

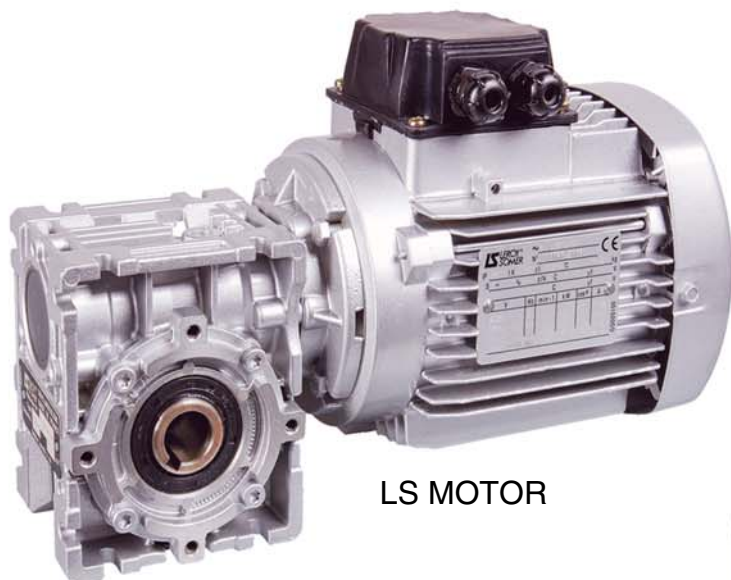
MULTIBLOC 4101

Worm and wheel drive systems

Selection guide

Electromechanical Multibloc 4101

Associated motor range



LS MOTOR



LSMV



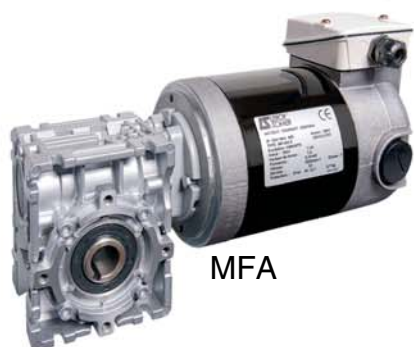
VARMECA



UNIMOTOR FM



MBT



MFA

MOTOR TECHNOLOGY

Asynchronous singlephase

Asynchronous threephase

Direct current

Servomotor

GEAR OUTPUT

Hollow shaft

Solid shaft

Mounting flange FF

Torque arm

Electromechanical Multibloc 4101

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Electromechanical Multibloc 4101

NOTES

Electromechanical Multibloc 4101

General information



Multibloc 4101 worm and wheel geared motors are used to adapt the speed of the electric motor to that of the driven machine. Their size is therefore determined by the power of the motor (P) expressed in kilowatts (kW) and the output rotation speed of the gearbox (n_s) in revolutions per minute (min^{-1}).

The main characteristic of the speed reducers is the rated output torque (M_{nS}) expressed in Newton-metres (Nm).

$$M_{nS} = \frac{P \times 9550}{n_s} \times \text{efficiency reducer}$$

Rated output torque: up to 45 Nm.
Powers: from 0.045 to 0.75 kW.
Reduction ratios: from 5 to 100.
Efficiency: from 47 % to 88 %.
Very quiet operation.

Construction

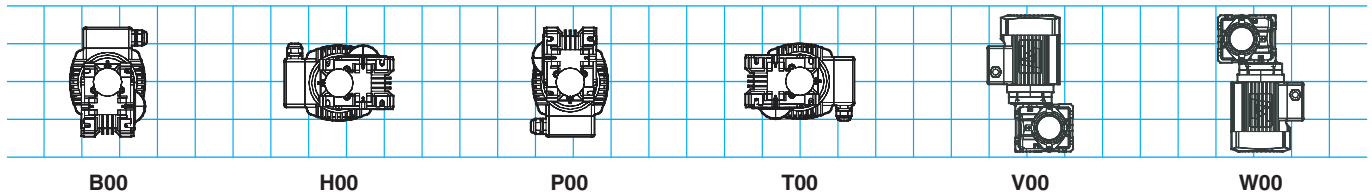
Description of (Mb) gearbox

Component	Materials	Remarks
Housing	Aluminium	<ul style="list-style-type: none"> - multi-position - high pressure die-cast aluminium - Highly ribbed to increase mechanical resistance and thermal dissipation
Gears	Steel + bronze	<ul style="list-style-type: none"> - worm and wheel system <ul style="list-style-type: none"> • hardened steel worm, ground surfaces • centrifuged bronze wheel • angular backlash 10' to 25'
Shaft	Steel	<ul style="list-style-type: none"> - straighten seal surfaces - key according to DIN 6883 - diameter tolerance according to IEC 72-1 (DIN 748) - tapped hole at end of output shaft
Sealed joints	Acrylnitrile Polyacrylate	<ul style="list-style-type: none"> - Seals 100% controlled before lubrication
Lubrication	Synthetic oil	<ul style="list-style-type: none"> - Delivered with the quantity of oil corresponding to multiposition operation - maintenance free, gearbox lubricated for life - no drain plug, level or filling plug - nominal ambient temperature from -16°C to $+40^{\circ}\text{C}$
Mounting		MU: geared motor with IEC motor, constructed with a universal mounting (8 holes for LS56)
Motor		<ul style="list-style-type: none"> LS: multi-voltage 220/380V, 230/400V, 240/415V three-phase and 230V single-phase - steel fan cover, equipped on request with drip cover for vertical operation (end shaft facing down) - terminal box equipped with cable gland and anti-pull system - standard protection IP55 - flange mounted to gear B14 standard
Brake motor		<ul style="list-style-type: none"> FMC: three-phase or single-phase failsafe asynchronous brake motor, from 0.06 to 0.75 kW FCR: three-phase failsafe asynchronous brake motor, from 0.25 to 0.75 kW
Other motors		<ul style="list-style-type: none"> MFA: DC motor from 0.075 to 0.37 kW (3000 min^{-1}) IP 44 MBT: low voltage DC motor (0.75 kW max) IP 40 or IP 44
Security	Plastic	Protective cover on opposite side to the output shaft for all hollow shaft or inserted shaft reducers
Finish		Unpainted

Electromechanical Multibloc 4101

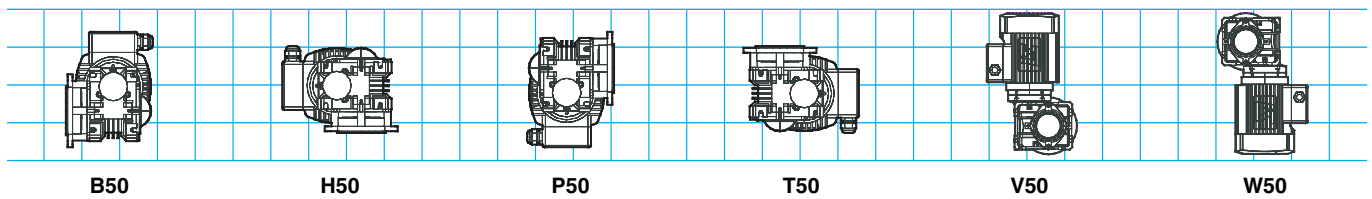
Mounting - Operating positions

1 - Standard Multibloc 4101 multiposition M00



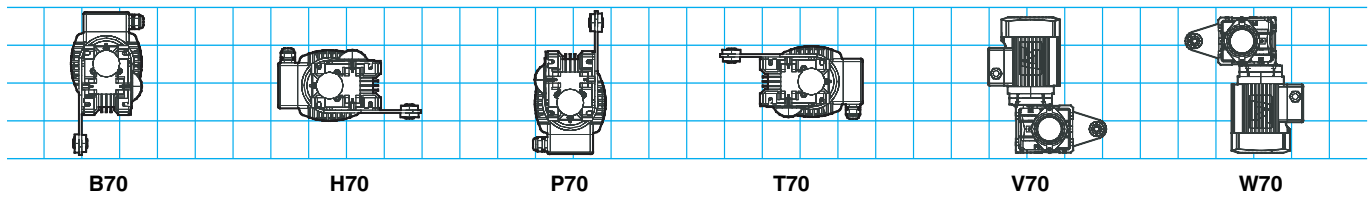
Positions to be specified only if motor drain hole is required on the motor.

