HYUNDAI LV AC Drive
N800S / N800A Series

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N800 Series

N800S : 1Ph, 208 - 240 V, 0.37 - 2.2 kW
3Ph, 208 - 240 V, 0.37 - 22 kW
3Ph, 308 - 480 V, 0.37 - 132 kW
N800A : 3Ph, 208 - 240 V, 0.37 - 75 kW
3Ph, 308 - 500 V, 0.75 - 250 kW

Available Synchronous Motor Control I IP54 (N800A Option)

- Excellent high-torque control performance
- Various user dedicated program, interface and option
- International standard certification, CE, UL, cUL, TR-CU, KC

MR9(IP21 Option) MR8(IP21 Option) MR7 MR6 MR5

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MR4

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N800 Series Selection Guide

Classification			N800S		N800A	Remark
			MI	MR	MR	
Capacity	1Ph	208 - 240 V	0.37 - 2.2 kW		-	150% Overload
	3Ph	208 - 240 V	0.37 - 11 kW	15 - 22 kW	0.37 - 75 kW	
		380 - 480 V	0.37 - 18.5 kW	22 - 132 kW	-	
		380 - 500 V	-	-	0.75 - 250 kW	
Structure		Operator	Text (Fixed)	Text (Detachable)	Graphics (Detachable)	
	Protection Rating	Protection Rating	MI1 - 3 : IP20 MI4 - 5 : IP21	MR6 - 7 : IP21 MR8 - 9 : IP00	MR4 - 7 : IP21 MR8 - 10 : IP00	
		Option (IP54)	-	-	○ (Exclude MR10)	MR8 - 9 : IP21(Option)
Built-in		DC Reactor	MI1 - 3 : Exception MI4 - 5 : Option	●	●	
		EMC-4 Filter	●	●	●	
		EMC-2 Filter	○	○	○	
		Brake Unit	MI1 : Do Not Support MI2 - 5 : Default	MR6 : Default MR7 - 9 : Option	MR4 - 6 : Default MR7 - 9 : Option	
		Micro-thin Film Capacitors	-	●	●	
Control Function		Parameter Read / Copy	MCA(Option) Possible	possible for PC Tool	●	
	Control	Frequency Control	●	●	●	
		Sensorless Vector (SLV)	●	●	●	
		Open Loop Torque Control	-	-	●	
		Application Wizard	-	-	●	
		Main Fan Control	-	●	●	
		Multipump Control	-	-	●	N800A: 6ea
		Fire Mode Control	-	-	●	
		Energy Counter	-	-	●	
		Real time clock	-	-	○	
		Driver Customizer	-	-	●	N800 HIMS
Communication	Built-in RS485	Modbus RTU	●	●	●	
		BACnet MSTP	-	○	●	
		Metasys N2	-	-	●	
	Built-in Ethernet	Modbus TCP	-	○	●	
		BACnet IP	-	○	●	
		Ethernet IP	-	-	○ S / W Option	
		Profinet I/O	- H / W Option	○ H / W Option	○ S / W Option	S / W Option
	Communication Cards	Profibus-DP	○	○	○	
		EtherCAT	○	○	○	
		Devicenet	○	○	○	
		CANopen	○	○	○	
		LonWorks	-	-	○	
Option		STO (Safe Torque Off)	-	-	○	
		SS1 (Safe Stop1)	-	-	○	
		ATEX Thermistor input	-	-	○	
Available Option Slot			1	1	3	Refer to P.11, 33
PC Tool		N800 HIMS	●	●	●	Include the download function

※ ● default ○ option - NA

If you need Close-Loop Control, please contact us.

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N800 Series selection table according to the motor capacity

N800S Series Models			
Applicable Motor[kW][1)]	1Ph, 220 V	3Ph, 220 V	3Ph, 440 V
0.37	N800S0020-1L-0002-2	N800S0020-3L-0002-2	N800S0020-3L-0001-4
0.55	N800S0020-1L-0003-2	N800S0020-3L-0003-2	N800S0020-3L-0002-4
0.75	N800S0020-1L-0004-2	N800S0020-3L-0004-2	N800S0020-3L-0003-4
1.1	N800S0020-1L-0005-2	N800S0020-3L-0005-2	N800S0020-3L-0004-4
1.5	N800S0020-1L-0007-2	N800S0020-3L-0007-2	N800S0020-3L-0005-4
2.2	N800S0020-1L-0009-2	N800S0020-3L-0011-2	N800S0020-3L-0006-4
3		N800S0020-3L-0012-2	N800S0020-3L-0008-4
4		N800S0020-3L-0017-2	N800S0020-3L-0009-4
5.5		N800S0020-3L-0025-2	N800S0020-3L-0012-4
7.5		N800S0020-3L-0031-2	N800S0020-3L-0016-4
11		N800S0020-3L-0038-2	N800S0020-3L-0023-4
15		N800S0100-3L-0075-2	N800S0020-3L-0031-4
18.5		N800S0100-3L-0088-2	N800S0020-3L-0038-4
22		N800S0100-3L-0105-2	N800S0100-3L-0061-5
30			N800S0100-3L-0072-5
37			N800S0100-3L-0087-5
45			N800S0100-3L-0105-5
55			N800S0100-3L-0140-5
75			N800S0100-3L-0170-5
90			N800S0100-3L-0205-5
110			N800S0100-3L-0261-5
132			N800S0100-3L-0310-5

N800A Series Models			
Applicable Motor[kW][1)]	1Ph, 220 V	3Ph, 220 V	3Ph, 440 V
0.37		N800A0100-3L-0003-2	
0.55		N800A0100-3L-0004-2	
0.75		N800A0100-3L-0007-2	N800A0100-3L-0003-5
1.1		N800A0100-3L-0008-2	N800A0100-3L-0004-5
1.5		N800A0100-3L-0011-2	N800A0100-3L-0005-5
2.2		N800A0100-3L-0012-2	N800A0100-3L-0008-5
3		N800A0100-3L-0018-2	N800A0100-3L-0009-5
4		N800A0100-3L-0024-2	N800A0100-3L-0012-5
5.5		N800A0100-3L-0031-2	N800A0100-3L-0016-5
7.5		N800A0100-3L-0048-2	N800A0100-3L-0023-5
11		N800A0100-3L-0062-2	N800A0100-3L-0031-5
15		N800A0100-3L-0075-2	N800A0100-3L-0038-5
18.5		N800A0100-3L-0088-2	N800A0100-3L-0046-5
22		N800A0100-3L-0105-2	N800A0100-3L-0061-5
30		N800A0100-3L-0140-2	N800A0100-3L-0072-5
37		N800A0100-3L-0170-2	N800A0100-3L-0087-5
45		N800A0100-3L-0205-2	N800A0100-3L-0105-5
55		N800A0100-3L-0261-2	N800A0100-3L-0140-5
75		N800A0100-3L-0310-2	N800A0100-3L-0170-5
90			N800A0100-3L-0205-5
110			N800A0100-3L-0261-5
132			N800A0100-3L-0310-5
160			N800A0100-3L-0385-5
200			N800A0100-3L-0460-5
250			N800A0100-3L-0590-5

※ 1) The standard is heavy duty.

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Features

HHI N800S AC drive comes packed with functionality and possibilities to bring any machine control to a completely new level. The compact size in combination with a wide power range is the base, but N800S's possibilities do not end there.

▪ Wide Power Range

- N800S is available in all common voltages in the range of 208 - 480 V / 380 - 480 V with a wide power range up to 132 kW.

▪ Cutting-Edge Performance

- Built-in RS485 interface offers a cost effective and simple serial control interface for the drive. (200 V Class MR7, 400 V Class MR6 - 9 have Ethernet as a standard)
- With optional modules, N800S can be connected to almost any fieldbus system including CANopen, Devicenet and Profibus-DP.

▪ Fast Installation and Set-up

- Easy access terminals, built-in DIN rail mounting and the MCA parameter copying tool without main power in the drive which can settings are all examples of features that help reduce start-up time.

Technical Specification

Mains Connection	Input Voltage U_{in}	208…240 V, -15 % … +10 % 1Ph 208…240 V, -15 % … +10 % 3Ph 380…480 V, -15 % … +10 % 3Ph
	Input Frequency	45…66 Hz
	Connections to mains	Once per minute or less (normal case)
Motors Connection	Output Voltage	0…U_{in}
	Output Current	Countinuous rated current I_N at rated ambient temperature overload 1.5 x I_N max. 1 min/10 min (for MI Frame)[1]
	Starting Current/Torque	Current 2 x I_N for 2 secs in every 20 sec period / Torque depends on motor
	Output frequency	0…320 Hz
	Frequency resolution	0.01 Hz
Control Characteristics	Control method	Frequency control U / f, Open loop sensorless vector control
	Switching frequency	1.5…16 kHz: Factory default 4 kHz
	Braking torque	100 % x T_N with brake chopper in 3-phase version sizes MI2 - 5, MR6 30 % x T_N with DC-braking. Dynamic flux braking available in all types
Ambient Conditions	Ambient operating temperature	-10℃ (no frost) … +50℃: Rated loadability I_N (1L-0009-2, 3L-0007-2, 3L-0011-2 and with options ENC-IN01-MIx ambient max. +40℃)
	Storage temperature	-40℃… +70℃
	Altitude	100 % load capacity (no derating) up to 1,000 m 1 % derating for each 100 m above 1,000 m: Max. 2,000 m
	Enclosure class	MI1 - 3: IP20, MI4 - 5: IP21, MR6 - 7: IP21, MR8 - 9: IP00
EMC	Immunity	Compliance with EN 61800-3 (2004)
	Emissions	208 - 240 V: EMC level C2: with an internal + EMC2 Option 380 - 480 V: EMC level C2: with an internal + EMC2 Option
Approvals	EN 61800, CE, UL cUL, TR-CU, KC, IEC (Not all versions, see unit nameplate for more detailed approvals.)	

※ 1) Please refer to the page 7 for the rated current of MR Frame.

N800S Model Type ▸

N800S0020 - 1L - 0009 - 5 + OPTION CODES

Product	Input Phase	Rated Current	Rated Voltage	Option
Frame MI Frame : 0020 MR Frame : 0100	**Phase Division** 1L : 1Ph 3L : 3Ph		**Voltage Division** 2 : 208 - 240 V 4 : 380 - 480 V 5 : 380 - 500 V	**Factory Install Option** +EMC2 +DBIN +QFLG

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Ratings

Voltage	Model	Heavy Load (Constant Torque)				Light Load (Variable Torque)				Frame Size	Protec -tion Rating	Dimensions W x H x D [mm]	Weight [kg]
		Rating Capacity		Motor Current		Rating Capacity		Motor Current					
		kW	hp	Continuous Current I_H [A]	50% Overload Current 1.5xI_H [A]	kW	hp	Continuous Current I_L [A]	10% Overload Current 1.1xI_L [A]				
220 V 1Ph	N800S0020-1L-0002-2	0.37	0.5	2.4	3.6	-	-	-	-	MI1	IP20	66×160×99	0.55
	N800S0020-1L-0003-2	0.55	0.75	2.8	4.2	-	-	-	-				
	N800S0020-1L-0004-2	0.75	1	3.7	5.6	-	-	-	-	MI2	IP20	90×195×102	0.7
	N800S0020-1L-0005-2	1.1	1.5	4.8	7.2	-	-	-	-				
	N800S0020-1L-0007-2	1.5	2	7	10.5	-	-	-	-				
	N800S0020-1L-0009-2	2.2	3	9.6	14.4	-	-	-	-	MI3	IP20	100×255×109	0.99
220 V 3Ph	N800S0020-3L-0002-2	0.37	0.5	2.4	3.6	-	-	-	-	MI1	IP20	66×160×99	0.55
	N800S0020-3L-0003-2	0.55	0.75	2.8	4.2	-	-	-	-				
	N800S0020-3L-0004-2	0.75	1	3.7	5.6	-	-	-	-	MI2	IP20	90×195×102	0.7
	N800S0020-3L-0005-2	1.1	1.5	4.8	7.2	-	-	-	-				
	N800S0020-3L-0007-2	1.5	2	7	10.5	-	-	-	-				
	N800S0020-3L-0011-2	2.2	3	11	16.5	-	-	-	-	MI3	IP20	100×255×109	0.99
	N800S0020-3L-0012-2	3	4	12.5	18.8	-	-	-	-	MI4	IP21	165×370×165	7
	N800S0020-3L-0017-2	4	5	17.5	26.3	-	-	-	-				
	N800S0020-3L-0025-2	5.5	7.5	25	37.5	-	-	-	-				
	N800S0020-3L-0031-2	7.5	10	31	46.5	-	-	-	-	MI5	IP21	165×414×202	7
	N800S0020-3L-0038-2	11	15	38	57	-	-	-	-				
	N800S0100-3L-0075-2	15	20	62	93	18.5	25	75	82.5	MR7	IP21	237×660×259	37.5
	N800S0100-3L-0088-2	18.5	25	75	112.5	22	30	88	96.8				
	N800S0100-3L-0105-2	22	30	88	132	30	40	105	115.5				
440 V 3Ph	N800S0020-3L-0001-4	0.37	0.5	1.3	2	-	-	-	-	MI1	IP20	66×160×99	0.55
	N800S0020-3L-0002-4	0.55	0.75	1.9	2.9	-	-	-	-				
	N800S0020-3L-0003-4	0.75	1	2.4	3.6	-	-	-	-				
	N800S0020-3L-0004-4	1.1	1.5	3.3	5	-	-	-	-	MI2	IP20	90×195×102	0.7
	N800S0020-3L-0005-4	1.5	2	4.3	6.5	-	-	-	-				
	N800S0020-3L-0006-4	2.2	3	5.6	8.4	-	-	-	-				
	N800S0020-3L-0008-4	3	5	7.6	11.4	-	-	-	-	MI3	IP20	100×255×109	0.99
	N800S0020-3L-0009-4	4	6	9	13.5	-	-	-	-				
	N800S0020-3L-0012-4	5.5	7.5	12	18	-	-	-	-				
	N800S0020-3L-0016-4	7.5	10	16	24	-	-	-	-	MI4	IP21	165×370×165	7
	N800S0020-3L-0023-4	11	15	23	34.5	-	-	-	-				
	N800S0020-3L-0031-4	15	20	31	46.5	-	-	-	-	MI5	IP21	165×414×202	7
	N800S0020-3L-0038-4	18.5	25	38	57	-	-	-	-				
	N800S0100-3L-0061-5	22	30	46	69	30	40	61	67.1	MR6	IP21	195×557×229	20
	N800S0100-3L-0072-5	30	40	61	91.5	37	50	72	79.2	MR7	IP21	237×660×259	37.5
	N800S0100-3L-0087-5	37	50	72	108	45	60	87	95.7				
	N800S0100-3L-0105-5	45	60	87	130.5	55	75	105	115.5				
	N800S0100-3L-0140-5	55	75	105	157.5	75	100	140	154	MR8	IP00	290×794×343	62
	N800S0100-3L-0170-5	75	100	140	210	90	125	170	187				
	N800S0100-3L-0205-5	90	125	170	255	110	150	205	225.5				
	N800S0100-3L-0261-5	110	150	205	307.5	132	200	261	287.1	MR9	IP00	480×970×365	97
	N800S0100-3L-0310-5	132	200	251	376.5	160	250	310	341				

※ In case of Drive model name, it is exclude the option (+BM3Y+IPxx)

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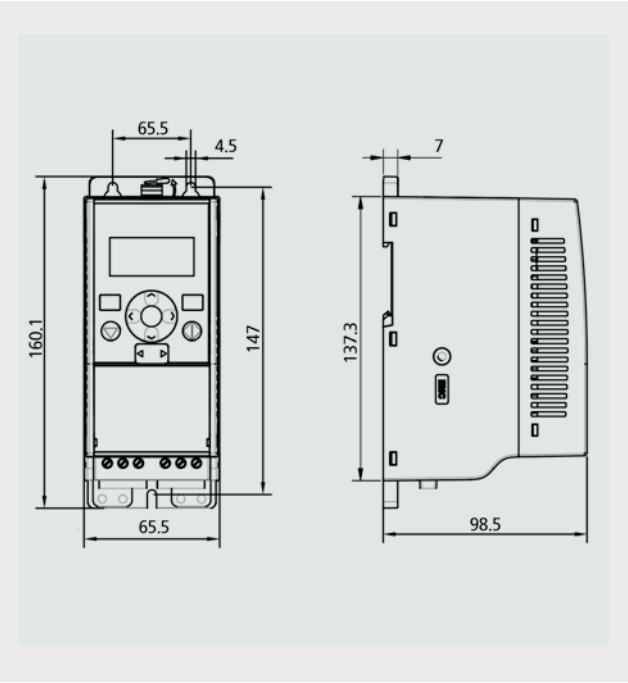
Dimensions

[MI1 Frame]

[220] N800S0020-1L-0002-2 (0.37 kW) / N800S0020-3L-0002-2 (0.37 kW)

