

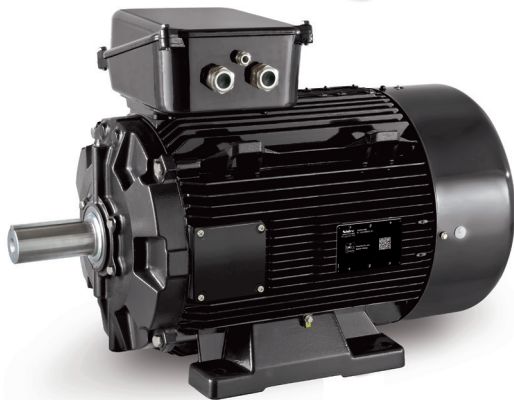
Nidec

All for dreams



Commissioning guide

Dynec+ with Powerdrive F300 / Pump drive F600



Reference: 6068 en - 2023.05 / b

LEROY-SOMERTM

1 - INTRODUCTION

Before setting the drive, please follow the safety and installation instructions for Dyneo+ motors and Powerdrive F300 / Pump drive F600 drives described in their respective manual.

Dyneo+ motors:

http://www.leroy-somer.com/documentation_pdf/5411_en.pdf

Powerdrive F300 / Pump drive F600 drive:

see the Getting started guide and associated Power Installation guide (available from the Control Techniques website).



- **The installation and commissioning must be carried out by qualified, competent and authorized personnel.**

Then proceed with the quick commissioning described in §2 from the factory setting.

Requirements:

- Parameters shown in motor data tables from the annex are only applicable for the Powerdrive F300 / Pump drive F600 drive rating indicated for each data line. If a drive with a different rating is used, then *Current Controller Kp Gain (Pr 04.013)* and *Current Controller Ki Gain (Pr 04.014)* must be scaled, as detailed below:

$$\text{New value} = \text{Annex value} \times (Kc_{\text{New drive}} / Kc_{\text{Annex drive}})$$

Values for Kc can be found in the Parameter Reference Guide, in the Current ratings section.

- Ensure the drive has a firmware version equal or higher than V01.20.00.00 (Powerdrive F300) or V04.22.00.00 (Pump Drive F600).
- Do not enable the autotune procedure.

2 - COMMISSIONING WITH POWERDRIVE F300 / PUMP DRIVE F600

RFC-S mode for interchangeable Dyneo+ permanent magnet motors without position feedback (Sensorless)

