3	192	2555	325,1
6Z895 07/3A-MC8	3044	203,3	192	2555	333,7
6Z895 07-MC8	3244	203,3	192	2755	371,7
6Z895 8/3A-MC8	3396	203,3	192	2755	380,9
6Z895 08-MC8	3396	203,3	192	2755	380,9
6Z895 09-MC10	3495	236	236	2702	501,1
6Z895 10-MC10	3797	236	236	2852	557,4
6Z895 11-MC10	3949	236	236	2852	566,6

6z895a-2p60-en_a_td

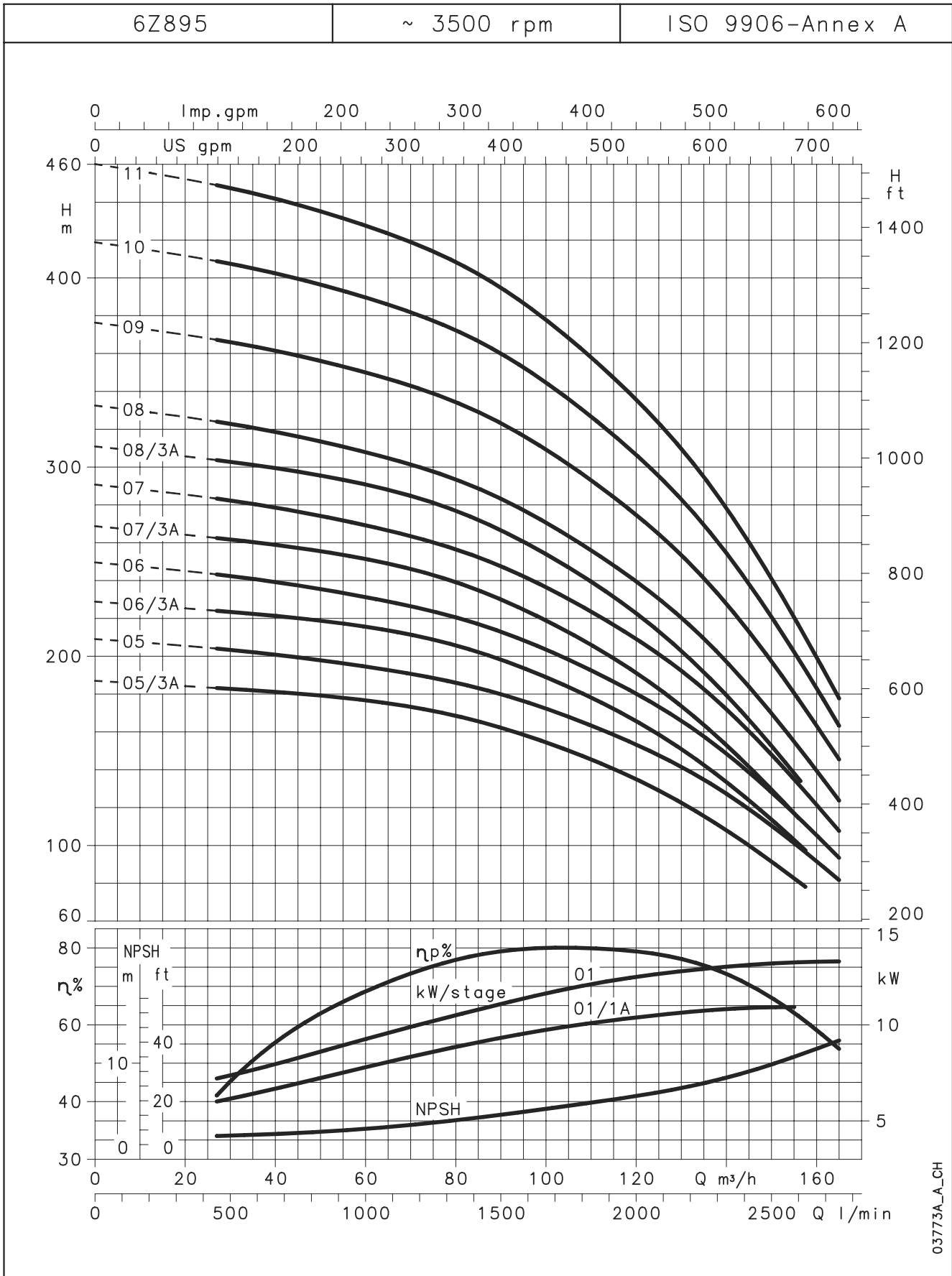
- 1) Max electric-pump diameter with 2 motor cables included.
In case of 1 motor cable C = 201,5 mm with MC8 motor.
C = 236 mm with MC10 motor.
- 2) T min valid only for max. flow speed of 4,2 m/s.
For higher speeds, please contact our sales network.
- 3) Without cables.
- 4) For pumps without non-return valve, reduce dimension A by 110 mm, and reduce weight by 4 Kg.



ITT

Lowara

6Z895 SERIES, 5 TO 11 STAGES OPERATING CHARACTERISTICS AT 60 Hz



03773A_A_CH

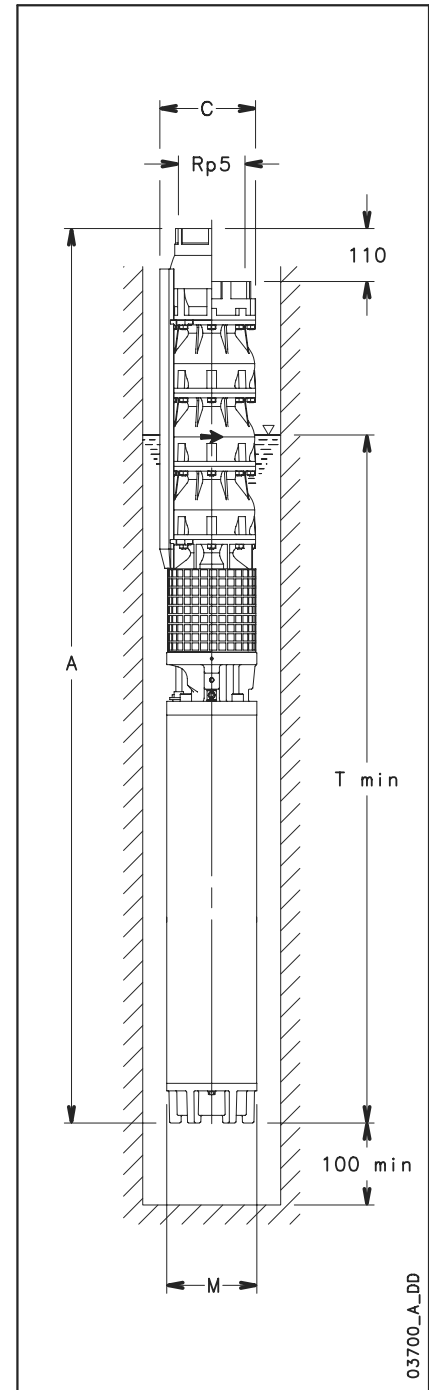
The head loss of the non-return valve is included.
 $\Delta H_v = 0,0000533 \cdot Q^2$ Loss = 0,2 / 0,45 / 0,75 m at 60 / 90 / 120 m³/h
 These performances are valid for liquids with density $\rho = 1,0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

6Z8125 SERIES, 1 TO 4 STAGES OPERATING CHARACTERISTICS AT 60 Hz

PUMP TYPE	MOTOR * POWER		Q = DELIVERY						
			l/min	0	600	1600	2500	3050	3550
			m ³ /h	0	36	96	150	183	213
		H = TOTAL HEAD METERS COLUMN OF WATER							
	kW	HP							
6Z8125 01/1A	11	15	34,9	32,2	27,1	20,9	14,3		
6Z8125 01	15	20	39,2	35,8	30,4	24,7	18,9	10,1	
6Z8125 02/2B	15	20	60,1	55,7	45,6	31,9	17,8		
6Z8125 02/2A	18,5	25	69	63,5	53,3	40,9	27,6		
6Z8125 02	22	30	77,8	71,1	60,2	48,8	37	19,6	
6Z8125 03/2B	30	40	100,6	92,7	77,3	58,1	38		
6Z8125 03/2A	30	40	108,7	99,8	84,1	66,2	47		
6Z8125 03	37	50	117,7	107,5	91,4	74,4	57	30,7	
6Z8125 04/2B	37	50	138	126,8	105,8	80,8	54,8		
6Z8125 04/2A	44	60	150,6	138,2	117,3	93,9	69,2		
6Z8125 04	44	60	159,4	145,6	124,2	101,8	79	44,1	

* SERVICE FACTOR = 1.15

6z8125-2p60-en_a_th



DIMENSIONS AND WEIGHTS

PUMP TYPE	DIMENSIONS (mm)				WEIGHT kg ⁽³⁾
	A ⁽⁴⁾	C ⁽¹⁾	M	Tmin ⁽²⁾	
6Z8125 01/1A-L6C	1307	200	140	1730	79,7
6Z8125 01-L6C	1362	200	140	1785	85,9
6Z8125 02/2B-L6C	1514	200	140	1785	95,2
6Z8125 02/2A-L6C	1589	200	140	1860	102,6
6Z8125 02-L6C	1649	200	140	1920	108,6
6Z8125 03/2B-L6C	1931	200	140	2050	130,4
6Z8125 03/2A-L6C	1931	200	140	2050	130,4
6Z8125 03-L6C	2061	200	140	2180	143,4
6Z8125 04/2B-L6C	2213	200	140	2180	152,6
6Z8125 04/2A-MC8	2228	203,3	192	2195	234,6
6Z8125 04-MC8	2228	203,3	192	2195	234,6

6z8125-2p60-en_a_td

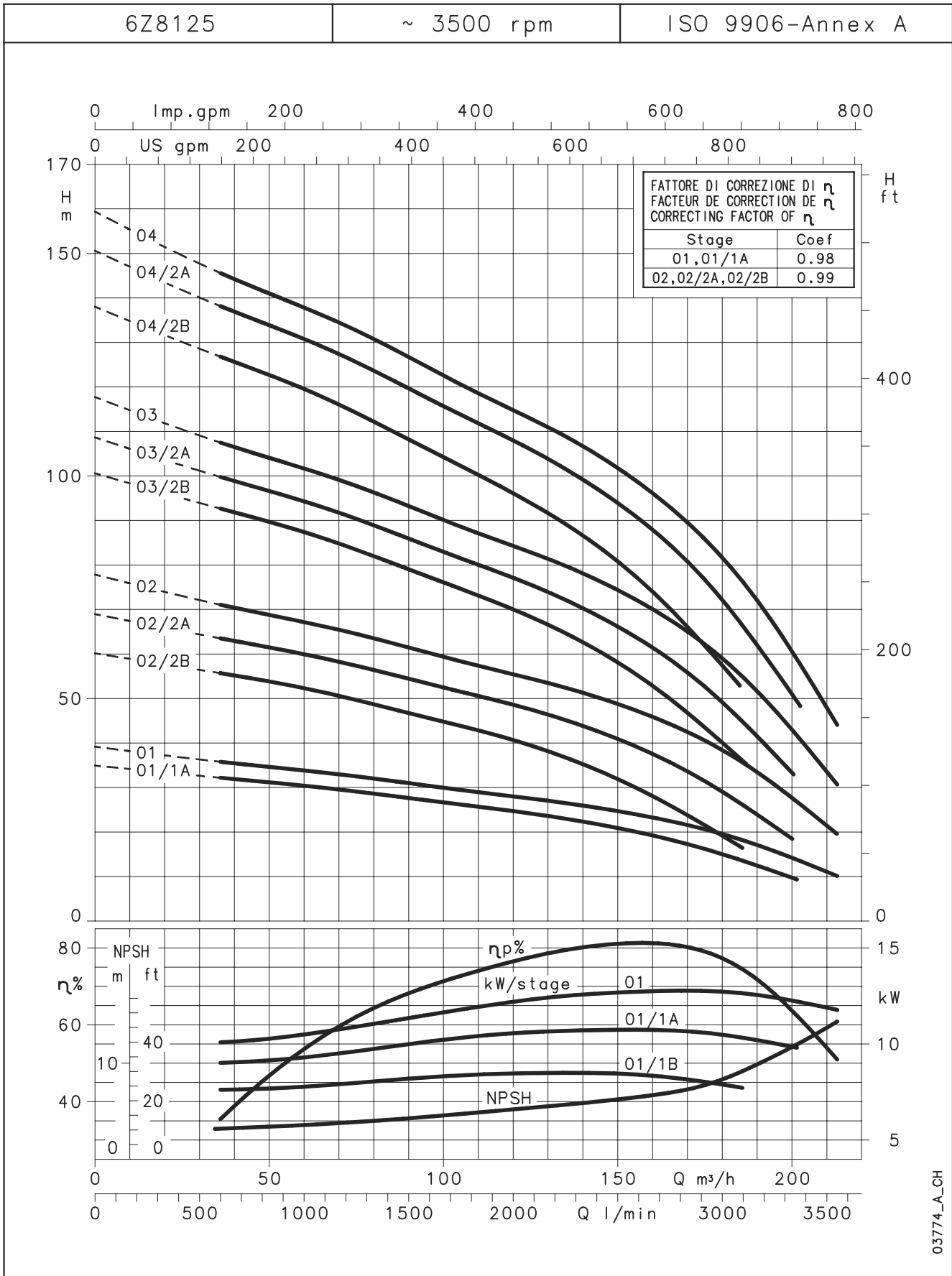
- 1) Max electric-pump diameter with 2 motor cables included.
In case of 1 motor cable C = 198 mm with L6C motor.
C = 201,5 mm with MC8 motor.
- 2) T min valid only for max. flow speed of 4,2 m/s.
For higher speeds, please contact our sales network.
- 3) Without cables.
- 4) For pumps without non-return valve, reduce dimension A by 110 mm, and reduce weight by 4 Kg.



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6Z8125 SERIES, 1 TO 4 STAGES OPERATING CHARACTERISTICS AT 60 Hz



03774-A-CH

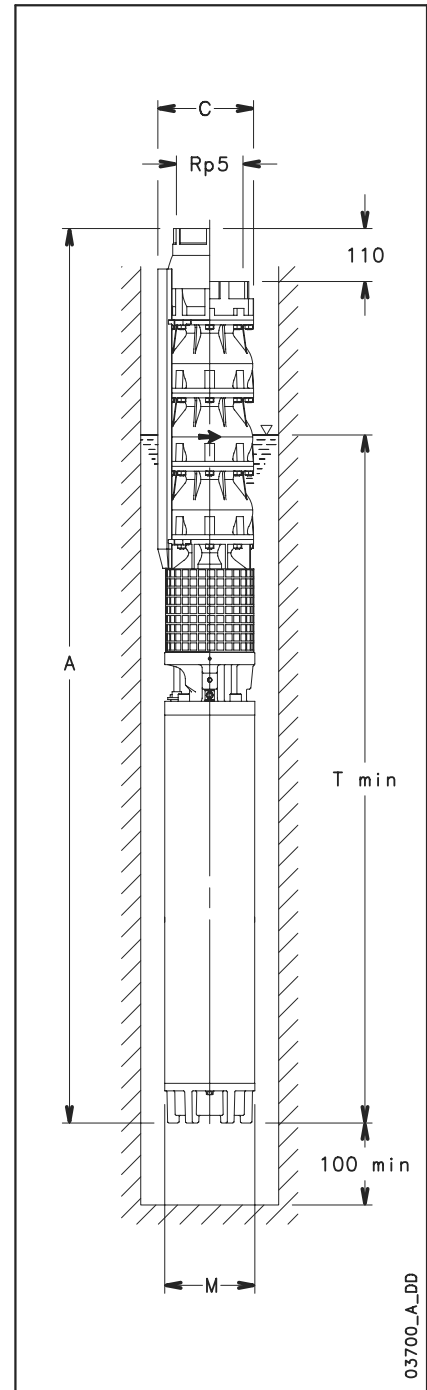
The head loss of the non-return valve is included.
 $\Delta H_v = 0,0000533 \cdot Q^2$ Loss = 0,35 / 0,75 / 1,35 m at 80 / 120 / 160 m³/h
 These performances are valid for liquids with density $\rho = 1,0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

6Z8125 SERIES, 5 TO 11 STAGES OPERATING CHARACTERISTICS AT 60 Hz

PUMP TYPE	MOTOR * POWER		Q = DELIVERY						
			l/min	0	600	1600	2500	3350	3550
			m ³ /h	0	36	96	150	201	213
		H = TOTAL HEAD METERS COLUMN OF WATER							
6Z8125 05/3A	52	70	188,5	173,1	147,5	118,4	63,3		
6Z8125 05	55	75	202,7	185,2	159,1	131,6	79,6	60,3	
6Z8125 06/3A	66	90	229,1	210,2	179,3	144,8	79,2		
6Z8125 06/1A	66	90	238,2	217,9	186,6	153,1	89,3		
6Z8125 07/3A	75	100	265,9	243,7	207,1	166,6	89,9		
6Z8125 07	92	125	280,1	255,8	218,6	179,5	105,6	78,8	
6Z8125 08/3A	92	125	307	281,3	239,5	193,6	106,5		
6Z8125 08	92	125	320,3	292,6	250,2	205,6	121,2	90,5	
6Z8125 09	110	150	364,5	332,9	285,6	235,7	142,1	107,3	
6Z8125 10	129	175	405,7	370,7	318,2	263	159,2	120,4	
6Z8125 11	129	175	445,2	406,7	349	288,1	173,5	130,9	

* SERVICE FACTOR = 1.15

6z8125a-2p60-en_a_th



DIMENSIONS AND WEIGHTS

PUMP TYPE	DIMENSIONS (mm)				WEIGHT kg ⁽³⁾
	A ⁽⁴⁾	C ⁽¹⁾	M	Tmin ⁽²⁾	
6Z8125 05/3A-MC8	2470	203,3	192	2285	263,9
6Z8125 05-MC8	2510	203,3	192	2325	269,9
6Z8125 06/3A-MC8	2802	203,3	192	2465	308,1
6Z8125 06/1A-MC8	2802	203,3	192	2465	308,1
6Z8125 07/3A-MC8	3044	203,3	192	2555	333,7
6Z8125 07-MC8	3244	203,3	192	2755	371,7
6Z8125 8/3A-MC8	3396	203,3	192	2755	380,9
6Z8125 08-MC8	3396	203,3	192	2755	380,9
6Z8125 09-MC10	3516	236	236	2702	501,1
6Z8125 10-MC10	3818	236	236	2852	557,4
6Z8125 11-MC10	3970	236	236	2852	566,6

6z8125a-2p60-en_a_td

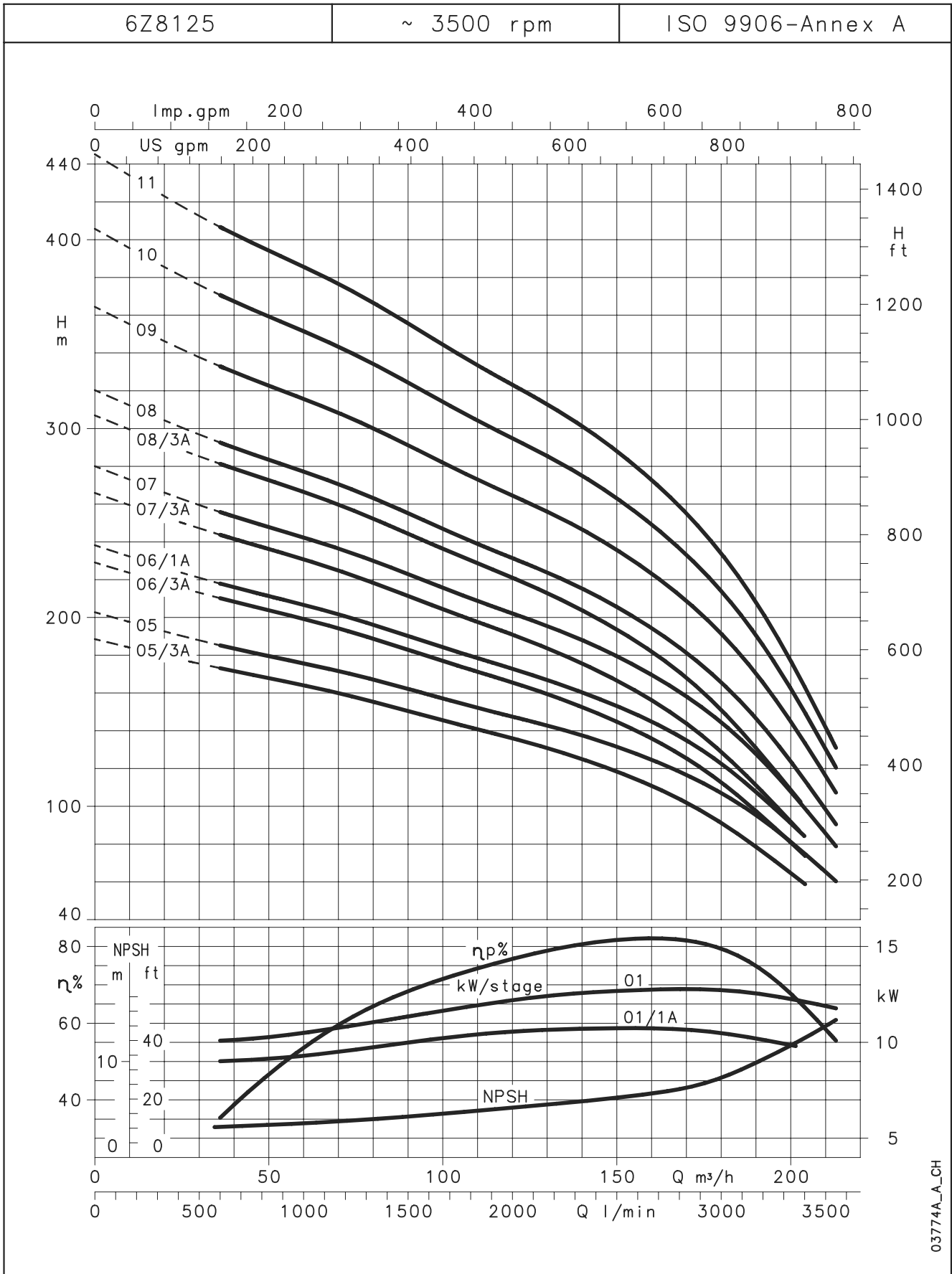
- 1) Max electric-pump diameter with 2 motor cables included.
In case of 1 motor cable C = 201,5 mm with MC8 motor.
C = 236 mm with MC10 motor.
- 2) T min valid only for max. flow speed of 4,2 m/s.
For higher speeds, please contact our sales network.
- 3) Without cables.
- 4) For pumps without non-return valve, reduce dimension A by 110 mm, and reduce weight by 4 Kg.



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6Z8125 SERIES, 5 TO 11 STAGES OPERATING CHARACTERISTICS AT 60 Hz



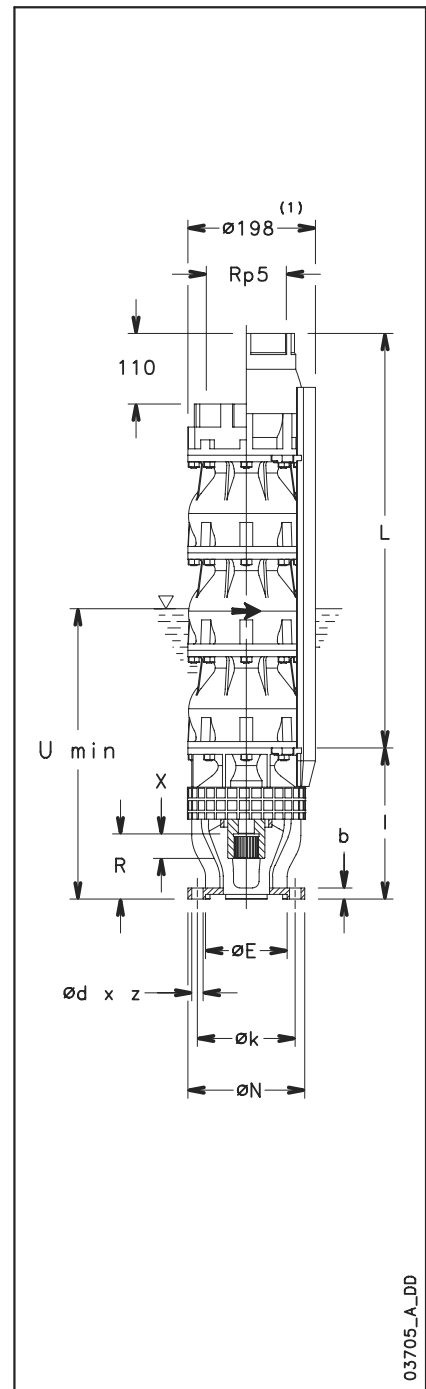
03774A_A_CH

The head loss of the non-return valve is included.
 $\Delta H_v = 0,0000533 \cdot Q^2$ Loss = 0,35 / 0,75 / 1,35 m at 80 / 120 / 160 m³/h
 These performances are valid for liquids with density $\rho = 1,0 \text{ Kg/dm}^3$ and kinematic viscosity $\nu = 1 \text{ mm}^2/\text{sec}$.