2 - Standard Multibloc 4101 multiposition with BS flange M50 or M05 or M55



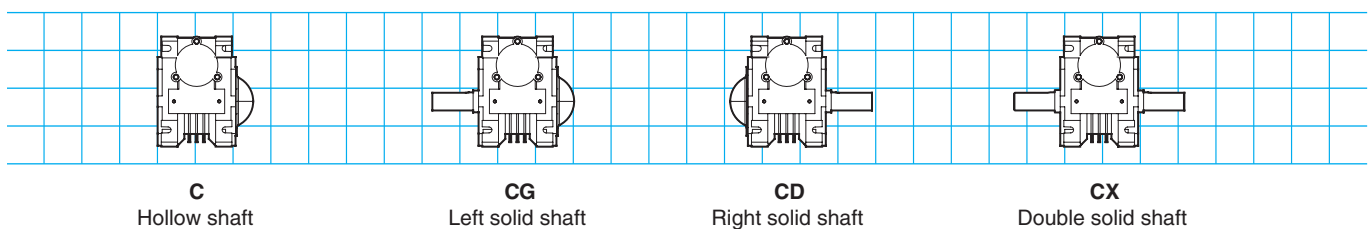
Other flange positions: on the right side (ex. B05), both sides (ex. B55).
Positions to be specified only if motor drain hole is required on the motor.

3 - Standard Multibloc 4101 multiposition with torque arm M70 or M07

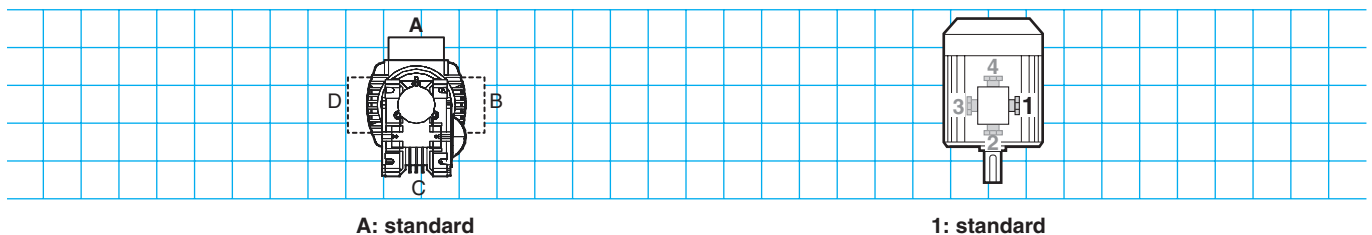


Other positions for torque arm: on the right side (ex. B07).
Positions to be specified only if motor drain hole is required on the motor.
The torque arm kit is delivered unassembled as standard (M700).

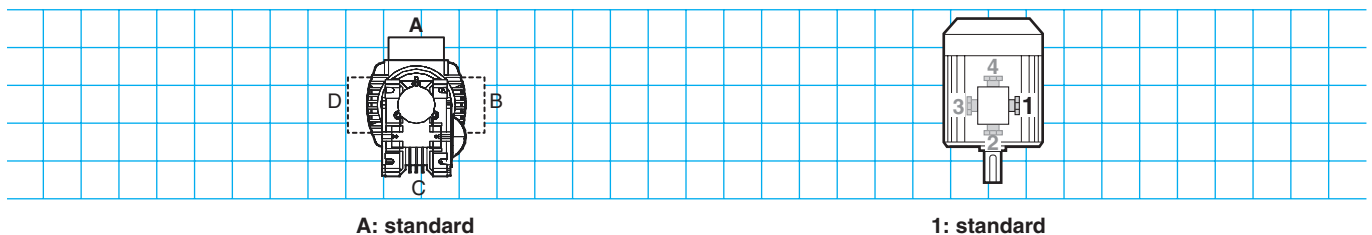
4 - Output types



5 - Terminal box position



6 - Cable gland position




Electromechanical Multibloc 4101

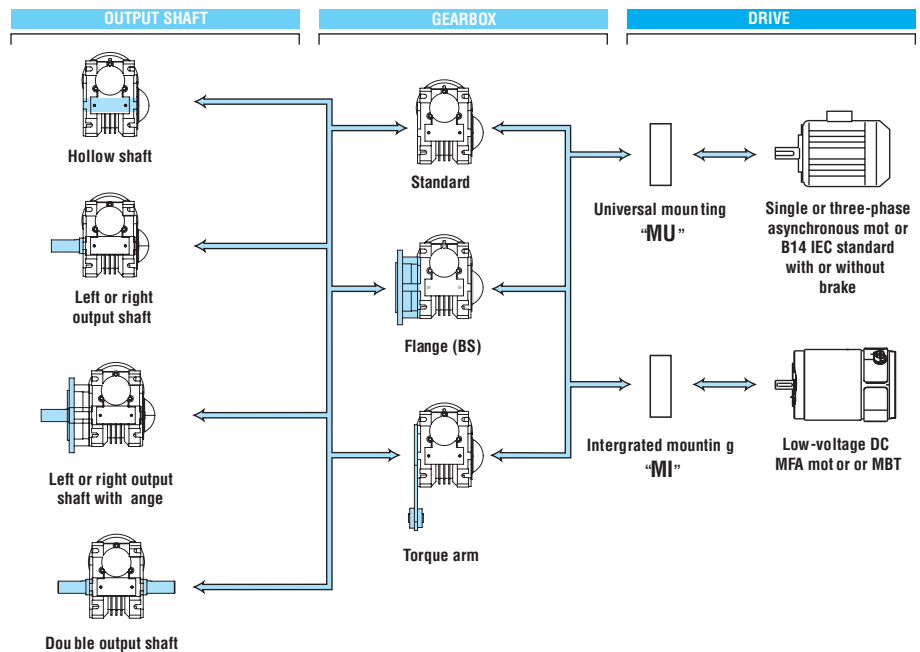
Adaptation possibilities

Leroy-Somer offers several drives for its gearboxes which meet a diverse range of needs. They are described below.

For other drives, please consult the Leroy-Somer technical specialists who will be pleased to meet you.

