ID300/302 Integrated Motor and Drive

INSTALLATION AND QUICK START COMMISSIONING GUIDE





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Installation and Quick Start Commissioning Guide

For technical assistance or questions related to the ID300 Motor, call Customer Service: 1-800-566-1418

Read the entire manual prior to using the motor. Follow all instructions contained herein.

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Important Safety Information

This manual contains important safety, operating, and installation instructions for the ID300/302 Motor. Save this manual and read it before operating or using the controller. Read and understand all safety precautions before operation or maintenance. Improper practices can result in burns, cuts, other bodily injury, or death.

- Read all instructions thoroughly and be familiar with the equipment before installing or working on it.
- For safety, the ID300/302 must be connected to an approved ground terminal.
- If accidentally starting the installation is likely to cause a risk to personnel or the machines being driven, it is essential to supply the equipment via a circuit-breaking device (power contactor) which can be controlled via an external safety system (emergency stop detection of errors on the installation).
- The ID300/302 is fitted with safety devices which, in the event of a problem, control stopping the motor. The motor itself can become jammed for mechanical reasons. Voltage fluctuations and power loss may also cause the motor to stop. Removing the causes of the shutdown can lead to restarting, which may be dangerous for certain machines or installations. In such cases, it is essential that the user takes appropriate precautions against the motor restarting after an unscheduled stop.
- The variable speed drive is designed to supply the motor and the driven machine above its
 rated speed. If the motor or the machine are not mechanically designed to withstand such
 speeds, the user may be exposed to serious danger resulting from mechanical deterioration.
 Before programming a high speed, it is important that the user validates that the installation can
 withstand it.
- The ID300/302 is designed to be integrated in an installation or an electrical machine, and under no circumstances should be considered to be a safety device. With the sole exception of the Safe Torque Off (ID302 only), none of the drive functions must be used to ensure safety of personnel, i.e., they **must not** be used for safety-related functions. It is the responsibility of the machine manufacturer, the designer of the installation, or the user to take all necessary precautions to ensure that the system complies with current standards, and to provide any devices required to ensure the safety of equipment and personnel.
- Nidec Motor Corporation declines all responsibility in the event of the above warnings are not observed.

General

- Depending on their degree of protection, the ID300/302 motor may contain unprotected live parts, which may be moving or rotating, as well as hot surfaces, during operation.
- Removal of protection devices, incorrect use, faulty installation or inappropriate operation could present a serious risk to personnel and equipment. For further information, consult the manual.
- All work relating to transportation, installation, commissioning and maintenance must be performed by experienced, qualified personnel per the National electrical Code and all local electrical codes/specifications.
- Only trained and qualified professionals familiar with ID300/302 motors should install, mount, commission, and operate the motor.

Usage

- ID300/302 motors and drives are components designed for integration into installations or electrical machines. When integrated into a machine, commissioning **MUST NOT** take place until it has been verified that the machine conforms to National Electrical Code and all applicable safety standards.
- Installation and wiring must follow the National Electrical Code and all local electrical codes.

Transportation, Storage

- All instructions concerning transportation, storage, and correct handling must be observed.
- The climatic conditions specified in the manual must be observed.

Installation

WARNING

- The installation and cooling of equipment must comply with the specifications in the manual supplied with the product.
- The ID300/302 motor must be protected against any excessive stress. There must be no damage to parts and/or modification of the clearance between components during transportation and handling.
- Avoid touching the electronic components and contact parts.
- The ID300/302 motor contains parts which are sensitive to electrostatic stresses and may be easily damaged, if handled incorrectly. Electrical components **MUST NOT** be exposed to mechanical damage or destruction. Otherwise, there is a serious risk to the safety and health of personnel.

Electrical Connection

- All National and local safety codes must be observed when work is performed on the ID300/302 motor while power is applied.
- The electrical installation must comply with the relevant specifications (for example conductor cross-sections, protection via fused circuit-breaker, connection of protective conductor). More detailed information is given in the manual.
- Instructions for an installation which meets the requirements for electromagnetic compatibility, such as screening, grounding, presence of filters, and correct insertion of cables and conductors are given in the documentation supplied with the ID300/302 motor. These instructions must be followed in all cases.
- When required, adherence to the FCC standard is the responsibility of the manufacturer of the installation or the machine.

Operation

- Installations incorporating the ID300/302 must be fitted with additional circuit protection and monitoring devices per the National Electrical Code and all local electrical codes. Modifications to the ID300/302 motor using control software are permitted.
- **DO NOT** touch active parts of the device or the live power connections immediately after the ID300/302 motor is powered down. The capacitors may still be charged. Wait at least 10 minutes before removing the cover.
- All doors and protective covers must be kept closed during operation.

ACAUTION

• Wear safety glasses to inspect the equipment while it is running or while working on equipment.

Service and Maintenance

NOTICE

• Refer to the manufacturer's documentation.

1 Start Up Tips for the ID300/302

Read the entire manual before attempting any of the following Tips. These Tips are intended to simplify the startup of the ID300/302 unit. Make sure to install the unit in an environment that falls within the environmental conditions outlined in this manual. In addition, confirm that all wiring and fusing is per the manual, the National Electrical Code and all State and Local codes.

1.1 Jumper Wire

A jumper wire or strap must be installed between **Terminals 6 and 8** to allow the ID300/302 to be started. Without the jumper wire, the RTC Keypad will display "Inhibit." Make sure the main electrical power is switched off and locked out before removing the ID300/302 top cover. It is easier to remove the terminal blocks above the one that includes **Terminals 6 and 8** to install the jumper wire. Reinstall the terminal blocks in the reverse order. Refer to Section 4.2 on **page 23** for location of the terminal blocks.

1.2 RTC Keypad and Cable



The standard factory programming of the ID300/302 unit is to use the remote RTC keypad and cable. The cable needs to be routed through one of the ports on the side flange of the ID300/302 unit by removing one of the plastic plugs and installing a cable gland designed for the RJ45 cable plug to slide through.









1.3 0 Menu

The ID300/302 has 22 menus of parameters that can be tailored to a customer's application. The ID300/302 has a custom program installed that tailors the unit to the motor rating and sets **0 Menu** parameters to a custom configuration as shown beginning on **page 38**.

If the operation of the unit does not match your application, then the keypad can be used to change a parameter and save the new setting into memory. Refer to the procedure on the next page for a simplified approach to programming the ID300/302.

1.4 Application-Related 0 Menu

The first 9 parameters of **0 Menu** are most likely application-related features that may need configured to match the application. Refer to the **0 Menu** parameter list beginning on **page 38**.

- Direction of Rotation Unlike a regular 3 phase motor, the direction of the ID300/302 unit does not change by swapping any two of the 3 input power leads. The ID300/302 controller is prewired to the motor and negates this approach for reversal of direction. Instead, Parameter 8 of 0 Menu (Force Rev Direction) can be changed from a "0" (OFF) to a "1" (ON) to change the direction of the motor's rotation.
- Starting from Last Set Point The ID300/302 unit is programmed to start from the last programmed set point, instead of 0 RPM (requiring the entry of a set point every time the unit is started). If this operation does not match the application, this feature can be change by resetting Parameter 9 in the 0 Menu. Use the keypad to access Parameter 9 and change the value from a "1" to a "0". This will clear the set point. In this mode, the set point is cleared when the unit is turned off and will require the set point to be entered when the unit is restarted.

1.5 Fault Condition Reset

Reset the ID300 from a Fault Condition – If the ID300/302 is using the RTC Keypad for control, any fault condition will be shown in the display. The cause of the fault and possible corrective action can be found in Section 6 of the manual beginning on **page 41**. Once the cause is corrected and the motor rotation has stopped, press the Red button on the RTC Keypad to clear the fault.



If the keypad is the being used to control the ID300/302 unit, the main electrical power can be removed for 25 seconds and then reapplied to clear the fault. An optional method is to open and then close **Terminal 8**. Refer to Section 4.2 on **page 23**.

1.6 Using the Keypad

Programming and Saving Parameters – For ease of use, the drive parameters most likely to need changing are in the **0 Menu**. If there is a need for other parameters to be changed, the menus can be accessed using the keypad.

This manual provides a detailed explanation of programming the ID300/302 unit and saving the parameters. Refer to Section 5.1 on **page 34**. Below is a simplified procedure.

Button	Function
	The Green button starts the motor.
	The Red button stops the motor.
	The arrows buttons to navigate the menu system and change the settings once the parameter is selected.
	The Enter button selects Parameter View or Edit Mode . It also saves a parameter change. When navigating in Parameter View to a specific value, press the Enter button to begin editing. Use the arrow keys to change the parameter value. Then, press the Enter Enter button again to accept the change.
	Used the Escape button to exit from the Edit Mode . Press this button to return to the Main Screen. The Main Screen is used to adjust the speed of the motor. The motor input frequency can be changed using the arrow keys. Since the ID300 is an asynchronous motor, it will operate at an RPM related to the frequency setting, less the motor slip.