Action	Description																																																																																																																																																																
Before power-up	Ensure: <ul style="list-style-type: none"> The drive enable signal is not given (terminal 29) The Run signal is not given Motor is connected 																																																																																																																																																																
Advanced menu access from the keypad	To access all menus required for commissioning, set Pr 00.049 = All menus (1) on Powerdrive F300 and Pr 00.001 = All menus (1) on Pump drive F600 Reminder: Select the menus using the left and right arrows. The parameters are selected using the up and down arrows.																																																																																																																																																																
Power-up the drive	If Open Loop or RFC-A mode is displayed when the drive is powered up: <ul style="list-style-type: none"> Set Pr 11.31 = RFC-S (3). If the frequency of the mains supply is 60Hz, set Pr 00.000 = 1254, otherwise if the frequency of the mains is 50Hz, Pr 00.000 = 1253. If RFC-S mode is displayed when the drive is powered up: <ul style="list-style-type: none"> If the frequency of the mains supply is 60Hz, set Pr 00.000 = 1244, otherwise if the frequency of the mains is 50Hz, set Pr 00.000 = 1233. Press the red Reset button or toggle the Reset logic input. These actions will leave the drive in RFC-S mode with defaulted parameters. The drive will be in a tripped state, but the associated trips are addressed by settings within this procedure.																																																																																																																																																																
Set maximum speed	Set the maximum speed in Pr 01.006 (rpm).																																																																																																																																																																
Set acceleration and deceleration rates	Set: <ul style="list-style-type: none"> Acceleration rate in Pr 02.011 (s up to Pr 01.006) - A value of 20s suits most applications. Deceleration rate in Pr 02.021 (s up to Pr 01.006) - A value of 20s suits most applications. If a braking resistor is installed, set Pr 02.004 = Fast (0). Also ensure Pr 10.030 and Pr 10.031 and Pr 10.061 are set correctly, otherwise premature 'Brake R Too Hot' trips may be seen.																																																																																																																																																																
Motor thermistor set-up	The motor PTC thermistor must be connected to the drive, using analogue input 2 (terminals 4 and 6). For the drive to manage the thermistor: <ul style="list-style-type: none"> Set <i>Analogue Input 2 Mode</i> (Pr 07.011) = Therm Short Cct (7). Set <i>Analogue Input 2 Destination</i> Pr 07.014 = 000 If two analogue inputs are required, then it may be necessary to fit an SI-I/O module.																																																																																																																																																																
Enter motor nameplate details	Refer to the Dyneo+ motor tables located in the Appendix. Select the table corresponding to the motor speed range (1500 or 3000 rpm). Then depending on the motor type and its power, select the line that corresponds to the voltage, the supply frequency and the rated speed of the application. From this line, set in the drive the values of all the parameters listed in the table. NOTE: If the motor type does not appear in the table, then it is from the Compact range. In this case, please contact Control Techniques Technical Support. Example: For the 1500 range motor, LSHRM 160MR1 – 11 kW 400V – 50Hz with a rated speed of 1500 rpm, parameter values to set in the drive are the ones of the green line as indicated below: <table border="1" style="margin-top: 10px;"> <thead> <tr> <th colspan="17">Range 1500 rpm</th> </tr> <tr> <th rowspan="3">MOTOR type</th> <th rowspan="3">kW</th> <th rowspan="3">Drive</th> <th rowspan="3">Coupling</th> <th rowspan="3">HZ</th> <th colspan="12">PARAMETERS</th> <th rowspan="3">Torque angle (°)</th> </tr> <tr> <th>#03.010</th> <th>#03.011</th> <th>#04.013</th> <th>#04.014</th> <th>#04.015</th> <th>#05.007</th> <th>#05.008</th> <th>#05.009</th> <th>#05.017</th> <th>#05.024</th> <th>#05.033</th> <th>#05.069</th> <th>#05.072</th> <th>#05.075</th> <th>#05.078</th> <th>#05.082</th> <th>#05.084</th> <th>#05.087</th> </tr> <tr> <th>Speed Gain Kp</th> <th>Speed Gain Ki</th> <th>Current Gain Kp</th> <th>Current Gain Ki</th> <th>Thermal