 *The Multibloc Mb 4101 gearbox can be used in conjunction with the following drives:*

- **single-phase motors:**
 - LS motor 0.06 to 0.75 kW,
 - LS brake motor FMC 0.06 to 0.75 kW,
- **three-phase asynchronous motors:**
 - LS motor 0.045 to 0.75 kW,
 - brake motor FMC from 0.045 to 0.75 kW,
 - brake motor FCR from 0.18 to 0.75 kW,
- **direct current motors:**
 - MFA 0.075 to 0.37 kW (3000 min⁻¹)
- **electronic drives:**
 - MVE 0.075 to 0.37 kW (3000 min⁻¹)
- **low voltage direct current motors (12 to 48V):**
 - MBT from 0.07 to 0.75 kW



Designation / Codification

Mb	4101	M00	C	20	MU	4P	LS 63	0.12 kW
Gearbox type	Size and number of stages	Mounting position	Low speed shaft	Reduction ratio	Universal mounting	Number of poles	LS motor type, frame size	Motor power

 *Codification example:*

Mb 4101 - M00C - 20 - MU - 4P - LS 63 - 0.12 kW
- 230/400V - TRI - 50 Hz

Electromechanical Multibloc 4101

Load on low speed shaft

The admissible loads on the low speed shaft depends on the reduction and mounting with or without flange.

Forces in Newtons (N)

2P Motor (3000 min ⁻¹)						
Gearbox characteristics			Clockwise or anti-clockwise			
Speed min ⁻¹	Reduction	Cmax Nm	M00D or M00G		M50G or M05D	
			Fr	Fa- or Fa+	Fr	Fa- or Fa+
28.0	100	23	2380	1900	1850	1900
35.0	80	25	2180	1690	1700	1690
46.7	60	28	1930	1440	1505	1440
56.0	50	30	1780	1290	1390	1290
70.1	40	31	1630	1140	1270	1140
93.4	30	34	1420	950	1110	950
112.1	25	28	1370	870	1070	870
140.1	20	29	1240	730	970	730
186.8	15	31	1070	560	835	560
280.2	10	21*	970	425	760	425
373.6	7.5	16*	890	355	700	355
560.4	5	11*	790	260	620	260

* Torque limit for a maximum power of 750W

4P Motor (1500 min ⁻¹)						
Gearbox characteristics			Clockwise or anti-clockwise			
Speed min ⁻¹	Reduction	Cmax Nm	M00D or M00G		M50G or M05D	
			Fr	Fa- or Fa+	Fr	Fa- or Fa+
14.0	100	29	3010	2000	2360	2600
17.4	80	33	2750	2000	2150	2365
23.3	60	36	2435	2000	1910	2000
27.9	50	39	2215	1800	1750	1800
34.9	40	41	2040	1700	1600	1500
46.5	30	45	1780	1300	1390	1300
55.8	25	38	1710	1340	1335	1180
69.8	20	39	1545	990	1200	1005
93.0	15	40	1345	770	1050	780
139.5	10	40	1090	430	850	435
186.0	7.5	33*	985	280	765	290
279.0	5	22*	890	160	690	170

* Torque limit for a maximum power of 750W

6P Motor (1000 min ⁻¹)						
Gearbox characteristics			Clockwise or anti-clockwise			
Speed min ⁻¹	Reduction	Cmax Nm	M00D or M00G		M50G or M05D	
			Fr	Fa- or Fa+	Fr	Fa- or Fa+
9.1	100	32	3480	2500	2710	2500
11.3	80	35	3190	2500	2490	2500
15.1	60	39	2830	2500	2210	2500
18.1	50	42	2615	2240	2040	2240
22.6	40	45	2370	1970	1850	1970
30.2	30	49	2070	1645	1615	1645
36.2	25	43	1980	1460	1545	1460
45.3	20	44	1790	1240	1400	1240
60.3	15	45	1560	970	1220	970
90.5	10	44	1280	575	1000	575
120.7	7.5	36*	1160	400	905	400
181.0	5	24*	1050	240	820	240

* Torque limit for a maximum power of 550W

Electromechanical Multibloc 4101

Load on low speed shaft

Force directions	
M00CD & M05CD	$F_a +$: axial force by PULLING the shaft end
	$F_a -$: axial force by PUSHING the shaft end
M00CG & M50CG	$F_a +$: axial force by PUSHING the shaft end
	$F_a -$: axial force by PULLING the shaft end

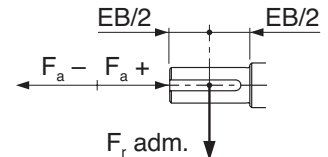
F_r adm. = acceptable radial force on the shaft at 22.5 mm (EB/2) from the hollow shaft shoulder.

Note : 1° In the case of 2 end shafts, F_r adm. must be distributed.

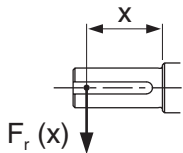
2° The effort corresponds to the shaft related to the hollow shaft.

3° These figures correspond to the most unfavourable load conditions.

SPECIAL CASES: please consult.



Calculation of $F_r(x)$ for a non centered radial load:



M00CG and M00CD

$$F_r(x) = \frac{94}{71.5 + x} \times F_r \text{ adm. and imperatively } \leq 3100 \text{ N. maximum}$$

M50CG and M05CD

$$OF_r(x) = \frac{120}{97.5 + x} \times F_r \text{ adm. and imperatively } \leq 2500 \text{ N. maximum}$$

Electromechanical Multibloc 4101

Selection - 2P Motor (3000 min⁻¹)

Gearbox: Multibloc Mb M00 or M50 or M05 flanged form

Universal mounting MU

Asynchronous motors: LS series, IP 55, class F, **2 poles**

Three-phase: multi-voltage : 220/380V - 230/400 V - 240/415 V from 0.09 to 0.75 kW

Single-phase: multi-voltage : 220-240 V from 0.06 to 0.37 kW

Brakes motors: asynchronous LS series, type FCR, FMC. class F

FCR: 2 poles - multi-voltage: 220/380V - 230/400 V - 240/415 V from 0.37 to 0.75 kW

FMC: 2 poles - multi-voltage: 220/380V - 230/400 V - 240/415 V from 0.09 to 0.75 kW

28 to 560.4 min⁻¹

			LS (kW)						
			0.09	0.12	0.18	0.25	0.37	0.55	0.75
			three-phase B14						
min ⁻¹	i	C max for k=1 Nm	56		63		71		
28	100	23	2.46	1.54	0.88				
35	80	25	3.06	1.91	1.09	0.73			
46.7	60	28	4.14	2.59	1.48	0.99			
56	50	30	5.09	3.18	1.82	1.22	0.78		
70.1	40	31	6.21	3.88	2.22	1.49	0.95		
93.4	30	34	8.61	5.38	3.07	2.06	1.32	0.85	
112.1	25	28	8.18	5.11	2.92	1.96	1.25	0.81	
140.1	20	29	10.20	6.38	3.64	2.45	1.56	1.01	0.72
186.8	15	31	14.20	8.87	5.06	3.40	2.17	1.41	1.01
280.2	10	29	19.02	11.88	6.78	4.56	2.91	1.89	1.35
373.6	7.5	28	24.21	15.12	8.63	5.80	3.70	2.40	1.71
560.4	5	24	30.78	19.23	10.98	7.38	4.71	3.05	2.18
Brake motors B14, 2p			three-phase B14						
FMC			56		63		71		
FCR			71						

The reduction ratios correspond to exact reductions

Transmissible torque :