1.7 Drive Functions

The **0 Menu** has been customized to allow easy access to most of the parameters that are commonly changed by a user. **0 Menu** will be different in your unit versus the factory reset values stored in the ID300/302.

With the **RTC keypad cable** already connected to the **RJ45 plug** inside the ID300 and the **jumper wire** installed from **Terminal 6 to 8**, follow the steps below to change any parameter value in the ID300/302:

1. Power up the unit.

The keypad will light up and display "READY".

2. Press the **Enter** button to access **Programming Mode**.

The display will change to show a menu and parameter value.

- Press the arrow keys to navigate to a specific parameter menu (from 0 22). The Left and Right arrow key decrease and increase the menu number respectively.
- 4. In the specific menu, press the **Up** and **Down** arrow keys to reach the exact parameter.
- 5. Press the **Enter** button.

The right-most digit will begin flashing.

- 6. Press the Left arrow key to move the cursor to the digit you want to highlight. Use the Up or Down arrow keys to increase or decrease the value.
- 7. Press the Enter key to save the value, if you are in the **0 Menu**.
- Note: If you are in any other menu (menu 1-22), then there is another step to save the value when power is removed.

Press the **Down** arrow key until you see the **0 Menu**. Then, press the Enter button. The display will start flashing. Press the Up arrow key to change the display from **No Action** to **Save Parameters.**

Press the **Enter** button and then the **Red** button. The display will change to **No Action**, which means your changes have been saved. Press the **Escape** button to exit **Programming Mode**.

1.8 Example Setting Change: Parameter 0.008 - Force Reference Direction



Force Reference Direction changes the direction of the motor rotation. **None** is the default. Other than **None**, there are two options for the different rotations of the motor. As the motor leads are not easily accessible in the controller terminal box, this step replaces reversing any two of the motor leads to change direction.

Press the **Enter** key to save all changes. Then, press the **Escape** key.

- The control circuits are isolated from the power circuits in the ID300/302 by single insulation only. The installer must ensure that the external control circuits are insulated from human contact by at least one layer of insulation (supplementary insulation) rated for use at the AC supply voltage.
- If the control circuits are to be connected to other circuits classified as Safety Extra Low Voltage (SELV) (e.g., to a personal computer), an additional isolating barrier must be included in order to maintain the SELV classification.
- If any of the digital inputs (including the drive enable or STO inputs) are connected in parallel with an inductive load (i.e., contactor or motor brake) then suitable suppression (i.e., diode or varistor) should be used on the coil of the load. If no suppression is used, then over voltage spikes can cause damage to the digital inputs and outputs on the ID300/302.
- When the ID300/302 is controlled remotely, avoid routing of power cables and control cables in close proximity with each other.
- Ensure the logic polarity is correct for the control circuit to be used. Incorrect logic polarity could cause the motor to be started unexpectedly. Positive logic is required for the ID300/302.

2 Overview of the ID300/302 Integrated Motor & Drive

This manual describes the characteristics, installation, and quick start of the ID300/302 mounted to motors. The overview assumes the motor is operating within the following parameters:

- Ambient Temperature: 40° C (104° F)
- Altitude: 1000 m (3,280 feet)
- Switching Frequency: 3 kHz

De-rating is required for higher ambient temperature, altitude, or switching frequency. For additional information, contact your Nidec sales representative.

2.1 General Operating Principles

The ID300/302 is a 3-phase induction motor and integrated, high performance variable speed drive. The ID300/302 can be used with a large selection of options for motor and drive that allows the product to suit application needs. The motor can be offered in several mounting arrangements (footed, flange, etc).

Drive software and parameter structure are common across all sizes of ID300's, allowing easy commissioning for users who are already familiar with the process. The ID300/302 integrates a high-performance motor control.

2.2 Designation and Presentation

2.2.1 ID300/302 Designation



(*) Safe Torque Off

1.1.1 ID300/302 Label



1.1.2 Motor Nameplate



Note: Motor parameters are factory set and indicated below for informational purposes only.

Designations	Description
HP	Horsepower
kW	Rated output power
PH	Three-phase AC motor
Volts	Drive mains supply voltage
Hz	Supply frequency
FLA	Rated current
INSUL CLASS	
RPM	Revolutions per minute
BAL	Balancing Mode
PF	Power Factor
MAX AMB	Max ambient temperature
NEMA NOM EFFICIENCY	Energy Efficiency
SHAFT END BRG	
OPP END BRG	
cURus	Motor conformance with Canadian requirements and US
VT	Variable torque, available at motor shaft per squared load law

2.2.4 ID300/302 Presentation



US mo

Size 3



2.3 Environmental Characteristics

Button	Function
Environmental protection rating	 IP55 = ID300 IP54 = motor
Operating ambient air temperature	 -16° C (-26° F) to 40° C (104° F) Up to 50° C (122° F) with de-rating (current de-rating of 1 % per additional Celsius degree from 40° C. For more information, contact Nidec Motor Corporation.
Storage and transport temperature	 Storage time is 2 years at temperature between -15° C (-26° F) and 55° C (131° F). As the drive low voltage capacitors cannot be reformed due to their location, it is recommended that drives are powered up for a minimum of 1 hour after every 2 years of storage. This process allows the drive to be stored for an additional 2 years. As a general rule, machines must be stored in a horizontal position, in a dry location protected from harsh weather conditions, free from vibration, dust and corrosive gases. At relative humidity levels above 90%, the motor insulation can drop very quickly and become virtually non-existent at around 100%. The state of the anti-rust protection on unpainted motor parts should be monitored. During storage, the motor drain plugs must be removed to allow condensation water to escape. For long storage periods refer to the motor installation manual. If the storage location is subject to vibration, try to reduce the effect of this vibration by placing the machine on a rubber pad or similar damping material). Turn the rotor a fraction of a turn once every 2 weeks to prevent the bearing races from becoming marked.
Relative humidity	5 to 90% (non-condensing).
Altitude	 < 1,000 m (3,300 ft.) without de-rating. 1,000 m to 3,000 m (3,300 ft. to 9,900 ft.) above sea level: de-rate the maximum output current from the specified figure by 1 % per 100 m (330 ft.) above 1,000 m (3,300 ft.). For example, at 3,000 m (9,900 ft.), the output current of the drive would have to be derated by 20 %. For more information, contact Nidec Motor Corporation.
Pollution	Dry, non-conductive pollution only (pollution degree 2 according to IEC 60664-1).
Vibration	Meets the requirements of IEC 61800-5-1, Table 27
RoHS Directive	Meets EU Directive 2011/65/EU
EMC	 Conforms to C3 level of EN 61800-3 + A1 (2012) for '58MPI 1ePI@IAr ID300 Conforms to C3 level of EN 61800-3 +A 1 (2012) and EN 61326-3-1 +EN 61000-6-7 for ID302
UL standards	Conforms to UL 61800-5-1_1.

2.4 Electrical Characteristics

2.4.1 General Characteristics

Button	Function
Maximum supply imbalance	3 % voltage imbalance between phases
Starts per hour	By electronic control circuit or keypad: unlimited By interrupting the AC supply: ≤ 20 (equally spaced)
Motor frequency variation range	From 10 to 150 Hz maximum. The range can be different, depending on if a 2 pole or 4 pole motor is utilized. For more information, contact Nidec Motor Corporation.
Efficiency	NEMA Premium Efficient
Overload	150% of the full rated output current for 60 seconds or 180% for 3 seconds, 10 times per hour
Mains supply voltage and frequency	200 V drive: 200 V to 230 V ±10 %, 1 phase or 3 phases 400 V drive: 380 V to 480 V ±10 %, 3 phases Frequency Range: 45 to 66 Hz

2.4.2 ID300 Ratings

Supply		ID300 Drive		Motor	
Voltage	Max Input Current	Size ID300K	Output Power		
(V)	(A)		e ID300K	kW	HP
	4.5		12017	0.25	0.33
230V 1ph / 3ph 400V 3ph	5.3	1 -	12024	0.37	0.5
	8.1		12030	0.55	0.75
	1.6		14012	0.25	0.33
	2.2		14015	0.37	0.5
	2.9		14018	0.55	0.75

Note: The mains current value is a typical value which depends on the source impedance. The higher the impedance, the lower the current.

2.4.3 ID300 Ratings

Supply		ID300 Drive		Motor	
Voltage	Max Input Current	Sizo		Output Power	
(V)	(A)	5126	IDSUUK	kW	HP
	8.1	1	12030	0.75	1.0
230V 1ph / 3ph	9.1		22035	0.9	1.25
	12	2	22052	1.1	1.5
	14.3		22057	1.5	2.0
230V 3ph	10.2	-	32075	1.8	2.4
	12.2		32078	2.2	3.0
	12.2	3	32120	3.0	4.0
	14.8		32155	4.0	5.0

Note: The mains current value is a typical value which depends on the source impedance. The higher the impedance, the lower the current.