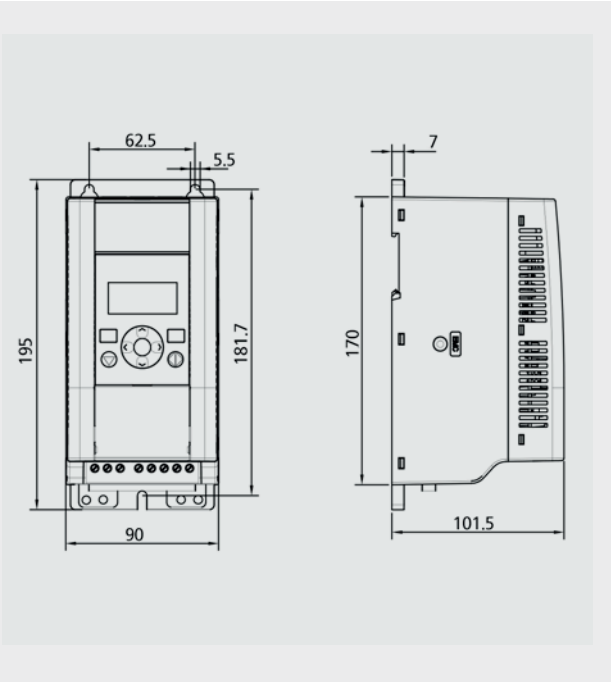
[440] N800S0020-3L-0001-4 (0.37 kW) / N800S0020-3L-0003-4 (0.75 kW)



[MI2 Frame]

[220] N800S0020-1L-0004-2 (0.75 kW) / N800S0020-1L-0007-2 (1.5 kW)
N800S0020-3L-0004-2 (0.75 kW) / N800S0020-3L-0007-2 (1.5 kW)

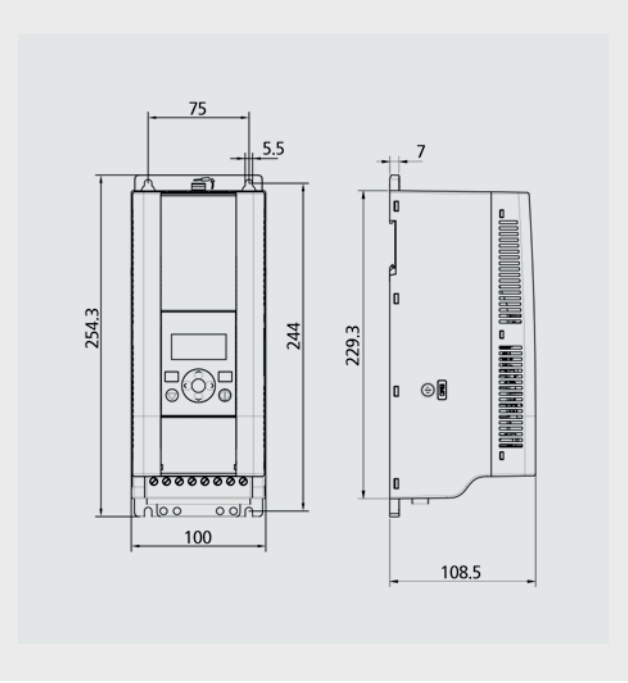
[440] N800S0020-3L-0005-4 (1.5 kW) / N800S0020-3L-0006-4 (2.2 kW)



[MI3 Frame]

[220] N800S0020-1L-0009-2 (2.2 kW) / N800S0020-3L-0011-2 (2.2 kW)

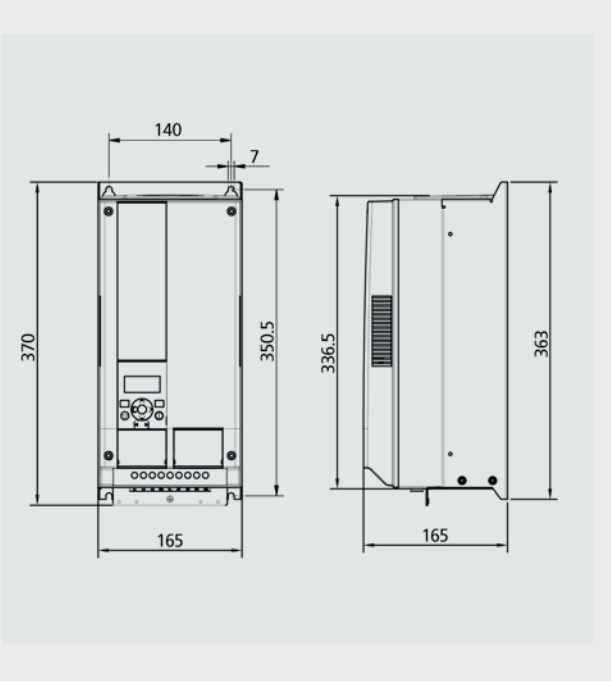
[440] N800S0020-3L-0009-4 (4 kW) / N800S0020-3L-0012-4 (5.5 kW)



[MI4 Frame]

[220] N800S0020-3L-0017-2 (4 kW) / N800S0020-3L-0025-2 (5.5 kW)

[440] N800S0020-3L-0016-4 (7.5 kW) / N800S0020-3L-0023-4 (11 kW)



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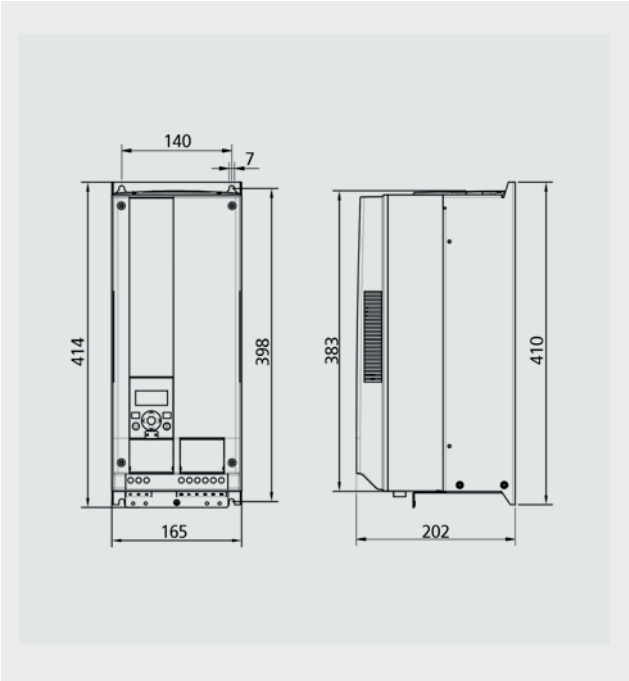
[MI5 Frame]

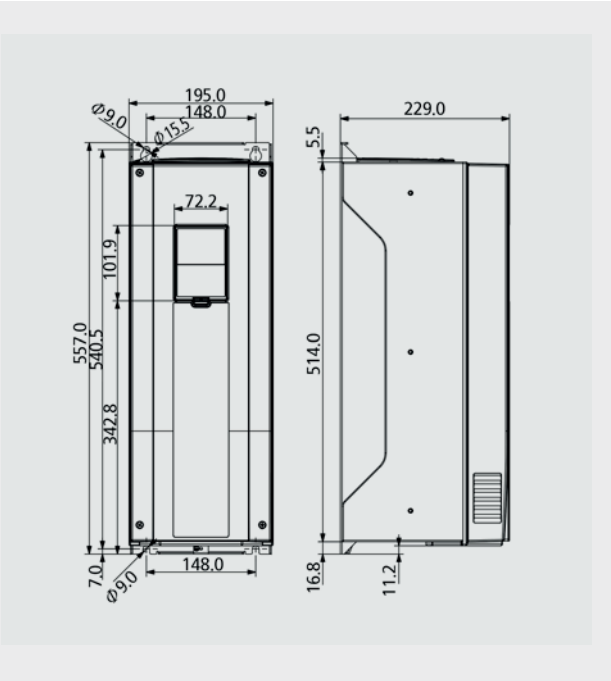
[220] N800S0020-3L-0031-2 (7.5 kW) / N800S0020-3L-0038-2 (11 kW)

[440] N800S0020-3L-0031-4 (15 kW) / N800S0020-3L-0038-4 (18.5 kW)



[MR6 Frame]

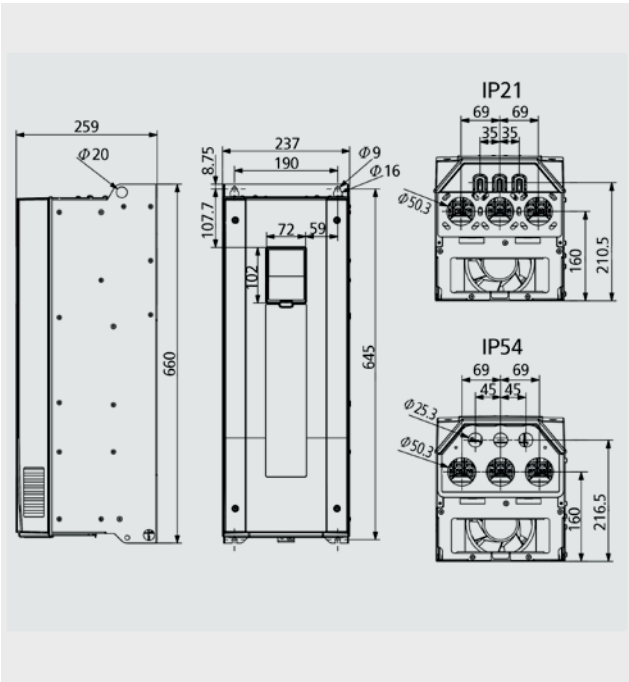
[440] N800S0100-3L-0061-5 (22 kW)



[MR7 Frame]

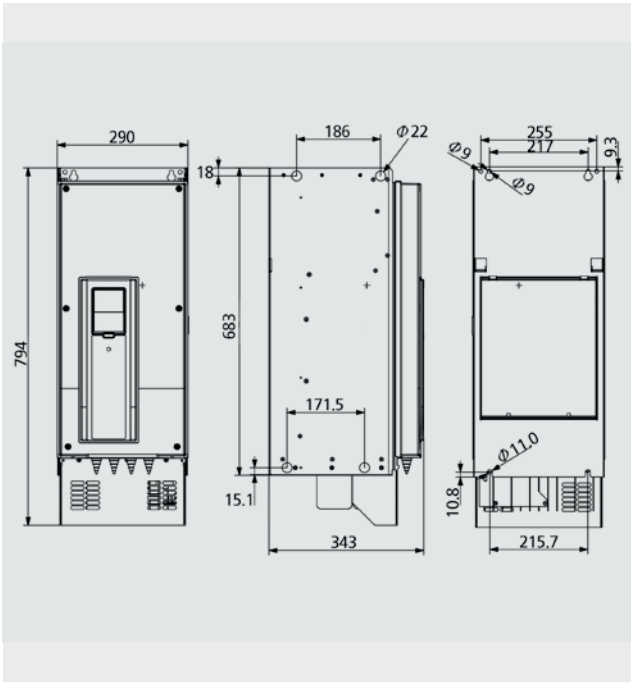
[220] N800S0100-3L-0075-2 (15 kW) / N800S0100-3L-0088-2 (18.5 kW)
N800S0100-3L-0105-2 (22 kW)

[440] N800S0100-3L-0072-5 (30 kW) / N800S0100-3L-0087-5 (37 kW)
N800S0100-3L-0105-5 (45 kW)



[MR8 Frame]

[440] N800S0100-3L-0140-5 (55 kW) / N800S0100-3L-0170-5 (75 kW)
N800S0100-3L-0205-5 (90 kW)



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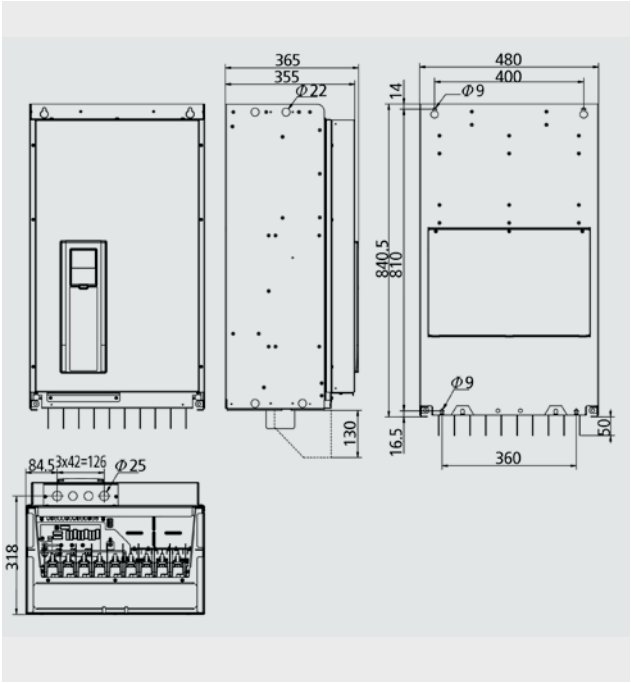
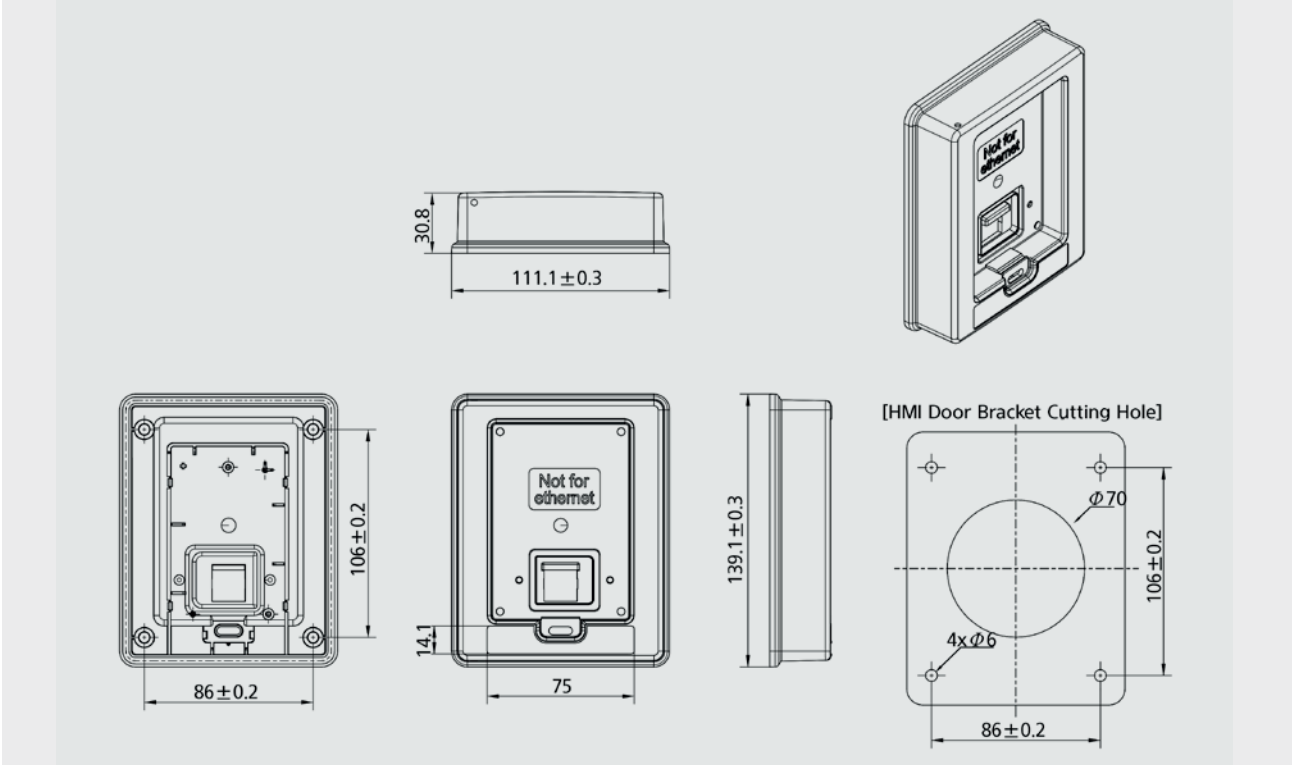
[MR9 Frame]

[440] N800S0100-3L-0261-5 (110 kW) / N800S0100-3L-0310-5 (132 kW)



[MR Door Mount]



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Option

Factory Install Option	Details
+EMC2	C2 Level EMC Filter (In case of MI4-MI5, include the DC reactor if +EMC2 select)
+QPES	Cable Shield Ground Kit
+QFLG	Flang Mount for MI4 and MI5

Factory Install Option	Details
ENC-SLOT-MC03-13+BM3Y	Option Board Mounting Kit for MI1~MI3
ENC-SLOT-MC03-45+BM3Y	Option Board Mounting Kit for MI4~MI5
ENC-IN01-MIx+BM3Y	NEMA 1 Kit MI1 ~ MI5. x = 1, 2, 3, 4, 5 (Include IP21 Cover for MI1 - MI3)
ADP-MCAA-KIT+BM3Y	Complete MCA + USB Cable Kit
PAN-HMDR-TMX-MC03-3M+BM3Y	Complete Keypad Door Mounting Kit (3.0 m Cable)
PAN-HMDR-TMX-MC03-6M+BM3Y	Complete Keypad Door Mounting Kit (6.0 m Cable)

※ The options as above are only for frame MI and refer to the Page 33 for options of frame MR. (It takes ENC-SLOT-MC03 to use slot option for MI frame.)