6Z855 SERIES DIMENSIONS AND WEIGHTS

PUMP TYPE	MAX PUMP POWER at 3500 min ⁻¹ kW	DIMENSIONS (mm)			WEIGHT kg ⁽³⁾
		L ⁽³⁾	I	U _{min} ⁽²⁾	
6Z855 01/1A	5,8	325	235	1000	26,6
6Z855 01	8,0	325	235	1000	26,6
6Z855 02/2A	11,3	460	235	1000	35,2
6Z855 02/1A	13,5	460	235	1000	35,2
6Z855 02	15,8	460	235	1000	35,2
6Z855 03/3A	16,8	595	235	1000	43,9
6Z855 03/1A	21,2	595	235	1000	43,9
6Z855 03	23,4	595	235	1000	43,9
6Z855 04/2A	26,5	730	235	1000	52,5
6Z855 04	30,9	730	235	1000	52,5
6Z855 05/2A	34,3	865	235	1000	61,2
6Z855 05	38,7	865	235	1000	61,2
6Z855 06/2A	42,0	1000	235	1000	69,8
6Z855 06	46,4	1000	235	1000	69,8
6Z855 07	54,1	1135	235	1000	77,8
6Z855 08	61,9	1270	235	1000	86,5
6Z855 09	69,6	1405	235	1000	95,1
6Z855 10	77,4	1540	235	1000	103,8
6Z855 11	85,1	1675	235	1000	112,4
6Z855 12	92,8	1810	235	1000	121,1
6Z855 13	100,6	1945	235	1000	129,7

6z855p-2p60-en_a_td



03705_A_DD

MOTOR CONNECTION

MOTOR	DIMENSIONS (mm)							
	N	k	d	z	b	E ^{H7}	R	X
6" (NEMA)	182	111	13,5	4	17	76,16	73	24
8" (NEMA)	182	152,4	18	4	17	127	101,3	40
Coupling 6" and 8" according to NEMA standards								

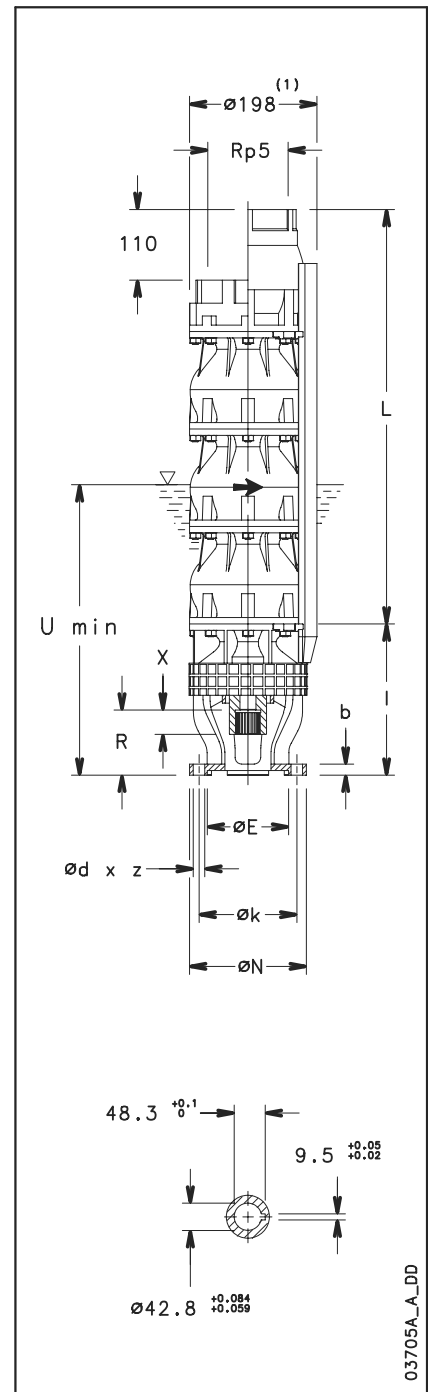
z8-mtcn-2p60_a_td

- 1) Max pump diameter with 1 motor cable included.
- 2) U_{min} valid only for max. flow speed of 4,2 m/s.
For higher speeds, please contact our sales network.
- 3) For pumps without non-return valve, reduce dimension L by 110 mm, and reduce weight by 4 Kg.

**6Z875 SERIES
DIMENSIONS AND WEIGHTS**

PUMP TYPE	MAX PUMP POWER at 3500 min ⁻¹ kW	DIMENSIONS (mm)			WEIGHT kg ⁽³⁾
		L ⁽³⁾	I	U _{min} ⁽²⁾	
6Z875 01/1B	6,2	342	235	1000	26,9
6Z875 01/1C	8,3	342	235	1000	26,9
6Z875 01	8,9	342	235	1000	26,9
6Z875 02/2B	12,3	494	235	1000	36,2
6Z875 02/1A	15,3	494	235	1000	36,2
6Z875 02	17,8	494	235	1000	36,2
6Z875 03/2B	21,2	646	235	1000	45,4
6Z875 03/1A	24,2	646	235	1000	45,4
6Z875 03	26,7	646	235	1000	45,4
6Z875 04/2A	30,7	798	235	1000	54,6
6Z875 04/1A	33,1	798	235	1000	54,6
6Z875 04	35,6	798	235	1000	54,6
6Z875 05/2A	39,6	950	235	1000	63,9
6Z875 05/1A	42,0	950	235	1000	63,9
6Z875 05	44,5	950	235	1000	63,9
6Z875 06/2A	48,5	1102	235	1000	72,4
6Z875 06	53,4	1102	235	1000	72,4
6Z875 07	62,3	1254	235	1000	81,7
6Z875 08	71,2	1406	235	1000	90,9
6Z875 09	80,1	1558	235	1000	100,1
6Z875 10	89,0	1710	235	1000	109,4
6Z875 11	97,9	1862	235	1000	118,6
6Z875 12	106,8	2014	256	1000	127,8
6Z875 13	115,7	2166	256	1000	137

6z875p-2p60-en_a_td


MOTOR CONNECTION

MOTOR	DIMENSIONS (mm)							
	N	k	d	z	b	E ^{H7}	R	X
6" (NEMA)	182	111	13,5	4	17	76,16	73	24
8" (NEMA)	182	152,4	18	4	17	127	101,3	40
10"	232	190,5	M16	4	21	127	101,3	84

Coupling 6" and 8" according to NEMA standards

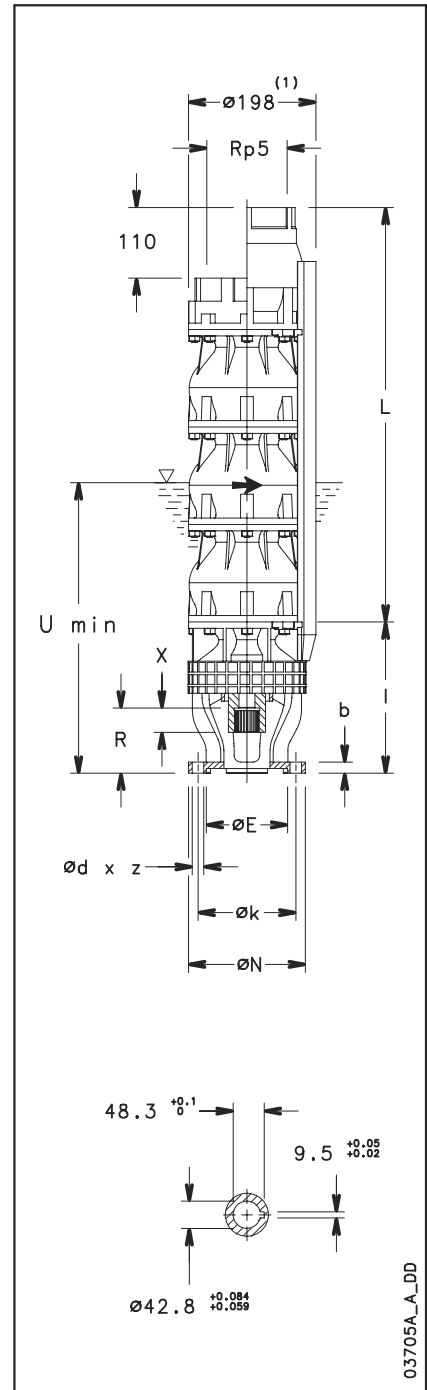
z8a-mtcn-2p50_a_td

- 1) Max pump diameter with 1 motor cable included.
- 2) U_{min} valid only for max. flow speed of 4,2 m/s.
For higher speeds, please contact our sales network.
- 3) For pumps without non-return valve, reduce dimension L by 110 mm, and reduce weight by 4 Kg.

**6Z895 SERIES
DIMENSIONS AND WEIGHTS**

PUMP TYPE	MAX PUMP POWER at 3500 min ⁻¹ kW	DIMENSIONS (mm)			WEIGHT kg ⁽³⁾
		L ⁽³⁾	I	U _{min} ⁽²⁾	
6Z895 01/1B	8,8	342	235	1000	26,9
6Z895 01/1A	11,1	342	235	1000	26,9
6Z895 01	13,5	342	235	1000	26,9
6Z895 02/2B	17,4	494	235	1000	36,2
6Z895 02/2A	22,1	494	235	1000	36,2
6Z895 02	26,7	494	235	1000	36,2
6Z895 03/2B	30,5	646	235	1000	45,4
6Z895 03/2A	35,1	646	235	1000	45,4
6Z895 03	39,6	646	235	1000	45,4
6Z895 04/2B	43,3	798	235	1000	54,6
6Z895 04/2A	47,8	798	235	1000	54,6
6Z895 04	52,3	798	235	1000	54,6
6Z895 05/3A	58,6	950	235	1000	63,9
6Z895 05	65,4	950	235	1000	63,9
6Z895 06/3A	71,7	1102	235	1000	73,1
6Z895 06	78,5	1102	235	1000	73,1
6Z895 07/3A	84,8	1254	235	1000	81,7
6Z895 07	91,6	1254	235	1000	81,7
6Z895 8/3A	97,9	1406	235	1000	90,9
6Z895 08	104,6	1406	235	1000	90,9
6Z895 09	117,7	1558	256	1000	100,1
6Z895 10	130,8	1710	256	1000	109,4
6Z895 11	143,9	1862	256	1000	118,6

6z895p-2p60-en_a_td



03705A_A_DD

MOTOR CONNECTION

MOTOR	DIMENSIONS (mm)							
	N	k	d	z	b	E ^{H7}	R	X
6" (NEMA)	182	111	13,5	4	17	76,16	73	24
8" (NEMA)	182	152,4	18	4	17	127	101,3	40
10"	232	190,5	M16	4	21	127	101,3	84

Coupling 6" and 8" according to NEMA standards

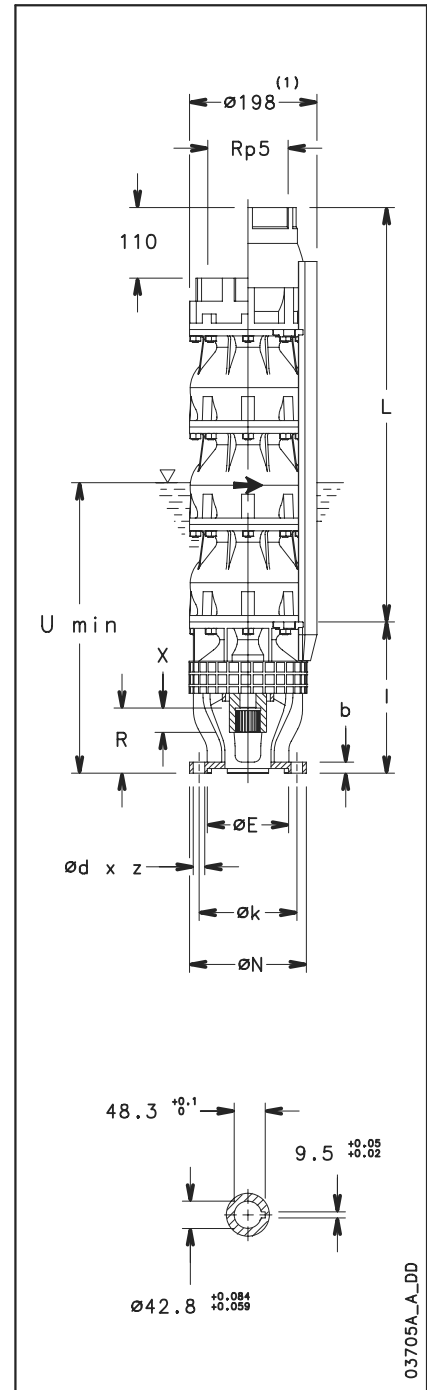
z8a-mtcn-2p50_a_td

- 1) Max pump diameter with 1 motor cable included.
- 2) U_{min} valid only for max. flow speed of 4,2 m/s.
For higher speeds, please contact our sales network.
- 3) For pumps without non-return valve, reduce dimension L by 110 mm, and reduce weight by 4 Kg.

**6Z8125 SERIES
DIMENSIONS AND WEIGHTS**

PUMP TYPE	MAX PUMP POWER at 3500 min ⁻¹ kW	DIMENSIONS (mm)			WEIGHT kg ⁽³⁾
		L ⁽³⁾	I	U _{min} ⁽²⁾	
6Z8125 01/1A	10,8	342	235	1000	26,9
6Z8125 01	13,1	342	235	1000	26,9
6Z8125 02/2B	17,6	494	235	1000	36,2
6Z8125 02/2A	21,5	494	235	1000	36,2
6Z8125 02	26,0	494	235	1000	36,2
6Z8125 03/2B	30,3	646	235	1000	45,4
6Z8125 03/2A	34,1	646	235	1000	45,4
6Z8125 03	38,6	646	235	1000	45,4
6Z8125 04/2B	42,7	798	235	1000	54,6
6Z8125 04/2A	46,5	798	235	1000	54,6
6Z8125 04	50,9	798	235	1000	54,6
6Z8125 05/3A	57,0	950	235	1000	63,9
6Z8125 05	63,7	950	235	1000	63,9
6Z8125 06/3A	69,8	1102	235	1000	73,1
6Z8125 06/1A	74,2	1102	235	1000	73,1
6Z8125 07/3A	82,5	1254	235	1000	81,7
6Z8125 07	89,1	1254	235	1000	81,7
6Z8125 08/3A	95,2	1406	235	1000	90,9
6Z8125 08	101,8	1406	235	1000	90,9
6Z8125 09	114,6	1558	256	1000	100,1
6Z8125 10	127,3	1710	256	1000	109,4
6Z8125 11	140,0	1862	256	1000	118,6

6z8125p-2p60-en_a_td


MOTOR CONNECTION

MOTOR	DIMENSIONS (mm)							
	N	k	d	z	b	E ^{H7}	R	X
6" (NEMA)	182	111	13,5	4	17	76,16	73	24
8" (NEMA)	182	152,4	18	4	17	127	101,3	40
10"	232	190,5	M16	4	21	127	101,3	84
Coupling 6" and 8" according to NEMA standards								

z8a-mtcn-2p50_a_td

03705A_A_DD

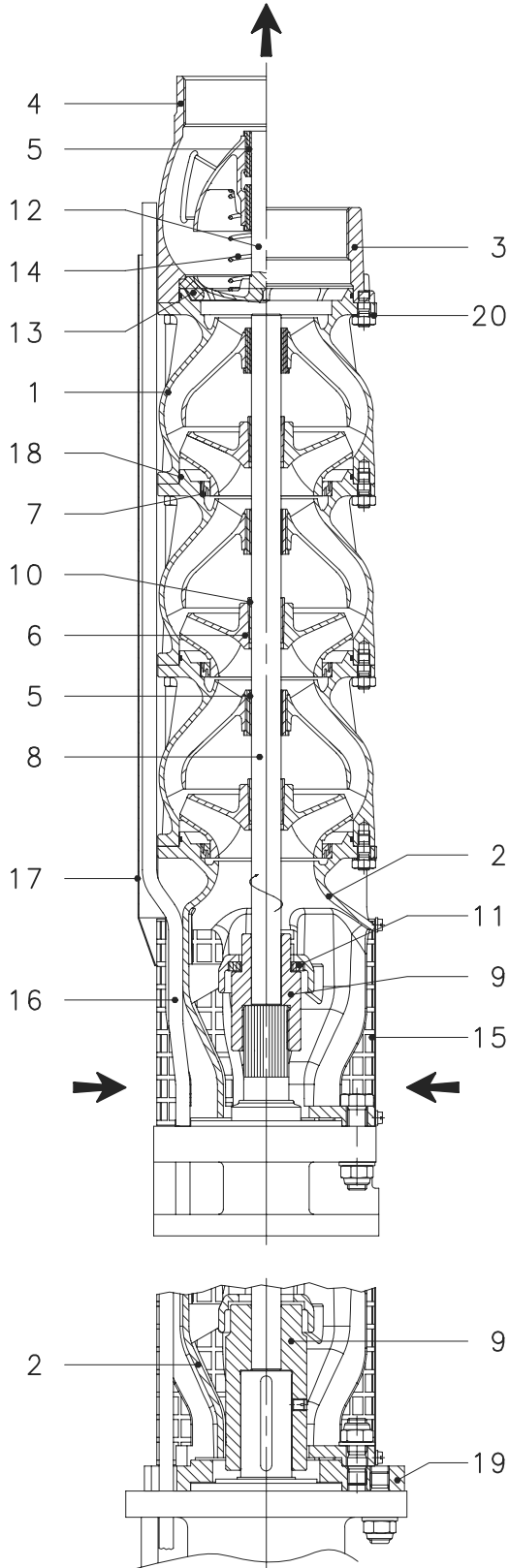
- 1) Max pump diameter with 1 motor cable included.
- 2) U_{min} valid only for max. flow speed of 4,2 m/s.
For higher speeds, please contact our sales network.
- 3) For pumps without non-return valve, reduce dimension L by 110 mm, and reduce weight by 4 Kg.



ITT

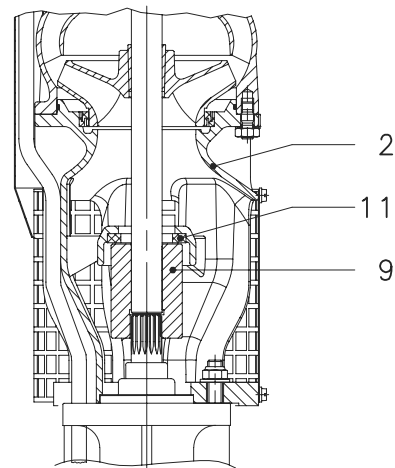
Lowara

6Z8 SERIES PUMP CROSS SECTION AND LIST OF COMPONENTS



N.RIF.	DESCRIZIONE
1	Stage casing
2	Suction casing
3	Delivery casing
4	Valve body
5	Bush bearing
6	Impeller
7	Wear ring
8	Shaft
9	Coupling
10	Locking sleeve
11	Thrust bearing
12	Non-return valve
13	Valve seat
14	Valve spring
15	Suction strainer
16	Motor cable
17	Cable guard
18	O-ring
19	10" Motor adapter
20	Clamping plate

z8-2p60_b_tp



03702_A_DS

6" Submersible motors

Submersible liquid-cooled motors. The choice of component materials ensures optimum operating performances, superior quality, reliability and ease of installation.

L6C Series 60 Hz



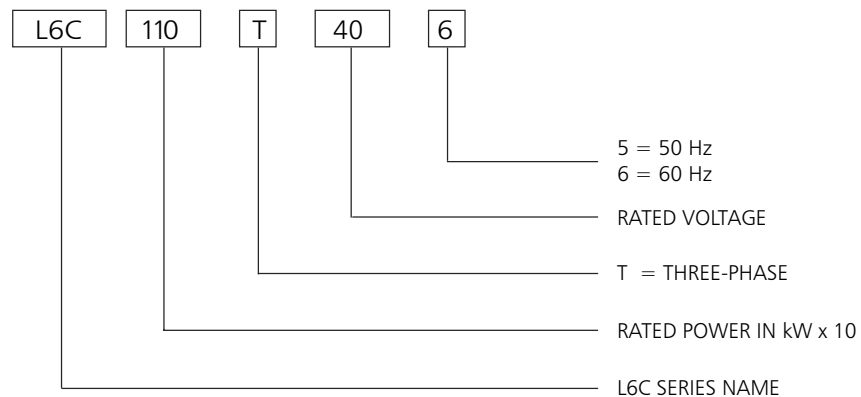
SPECIFICATIONS

- **Stainless steel** outer sleeve.
- Shaft extension and coupling dimensions to **NEMA** standards.
- Class **F insulation**.
- Protection class: **IP68**.
- Compensating bellows for internal liquid expansion.
- Axial load supported by Kingsbury type thrust bearing.
- **Mechanical seal** protected by sand guard.
- Maximum **immersion depth**: 250 m.
- Maximum **number of start per hour** at regular intervals: 25 for direct start.
- Maximum supply **voltage variations** allowed: $\pm 10\%$.
- Maximum water **temperature**: 35°C.
Max. temperature applies to motors working in an installation capable of delivering a flow of water around the motor jacket of at least 0,2 m/s.
- **Axial thrust**:
16000 N from 4 to 22 kW;
27000 N from 30 to 37 kW.
- **Extractable supply cable** fitted with watertight connector.
- **Versions**:
- Three-phase:
4 to 37 kW 230/380 V, 60 Hz.
- Motors with double cable outlet for star/delta start can be supplied upon request.
- Can also operate in horizontal position, provided that the associated pump can apply an axial thrust of at least 250 N on the entire operating field.
- Screws included.

OPTIONAL FEATURES

- Silicon Carbide mechanical seal.
- Special voltages.
- Inverter applications.
- PT100 temperature sensor.