Transmissible torque = $\frac{\text{Max torque for k=1}}{\text{Factor k}}$

Example: for ratio 1/30 and 0.18 kW motor:

$$\text{Transmissible torque} = \frac{34}{3.07} = 11.07 \text{ Nm}$$

Selection example:

Required power:	0.18 kW
Required speed:	93.4 min ⁻¹
Main supply:	Three-phase 50 Hz
Mounting and position:	with flange
Shaft end:	hollow

Designation:
Mb 4101 - M50C - 30 MU / 2P LS 63 0.18 KW
230/400V 50 Hz

Electromechanical Multibloc 4101

Selection - 4p Motor (1500 min⁻¹)

Gearbox: Multibloc Mb M00 or M50 or M05 flanged form

Universal mounting MU

Asynchronous motors: LS-series, IP 55, class F, 4 pole

Three-phase: multi-voltage : 220/380V - 230/400 V - 240/415 V from 0.06 to 0.55 kW

Single-phase: multi-voltage : 220-240 V from 0.06 to 0.37 kW

Brake motors: asynchronous, LS series, type FCR, FMC, class F

FCR: 4 poles - multi-voltage : 220/380V - 230/400 V - 240/415 V from 0.25 to 0.55 kW

FMC: 4 poles - multi-voltage : 220/380V - 230/400 V - 240/415 V from 0.06 to 0.55 kW

14 to 279 min⁻¹

			LS (kW)						
			0.06	0.09	0.12	0.18	0.25	0.37	0.55
			three-phase B14						
			56		63		71		
			single-phase B14						
min ⁻¹	i	C max for k=1 Nm	56 P	63 P		71 P			
14	100	29	2.14	1.26	0.88				
17.4	80	33	2.75	1.61	1.13	0.72			
23.3	60	36	3.59	2.10	1.48	0.93			
27.9	50	39	4.37	2.56	1.80	1.14	0.81		
34.9	40	41	5.47	3.21	2.25	1.42	1.02		
46.5	30	45	7.44	4.36	3.06	1.94	1.38	0.90	
55.8	25	38	7.03	4.12	2.90	1.83	1.31	0.85	
69.8	20	39	8.68	5.08	3.57	2.26	1.61	1.05	
93	15	40	11.29	6.61	4.65	2.94	2.10	1.37	0.90
139.5	10	40	16.33	9.57	6.73	4.25	3.04	1.98	1.30
186	7.5	40	21.27	12.47	8.77	5.54	3.96	2.58	1.69
279	5	34	26.51	15.54	10.92	6.90	4.93	3.21	2.11
			three-phase B14						
Brake motors B14, 4p			56		63		71		
FMC							71		
FCR							71		
			single-phase B14						
FMC			56 P	63 P		71 P			

The reduction ratios correspond to exact reductions

Transmissible torque:

$$\text{Transmissible torque} = \frac{\text{Max torque for } k=1}{\text{Factor } k}$$

Example: for ratio 1/30 and 0.12 kW motor:

$$\text{Transmissible torque} = \frac{45}{3.06} = 14.70 \text{ Nm}$$

Selection example:

Required power:	0.12 kW
Required speed:	46.5 min ⁻¹
Supply:	Three-phase 50 Hz
Mounting and position:	with flange
Shaft:	hollow

Designation:

**Mb 4101 - M50C - 30 MU / 4P LS 63 0.12 KW
230/400V 50 Hz**

Electromechanical Multibloc 4101

Selection - 6p Motor (1000 min⁻¹)

Gearbox: Multibloc Mb M00 or M50 or M05 flanged form

Universal mounting MU

Asynchronous motors: LS series, IP 55, class F, **6 poles**

Three-phase: multi-voltage: 220/380V - 230/400 V - 240/415 V from 0.045 to 0.25 kW

Single-phase: multi-voltage: 220-240 V from 0.06 to 0.37 kW

Brake motors: asynchronous LS series, types FCR, FMC, class F

FCR: 6 poles - multi-voltage: 220/380V - 230/400 V - 240/415 V from 0.18 to 0.25 kW

FMC: 6 poles - multi-voltage: 220/380V - 230/400 V - 240/415 V from 0.045 to 0.25 kW

9.1 to 181 min⁻¹

		LS (kW)				
		0.045	0.09	0.12	0.18	0.25
		three-phase B14				
min ⁻¹	i	C max for k=1 Nm	56	63	71	
9.1	100	32	2.10	0.86		
11.3	80	35	2.57	1.06	0.84	
15.1	60	39	3.39	1.39	1.11	0.71
18.1	50	42	4.15	1.71	1.36	0.87
22.6	40	45	5.11	2.10	1.68	1.07
30.2	30	49	6.97	2.87	2.29	1.46
36.2	25	43	6.73	2.77	2.21	1.41
45.3	20	44	8.27	3.40	2.71	1.73
60.3	15	45	10.84	4.46	3.55	2.27
90.5	10	44	14.94	6.14	4.89	3.13
120.7	7.5	44	19.45	8.00	6.37	4.07
181	5	40	25.91	10.65	8.49	5.42
		three-phase B14				
Brake motors - B14, 6p						
FMC			56	63	71	
FCR					71	

The reduction ratios correspond to exact reductions

Transmissible torque:

Transmissible torque = $\frac{\text{Max torque for k=1}}{\text{Factor k}}$

Example: for ratio 1/30 and 0.12 kW:

$$\text{Transmissible torque} = \frac{49}{2.29} = 21.40 \text{ Nm}$$

Selection example:

Required power:	0.12 kW
Required speed:	45.3 min ⁻¹
Supply:	Three-phase 50 Hz
Mounting and position:	with flange
Shaft end:	hollow

Designation:

**Mb 4101 - M50C - 20 MU / 6P LS 71 0.12 KW
230/400V 50 Hz**

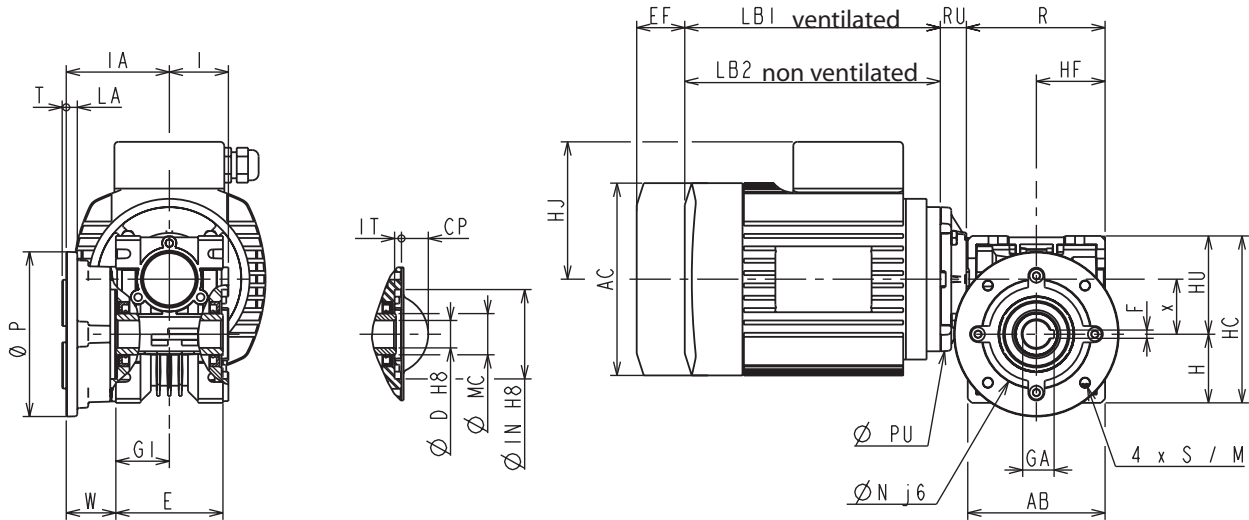
Electromechanical Multibloc 4101

Dimensions

Overall dimensions of Multibloc (Mb) gear motor, Universal mounting MU,
hollow shaft (C)