MCA Adapter
(ADP-MCAA-KIT+BM3Y)

Option Board Mounting Kit
(ENC-SLOT-MC03-13+BM3Y,
ENC-SLOT-MC03-45+BM3Y)

Keypad Door Mounting Kit
(PAN-HMDR-TMX-MC03-3M+BM3Y,
PAN-HMDR-TMX-MC03-6M+BM3Y)

IP21 / NEMA Kit
(ENC-IN01-MIx+BM3Y)

Typical Application

- Fans and Pumps
- Conveyors
- Packaging, Processing and Washing Machines
- Compressors

Technical Highlights

- Wide Power Range up to 132 kW
- High Performance and Functionality
- Flexible I/O Configuration and Communication Support
- Fast Installation and Setup

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Keypad Operation

MI Frame

Explanation on Keypad ▸

Symbol	Name	Functionality
	START	Start Function
	STOP	Stop Function
OK	OK	Enable the setting value or parameter
BACK RESET	Back / Reset	return the before menu / Escape the edit mode / fault reset
	Up and Down	Move up the menu or increase the parameter value Move up the menu or decrease the parameter value
	Left and Rignt	Move the cursor left or right
LOC REM	Loc / Rem	Change the motor rotation direction / control page / control position

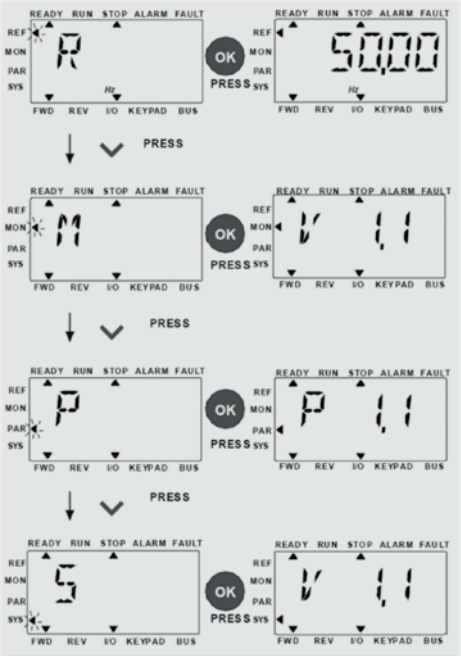
Operating Method

Reference Menu
Regardless of the control position, it display the keypad reference value.

Monitoring Menu
Monitoring Value searching

Parameter Menu
Set the parameter value

System Menu
Confirm the system parameter and fault



- Menu Tree
  1) Reference(Freq. Command) Menu [R]
  2) Monitoring Menu [M ▶ V]
  3) Parameter Menu [P]
  4) System Menu [S]
- Menu change to use the Up/Down button
- Confirm to push OK button
- Menu in the group select by the Left/Right button
- Inner parameter select by the Up/Down button
- Edit mode by OK button
- Change the value UP/Down and Left/Right
- Finish the value setting to push the OK button

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MR Frame

Explanation on Keypad ▸

Symbol	Name	Functionality
	START	Start Function
	STOP	Stop Function
OK	OK	Enable the setting value or parameter
BACK RESET	Back / Reset	return the before menu / Escape the edit mode / fault reset
	Up and Down	Move up the menu or increase the parameter value Move up the menu or decrease the parameter value
	Left and Rignt	Move the cursor left or right
FUNCT	FUNCT	- Change the control position - Control page - Change the motor rotation direction

Operating Method

Reference Menu
Regardless of the control position, it display the keypad reference value.

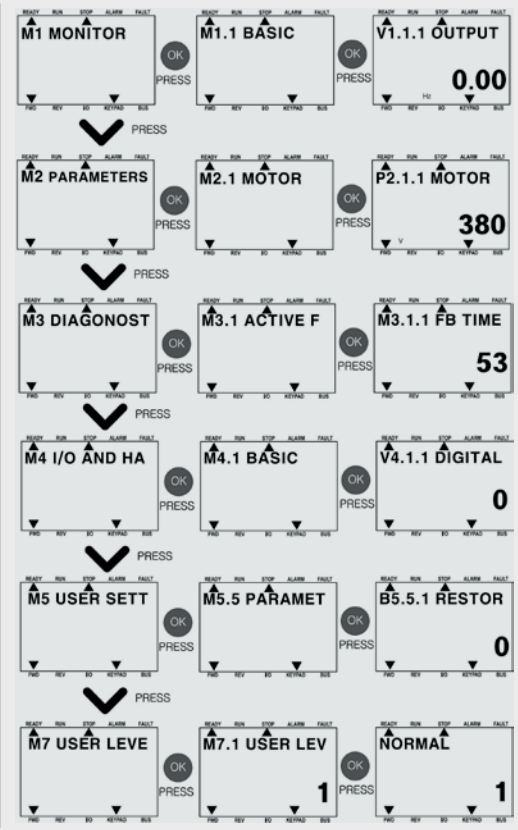
Parameter Menu
Set the parameter value

Diagnostic Menu
Confirm the fault and reset

I/O and Hardware Menu
Confirm the setting value for option

User setting Menu
Backup and compare the parameter

User Level Menu
Set the access user level



- Menu Tree
  1) Monitoring Menu [M1]
  2) Parameter Menu [M2]
  3) Diagnostic Menu [M3]
  4) I/O and Hardware Menu [M4]
  5) User Setting Menu [M5]
  6) User Level Menu [M7]
- Change the Menu using the Up/Down button
- Access the wanted menu to push OK button
- Select the group in the menu by Up/Down button
- Select the detailed parameter by Up/Down button.
- Access the edit mode to push OK button.
- Change the value by Up/Down button, and change the places by Left/Right button.
- Finish to push OK button.
- Frequency Reference change
  1st : Click the FUNCT button
  2nd : set using Up/Down button in the control page menu

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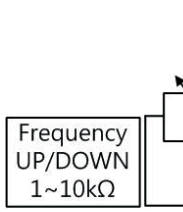
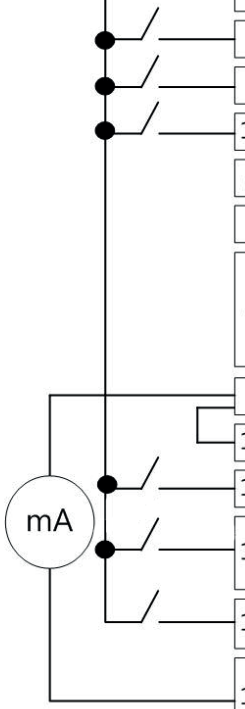
MI Frame I/O Configuration





Standard I/O Board

Formation		Signal	Default Value	Remark
1	+10Vref	Reference Voltage Out		Max. load = 10mA
2	AI1+	Analogue In 1	Frequency Reference	0~10V, Ri=250kΩ
3	GND	I/O GND		
6	24V Out	Using for DI Signal 24V		Max. ±20%, Load 50mA
7	DI_C	DI Common		DI1~DI6 COMMON
8	DI1	Digital In 1	Forward direction	Positive Logic1: 18 ~ 30V Logic0: 0 ~ 5V Negative Logic1: 0 ~ 10V Logic0: 18 ~ 30V Ri=10kΩ(floating)
9	DI2	Digital In 2	Reverse direction	
10	DI3	Digital In 3	Fault Reset	
A	A	RS485 signal A	Fieldbus(-)	Negative
B	B	RS485 signal B	Fieldbus(+)	Positive
4	AI2	Analogue In 2	PID real value or Frequency reference	Default 0[4] ~ 20mA, Ri=250Ω or 0 ~ +10V, Ri= 250kΩ Change the set using jump
5	GND	I/O GND		
13	DO-	DO Common		
14	DI4	Digital In 4	Preset speed B0	Refer to DI1
15	DI5	Digital In 5	Preset speed B1	Refer to DI1 Change the set using jump : Encoder In A(possible 10kHz)
16	DI6	Digital In 6	Remote control frequency reference 2	Refer to DI1
18	AO	Analogue Out	Output frequency	0~10V, RL≥1kΩ 0[4]~20mA, RL≤500Ω Change the set using jump
20	DO	Digital Out	Active = READY	Open collector, Max. load 35V/50mA
22	RO1 NO	Relay Out 1	Active = RUN	Switching load: 250Vac/3A, 24Vdc/3A
23	RO1 CM			
24	RO2 NC	Relay Out 2	Active = FAULT	Switching load: 250Vac/3A, 24Vdc/3A
25	RO2 CM			
26	RO2 NO			

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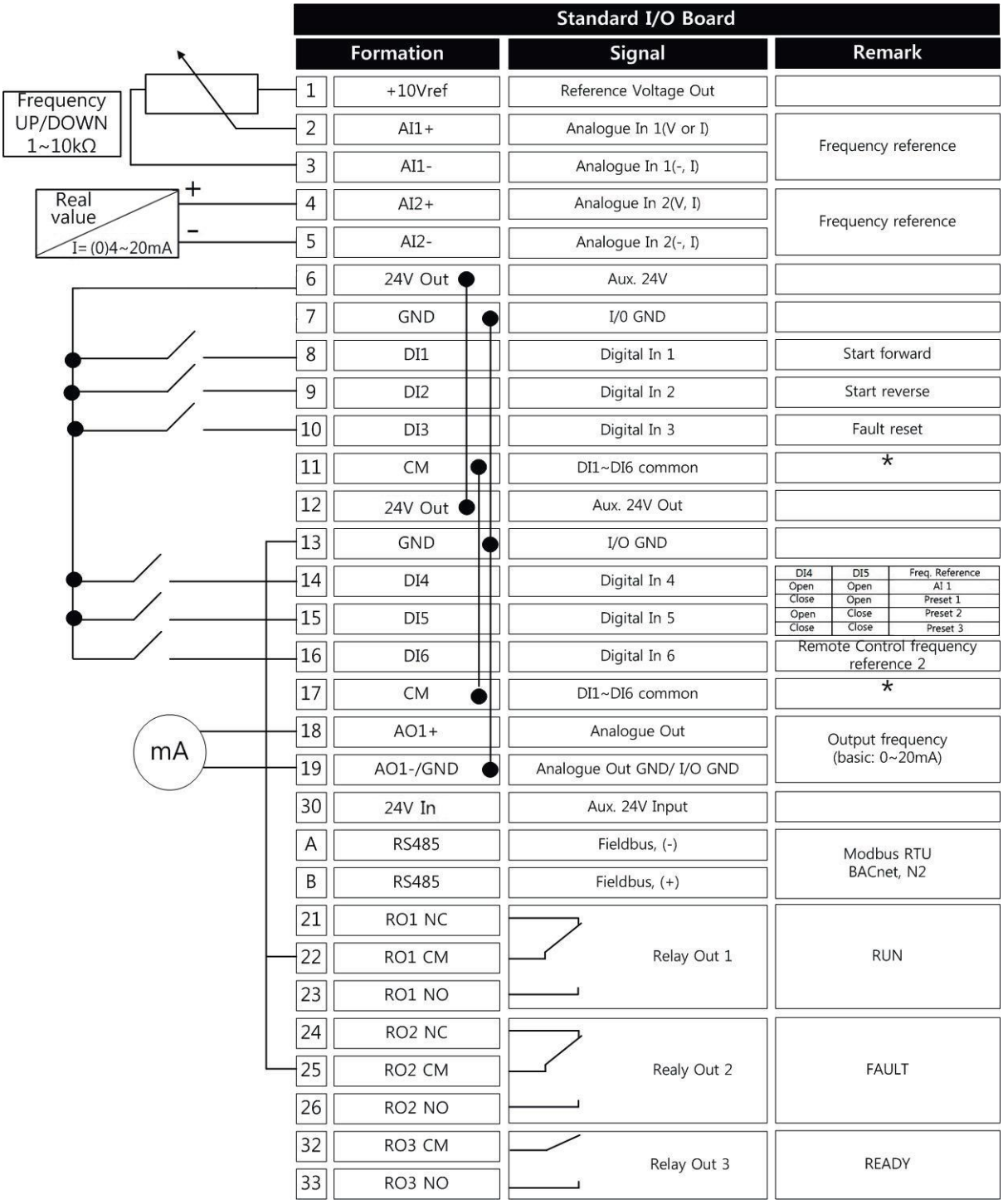
MR Frame I/O Configuration



Standard I/O Board			
	Formation	Signal	Remark
1	+10Vref	Reference Voltage Out	
2	AI1+	Analogue In 1(V or I)	Frequency reference
3	AI1-	Analogue In 1(-, I)	
4	AI2+	Analogue In 2(V, I)	Frequency reference
5	AI2-	Analogue In 2(-, I)	
6	24V Out	Aux. 24V	
7	GND	I/0 GND	
8	DI1	Digital In 1	Start forward
9	DI2	Digital In 2	Start reverse
10	DI3	Digital In 3	Fault reset
11	CM	DI1~DI6 common	*
12	24V Out	Aux. 24V Out	
13	GND	I/O GND	
14	DI4	Digital In 4	DI4 / DI5 / Freq. Reference Open / Open / AI 1 Close / Open / Preset 1 Open / Close / Preset 2 Close / Close / Preset 3
15	DI5	Digital In 5	
16	DI6	Digital In 6	Remote Control frequency reference 2
17	CM	DI1~DI6 common	*
18	AO1+	Analogue Out	Output frequency (basic: 0~20mA)
19	AO1-/GND	Analogue Out GND/ I/O GND	
30	24V In	Aux. 24V Input	
A	RS485	Fieldbus, (-)	Modbus RTU BACnet, N2
B	RS485	Fieldbus, (+)	
21	RO1 NC	Relay Out 1	RUN
22	RO1 CM		
23	RO1 NO		
24	RO2 NC	Realy Out 2	FAULT
25	RO2 CM		
26	RO2 NO		
32	RO3 CM	Relay Out 3	READY
33	RO3 NO		

※ 1) The digital input is seperated with the ground by DIP switch.

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Function Parameter

No.	MI Frame	MR Frame	Parameter	Min.	Max.	Unit	Default	ID	Refer
1	P1.1	P2.1.1	Motor Nominal Voltage	180	500	V	220 / 380	110	Check rating plate on the motor
2	P1.2	P2.1.2	Motor Nominal Frequency	30	320	Hz	60	111	Check rating plate on the motor
3	P1.3	P2.1.3	Motor Nominal Speed	30.00	320.00	rpm	60.00	112	Nominal Motor Speed, rpm
4	P1.4	P2.1.4	Motor Nominal Current	0.2×Inunit	2.0×Inunit	A	Inunit	113	Check rating plate on the motor
5	P1.7	P2.1.7	Current Limit	0.2×Inunit	2.0×Inunit	A	1.5×Inunit	107	Maximum motor current
6	P2.1	P2.2.1	Remote control Place 1 Selection	0	2		0	172	0=I/O terminal, 1=Fieldbus, 2=Keypad
7	P2.3	P2.2.3	Stop Function	0	1		1	506	0=Coasting 1=Ramp
8	P3.2	P2.3.2	Max. Frequency	0	320	Hz	60	102	Max. frequency reference
9	P3.3	P2.3.3	Remote Control Place 1 Frequency Reference Selection	0.00	320.00		60.00	117	1=Preset speed 0 2=Keupad 3=Fieldbus 4=AI1 5=AI2 6=PID 7=AI1 + AI2 8=Motor potentiometer 9=Pulse train/Encoder 10=AIE1 11, 12, 13=Temperature input 1, 2, 3
10	P4.2	P2.4.2	Accelation Time 1	0.1	3000	s	10.0	103	Acceleration time from 0 Hz to maximum frequency.
11	P4.3	P2.4.3	Deceleration Time 1	0.1	3000.0	s	10.0	104	Deceleration time from maximum frequency to 0 Hz.
12	P6.1	P2.6.1	AI1 Signal Range	0	3000.0		0	379	0=0 - 100% 1=20 - 100% 20% is the same as 2V minimum signal level.
13	P1.8	P2.1.8	Motor Control Mode	0	1		0	600	0=U/f(V/f) 1=Open loop speed control
14	P1.16	P2.1.16	Switching Frequency	1.5	16.0	kHz	4.0/2.0	601	PWM frequency. If values are higher than default, reduce the current capacity
15	P1.19	P2.1.19	Motor Identification	0	2		0	631	0 = Not active 1 = Standstill identification (need run command within 20 s to activate)
16	P3.12	P2.3.12	Remote Control Place 2 Frequency Reference Selection	1	Varies		5	131	MI=P3.3 MR=P2.3.3
17	P5.15	P2.5.15	Remote Control Place Freq Reference 2 (AT terminal: V or I)	0	Varies		0	343	See parameter MI P5.1, MR P2.5.1
18	P6.5	P2.6.5	AI2 Signal Range	0	1		1	390	0=0-100% 1=20%-100% 20% is the same as 2 V min. signal level. 2 V, or 4 mA
19	P1.23	M4→P4.6.4.1	Sine Filter	0	1		0	522	0=not used 1=used
20	P9.1	P2.9.1	Analog Output Signal Selection	0	14		1	307	0=not used 1=Output freq. 2=Output current 3=Motor torque 4=PID output 5=Freq. reference 6=Motor speed 7=Motor power 8=Motor voltage 9=DC-link voltage 10~13=Process data IN1~3 14=TEST 100%
21	P9.2	P2.9.2	Analog Output Minimum	0	1		0	310	0=0 V / 0 mA 1=2 V / 4 mA
22	P1.17	M4→P4.6.2.1	BRD Used (Brake Chopper)	0	2		0	504	0=Disabled 1=Enabled: always 2=Run state
23	P1.18	P2.1.18	Brake Chopper Level	0	911	V	As default	631	240 V input 240*1.35-*1.18=382 V 400 V input 400*1.35*1.18=638 V
24	P17.2	P2.17.2	Parameter Conceal	0	1		1	115	0 = All parameters visible 1 = Only quick setup parameter group visible
25	Syetem parameter P4.2	M5→B5.5.1	Restore Factory Defaults	0	1		0	831	1 = Restores factory defaults for all parameters
26	Syetem parameter P4.3	M7 Mode P7.2	Password	00000	99999		0000	832	MI: if default(0000) changes, parameter not change MR: if default(0000) changes, access level set enable.
27	Syetem parameter P4.5	-	Save parameter set to panel	0	1		0		MI=hidden when connect with PC , In case of connect Door mount keypad, visible MR=only PC tool enable.
28	Syetem parameter P4.6	-	Restore parameter set from panel	0	1		0		MI=hidden when connect with PC , In case of connect Door mount keypad, visible MR=only PC tool enable.
29	-	M4→P4.6.1.1	Fan Control Mode	0	1		1	2377	0=Enable:always 1=optimozing (MI: optimizing, refer to power circuit setting)
30	-	M4→P4.7.2	Remember init. Screen	0	4		0		1=Main index 2=Main menu 3=Control page (set the keypad)

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Features

HHI N800A AC drive is equipped with
smart new benefits from functional safety with Safe Torque Off to prevent the drive from generating torque on the motor shaft, Safe Stop1, and ATEX certified motor over-temperature protection.
N800A also has unique features with built-in Ethernet to make integration to plant automation easy and efficient via integrated Modbus TCP, Ethernet IP or Profinet I/O.