IDENTIFICATION CODE



EXAMPLE : L6C110T406

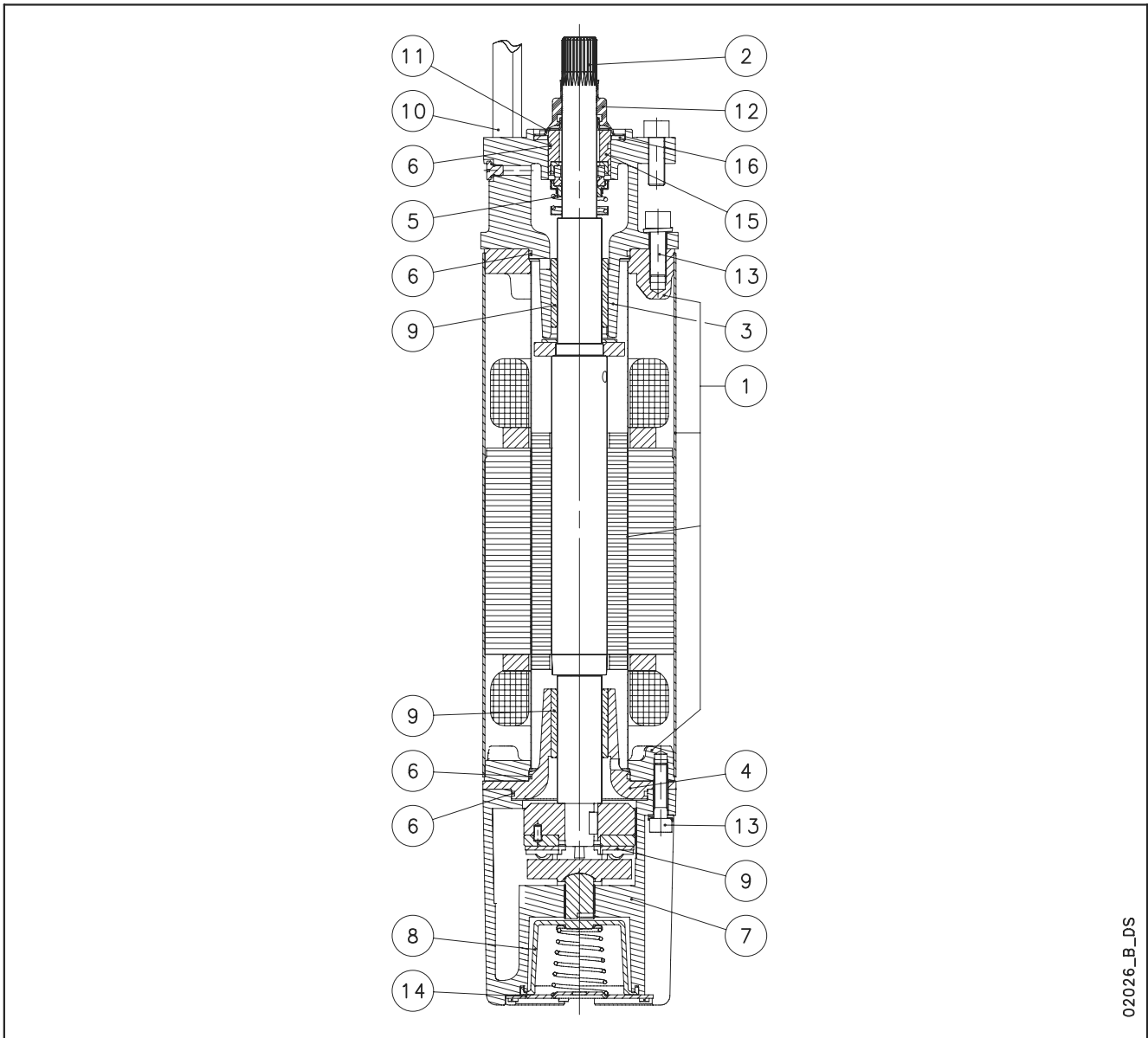
L6C MOTOR :
RATED POWER 11 kW; THREE-PHASE;
RATED VOLTAGE 400 V; 60 Hz

High static torque

Power supply cable with extractable connector



L6C SERIES MOTORS MOTOR CROSS SECTION AND TABLE OF MATERIALS



02026_B_DS

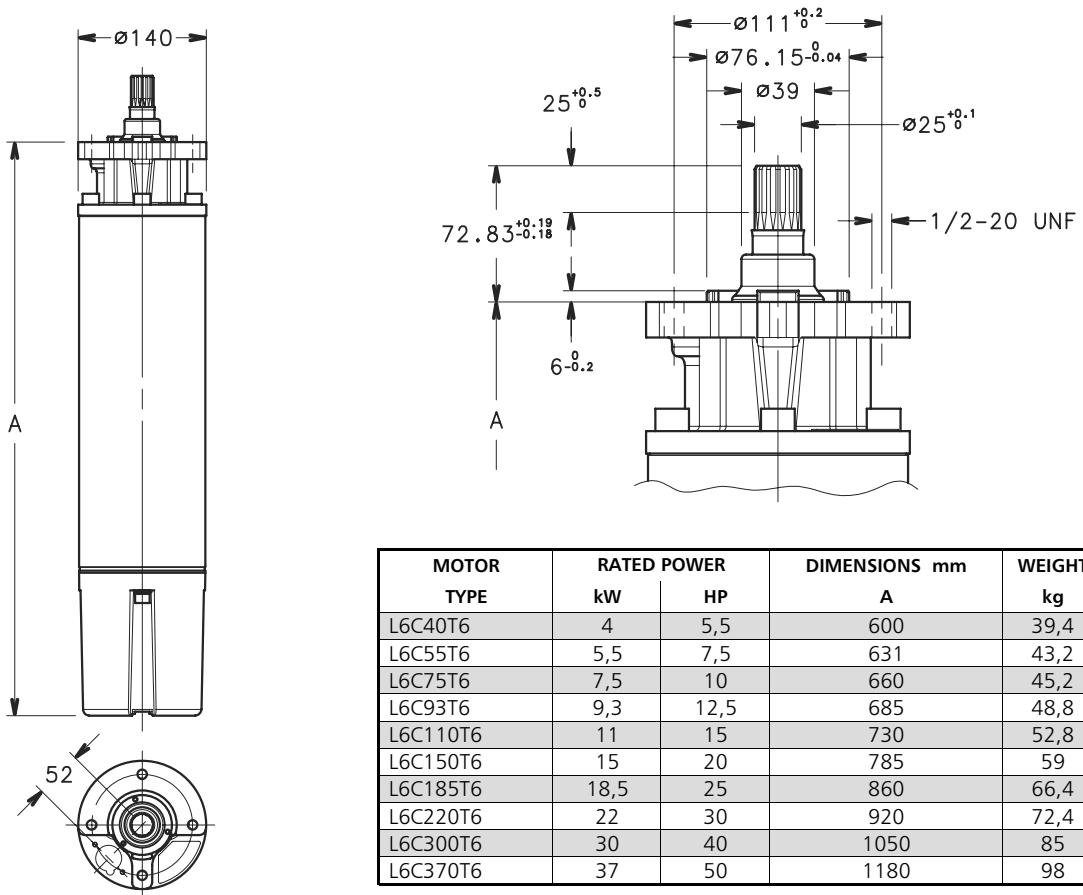
REF. N°	NAME	MATERIAL	REFERENCE STANDARDS	
			EUROPE	USA
1	Flange, inner and outer sleeve	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
2	Shaft extension (up to 18.5 kW)	Stainless steel	EN 10088-3-X5CrNiMo17-12-2 (1.4401)	AISI 316
	Shaft extension (from 22 kW)	Stainless steel (Duplex)	EN 10095 X3CrNiMoN27-5-2 (1.4460)	AISI 329
3	Upper support	Cast iron	EN-GJL-200	Class 25 B
4	Intermediate support	Cast iron	EN-GJL-200	Class 25 B
5	Mechanical seal	Carbon graphite / Aluminium oxide		
6	Elastomers	NBR		
7	Lower support	Cast iron	EN-GJL-200	Class 25 B
8	Compensating bellows	NBR		
9	Bearings	Carbon-graphite		
10	Cable	EPDM		
11	Fixed sand guard	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
12	Removable sand guard	NBR		
13	Bolts and screws	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
14	Lower cover	Stainless steel	EN 10088-1-X5CrNi18-10 (1.4301)	AISI 304
15	Mechanical seal spacer	A105 nichel plated		
16	Sand guard gasket	CR neoprene		
	Cooling liquid	Deminerlized water + antifreeze		



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L6C SERIES MOTORS DIMENSIONS AND WEIGHTS AT 60 Hz



l6c-2p60-en_a_td

02027_B_DD



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L6C SERIES MOTORS THREE-PHASE OPERATING CHARACTERISTICS AT 60 Hz

MOTOR TYPE THREE-PHASE	RATED POWER		SERVICE FACTOR S. F.	RATED VOLTAGE V	OPERATING CHARACTERISTICS AT FULL (S.F.) POWER				DIRECT STARTING		MAX WATER TEMPERATURE °C	CABLE TYPE	
	kW	HP			A	rpm	η %	cos ϕ	Ts/Tn	Ia/In		Nc x sez mm ²	L m
L6C40T386	4	5.5	1.15	230	19	3470	0.79	0.8	1.7	5.45	35	4x4	4
				380	11.5	3470	0.79	0.8	1.7	5.5			
L6C55T386	5.5	7.5	1.15	230	26.6	3450	0.77	0.8	1.8	5	35	4x4	4
				380	16.1	3450	0.77	0.8	1.8	5			
L6C75T386	7.5	10	1.15	230	33	3440	0.8	0.81	2	5.45	35	4x4	4
				380	20	3440	0.8	0.81	2	5.5			
L6C93T386	9.3	12.5	1.15	230	41.2	3450	0.82	0.8	2.1	4.8	35	4x4	4
				380	25	3450	0.82	0.8	2.1	4.8			
L6C110T386	11	15	1.15	230	46.6	3465	0.85	0.82	2.2	5.2	35	4x4	4
				380	28.2	3465	0.85	0.82	2.2	5.2			
L6C150T386	15	20	1.15	230	61.6	3440	0.85	0.83	2.4	5.45	35	4x6	4
				380	37.3	3440	0.85	0.83	2.4	5.45		4x4	
L6C185T386	18.5	25	1.15	230	80	3440	0.86	0.8	2.5	5.7	35	4x8	4
				380	48.4	3440	0.86	0.8	2.5	5.7		4x6	
L6C220T386	22	30	1.15	230	99.6	3440	0.86	0.77	2.6	5.8	35	4x8	4
				380	60.2	3440	0.86	0.77	2.6	5.8		4x6	
L6C300T386	30	40	1.15	230	128	3440	0.85	0.82	2.6	6.2	35	4x8	4
				380	75	3440	0.85	0.82	2.6	6.2			
L6C370T386	37	50	1.15	230	150	3440	0.84	0.84	2.6	6.2	35	4x8	4
				380	90	3440	0.84	0.88	2.6	6.2			

* Ts/Tn = ratio between starting torque and nominal torque.

l6c-2p60-en_b_te

8" Submersible motors

MC8 Series 60 Hz



APPLICATION

Three-phase asynchronous submersible water filled motor, with short-circuit rotor and special water-resistant windings.

The choice of component materials ensures optimum operating performances, high reliability and ease of installation.

SPECIFICATIONS

- Shaft extension and coupling dimensions to NEMA standards

Rewindable stator PVC insulation

Protection class: IP68

Fill liquid

The motors are filled with water containing non-toxic antifreeze (15%). This liquid, besides protecting the motor from low temperatures, helps to inhibit oxidation and improve lubrication.

- **Large compensating diaphragm** for internal liquid expansion. The motor is also equipped with a relief valve enabling the escape of liquid in the event of abnormal temperature increases.
- Axial load supported by oscillating bearing.
- To prevent fluid exchange between the external and internal environments, all the standard motors are equipped with two lip seals. Motors with mechanical seal are available on request.
- Maximum immersion depth:
 - 40 m for standard motors (lip seal)
 - 350 m for motors with mechanical seal (on request).
- Maximum number of evenly distributed starts per hour: 10

- Maximum supply voltage variation: +6%-10%.
- Maximum axial thrust: 50,000 N.
- Available versions:
 - MC8 three-phase: 30 to 92 kW 380, 460 V 60 Hz
 - Different voltages available on request
- PVC winding
- The motors are supplied with three 5-metre lengths of H07BBF-type circular single-core cable.
- Ambient temperature: 25°C; the motors must operate in installations ensuring a minimum water velocity around the motor sleeve of 0.20 m/s.

OPTIONAL FEATURES

- 4-pole motors.
- Special voltages of up to 1000 V.
- Horizontal installation.
- Inverter applications.
- High temperature windings.
- **Different materials on request.**

ACCESSORIES

- Panels.
- Drop cables.



MC8 SERIES MOTORS DIMENSIONS AND WEIGHTS AT 60 Hz

MOTOR TYPE	RATED POWER		DIMENSIONS mm		WEIGHT
	kW	HP	L	kg	
MC8-40 /60	30	40	1015	145	
MC8-50 /60	37	50	1105	162	
MC8-60 /60	44	60	1195	180	
MC8-70 /60	52	70	1285	200	
MC8-75 /60	55	75	1325	206	
MC8-80 /60	59	80	1375	217	
MC8-90 /60	66	90	1465	235	
MC8-100 /60	75	100	1555	252	
MC8-125 /60	92	125	1755	290	

mc 8-2p60-en_a_td

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OPERATING CHARACTERISTICS AT 60 Hz

MOTOR TYPE	RATED POWER		SERVICE FACTOR	VOLTAGE V	OPERATING FEATURES AT RATED POWER				DIRECT STARTING		MAX. WATER TEMPERATURE °C	CABLE TYPE	
	kW	HP			RATED CURRENT A	SPEED rpm	EFF. η %	cosφ	Ts/Tn*	Ia/In		Nc x sez. (mm²)	L (m)
MC8-40 /60	30	40	1,15	380	64,5	3480	82	0,83	1,2	5,6	25	3x1x10	5
												3x1x10	5
MC8-50 /60	37	50	1,15	380	83	3480	82	0,83	1,22	5,5	25	3x1x10	5
												3x1x10	5
MC8-60 /60	44	60	1,15	380	96	3495	84	0,82	1,13	5,1	25	3x1x16	5
												3x1x16	5
MC8-70 /60	52	70	1,15	380	115	3490	83	0,82	1,25	6,9	25	3x1x16	5
												3x1x16	5
MC8-75 /60	55	75	1,15	380	120	3490	83	0,83	1,4	5	25	3x1x16	5
												3x1x16	5
MC8-80 /60	59	80	1,15	380	128	3500	84	0,82	1,40	5,6	25	3x1x16	5
												3x1x16	5
MC8-90 /60	66	90	1,15	380	144	3490	84	0,83	1,18	5,4	25	3x1x16	5
												3x1x16	5
MC8-100 /60	75	100	1,15	380	160	3500	84	0,83	1,18	5,6	25	3x1x25	5
												3x1x25	5
MC8-125 /60	92	125	1,15	380	186	3495	84	0,85	1	5	25	3x1x25	5
												3x1x25	5

* Ts/Tn = ratio between starting torque and nominal torque.

**10"
Submersible
motors**
**MC10 Series
60 Hz**

APPLICATION

Three-phase asynchronous submersible water filled motor, with short-circuit rotor and special water-resistant windings.

The choice of component materials ensures optimum operating performances, high reliability and ease of installation.

SPECIFICATIONS

- **Rewindable stator** PVC insulations

Protection class: IP68

Fill liquid

The motors are filled with water containing non-toxic antifreeze (15%). This liquid, besides protecting the motor from low temperatures, helps to inhibit oxidation and improve lubrication.

- **Large compensating diaphragm** for internal liquid expansion. The motor is also equipped with a relief valve enabling the escape of liquid in the event of abnormal temperature increases.
- Axial load supported by oscillating bearing.
- To prevent fluid exchange between the external and internal environments, all the standard motors are equipped with two lip seals. Motors with mechanical seal are available on request.
- Maximum immersion depth:
 - 40 m for standard motors (lip seal)
 - 350 m for motors with mechanical seal (on request).
- Maximum number of evenly distributed starts per hour: 8

- Maximum supply voltage variation: +6%-10%.
- Maximum axial thrust: 65,000 N.
- Available versions: MC10 three-phase: 92 to 150 kW 380, 460 V 60 Hz
Different voltages available on request
- PVC winding
- The motors are supplied with three 5-metre lengths of H07BBF-type circular single-core cable.
- Ambient temperature: 25°C; the motors must operate in installations ensuring a minimum water velocity around the motor sleeve of 0.20 m/s.

**OPTIONAL
FEATURES**

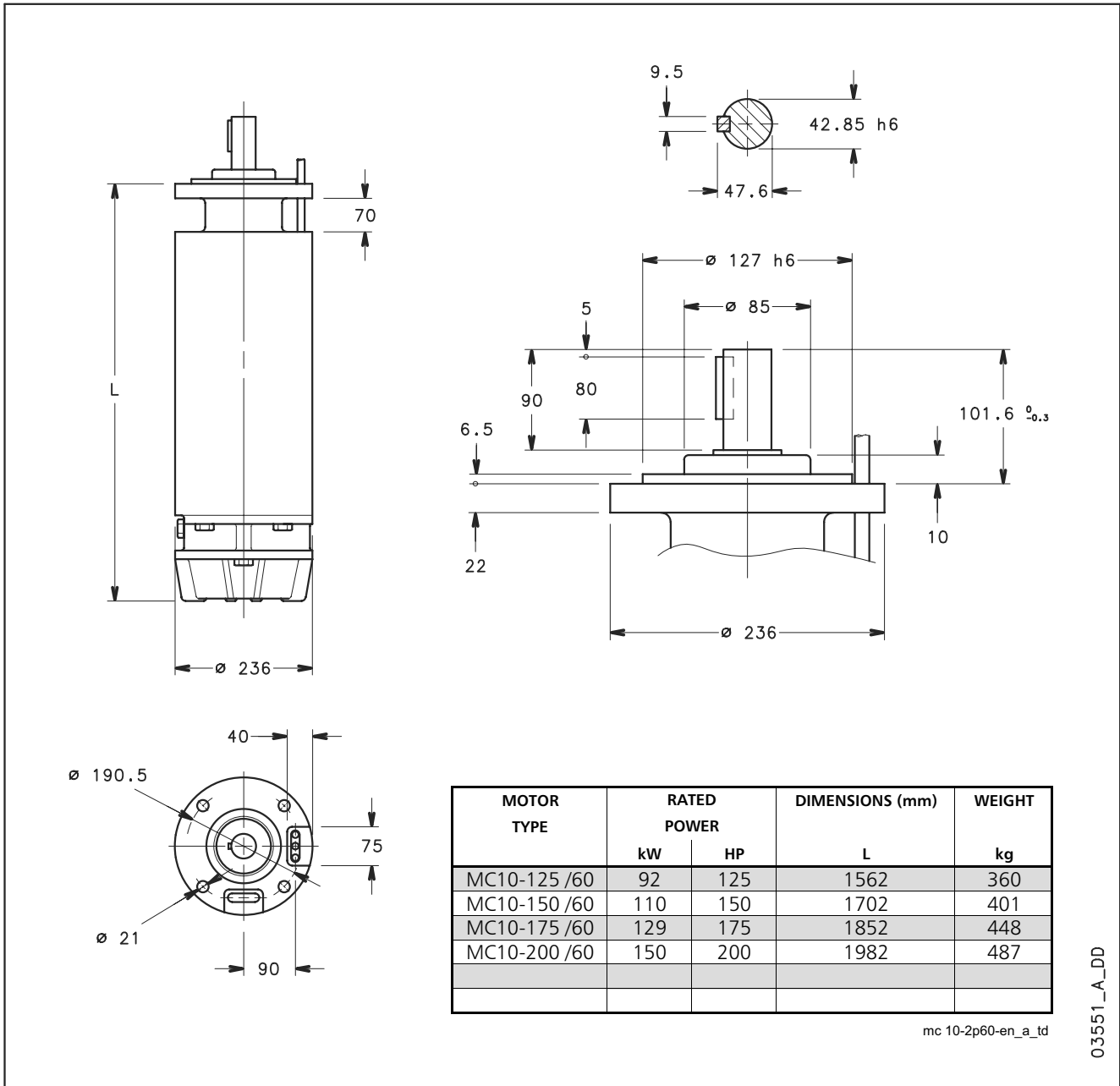
- 4-pole motors.
- Special voltages of up to 1000 V.
- Horizontal installation.
- Inverter applications.
- High temperature windings.
- **Different materials on request.**

ACCESSORIES

- Panels.
- Drop cables.



MC10 SERIES MOTORS DIMENSIONS AND WEIGHTS AT 60 Hz



OPERATING CHARACTERISTICS AT 60 Hz

MOTOR TYPE	RATED POWER		SERVICE FACTOR	VOLTAGE	OPERATING FEATURES AT RATED POWER				DIRECT STARTING		MAX. WATER TEMPERATURE	CABLE TYPE	
	kW	HP			RATED CURRENT	SPEED	EFF.	cosφ	Ts/Tn*	Ia/In		Nc x sez.	L
MC10-125 /60	92	125	1,15	380	198	3510	84	0,84	1,07	6,15	25	3x1x35	5
					157	3515	84	0,83	1,12	6,33		3x1x35	5
MC10-150 /60	110	150	1,15	380	240	3520	85	0,82	1,2	6,76	25	3x1x50	5
					197	3525	85	0,82	1,22	6,76		3x1x50	5
MC10-175 /60	129	175	1,15	380	288	3535	87	0,8	1,8	7,1	25	3x1x70	5
					230	3530	87	0,8	1,7	6,96		3x1x70	5
MC10-200 /60	150	200	1,15	380	325	3535	85	0,81	1,6	6,7	25	3x1x70	5
					265	3540	86	0,8	1,8	6,98		3x1x70	5

* Ts/Tn = ratio between starting torque and nominal torque.