Constant (s)</th> <th>Rated current (A)</th> <th>Rated speed (rpm)</th> <th>Rated voltage (V)</th> <th>Stator Resistance (Ω)</th> <th>Ld (mH)</th> <th>BEMF (V/kmin¹)</th> <th>Trip current (%)</th> <th>Lq @0A (mH)</th> <th>Lq (%)</th> <th>Lq @ Iq (mH)</th> <th>Id (%)</th> <th>Lq @ Id (mH)</th> <th>Torque</th> </tr> </thead> <tbody> <tr> <td rowspan="4">LSHRM 160 MR1</td> <td>11</td> <td>044-00240A</td> <td>Y</td> <td>50</td> <td>0.005</td> <td>0.05</td> <td>152</td> <td>269</td> <td>800</td> <td>21.0</td> <td>1500</td> <td>400</td> <td>0.31582</td> <td>7.626</td> <td>72.1</td> <td>236</td> <td>68.540</td> <td>73</td> <td>44.845</td> <td>-108</td> <td>68.540</td> <td>56</td> </tr> <tr style="background-color: #e0ffe0;"> <td>11</td> <td>044-00240A</td> <td>Y</td> <td>60</td> <td>0.005</td> <td>0.05</td> <td>152</td> <td>269</td> <td>800</td> <td>20.3</td> <td>1800</td> <td>400</td> <td>0.31582</td> <td>7.626</td> <td>72.1</td> <td>244</td> <td>68.540</td> <td>73</td> <td>44.845</td> <td>-108</td> <td>68.540</td> <td>56</td> </tr> <tr> <td>12.7</td> <td>044-00240A</td> <td>Y</td> <td>60</td> <td>0.005</td> <td>0.05</td> <td>152</td> <td>269</td> <td>800</td> <td>21.2</td> <td>1800</td> <td>460</td> <td>0.31582</td> <td>7.626</td> <td>72.1</td> <td>233</td> <td>68.540</td> <td>73</td> <td>44.845</td> <td>-108</td> <td>68.540</td> <td>56</td> </tr> <tr> <td>19.1</td> <td>064-00480A</td> <td>D</td> <td>87</td> <td>0.005</td> <td>0.05</td> <td>124</td> <td>219</td> <td>800</td> <td>38.2</td> <td>2600</td> <td>400</td> <td>0.10527</td> <td>2.542</td> <td>41.6</td> <td>218</td> <td>22.847</td> <td>73</td> <td>14.948</td> <td>-108</td> <td>22.850</td> <td>56</td> </tr> </tbody> </table>	Range 1500 rpm																	MOTOR type	kW	Drive	Coupling	HZ	PARAMETERS												Torque angle (°)	#03.010	#03.011	#04.013	#04.014	#04.015	#05.007	#05.008	#05.009	#05.017	#05.024	#05.033	#05.069	#05.072	#05.075	#05.078	#05.082	#05.084	#05.087	Speed Gain Kp	Speed Gain Ki	Current Gain Kp	Current Gain Ki	Thermal Constant (s)	Rated current (A)	Rated speed (rpm)	Rated voltage (V)	Stator Resistance (Ω)	Ld (mH)	BEMF (V/kmin ¹)	Trip current (%)	Lq @0A (mH)	Lq (%)	Lq @ Iq (mH)	Id (%)	Lq @ Id (mH)	Torque	LSHRM 160 MR1	11	044-00240A	Y	50	0.005	0.05	152	269	800	21.0	1500	400	0.31582	7.626	72.1	236	68.540	73	44.845	-108	68.540	56	11	044-00240A	Y	60	0.005	0.05	152	269	800	20.3	1800	400	0.31582	7.626	72.1	244	68.540	73	44.845	-108	68.540	56	12.7	044-00240A	Y	60	0.005	0.05	152	269	800	21.2	1800	460	0.31582	7.626	72.1	233	68.540	73	44.845	-108	68.540	56	19.1	064-00480A	D	87	0.005	0.05	124	219	800	38.2	2600	400	0.10527	2.542	41.6	218	22.847	73	14.948	-108	22.850	56
Range 1500 rpm																																																																																																																																																																	
MOTOR type	kW	Drive	Coupling	HZ	PARAMETERS												Torque angle (°)																																																																																																																																																
					#03.010	#03.011	#04.013	#04.014	#04.015	#05.007	#05.008	#05.009	#05.017	#05.024	#05.033	#05.069		#05.072	#05.075	#05.078	#05.082	#05.084	#05.087																																																																																																																																										
					Speed Gain Kp	Speed Gain Ki	Current Gain Kp	Current Gain Ki	Thermal Constant (s)	Rated current (A)	Rated speed (rpm)	Rated voltage (V)	Stator Resistance (Ω)	Ld (mH)	BEMF (V/kmin ¹)	Trip current (%)		Lq @0A (mH)	Lq (%)	Lq @ Iq (mH)	Id (%)	Lq @ Id (mH)	Torque																																																																																																																																										
LSHRM 160 MR1	11	044-00240A	Y	50	0.005	0.05	152	269	800	21.0	1500	400	0.31582	7.626	72.1	236	68.540	73	44.845	-108	68.540	56																																																																																																																																											
	11	044-00240A	Y	60	0.005	0.05	152	269	800	20.3	1800	400	0.31582	7.626	72.1	244	68.540	73	44.845	-108	68.540	56																																																																																																																																											
	12.7	044-00240A	Y	60	0.005	0.05	152	269	800	21.2	1800	460	0.31582	7.626	72.1	233	68.540	73	44.845	-108	68.540	56																																																																																																																																											
	19.1	064-00480A	D	87	0.005	0.05	124	219	800	38.2	2600	400	0.10527	2.542	41.6	218	22.847	73	14.948	-108	22.850	56																																																																																																																																											