▪ One Drive, Extensive Applications

- Optimal solution to suit various process applications across a wide spectrum of industries.
- User can optimize N800A with a wide range of fieldbus options and features for motor and process control.

▪ Eco-Friendly

- DC link capacitors are made with unique plastic foil technology instead of electrolyte.
  (No limitations on storage without reforming)
- Our new N800A fulfills key international standards and global requirements, including RoHS (lead free),
  EMC & Harmonics approvals.

▪ Various Options

- Several standard features such as built-in I/O with 3 option slots, integrated RS485 and
  Ethernet based fieldbus support, varnished boards and robust motor control features for reliability.
- IP54 / UL Type12 and flange (through hole) mounting.
- Frame sizes MR8 - MR10 are also available as compact IP00 for easy installation to cabinets or enclosures.

MR4 MR5 MR6 MR7 MR8 (IP21 Option) MR9 (IP21 Option)

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Applications

	Common Features	Benefits
N800A	· Compliance with global standards	· Global compatibility
	· Built-in Modbus TCP and Modbus RTU Profinet I/O or Ethernet IP as software option	· Most of what is needed is in-built · Easy integration with plant automation
	· Safe Torque Off, Safe Stop1 and ATEX	· Improved safety at work
	· Integrated DC Chokes	· No additional accessories required
	· Conformal coating · Compact IP54 / UL Type12 with same footprint as IP21 / UL Type1 · Flange mounting · Side by side mounting for IP54 / UL Type12	· High reliability in difficult environments, easy and cost effective installation
	· Standard I/O + 3 free slots · Fieldbus options, built-in PLC capability	· Reduces need for an external controller
	· High efficiency 〉97 % + energy optimization, energy counter · Real time clock with calendar based functions · Optimized control of cooling fan	· Fast investment payback, increase profits · Easy monitoring of energy savings · Reduce noise levels
Applications	**Dedicated Features**	**Added Benefits**
Pumps	· 2 PID controllers with sleep mode, slot fill, jockey pump, pump autoclean PM and induction motor support	· Demand based optimization of the process for accurate process control and energy saving · Easy selection for any motor · PM motor allows higher power density, less mechanics
Fans	· Flying start · Motor switch · 3 prohibited frequency ranges · PM and induction motor support	· Save time during process operation and maintenance · Fan lifetime increased due to reduced mechanical stress · Easy selection for any motor · PM motor allows higher power density = energy savings
Compressors	· IP21 / UL Type1, IP54 / UL Type12 · Flange (through hole) mounting (MR4 - 9) · IP00 for MR8 - 10	· Suitable for wide installation needs · Easy to integrate into the machine, saving space and cost of integration and cooling
Conveyors	· Load drooping · Auto-tuning without disconnecting the motor from the load · Mechanical brake · Torque boost	· Avoid mechanical stress · Easy commissioning

Typical Applications

- **Process Industry**
  - Conveyors
  - Pumps & Fans
  - Chippers, Debarking Drums, Sawmills
- **Industrial HVAC / Semiconductor Industry**
  - Compressors
  - Pumps & Fans
- **Chemical, Oil & Gas**
  - Compressors
  - Pumps & Fans
- **Water**
  - Distribution
  - Desalination
  - Treatment
  - Pumps, Compressors, Conveyors
- **Mining & Minerals**
  - Conveyors
  - Pumps & Fans
- **Marine**
  - Cargo pumps, Compressors
  - Steering gear
- **Cement Auxiliary Drives**
  - Conveyors
  - Pumps & Fans

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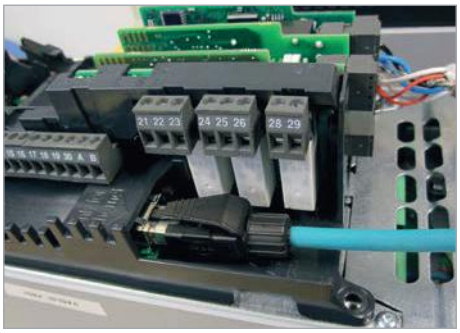
Smart Integration to Your Plant Automation

▪ Fieldbus

- N800A is easily integrated with your plant's automation system using built-in Modbus RTU (RS485) or Modbus TCP (Ethernet).
- **Software options**: Ethernet IP, Profinet I/O
  Click in fieldbus options: Profibus-DP, Devicenet, LonWorks, CANopen

▪ Built-In Ethernet

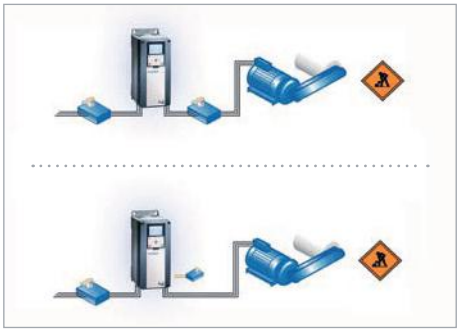
- Ethernet is the preferred protocol in industries today. That makes the N800A an economical choice.
- No additional options or gateways are needed for the communication with process automation due to its unique built-in Ethernet for local monitoring.



Protective Features

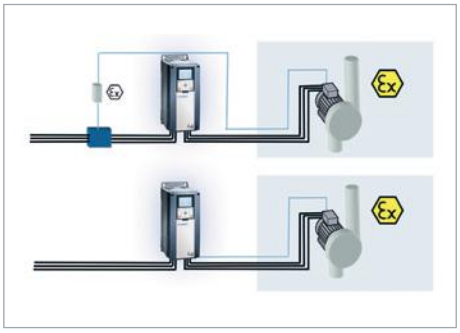
▪ Safe Torque Off, Safe Stop1

- Safe Torque Off (STO) prevents the drive from generating torque on the motor shaft and prevents unintentional start-ups with stop category0, EN 60204-1.
- Safe Stop1 (SS1) initiates motor deceleration and initiates the STO function after an application specific time delay with stop category1, EN 60204-1.



▪ ATEX Certified Thermistor Input

- Certified and compliant with the European ATEX directive, 94 / 9 / EC, the integrated thermistor input is specially designed for the temperature supervision of motors that are placed in potentially explosive gas, vapor.
  If over-heating is detected, the drive immediately stops feeding energy to the motor.



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Easier Commissioning

User-Friendly Keypad

N800A's keypad has ensured that the user interface is simple and intuitive to use due to keypad's well-structured menu system that allows for fast commissioning and trouble-free operation.

- Graphical keypad with multiple language support
- 9 signals can be monitored at the same time on a single multi-monitor page and is configurable to either 9,6 or 4 signals
- 3 color LED status indication on the control unit: **blinking green** = ready, **green** = run, **red** = fault
- Trend display for two signals at the same time

Quick Start Wizards

Quick Start 8 Wizards ensures easy set up application.
Easy diagnostic with help in plain text is provided for each parameter, signal and fault.

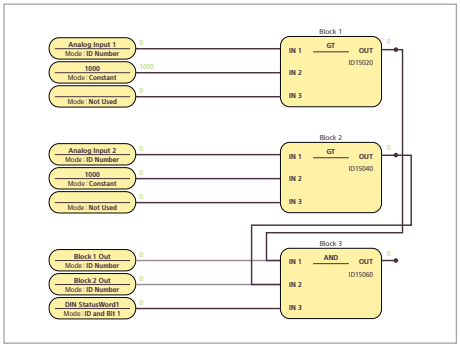
- Startup Wizard - For fast setup of basic pump or fan applications
- PID Mini-Wizard - For easy commissioning of internal PID Controller
- Multi-Pump Wizard - For easy commissioning of Multi-Pump system
- Fire Mode Wizard - For easy commissioning of Fire Mode function

Easy Installation

- Both IP21 / UL Type1 and IP54 / UL Type12 units with the same footprint.
- Compact IP54 / UL Type12 units can be installed side by side and require no additional space between them.
- Frame size MR8 - 10 are available as IP00 for cabinet installation.
- Flange mounting option enables through-hole mounting in the enclosure with the heat sink remaining on the outside of the enclosure.

Built-in PLC Functionality

N800A comes equipped with a built-in PLC functionality that enables the drive to adapt to almost any function requiring I/O and control logic.
Configurations can be copied using PC tool as part of the normal parameter list.



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Optimize Your Drive Your Way with N800A Software Tools

Energy Save[1)]

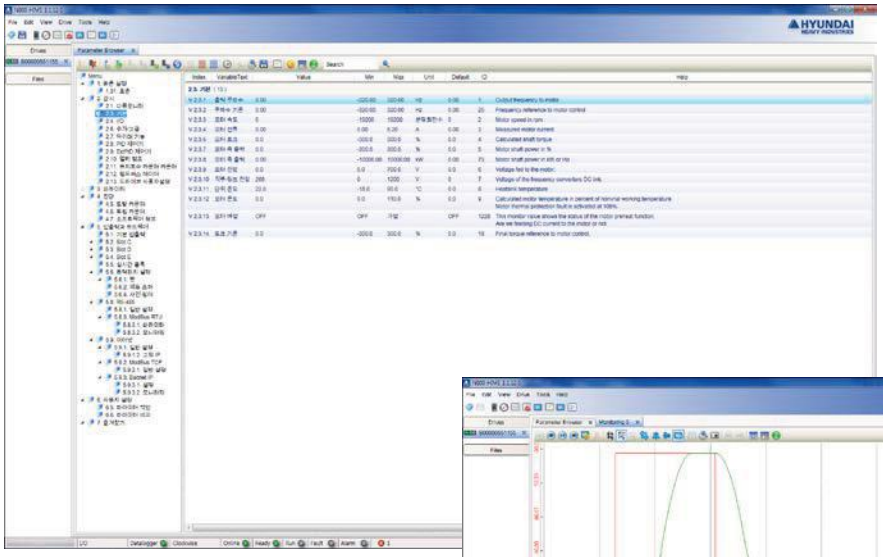
- Energy saving at the optimized operating
- Offer the using energy

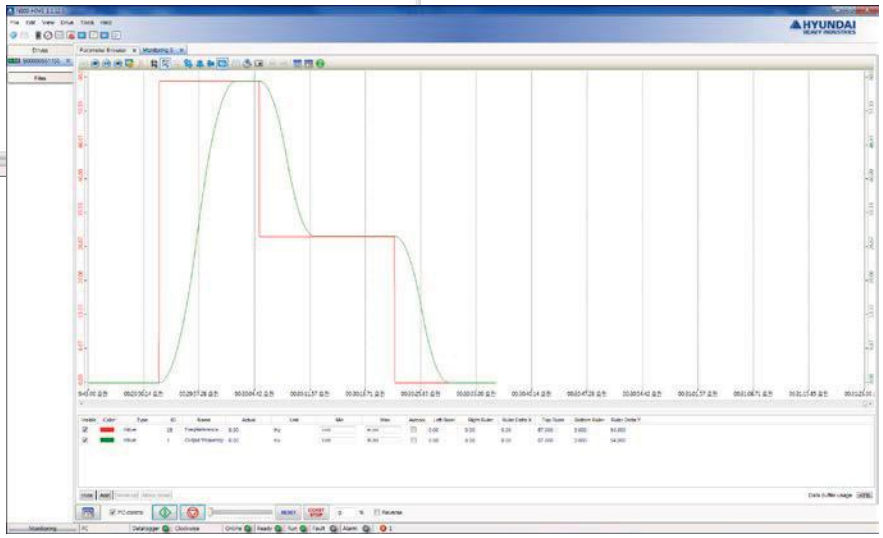
Hamonics

- Built-in DC reactor for Hamonics reduction
- Forecasting Harmonic content and power quality through the harmonics tools[1)]

HIMS (HYUNDAI Inverter Monitoring System)

- Easy commissioning and maintenance
- RS485 Serial communication
- Function : parameter set and confirm, status monitoring, fault confirm, Drive operation
- Easy parameter history management





※ 1) If you need this function, contact us.

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Technical Data

Mains Connection	Input voltage U_{in}	3-phase 208…240 V; 3-phase 380…500 V; -10 % … +10 %
	Input frequency	45 - 66 Hz
	Connection to mains	Once per minute or less
	Starting delay	4 sec (MR4 - MR6); 6 sec (MR7 - MR10);
Motor Connection	Output voltage	0-U_{in}
	Continuous output current	I_L: Ambient temperature up to 40℃ (104°F) overload 1.1 x I_L (1 min / 10 min) I_H: Ambient temperature up to 50℃ (122°F) overload 1.5 x I_H (1 min / 10 min)
	Output frequency	0…320 Hz (Standard)
	Frequency resolution	0.01 Hz
Control Characteristics	Control method	Frequency Control U/f, Sensorless Vector (SLV), Open loop Torque Control
	Switching frequency	1.5…10 kHz; Automatic switching frequency reduction in case of overheating
	Frequency reference	Resolution 0.01 Hz
	Analog input	Resolution 0.1 % (10-bit)
	Field weakening point	8…320 Hz
	Acceleration time	0.1…3,000 sec
	Deceleration time	0.1…3,000 sec
Ambient Conditions	Ambient operating temperature	I_L: -10℃ (-14°F) (no frost)…+ 40℃ (104°F) I_H: -10℃ (-14°F) (no frost)…+ 50℃ (122°F)
	Storage temperature	-40℃ (-40°F) …+70℃ (158°F)
	Relative humidty	0 to 95 % RH, non-condensing, non-corrosive
	Air quality: EN / IEC 60068-2-60 · Chemical vapors · Mechanical particles	 EN / IEC 60721-3-3, unit in operation, class 3C2 EN / IEC 60721-3-3, unit in operation, class 3S2
	Altitude	100 % load capacity (no derating) up to 1,000 m (3,280 ft) 1 % derating for each 100 m (3,28 ft) above 1,000 m (3,28 ft) Max altitudes: 4,000 m (13,123 ft) (TN and IT systems) 240 V relay voltage up to 3,000 m (9,842 ft) from 3,000 m…4,000 m (9,842 ft…13,123 ft) 120 V relay voltage can be used
	Vibration	EN / IEC 61800-5-1 EN / IEC 60068-2-6
	Shock	EN / IEC 61800-5-1 EN / IEC 60068-2-27
	Enclosure class	MR4 - 7: IP21 / UL TYPE1 standard / MR8 - 10: IP00 standard MR4 - 9: IP54 / UL TYPE12 option, MR8 - 9: IP21 option
EMC[1)]	Immunity	Fulfils EN / IEC 61800-3, first and second environment
	Emissions	EN 61800-3 category C2 / C4
Emissions	Average sound pressure level in dB (A) (1 m from the drive)	MR4: 45…56 MR5: 57…65 MR6: 63…72 MR7: 43…73 MR8: 58…73 MR9: 54…75 MR10: 70…75 Sound pressure depends on the cooling fans speed which is controlled in accordance with the drive temperature
Safety and Approvals	-	EN / IEC 61800-5-1, EN / IEC 61800-3, EN / IEC 61800-3-12, UL 508C, CE, UL, cUL, TR-CU
Functional Safety[2)]	STO	EN / IEC 61800-5-2 Safe Torque Off (STO) SIL3, EN ISO 13849-1 PL "e" category 3, EN 62061: SILCL3, IEC 61508: SIL3
	SS1	EN / IEC 61800-5-2 Safe Stop1 (SS1) SIL2, EN ISO 13849-1 PL "d" category 3, EN 62061: SILCL2, IEC 61508: SIL2
	ATEX Thermistor Input	94 / 9 / EC, CE 0537 Ex 11 (2) GD

※ 1) C4 Standard, C2 Option
※ 2) Card Option OPT-BJ-V+BM2Y

N800A Model Type ▸

N800A0100 - 3L - 0009 - 5 + OPTION CODES

Product - Input Phase - Rated Current - Rated Voltage + Option

Voltage Division
2 : 208 - 240 V
4 : 380 - 480 V
5 : 380 - 500 V

Factory Install Option
+EMC2 +IP54 (MR4 ~ MR9)
+DBIN (Braking Unit) +IP21 (MR8 ~ MR9)
+QFLG (Flange Mounting Kit) +SBRT (Realtime Battery)
+FBIE (Ehternet IP, Profinet I/O-Software Option)