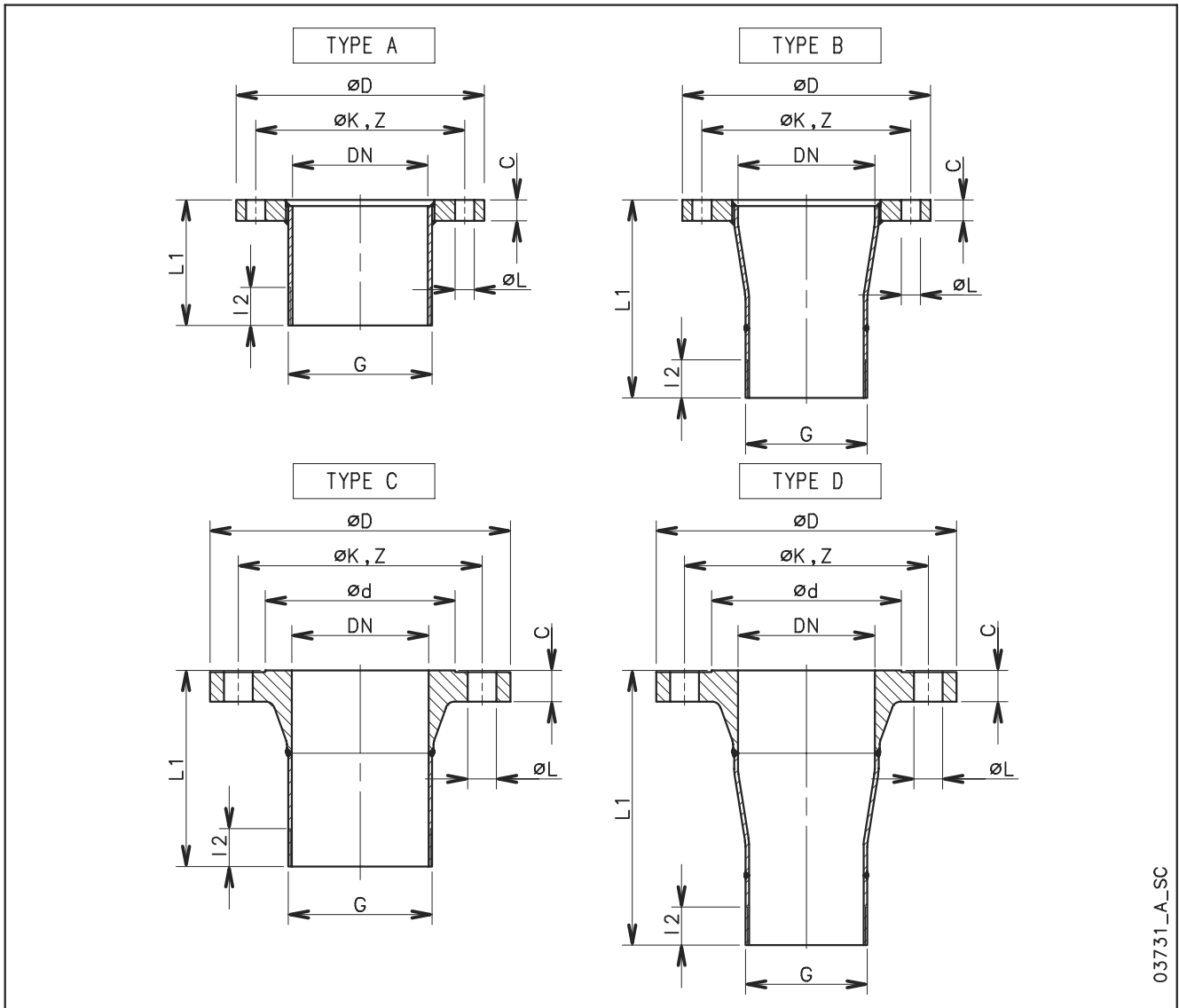


ACCESSORIES

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Level probe module	48
Lightning protection	49
Cooling shrouds	50



ISO-THREADED FLANGES



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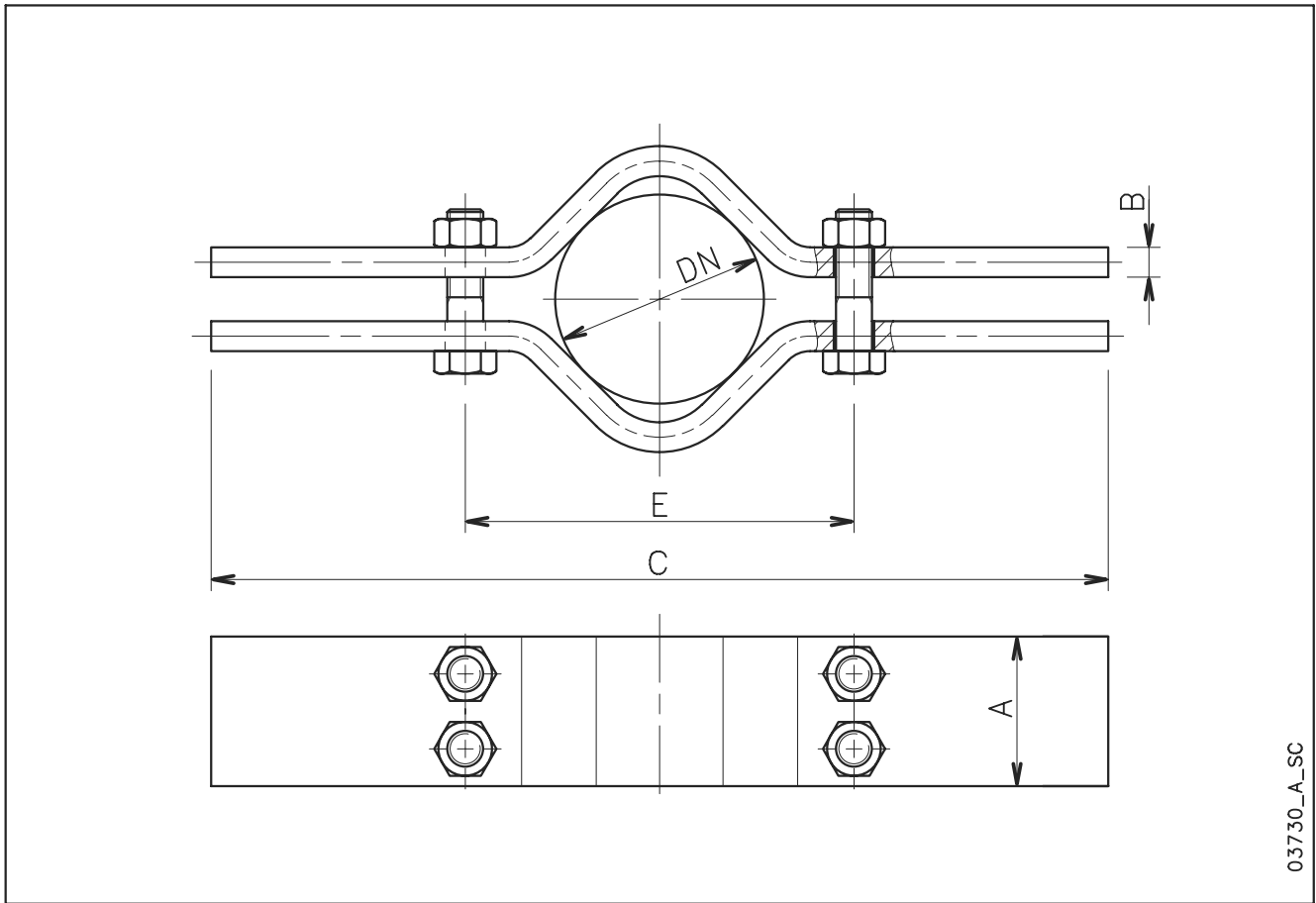
PUMP TYPE	THREADING ISO 7-1 G	Dimensions (mm)											
		* Flange according to EN 1092-1									L1	I2	TYPE
		DN	PN	ø D	ø d	ø K	Z	ø L	C				
Z855 Z875 Z895 Z8125	R 5	125	10÷16	250	-	210	8	18	22	108	44	A	
		125	25÷40	270	188	220	8	26	26	168	44	C	
		125	63	295	188	240	8	30	34	188	44	C	
		150	10÷16	285	-	240	8	22	22	248	44	B	
		150	25÷40	300	218	250	8	26	28	315	44	D	
		150	63	345	218	280	8	33	36	335	44	D	

* Flanges according to ASME B16.5 available on request.

z8-flange-2p60_a_td



CARRYING CLAMPS



03730_A_SC

Ø PIPE NOMINAL DN	CARRYING CLAMPS							PIPE WEIGHT		
	Dimensions (mm)						Pmax ⁽¹⁾ kg	Flanged kg/m	Threaded kg/m	Water kg/m
	A	B	C	E	VITE					
65	R 2 1/2"	50	15	600	130	M16x90	1300	6,7	8,0	3,3
80	R 3"	80	15	600	180	M20x70	3400	8,4	10,5	5,0
100	R 4"	80	15	600	180	M20x110	3400	20,5	15,0	7,9
125	R 5"	100	20	600	260	M24x90	7250	27,5	18,5	12,3
150	R 6"	100	20	600	260	M24x130	7250	33,0	22,0	17,6
175	R 7"	120	25	800	360	M30x110	9750	27,0	25,5	24,0
200	R 8"	120	25	800	360	M30x150	9750	33,0	34,0	31,5
250	R 10"	120	25	800	360	M30x220	9750	48,0	48,0	49,0

1) Max weight allowable.

clamp-2p60_a_td

NOTE. Two sets of clamps are necessary for the installation of one unit.



MOTOR-CONTROL PANEL COMBINATION TABLE

MOTOR TYPE L6C - 6" THREE-PHASE	RATED POWER		CURRENT AT S.F. 380 V A	CAPACITOR μ F / 450 V	PANEL TYPE					
	kW	HP			QTD/...	Q3D/...	Q3Y/...	Q3I/...	Q3A/...	Q3SF/...
	4	5,5	11,5	-	...55	...55	...55	...55	...55	...75
5,5	7,5	16,1	-	...92	...92	...92	...92	...92	...75	
7,5	10	20	-	...92	...92	...92	...92	...92	...150	
9,3	12,5	25	-	-	...110	...110	...110	...110	...150	
11	15	28,2	-	-	...110	...110	...110	...110	...150	
15	20	37,3	-	-	...150	...150	...150	...150	...220	
18,5	25	48,4	-	-	...220	...220	...220	...220	...300	
22	30	60,2	-	-	...300	...300	...300	...300	...300	
30	40	75	-	-	...370	...370	...370	...370	...370	
37	50	90	-	-	-	-	...550	...550	...550	

For different voltages please contact our sales network

L6c-2p60_a_tc

MOTOR TYPE	RATED POWER		RATED CURRENT 380 V A	CAPACITOR μ F / 450 V	PANEL TYPE					
	kW	HP			Q3D/...	Q3I/...	Q3A/...	Q3SF/...		
MC8 - 8"	30	40	64,5	-	...370	...370	...370	...370		
	37	50	83	-	(1)	...550	...550	...550		
	44	60	96	-	(1)	...550	...550	...550		
	52	70	115	-	(1)	...750	...750	...590		
	55	75	120	-	(1)	...750	...750	...750		
	59	80	128	-	-	...750	...750	...750		
	66	90	144	-	-	...900	...900	...900		
	75	100	160	-	-	...900	...900	...900		
	92	125	186	-	-	...1100	...1100	...900		

MC8-2p60_c_tc

MOTOR TYPE	RATED POWER		RATED CURRENT 380 V A	CAPACITOR μ F / 450 V	PANEL TYPE				
	kW	HP			Q3I/...	Q3A/...	Q3SF/...		
MC10 - 10"	92	125	198	-	...1100	...1100	...1100		
	110	150	240	-	...1100	...1100	...1100		
	129	175	288	-	(1)	(1)	(1)		
	150	200	325	-	(1)	(1)	(1)		

(1) On request

MC10-2p60_c_tc

For different voltages please contact our sales network

Three-Phase Electric Panel

APPLICATIONS

- Protection and control of a three-phase submersible electric pump.

QTD Series

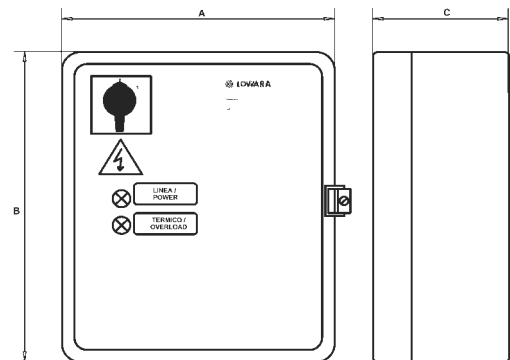


SPECIFICATIONS

- Control through an external enable contact.
- Supply voltage: 3 x 400 V \pm 10 %.
- Frequency: 50/60 Hz
- Power: 0.37 to 9.2 kW.
- Direct motor start.
- Protection class: IP 54.
- Ambient temperature: -5 to +40 °C (limit specified by EN Standard 60439-1).
- Maximum relative humidity: 50% at +40°C, provided that no condensation occurs (limit specified by EN standard 60439-1).
- Wall mounted.
- Metal enclosure.
- Ready for installation of dry running control float or pressure switch (to be ordered separately).
- Power and thermal overload indicator lights.

OPTIONAL ACCESSORIES

- VR3 three-phase module for overvoltage protection (lightning protector).
- SLD series 24V level kit. Probe module for protection against dry running (set of three electrodes included in the supply).



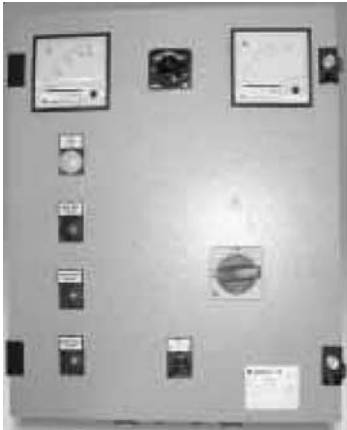
PANEL TYPE	RATED POWER		APPLICATION RANGE A	DIMENSIONS A x B x C mm	WEIGHT WITH PACKING Kg
	kW	HP			
QTD/03	0,37	0,5	0.6-1.0	235x265x150	5,8
QTD/05	0,55	0,75	1.0-1.6		
QTD/11	1,1	1,5	1.6-2.5		
QTD/15	1,5	2	2.5-4.0		
QTD/22	2,2	3	4.0-6.3		
QTD/30	3	4	6.3-10.0		
QTD/40	4	5,5	10.0-12.0		
QTD/55	5,5	7,5	10.0-16.0		
QTD/92	9,2	12,5	16.0-20.0		

Line protection to be provided by the user.

For proper selection, make sure that the ampere input of the electric motor matches the values specified in the table.

Three-Phase Electric Panel

Q3D Series



APPLICATIONS

- Protection and control of a three-phase submersible electric pump.

SPECIFICATIONS

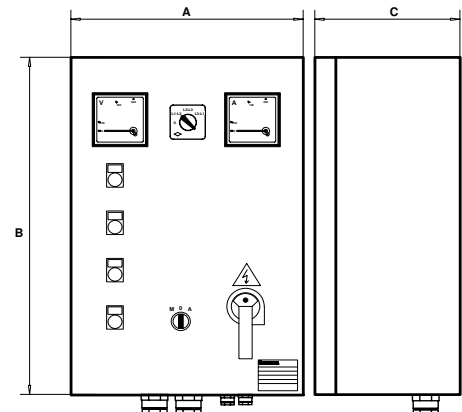
- Manual control through an Auto/Man selector switch.
- Automatic control through an external enable contact.
- Supply voltage: 3 x 400 V \pm 10 %.
Frequency: 50/60 Hz.
- 24 V AC low voltage auxiliary circuit.
- Power: 0.37 to 37 kW.
- Direct start.
- Protection class: IP 54.
- Ambient temperature: -5 to +40 °C (limit specified by EN Standard 60439-1).
- Maximum relative humidity: 50% at +40°C, provided that no condensation occurs (limit specified by EN standard 60439-1).
- Wall mounted.
- Metal enclosure.
- Power, pump running, thermal overload and dry running indicator lights.
- Manual-reset thermal relay for overload protection, sensitive to phase failure.
- Ready for installation of dry running

control float or pressure switch (to be ordered separately).

Can be equipped with electronic protection module with electrodes.

OPTIONAL ACCESSORIES

- SLD series 24V level kit.
Probe module for protection against dry running (set of three electrodes included in the supply).
- Float.
- Pressure switch.
- VR3 three-phase module for overvoltage protection (lightning protector).



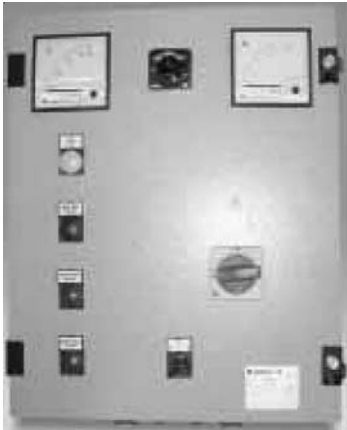
PANEL TYPE	RATED POWER		APPLICATION RANGE A	DIMENSIONS A x B x C mm	WEIGHT WITH PACKING Kg
	kW	HP			
Q3D/03	0,37	0,5	0,9-1,5	300 x 400 x 200	15
Q3D/05	0,5	0,75	1,4-2,3		
Q3D/11	1,1	1,5	2,0-3,3		
Q3D/15	1,5	2,0	3,0-5,0		
Q3D/22	2,2	3,0	4,5-7,5		
Q3D/30	3	4,0	6,0-10,0		
Q3D/40	4	5,5	9,0-12,0		
Q3D/55	5,5	7,5	9,0-15,0		
Q3D/92	9,2	12,5	14,0-23,0	400 x 500 x 200	20
Q3D/110	11	15	20,0-32,0		
Q3D/150	15	20	28,0-38,0		
Q3D/220	22	30	35,0-50,0	400 x 600 x 200	27
Q3D/300	30	40	45,0-63,0		
Q3D/370	37	50	60,0-80,0		

Line protection to be provided by the user.

For proper selection, make sure that the ampere input of the electric motor matches the values specified in the table.

Three-Phase Electric Panel

Q3Y Series



APPLICATIONS

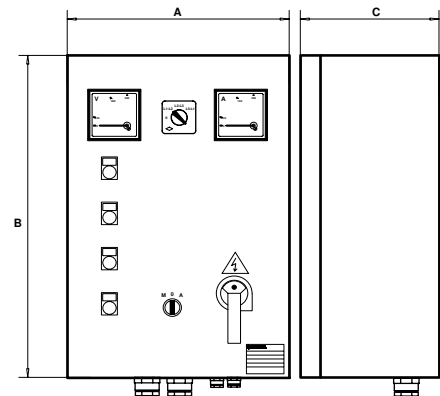
- Protection and control of a three-phase borehole pump.

SPECIFICATIONS

- Manual control through Auto/Man selector switch.
- Automatic control through an external enable contact.
- Supply voltage: 3 x 400 V \pm 10 %.
- Frequency: 50/60 Hz.
- 24 V AC low voltage auxiliary circuit.
- Power: 4 to 110 kW.
- Star-delta starting.
- Protection class: IP 54.
- Ambient temperature: -5 to +40 °C (limit specified by EN standard 60439-1).
- Maximum relative humidity: 50% at +40°C, provided that no condensation occurs (limit specified by EN standard 60439-1).
- Wall mounted.
- Metal enclosure.
- Power - pump running - thermal overload - dry running indicator lights.
- Manual-reset thermal relay for overload protection, sensitive to phase failure.
- Ready for installation of dry running control float or pressure switch (to be ordered separately).
Can be fitted with electronic protection module with electrodes.

OPTIONAL ACCESSORIES

- SLD series 24V level kit.
Probe module for protection against dry running (set of three electrodes included in the supply).
- Float.
- Pressure switch.
- VR3 three-phase module for overvoltage protection (lightning protector).



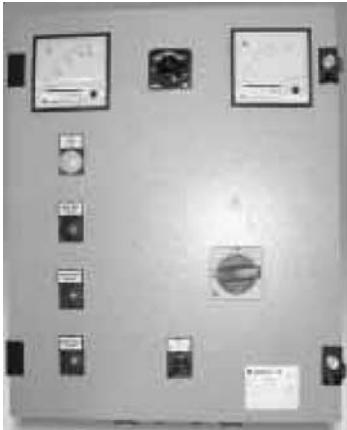
PANEL TYPE	RATED POWER		APPLICATION RANGE A	DIMENSIONS A x B x C mm	WEIGHT WITH PACKING kg
	kW	HP			
Q3Y/40	4	5,5	8,0-12,0	400 x 600 x 200	23
Q3Y/55	5,5	7,5	11,0-16,0		
Q3Y/92	7,5 - 9,2	10 - 12,5	16,0-24,0		
Q3Y/110	11	15	24,0-32,0		
Q3Y/150	15	20	30,0-40,0		
Q3Y/220	18,5 - 22	25 - 30	35,0-50,0	500 x 700 x 200	32
Q3Y/300	30	40	50,0-62,0		
Q3Y/370	37	50	60,0-80,0	600 x 800 x 250	80
Q3Y/550	45 - 55	60 - 75	80,0-110,0		
Q3Y/750	75	100	90,0-140,0		
Q3Y/900	90	125	135,0-180,0	600 x 1300 x 300 floor	100-120
Q3Y/1100	110	150	180,0-250,0	600 x 1500 x 300 floor	

Line protection to be provided by user.

For proper selection, make sure that the ampere input of the electric motor falls within the application range shown in the table.

Three-Phase Electric Panel

Q3I Series



APPLICATIONS

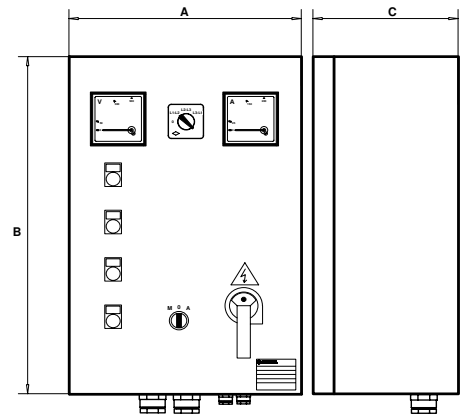
- Protection and control of a three-phase submersible electric pump.

SPECIFICATIONS

- Manual control through an Auto/Man selector switch.
- Automatic control through external enable contact.
- Supply voltage: 3 x 400 V \pm 10 %.
Frequency: 50/60 Hz.
- Auxiliary low-voltage circuit: 24 V AC.
- Power: 5.5 to 110 kW.
- Impedance start.
- Protection class: IP 54.
- Ambient temperature: -5 to +40 °C (limit specified by EN Standard 60439-1).
- Maximum relative humidity: 50% at +40°C, provided that no condensation occurs (limit specified by EN standard 60439-1).
- Wall mounted.
- Metal enclosure.
- Power - pump running - thermal overload - dry running indicator lights.
- Manual-reset thermal relay for overload protection, sensitive to phase failure.
- Ready for installation of dry running control float or pressure switch (to be ordered separately).
Can be equipped with electronic protection module with electrodes.

OPTIONAL ACCESSORIES

- SLD series 24V level kit.
Probe module for protection against dry running (set of three electrodes included in the supply).
- Float.
- Pressure switch.
- VR3 three-phase module for overvoltage protection (lightning protector).



PANEL TYPE	RATED POWER		APPLICATION RANGE A	DIMENSIONS A x B x C mm	WEIGHT WITH PACKING kg
	kW	HP			
Q3I/55	5,5	7,5	9,0-15,0	400 x 600 x 250	35
Q3I/92	7,5 - 9,2	10 - 12,5	14,0-23,0		
Q3I/110	11	15	20,0-32,0		
Q3I/150	12,5 - 15	17 - 20	28,0-38,0	500 x 700 x 250	50
Q3I/220	18,5 - 22	25 - 30	35,0-47,0		
Q3I/300	30	40	46,0-62,0		
Q3I/370	37	50	60,0-78,0		
Q3I/550	45 - 55	60 - 75	75,0-110,0	600 x 1300 x 300	100-150
Q3I/750	75	100	90,0-140,0	floor	
Q3I/900	90	125	120,0-180,0	600 x 1500 x 300	
Q3I/1100	110	150	180,0-250,0	floor	

Line protection to be provided by the user.

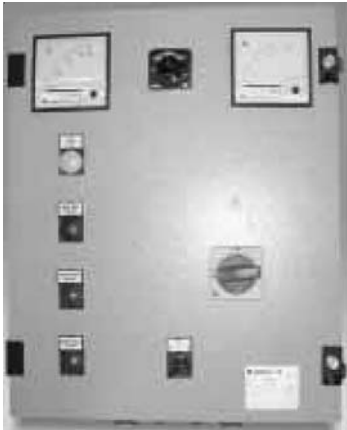
For proper selection, make sure that the ampere input of the electric motor matches the values specified in the table.

Three-Phase Electric Panel

APPLICATIONS

- Protection and control of a three-phase submersible electric pump.

Q3A Series

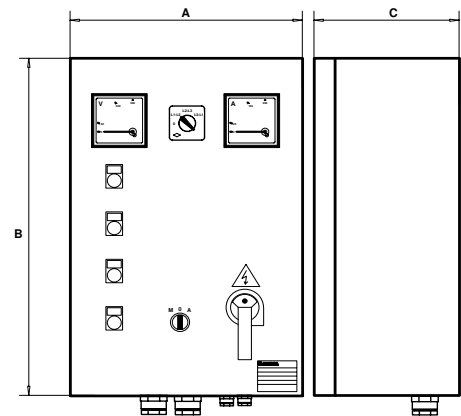


SPECIFICATIONS

- Manual control through an Auto/Man selector switch.
- Automatic control through an external enable contact.
- Supply voltage: 3 x 400 V \pm 10 %.
Frequency: 50/60 Hz.
- 24 V AC low voltage auxiliary circuit.
- Power: 5.5 to 110 kW.
- Starting autotransformer
- Protection class: IP 54.
- Ambient temperature: -5 to +40 °C (limit specified by EN Standard 60439-1).
- Maximum relative humidity: 50% at +40°C, provided that no condensation occurs (limit specified by EN standard 60439-1).
- Wall mounted.
- Metal enclosure.
- Power - pump running - thermal overload - dry running indicator lights.
- Manual-reset thermal relay for overload protection, sensitive to phase failure.
- Ready for installation of dry running control float or pressure switch (to be ordered separately).
Can be equipped with electronic protection module with electrodes.

OPTIONAL ACCESSORIES

- SLD series 24V level kit.
Probe module for protection against dry running (set of three electrodes included in the supply).
- Float.
- Pressure switch.
- VR3 three-phase module for overvoltage protection (lightning protector).



PANEL TYPE	RATED POWER		APPLICATION RANGE A	DIMENSIONS A x B x C mm	WEIGHT WITH PACKING kg
	kW	HP			
Q3A/55	5,5	7,5	9,0-15,0	500 x 700 x 250	50
Q3A/92	7,5 - 9,2	10 - 12,5	14,0-23,0		
Q3A/110	11	15	20,0-32,0		
Q3A/150	12,5 - 15	17 - 20	28,0-38,0		
Q3A/220	18,5 - 22	25 - 30	35,0-47,0		
Q3A/300	30	40	46,0-62,0	600 x 900 x 300	90
Q3A/370	37	50	60,0-78,0		
Q3A/550	45 - 55	60 - 75	75,0-110,0	600 x 1500 x 300 floor	150-200
Q3A/750	75	100	90,0-140,0		
Q3A/900	90	125	120,0-180,0	600 x 1700 x 400 floor	
Q3A/1100	110	150	180,0-250,0		

Line protection to be provided by the user.