Supply		ID300 Drive		Motor	
Voltage	Max Input Current	Size		Output	Power
(V)	(A)		IDSOOK	kW	HP
	3.4		14021	0.75	1.0
	3.5	1	14025	0.9	1.25
400∨ 3ph	3.5	1	14030	1.1	1.5
	3.9		14033	1.5	2.0
	7	2	24042	1.8	2.4
	7.5		24050	2.2	3.0
	8		24070	3.0	4.0
	9.5		24085	4.0	5.0
	13	2	34119	5.5	7.5
	16	3	34155	7.5	10.0

Note: The mains current value is a typical value which depends on the source impedance. The higher the impedance, the lower the current.

2.5 Earth Leakage Current

2.5.1 Ground Leakage of the Motor and Drive

The motor and drive leakage current values are as follows:

50 Hz 50 Hz • 2.9 mA* AC at 230 V 1ph (L-N) • 1.6 mA* AC at 230 V 3ph (TN) • 0.8 mA* AC at 230 V 1ph (L-L) • 2.9 mA* AC at 230 V 3ph (corner delta) • 1.2 mA* AC at 230 V 3ph (TN) • 2.9 mA* AC at 480 V 3ph (corner delta) • 19.4 mA* AC at 480 V 3ph (TN) • 5.7 mA* AC at 480 V 3ph (corner delta) • 49.4 mA* AC at 480 V 3ph (corner delta) • 1.9 mA* AC at 230 V 3ph (corner delta) • 60 Hz • 1.9 mA* AC at 230 V 3ph (Corner delta) • 3.5 mA* AC at 230 V 1ph (L-N) • 3.4 mA* AC at 230 V 3ph (TN) • 0.9 mA* AC at 230 V 1ph (L-N) • 3.8 mA* AC at 480 V 3ph (TN) • 1.4 mA* AC at 230 V 3ph (TN) • 6.9 mA* AC at 480 V 3ph (corner delta)	Size 1 or 2 Drive	Size 3 Drive
 3.4 mA* AC at 230 V 3ph (corner delta) 21.3 mA* AC at 480 V 3ph (TN) 57.3 mA* AC at 480 V 3ph (corner delta) 	50 Hz 50 Hz 2.9 mA* AC at 230 V 1ph (L-N) 0.8 mA* AC at 230 V 1ph (L-L) 1.2 mA* AC at 230 V 3ph (TN) 2.9 mA* AC at 230 V 3ph (corner delta) 19.4 mA* AC at 230 V 3ph (corner delta) 49.4 mA* AC at 480 V 3ph (corner delta) 60 Hz 3.5 mA* AC at 230 V 1ph(L-N) 0.9 mA* AC at 230 V 1ph (L-L) 1.4 mA* AC at 230 V 3ph (TN) 3.4 mA* AC at 230 V 3ph (corner delta) 21.3 mA* AC at 480 V 3ph (corner delta) 57.3 mA* AC at 480 V 3ph (corner delta)	50 Hz • 1.6 mA* AC at 230 V 3ph (TN) • 2.9 mA* AC at 230 V 3ph (corner delta) • 3.2 mA* AC at 480 V 3ph (TN) • 5.7 mA* AC at 480 V 3ph (corner delta) 60 Hz • 1.9 mA* AC at 230 V 3ph (TN) • 3.4 mA* AC at 230 V 3ph (corner delta) • 3.8 mA* AC at 480 V 3ph (corner delta) • 6.9 mA* AC at 480 V 3ph (corner delta)

*Proportional to the supply voltage and frequency.

- Due to the leakage current, a permanent fixed ground connection must be provided, or other suitable measures must be taken to prevent a safety hazard occurring if the connection is lost. For more details, refer to Section 4.5 on **page 27**.
- ID300/302 integrates an internal EMC filter, but there is no possibility to disconnect it. If the ground leakage current is unacceptable for the application, contact Nidec Motor Corporation.

2.5.2 Use of Earth Leakage Detector (RCD)

A type B RCD that is capable to detect AC and pulsating DC fault currents can be used with the ID300/302. If an external EMC filter is used, a delay of at least 50 ms is recommended to avoid nuisance tripping. The leakage current is likely to exceed the trip level if all phases are not energized simultaneously.

2.6 Thermal Overload Protection and Limits

The ID300/302 integrates internal functions to protect the motor and drive against overloads.

2.6.1 Motor Protection

Current in the lower IGBTs is continuously measured. The drive software uses these measurements to calculate the actual I²t value for the motor. If the actual motor I²t exceeds the rated motor I²t, the drive will trip. All drive models have thermal memory retention. However, an optional PTC thermistor can be added in the motor windings to secure additional thermal protection.

2.6.2 Drive Protection

An overload on the output of the drive will cause the junction temperature of the IGBT to rise. This junction temperature is estimated by the IGBT thermal model, taking into account the operating conditions. When the estimated junction temperature reaches its limit, the drive will trip.

2.7 Surge Immunity of Control Circuits

The input/output ports for the control circuits are designed for general use within machines and small systems without any special precautions. These circuits meet the requirements of IEC 61000-6-2: (1 kV surge), provided the 0 V connection is not grounded.

In applications that may be exposed to high-energy voltage surges, some special measures may be required to prevent malfunction or damage. Surges may be caused by lightning or severe power faults, in association with grounding arrangements which permit high transient voltages between nominally grounded points. This is a particular risk where the circuits extend outside the protection of a building. As a general rule, if the circuits are to pass outside the building in which the ID300/302 is located, or if cable runs within a building exceed 100ft (30 M), some of the following techniques should be used:

- A. **Galvanic Isolation DO NOT** connect the control 0 V terminal to ground. Avoid loops in the control wiring, i.e., ensure every control wire is accompanied by its return (0 V) wire.
- B. **Shielded Cable with Additional Power Ground Bonding** The cable shield may be connected to ground at both ends, but in addition, the ground conductors at both ends of the cable must be bonded together by a power ground cable (equipotential bonding cable) with cross-sectional area of at least 10 mm2 (7 AWG), or 10 times the area of the signal cable shield, or to suit the electrical safety requirements of the plant. This ensures that fault or surge current passes mainly through the ground cable and not in the signal cable shield. If the building or plant has a well-designed common bonded network, this precaution is not necessary.
- C. Additional Over-Voltage Suppression For the analog and digital inputs and outputs, a Zener diode network or a commercially available surge suppressor may be connected in parallel with the input circuit as shown below (performances must be at least equal to one of the two Zener diodes BZW50-15).



If a digital port experiences a severe surge, its protective trip may operate ('I/O Overload' trip).

2.8 Options

Туре	Option	Name	Details
Keypads		ID-SIZE1- Keypad ID-SIZE3- Keypad	 For size 1 and 2 drives, use ID-SIZE1- Keypad For size 3 drive, use ID-SIZE3-Keypad Integrated Keypad, LCD display Main functions: Speed display, drive status, motor commands, parameter settings. Mounting arrangement: replaces standard terminal cover. This option must be mounted by the user. Refer to the relevant mounting documentation. It cannot be combined with a ID-SIZE1-Fieldbus option for size 1 and 2 drives and with ID-3 CABLE-RJ45- FLANGE for sizes 1 to 3 drives.
		Field Keypad RTC	Remote keypad with a LCD display and real time clock. Main functions: Speed display, drive status, motor commands, parameter settings, real time clock. Mounting arrangement: This option must be connected by the user via the internal drive RJ45 connector. Refer to the relevant mounting documentation.

3 Mechanical Installation

- The mechanical and electrical installation instructions must be followed. Any questions or doubt should be referred to the supplier of the equipment. It is the responsibility of the owner or user to ensure that the installation of the ID300/302, any external option unit, and the way in which they are operated and maintained comply with the applicable legislation, regulations and codes of practice in the country in which the equipment is used.
- The drive contains capacitors that remain charged to a potentially lethal voltage after the AC supply has been disconnected. If the drive has been energized, the AC supply must be isolated at least 10 minutes before work may continue. Normally, the capacitors are discharged by an internal resistor. Under certain, fault conditions, it is possible that the capacitors may fail to discharge, or be prevented from being discharged by a voltage applied to the output terminals. If the drive has failed in a manner that causes the keypad display (if present) to go blank immediately, it is possible that the capacitors will not be discharged. In this case, consult Nidec Motor Corporation or an authorized distributor.
- The ID300/302 and its options must be installed by qualified personnel who are familiar with the requirements for safety and EMC. The assembler is responsible for ensuring that the end-product or system complies with all the relevant laws in the country where it is to be used.
- When the cover is open, the ID300/302 degree of protection is IP10. Any work or maintenance should be carried out by experienced, qualified personnel. **DO NOT** open the ID300/302 while energized.
- Holes are provided at the lowest points of the motor enclosure, depending on the operating position, to drain off any moisture that may have been accumulated inside during cooling of the motor. In conditions that encourage the formation of condensation, it is advisable to leave the drain holes permanently open.