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Ratings

Voltage	Model	Heavy Load (Constant Torque)				Light Load (Variable Torque)				Max. Current	Frame	Protec-tion Rating	Dimensions W x H x D [mm]	Weight [kg]
		Rating Capacity		Motor Current		Rating Capacity		Motor Current						
		kW	hp	Continuous Current I_H [A]	150% Overload Current 1.5xI_H[A]	kW	hp	Continuous Current I_L [A]	110% Overload Current 1.1xI_L [A]					
220 V 3Ph	N800A0100-3L-0003-2	0.37	0.5	2.6	3.9	0.55	0.75	3.7	4.1	5.2	MR4	IP21	128×328×190	6
	N800A0100-3L-0004-2	0.55	0.75	3.7	5.6	0.75	1	4.8	5.3	7.4				
	N800A0100-3L-0007-2	0.75	1	4.8	7.2	1.1	1.5	6.6	7.3	9.6				
	N800A0100-3L-0008-2	1.1	1.5	6.6	9.9	1.5	2	8	8.8	13.2				
	N800A0100-3L-0011-2	1.5	2	8	12	2.2	3	11	12.1	16				
	N800A0100-3L-0012-2	2.2	3	9.6	14.4	3	4	12.5	13.8	19.2				
	N800A0100-3L-0018-2	3	4	12.5	18.8	4	5	18	19.8	25	MR5	IP21	144×419×214	10
	N800A0100-3L-0024-2	4	5	18	27	5.5	7.5	24	26.4	36				
	N800A0100-3L-0031-2	5.5	7.5	25	37.5	7.5	10	31	34.1	46				
	N800A0100-3L-0048-2	7.5	10	31	46.5	11	15	48	52.8	62	MR6	IP21	195×557×229	20
	N800A0100-3L-0062-2	11	15	48	72	15	20	62	68.2	96				
	N800A0100-3L-0075-2	15	20	62	93	18.5	25	75	82.5	124	MR7	IP21	237×660×259	37.5
	N800A0100-3L-0088-2	18.5	25	75	112.5	22	30	88	96.8	150				
	N800A0100-3L-0105-2	22	30	88	132	30	40	105	115.5	176				
	N800A0100-3L-0140-2	30	40	114	171	37	50	140	154	210	MR8	IP00 IP21	290×794×343 290×966×343	62 66
	N800A0100-3L-0170-2	37	50	140	210	45	60	170	187	280				
	N800A0100-3L-0205-2	45	60	170	255	55	75	205	225.5	340				
	N800A0100-3L-0261-2	55	75	211	316.5	75	100	261	287.1	410	MR9	IP00 IP21	480×970×365 480×1150×365	97 108
	N800A0100-3L-0310-2	75	100	251	376.5	90	125	310	341	502				
	N800A0100-3L-0003-5	0.75	1	2.6	3.9	1.1	1.5	3.4	3.7	5.2	MR4	IP21	128×328×190	6
	N800A0100-3L-0004-5	1.1	1.5	3.4	5.1	1.5	2	4.8	5.3	6.8				
	N800A0100-3L-0005-5	1.5	2	4.3	6.5	2.2	3	5.6	6.2	8.6				
	N800A0100-3L-0008-5	2.2	3	5.6	8.4	3	4	8	8.8	11.2				
	N800A0100-3L-0009-5	3	4	8	12	4	5	9.6	10.6	16				
	N800A0100-3L-0012-5	4	5	9.6	14.4	5.5	7.5	12	13.2	19.2				
440 V 3Ph	N800A0100-3L-0016-5	5.5	7.5	12	18	7.5	10	16	17.6	24	MR5	IP21	144×419×214	10
	N800A0100-3L-0023-5	7.5	10	16	24	11	15	23	25.3	32				
	N800A0100-3L-0031-5	11	15	23	34.5	15	20	31	34.1	46				
	N800A0100-3L-0038-5	15	20	31	46.5	18.5	25	38	41.8	62	MR6	IP21	195×557×229	20
	N800A0100-3L-0046-5	18.5	25	38	57	22	30	46	50.6	76				
	N800A0100-3L-0061-5	22	30	46	69	30	40	61	67.1	92				
	N800A0100-3L-0072-5	30	40	61	91.5	37	50	72	79.2	122	MR7	IP21	237×660×259	37.5
	N800A0100-3L-0087-5	37	50	72	108	45	60	87	95.7	144				
	N800A0100-3L-0105-5	45	60	87	130.5	55	75	105	115.5	174				
	N800A0100-3L-0140-5	55	75	105	157.5	75	100	140	154	210	MR8	IP00 IP21	290×794×343 290×966×343	62 66
	N800A0100-3L-0170-5	75	100	140	210	90	125	170	187	280				
	N800A0100-3L-0205-5	90	125	170	255	110	150	205	225.5	340				
	N800A0100-3L-0261-5	110	150	205	307.5	132	200	261	287.1	410	MR9	IP00 IP21	480×970×365 480×1150×365	97 108
	N800A0100-3L-0310-5	132	200	251	376.5	160	250	310	341	502				
	N800A0100-3L-0385-5	160	250	310	450	200	300	385	424	540	MR10	IP00	506×980×525	205
	N800A0100-3L-0460-5	200	300	385	578	250	375	460	506	693				
	N800A0100-3L-0590-5	250	375	520	780	315	475	590	649	936				

※ In case of Drive model name, it is exclude the option(+BM3Y+IPxx)

1) Built-in DC reactor in all mode

2) The same size in IP21/IP54

3) The default frame is IP00 in 220 V, 37 - 90 kW, 55 - 132 kW

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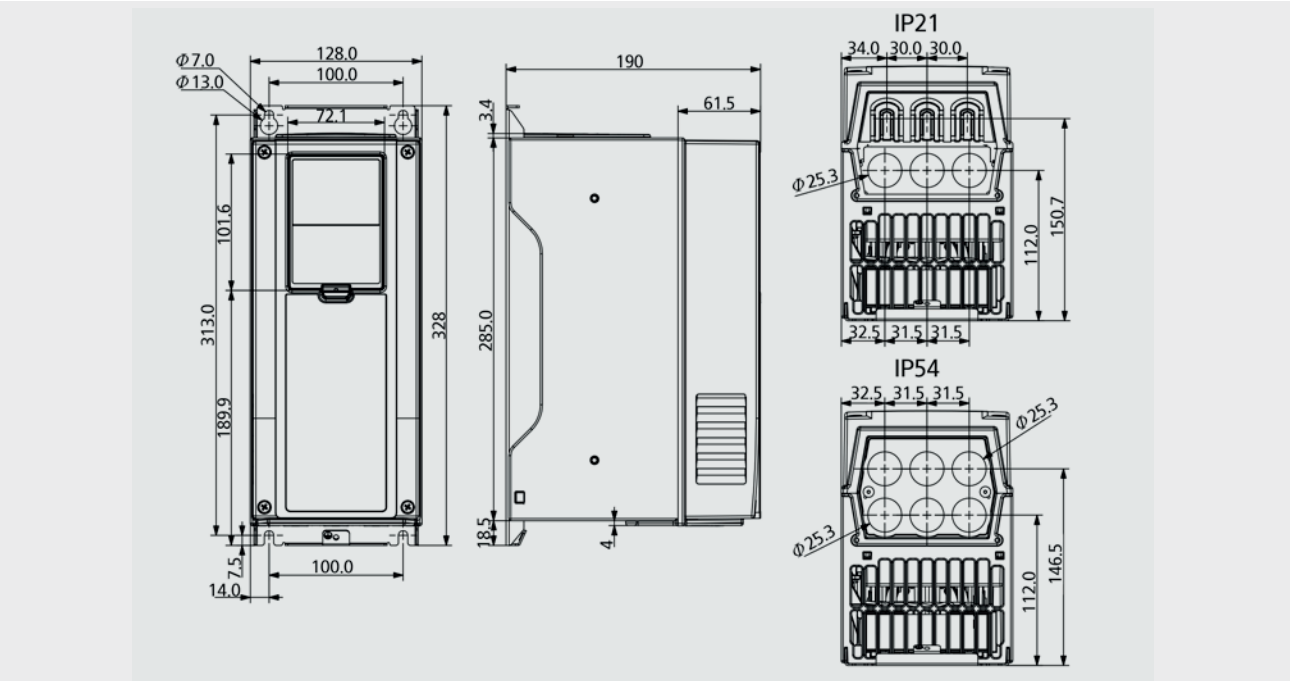
Dimensions

[MR4 Frame]

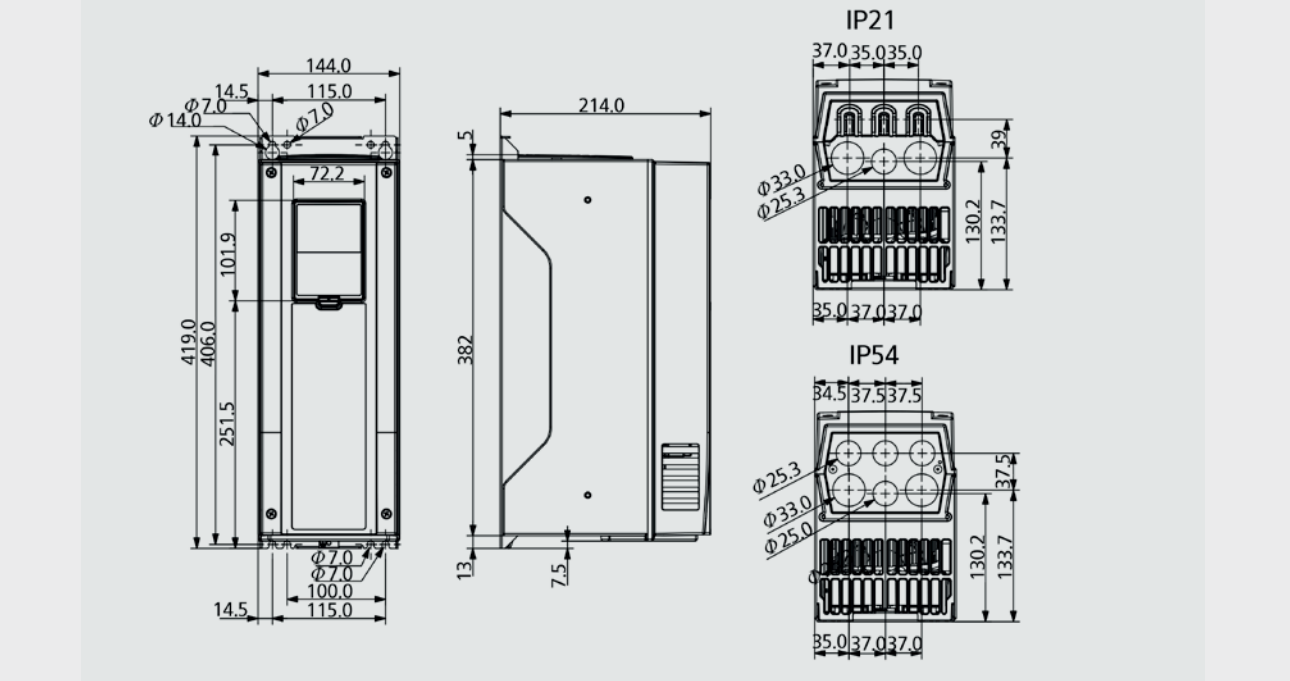
[220] N800A0100-3L-0003-2 (0.37 kW) / N800A0100-3L-0004-2 (0.55 kW) / N800A0100-3L-0007-2 (0.75 kW)
N800A0100-3L-0008-2 (1.1 kW) / N800A0100-3L-0011-2 (1.5 kW) / N800A0100-3L-0012-2 (2.2 kW)
[440] N800A0100-3L-0003-5 (0.75 kW) / N800A0100-3L-0004-5 (1.1 kW) / N800A0100-3L-0005-5 (1.5 kW)
N800A0100-3L-0008-5 (2.2 kW) / N800A0100-3L-0009-5 (3 kW) / N800A0100-3L-0012-5 (4 kW)



[MR5 Frame]

[220] N800A0100-3L-0018-2 (3 kW) / N800A0100-3L-0024-2 (4.4 kW) / N800A0100-3L-0031-2 (5.5 kW)

[440] N800A0100-3L-0016-5 (5.5 kW) / N800A0100-3L-0023-5 (7.5 kW) / N800A0100-3L-0031-5 (11 kW)



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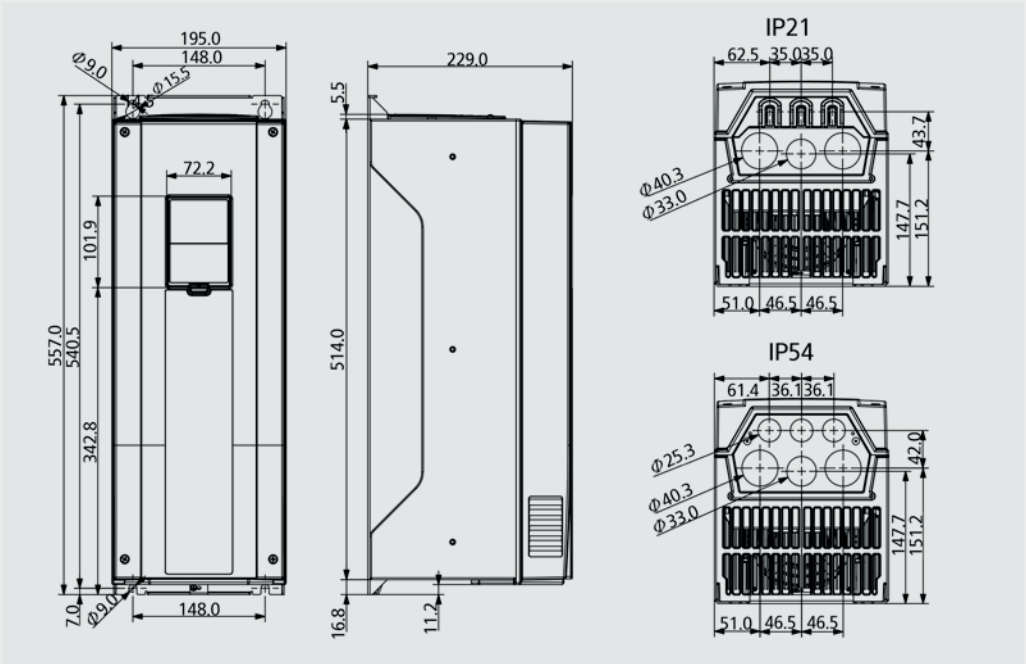
[MR6 Frame]

[220] N800A0100-3L-0048-2 (7.5 kW) / N800A0100-3L-0062-2 (11 kW)

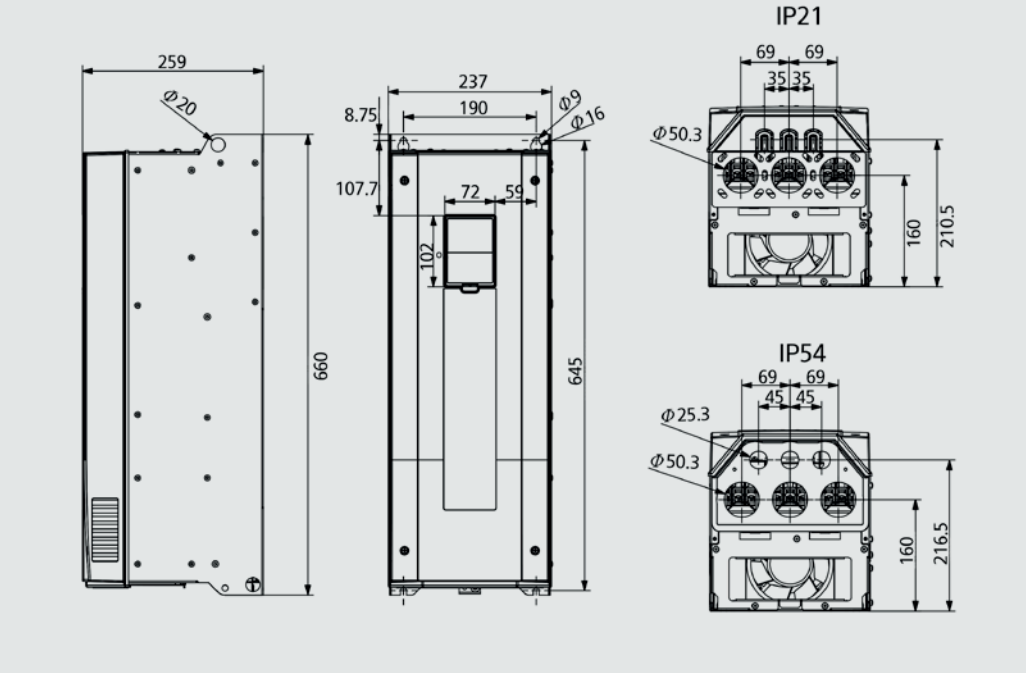
[440] N800A0100-3L-0038-5 (15 kW) / N800A0100-3L-0046-5 (18.5 kW) / N800A0100-3L-0061-5 (22 kW)



[MR7 Frame]