For proper selection, make sure that the ampere input of the electric motor matches the values specified in the table.

Three-Phase Electric Panel

Q3SF Series



APPLICATIONS

- Protection and control of a three-phase submersible electric pump.

SPECIFICATIONS

- Manual control through an Auto/Man selector switch.
- Automatic control through an external enable contact.
- Supply voltage: 3 x 400 V \pm 10 %.
- Frequency: 50/60 Hz.
- 24 V AC low voltage auxiliary circuit.
- Power: 5.5 to 110 kW.
- Softstart with torque control.
- Protection class: IP 54.
- Ambient temperature: -5 to +40 °C (limit specified by EN Standard 60439-1).
- Maximum relative humidity: 50% at +40°C, provided that no condensation occurs (limit specified by EN standard 60439-1).
- Wall mounted.
- Metal enclosure.
- Dry running indicator light.
- Power - pump running - malfunction LEDs on starter keypad.
- ON/OFF selector switch for activation of by-pass contactor.
- Ready for installation of dry running control float or pressure switch (to be ordered separately).
Can be equipped with electronic protection module with electrodes.

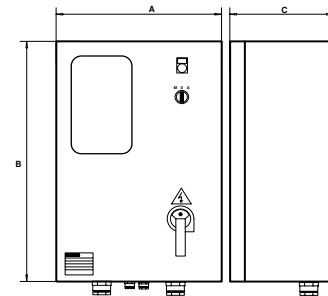
Low-voltage protection on auxiliary circuits.
Protection against starter overtemperature / overload / malfunction.
Protection against overload / locked rotor / current asymmetry on motor side.
Short-circuit protection on inputs and outputs.
RS232 interface for remote control and RS 485 for use of remote keypad.
Incorporated by-pass contactor.

OPTIONAL ACCESSORIES

- SLD series 24V level kit.
Probe module for protection against dry running (set of three electrodes included in the supply).
- Float.
- Pressure switch.
- VR3 three-phase module for overvoltage protection (lightning protector).

STATIC STARTER CHARACTERISTICS

- Static starter for gradual start-up/shutdown, featuring: keypad with liquid crystal display showing voltage, absorbed current, $\cos \varphi$, operating hours, number of starts, last twenty messages on system status (events / alarms).
Protections against phase failure / phase sequence / frequency out of limits on power supply line.



PANEL TYPE	RATED POWER		APPLICATION RANGE A	DIMENSIONS A x B x C mm	WEIGHT WITH PACKING kg
	kW	HP			
Q3SF/75	5,5-7,5	7,5-10	8,5-17	400 x 600 x 250	35
Q3SF/150	9,2-15	12,5-20	15-30		
Q3SF/220	18,5-22	25-30	28-45	600 x 900 x 300	90
Q3SF/300	30	40	42-60		
Q3SF/370	37	50	55-75		
Q3SF/450	45	60	70-85		
Q3SF/550	55	75	80-110		
Q3SF/590	59	80	105-125	600 x 1700 x 400 floor	120
Q3SF/750	75	100	120-142		
Q3SF/900	90	122	135-190		
Q3SF/1100	110	150	185-245		

Line protection to be provided by the user.

For proper selection, make sure that the ampere input of the electric motor matches the values specified in the table.

Level Control Panel
QCL5 Series

APPLICATIONS

- Accessory for electric pump control panels, suitable for tank filling or drainage applications or for activation of audible or visual alarms.

SPECIFICATIONS

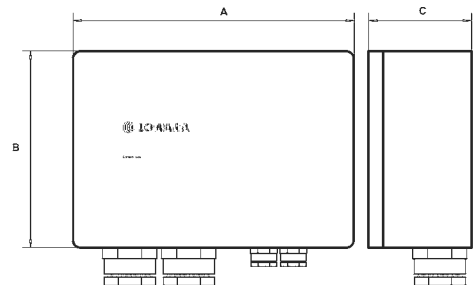
- Automatic control through probes.
- Supply voltage: 1 x 230 V \pm 10% or 1 x 24 V \pm 10%.
- Frequency 50/60 Hz.
- Voltage to probes: 15 V AC at 0.5 mA max.
- Switch contact: 48 V AC at 3 A max (250 W max).
- Autotransformer start.
- Protection class: IP 55.
- Ambient temperature: -5 to +40 °C (limit specified by EN standard 60439-1).
- Maximum relative humidity: 50% at +40°C, provided that no condensation occurs (limit specified by EN standard 60439-1).
- Wall mounted.
- Electrodes suitable for water at a maximum temperature of 40°C.
- Plastic enclosure.
- Set of three electrodes included in the supply.

OPTIONAL ACCESSORIES

- Drop cable with circular cross section.

For connection of the electrodes to the panel we recommend the following cross sections:

LENGHT mt		CABLE CROSS SECTION mm ²
0	50	0,50
50	100	0,75
100	200	1,00
200	400	2,50
400	oltre	4,00



Three-pole cables can be used for short lengths.

Otherwise we recommend the use of unipolar cables placed at suitable distances from each other to prevent the capacitive effect of the cable from interfering with the proper operation of the electronic module.

PANEL TYPE	VOLTAGE V	OUTPUT CONTACTS	CONTACT CAPACITY	DIMENSIONS A x B x C mm	WEIGHT WITH PACKING kg
QCL5/230	1x230 50/60 Hz	NO-C-NC	48 V a 3 A	90x130x60	0,5
QCL5/24	1x24 50/60 Hz				

Line protection to be provided by the user.

**Level
Probe
Module**
SLD Series
APPLICATIONS

- Accessory for electric panels.

SPECIFICATIONS

- Electronic module for use of probes as protection against dry running.
- Supply voltage: 1 x 24 V \pm 10 % for model SLD/24.
- Frequency: 50/60 Hz.
- Absorbed power: 2 VA.
- Voltage to probes: 15 V AC at 0.5 mA max.
- Switch contact: 24 V AC at 5 A max (250 W max).
- Designed for installation on Lowara electric panels featuring DIN bar.
- Electrodes suitable for water at a maximum temperature of 40°C.

**CONSTRUCTION
CHARACTERISTICS**

- Module made of plastic material with DIN bar attachment
- Cables with quick plug-in connectors.
- Set of three electrodes included in the supply.
- Electrodes with nylon 6 body, stainless steel sensitive element, brass washer and nitrile rubber seal.

**OPTIONAL
ACCESSORIES**

- Drop cable with circular cross section For connection of the electrodes to the panel we recommend the following cross sections:



LENGHT mt		CABLE CROSS SECTION mm ²
0	50	0,50
50	100	0,75
100	200	1,00
200	400	2,50
400	oltre	4,00

Three-pole cables can be used for short lengths.

Otherwise we recommend the use of single-pole cables placed at suitable distances

from each other to prevent the capacitive effect of the cable from interfering with the proper operation of the electronic module.

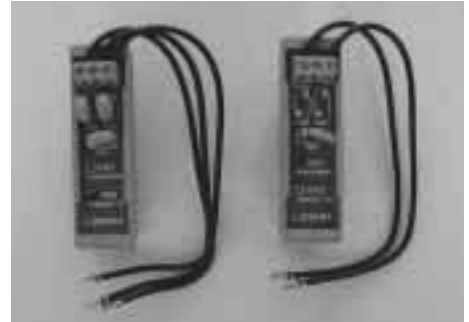
TYPE	VOLTAGE v	CONTACT CAPACITYI	APPLICATIONS	DIMENSIONS A x B x C mm
Kit SLD/24	1 x 24 50/60 Hz	24 V a 5 A	QMCS-QTD Q3D-Q3Y Q3A-Q3I Q3SF	90 x 35 x 60

**Protection
against
lightning**
APPLICATIONS

- Accessory for electric panels.

**VR SERIES
SPECIFICATIONS**

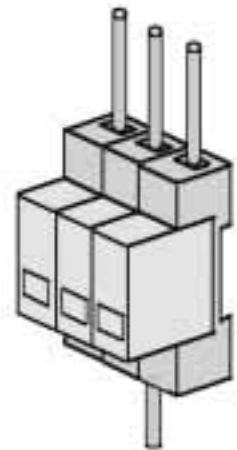
- Lightning arresters for protection of three-phase lines.
- To be connected between the phases and earth conductor.
- Operating voltage: 460 V AC.
- Maximum varistor voltage: 750 V with 100 A peak current.
- Designed for installation on Lowara electric panels featuring DIN bar.



TYPE	VOLTAGE v	APPLICATION
KIT VR3	3 x 400 50/60 Hz	QTD - Q3D

**SCA3 SERIES
SPECIFICATIONS**

- Lightning arresters for protection of three-phase lines.
To be connected between the phases and earth conductor.
- Operating voltage: 500 VAC.
- Max varistor voltage: 2.5 kV with 40 kA peak current.
- Designed for assembly on Lowara electric panels featuring DIN bar.



TYPE	VOLTAGE v	APPLICATION
KIT SCA3	3 x 400 50/60 Hz	Q3Y - Q3A - Q3I - Q3SF Q3D

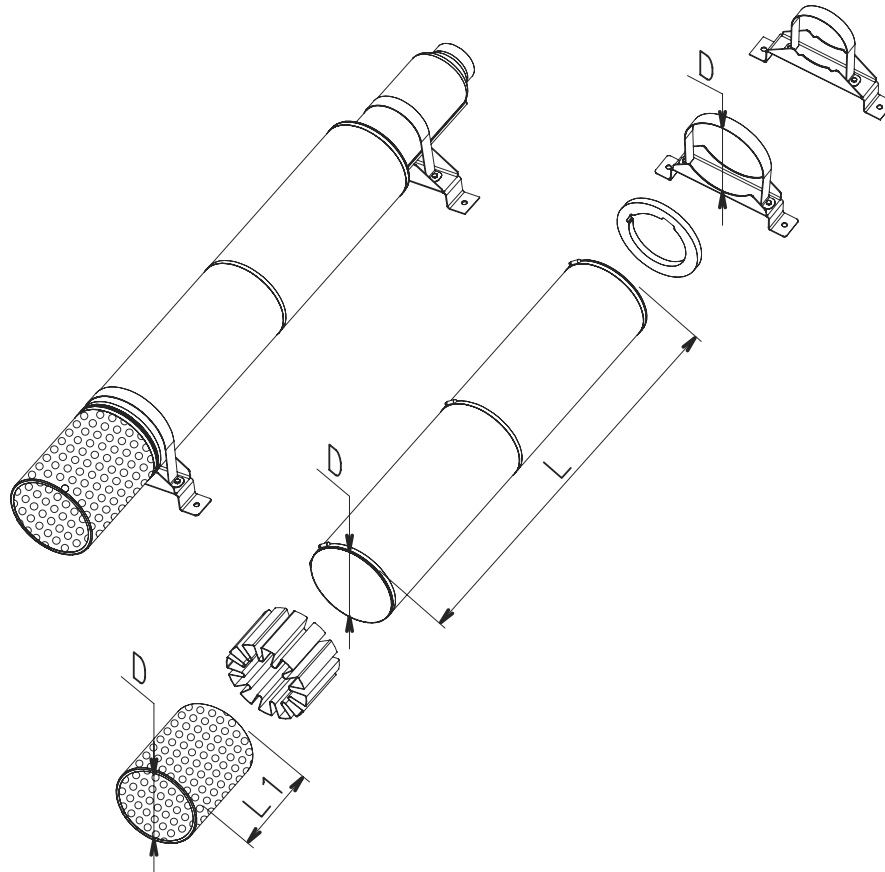


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Lowara

COOLING SHROUDS

01890_A_DD



TYPE	COOLING SET SHROUD D x L	COOLING SET FILTER D x L1	COOLING SET SUPPORTS D
6"	D225X800	D225X192	D225
	D225X900	D225X192	D225
	D225X1000	D225X192	D225
	D225X1250	D225X192	D225
	D225X1500	D225X192	D225
	D225X1750	D225X192	D225
	D256X800	D256X325	D256
	D256X900	D256X325	D256
	D256X1000	D256X325	D256
	D256X1250	D256X325	D256
8"	D256X1500	D256X325	D256
	D256X1750	D256X325	D256
	D256X2000	D256X325	D256
	D256X2250	D256X325	D256
	D285X1250	D285X385	D285
	D285X1500	D285X385	D285
	D285X1750	D285X385	D285
	D285X2000	D285X385	D285
10"	D285X2500	D285X385	D285
	D285X1750	D285X385	D285
	D285X2000	D285X385	D285
	D330X1750	D330X385	D330
	D330X2000	D330X385	D330
	D330X2250	D330X385	D330

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Lowara

L6C SERIES MOTORS MOTOR-COOLING SLEEVE COMBINATION TABLE

MOTOR TYPE	PUMP TYPE	N. OF STAGES	COOLING SET SHROUD	COOLING SET FILTER	COOLING SET SUPPORTS
L6C	6Z855 01/1A-L6C	1	D225X900	D225X192	D225 2PZ
	6Z855 01-L6C	1	D225X900	D225X192	D225 2PZ
	6Z855 02/2A-L6C	2	D225X1000	D225X192	D225 2PZ
	6Z855 02/1A-L6C	2	D225X1000	D225X192	D225 2PZ
	6Z855 02-L6C	2	D225X1000	D225X192	D225 2PZ
	6Z855 03/3A-L6C	3	D225X1000	D225X192	D225 2PZ
	6Z855 03/1A-L6C	3	D225X1000	D225X192	D225 2PZ
	6Z855 03-L6C	3	D225X1250	D225X192	D225 2PZ
	6Z855 04/2A-L6C	4	D225X1250	D225X192	D225 2PZ
	6Z855 04-L6C	4	D225X1250	D225X192	D225 2PZ
	6Z855 05/2A-L6C	5	D225X1250	D225X192	D225 2PZ
	6Z855 05-L6C	5	D225X1500	D225X192	D225 3PZ
	6Z855 06/2A-L6C	6	D225X1500	D225X192	D225 3PZ
	6Z875 01/1B-L6C	1	D225X900	D225X192	D225 2PZ
	6Z875 01/1C-L6C	1	D225X900	D225X192	D225 2PZ
	6Z875 01-L6C	1	D225X1000	D225X192	D225 2PZ
	6Z875 02/2B-L6C	2	D225X1000	D225X192	D225 2PZ
	6Z875 02/1A-L6C	2	D225X1000	D225X192	D225 2PZ
	6Z875 02-L6C	2	D225X1000	D225X192	D225 2PZ
	6Z875 03/2B-L6C	3	D225X1000	D225X192	D225 2PZ
	6Z875 03/1A-L6C	3	D225X1250	D225X192	D225 2PZ
	6Z875 03-L6C	3	D225X1250	D225X192	D225 2PZ
	6Z875 04/2A-L6C	4	D225X1250	D225X192	D225 2PZ
	6Z875 04/1A-L6C	4	D225X1250	D225X192	D225 2PZ
	6Z875 04-L6C	4	D225X1500	D225X192	D225 3PZ
	6Z875 05/2A-L6C	5	D225X1500	D225X192	D225 3PZ
	6Z875 05/1A-L6C	5	D225X1500	D225X192	D225 3PZ
	6Z895 01/1B-L6C	1	D256X900	D256X325	D256 2PZ
	6Z895 01/1A-L6C	1	D256X1000	D256X325	D256 2PZ
	6Z895 01-L6C	1	D256X1000	D256X325	D256 2PZ
	6Z895 02/2B-L6C	2	D256X1000	D256X325	D256 2PZ
	6Z895 02/2A-L6C	2	D256X1000	D256X325	D256 2PZ
	6Z895 02-L6C	2	D256X1250	D256X325	D256 2PZ
	6Z895 03/2B-L6C	3	D256X1250	D256X325	D256 2PZ
	6Z895 03/2A-L6C	3	D256X1250	D256X325	D256 2PZ
	6Z895 03-L6C	3	D256X1500	D256X325	D256 3PZ
	6Z895 04/2B-L6C	4	D256X1500	D256X325	D256 3PZ
	6Z8125 01/1A-L6C	1	D256X1000	D256X325	D256 2PZ
	6Z8125 01-L6C	1	D256X1000	D256X325	D256 2PZ
	6Z8125 02/2B-L6C	2	D256X1000	D256X325	D256 2PZ
	6Z8125 02/2A-L6C	2	D256X1000	D256X325	D256 2PZ
	6Z8125 02-L6C	2	D256X1250	D256X325	D256 2PZ
6Z8125 03/2B-L6C	3	D256X1250	D256X325	D256 2PZ	
6Z8125 03/2A-L6C	3	D256X1250	D256X325	D256 2PZ	
6Z8125 03-L6C	3	D256X1500	D256X325	D256 3PZ	
6Z8125 04/2B-L6C	4	D256X1500	D256X325	D256 3PZ	

* Horizontal installation not allowed. The supports must be used for vertical electric pump locking.

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MC8 SERIES MOTORS MOTOR-COOLING SLEEVE COMBINATION TABLE

MOTOR TYPE	PUMP TYPE	N. OF STAGES	COOLING SET SHROUD	COOLING SET FILTER	COOLING SET SUPPORTS
MC8	6Z855 06-MC8	6	D256X1500	D256X325	D256 3PZ
	6Z855 07-MC8	7	D256X1500	D256X325	D256 3PZ
	6Z855 08-MC8	8	D256X1750	D256X325	D256 3PZ
	6Z855 09-MC8	9	D256X1750	D256X325	D256 3PZ
	6Z855 10-MC8	10	D256X1750	D256X325	D256 3PZ
	6Z855 11-MC8	11	D256X1750	D256X325	D256 3PZ
	6Z855 12-MC8	12	D256X2000	D256X325	D256 3PZ
	6Z855 13-MC8	13	D256X2000	D256X325	D256 3PZ
	6Z875 05-MC8	5	D256X1500	D256X325	D256 3PZ
	6Z875 06/2A-MC8	6	D256X1500	D256X325	D256 3PZ
	6Z875 06-MC8	6	D256X1500	D256X325	D256 3PZ
	6Z875 07-MC8	7	D256X1750	D256X325	D256 3PZ
	6Z875 08-MC8	8	D256X1750	D256X325	D256 3PZ
	6Z875 09-MC8	9	D256X1750	D256X325	D256 3PZ
	6Z875 10-MC8	10	D256X2000	D256X325	D256 3PZ
	6Z875 11-MC8	11	D256X2000	D256X325	D256 3PZ
	6Z895 04/2A-MC8	4	D285X1500	D285X385	D285 3PZ
	6Z895 04-MC8	4	D285X1500	D285X385	D285 3PZ
	6Z895 05/3A-MC8	5	D285X1500	D285X385	D285 3PZ
	6Z895 05-MC8	5	D285X1750	D285X385	D285 3PZ
	6Z895 06/3A-MC8	6	D285X1750	D285X385	D285 3PZ
	6Z895 06-MC8	6	D285X1750	D285X385	D285 3PZ
	6Z895 07/3A-MC8	7	D285X1750	D285X385	D285 3PZ
	6Z895 07-MC8	7	D285X2000	D285X385	D285 3PZ
	6Z895 08/3A-MC8	8	D285X2000	D285X385	D285 3PZ
	6Z895 08-MC8	8	D285X2000	D285X385	D285 3PZ
	6Z8125 04/2A-MC8	4	D285X1500	D285X385	D285 3PZ
	6Z8125 04-MC8	4	D285X1500	D285X385	D285 3PZ
	6Z8125 05/3A-MC8	5	D285X1500	D285X385	D285 3PZ
	6Z8125 05-MC8	5	D285X1750	D285X385	D285 3PZ
	6Z8125 06/3A-MC8	6	D285X1750	D285X385	D285 3PZ
	6Z8125 06/1A-MC8	6	D285X1750	D285X385	D285 3PZ
6Z8125 07/3A-MC8	7	D285X1750	D285X385	D285 3PZ	
6Z8125 07-MC8	7	D285X2000	D285X385	D285 3PZ	
6Z8125 08/3A-MC8	8	D285X2000	D285X385	D285 3PZ	
6Z8125 08-MC8	8	D285X2000	D285X385	D285 3PZ	

* Horizontal installation not allowed. The supports must be used for vertical electric pump locking.

MC8_camicie-Z8-60_a_ta

MC10 SERIES MOTORS MOTOR-COOLING SLEEVE COMBINATION TABLE

MOTOR TYPE	PUMP TYPE	N. OF STAGES	COOLING SET SHROUD	COOLING SET FILTER	COOLING SET SUPPORTS
MC10	6Z875 12-MC10	12	D285X2000	D285X385	D285 3PZ
	6Z875 13-MC10	13	D285X2000	D285X385	D285 3PZ
	6Z895 09-MC10	9	D330X2000	D330X385	D330 3PZ
	6Z895 10-MC10	10	D330X2250	D330X385	D330 3PZ
	6Z895 11-MC10	11	D330X2250	D330X385	D330 3PZ
	6Z8125 09-MC10	9	D330X2000	D330X385	D330 3PZ
	6Z8125 10-MC10	10	D330X2250	D330X385	D330 3PZ
6Z8125 11-MC10	11	D330X2250	D330X385	D330 3PZ	

* Horizontal installation not allowed. The supports must be used for vertical electric pump locking.

MC10_camicie-Z8-60_a_ta



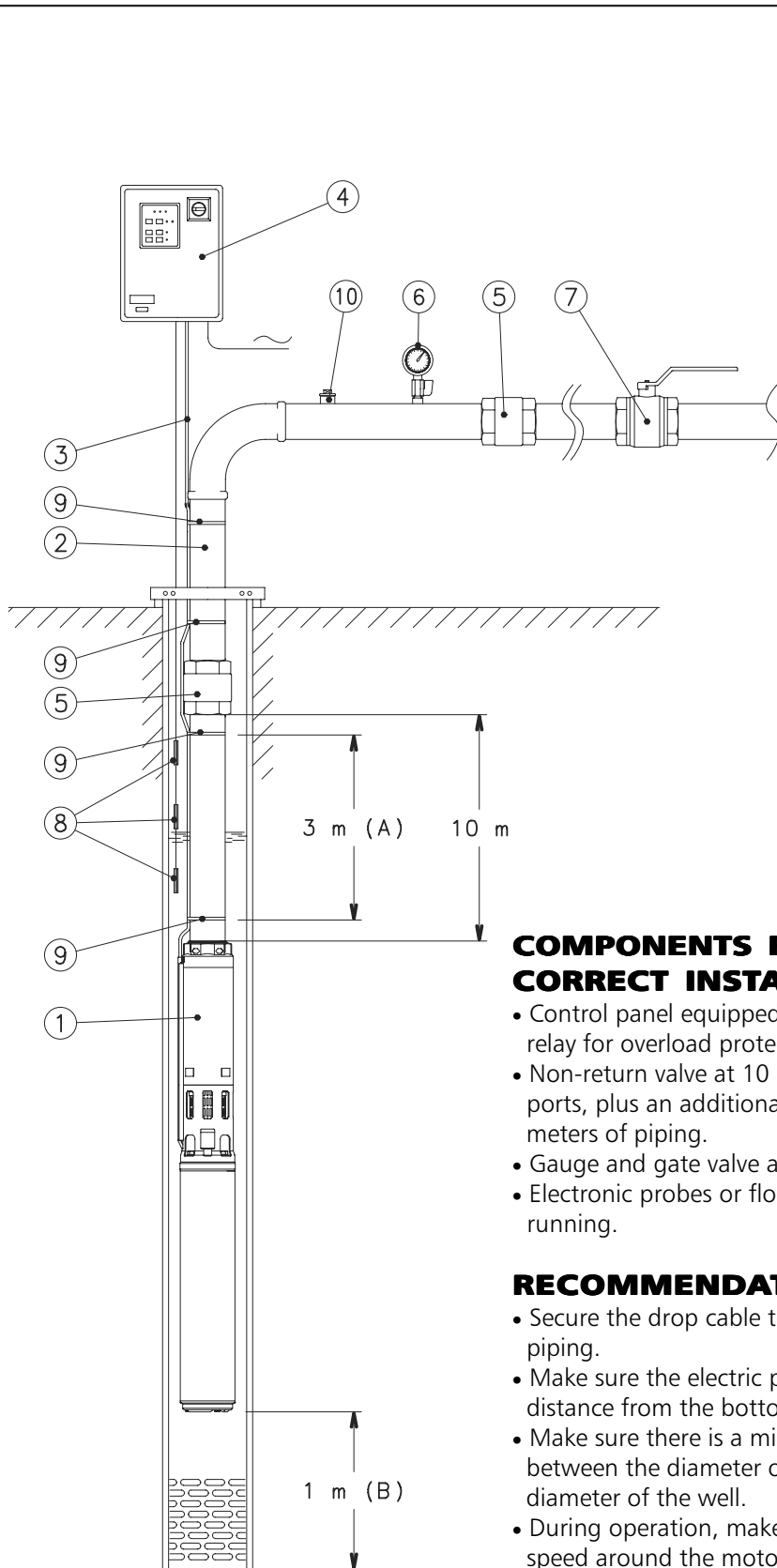
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Lowara

TECHNICAL APPENDIX



SUBMERSIBLE ELECTRIC PUMP INSTALLATION DIAGRAM



- 1 - Submersible electric pump.
- 2 - Delivery pipe.
- 3 - Drop cable.
- 4 - Control panel.
- 5 - Non-return valve.
- 6 - Gauge.
- 7 - On/off valve.
- 8 - Level sensors for protection against dry running.
- 9 - Cable clamp.
- 10 - Electric pump bleed/priming cap.