3.1 Initial Inspection

Before installing the ID300/302, check that:

- The motor and drive have not been damaged during transport.
- The information on the nameplate is compatible with the power supply.

For nameplate details, refer to Section 2.2 on page 10.

3.2 Handling

WARNING

- The lifting rings are for lifting the motor and drive only (not connected to the driven machine).
- Verify that the lifting equipment is suitable for the weight to be handled.
- Lifting the motor by any other means can result in damage to the motor or injury to personnel.



- A motor and drive intended for use in the vertical position may be delivered on a pallet in the horizontal position. When the motor is pivoted, under no circumstances should the shaft be allowed to touch the ground as the bearings may be irreparably damaged.
- Additional special precautions must be taken, as the integral motor lifting rings are not designed for pivoting the motor.

3.3 Cooling

The motor with integrated ID300/302 drive is fitted to the machine like a standard motor with flange or foot mounting. Motor ventilation cools the motor and drive. The drive fan (if present) provides additional cooling to the drive. Ensure that the ventilation air inlet is free of obstruction.



3.4 Mountings and Positions

The motor must be mounted in the position specified on the order, and on a base which is rigid enough to prevent distortion and vibration. Where the motor feet have six fixing holes, it is preferable to use those which correspond to the standard dimensions for the motor power rating, or to those shown at B2.



Ensure that there is easy access to the terminal box and the condensation drain plugs. Use lifting equipment which is compatible with the weight of the motor and drive.

- When the motor is fitted with lifting rings, they are for lifting the motor and drive on its own and **MUST NOT** be used to lift the whole machine after the motor and drive has been fitted to it.
- When installing a suspended motor, it is essential to provide protection in case the mounting breaks.
- Never stand on the motor.

3.5 Coupling

3.5.1 Preparation

Turn the motor by hand before coupling to detect any possible damage due to handling.



Remove any protection from the shaft extension. Drain off any condensation which may have formed inside the motor by removing the plugs from the drain holes.

3.5.2 Balancing

Rotating machines are balanced in accordance with standard NEMA MG1.

The motors are balanced with ½ key as standard unless otherwise indicated. Any coupling element (pulley, coupling sleeve, slip-ring, etc.) must therefore be balanced accordingly. To determine the motor balancing, refer to the nameplate.

The coupling needs to be adapted to the length of the key, or the visible parts protruding from the key need to be machined. A customized key can be used.

• Failure to adhere to these recommendations can lead to premature wear of the bearings and void the factory warranty.



All measures must be taken to ensure protection against the risks which arise when there are rotating parts (coupling sleeve, pulley, belt, etc.).

- If a motor is started up without a coupling device having been fitted, carefully secure the key in its location.
- Beware of back-driving when the motor is switched off. The appropriate precautions must be taken:
- - For pumps, a non-return valve must be installed.
- - For mechanical devices, install a backstop or a holding brake, etc.

3.5.3 Coupling Methods

- For further details on the different coupling methods, refer to the installation and maintenance manual of
- 3 phase induction motors.

4 Connections

- All connection work must be performed in accordance with National Electrical Code and all local electrical codes. This includes earthing to ensure that no directly accessible part of the ID300/302 can be at the mains voltage or any other dangerous voltage.
- The voltages on the cables or connections of the mains supply may cause fatal electric shocks. Contact must be avoided in all circumstances.
- The ID300/302 must be supplied via a circuit-breaking device so that it can be powered down safely. The power supply must be disconnected from the drive before the cover is removed from the drive or before any maintenance is performed.
- The drive contains capacitors which remain charged at a fatal voltage even after the power supply has been switched off. Wait 10 minutes after powering down the drive before removing the protection devices.
- Special attention must be given if the ID300/302 is installed in equipment which is connected to the AC supply by a plug and socket. The AC supply terminals of the drive are connected to the internal capacitors through rectifier diodes which are not intended to provide safety isolation. If the plug terminals can be touched when the plug is disconnected from the socket, a means of automatically isolating the plug from the drive must be used (e.g., a latching relay).
- The STOP and the Safe Torque Off functions **DO NOT** remove dangerous voltages from the drive, the motor or any external option units.
- The drive power supply must be protected against overloads and short-circuits.
- It is vital to properly size all electrical circuit and motor protection devices per NEC and local codes
- Connection with copper conductor only.
- Verify that the voltage and current of the ID300/302 and the mains supply are compatible.
- **DO NOT** touch the heatsink of the ID300/302 as it may become very hot during operation.

4.1 Terminal Block Access

Unscrew the 4 or 6 screws of the cover using a screwdriver (depending on drive model). Lift the cover.

- To maintain the IP55 protection of the ID300/302, it is essential to avoid damaging the seal while removing the cover. Reposition the cover correctly when reassembling and tighten each of the 4 or 6 screws to the required 5Nm max torque.
- Adhere to the tightening torque to avoid damage to the threading.



4.2 Terminal Block Location

Power and control terminal blocks are all removable (relay, STO, control, AC power).

WARNING

• To avoid a fire hazard and maintain validity of the UL listing, adhere to the specified tightening torques for the power and ground terminals

ID300/302 Sizes 1 and 2



ID300 Size 3



4.3 Cable Runs

- The ID300/302 is supplied with IP55 protection. Only the use of correctly installed IP55 or higher protection cable glands ensure that this protection index is maintained.
- To preserve the product's original IP55 protection, it is essential to tighten the cable gland seal correctly (so that the cable gland cannot be unscrewed by hand).
- Use a wire bend where the cables enter the cable glands so that water cannot enter the terminal box.

Replace the plugs fitted on the holes with cable glands and their seals as specified in the table below.

Source to Connect	Gland Type	Dimensions
Main Supply Input	Standard or EMC	M25 or M20
Digital I/O	Standard or EMC	M16 or M20
Analog I/O	EMC	M16 or M20

Note: Keep the plug if the cable entry is not used. It is advisable to use shielded cables for analog signals to avoid any EMC disturbances.

4.4 Cable Sizes and Fuses

- It is the responsibility of the user to connect the ID300/302 and fit protective devices in accordance with applicable National Electrical Code and local electrical codes and regulations in the country of use. This is particularly important regarding the size of the cables, the type and rating of fuses, the earth or ground connection, powering down, acknowledging trips, isolation, and protection against over currents.
- The following table is provided for informational use only. Under no circumstances should the information be used in place of the current National Electrical Code and local standards.

The fuses types must be either IEC type gG or UL class CC, J or T. The circuit breakers must be UL listed class DIVQ/ DIVQ7.

Mains Supply	Max Input Current (A)	ID300K Ref	Fuse Ratings		Cable	e Size
			CEI	UL	mm²	AWG
	4.5	12017	6	6		
	5.3	12024	6	6	1	16
230V	8.1	12030	10	10		
1ph	9.1	22035	16	15	1.5	12
	12	22052	16	15	2.5	10
	14.3	22057	20	20	2.5 / 4	10

Mains	Max Input	ID300K Ref	Fuse Ratings		Cable Size	
Supply	Supply Current (A)		CEI	UL	mm²	AWG
	4.5	12017	6	6		
	5.3	12024	6	6	1	16
	8.1	12030	10	10		
	9.1	22035	16	15		
230V	12	22052	16	15	15	10
1ph	14.3	22057	16	15	1.5	12
	10.2	32075	16	15		
	12.2	32087	16	15		
	12.2	32120	20	20	2.5	10
	14.8	32155	20	20		

Mains	Max Input	ID300K Ref	Fuse R	atings	Cable	e Size
Supply	Current (A)		CEI	UL	mm²	AWG
	1.6	14012	6	6		
	2.2	14015	6	6		
	2.9	14018	6	6		
	3.4	14021	6	6		
	3.5	14025	6	6	1.5	12
460V 3ph	3.5	14030	6	6		
	3.9	14033	10	10		
	7	24042	10	10		
	7.5	24050	10	10		
	8	24070	16	15		
	9.5	24085	16	15	2.5	10
	13	34119	20	20		
	16	34155	25	25	4	10

Notes:

- The mains current value is a typical value which depends on the source impedance. The higher the impedance, the lower the current.
- By default, the switching frequency is set to 3 kHz.
- ID300/302 are suitable for use on a circuit with a short circuit capability of not more than 5000 rms symmetrical Amperes, 480V or 230V maximum when protected by fuses as specified above.