Dimensions in millimetres

- M50C, M05C Flange form



Type	Standard gearbox																		Weight *	
	R	HC	AB	RU	H	x	HU	HF	G	I	IA	IN	IT	M	N	P	S	LA		T
Mb 4101	101	121.5	100	19	50	40	71.5	50	39	43	75	65	5	100	80	120	7	8	3	2.5

* Gearbox only

Type	Hollow shaft						
	D	E	GA	F	W	MC	CP
Mb 4101	20	78	22.8	6	36	30	20

Other available flanges ¹											
BD1						BD2					
M1	N1	P1	S1	LA1	T1	M2	N2	P2	S2	LA2	T2
85	70	105	7	7	3	115	95	140	9	8	3

1. The letters are indexed in order to differentiate from the letters indicated on the standard shaft picture.

Shaft height	Asynchronous and brake motors															
	LS three-phase				LS single-phase				Brakes							
	AC	HJ	LB1	LB2	PU	Max Weight kg	AC	HJ	LB1	LB2	PU	Max** Weight kg	EF max		Weight ¹ kg	
													FMC	FCR	FMC	FCR
56	110	85	156	135	80	3.4	110	93	156	135	80	3.5	50	-	0.9	-
63	124	90	172	150	90	4.3	124	98	172	150	90	4.5	50	-	0.9	-
71 ²	140	102	183	155	105	6.5	140	110	183	155	105	7.5	50	88	0.9	2.5
80	170	114	215	177	105	10.9	170	122	215	177	105	11	-	77	-	7.2

** Gearbox only

1. Additional brake Weight.

2. For LS71: 0.25 kW three-phase 6 pole, 0.37 kW single-phase 4 pole, 0.55 kW three-phase 4 pole: dimension LB = + 9.

Motors LS56, LS63, LS71: B14 IEC standard (note: LS56 = 8 holes).

Motor LS 80: B14, F85, end shaft14x30.

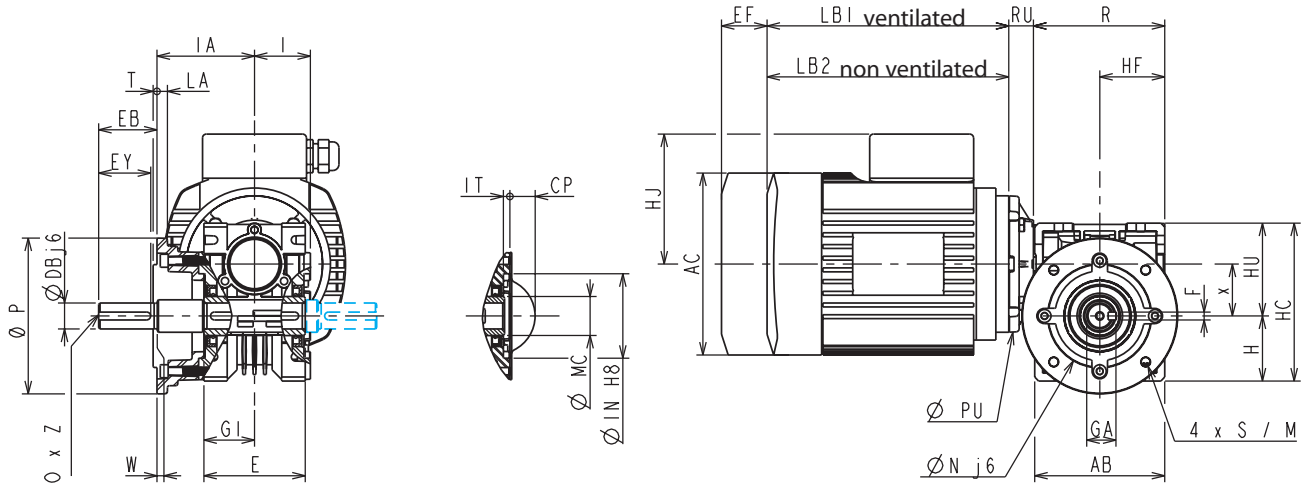
Electromechanical Multibloc 4101

Dimensions

Overall dimensions of Multibloc (Mb) gear motor, universal mounting MU,
solid shaft (CG, CD, CX)

Dimensions in millimetres

- M50CG, M05CD, M50CX, M05CX standard form



Type	Standard gearbox																			Weight *
	R	HC	AB	RU	H	x	HU	HF	G	I	IA	IN	IT	M	N	P	S	LA	T	
Mb 4101	101	121.5	100	19	50	40	71.5	50	39	43	75	65	5	100	80	120	7	8	3	2.5

* Gearbox only

Type	Solid shaft									
	DB	EB	EY	E	GA	F	W	MC	O	Z
Mb 4101	20	45	40	78	22.5	6	0	30	M6	15

Other available flanges ¹											
BD1						BD2					
M1	N1	P1	S1	LA1	T1	M2	N2	P2	S2	LA2	T2
85	70	105	7	7	3	115	95	140	9	8	3

1. The letters are indexed in order to differentiate from the letters indicated on the standard shaft picture.

Shaft height	Asynchronous and brake motors												Brakes			
	LS three-phase					Max Weight kg	LS single-phase					Max** Weight kg	EF max		Weight ¹ kg	
	AC	HJ	LB1	LB2	PU		AC	HJ	LB1	LB2	PU		FMC	FCR	FMC	FCR
56	110	85	156	135	80	3.4	110	93	156	135	80	3.5	50	-	0.9	-
63	124	90	172	150	90	4.3	124	98	172	150	90	4.5	50	-	0.9	-
71 ²	140	102	183	155	105	6.5	140	110	183	155	105	7.5	50	88	0.9	2.5
80	170	114	215	177	105	10.9	170	122	215	177	105	11	-	77	-	7.2

** Gearbox only

1. Additional brake Weight.

2. For LS71: 0.25 kW three-phase 6 pole, 0.37 kW single-phase 4 pole, 0.55 kW three-phase 4 pole: dimension LB = + 9.

Motors LS56, LS63, LS71: B14 IEC standard (note: LS56 = 8 holes).

Motor LS 80: B14, F85, end shaft 14x30.