[220] N800A0100-3L-0075-2 (15 kW) / N800A0100-3L-0088-2 (18.5 kW) / N800A0100-3L-0105-2 (22 kW)

[440] N800A0100-3L-0072-5 (30 kW) / N800A0100-3L-0087-5 (37 kW) / N800A0100-3L-0105-5 (45 kW)



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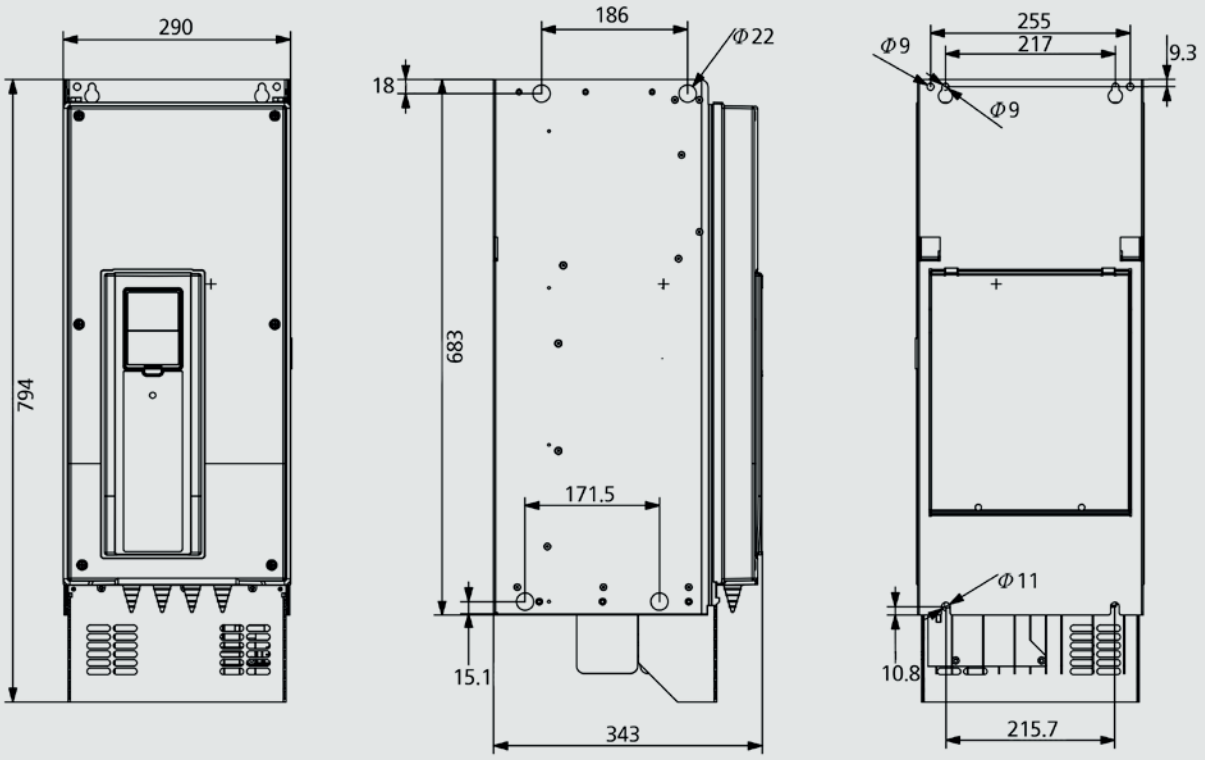
[MR8 Frame / IP00]

[220] N800A0100-3L-0140-2 (30 kW) / N800A0100-3L-0170-2 (37 kW) / N800A0100-3L-0205-2 (45 kW)

[440] N800A0100-3L-0140-5 (55 kW) / N800A0100-3L-0170-5 (75 kW) / N800A0100-3L-0205-5 (90 kW)



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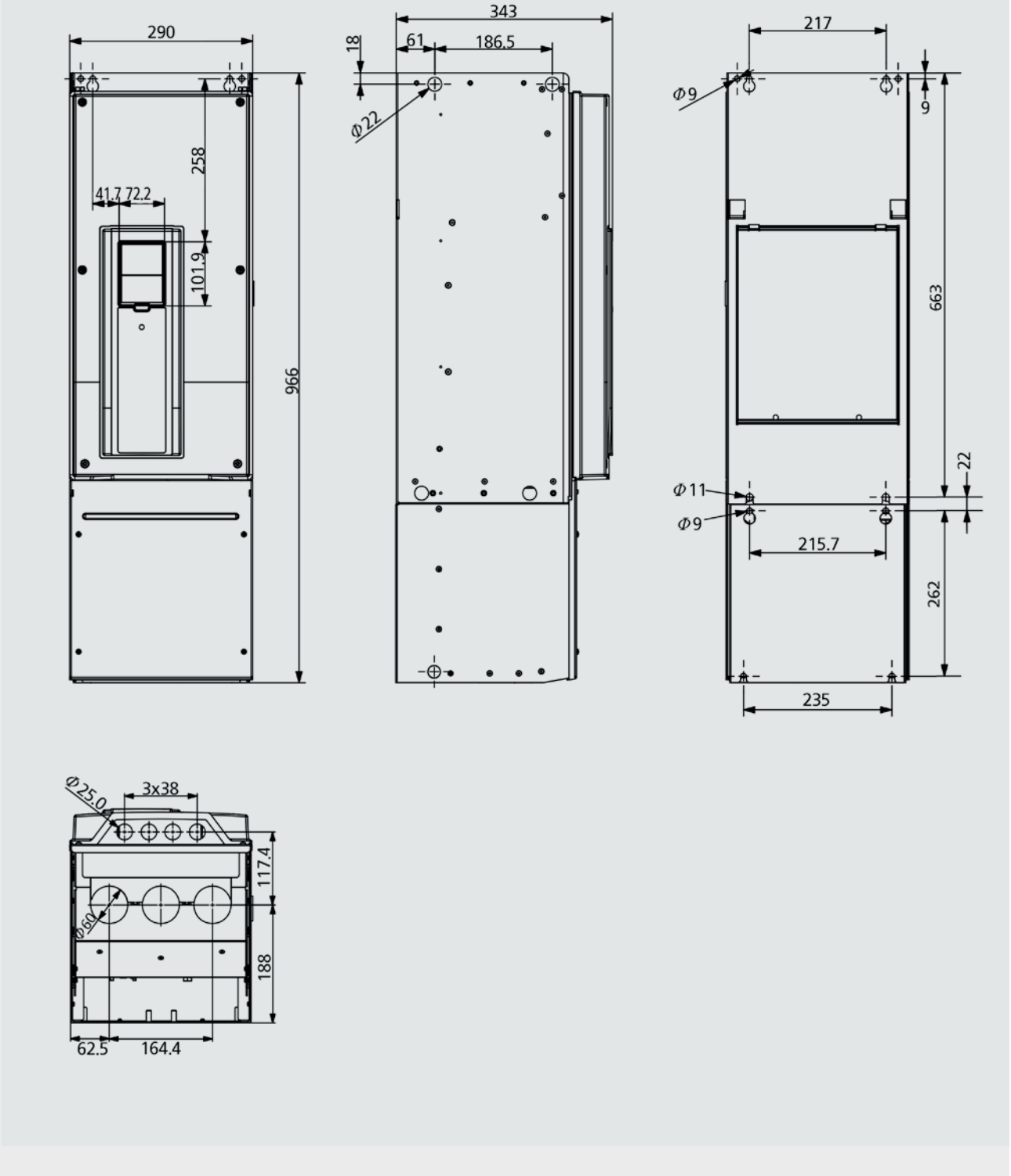
[MR8 Frame / IP21, IP54]

[220] N800A0100-3L-0140-2 (30 kW) / N800A0100-3L-0170-2 (37 kW) / N800A0100-3L-0205-2 (45 kW)

[440] N800A0100-3L-0140-5 (55 kW) / N800A0100-3L-0170-5 (75 kW) / N800A0100-3L-0205-5 (90 kW)



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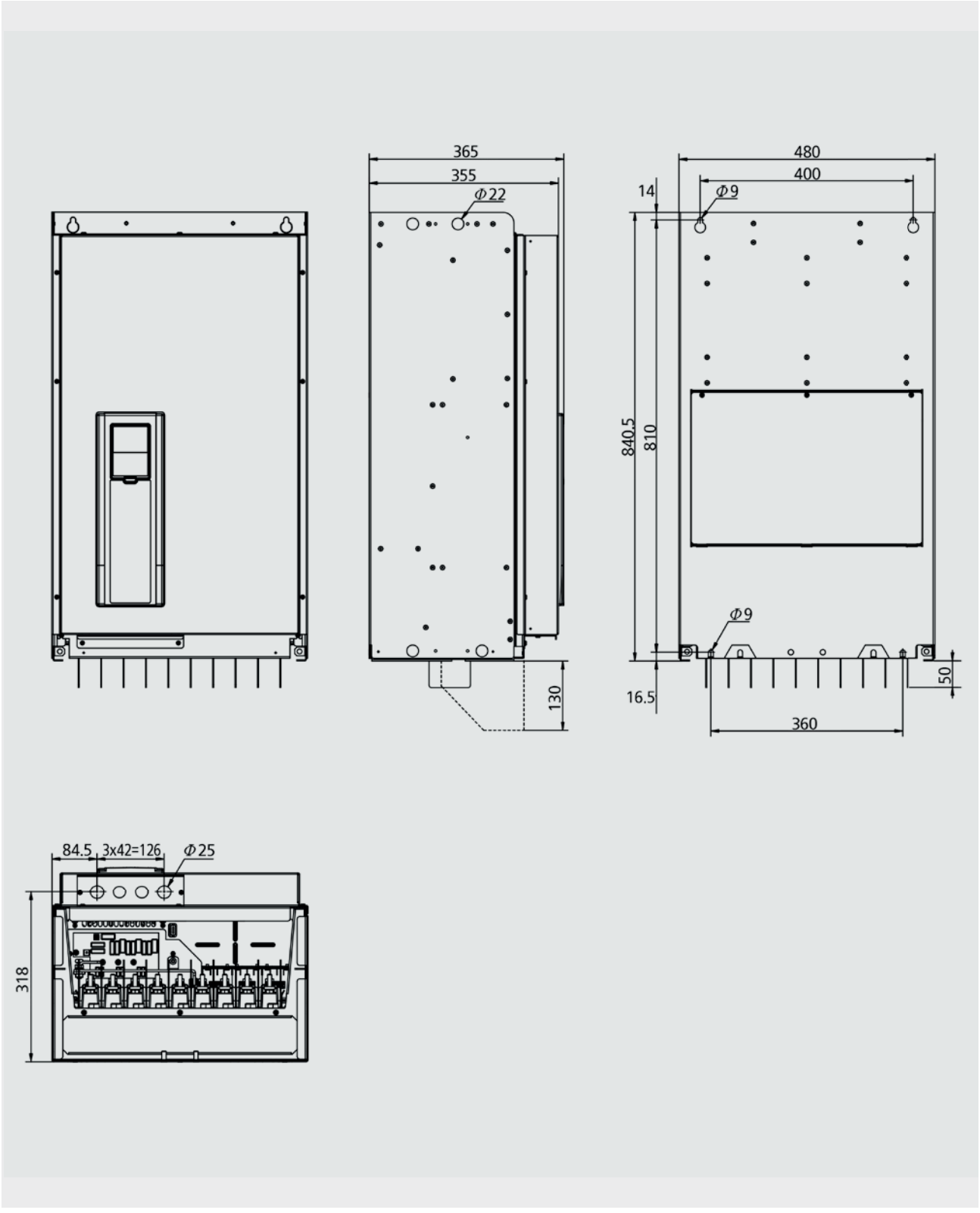
[MR9 Frame / IP00]

[220] N800A0100-3L-0261-2 (55 kW) / N800A0100-3L-0310-2 (75 kW)

[440] N800A0100-3L-0261-5 (110 kW) / N800A0100-3L-0310-5 (132 kW)



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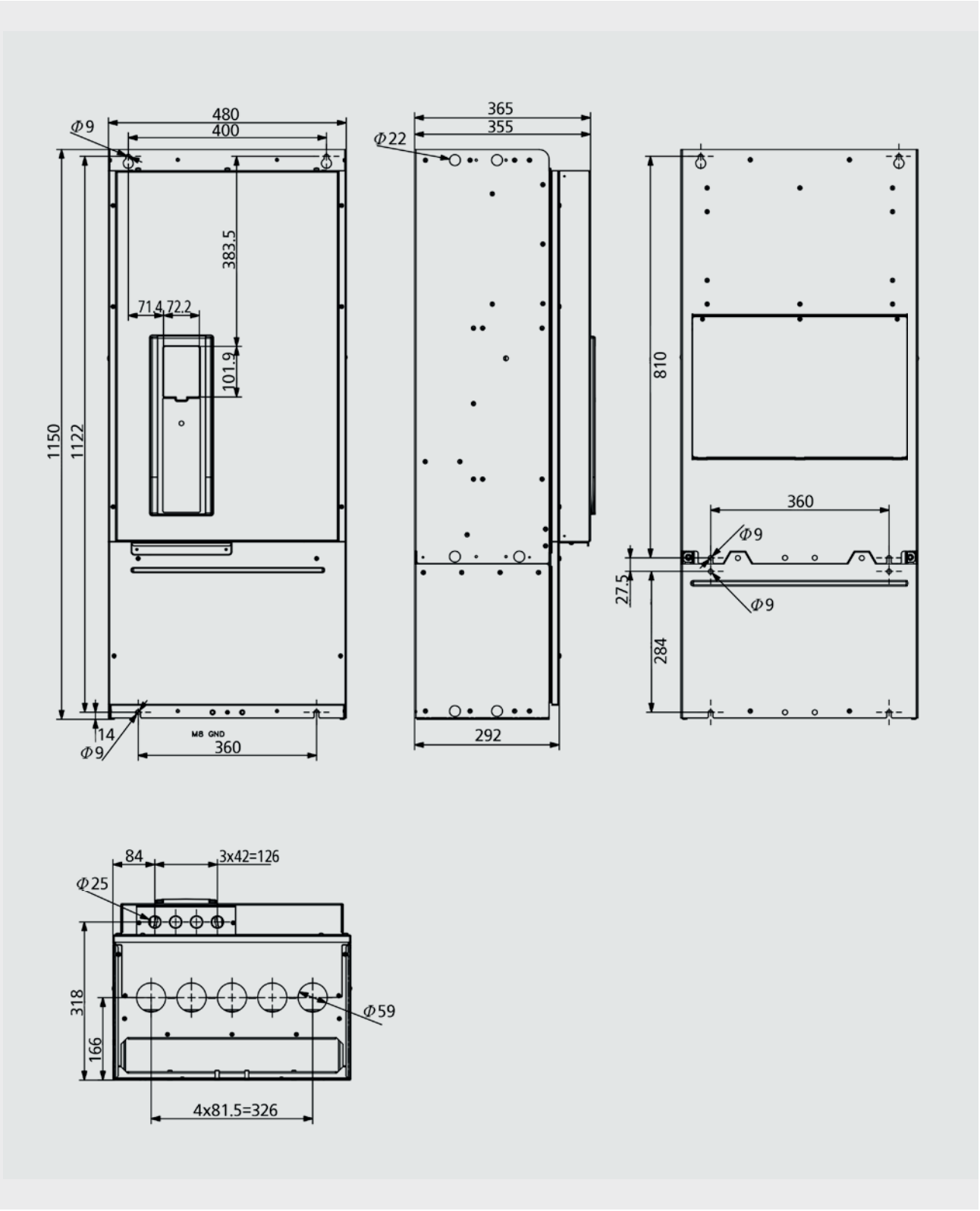
[MR9 Frame / IP21, IP54]

[220] N800A0100-3L-0261-2 (55 kW) / N800A0100-3L-0310-2 (75 kW)

[440] N800A0100-3L-0261-5 (110 kW) / N800A0100-3L-0310-5 (132 kW)