4.5 Power Connections

- The motor must be connected to earth. Grounding must be performed in accordance with National Electrical Code and local electrical codes.
- Due to large leakage current, a permanent fixed ground connection must be provided to the system by using a 10 mm2 (7 AWG) flat braid.
- Check that the terminal block has been removed from its fixed holder (unplugged) before making any connections to avoid putting pressure on the card.



Standard Drive Power Connections

230V or 400V-3ph: Connect to L1, L2, L3

4.6 Control Terminals

- The control circuits are isolated from the power circuits by single insulation only. The installer must ensure that the external control circuits are insulated from human contact by at least one layer of insulation (supplementary insulation) rated for use at the AC supply voltage.
- If the control circuits are to be connected to other circuits classified as Safety Extra Low Voltage (SELV) (e.g., to a personal computer), an additional isolating barrier must be included in order to maintain the SELV classification.
- If any of the digital inputs (including the drive enable or STO inputs) are connected in parallel with an inductive load (i.e., contactor or motor brake), then suitable suppression (i.e., diode or varistor) should be used on the coil of the load. If no suppression is used, then over voltage spikes can cause damage to the ID300/302digital inputs and outputs.
- When the ID300/302 is controlled remotely, avoid routing of power cables and control cables in close proximity with each other.
- Ensure that the logic polarity is correct for the control circuit to be used. Incorrect logic polarity could cause the motor to be started unexpectedly. Positive logic is required for the ID300/302.
- To avoid putting pressure on the PCB card, ensure that the terminal blocks have been removed from their fixed holder (unplugged) before making any connections.

The ID300/302 is delivered with the 'STANDARD Keypad' default configuration.



Control Terminal Blocks

4.6.1 Terminal Characteristics

Refer to Section 4.6 on **page 28** for proper isolation of cables.

1	+10V	Size 3 Drive
Function		Supply for external analog devices
Nominal Voltage		10.2 V
Voltage Tolerance		± 3%
Max Output Current		5mA

3	0V	
Function		Common connection for all external devices

2	ADI1	Analog or digital input 1
4	ADI2	Analog or digital input 2
AD11 Default Fu	inction	10.2 V
AD12 Default Function		± 3%
Type of Input		5mA
Resolution		
Sample Rate		
Operating in Vo	oltage Mode	
Full Scale Voltag	ge Range	0 V to ± 3%
Max Offset		± 30 mV
Absolute Max Voltage Range		-18 V to +30 V relative to 0 V
Input Resistance		100 kΩ
Operating in Current Mode		
Current Range		0 to 20 mA ± 5 %
Maximum Offset		250 μΑ
Load Impedance		165 kΩ
Operating in Di	gital Mode	
Impedance		6.8 kΩ
Input Threshold		10 V ± 0.8 V (IEC 61131-2)
Operating in Thermistor Mode (ADI2 Only		y)
Voltage Range		± 10 V
Input Threshold		> 3.3 kΩ
Reset Threshold		< 1.8 kΩ
Bias for DIN44081 (PTC), PT1000, PT2000, etc.		

5	ADI1	Analog or digital input or analog output
Default Function	1	Assigned to red, green, and yellow LEDs (flange options)
Resolution		11 bits
Sample Rate		4 ms
Operating as A	nalog Voltage Input	·
Type of Input		Unipolar single-ended analog voltage, unipolar single-ended current or digital input (positive logic) or unipolar single-ended voltage output
Full Scale Voltag	ge Range	0 V to +10 V ± 3 %
Maximum Offset	t	± 30 mV
Absolute Maxim	um Voltage Range	-18 V to +30 V relative to 0 V
Input Resistance	e	100 κΩ
Resolution		11 bits
Sample Rate		4 ms
Operating as Analog Current Input		·
Current Range		0 to 20 mA ± 5 %
Maximum Offset		250 μΑ
Resolution		11 bits
Sample Rate		4 ms
Load Impedance	9	165 kΩ
Operating as Die	gital Input	
Impedance		6.8 kΩ
Input Threshold		10 V ± 0.8 V (IEC 61131-2, Type 1)
Operating as Voltage Output		
Full Scale Voltage Range		0 V to +10 V ± 5 %
Minimum Load F	Resistance	2 κΩ
Resolution		0.1 %

6 11	+24V	
Function		Supply for external digital devices
Voltage Tolerance		± 20 %
Maximum Output Current		200 mA (Total including all digital outputs)
Protection		Current limit and trip

7	DIO1	Digital input or output 1
Default Function		ADI1 and ADI2 reference select
Туре		Positive logic digital input only (for output, with 6-7k Ω pull down)
Voltage Range		0 V to +24 V
Sample Rate		4 ms
Operating as an Input (Default)		
Absolute Maximum Applied Voltage Range		-8 V to +30 V relative to 0V
Impedance		6.8 kΩ
Input Threshold		10 V ± 0.8 V (IEC 61131-2, Type 1)
Operating as an Output		
Nominal maximum Output Current		50 mA
Maximum Output Current		200 mA (total, including +24 Vout)

8	DI2	Digital input 2
9	DI3	Digital input 3
10	DI4	Digital input 4
DI2 Default Fund	tion	- ID300: Drive enable
- ID302: Not ass	igned	± 3%
DI3 Default Fund	tion	Run forward
DI4 Default Function		Run reverse
Туре		Positive logic digital input only
Voltage Range		0 V to +24 V
Absolute Maximum Applied Voltage Range		-18 V To +30 V Relative To 0 V
Impedance		6.8 kΩ
Input Threshold		10 V ± 0.8 V (IEC 61131-2)
Sample Rate		1 ms when routed to destinations Pr 06.035 or Pr 06.036, otherwise 4 ms
Operating as Digital Input (Default)		

41	Polov Contacto	
42	Relay Contacts	
Default Function		Drive OK indicator (Closed when power applied and drive OK)
Contact Voltage	Rating	240 Vac, Installation over-voltage category II
Contact Maximum Current Rating		2 A AC 240 V
4 A DC 30 V resistive load		Current limit and trip
Contact Minimum Recommended Rating		12 V 100 mA
Contact Type		Normally open
Update Rate		1 ms

4.6.2 Safe Torque Off Inputs (ID302 Only)

The Safe Torque Off function provides a means for preventing the drive from generating torque in the motor with a very high level of integrity. It is suitable for incorporation into a safety system for a machine.

The safety function is active when one or both STO inputs are in the logic-low state, as specified in the control terminal specification. The function is defined according to EN/IEC 61800-5-2.

- The design of safety-related control systems must only be performed by personnel with the required training and experience. The Safe Torque Off function will only ensure the safety of a machine if it is correctly incorporated into a complete safety system. The system must be subject to a risk assessment to confirm that the residual risk of an unsafe event is at an acceptable level for the application.
- Safe Torque Off inhibits the operation of the drive. Safe Torque Off **DOES NOT** provide electrical isolation. The supply to the drive must be disconnected by an approved isolation device before gaining access to power connections.
- It is essential to observe the maximum permitted voltage of 5 V for a safe low (disabled) state of Safe Torque Off. The connections to the drive must be arranged so that voltage drops in the 0 V wiring cannot exceed this value under any loading condition. It is strongly recommended that the Safe Torque Off circuits be provided with a dedicated 0 V conductors which should be connected to Terminals 32 and 33 at the drive.

- There is no ID302 available for 230V supply.
- For more details on STO inputs, refer to http://www.leroy-somer.com/documentation_pdf/5512_en.pdf

41	STO1	Safa Targua Off function (drive anable)
42	STO2	Sale Torque On Tunction (unve enable)
Terminal 31 Fund	ction	STO1 channel
Terminal 32 Fun	ction	STO2 channel
Туре		Positive logic only digital input
Voltage Range		0 to +24 V
Absolute Maximum Applied Voltage		30 V
Logic Threshold		10 V ± 5 V
Low State Maximum Voltage for Disable to SIL3 and PL e		5 V
Impedance		>4 mA @ 15 V, <15 mA @ 30 V (IEC 61131-2, type 1)
Low State Maximum Current for Disable to SIL3 and PL e		0.5 mA
Response Time		Nominal: 12 ms Maximum: 20 ms

41	0 V STO1	
42	0 V STO2	
Terminal 31 Function		Common connection for STO1
Terminal 32 Function		Common connection for STO2

4.6.3 EIA 485 Serial Communication Port

- When using the communications port with a personal computer or centralized controller, an isolation device must be included that has a rated voltage at least equal to the drive supply voltage. Ensure that the correct fuses are installed at the drive input, and that the drive is connected to the correct supply voltage.
- If a serial communications converter other than the Nidec Comms cable is used for connection to other circuits which are classified as Safety Extra Low Voltage (SELV) (e.g., to a personal computer), then a safety isolating barrier must be included to maintain the SELV classification.