NOTE: When setting **Pr 05.069**, it may be necessary to increase the value entered, to ensure that the actual trip level displayed in **Pr 05.068** is close to (but not greater than) the required value.

Action	Description
Additional settings	<p>Set:</p> <ul style="list-style-type: none"> • <i>Current Reference Filter 1 Time Constant</i> Pr 04.012 = 2 ms • <i>Thermal Protection Mode</i> Pr 04.016 = Disabled (4) • <i>Maximum Switching Frequency</i> Pr 05.018 = 3kHz (1) • <i>Flux Control Gain</i> Pr 05.027 = 0.1 • <i>Minimum Switching Frequency</i> Pr 05.038 = 3kHz (1) • <i>Voltage Headroom</i> Pr 05.041 = 5%. [Do not set a lower value. Increase this value to 10%, if the motor is unstable in the field weakening area]. • <i>RFC Low Speed Mode</i> Pr 05.064 = Injection (0) • <i>Saliency Torque Control Select</i> Pr 05.065 = Auto (3) [Ensure that Pr 05.066 = High (2), otherwise check the value entered for Pr 05.087 from the table] • <i>Inverted Saturation Characteristic</i> Pr 05.070 = On (1) • <i>Low Speed Sensorless Mode Current Limit</i> Pr 05.071 = 60% [Note: This forces a reduced current limit between zero speed and 20% of motor rated speed] <p>If the load is a high inertia, Pr 03.010 may need to be increased.</p>
Save parameters	Select «Save Parameters» in Pr mm.000 and press the red reset button or toggle the reset digital input.
Start-up	Drive is ready to start-up.

APPENDIX

COMPACT RANGE 3000 rpm																							
MOTOR	kW	Drive		Coupling	Hz	PARAMETERS																	
		F300 / F600				#03.010	#03.011	#04.013	#04.014	#04.015	#05.007	#05.008	#05.009	#05.017	#05.024	#05.033	#05.069	#05.072	#05.075	#05.078	#05.082	#05.084	#05.087
						Speed Gain Kp	Speed Gain Ki	Current Gain Kp	Current Gain Ki	Thermal Constant (s)	Rated Current (A)	Rated Speed (min ⁻¹)	Rated Voltage (V)	Stator Resistance (Ω)	Ld (mH)	BEMF (V/kmin ⁻¹)	Trip Current (%)	Lq @0A (mH)	Iq (%)	Lq @ Iq (mH)	Id (%)	Lq @ Id (mH)	orque angle (°)
LSHRM 132 MU3	32	074-00790A	Y	100	0,005	0,05	146	245	800	61	3000	400	0,07480	1,906	36,1	156	17,135	63	9,92	-114	17,135	61	
	32	074-00790A	Y	120	0,005	0,05	146	245	800	69,6	3600	400	0,07480	1,906	36,1	136	17,135	63	9,92	-114	17,135	61	
	37	074-00790A	Y	120	0,005	0,05	146	245	800	59,6	3600	460	0,07480	1,906	36,1	159	17,135	63	9,92	-114	17,135	61	
LSHRM 160 LR3	56	084-01550A	D	173	0,005	0,05	99	165	800	110	5200	400	0,02493	0,635	20,8	140	5,712	63	3,307	-114	5,712	61	
	37	074-00790A	Y	100	0,005	0,05	143	220	800	70,1	3000	400	0,06720	1,87	39,3	150	16,972	61	9,68	-115	16,972	62	
	43	074-00790A	Y	120	0,005	0,05	143	220	800	69,3	3600	400	0,06720	1,87	39,3	152	16,972	61	9,68	-115	16,972	62	
LSHRM 180 L1M	64	084-01550A	Y	100	0,030	0,1	118	145	1000	126	3000	400	0,02190	0,76	33,4	160	5,988	69	4,22	-110	5,988	58	
	64	084-01550A	Y	120	0,030	0,1	118	145	1000	121	3600	400	0,02190	0,76	33,4	168	5,988	69	4,22	-110	5,988	58	
	74	084-01550A	Y	120	0,030	0,1	118	145	1000	123	3600	460	0,02190	0,76	33,4	165	5,988	69	4,22	-110	5,988	58	
LSHRM 200 LR1	75	084-01840A	Y	100	0,030	0,1	117	136	1000	148	3000	400	0,01750	0,645	33,4	159	5,126	69	3,6	-110	5,126	58	
	75	084-01840A	Y	120	0,030	0,1	117	136	1000	141	3600	400	0,01750	0,645	33,4	167	5,126	69	3,6	-110	5,126	58	
	86	084-01840A	Y	120	0,030	0,1	117	136	1000	145	3600	460	0,01750	0,645	33,4	162	5,126	69	3,6	-110	5,126	58	
LSHRM 225MG1M	172	114-04370E	Y	100	0,005	0,1	119	74	1200	327	3000	400	0,00465	0,321	35,8	165	3,203	61	1,86	-115	3,203	62	
	172	114-04370E	Y	120	0,005	0,1	119	74	1200	318	3600	400	0,00465	0,321	35,8	169	3,203	61	1,86	-115	3,203	62	
	198	114-04370E	Y	120	0,005	0,1	119	74	1200	314	3600	460	0,00465	0,321	35,8	171	3,203	61	1,86	-115	3,203	62	
LSHRM 250 MF1	206	114-04870E	Y	100	0,005	0,1	123	70	1200	382	3000	400	0,00390	0,29	38,3	165	2,937	61	1,7	-115	2,937	62	
	206	114-04870E	Y	120	0,005	0,1	123	70	1200	384	3600	400	0,00390	0,29	38,3	164	2,937	61	1,7	-115	2,937	62	
	248	114-04870E	Y	120	0,005	0,1	123	70	1200	388	3600	460	0,00390	0,29	38,3	163	2,937	61	1,7	-115	2,937	62	