A - Distance between the clamps that secure the drop cable to the delivery pipe.

B - Distance from the bottom of the well to the electric pump.

COMPONENTS REQUIRED FOR CORRECT INSTALLATION

- Control panel equipped with a main switch and thermal relay for overload protection.
- Non-return valve at 10 meters' distance from the delivery ports, plus an additional non-return valve every 30 ÷ 50 meters of piping.
- Gauge and gate valve at well mouth.
- Electronic probes or floats for protection against dry running.

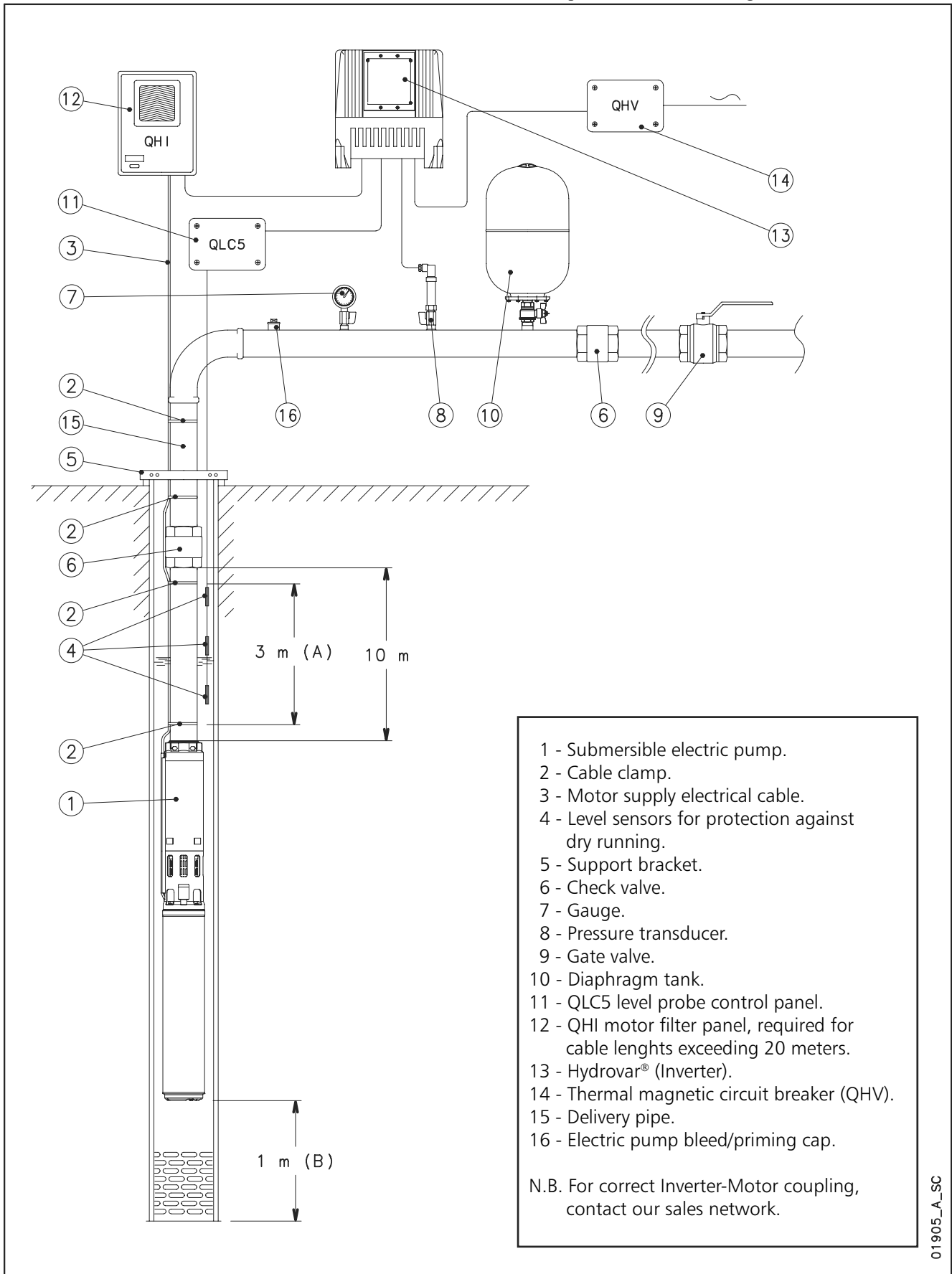
RECOMMENDATIONS

- Secure the drop cable to the pipe every 3 ÷ 6 meters of piping.
- Make sure the electric pump is installed at a safe distance from the bottom of the well.
- Make sure there is a minimum distance of 3 mm between the diameter of the pump and the internal diameter of the well.
- During operation, make sure that the water circulation speed around the motor is at least 8 cm/sec.
- Make sure that the minimum dynamic level of the water in the well is at least 1 m above the pump's delivery port.

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EXAMPLE OF INSTALLATION OF A SUBMERSIBLE ELECTRIC PUMP CONTROLLED BY AN INVERTER (HYDROVAR®)



L6C SERIES MOTORS

TABLE OF POWER REDUCTION COEFFICIENTS WITH INCREASED WATER TEMPERATURE

MOTOR TYPE	RATED POWER kW	TEMPERATURE °C					
		35	40	45	50	55	60
L6C	all models	1	0,95	0,8	0,75	0,7	0,6

L6c-derating-60_b_te

EXAMPLE:

A 7,5 kW L6C motor is to be used in 45°C water.

Motor power at 50 °C = 7,5 x 0,8 = 6 kW

MC8 - MC10 - MC12 SERIES MOTORS

TABLE OF POWER REDUCTION COEFFICIENTS WITH INCREASED WATER TEMPERATURE

MOTOR TYPE	RATED POWER kW	TEMPERATURE °C							
		25	30	35	40	45	50	55	60
MC8 (1)	All Models	1	0,85	0,74	-	-	-	-	-
MC8 (2)	All Models	1	1	1	1	1	0,85	0,75	0,67
MC10 (1)	All Models	1	0,85	0,74	-	-	-	-	-
MC10 (2)	All Models	1	1	1	1	1	0,85	0,75	0,67
MC12 (1)	All Models	1	0,85	0,74	-	-	-	-	-
MC12 (2)	All Models	1	1	1	1	1	0,85	0,75	0,67

(1) Standard windings for water temperature up to 35 °C.

MC-derating-60-en_a_te

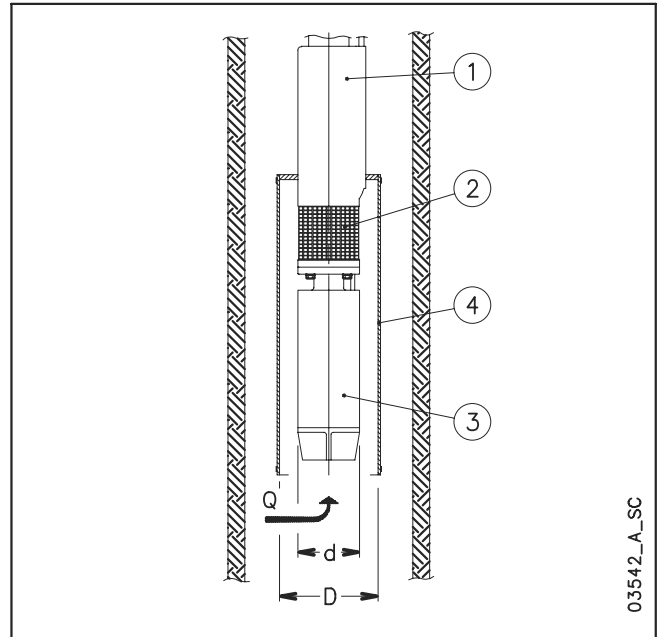
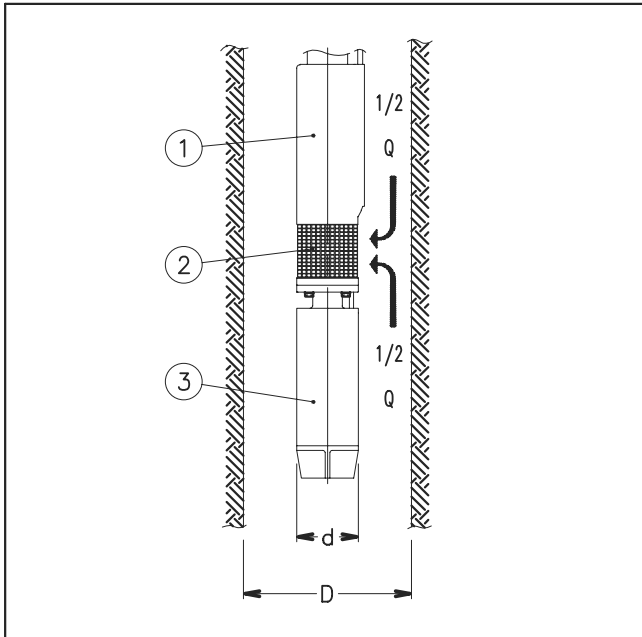
(2) Special windings for water temperature from 35 °C to 60 °C.

EXAMPLE:

A MC8-75, 55 kW motor must work in water at a temperature of 35 °C.

Motor power at 35 °C = 55 x 0,74 = 40,7 kW

CALCULATING THE SPEED OF THE FLUID THAT FLOWS AROUND A SUBMERGED MOTOR AND SIZING OF THE COOLING SLEEVE



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The following formula is used to verify whether the speed of the fluid that flows around the motor of a submersible pump is high enough to guarantee the proper cooling of the motor:

$$v = \frac{\frac{Q}{2}}{\pi \cdot \left(\frac{D^2}{4} - \frac{d^2}{4} \right)}$$

Where: Q in [m³/s] is the operating flow rate of the electric pump; only half of this flow is taken into account, because the fluid which is sucked into the area of the filter (2), comes from the motor side (3) as well as from the pump side (1);
 D in [m] corresponds to the diameter of the well;
 d in [m] corresponds to the diameter of the motor (3);
 v in [m/s] is the calculated speed of the fluid that flows around the motor.

Now, compare the speed thus calculated (v) with the minimum speed required for correct cooling of the motor (v_m): if v ≥ v_m it means that the motor is properly cooled, if v < v_m will be necessary to mount a cooling sleeve (4).

Example:

An electric pump OZ630/12 (motor diameter d = 0.144 m) operates in an 8" (well diameter D = 0.203 m) with flow rate Q = 20 m³/h = 0.0055 m³/s.

Speed of fluid v = (0.0055/2) / {π·[(0.203)²/4 – (0.144)²/4]} = 0.17 m/s.

The minimum speed required for proper motor cooling is v_m = 0.20 m/s.

Because v < v_m, it will be necessary to mount a cooling sleeve.

The following formula is used to determine the maximum diameter of a cooling sleeve to be mounted on a submersible motor:

$$D = \sqrt{4 \cdot \left(\frac{Q}{v \cdot \pi} + \frac{d^2}{4} \right)}$$

Where: Q in [m³/s] is the operating flow rate of the electric pump; the entire flow is taken into account because the fluid comes from the motor side (3) only;
 D in [m] corresponds to the diameter of the cooling sleeve (4);
 d in [m] corresponds to the diameter of the motors(3);
 v_m in [m/s] is the minimum speed of the fluid that flows around the motor.

If the electric pump operates at different flow rate, the minimum flow rate must be taken into account for calculating the diameter of the cooling sleeve.

Example:

A motor coupled to the electric pump OZ615/24 (motor diameter d = 0.144 m), which operates with flow rate Q = 15 m³/h = 0.0042 m³/s, requires a minimum speed of the fluid of v_m = 0.20 m/s.

Cooling sleeve diameter D = {4·[(0.0042/(0.2·π)+(0.144)²/4]}^{0.5} = 0.217 m.

DETERMINING THE CABLE SECTION REQUIRED FOR LOW-VOLTAGE SUBMERSIBLE MOTORS

The section required depends on the maximum admissible load current - which determines the heating factor - on the ambient temperature and how the cable is laid.

Voltage loss, and therefore loss of cable efficiency, constitutes the decisive selection criterium for long cables.

The required cable section is calculated based on the following formulas:

$$\text{Direct start: } q = \frac{\sqrt{3} \cdot I \cdot \cos\phi \cdot 100}{x \cdot \Delta u \cdot U}$$

$$\text{Star - Delta start } q = \frac{2 \cdot I \cdot \cos\phi \cdot 100}{\sqrt{3} \cdot x \cdot \Delta u \cdot U}$$

q... cable section in mm²

l... Cable length in mm

I... rated motor current in A

cosφ... Power factor of submersible motor

X... Electrical conductivity (53 for copper)

U... Rated voltage

Δu Voltage drop in %

When sizing the cable section, keep in mind that higher voltage drops mean increased power losses and consequently higher operating costs.

The diagrams show how the required cable section is calculated based on a voltage rating of **400V** and a power factor **cosφ=0,85** and **3% voltage drop**, at an ambient temperature of **30°C**. If the temperature is higher than 30°C, the maximum admissible current carrying capacity of the cable at the actual ambient temperature must be taken into account (see table next to diagrams).

The inductive voltage drop is negligible and has not been taken into account, therefore these diagrams can be adopted **regardless of the frequency**.

The current carrying capacity can be established from the horizontal lines above the length of the cable (vertical lines). The bend point indicates the limit length for 3% voltage drops.

Examples:

1.) Star-Delta start:

Calculate the cable section
Rated motor current: 85 A

Waterproof cable
Length of cable: 35 m

On the horizontal axis, follow the 85 A rated current until you reach a conductivity section with which the length of the cable is greater than or equal to 35m. In this case, 6 mm². The maximum length for a 3% voltage drop is 43 m. Therefore, in this case the voltage drop is $3 \times 35 / 46 = 2.3\%$

2.) the same data, but with 50°C ambient temperature:

The table next to the diagram shows that the maximum current carrying capacity of a 6 mm² cable at 50°C is 78 A, therefore a section of 10 mm² must be selected. The maximum length for a 3% voltage drop is 76 m. Therefore, in this case the voltage drop is $3 \times 35 / 76 = 1.4\%$

3.) the same data, but with 500V voltage:

In order to use the diagrams, the rated current of the motor must be converted in proportion to the voltage:

$$\text{Current reading} = \frac{400V}{\text{rated voltage}} \times \text{rated current}$$

$$\text{Current reading} = \frac{400V}{500V} \times 85 = 68 \text{ A}$$

The maximum length for a 3% voltage drop is 38 m. Therefore, the voltage drop is: $3 \times 35 / 38 = 2.75\%$

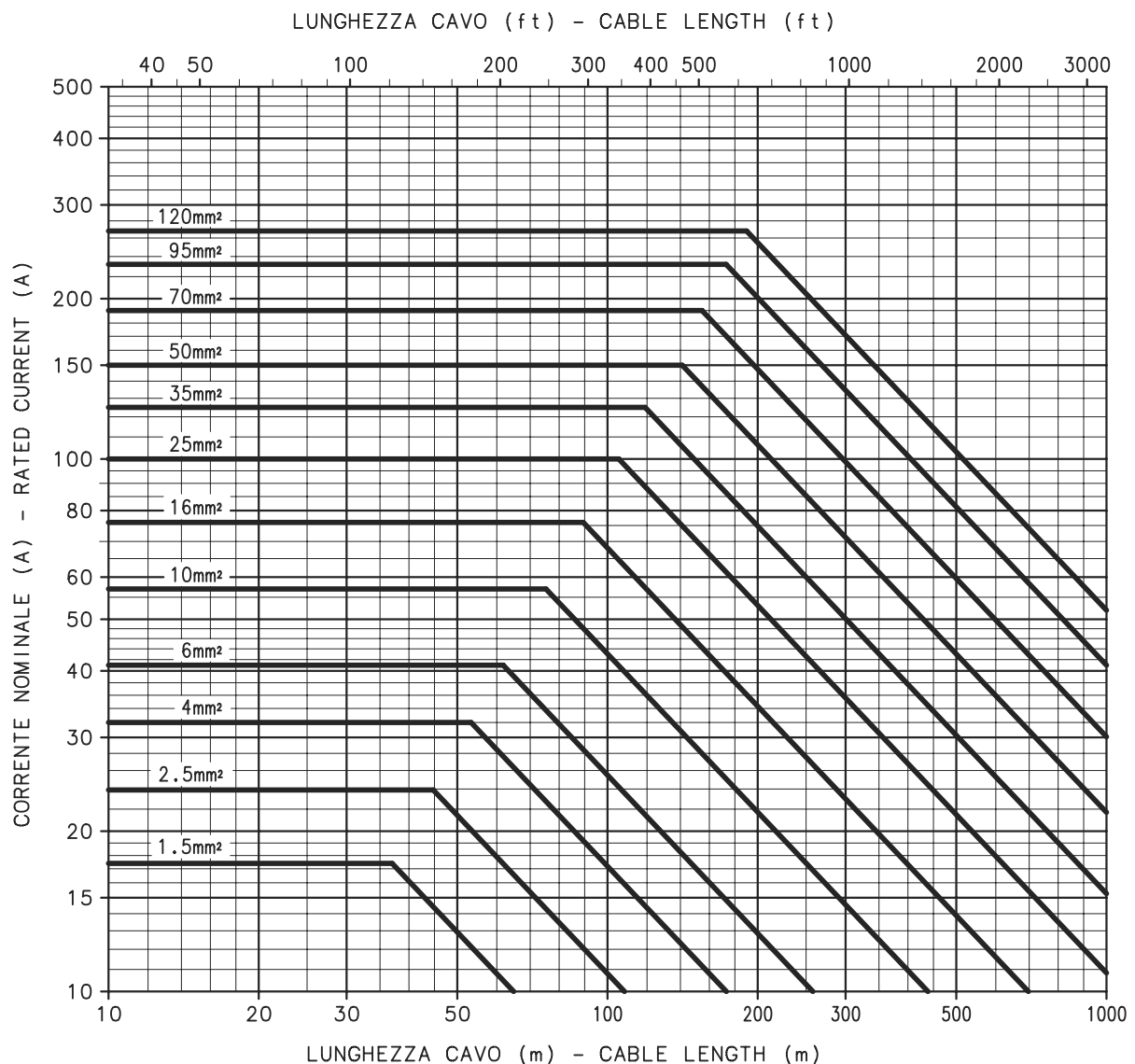


SIZING OF CHLOROPRENE RUBBER (CR) H07RN-F CABLES DIRECT-ON-LINE START

Temperature	10°C	15°C	20°C	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C
Section (mm²)	Corrente max - Max current - (A)										
1,5	21	20	19	18	17	16	15	13	12	-	-
2,5	29	28	26	25	24	22	20	19	17	-	-
4	39	37	35	34	32	29	27	25	22	-	-
6	50	48	46	43	41	38	35	32	29	-	-
10	69	66	63	61	57	53	49	45	40	-	-
16	92	89	85	81	76	70	66	60	54	-	-
25	123	118	113	108	101	94	88	80	71	-	-
35	152	146	140	133	125	116	108	98	88	-	-
50	184	176	169	161	151	140	131	119	107	-	-
70	234	224	215	205	192	178	167	151	136	-	-
95	283	271	259	248	232	215	201	183	164	-	-
120	328	314	301	287	269	250	234	212	191	-	-

400 V - 3 % voltage drop - 30 °C ambient temperature - $\cos \phi = 0,85$

dim-cavi60_d-h07_b_te



Not suitable for permanent immersion in water.

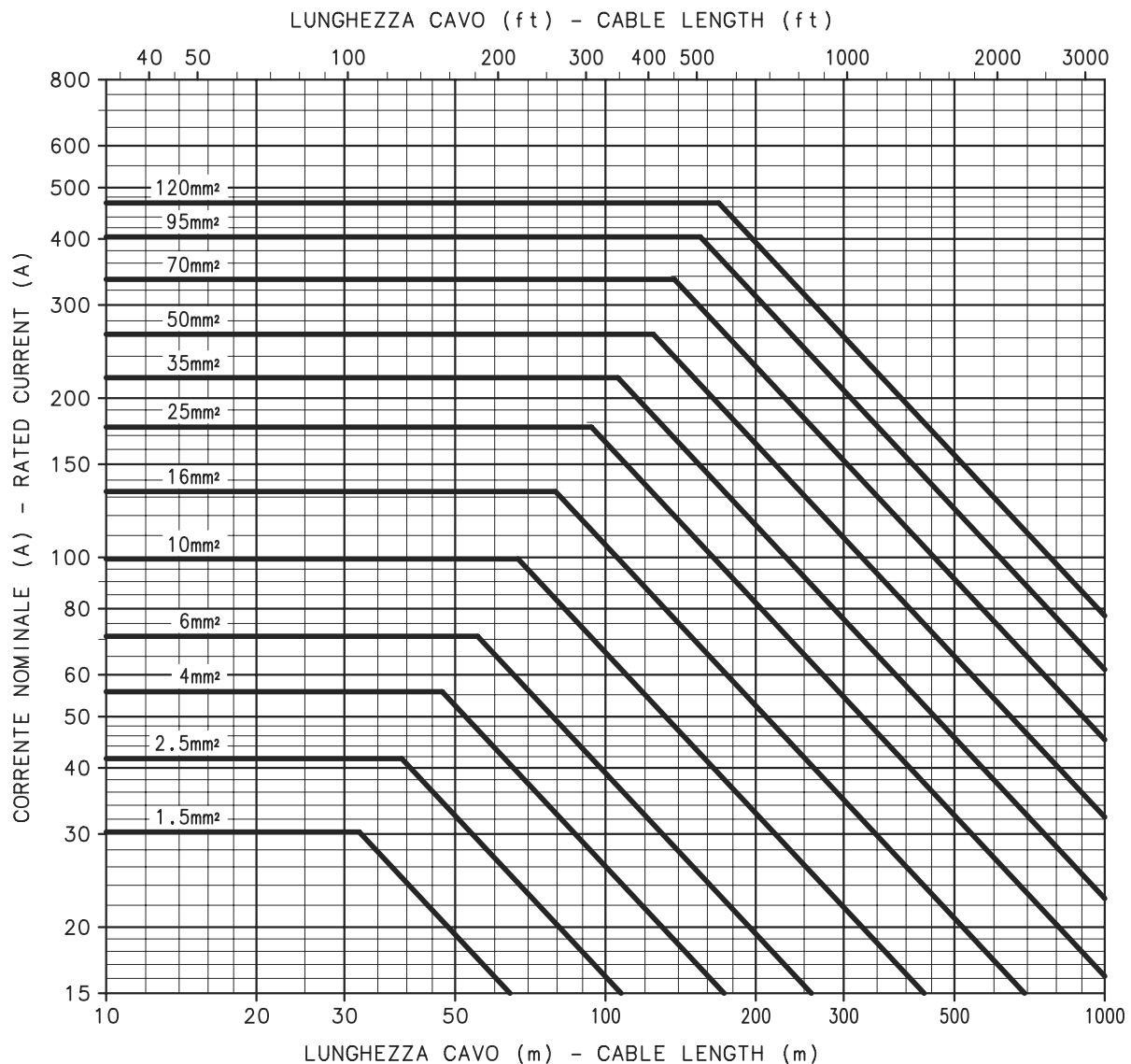


SIZING OF CHLOROPRENE RUBBER (CR) H07RN-F CABLES START-DELTA START

Temperature	10°C	15°C	20°C	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C
Section (mm ²)	Corrente max - Max current - (A)										
1,5	37	35	34	32	30	28	26	24	21	-	-
2,5	50	48	46	44	41	38	36	32	29	-	-
4	67	64	62	59	55	51	48	43	39	-	-
6	86	83	79	76	71	66	61	56	50	-	-
10	120	115	110	105	98	91	86	78	70	-	-
16	160	154	147	140	131	122	114	104	93	-	-
25	213	204	195	187	175	162	152	138	124	-	-
35	264	253	242	231	216	201	188	171	153	-	-
50	319	306	293	279	261	243	227	206	185	-	-
70	405	389	372	355	332	309	289	262	263	-	-
95	490	470	450	429	401	373	349	317	285	-	-
120	568	545	521	498	465	433	405	368	330	-	-

400 V - 3 % voltage drop - 30 °C ambient temperature - $\cos \phi = 0,85$

dim-cavi60_sd-h07_b_te



Not suitable for permanent immersion in water.