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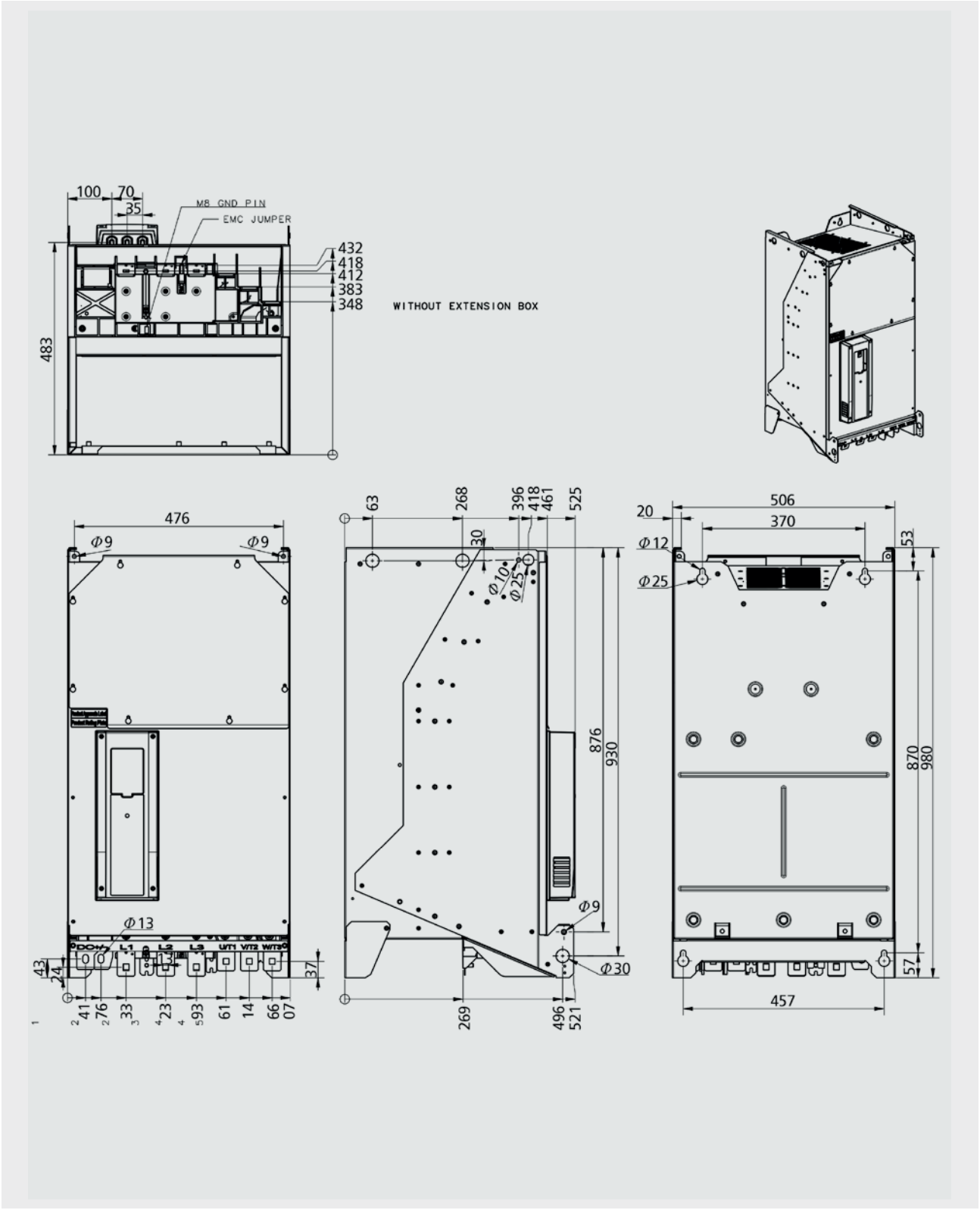
[MR10 Frame / IP00]

[440] N800A0100-3L-0385-5 (160 kW) / N800A0100-3L-0460-5 (200 kW) / N800A0100-3L-0590-5 (250 kW)



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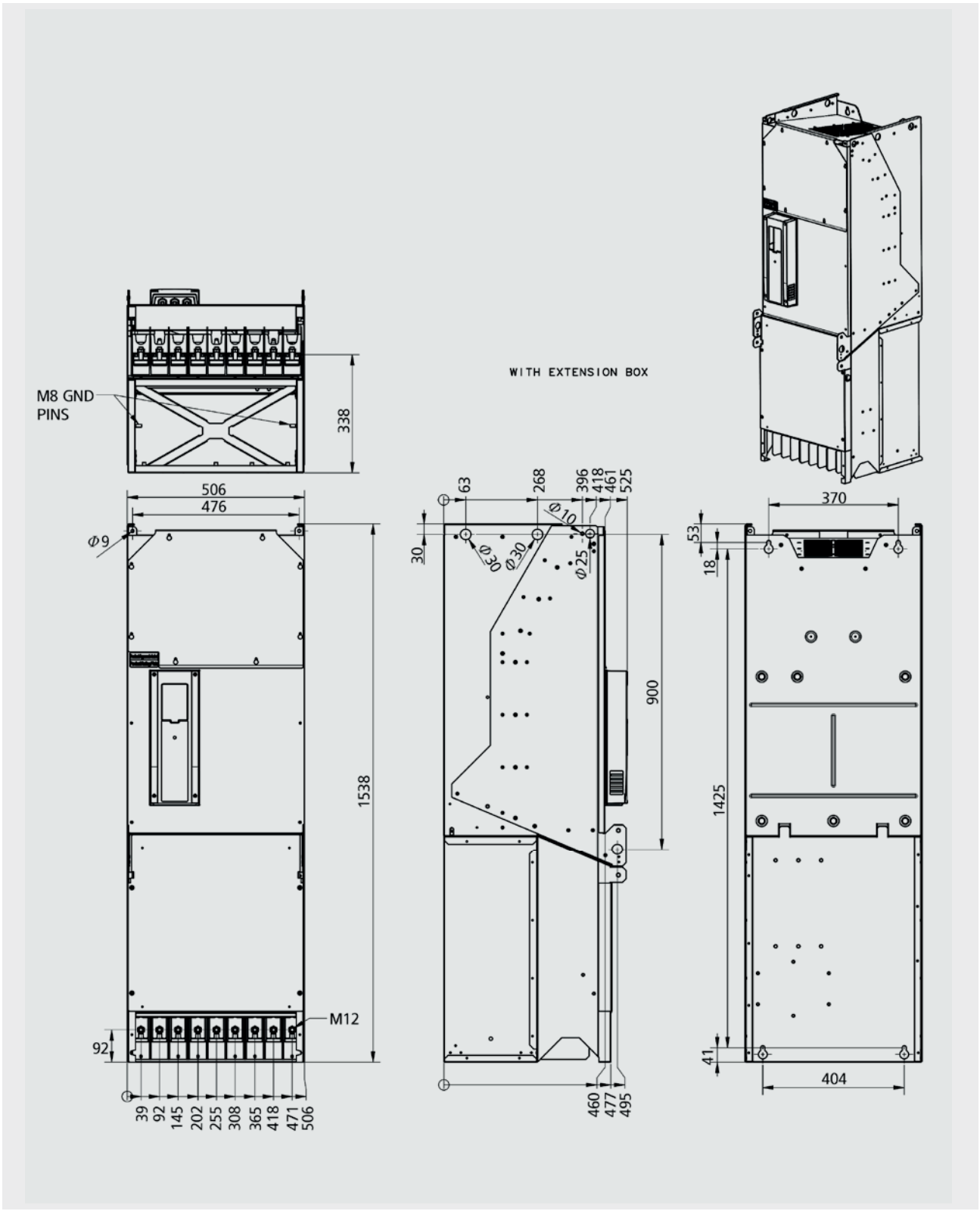
[MR10 Frame / IP00+DBIN (Extension box)]

[440] N800A0100-3L-0385-5 (160 kW) / N800A0100-3L-0460-5 (200 kW) / N800A0100-3L-0590-5 (250 kW)



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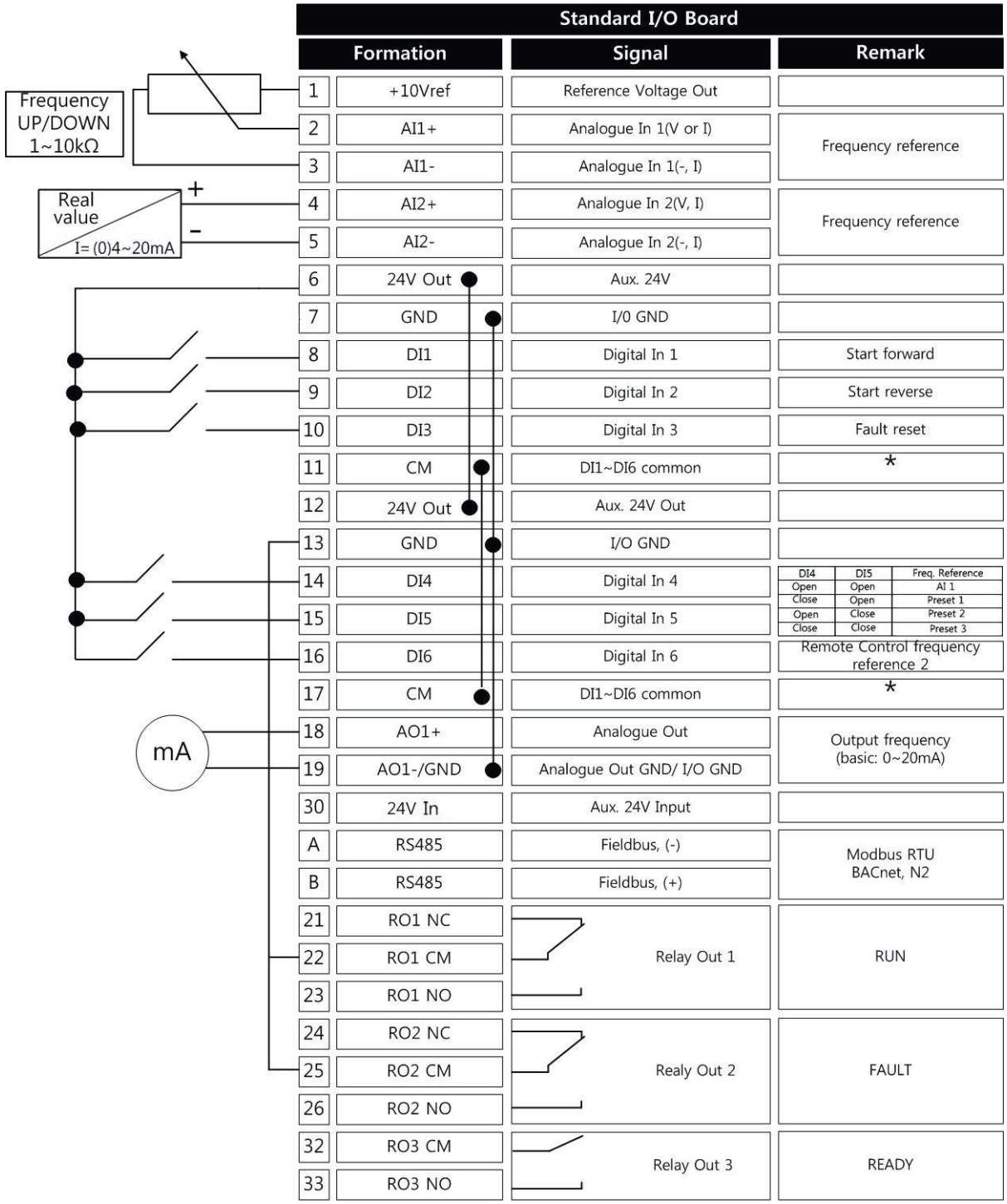
I/O Configuration



Standard I/O Board			
	Formation	Signal	Remark
1	+10Vref	Reference Voltage Out	
2	AI1+	Analogue In 1(V or I)	Frequency reference
3	AI1-	Analogue In 1(-, I)	
4	AI2+	Analogue In 2(V, I)	Frequency reference
5	AI2-	Analogue In 2(-, I)	
6	24V Out	Aux. 24V	
7	GND	I/0 GND	
8	DI1	Digital In 1	Start forward
9	DI2	Digital In 2	Start reverse
10	DI3	Digital In 3	Fault reset
11	CM	DI1~DI6 common	*
12	24V Out	Aux. 24V Out	
13	GND	I/O GND	
14	DI4	Digital In 4	DI4 / DI5 / Freq. Reference: Open / Open / AI 1; Close / Open / Preset 1; Open / Close / Preset 2; Close / Close / Preset 3
15	DI5	Digital In 5	
16	DI6	Digital In 6	Remote Control frequency reference 2
17	CM	DI1~DI6 common	*
18	AO1+	Analogue Out	Output frequency (basic: 0~20mA)
19	AO1-/GND	Analogue Out GND/ I/O GND	
30	24V In	Aux. 24V Input	
A	RS485	Fieldbus, (-)	Modbus RTU BACnet, N2
B	RS485	Fieldbus, (+)	
21	RO1 NC	Relay Out 1	RUN
22	RO1 CM		
23	RO1 NO		
24	RO2 NC	Realy Out 2	FAULT
25	RO2 CM		
26	RO2 NO		
32	RO3 CM	Relay Out 3	READY
33	RO3 NO		

※ **1)** The digital input is seperated with the ground by DIP switch.

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Option

Factory Installed Options Code	
Option Code	Description
+IP54	IP54 / UL Type12 (MR4 ~ MR9)
+IP21	IP21 (MR8 ~ MR9)
+SBRT[1)]	Real-time Clock Battery
+FBIE[1)]	Ethernet IP, Profinet I/O (Softwate Option Onboard)
+QFLG	Flange Mounting (MR4 ~ 7, for MR8 and MR9 with IP00)
+EMC2	EMC-level C2 for general industry
+EMC4[1)]	EMC-level C4 for IT networks
+DBIN	Dynamic Braking (for MR7 ~ MR9)

Seperately Delivered	
Option Code	Description
PAN-HMDR-MK01-3M+BM2Y	Door mounting kit with 3M cable (CAB-RJ45P-3M)
PAN-HMDR-MK01-6M+BM2Y	Door mounting kit with 3M cable (CAB-RJ45P-6M)
PAN-HMPA-MK01+BM2Y	Panel adapter, IP54 (dummy keypad)
CAB-RJ45P-3M+BM2Y	3M RJ45 cable door mounting kit
CAB-RJ45P-6M+BM2Y	6M RJ45 cable door mounting kit
CAB-USB/RS485+BM2Y	PC cable for software tolls (USB to RS485, 3M)
OPT-BT-MC04-5+BM2Y[1)]	Battery package for (5 pcs) for real time clock
OPT-BT-MC04-20+BM2Y[1)]	Battery package for (20 pcs) for real time clock

Seperately Delivered Options Code (for option slot)				
Option Boards (all boards are varnished)		Option Slot		
		C	D	E
OPT-B1-V+BM2Y	6 x DI / DO, each I/O can be individually programmable as input or output	●	●	●
OPT-B2-V+BM2Y	2 x Relay output + Thermistor	●	●	●
OPT-B4-V+BM2Y	1 x AI, 2 x AO (Isolated)	●	●	●
OPT-B5-V+BM2Y	3 x Relay output	●	●	●
OPT-B9-V+BM2Y	1 x RO, 5 x DI (42-240 VAC)	●	●	●
OPT-BF-V+BM2Y	1 x AO, 1 x DO, 1 x RO	●	●	●
OPT-BH-V+BM2Y	3 x Temperature measurement (support for PT100, PT1000, NI1000, KTY84-130, KTY84-150, KTY84-131 sensors)	●	●	●
OPT-BJ-V+BM2Y	Safe Torque-Off, ATEX Thermistor input, Safe Stop1	-	-	●
OPT-E3-V+BM2Y	Profibus-DP V1 (Screw connector)	-	●	●
OPT-E5-V+BM2Y	Profibus-DP V1 (D9 connector)	-	●	●
OPT-E6-V+BM2Y	CANopen	-	●	●
OPT-E7-V+BM2Y	Devicenet	-	●	●
OPT-EC-V+BM2Y	EtherCAT	-	●	●
OPT-C4-V+BM2Y	LonkWorks	-	●	●

※ 1) Not available in N800S MR frame .
2) In case of N800S MR frame, only support E slot.