COMPACT RANGE 3600 rpm																							
MOTOR	kW	Drive		Coupling	Hz	PARAMETERS																	
		F300 / F600				#03.010	#03.011	#04.013	#04.014	#04.015	#05.007	#05.008	#05.009	#05.017	#05.024	#05.033	#05.069	#05.072	#05.075	#05.078	#05.082	#05.084	#05.087
						Speed Gain Kp	Speed Gain Ki	Current Gain Kp	Current Gain Ki	Thermal Constant (s)	Rated Current (A)	Rated Speed (min ⁻¹)	Rated Voltage (V)	Stator Resistance (Ω)	Ld (mH)	BEMF (V/kmin ⁻¹)	Trip Current (%)	Lq @0A (mH)	Iq (%)	Lq @ Iq (mH)	Id (%)	Lq @ Id (mH)	orque angle (°)
LSHRM 132 MU3	38	074-00940A	Y	120	0,005	0,05	114	182	800	73	3600	400	0,04780	1,276	29,5	156	11,471	63	6,75	-114	11,471	61	
LSHRM 160 LR3	40	074-00940A	D	120	0,005	0,05	109	167	800	75,6	3600	400	0,04367	1,221	31,8	169	11,089	85	2,3	-98	11,089	49	
LSHRM 180 L1M	75	084-01840A	Y	120	0,030	0,1	102	125	1000	146	3600	400	0,01610	0,559	28,6	159	4,399	70	3,11	-110	4,399	58	
LSHRM 200 LR1	87	084-01840A	Y	120	0,030	0,1	99	114	1000	167	3600	400	0,01460	0,542	30,6	153	4,307	69	2,98	-111	4,307	58	
LSHRM 225MG1M	181	114-04870E	D	120	0,005	0,1	112	66	1200	337	3600	400	0,00365	0,264	32,4	174	2,637	63	1,57	-114	2,637	61	
LSHRM 250 MF1	230	114-04870E	D	120	0,005	0,1	92	51	1200	430	3600	400	0,00283	0,218	33,2	167	2,203	63	1,28	-114	2,203	61	