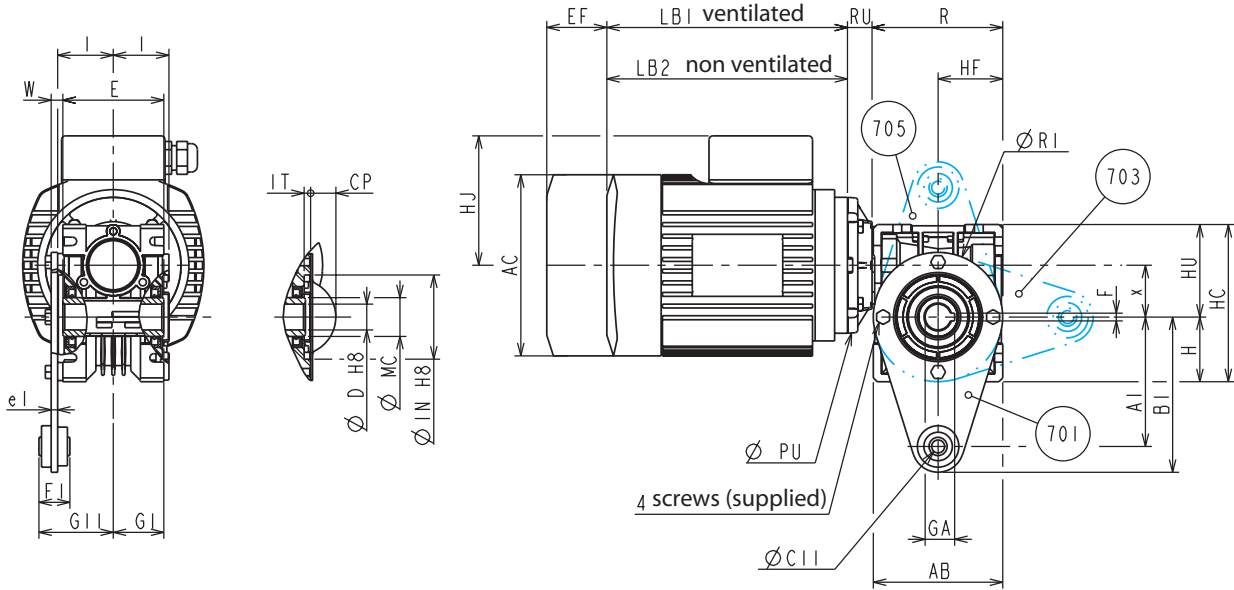
Electromechanical Multibloc 4101

Dimensions

Overall dimensions of Multibloc (Mb) gear motor, universal mounting MU,
hollow shaft (C), with torque arm

Dimensions in millimetres

- M70C, M07C Form



Type	Gearbox with torque arm																Weight* kg				
	R	HC	AB	RU	H	x	HU	HF	G	I	IN	IT	A1	B1	R1	C1		F1	G1	e1	Vis
Mb 4101	101	121.5	100	19	50	40	71.5	50	39	43	65	5	100	120	100	10	24	57.5	5	M6x16	2.8

* Gearbox only

In order to easily adapt onto the machine, the torque arm is delivered
(with its fixing screws) not mounted on the gearbox (M700C).

Type	Hollow shaft						
	D	E	GA	F	W	MC	CP
Mb 4101	20	78	22.8	6	9	30	20

Shaft height	Asynchronous and brake motors															
	LS three-phase					Max Weight kg	LS single-phase					Max** Weight kg	Brakes			
	AC	HJ	LB1	LB2	PU		AC	HJ	LB1	LB2	PU		EF max		Weight ¹ kg	
											FMC	FCR	FMC	FCR		
56	110	85	156	135	80	3.4	110	93	156	135	80	3.5	50	-	0.9	-
63	124	90	172	150	90	4.3	124	98	172	150	90	4.5	50	-	0.9	-
71 ²	140	102	183	155	105	6.5	140	110	183	155	105	7.5	50	88	0.9	2.5
80	170	114	215	177	105	10.9	170	122	215	177	105	11	-	77	-	7.2

** Gearbox only

1. Additional brake Weight.
2. For LS71 : 0.25 kW three-phase 6 pole, 0.37 kW single-phase 4 pole, 0.55 kW three-phase 4 pole: cote LB = + 9.

Motors LS56, LS63, LS71: B14 IEC standard (note: LS56 = 8 holes).
Motor LS 80: B14, F85, end shaft14x30.

I - SCOPE OF APPLICATION

These General Conditions of Sale ("GCS") shall apply to the sale of all products, components, software and services (referred to as "Products") proposed or sold by the Seller to the Client. Said GCS shall also apply to all quotation or offers made by the Seller, and are an integral part of all orders. "Seller" is understood to mean all companies directly or indirectly controlled by LEROY-SOMER. As a complementary measure, orders are also subject to the latest version in force of the Inter-Union General Conditions of Sale for France of the F.I.E.E.C. (*Fédération des Industries Electriques, Electroniques et de Communication* [Federation of Electrical, Electronic and Communication Industries]), inasmuch as they are not contrary to the GCS.

The acceptance of the Seller's offers or quotations, or any order, entails the acceptance without reservation of these GCS and rules out all contrary provisions shown on all other documents and, in particular, on the Client's order forms and the Client's General Conditions of Purchase.

If the sale concerns castings, by way of derogation to Paragraph 1 above, said *castings* shall be subject to the latest version in force of the *Conditions Générales Contractuelles des Fondries Européennes* (General Contractual Conditions of European Foundries).

The Products and services sold pursuant to these GCS may under no circumstances be used for applications in the nuclear field, as such sales expressly fall under technical specifications and specific contracts that the Seller reserves the right to refuse.

II - ORDERS

All orders, even those taken by the Seller's agents and representatives, and regardless of the transmission method, shall only bind the Seller after written acceptance thereby of the order.

The Seller reserves the option of modifying the characteristics of its Products without notice. However, the Client shall retain the possibility of specifying the characteristics on which its commitment is contingent. In the absence of any such express stipulation, the Client may not refuse delivery of new, modified Products.

The Seller may not be held liable for an unsatisfactory selection of Products if said selection results from conditions of use that are incomplete and/or mistaken, or not disclosed to the Seller by the Client. Except in the event of a stipulation to the contrary, the offers and quotations remitted by the Seller shall only be valid for thirty days as from the date on which they are drawn up.

Where the Products must comply with standards, specific regulations and/or be received by control and inspection agencies, the price request must be accompanied by the technical specification, all terms and conditions the Seller must comply with. Reference shall be made thereto on the quotation or offer. Approval and attendance costs shall always be borne by the Client.

III - PRICES

Tariffs are expressed exclusive of tax and may be revised without notice.

Prices are either deemed to be firm for the period of validity specified on the quotation, or subject to a revision formula attached to the offer and which specifies, according to the regulations, parameters pertaining to the materials, products, various services and salaries for which the indices are published in the B.O.C.C.R.F. (*Bulletin Officiel de la Concurrence, de la Consommation et de la Répression des Fraudes* [French Official Journal of Competition and Consumer Matters, and Anti-Fraud Measures]).

All additional costs, in particular approval costs, specific checks, etc., shall be invoiced in addition.

IV - DELIVERY

Sales are governed by the latest edition in force of the INCOTERMS published by the Internal Chamber of Commerce ("I.C.C. INCOTERMS").

The Products shall be dispatched according to the conditions stated on the order acknowledgement issued by the Seller for all orders of Products.

Except in the event of specific provisions, the prices correspond to Products that are made available in the Seller's factories, including basic packaging.

Except in the event of a provision to the contrary, the Products shall always be transported at the risk of the addressee. In all cases, it shall be the responsibility of the addressee to make any claims to the carrier, within the delivery time and in the forms specified by law, concerning the state or number of parcels received, and to concomitantly provide the Seller with a copy of such declaration. Failure to comply with said procedure shall exempt the Seller from any liability. In any event, the Seller's liability may not exceed the amount of the indemnities received from its insurers.