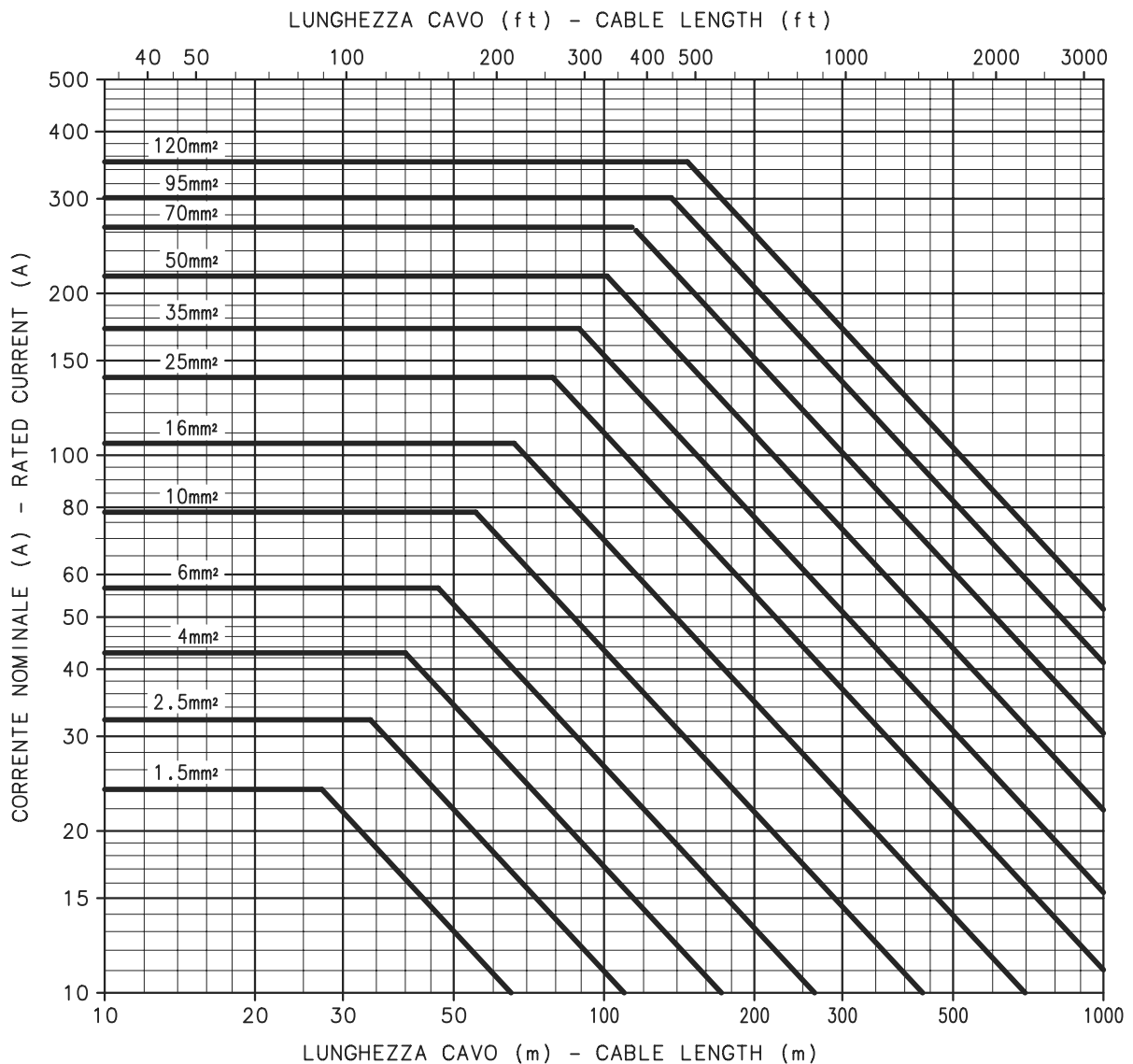


SIZING OF ETHYLENE-PROPYLENE RUBBER (EPR) CABLES DIRECT-ON-LINE START

Temperature	10°C	15°C	20°C	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C
Section (mm ²)	Corrente max - Max current - (A)										
1,5	27	26	25	24	24	23	21	20	19	18	15
2,5	36	35	33	33	32	30	29	27	26	24	20
4	49	48	45	44	43	41	39	37	35	32	27
6	64	62	59	58	56	53	50	48	45	42	36
10	89	87	82	81	78	74	70	67	63	59	50
16	119	116	110	108	104	99	94	90	85	79	67
25	158	154	146	143	138	132	125	120	113	104	89
35	196	191	181	177	171	164	155	148	140	129	111
50	244	238	225	221	213	204	193	185	174	164	138
70	302	294	278	273	263	252	239	228	215	199	170
95	346	337	319	313	301	288	273	261	246	228	195
120	404	394	373	366	352	337	320	306	288	267	228

400 V - 3 % voltage drop - 30 °C ambient temperature - $\cos \phi = 0,85$

dim-cavi60_d-epr_b_te



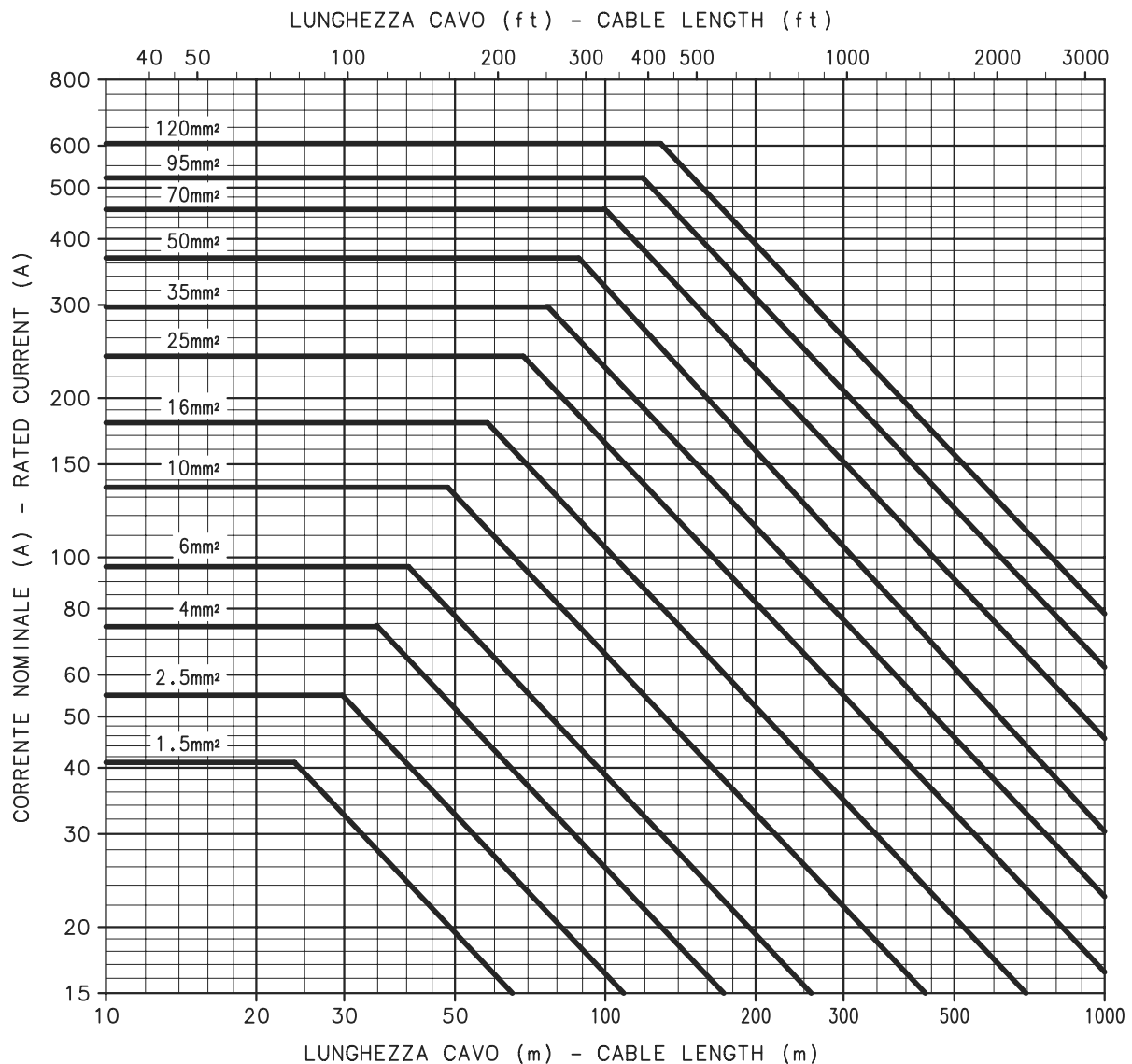


SIZING OF ETHYLENE-PROPYLENE RUBBER (EPR) CABLES START-DELTA START

Temperature	10°C	15°C	20°C	25°C	30°C	35°C	40°C	45°C	50°C	55°C	60°C
Section (mm²)	Corrente max - Max current - (A)										
1,5	47	45	43	42	41	39	37	35	33	31	36
2,5	63	61	58	57	55	52	50	47	45	41	35
4	85	82	78	76	74	71	67	64	60	56	48
6	110	107	101	99	96	92	87	83	78	72	62
10	155	151	143	140	135	129	122	117	110	102	87
16	207	201	190	187	180	172	163	156	147	136	117
25	274	267	253	248	239	229	217	207	195	181	155
35	340	331	313	307	296	284	269	257	242	224	192
50	423	412	390	382	368	353	334	320	301	279	239
70	523	509	482	473	455	436	414	395	373	345	295
95	599	583	522	541	521	500	474	453	427	395	338
120	700	682	645	633	609	584	554	529	499	462	395

400 V - 3 % voltage drop - 30 °C ambient temperature - $\cos \phi = 0,85$

dim-cavi60_sd-epr_b_te



ASYNCHRONOUS MOTOR STARTING SYSTEMS

Direct

Suitable for low-power motors.

The starting current (I_a) is much higher than the rated current (I_n).

Starting current $I_a = I_n \times 4 - 8$

Starting torque $C_a = C_n \times 2 - 3$

Indirect

• Star/Delta

The starting current (I_a) is three times less than the direct starting current.

Starting current $I_a = I_n \times 1.3 - 2.7$

Starting torque $C_a = C_n \times 0.7 - 1$

In the star to delta changeover phase (approx. 70 ms) the motor is not supplied and tends to reduce its rotation speed.

In the case of submersible electric pumps with power above 10 HP, the modest mass of the rotor causes a slowdown at changeover, so that the initial Star supply phase is rendered partially useless.

In such cases we recommend using impedance panels or an autotransformer.

• Impedances

The motor is started with a voltage which is lower than the rated one, and which is obtained by means of impedances.

The Lowara panels use impedances which cut down to 70% the starting voltage.

The switch to the rated voltage takes place without any interruptions of the power supply.

Rated voltage $V_n = 380 \text{ V}$

Starting voltage $V_a = V_n \times 0,7 = 266 \text{ V}$

$$I_a = I_n \times 4 \div 8 \times \left(\frac{V_a}{V_n} \right) = I_n \times 3 \div 6$$

Starting voltage

Starting torque

$$C_a = C_n \times 2 \div 3 \times \left(\frac{V_a}{V_n} \right)^2 = C_n \times 1 \div 1,5$$

Autotransformer

The pump is started with a voltage which is lower than the rated one.

The Lowara panels use an autotransformer with a voltage that is 70% the value of the line voltage.

The switch to the rated voltage occurs without any interruptions of the power supply.

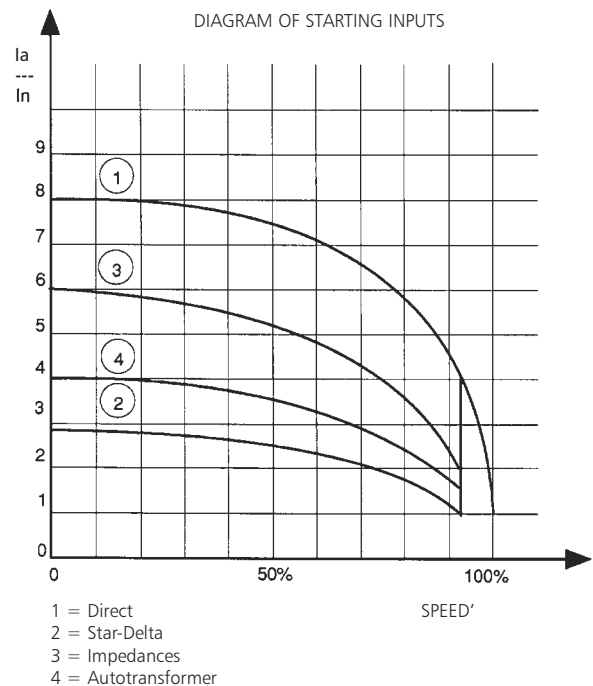
Rated voltage $V_n = 380 \text{ V}$

Starting current

$$I_a = I_n \times 4 \div 8 \times \left(\frac{V_a}{V_n} \right) = I_n \times 3 \div 6$$

Starting torque

$$C_a = C_n \times 2 \div 3 \times \left(\frac{V_a}{V_n} \right)^2 = C_n \times 1 \div 1,5$$



WATER REQUIREMENTS IN CIVIL USERS

Determination of the water requirement depends on the type of users and contemporaneity factor. The calculation may be subject to regulations, standards or customs that may vary from country to country. The calculation method shown below is an example based on practical experience, designed to provide a reference value and not a substitute for detailed analytical calculation.

Water requirements in condominiums

The **consumption table** shows the maximum values for each delivery point, depending on the plumbing amenities.

MAXIMUM CONSUMPTION FOR EACH DELIVERY POINT

TYPE	CONSUMPTION (l/min)
Sink	9
Dishwasher	10
Washing machine	12
Shower	12
Bathtub	15
Washbasin	6
Bidet	6
Flush tank WC	6
Controlled flushing system WC	90

G-at-cm_a_th

The **sum of the water consumption values** of each delivery point determines the maximum theoretical requirement, which must be reduced according to the **contemporaneity coefficient**, because in actual fact the delivery points are never used all together.

$f = \frac{1}{\sqrt{(0,857 \times Nr \times Na)}}$	Coefficient for apartments with one bathroom and flush tank WC
$f = \frac{1}{\sqrt{(0,857 \times Nr \times Na)}}$	Coefficient for apartments with one bathroom and controlled flushing system WC
$f = \frac{1,03}{\sqrt{(0,545 \times Nr \times Na)}}$	Coefficient for apartments with two bathrooms and flush tank WC
$f = \frac{0,8}{\sqrt{(0,727 \times Nr \times Na)}}$	Coefficient for apartments with two bathrooms and controlled flushing system WC
f= coefficient; Nr= number of delivery points; Na= number of apartments	

The **table of water requirements in civil users** shows the maximum contemporaneity flow-rate values based on the **number of apartments** and the type of WC for apartments with one bathroom and two bathrooms. As regards apartments with one bathroom, 7 drawing points have been taken into consideration, while 11 points have been considered for apartments with two bathrooms. If the number of drawing points or apartments is different, use the formulas to **calculate** the requirement.



TABLE OF WATER REQUIREMENTS IN CIVIL USERS

NUMBER OF APARTMENTS	WITH FLUSH TANK WC		WITH CONTROLLED FLUSHING SYSTEM WC	
	1	2	1	2
	FLOW RATE (l/min)			
1	32	40	60	79
2	45	56	85	111
3	55	68	105	136
4	63	79	121	157
5	71	88	135	176
6	78	97	148	193
7	84	105	160	208
8	90	112	171	223
9	95	119	181	236
10	100	125	191	249
11	105	131	200	261
12	110	137	209	273
13	114	143	218	284
14	119	148	226	295
15	123	153	234	305
16	127	158	242	315
17	131	163	249	325
18	134	168	256	334
19	138	172	263	343
20	142	177	270	352
21	145	181	277	361
22	149	185	283	369
23	152	190	290	378
24	155	194	296	386
25	158	198	302	394
26	162	202	308	401
27	165	205	314	409
28	168	209	320	417
29	171	213	325	424
30	174	217	331	431
35	187	234	357	466
40	200	250	382	498
45	213	265	405	528
50	224	280	427	557
55	235	293	448	584
60	245	306	468	610
65	255	319	487	635
70	265	331	506	659
75	274	342	523	682
80	283	354	540	704
85	292	364	557	726
90	301	375	573	747
95	309	385	589	767
100	317	395	604	787
120	347	433	662	863
140	375	468	715	932
160	401	500	764	996
180	425	530	811	1056
200	448	559	854	1114

For seaside resorts, a flow rate increased by at least 20% must be considered.

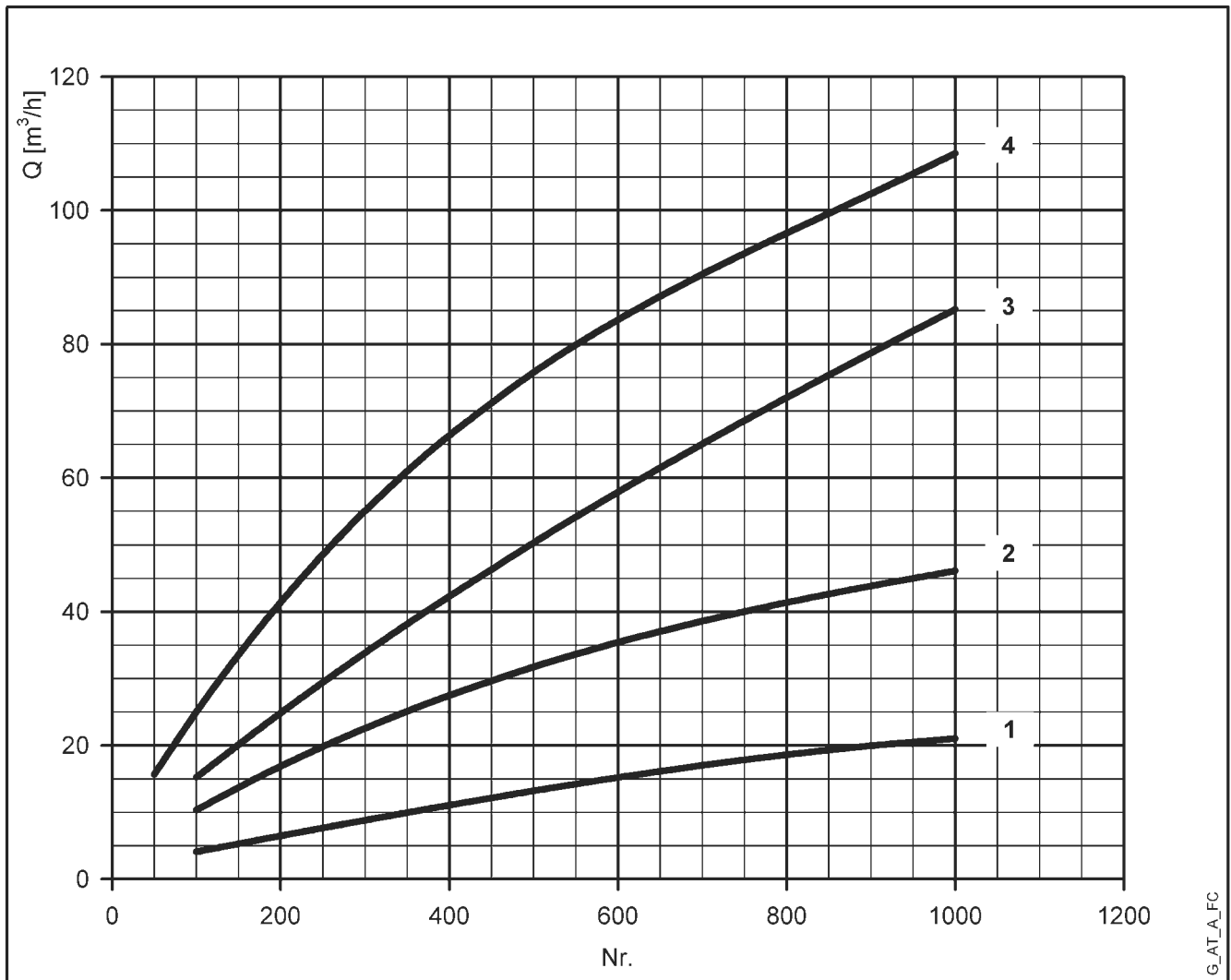
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WATER REQUIREMENTS FOR COMMUNITY BUILDINGS

The requirements of buildings intended for specific uses, such as **offices, residential units, hotels, department stores, nursing homes** and so on, are different from those of condominiums, and both their global daily water consumption and the maximum contemporaneity flow rate are usually greater. The **diagram of water requirements for community buildings** shows the maximum contemporaneity flow rate of some types of communities, for guidance.

These requirements must be determined case by case with the utmost accuracy, using analytical calculation methods, according to particular needs and local provisions.



For seaside resorts, the flow rate must be increased by at least 20%.

- 1 = Offices (N. of people)
- 2 = Department stores (N. of people)
- 3 = Nursing homes (N. of beds)
- 4 = Hotels, residences (N. of beds)

NPSH

The minimum operating values that can be reached at the pump suction end are limited by the onset of cavitation.

Cavitation is the formation of vapour-filled cavities within liquids where the pressure is locally reduced to a critical value, or where the local pressure is equal to, or just below the vapour pressure of the liquid.

The vapour-filled cavities flow with the current and when they reach a higher pressure area the vapour contained in the cavities condenses. The cavities collide, generating pressure waves that are transmitted to the walls. These, being subjected to stress cycles, gradually become deformed and yield due to fatigue. This phenomenon, characterized by a metallic noise produced by the hammering on the pipe walls, is called incipient cavitation.

The damage caused by cavitation may be magnified by electrochemical corrosion and a local rise in temperature due to the plastic deformation of the walls. The materials that offer the highest resistance to heat and corrosion are alloy steels, especially austenitic steel. The conditions that trigger cavitation may be assessed by calculating the total net suction head, referred to in technical literature with the acronym NPSH (Net Positive Suction Head).

The NPSH represents the total energy (expressed in m.) of the liquid measured at suction under conditions of incipient cavitation, excluding the vapour pressure (expressed in m.) that the liquid has at the pump inlet.