COMPACT RANGE 4500 rpm																							
MOTOR	kW	Drive		Coupling	Hz	PARAMETERS																	
		F300 / F600				#03.010	#03.011	#04.013	#04.014	#04.015	#05.007	#05.008	#05.009	#05.017	#05.024	#05.033	#05.069	#05.072	#05.075	#05.078	#05.082	#05.084	#05.087
						Speed Gain Kp	Speed Gain Ki	Current Gain Kp	Current Gain Ki	Thermal Constant (s)	Rated Current (A)	Rated Speed (min ⁻¹)	Rated Voltage (V)	Stator Resistance (Ω)	Ld (mH)	BEMF (V/kmin ⁻¹)	Trip Current (%)	Lq @0A (mH)	Iq (%)	Lq @ Iq (mH)	Id (%)	Lq @ Id (mH)	orque angle (°)
LSHRM 132 MU3	48	074-01120A	D	150	0,005	0,05	103	172	800	93,4	4500	400	0,03467	0,888	24,6	143	7,977	61	4,55	-115	7,977	62	
LSHRM 160 LR3	50	074-01120A	D	150	0,005	0,05	87	135	800	96,4	4500	400	0,02723	0,754	25	164	6,845	65	4,16	-113	6,845	60	
LSHRM 180 L1M	88	094-02210A	Y	150	0,030	0,1	79	99	1000	170	4500	400	0,01137	0,388	23,9	160	3,055	70	2,19	-110	3,055	58	
LSHRM 200 LQ1	88	094-02210A	Y	150	0,030	0,1	79	99	1000	170	4500	400	0,01137	0,388	23,9	160	3,055	70	2,19	-110	3,055	58	
LSHRM 225MG1M	185	114-04870E	D	150	0,005	0,1	75	46	1200	369	4500	400	0,00254	0,177	26,5	190	1,765	69	1,1	-110	1,765	58	
LSHRM 250 SF1	240	114-04870E	D	150	0,005	0,1	73	41	1200	441	4500	400	0,00227	0,172	29,5	181	1,741	65	1,07	-113	1,741	60	

APPENDIX

COMPACT RANGE 6000 rpm																						
MOTOR	kW	Drive		Hz	PARAMETERS																	
		F300 / F600	Coupling		#03.010	#03.011	#04.013	#04.014	#04.015	#05.007	#05.008	#05.009	#05.017	#05.024	#05.033	#05.069	#05.072	#05.075	#05.078	#05.082	#05.084	#05.087
					Speed Gain Kp	Speed Gain Ki	Current Gain Kp	Current Gain Ki	Thermal Constant (s)	Rated Current (A)	Rated Speed (min ⁻¹)	Rated Voltage (V)	Stator Resistance (Ω)	Ld (mH)	BEMF (V/kmin ⁻¹)	Trip Current (%)	Lq @0A (mH)	Iq (%)	Lq @ Iq (mH)	Id (%)	Lq @ Id (mH)	orque angle (°)
LSHRM 132 MU3	57	084-01550A	D	200	0,005	0,05	82	143	800	134	6000	400	0,02023	0,525	18,9	150	4,72	63	2,81	-114	4,72	61
LSHRM 160 LR3	65	084-01550A	D	200	0,005	0,05	70	111	800	106	6000	400	0,01593	0,45	19,3	157	4,087	65	2,47	-113	4,087	60
LSHRM 180 L1M	80	084-01840A	Y	200	0,030	0,1	71	94	1000	88	6000	400	0,01137	0,388	23,9	186	3,055	74	2,35	-107	3,055	56
LSHRM 200 LR1	90	084-01840A	Y	200	0,030	0,1	52	66	1000	62	6000	400	0,00800	0,287	22,3	201	2,278	76	1,81	-105	2,278	54
LSHRM 225SG1	185	114-04870E	Y	200	0,005	0,1	69	43	1200	46	6000	400	0,00252	0,164	25,5	213	1,634	71	1,08	-109	1,634	57
LSHRM 250 SF1S	220	114-04870E	D	200	0,005	0,1	56	32	1200	32	6000	400	0,00177	0,132	25,8	219	1,333	71	0,89	-109	1,333	57

NOTES

NOTES

Nidec
All for dreams

LEROY-SOMERTM



Moteurs Leroy-Somer
Headquarter: Boulevard Marcellin Leroy - CS 10015
16915 ANGOULÊME Cedex 9

Limited company with capital of 38,679,664 €
RCS Angoulême 338 567 258

www.leroy-somer.com