Nidec Motor Corporation has designed an Isolated Serial Communications Lead to connect the drive to IT equipment and is available as an optional device. Contact your sales representative for more information.

The Isolated Serial Communications Lead has reinforced insulation as defined in IEC60950 for altitudes up to 3,000 m (9,842 feet).

5 Quick Start Commissioning

This section details the commissioning of **STANDARD Keypad configuration**, which is the default. If this configuration is not suitable for the application, refer to Section 5 http://www.leroy-somer.com/documentation_pdf/5512_en.pdf.

- Ensure that no damage or safety hazard could arise from the motor starting unexpectedly.
- By default, the correct motor rated current is set in **Pr 05.007**. **DO NOT** alter the rated current. Otherwise, it will affect the thermal protection of the motor.
- If the intended maximum speed affects the safety of the machinery, additional independent overspeed protection must be used.
- The ID300/302 has low DC bus capacitance (film capacitors) which can induce voltage ripple on the DC bus with low load conditions. The default settings of the drive address this phenomenon. For more dynamic applications, it is advisable to adapt the setting.

5.1 Use of a Field Keypad RTC or ID-SIZE 1or ID-SIZE 3-Keypad

WARNING

• If the drive is started using a Keypad, it will run to the speed defined by a keypad reference. Depending on the application, the keypad reference may not be acceptable. The user must check in Pr 01.017 and ensure that the keypad reference has been set to 0.

If the default settings of the ID300/302 standard configuration are not suitable for the application, the parameters can be modified using the Keypad option. Commands can be given from the Keypad using the factory preset configuration. Refer to Section 5.1.6 on page 37 for additional information. To connect the Keypad, refer to the relevant Keypad installation sheet for more details.

5.1.1 Understanding the Display



5.1.2 How to Read or Edit Parameters

By default, only the first 10 parameters of **0 Menu** are available. For **0 Menu** parameter access, set Pr 00.010 to Level 2. FOR advanced parameter access, set **Pr 00.010** to All Menus.



- Parameter values affect the motor protection and the safety of the system. **DO NOT** change parameter values without careful consideration. Incorrect values may cause damage to the unit or a safety hazard.
- Be aware that some parameters are factory-set and should not be changed. For more details, refer to Section 5.1.5 Restoring Parameter Defaults on **page 36**.

Power-up the ID300/302 and keep the drive disabled during the setting of parameters (Terminal 8 or Terminals 31 & 34 open). Parameters can then be adjusted for the needs of the application. All **0 Menu** parameters are listed in Section 5.4 on **page 38**.

5.1.3 Navigation and Menu Structure

The drive parameter structure consists of menus (0 to 22) and parameters.

The drive initially powers up so that only the first 10 parameters of **0 Menu c**an be viewed. The left and right navigation buttons can only be used to move between menus, if **Pr 00.010** has been set to show 'All Menus'.



5.1.4 Saving Parameters

When changing a parameter in **0 Menu**, the new value is saved when pressing **Enter** to return to Parameter View Mode from Parameter Edit Mode.

If parameters have been changed in the advanced menus, the change will not be saved automatically. A Save function must be initiated. Follow the procedure below.

- 1. Select SAVE in Pr mm.000*.
- 2. Either press the **Red** reset keypad button or toggle the reset digital input.

* Where mm can be any menu number.

5.1.5 Restoring Parameter Defaults

Restoring parameter defaults by this method saves the default values in the drive memory. User security status **Pr 00.010** is not affected by this procedure.

- 1. Ensure that the drive is not enabled, i.e., the drive is in Inhibit state.
- 2. Select 'Reset 50 Hz Defs' in **Pr 00.000**.
- 3. Press the **Red** reset keypad button.

Note: Motor parameters **Pr 00.006 to Pr 00.009** and their relevant advanced parameters (**Pr 05.007** to **Pr 05.010**) are not affected by this procedure.

WARNING

Some ID300/302 parameters are set at the factory to take in account the characteristics of the
motor, the drive, and the options already fitted at factory. This avoids any extra settings for the
customer. But if drive default parameter values are restored during commissioning, the factory
preset parameters will be lost and set back to their default value (except the ones of the motor
rating). If it is necessary to restore the parameter default values, it is not recommended to set the
parameters to the same values as already done at the factory.

5.1.6 Quick Commissioning with a Keypad

Control Connection

Follow control connection diagrams described in Section 5.2.1 on page 38.

Quick Start-Up

- Make the required power connections and control connections as indicated above. Refer to Section 4.5 on **page 27**.
- Ensure that the drive is disabled (Terminal 8 or Terminals 31 and 34 are open).
- Power up the drive.
- Close the Enable Terminal 8 or the STO Terminals 31 & 34.
- Give a Run Forward (or Run Reverse if available) command by pressing the dedicated key on the keypad.
- Adjust the frequency reference by pressing the **Up** key on navigation keys until the correct speed reference is reached. (The last setting for speed is saved and applies the next time it is started.)
- Stopping the motor: press the **Stop** key for the motor to stop under ramp control, or remove the **Enable** signal by opening Terminal 8 or Terminals 31 & 34. The motor will then coast to a stop.

For more details about Keypad or keypad ref configurations,

refer to Section 5 http://www.leroy-somer.com/documentation_pdf/5512_en.pdf

Keypad Status Indications

Upper Row String	Description	Drive Output Stage
Inhibit	The drive is inhibited and cannot be run.	Disabled
Ready	The drive is ready to run. The drive enable is active.	Disabled
Stop	The drive is stopped / holding zero frequency.	Enabled
Run	The drive is active and running.	Enabled
Supply Loss	Supply loss condition has been detected.	Enabled
Deceleration	The motor is being decelerated to zero frequency because the final drive run has been deactivated.	Enabled
DC Injection	The drive is applying DC injection braking.	Enabled
Trip	The drive has tripped and no longer controlling the motor. The trip code appears in the lower display.	Disabled
Under Voltage	The drive is in the under voltage state.	Disabled
Heat	The motor pre-heat function is active.	Enabled

When the drive is in 'trip' condition, the upper row of the display will indicate that the drive has tripped. The lower row of the display will show the trip code. For further information regarding trip codes, refer to Section 6.1 on **page 41**.

During an 'alarm' condition, the upper row of the display alternates between the drive status (Inhibit, Ready or Run, depending on what is displayed) and the alarm. For further information regarding alarms, refer to Section 6.2 on **page 43**.

5.2 Quick Commissioning with Terminal Control

5.2.1 Control Connections



5.3 Commissioning by Using a Fieldbus or Modbus RTU

With a fieldbus netword or Modbus RTU, the user needs to set **Pr 06.043** to enable the use of the control word **Pr 06.042** and the status word **Pr 10.040**.

The control word allows the user to command the drive by setting only one parameter (**Pr 06.042**, a 15bit parameter).

The status word allows the user to know drive status information by reading only one parameter (**Pr 10.040**, which is a 15-bit parameter).

For more details, refer to http://www.leroy-somer.com/documentation_pdf/5512_en.pdf

5.4 Basic Parameters of STANDARD Configuration

0 Menu is used to group various commonly used parameters for a basic, easy setup of the drive. All the parameters in **0 Menu** appear in other menus (advanced menus) which provide more precise settings. For more details about **0 Menu** parameters or advanced menus, refer to http://www.leroy-somer.com/documentation_pdf/5512_en.pdf . By default, only the first 10 parameters of **0 Menu** are available. For 0 Menu parameter access, set **Pr 00.010** to Level 2. For advanced parameter access, set **Pr 00.010** to All Menus.

Note: The drive must be disabled when setting parameters (Terminal 8 or Terminals 31 & 34 open). Parameters which have no default value are Read-Only parameters.