If the provisions concerning transportation are amended by the Client subsequent to the acceptance of the order, the Seller reserves the right to invoice any supplemental costs that may result therefrom.

Except in the event of a contractual or statutory obligation to the contrary, packaging shall not be returnable.

In the event that a delivery of Products is delayed for a reason not attributable to the Seller, the Products stored on the Seller's premises shall be insured at the exclusive risk of the Client. Consideration for storage, costs will be invoiced at a rate of 1% (*one per cent*) of the total amount of the order, per week or partial week of storage, with no deductible or *de minimis* amount, as from the date of Products availability provided for in the contract. Upon expiration of a period of thirty days as from said date, the Seller may, at its discretion, either freely dispose of the Products and/or agree with the Client on a new delivery date for said Products, or invoice the Client in full for payment, according to the timetables and amount provided for contractually. In any event, down payments shall inure to the Seller as indemnities, without prejudice to any other action the Seller may take.

V - DELIVERY TIME

The Seller shall only be bound by the delivery time mentioned on its order acknowledgement. Said delivery time shall only start to run as from the date of issuance of the order acknowledgement by the Seller, and subject to the fulfilment of the conditions provided for on the confirmation receipt, in particular receipt of the down payment for the order, notification of the opening of an operative irrevocable and confirmed documentary credit that complies in all respects to the Seller's request (*in particular regarding the amount, currency, validity and licence*), acceptance of the payment conditions accompanied by the implementation of any guarantees requested, etc. Exceeding delivery time shall not grant the Client entitlement to damages and/or penalties.

Except in the event of a specific condition to the contrary, the Seller reserves the right to make partial deliveries.

Delivery times shall be interrupted by right and without the need for any judicial formalities, by any failure to pay or late payment by the Client.

VI - TESTS - QUALIFICATION

The Products manufactured by the Seller are checked and tested before leaving its factories. Clients may be present at said tests if specified on the order.

Specific tests and/or trials, as well as approval of Products, requested by the Client, whether carried out on the Client's premises or in the Seller's factories, on site, or by control and inspection agencies, must be specified on the order and are always at Client's expense.

Prototypes for Products specially developed or adapted for a Client must be qualified by the Client before serial production in order to ensure that it is compatible with the other components that make up its equipment, and that it is adapted to the intended use. Said qualification will also enable the Client to ensure that the Products comply with the technical specification. In this respect, the Client and Seller shall sign a Product Approval Form in two original, one of which shall be retained by the Client and one by the Seller.

In the event that the Client requires delivery without having firstly qualified the Products, said Products shall be delivered as they stand and shall always be deemed to be prototypes; the Client shall then be solely liable for using the Products or delivering them to its own clients. However, the Seller may also decide not to deliver the Products that have not received the Client's prior approval.

VII - PAYMENT CONDITIONS

All sales shall be deemed to be completed and payable at the Seller's registered office, without any possible derogation, regardless of the payment method, where the contract was concluded and where delivery was made.

Where the Client is located out of French territory, invoices shall be payable in cash upon receipt, or by a bank draft or a bill of exchange, within 30 (thirty) days net.

All early payment compared to the deadline fixed shall give right to a discount of 0,2% (*nought point two per cent*) per month, of the amount concerned of the invoice.

Except in the event of provisions to the contrary, where the Client is located outside of French Territory, invoices shall be payable in cash against remittance of shipping documents, or by irrevocable documentary credit confirmed by a first rate French bank, at Client's expense.

Payment shall be understood to mean the funds being made available on the Seller's bank account and must imperatively be made in the invoicing currency.

Pursuant to French Law no. 2001-420 of 15 May 2001, failure to pay an invoice when due shall trigger, after service of formal notice that has remained without effect, payment to the Seller of a flat-rate penalty on the due date of the receivable, which shall be applied to amount inclusive of tax of monies owed if the invoice is liable to VAT (*Value Added Tax*), and the suspension of pending orders. Said penalty is equal to the European Central Bank Rate + 7 basis points.

The collection of said monies via litigation shall trigger an increase of 15% (*fifteen per cent*) of the amount claimed, with a minimum of Euros 500 exclusive of tax (*five hundred euros exclusive of tax*), with tax in addition if due.

Moreover, subject to compliance with the statutory provisions in force, in the event of total or partial failure to pay any invoice or instalment whatsoever, regardless of the payment method used, all amounts that remain owed to the Seller (*including its subsidiaries, affiliated or allied companies, whether French or foreign*) for all deliveries and services, regardless of the due date originally provided for, shall immediately become due.

Notwithstanding any specific payment conditions provided for between the parties, the Seller reserves the right to require, in the event of a decline in the Client's credit rating, a payment incident or bankruptcy of the Client :

- the payment in cash, before the Products leave the factory, for all orders currently being fulfilled,
- down payments to be made on all orders,
- alternative or different payment guarantees.

VIII - PAYABLE AND RECEIVABLE BALANCE

Except where prohibited by law, the Seller and the Client expressly agree to balance their payables and receivables arising from their trade relations, even if all conditions defined by law for legal balancing are not met.

For the application of said clause, the Seller shall mean any company of the LEROY-SOMER Group.

IX - TRANSFER OF RISK / RESERVE OF TITLE

Risk shall be transferred as soon as the Products are made available, according to the delivery conditions stipulated on the order acknowledgement.

The transfer to the Client of title shall take place after payment in full. In the event that the restitution of the Products delivered is claimed by the Seller, the Seller is entitled to retain any down payment as compensation.

Remittance of a bill that creates an obligation to pay (*bill of exchange or other*) shall not constitute payment and discharge.

For as long as the price has not been paid in full, the Client is required to inform the Seller, within twenty-four hours, of the sequestration, requisition or confiscation of the Products for the benefit of a third party, and to take all protective measures to make known the Seller's property right in the event of action by creditors, and to cause such right to be respected.

X - CONFIDENTIALITY

Each of the parties undertakes to maintain the confidentiality of all technical, trade, financial or other information received from the other party, whether orally, in writing or by any other means of communication, when any order is negotiated and/or fulfilled.

This confidentiality obligation shall apply throughout the period during which the order is fulfilled and for 5 (five) years subsequent to completion or cancellation thereof, regardless of the reasons therefor.

XI - INDUSTRIAL AND INTELLECTUAL PROPERTY

Data, studies, results, information or software, whether patentable or not obtained by the Seller when any order is fulfilled shall remain the exclusive property of the Seller.

With the exception of instruction and maintenance manuals, documents of any nature remitted to the Client shall remain the exclusive property of the Seller and must be returned to it upon request, even if the Client was invoiced for part of the cost of the study, and said documents may not be disclosed to third parties or used without the Seller's prior written agreement.

XII - CANCELLATION / TERMINATION

The Seller reserves the right to cancel or terminate immediately, at the Seller's discretion, by right and without the need for any judicial formalities, the contract in the event of failure to pay any portion whatsoever of the price, when due, or in the event of any breach of any of the Client's contractual obligations. Down payments and any amount already paid shall remain in Seller's hands in the form of indemnities, without prejudice to the Seller's right to claim damages. In the event that the contract is cancelled, the Products must be returned to the Seller immediately, regardless of where the Products are located, at Client's expense and risk, under penalty of 10% (*ten per cent*) of the value thereof, per week's delay.