To find the static height h_z at which to install the machine under safe conditions, the following formula must be verified:

$$h_p + h_z \geq (NPSHr + 0.5) + h_f + h_{pv} \quad \textcircled{1}$$

where:

- h_p** is the absolute pressure applied to the free liquid surface in the suction tank, expressed in m. of liquid; h_p is the quotient between the barometric pressure and the specific weight of the liquid.
- h_z** is the suction lift between the pump axis and the free liquid surface in the suction tank, expressed in m.; h_z is negative when the liquid level is lower than the pump axis.
- h_f** is the flow resistance in the suction line and its accessories, such as: fittings, foot valve, gate valve, elbows, etc.
- h_{pv}** is the vapour pressure of the liquid at the operating temperature, expressed in m. of liquid. h_{pv} is the quotient between the P_v vapour pressure and the liquid's specific weight.
- 0.5** is the safety factor.

The maximum possible suction head for installation depends on the value of the atmospheric pressure (i.e. the elevation above sea level at which the pump is installed) and the temperature of the liquid.

To help the user, with reference to water temperature (4°C) and to the elevation above sea level, the following tables show the drop in hydraulic pressure head in relation to the elevation above sea level, and the suction loss in relation to temperature.

Water temperature (°C)	20	40	60	80	90	110	120
Suction loss (m)	0,2	0,7	2,0	5,0	7,4	15,4	21,5

Elevation above sea level (m)	500	1000	1500	2000	2500	3000
Suction loss (m)	0,55	1,1	1,65	2,2	2,75	3,3

Flow resistance is shown in the tables at pages 69-70 of this catalogue. To reduce it to a minimum, especially in cases of high suction head (over 4-5 m.) or within the operating limits with high flow rates, we recommend using a suction line having a larger diameter than that of the pump's suction port. It is always a good idea to position the pump as close as possible to the liquid to be pumped.

Make the following calculation:

Liquid: water at ~ 15°C $\gamma = 1 \text{ kg/dm}^3$
 Flow rate required: 30 m³/h
 Head for required delivery: 43 m.
 Suction lift: 3.5 m.
 The selection is an FHE 40-200/75 pump whose NPSH required value is, at 30 m³/h, 2.5 m.

For water at 15°C the h_{pv} term is $\frac{P_v}{\gamma} = 0,174 \text{ m (0.01701 bar)}$

and $h_p = \frac{P_a}{\gamma} = 10,33 \text{ m}$

The H_f flow resistance in the suction line with foot valves is ~1.2 m.

By substituting the parameters in formula $\textcircled{1}$ with the numeric values above, we have:

$$10,33 + (-3,5) \geq (2,5 + 0,5) + 1,2 + 0,17$$

from which we have: 6.8 > 4.4

The relation is therefore verified.



TECHNICAL APPENDIX VAPOUR PRESSURE PS VAPOUR PRESSURE AND ρ DENSITY OF WATER TABLE

t °C	T K	ps bar	ρ kg/dm ³	t °C	T K	ps bar	ρ kg/dm ³	t °C	T K	ps bar	ρ kg/dm ³
0	273,15	0,00611	0,9998	55	328,15	0,15741	0,9857	120	393,15	1,9854	0,9429
1	274,15	0,00657	0,9999	56	329,15	0,16511	0,9852	122	395,15	2,1145	0,9412
2	275,15	0,00706	0,9999	57	330,15	0,17313	0,9846	124	397,15	2,2504	0,9396
3	276,15	0,00758	0,9999	58	331,15	0,18147	0,9842	126	399,15	2,3933	0,9379
4	277,15	0,00813	1,0000	59	332,15	0,19016	0,9837	128	401,15	2,5435	0,9362
5	278,15	0,00872	1,0000	60	333,15	0,1992	0,9832	130	403,15	2,7013	0,9346
6	279,15	0,00935	1,0000	61	334,15	0,2086	0,9826	132	405,15	2,867	0,9328
7	280,15	0,01001	0,9999	62	335,15	0,2184	0,9821	134	407,15	3,041	0,9311
8	281,15	0,01072	0,9999	63	336,15	0,2286	0,9816	136	409,15	3,223	0,9294
9	282,15	0,01147	0,9998	64	337,15	0,2391	0,9811	138	411,15	3,414	0,9276
10	283,15	0,01227	0,9997	65	338,15	0,2501	0,9805	140	413,15	3,614	0,9258
11	284,15	0,01312	0,9997	66	339,15	0,2615	0,9799	145	418,15	4,155	0,9214
12	285,15	0,01401	0,9996	67	340,15	0,2733	0,9793	155	428,15	5,433	0,9121
13	286,15	0,01497	0,9994	68	341,15	0,2856	0,9788	160	433,15	6,181	0,9073
14	287,15	0,01597	0,9993	69	342,15	0,2984	0,9782	165	438,15	7,008	0,9024
15	288,15	0,01704	0,9992	70	343,15	0,3116	0,9777	170	443,15	7,920	0,8973
16	289,15	0,01817	0,9990	71	344,15	0,3253	0,9770	175	448,15	8,924	0,8921
17	290,15	0,01936	0,9988	72	345,15	0,3396	0,9765	180	453,15	10,027	0,8869
18	291,15	0,02062	0,9987	73	346,15	0,3543	0,9760	185	458,15	11,233	0,8815
19	292,15	0,02196	0,9985	74	347,15	0,3696	0,9753	190	463,15	12,551	0,8760
20	293,15	0,02337	0,9983	75	348,15	0,3855	0,9748	195	468,15	13,987	0,8704
21	294,15	0,24850	0,9981	76	349,15	0,4019	0,9741	200	473,15	15,550	0,8647
22	295,15	0,02642	0,9978	77	350,15	0,4189	0,9735	205	478,15	17,243	0,8588
23	296,15	0,02808	0,9976	78	351,15	0,4365	0,9729	210	483,15	19,077	0,8528
24	297,15	0,02982	0,9974	79	352,15	0,4547	0,9723	215	488,15	21,060	0,8467
25	298,15	0,03166	0,9971	80	353,15	0,4736	0,9716	220	493,15	23,198	0,8403
26	299,15	0,03360	0,9968	81	354,15	0,4931	0,9710	225	498,15	25,501	0,8339
27	300,15	0,03564	0,9966	82	355,15	0,5133	0,9704	230	503,15	27,976	0,8273
28	301,15	0,03778	0,9963	83	356,15	0,5342	0,9697	235	508,15	30,632	0,8205
29	302,15	0,04004	0,9960	84	357,15	0,5557	0,9691	240	513,15	33,478	0,8136
30	303,15	0,04241	0,9957	85	358,15	0,5780	0,9684	245	518,15	36,523	0,8065
31	304,15	0,04491	0,9954	86	359,15	0,6011	0,9678	250	523,15	39,776	0,7992
32	305,15	0,04753	0,9951	87	360,15	0,6249	0,9671	255	528,15	43,246	0,7916
33	306,15	0,05029	0,9947	88	361,15	0,6495	0,9665	260	533,15	46,943	0,7839
34	307,15	0,05318	0,9944	89	362,15	0,6749	0,9658	265	538,15	50,877	0,7759
35	308,15	0,05622	0,9940	90	363,15	0,7011	0,9652	270	543,15	55,058	0,7678
36	309,15	0,05940	0,9937	91	364,15	0,7281	0,9644	275	548,15	59,496	0,7593
37	310,15	0,06274	0,9933	92	365,15	0,7561	0,9638	280	553,15	64,202	0,7505
38	311,15	0,06624	0,9930	93	366,15	0,7849	0,9630	285	558,15	69,186	0,7415
39	312,15	0,06991	0,9927	94	367,15	0,8146	0,9624	290	563,15	74,461	0,7321
40	313,15	0,07375	0,9923	95	368,15	0,8453	0,9616	295	568,15	80,037	0,7223
41	314,15	0,07777	0,9919	96	369,15	0,8769	0,9610	300	573,15	85,927	0,7122
42	315,15	0,08198	0,9915	97	370,15	0,9094	0,9602	305	578,15	92,144	0,7017
43	316,15	0,09639	0,9911	98	371,15	0,9430	0,9596	310	583,15	98,70	0,6906
44	317,15	0,09100	0,9907	99	372,15	0,9776	0,9586	315	588,15	105,61	0,6791
45	318,15	0,09582	0,9902	100	373,15	1,0133	0,9581	320	593,15	112,89	0,6669
46	319,15	0,10086	0,9898	102	375,15	1,0878	0,9567	325	598,15	120,56	0,6541
47	320,15	0,10612	0,9894	104	377,15	1,1668	0,9552	330	603,15	128,63	0,6404
48	321,15	0,11162	0,9889	106	379,15	1,2504	0,9537	340	613,15	146,05	0,6102
49	322,15	0,11736	0,9884	108	381,15	1,3390	0,9522	350	623,15	165,35	0,5743
50	323,15	0,12335	0,9880	110	383,15	1,4327	0,9507	360	633,15	186,75	0,5275
51	324,15	0,12961	0,9876	112	385,15	1,5316	0,9491	370	643,15	210,54	0,4518
52	325,15	0,13613	0,9871	114	387,15	1,6362	0,9476	374,15	647,30	221,20000	0,3154
53	326,15	0,14293	0,9862	116	389,15	1,7465	0,9460				
54	327,15	0,15002	0,9862	118	391,15	1,8628	0,9445				



TABLE OF FLOW RESISTANCE IN 100 m OF STRAIGHT CAST IRON PIPELINE (HAZEN-WILLIAMS FORMULA C=100)

FLOW RATE		NOMINAL DIAMETER in mm and INCHES																	
m ³ /h	l/min	15	20	25	32	40	50	65	80	100	125	150	175	200	250	300	350	400	
		1 1/2"	3/4"	1"	1 1/4"	1 1/2"	2	2 1/2"	3"	4"	5"	6"	7"	8"	10"	12"	14"	16"	
0,6	10	v hr	0,94 16	0,53 3,94	0,34 1,33	0,21 0,40	0,13 0,13												
0,9	15	v hr	1,42 33,9	0,80 8,35	0,51 2,82	0,31 0,85	0,20 0,29												
1,2	20	v hr	1,89 57,7	1,06 14,21	0,68 4,79	0,41 1,44	0,27 0,49	0,17 0,16											
1,5	25	v hr	2,36 87,2	1,33 21,5	0,85 7,24	0,52 2,18	0,33 0,73	0,21 0,25											
1,8	30	v hr	2,83 122	1,59 30,1	1,02 10,1	0,62 3,05	0,40 1,03	0,25 0,35											
2,1	35	v hr	3,30 162	1,86 40,0	1,19 13,5	0,73 4,06	0,46 1,37	0,30 0,46											
2,4	40	v hr		2,12 51,2	1,36 17,3	0,83 5,19	0,53 1,75	0,34 0,59	0,20 0,16										
3	50	v hr		2,65 77,4	1,70 26,1	1,04 7,85	0,66 2,65	0,42 0,89	0,25 0,25										
3,6	60	v hr		3,18 108	2,04 36,6	1,24 11,0	0,80 3,71	0,51 1,25	0,30 0,35										
4,2	70	v hr		3,72 144	2,38 48,7	1,45 14,6	0,93 4,93	0,59 1,66	0,35 0,46										
4,8	80	v hr		4,25 185	2,72 62,3	1,66 18,7	1,06 6,32	0,68 2,13	0,40 0,59										
5,4	90	v hr			3,06 77,5	1,87 23,3	1,19 7,85	0,76 2,65	0,45 0,74	0,30 0,27									
6	100	v hr			3,40 94,1	2,07 28,3	1,33 9,54	0,85 3,22	0,50 0,90	0,33 0,33									
7,5	125	v hr			4,25 142	2,59 42,8	1,66 14,4	1,06 4,86	0,63 1,36	0,41 0,49									
9	150	v hr				3,11 59,9	1,99 20,2	1,27 6,82	0,75 1,90	0,50 0,69	0,32 0,23								
10,5	175	v hr				3,63 79,7	2,32 26,9	1,49 9,07	0,88 2,53	0,58 0,92	0,37 0,31								
12	200	v hr				4,15 102	2,65 34,4	1,70 11,6	1,01 3,23	0,66 1,18	0,42 0,40								
15	250	v hr				5,18 154	3,32 52,0	2,12 17,5	1,26 4,89	0,83 1,78	0,53 0,60	0,34 0,20							
18	300	v hr				3,98 72,8	2,55 24,6	1,51 6,85	1,00 2,49	0,64 0,84	0,41 0,28								
24	400	v hr				5,31 124	3,40 41,8	2,01 11,66	1,33 4,24	0,85 1,43	0,54 0,48	0,38 0,20							
30	500	v hr				6,63 187	4,25 63,2	2,51 17,6	1,66 6,41	1,06 2,16	0,68 0,73	0,47 0,30							
36	600	v hr				5,10 88,6	3,02 24,7	1,99 8,98	1,27 3,03	0,82 1,02	0,57 0,42	0,42 0,20							
42	700	v hr				5,94 118	3,52 32,8	2,32 11,9	1,49 4,03	0,95 1,36	0,66 0,56	0,49 0,26							
48	800	v hr				6,79 151	4,02 42,0	2,65 15,3	1,70 5,16	1,09 1,74	0,75 0,72	0,55 0,34							
54	900	v hr				7,64 188	4,52 52,3	2,99 19,0	1,91 6,41	1,22 2,16	0,85 0,89	0,62 0,42							
60	1000	v hr				5,03 63,5	3,32 23,1	2,12 7,79	1,36 2,63	0,94 1,08	0,69 0,51	0,53 0,27							
75	1250	v hr				6,28 96,0	4,15 34,9	2,65 11,8	1,70 3,97	1,18 1,63	0,87 0,77	0,66 0,40							
90	1500	v hr				7,54 134	4,98 48,9	3,18 16,5	2,04 5,57	1,42 2,29	1,04 1,08	0,80 0,56							
105	1750	v hr				8,79 179	5,81 65,1	3,72 21,9	2,38 7,40	1,65 3,05	1,21 1,44	0,93 0,75							
120	2000	v hr				6,63 83,3	4,25 28,1	2,72 9,48	1,89 3,90	1,39 1,84	1,06 0,96	0,68 0,32							
150	2500	v hr				8,29 126	5,31 42,5	3,40 14,3	2,36 5,89	1,73 2,78	1,33 1,45	0,85 0,49							
180	3000	v hr							6,37 59,5	4,08 20,1	2,83 3,90	2,08 2,03	1,59 0,69	1,02 0,69	0,71 0,28				
210	3500	v hr							7,43 79,1	4,76 26,7	3,30 11,0	2,43 5,18	1,86 2,71	1,19 0,91	0,83 0,38				
240	4000	v hr							8,49 101	5,44 34,2	3,77 14,1	2,77 6,64	2,12 3,46	1,36 1,17	0,94 0,48				
300	5000	v hr							6,79 51,6	4,72 21,2	3,47 10,0	2,65 5,23	1,70 1,77	1,18 0,73					
360	6000	v hr							8,15 72,3	5,66 29,8	4,16 14,1	3,18 7,33	2,04 2,47	1,42 1,02					
420	7000	v hr							6,61 39,6	4,85 18,7	3,72 9,75	2,38 3,29	1,65 1,35	1,21 0,64					
480	8000	v hr							7,55 50,7	5,55 23,9	4,25 12,49	2,72 4,21	1,89 1,73	1,39 0,82					
540	9000	v hr							8,49 63,0	6,24 29,8	4,78 15,5	3,06 5,24	2,12 2,16	1,56 1,02	1,19 0,53				
600	10000	v hr							6,93 36,2	5,31 18,9	3,40 6,36	2,36 2,62	1,73 1,33	1,33 0,65					

hr = flow resistance for 100m of straight pipeline (m)
V = water speed (m/s)

FLOW RESISTANCE
TABLE OF FLOW RESISTANCE IN BENDS, VALVES AND GATES

The flow resistance is calculated using the equivalent pipeline length method according to the table below:

ACCESSORY TYPE	DN											
	25	32	40	50	65	80	100	125	150	200	250	300
	Equivalent pipeline length (m)											
45° bend	0,2	0,2	0,4	0,4	0,6	0,6	0,9	1,1	1,5	1,9	2,4	2,8
90° bend	0,4	0,6	0,9	1,1	1,3	1,5	2,1	2,6	3,0	3,9	4,7	5,8
90° smooth bend	0,4	0,4	0,4	0,6	0,9	1,1	1,3	1,7	1,9	2,8	3,4	3,9
Union tee or cross	1,1	1,3	1,7	2,1	2,6	3,2	4,3	5,3	6,4	7,5	10,7	12,8
Gate	-	-	-	0,2	0,2	0,2	0,4	0,4	0,6	0,9	1,1	1,3
Non return valve	1,1	1,5	1,9	2,4	3,0	3,4	4,7	5,9	7,4	9,6	11,8	13,9

G-a-pcv_a_th

The table is valid for the Hazen Williams coefficient $C = 100$ (cast iron pipework). For steel pipework, multiply the values by 1.41. For stainless steel, copper and coated cast iron pipework, multiply the values by 1.85.

When the **equivalent pipeline length** has been determined, the flow resistance is obtained from the table of flow resistance.

The values given are guideline values which are bound to vary slightly according to the model, especially for gate valves and non-return valves, for which it is a good idea to check the values supplied by the manufacturers.



VOLUMETRIC CAPACITY

Litres per minute l/min	Cubic metres per hour m ³ /h	Cubic feet per hour ft ³ /h	Cubic feet per minute ft ³ /min	Imp. gal. per minute Imp. gal./min	US gal. per minute Us gal./min
1,0000	0,0600	2,1189	0,0353	0,2200	0,2640
16,6670	1,0000	35,3147	0,5886	3,6660	4,4030
0,4720	0,0283	1,0000	0,0167	0,1040	0,1250
28,3170	1,6990	60,0000	1,0000	6,2290	7,4800
4,5460	0,2728	9,6326	0,1605	1,0000	1,2010
3,7850	0,2271	8,0209	0,1337	0,8330	1,0000
0,1100	0,0066	0,2339	0,0039	0,0240	0,0290

PRESSURE AND HEAD

Newtons per square metre N/m ²	kilopascal kPa	bar bar	Pound force per square inch psi	metre of water m H ₂ O	millimetre of mercury mm Hg
1,0000	0,0010	1 x 10 ⁵	1,45 x 10 ⁻⁴	1,02 x 10 ⁻⁴	0,0075
1000,0000	1,0000	0,0100	0,1450	0,1020	7,5000
100000,0000	100,0000	1,0000	14,5000	10,2000	750,1000
98067,0000	98,0700	0,9810	14,2200	10,0000	735,6000
6895,0000	6,8950	0,0690	1,0000	0,7030	51,7200
2984,0000	2,9840	0,0300	0,4330	0,3050	22,4200
9789,0000	9,7890	0,0980	1,4200	1,0000	73,4200
133,3000	0,1330	0,0013	0,0190	0,0140	1,0000
3386,0000	3,3860	0,0338	0,4910	0,3450	25,4000

LENGTH

millimetre mm	centimetre cm	metre m	inch in	foot ft	yard yd
1,0000	0,1000	0,0010	0,0394	0,0033	0,0011
10,0000	1,0000	0,0100	0,3937	0,0328	0,0109
1000,0000	100,0000	1,0000	39,3701	3,2808	1,0936
25,4000	2,5400	0,0254	1,0000	0,0833	0,0278
304,8000	30,4800	0,3048	12,0000	1,0000	0,3333
914,4000	91,4400	0,9144	36,0000	3,0000	1,0000

VOLUME

cubic metre m ³	litre litre	millilitre ml	imp. gallon imp. gal.	US gallon US gal.	cubic foot ft ³
1,0000	1000,0000	1 x 10 ⁶	220,0000	264,2000	35,3147
0,0010	1,0000	1000,0000	0,2200	0,2642	0,0353
1 x 10 ⁻⁶	0,0010	1,0000	2,2 x 10 ⁻⁴	2,642 x 10 ⁻⁴	3,53 x 10 ⁻⁵
0,0045	4,5460	4546,0000	1,0000	1,2010	0,1605
0,0038	3,7850	3785,0000	0,8327	1,0000	0,1337
0,0283	28,3170	28317,0000	6,2288	7,4805	1,0000

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Headquarters

LOWARA S.r.l.
36075 Montecchio Maggiore
Vicenza - Italy
Tel. (+39) 0444 707111
Fax (+39) 0444 492166
e-mail: lowara.mkt@itt.com - http://www.lowara.com

"RESIDENTIAL AND COMMERCIAL WATER GROUP - EMEA" SALES NETWORK**ITALY**

MILANO 20090 Cusago - Viale Europa, 30
Tel. (+39) 02 90394188
Fax (+39) 0444 707176
e-mail: lowara.milano@itt.com

BOLOGNA 40132 - Via Marco Emilio Lepido, 178
Tel. (+39) 051 6415666
Fax (+39) 0444 707178
e-mail: lowara.bologna@itt.com

VICENZA 36061 Bassano del Grappa - Via Pigafetta, 6
Tel. (+39) 0424 566776 (R.A. 3 Linee)
Fax (+39) 0424 566773
e-mail: lowara.bassano@itt.com

PADOVA 35020 Albignasego - Via A. Volta, 56 - Zona Mandriola
Tel. (+39) 049 8801110
Fax (+39) 049 8801408
e-mail: lowara.bassano@itt.com

ROMA 00173 Via Frascineto, 8
Tel. (+39) 06 7235890 (2 linee)
Fax (+39) 0444 707180
e-mail: lowara.roma@itt.com

CAGLIARI 09122 - Via Dolcetta, 3
Tel. (+39) 070 287762 - 292192
Fax (+39) 0444 707179
e-mail: lowara.cagliari@itt.com

CATANIA 95027 S. Gregorio - Via XX Settembre, 75
Tel. (+39) 095 7123226 - 7123987
Fax (+39) 095 498902
e-mail: lowara.catania@itt.com

**EUROPE**

Pumpenfabrik ERNST VOGEL GmbH
A-2000 STOCKERAU
Ernst Vogel-Straße 2
Tel. (+43) 02266 604 - Fax (+43) 02266 65311
e-mail: vogelau.info@itt.com - http://www.vogel-pumpen.com

LOWARA DEUTSCHLAND GMBH
Biebigheimer Straße 12
D-63762 Großostheim
Tel. (+49) 0 60 26 9 43 - 0 - Fax (+49) 0 60 26 9 43 - 2 10
e-mail: lowarade.info@itt.com - http://www.lowara.de

LOWARA FRANCE S.A.S.
BP 57311
37073 Tours Cedex 2
Tel. (+33) 02 47 88 17 17 - Fax (+33) 02 47 88 17 00
e-mail: lowarafr.info@itt.com - http://www.lowara.fr

LOWARA FRANCE SAS Agence Sud
Z.I. La Sipière - BP 23
13730 Saint Victoret - F
Tel. (+33) 04 42 10 02 30 - Fax (+33) 04 42 10 43 75
http://www.lowara.fr

LOWARA NEDERLAND B.V.
Zandweistraat 22
4181 CG Waardenburg
Tel. (+31) 0418 655060 - Fax (+31) 0418 655061
e-mail: lowaranl.info@itt.com - http://www.lowara.nl

LOWARA PORTUGAL, Lda
Praçeta da Castanheira, 38
4475-019 Barca
Tel. (+351) 22 9478550 - Fax (+351) 22 9478570
e-mail: lowarapt.info@itt.com - http://www.lowara.pt

LOWARA PORTUGAL, Delegação
Quinta da Fonte - Edifício D. Pedro I
2770-071 Paço de Arcos
Tel. (+351) 21 0001628 - Fax (+351) 22 0001675

LOWARA UK LTD.
Millwey Rise, Industrial Estate
Axminster - Devon EX13 5HU UK
Tel. (+44) 01297 630200 - Fax (+44) 01297 630270
e-mail: lowaraukenquiries@itt.com - http://www.lowara.co.uk

LOWARA IRELAND LTD.
59, Broomhill Drive - Tallaght Industrial Estate
Tallaght - DUBLIN 24
Tel. (+353) 01 4520266 - Fax (+353) 01 4520725
e-mail: lowara.ireland@itt.com - http://www.lowara.ie

LOWARA VOGEL POLSKA Sp. z o.o.
Ul. Worcella 16
PL-40-652 Katowice
Tel. (+48) 032 202 8904 - Fax (+48) 032 202 5452
e-mail: biuro@lowara-vogel.pl - http://www.lowara-vogel.pl