Menu 0	Definition	Main Menu	Value
0.001	Min RPM	1.007	10
0.002	Max RPM	1.006	60
0.003	Accel	2.011	10
0.004	Decel	2.021	20
0.005	Config	11.034	Keypad
0.006	Max Switching Hz	5.018	3
0.007	Stop Mode	6.001	Ramp
0.008	Force Rev Direction	5.042	None
0.009	Remember set point	1.051	Last setting
0.010	Security	11.044	Level 1
0.014	Thermistor	7.045	3
0.015	Thermistor Feedback	7.047	-
0.020	Al2 Invert	7.013	0
0.023	AI2 Destination A	7.014	1.037
0.024	AO3 Scaling	7.020	1
0.025	AO3 Control	7.057	16
0.026	DI2 Destination A	8.022	6.038
0.027	AO3 Source A	7.019	0
0.029	A/D Output 3	7.003	-
0.030	Ramp Mode Select	2.004	0
0.031	Fwd / Rev	6.013	None
0.032	DC Bus Voltage	5.005	-
0.033	Output Hz	5.001	-
0.034	Output Volt	5.002	-
0.035	Motor RPM	5.004	-
0.037	Amp Magnitude	4.001	
0.038	Refereence On	1.011	-
0.039	Reverse Select	1.012	-
0.040	A/D input 1	7.001	-
0.041	A/D input 2	7.002	-
0.042	Drive Active	10.002	-
0.043	ADI1	7.007	Volt
0.044	AI2	7.011	4-20ma
0.045	ADI2	7.045	3

Menu 0	Definition	Main Menu	Value
0.046	ADI1 Scale	7.008	1.000
0.047	ADI2 Scale	7.012	1.000
0.048	ADI1 invert	7.009	0
0.049	ADI2 invert	7.013	0
0.050	ADI1 offset	7.030	0.00%
0.051	ADI2 offset	7.031	0.00%
0.052	ADIO3 Scale	7.020	1.000
0.053	ADIO3 out	7.057	16
0.054	DI2 Destin	8.022	6.038
0.055	ADIO3 Yel	7.019	0.000
0.056	DI4 Dest	8.024	6.032
0.057	ADIO3 out	7.003	-
0.058	DI1 Control	8.081	0
0.059	Motor Rated Hz	5.006	Disable
0.060	Bipolar Ref	1.010	0
0.061	Thermistor	7.045	1.0
0.062	Boost V	5.015	0.002 or
0.063	Max Amps	11.032	0.001 to
0.064	Control Mode	5.014	0.002
0.069	User Security Code	11.030	-
0.070	Status Mode 2	11.019	4.020
0.071	Status Mode 1	11.018	2.001
0.072	Customer Scaling	11.021	1.000
0.073	Serial Baud Rate	11.025	115200
0.074	Serial Addresss	11.023	1
0.075	Reset Serial comm	11.020	0
0.076	Digital I/O word	8.02	-
0.077	Therm Value	7.047	-
0.078	Onboard Program	1.047	Run
0.079	OUP Status	11.048	-
0.08	Software Version	11.029	-

6 Diagnostics

• **DO NOT** attempt to repair a faulty drive. **DO NOT** carry out fault diagnosis other than through the diagnostic features described in this chapter. A faulty drive must be returned to Nidec for repair.

This section details only main trips of the drive. For the complete list of the trips and their explanations, refer to http://www.leroy-somer.com/documentation_pdf/5512_en.pdf

If the drive trips on a fault or is in alarm state, a keypad option or "Connect" tool software is needed to view which trip/alarm code it is.

6.1 Trip Descriptions

If a keypad option is connected to the drive, press the Stop/Reset (Red) button. The fault can also be cleared (reset) by switching off the ID300/302, or by opening/closing the contact of Terminal 8-DI2 (ID300) or Terminals 31-STO1 & 34-STO2 (ID302).

Note: The table below provides the most common trips. For a comprehensive list, refer to http://www. leroy-somer.com/documentation_pdf/5512_en.pdf

Trip Code	Condition	Description
An Input 1 Loss	Analog input 1 current loss	Current loss was detected in current mode on Analog input 1 (Terminal 2).
An Input 1 OI	Analog input 1 over-current	Current input on analog input 1 exceeds 24 mA.
An Input 2 Loss	Analog input 2 current loss	Current loss was detected in current mode on Analog input 2 (Terminal 4).
An Input 2 OI	Analog input 2 over-current	Current input on analog input 2 exceeds 24 mA.
An Input 3 Loss	Analog input 3 current loss	Current loss was detected in current mode on Analog input 3 (Terminal 5).
An Input 3 OI	Analog input 3 over-current	Current input on analog input 3 exceeds 24 mA.
Autotune	Measured inertia has exceeded the parameter range	The drive has tripped during a rotating autotune or mechanical load measurement test.
Autotune Stopped	Autotune test stopped before completion	The drive was prevented from completing an autotune test, because either the drive enable or the drive run signals were removed.
Destination	Two or more parameters are writing to the same destination parameter	This trip indicates that destination output parameters of two or more logic functions (Menus 7 to 9, 12 or 14) within the drive are writing to the same parameter.
External Trip	External trip is initiated	The cause of the trip can be identified from the sub trip number displayed after the trip string.
I/O Overload	Digital output overload	The total current drawn from 24 V user supply or from the digital output has exceeded the limit.
Keypad Mode	Remote keypad has been removed when the drive is receiving the reference from the keypad	This trip indicates that the drive is in keypad mode and the keypad has been removed or disconnected from the drive.

Trip Code	Condition	Description
Motor Too Hot	Output current overload timed out (I2t)	 This trip indicates a motor thermal overload based on the output current and motor thermal time constant. The drive will trip on Motor Too Hot when the accumulator gets to 100 %. This can occur when: There is excessive mechanical load, ensure the load is not jammed / sticking. Check the load on the motor has not changed. Ensure the motor rated current is not zero.
OI ac	Instantaneous output over current detected. This trip cannot be reset until 10s after the trip was initiated	 The instantaneous drive output current has exceeded the set limit. Possible explanations: Acceleration/deceleration rate too low. If seen during autotune voltage boost too low. Possible short circuit on the output cabling. Possible integrity issue of the motor insulation. Values in the current loop gain parameters too high.
Over Speed	Motor frequency has exceeded the over frequency threshold	Excessive motor speed (typically caused by mechanical load driving the motor).
Over Volts	DC bus voltage has exceeded the peak level or maximum continuous level for 15 seconds	 This trip indicates that the DC bus voltage has exceeded the maximum limit. Possible solutions: Increase Deceleration Rate (Pr 00.004). Check nominal AC supply level. Check for supply disturbances which could cause the DC bus to rise. Check motor insulation using an insulation tester.
Phase Loss	Supply phase loss	The drive has detected an input phase loss or large supply imbalance.
Thermistor	Motor thermistor over- temperature	The Thermistor trip indicates that the motor thermistor connected to Terminal 4 (ADI2) on the control connections has indicated a motor over temperature.

6.2 Alarm Descriptions

In any mode, an alarm is an indication given on the keypad display by alternating the alarm string with the drive status string display. If an action is not taken to eliminate the alarm, except "Auto Tune" and "Limit Switch", the drive may eventually trip. Alarms are not displayed when a parameter is edited.

Alarm String	Description
Motor Overload	Motor Protection Accumulator Pr 04.019 in the drive has reached 75.0 % of the value at which the drive will trip and the load on the drive is >100 %.
Drive Overload	Drive over temperature. Percentage Of Drive Thermal Trip Level Pr 07.036 in the drive is greater than 90 %.
Auto Tune	The autotune procedure has been initialized and an autotune is in progress.
Limit Switch	Limit switch active. Indicates that a limit switch is active and that is causing the motor to be stopped.
Option Slot 1	Option slot alarm.
Low AC	Low voltage mode. See low AC alarm Pr 10.107 .
Current Limit	Current limit active. See Current Limit Active Pr 10.009 .
Fan	Fan reversed or failed.

7 Onboard PLC and MCS Software

The drive can store and execute a 12 kB Onboard PLC user program without the need for additional hardware, such as an option module.

Machine Control Studio programming software powered by CODESYS provides a flexible and intuitive environment for programming automation features. This software offers programming for the ID300/302's onboard PLC. The programming environment is fully EN/ IEC 61131-3 compliant.

The following EN/IEC 61131-3 programming languages are supported:

- Structured Text (ST)
- Function Block Diagram (FBD)
- Structured Function Chart (SFC)
- Ladder Diagram (LD)
- Instruction List (IL)

Additionally supported:

- Continuous Function Chart (CFC)
- Onboard intelligence
- Programmable Logic Control (PLC) memory: 12 kB
- 1 x Real-time task (16 ms), 1 x Background task

Intuitive IntelliSense functionality helps to write consistent and robust programming, speeding up software development. Programmers have access to a vibrant Open-Source community for function blocks. "Machine Control Studio" supports customers' own function block libraries with on-line monitoring of program variables, user defined watch windows, and help for on-line change of program, in line with current PLC practices.

To obtain the Machine Control Studio software (free of charge), refer to: https://acim.nidec.com/en-us/drives/control-techniques/downloads/user-guides-and-software/unidrive-m

8 Connect Software

"Connect" is a Windows[™] based software commissioning / start-up tool. It can manage several drive ranges, including ID300/302. To create your ID300/302 project, use Unidrive M Connect which is a common software.

CTScope is also included.

"Connect" can be used for commissioning / start-up and monitoring, drive parameters can be uploaded, downloaded, and compared. Simple or custom menu listings can be created. Drive menus can be displayed in standard list format or as live block diagrams. The software can communicate with a single drive or a network.