XIII - WARRANTY

The Seller warrants the Products against all operating defects caused by a material or manufacturing fault, for a period of twelve months as from the date on which the Products are made available, unless a different statutory provision subsequently applies, under the conditions defined below.

The warranty may only be triggered insofar as the Products have been stored, used and maintained in accordance with the Seller's instructions and manuals. The warranty does not apply where the defect results, in particular, from :

- inadequate monitoring, maintenance or storage,
- normal wear and tear on the Products,
- servicing or modification of the Products without the Seller's prior written authorisation,
- abnormal use of the Products or use of the Products for a purpose other than that intended,
- faulty installation of the Products on the premises of the Client and/or the end user,
- failure by the Client to disclose the purpose or conditions of use of the Products,
- failure to use genuine spare parts,
- force majeure or any event that is beyond the control of the Seller.

In any case, the warranty is limited to the replacement or repair of the parts or Products deemed faulty by the Seller's technical departments. If the repair is entrusted to a third party, the repair shall only be carried out once the Seller has agreed to the quotation for the repair.

All Products returns must have been given the Seller's prior, written authorisation.

The Products to be repaired must be dispatched carriage paid, to the address given by the Seller. If the Products are not accepted under warranty, their return to the Client shall be invoiced to the Client or the end user.

This warranty shall apply to the Seller's Products that are made readily available and therefore does not cover the de-installation and re-installation of said Products in the equipment into which it is mounted.

Repair, modification or replacement of any part or Product during the warranty period may not result in the warranty period being extended.

The provisions of this article constitute the Seller's sole obligation concerning the warranty of the Products delivered.

XIV - LIABILITY

The Seller's liability is strictly limited to the obligations stipulated in these GCS and those expressly accepted by the Seller. All penalties and indemnities provided for therein constitute lump sum damages that include discharge for the Seller and are exclusive of any other penalty or indemnification.

With the exception of the Seller's gross negligence and the compensation of bodily injury, the Seller's liability shall be limited, in total, to the contractual amount, exclusive of tax, of the Product(s) that give(s) right to compensation.

The Seller may under no circumstances be required to indemnify consequential, indirect and / or punitive damages that the Client may use as the basis for a claim; as a result, the Seller may not be required to indemnify, in particular, production losses, operating losses or lost profit or, in general, any damage eligible for indemnification other than bodily injury or damage to property.

The Client undertakes to hold harmless the Seller and / or its insurers from any and all claims made by its insurers and/or any third party in a contractual relation with the Client, in excess of the limit and for the exclusions listed above.

XV - SPARE PARTS AND ACCESSORIES

Spare parts and accessories shall be supplied upon request, to the extent of their availability. Associated costs shall be invoiced in addition. The Seller reserves the right to require a minimum quantity or invoicing amount per order.

XVI - WASTE MANAGEMENT

The Products that form the purpose of the sale does not fall within the scope of the European Directive 2002/96/EC (WEEE) dated January 27th, 2003, and all related legislation of Member States of the European Union that result therefrom, on the composition of electrical and electronic equipment and the disposal of waste from such equipment.

In accordance with Article L 541-2 of the French Environment Code, it is the responsibility of the waste holder to ensure the disposal thereof or to cause the disposal thereof at its own expense.

XVII - FORCE MAJEURE

With the exception of the Client's obligation to pay the monies owed to the Seller in respect of an order, the Client and Seller may not be held liable for the total or partial failure to perform their contractual obligations if such failure results from the occurrence of a force majeure. Delays or disturbances in production that totally or partially result from war (whether declared or not), terrorist act, strikes, riots, accidents, fires, floods, natural disasters, transportation delays, shortage of components or materials, governmental decision or action (including prohibition on import/export or the withdrawal of an import/export licence) shall, in particular, be deemed a force majeure.

If one of the parties is delayed or prevented from performing its obligations by reason of this Article for a period in excess of 180 consecutive days, each party may then terminate, by right and without any need for judicial formalities, the unperformed part of the order, by written notice to the other party, without liability. However, the Client shall be required to pay the price agreed pertaining to the Products already delivered on the date of termination.

XVIII - PROHIBITION ON UNLAWFUL PAYMENTS

The Client shall refrain from being engaged in any activity that would expose the Seller or any of its affiliates to a risk of penalties under laws and regulations of any relevant jurisdiction prohibiting improper payments, including but not limited to bribes or gifts of an obviously unreasonable amount, to any government or agency officials, to political parties or their officials or candidates for public office, or to any employee of any customer or supplier.

XIX - TRADE COMPLIANCE LAWS

The Client agrees that all applicable import, export control and sanctions laws, regulations, orders and requirements, as they may be amended from time to time, including without limitation those of the European Union, the United States of America, and the jurisdictions in which the Seller and the Client are established or from which Products may be supplied, and the requirements of any licences, authorisations, general licences or licence exceptions relating thereto ("Trade Compliance Laws") will apply to its receipt and use of Products, as well as related services and technology. In no event shall the Client use, transfer, release, export or re-export the Products, related services or technology in violation of Trade Compliance Laws.

Seller shall have no obligation to supply any Products, or services unless and until it has received any necessary licences or authorisations or has qualified for general licences or licence exceptions under Trade Compliance Laws.

If for any reason any such licences, authorisations or approvals are denied or revoked, or if there is a change in any Trade Compliance Laws that would prohibit Seller from fulfilling the contract, or would in the reasonable judgement of Seller otherwise expose Seller and/or Seller's Affiliate(s) to a risk of liability under Trade Compliance Laws, Seller shall be relieved without liability of all obligations under the contract.

XX - SEVERABILITY

All clauses and/or provisions of these General Conditions that are deemed or become null or void shall not cause the nullity or voidance of the contract, but solely the clause and/or provision concerned.

XXI - DISPUTES

THIS CONTRACT SHALL BE GOVERNED BY AND INTERPRETED IN ACCORDANCE WITH THE LAWS OF FRANCE.

ANY DISPUTE IN RELATION TO THE INTERPRETATION OR THE EXECUTION OF THIS CONTRACT NOT AMICABLY SETTLED BETWEEN THE PARTIES WITHIN A 30 DAY PERIOD, SHALL BE SETTLED BY THE COMPETENT COURT OF ANGOULÊME (FRANCE), EVEN IN THE CASE OF INTRODUCTION OF THIRD PARTIES OR THE INVOLVEMENT OF SEVERAL DEFENDANTS. HOWEVER, THE SUPPLIER RESERVES THE EXCLUSIVE RIGHT TO BRING THE DISPUTE TO THE COMPETENT COURTS OF THE SELLER OR THE CLIENT.

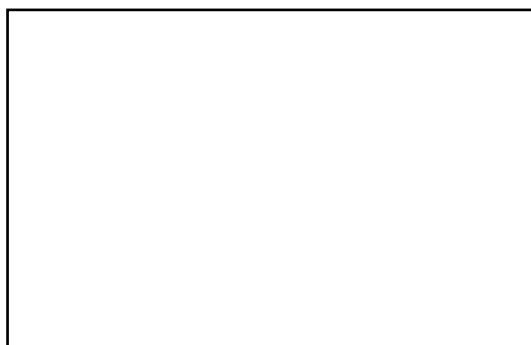


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