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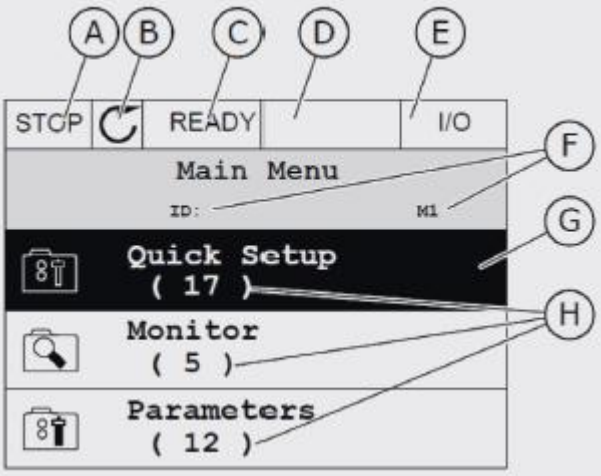
Keypad and LCD Display

Explanation on Keypad ▸

Symbol	Name	Functionality
	START	Start Function
	STOP	Stop Function
OK	OK	Enable the setting value or parameter
BACK RESET	Back / Reset	return the before menu / Escape the edit mode / fault reset
	Up and Down	Move up the menu or increase the parameter value Move up the menu or decrease the parameter value
	Left and Rignt	Move the cursor left or right
FUNCT	FUNCT	- Change the control position - Control page - Change the motor rotation direction

▪ Graphic Keypad



A. Status STOP / RUN

B. Motor Direction

C. Ready / Not Ready / Fault

D. Alarm

E. Control Position
(PC / Keypad / Fieldbus)

F. Present position in Menu
(ID number)

G. Enabled Group or Item

H. Parameter number in group

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Quick Setup

The Quick set-up mode will be process in the first power On time, or you can set up in the menu M1

No.	Item	Reference
1	Selection Language	Korea, USA, Russia, etc
2	Start Wizard	Yes / No, If manual set, choice No and push OK.
3	Application Wizard Selection	Standard, Local / Remote, Preset, PID, Motor Voltage ※ In case of choice, the default value in I/O is different. At standard choice, Refer to Catlague in I/O
4	Motor Type	PM / Induction Motor
5	Motor Nominal Vlotage	Range: Varies(Check rating plate on the motor)
6	Motor Nominal Frequency	Range: Varies(Check rating plate on the motor)
7	Motor Nominal Speed	Range: Varies(Check rating plate on the motor)
8	Motor Nominal Current	Range: Varies(Check rating plate on the motor)
9	Motor Cos Phi(Power Factor)	Range: Varies(Check rating plate on the motor)
10	Min. Frequency Value	Range: Varies
11	Max. Frequency Value	Range: Varies
12	Accelation Time	Range: Varies
13	Decellation Time	Range: Varies
14	Application Wizard Selection	Yes/No, If the quick setup mode will be continuous, choice Yes

Menu Tree

Main Menu	Sub Menus
M1 Quick setup	M1.Wizards
M2 Monitor	M2.1 Multimonitor
	M2.2 Trend Curve
	M2.3 Basic
	M2.4 I/O
	M2.5 Temperature Input
	M2.6 Extras / Advanced
	M2.7 Timer Functions
	M2.8 PID Controller
	M2.9 Ext PID Controller
	M2.10 Multi-Pump
	M2.11 Maintenance Count
	M2.12 Fieldbus Data

Main Menu	Sub Menus
M3 Parameters	M3.1 Motor Setting
	M3.2 Start/Stop Setup
	M3.3 References
	M3.4 Ramp and Brakes
	M3.5 I/O Configuration
	M3.6 Fiendbus Data Mapping
	M3.7 Prohibit Frequency
	M3.8 Supervisions
	M3.9 Protections
	M3.10 Automatic Reset
	M3.12 Timer Functions
	M3.13 PID Controller
	M3.14 Ext PID Controller
	M3.15 Multi-Pump
	M3.16 Maintenance Count
	M3.17 Fire Mode
	M3.18 Motoe Preheat
	M3.19 Drive User Set
	M3.20 Mechnical Brake
	M3.21 Pump Control

Main Menu	Sub Menus
M4 Diagnostic	M4.1 Active Faults
	M4.2 Fault Resets
	M4.3 Fault History
	M4.4 Total Counts
	M4.5 Trip Counts
	M4.6 Software Information
M5 I/O and Hardware	M5.1 I/O and Hardware
	M5.2 - M5.4 Slot C - E
	M5.5 Real Time Clock
	M5.6 Power Unit Setting
	M5.7 Keypad
	M5.8 RS485
	M5.9 Ethernet
M6 User Settings	M6.1 Language Selection
	M6.5 Parameter Backup
	M6.6 Parameter Compare
	M6.7 Drive Name
M7 Favourites	
M8 User Levels	M8.1 User Level
	M8.2 Access Code

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Functionality Parameter

No.	Code	Parameter	Min.	Max.	Unit	Defaut	ID	Refer
1	P3.1.1.1	Motor Nominal Voltage	Varies	Varies	V	Varies	110	Find the value Un on the rating plate of the motor.
2	P3.1.1.2	Motor Nominal Frequency	8.00	320.00	Hz	50.00/60.00	111	Find the value fn on the rating plate of the motor.
3	P3.1.1.3	Motor Nominal Speed	24	19200	rpm	Varies	112	Find the value nn on the rating plate of the motor.
4	P3.1.1.4	Motor Nominal Current	IH×0.1	IH×2	A	A	113	Find the value In on the rating plate of the motor.
5	P3.1.1.5	Motor Cos Phi (Power Factor)	0.3	1	-	Varies	120	Find the value on the rating plate of the motor.
6	P3.1.1.6	Motor Nominal Power	Varies	Varies	kW	Varies	116	Find the value In on the rating plate of the motor.
7	P3.1.2.1	Control Mode	0	2	-	0	600	0 = Frequency control (open loop) 1 = Speed control (open loop) 2 = Torque control (open loop)
8	P3.1.2.2	Motor Type	0	1	-	0	650	0 = Induction motor, 1 = PM motor
9	P3.1.2.3	Switching Frequency	1.5	Varies	kHz	Varies	601	
10	P3.1.2.4	Identification	0	2	-	0	631	Chech the motor nameplate. 0 = No action, 1 = At standstill, 2 = With rotation"
11	P3.1.2.12	Energy Optimization	0	1	-	0	666	To save energy and to lower the motor noise, the drive searches for the minimum motor current. You can use this function for example in fan and pump processes. Do not use the function with fast PID controlled processes. 0 = Disabled, 1 = Enabled
12	P3.1.3.1	Motor Current Limit	IH×0.1	Is	A	Varies	107	The maximum motor current from the AC drive
13	P3.1.4.1	U/f Ratio	0	2	-	0	108	The type of the U/f curve between zero frequency and the field weakening point.
14	P3.1.4.9	Auto Torque Boost	0	1	-	0	109	0=Disabled, 1=Enabled
15	P3.2.1	Remote Control Place	0	1	-	0	172	0 = I/O control 1 = Fieldbus control
16	P3.2.2	Local / Remote	0	1	-	0	211	0 = Remote, 1 = Local
17	P3.2.3	Keypad Stop Button	0	1	-	0	114	0=always enable 1=limited function of the stop button
18	P3.2.4	Start Function	0	1	-	0	505	0 = Ramping 1 = Flying start
19	P3.2.5	Stop Function	0	1	-	0	506	0 = Coasting, 1 = Ramping
20	P3.2.6	I/O A Start / Stop Logic	0	4	-	2	300	Logic = 0 Ctrl sgn 1 = Forward, Ctrl sgn 2 = Backward Logic = 1 Ctrl sgn 1 = Forward,(edge), Ctrl sgn 2 = Inverted Stop, Ctrl sgn 3 = Bckwrd(edge), Logic = 2 Ctrl sgn 1 = Forward(edge), Ctrl sgn 2 = Bckwrd(edge) Logic = 3 Ctrl sgn 1 = Start, Ctrl sgn 2 = Reverse Logic = 4 Ctrl sgn 1 = Start(edge), Ctrl sgn 2 = Reverse

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No.	Code	Parameter	Min.	Max.	Unit	Defaut	ID	Refer
21	P3.2.7	I/O B Start/Stop Logic	0	4	-	2	363	Refer to P3.2.6
22	P3.2.10	Remote to Local Function	0	2	-	2	180	The selection of copy settings when you go from Remote to Local (keypad) control. 0 = Keep Run,1 = Keep Run &Reference, 2 = Stop
23	P3.3.1.1	Minimum Frequency Reference	0.00	P3.3.1.2	Hz	0.00	101	The minimum frequency reference
24	P3.3.1.2	Maximum Frequency Reference	0.00	320.00	Hz	50.00/60.00	102	The maximum frequency reference
25	P3.3.1.5	I/O Control Reference A Selection	0	19	-	5	117	0 = Preset Frequency 0 ,1 = Keypad reference 2 = Fieldbus, 3 = AI1, 4 = AI2, 5 = AI1+AI2 6 = PID reference, 7 = Motor, potentiometer 8 = Joystick reference, 9 = Jogging reference 10~19 = Block Out.1~10 *The application that you set with parameter 1.2 gives the default value.
26	P3.3.1.6	I/O Control Reference B Selection	0	9	-	4	131	Selection of the reference source when the control place is I/O B. See above. You can force the I/O B control place to be active only with a digital input (P3.5.1.7).
27	P3.3.1.7	Keypad Control Reference Selection	0	19	-	2	121	Refer to P3.3.1.5
28	P3.3.1.8	Keypad Reference	P3.3.1.1	P3.3.1.2	Hz	0	184	You can adjust the frequency reference on the keypad with this parameter.
29	P3.3.1.9	Keypad Direction	0	1	-	0	123	The rotation direction of the motor when the control place is keypad. 0 = Forward 1 = Reverse
30	P3.3.1.10	Fieldbus Control Reference Selection	0	19	-	3	122	Refer to P3.3.1.5
31	P3.3.3.1	Preset Frequency Mode	0	1	-	0	182	0 = Binary coded 1 = Number of inputs
32	P3.3.3.2~9	Preset Frequency 0 - 7	P3.3.1.1	P3.3.1.2	Hz	5~30, 40, 50	105~180	Make the selection with digital input Preset frequency selection n
33	P3.3.3.10~12	Preset Frequency Selection 0 - 2	-	-	-	DIN A.4 DIN A.5 DigIN 0.1	419~421	A binary selector for Preset speeds (0-7). See parameters P3.3.3.2 to P3.3.3.9.
34	P3.3.6.1	Enable DI Jogging	Varies	Varies	-	DigIN 0.1	532	Enables the Jogging function from digital inputs. Does not have an effect on the jogging from the fieldbus. It is possible to enable Jogging only when the drive is in STOP state.
35	P3.3.6.2~3	Jogging Reference 1 - 2 Activation	Varies	Varies	-	DigIN 0.1 DinIN 0.1	530~531	Connect to a digital input to activate P3.3.6.4. If the input is activated, the drive starts.

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No.	Code	Parameter	Min.	Max.	Unit	Defaut	ID	Refer
36	P3.3.6.4 ~ 5	Jogging Reference 1~2		Max Ref	Hz	0.00	1239-1240	Gives the frequency reference when Jogging Reference 1 - 2 is activated.
37	P3.3.3.6	Jogging Ramp	0.1	300.0	s	10.0	1257	Gives the acceleration and deceleration times when the Jogging function is active.
38	P3.4.1.1	Ramp 1 Shape	0.0	100.0	%	0.0	500	You can make smoother the start and the end of the acceleration and deceleration ramps.
39	P3.4.1.2	Acceleration Time 1	0.1	300.0	s	5.0	103	Gives the time that is necessary for the output frequency to increase from zero frequency to maximum frequency.
40	P3.4.1.3	Deceleration Time 1	0.1	300.0	s	5.0	104	Gives the time that is necessary for the output frequency to decrease from maximum frequency to zero frequency.
41	P3.5.1.1	Control Signal 1 A	-	-	-	DigIN A.1	104	Ctrl signal 1 when the control place is I/O A (FWD).
42	P3.5.1.1	Control Signal 2 A	-	-	-	DigIN A.2	379	Ctrl signal 2 when the control place is I/O A (REV).
43	P3.5.1.11	External Fault Close	-	-	-	DigIN A.3	405	
44	P3.5.1.13	Fault Reset Close	-	-	-	DigIN A.6	414	
45	P3.5.1.21	Preset Frequency Selection 0	-	-	-	DigIN A.4	419	
46	P3.5.1.22	Preset Frequency Selection 1	-	-	-	DigIN A.5	420	
47	P3.5.1.23	Preset Frequency Selection 2	-	-	-	DigIN 0.1	421	
48	P3.5.1.49	Parameter Set 1/2 Selection	-	-	-	DigIN 0.1	496	OPEN = Parameter set 1 CLOSED = Parameter set 2
49	P3.5.2.1.1	AI1 Signal Selection	-	-	-	DigIN A.1	377	
50	P3.5.2.1.3	AI1 Signal Range	0	1	-	0	379	0=0 - 10 V / 0 - 20 mA 1=2 - 10 V / 4 - 20 mA
51	P3.5.2.1.4	AI1 Custom. Min	-160.00	160.00	%	0.00	380	The custom range minimum setting, 20% = 4 - 20 mA/2 - 10 V
52	P3.5.2.1.5	AI1 Custom. Max	-160.00	160.00	%	100.00	381	The custom range maximum setting.
53	P3.5.2.1.6	AI1 Signal Inversion	0	1	-	0	387	0 = Normal 1 = Signal Inverted
54	P3.5.2.2.1	AI2 Signal Selection	-	-	-	DigIN A.2	388	
55	P3.5.2.2.1	AI2 Signal Range	0	1	-	0	390	Refer to P3.5.2.1.3
56	P3.5.2.2.1	AI2 Custom. Min	-160.00	160.00	%	0.00	391	Refer to P3.5.2.1.4
57	P3.5.2.2.1	AI2 Custom. Max	-160.00	160.00	%	100.00	392	Refer to P3.5.2.1.5
58	P3.5.2.2.1	AI2 Signal Inversion	0	1	-	0	398	Refer to P3.5.2.1.6

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External Brake Resistor for N800

208 - 240 V

N800S Series			N800A Series			Light Load			Heavy Load		
Model	Power	Frame	Model	Power	Frame	Type	R [Ω]	Power [Kw]	형식명	R [Ω]	Power [Kw]
N800S0020-3L-0002-2	0.37	MI1	N800A0100-3L-0003-2	0.37	MR4	BRRK-0025-LD-2	30	0.1	BRRK-0025-HD-2	30	0.27
N800S0020-3L-0003-2	0.55		N800A0100-3L-0004-2	0.55							
N800S0020-3L-0004-2	0.75	MI2	N800A0100-3L-0007-2	0.75							
N800S0020-3L-0005-2	1.1		N800A0100-3L-0008-2	1.1							
N800S0020-3L-0007-2	1.5		N800A0100-3L-0011-2	1.5							
N800S0020-3L-0011-2	2.2	MI3	N800A0100-3L-0012-2	2.2							
N800S0020-3L-0012-2	3	MI4	N800A0100-3L-0018-2	3	MR5						
N800S0020-3L-0017-2	4		N800A0100-3L-0024-2	4							
N800S0020-3L-0025-2	5.5		N800A0100-3L-0031-2	5.5	MR5	BRRK-0031-LD-2	20	0.16	BRRK-0031-HD-2	20	0.41
N800S0020-3L-0031-2	7.5	MI5	N800A0100-3L-0048-2	7.5	MR6	BRRK-0061-LD-2	10	0.31	BRRK-0061-HD-2	10	0.81
N800S0020-3L-0038-2	11		N800A0100-3L-0062-2	11							
N800S0020-3L-0075-2	15	MR7	N800A0100-3L-0075-2	15	MR7	BRRK-0114-LD-2	3.3	0.95	BRRK-0114-HD-2	3.3	2.47
N800S0020-3L-0088-2	18.5		N800A0100-3L-0088-2	18.5							
N800S0020-3L-0105-2	22		N800A0100-3L-0105-2	22							
			N800A0100-3L-0140-2	30	MR8	BRRK-0205-LD-2	1.4	2.24	BRRK-0205-HD-2	1.4	5.81
			N800A0100-3L-0170-2	37							
			N800A0205-3L-0205-2	45							
			N800A0100-3L-0261-2	55	MR9						
			N800A0205-3L-0310-2	75							

380 - 500 V

N800S Series			N800A Series			Light Load			Heavy Load		
Model	Power	Frame	Model	Power	Frame	Type	R [Ω]	Power [Kw]	형식명	R [Ω]	Power [Kw]
N800S0020-3L-0001-4	0.37	MI1	-	-	MR4	BRRK-0022-LD-5	63	0.24	BRRK-0025-HD-5	63	0.61
N800S0020-3L-0002-4	0.55		-	-							
N800S0020-3L-0003-4	0.75		N800A0100-3L-0003-5	0.75							
N800S0020-3L-0004-4	1.1	MI2	N800A0100-3L-0004-5	1.1							
N800S0020-3L-0005-4	1.5		N800A0100-3L-0005-5	1.5							
N800S0020-3L-0006-4	2.2		N800A0100-3L-0008-5	2.2							
N800S0020-3L-0008-4	3	MI3	N800A0100-3L-0009-5	3							
N800S0020-3L-0009-4	4		N800A0100-3L-0012-5	4							
N800S0020-3L-0012-4	5.5		N800A0100-3L-0016-5	5.5	MR5	BRRK-0022-LD-5	63	0.24	BRRK-0025-HD-5	63	0.61
N800S0020-3L-0016-4	7.5	MI4	N800A0100-3L-0023-5	7.5							
N800S0020-3L-0023-4	11		N800A0100-3L-0031-5	11	MR5	BRRK-0031-LD-5	42	0.35	BRRK-0031-HD-5	42	0.91
N800S0020-3L-0031-4	15	MI5	N800A0100-3L-0038-5	15	MR6	BRRK-0045-LD-5	21	0.71	BRRK-0045-HD-5	21	1.83
N800S0020-3L-0038-4	18.5		N800A0100-3L-0046-5	18.5							
N800S0100-3L-0061-5	22	MR6	N800A0100-3L-0061-5	22	MR6	BRRK-0061-LD-5	14	1.06	BRRK-0061-HD-5	14	2.74
N800S0100-3L-0072-5	30	MR7	N800A0100-3L-0072-5	30	MR7	BRRK-0105-LD-5	6.5	2.28	BRRK-0105-HD-5	6.5	5.9
N800S0100-3L-0087-5	37		N800A0100-3L-0087-5	37							
N800S0100-3L-0105-5	45		N800A0100-3L-0105-5	45							
N800S0100-3L-0140-5	55	MR8	N800A0100-3L-0140-5	55	MR8	BRRK-0300-LD-5	3.3	4.56	BRRK-0300-HD-5	3.3	11.8
N800S0100-3L-0170-5	75		N800A0100-3L-0170-5	75							
N800S0100-3L-0205-5	90		N800A0100-3L-0205-5	90							
N800S0100-3L-0261-5	110	MR9	N800A0100-3L-0261-5	110	MR9	BRRK-0300-LD-5	3.3	4.56	BRRK-0300-HD-5	3.3	11.8
N800S0100-3L-0310-5	132		N800A0100-3L-0310-5	132							
			N800A0100-3L-0385-5	160	MR10	BRRK-0520-LD-5	1.4	10.6	BRRK-0520-HD-5	1.4	27.4
			N800A0100-3L-0460-5	200							
			N800A0100-3L-0590-5	250	MR10	BRRK-0730-LD-5	0.9	16.5	BRRK-0730-HD-5	0.9	43

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