CTScope is a PC Tool designed to trend/ trace the values of parameters from drives and option module. "Connect" software system requirements are:

- Windows 8, Windows 7 SP1, Windows Vista SP2, Windows XP SP3
- Minimum of 1280 x 1024 screen resolution with 256 colors
- Microsoft.Net Frameworks 4.0 (provided in the downloaded file)
- Note: You must have administrator rights to install Connect software.
- The ID300/302 operates at 115200 bauds as standard. However, at this speed it is necessary to correctly set the PC to allow the communication with "Connect" software. For the PC to be able to communicate with the drive, the latency time of the PC has to be changed and set to 1ms (instead of 16ms). To help the user, a procedure is available on www.commanderID300.info.

ACAUTION

• This new setting can affect other Comms software. It is then advisable to inform your IT department before making any change.

To obtain the "Connect" software (free of charge), refer to https://acim.nidec.com/en-us/drives/control-techniques/downloads/user-guides-and-software/unidrive-m

Note:

- Any previous version of Connect software should be uninstalled before proceeding with the new installation (existing projects will not be lost).
- Before selecting a preset configuration by setting **Pr 11.025**, ensure that the drive is disabled (open Terminal 8 or Terminals 31/34) and Connect software is "On line" with the drive (for the auto-configuration to take place correctly).
- An USB/RS485 lead has been designed to connect the drive to laptop computers and is available from the drive supplier (ref. 4500-0096).
- Parameter Reference Guides are included in the Connect software.
- If drive baud rate value is changed from its default value (**Pr 11.025**) at 115200 bauds, Connect software will work correctly, but slower. However, if ID-SIZE1 or ID-SIZE2 Keypad option is used at the same time, it will no longer be able to communicate with the drive.

9 Troubleshooting Guide

Incident	Possible Cause	Remedy
Abnormal noise	Originating in motor or machine being driven?	Uncouple the motor from the equipment being driven and test the motor on its own.
	The cause is mechanical , if the noise persists after switching off the power supply with the drive set to "freewheel" mode (open enable or STO terminal(s)).	
	Vibrations	Check that the key conforms to the type of balancing. (See section 3.5, page 20.)
	Damaged bearings	Change the bearings.
	Mechanical friction: ventilation, coupling	Check the installation.
Noisy motor	The cause is electrical, if the noise stops after switching off the power supply.	Check the power supply at the motor terminals. Check the drive settings.
	Normal voltage and 3 phases balanced	Check the connection of the AC terminal block and the tightening of the terminals.
	Abnormal voltage	Check the power supply line.
	Phase imbalance	Check the winding resistance.
	Other possible causes: • Incorrect settings • Drive malfunction	Refer to the ID300/302 http://www.leroy-somer.com/ documentation_pdf/5512_en.pdf
	Faulty ventilation	Check the environment.Clean the fan cover and the cooling fins.Check that the fan is correctly mounted.
Motor heats abnormally	Unsuitable switching frequency	Comply with the minimum switching frequency indicated on the motor nameplate.
	Faulty supply voltage	Check the voltage.
	Overload	Check the current consumption in relation to that indicated on the motor nameplate.
	Partial short circuit	Check the electrical continuity of the windings and/or the installation.
	Phase imbalance	Check the winding resistance.
	Other possible causes: • Incorrect settings • Drive malfunction	Refer to the ID300/302 http://www.leroy-somer.com/ documentation_pdf/5512_en.pdf

Incident	Possible Cause	Remedy
Motor does not start	At no load Mechanical seizing	When switched off: • Check that rotation of the shaft is not locked.
	Broken power supply line	Check the fuses, electrical protection.
	Thermal protection	Check for motor OL .
	On load Phase Imbalance	When switched off:Check the resistance and continuity of the windings.Check the electrical protection.
	Drive	Check the settings.
	Thermal protection	Check for motor OL .

10 Maintenance

• All work relating to installation, commissioning, and maintenance must be carried out by experienced, qualified personnel. Before carrying out any work, disconnect and lock the ID300/302 power supply circuit and wait 10 minutes for the capacitors to discharge.

10.1 Checks After Start-Up

After approximately 50 hours of operation, verify that the screws to the motor and the coupling device are still tight. In the case of chain or belt transmission, verify that the tension is correctly adjusted.

10.2 Cleaning

To ensure that the machine operates correctly, remove any dust or foreign bodies which might clog the motor cover grille (and drive fan grille, if present), and the motor / drive housing fins.

CAUTION

• Before carrying out any cleaning operation, verify that the motor is completely sealed (Terminal box, drain holes, etc.). Dry cleaning (vacuuming or compressed air) is always preferable to wet cleaning.

• To avoid introducing dust and particles under the seals, always clean at reduced pressure from the center of the motor towards the extremities.

- **DO NOT** disassemble the ID300/302 while it is under warranty as this will immediately void the coverage.
- Certain components which are sensitive to electrostatic discharge may be destroyed just by touching them. **DO NOT** leave any metal object in the connection area, as this could cause a short-circuit.

10.3 Draining Off Condensation Water

Temperature variations cause condensation to form inside the motor, which must be removed before it adversely affects motor operation. Condensation drain holes located at the bottom of the motor must be kept clean to maintain the factory warranty.

10.4 Bearings

The permanently greased bearings offer long grease life and therefore lubrication for the lifetime of the machines. The grease life depends of speed of rotation and ambient temperature.

• For details about preventative and routine maintenance, refer to the relevant documentation.

Notes

Warranty Information

LIMITED WARRANTY

Nidec Motor Corporation ("NMC") extends the following LIMITED WARRANTY to the purchaser and to its customers (collectively referred to as the "Purchaser") of the enclosed Integrated Motor and Drive components (collectively referred to as the "Goods"): the Goods are free from defects in materials and workmanship under normal use, service and maintenance FOR A PERIOD OF 24 MONTHS FROM THE DATE OF ORIGINAL PURCHASE FROM NMC OR THE NMC DEALER/RETAILER, NOT TO EXCEED 30 MONTHS FROM THE DATE OF MANUFACTURE BY NMC. THE FOREGOING WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY GIVEN AND ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WHETHER OR NOT THE PURPOSE OR USE HAS BEEN DISCLOSED TO SELLER IN SPECIFICATIONS, DRAWINGS OR OTHERWISE, AND WHETHER OR NOT SELLER'S PRODUCTS ARE SPECIFICALLY DESIGNED AND/OR MANUFACTURED BY SELLER FOR BUYER'S USE OR PURPOSE.

This warranty does not extend to any losses or damages due to misuse, accident, abuse, neglect, normal wear and tear, negligence (other than Seller's), unauthorized modification or alteration, use beyond rated capacity, unsuitable power sources or environmental conditions, improper installation, repair, handling, maintenance or application or any other cause not the fault of Seller. To the extent that Buyer or its agents has supplied specifications, information, representation of operating conditions or other data to Seller in the selection or design of the Goods and the preparation of Seller's quotation, and in the event that actual operating conditions or other conditions differ from those represented by Buyer, any warranties or other provisions contained herein which are affected by such conditions shall be null and void.

If within thirty (30) days after Purchaser's discovery of any warranty defects within the warranty period, Purchaser notifies NMC or the dealer from whom the Goods were purchased in writing, NMC shall, at its option and as Purchaser's exclusive remedy, repair or replace or refund the purchase price for that portion of the Goods found by NMC to be defective. Failure by Purchaser to give such written notice within the applicable time period shall be deemed an absolute and unconditional waiver of Purchaser's claim for such defects. If the battery charger is damaged in transit, Purchaser should file a claim directly with the carrier.

All costs associated with dismantling, reinstallation and the time and expense of IE's personnel and representatives for site travel and diagnosis under this warranty shall be borne by the Purchaser. Goods repaired or replaced during the warranty period shall be covered by the foregoing warranty for the remainder of the original warranty period or ninety (90) days from the date of shipment, whichever is longer. Purchaser assumes all other responsibility for any loss, damage, or injury to persons or property arising out of, connected with, or resulting from the use of Goods, either alone or in combination with other products/components.

IN NO EVENT, REGARDLESS OF THE FORM OF THE CLAIM OR CAUSE OF ACTION (WHETHER BASED IN CONTRACT, INFRINGEMENT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT OR OTHERWISE), SHALL NIDEC'S LIABILITY TO PURCHASER OR ITS CUSTOMER EXCEED THE PRICE PAID BY PURCHASER FOR THE SPECIFIC BATTERY CHARGER OR OTHER GOODS PROVIDED BY GIVING RISE TO THE CAUSE OF ACTION. IN NO EVENT SHALL NIDEC'S LIABILITY TO PURCHASER OR ITS CUSTOMER EXTEND TO INCLUDE INCIDENTAL CONSEQUENTIAL OR PUNITIVE DAMAGES. WITH RESPECT TO CONSUMER PRODUCTS, SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

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