

Commissioning Record

FORM 2 OF 3 | COMMISSIONING | POWER-UP, LOAD, SAFETY



Use this record after Form 1 is signed with every deficiency resolved. It follows the commissioning sequence in the book: Part A is the Chapter 14 power-up record, Part B is the Chapter 15 first rotation and load test record, and Part C is the Chapter 16 safety verification record. Work the phases in order. Each phase has acceptance criteria that must be met before moving to the next.

The parameter addresses differ by brand. The sequence does not. Record the parameter number from the product manual for the drive in front of you. The average and imbalance boxes calculate themselves in Acrobat and most desktop PDF readers.

Each item takes one disposition. *P (Pass): verified, acceptable, documented where required. F (Fail): verified, not acceptable; correct before proceeding. NA: not applicable to this installation. Do not mark an item Pass if it has not actually been verified.*

INSTALLATION IDENTIFICATION

Site / area		Drive designation (tag)	
Drive manufacturer and model		Drive serial number	
Drive software / firmware revision		Motor designation	
Motor nameplate FLA, as connected (A)		Motor nameplate RPM	
Driven equipment		Load type (VT / CT / PD)	
Form 1 completed and signed (date)		Commissioning technician	
Commissioning date		Witness / owner representative	

PART A | FIRST POWER-UP AND PARAMETER CONFIGURATION (CHAPTER 14)

Service by qualified persons only. Follow NFPA 70E. DC bus capacitors can hold hazardous voltage for several minutes after power is removed.

A.0 Safety Before Energization

P ☐	F ☐	NA ☐	A0.1 All power sources identified and disconnected. Drawings reviewed for every feed; some panels have more than one. Disconnection visually verified where possible. (Ch. 14)
P ☐	F ☐	NA ☐	A0.2 Lockout/tagout and PPE. Approved LOTO per the facility program. PPE selected from the arc flash documentation for this panel. (Ch. 14)
P ☐	F ☐	NA ☐	A0.3 Electrically safe condition confirmed. Voltmeter reading at the drive input terminals confirms absence of voltage. Equipment grounded as needed for stored capacitive energy. (Ch. 14)
P ☐	F ☐	NA ☐	A0.4 LOTO removed by the authorized person; area clear. (Ch. 13, Ch. 14)

Phase 1 | Applying Power for the First Time

P ☐	F ☐	NA ☐	A1.1 Drive completes soft charge and shows ready status with no fault. Do not cycle power repeatedly on a fault. Read the code, consult the manual, and find the cause before re-energizing. Common first power-up faults: input phase loss, ground fault, overvoltage or undervoltage. (Ch. 14)
			Fault code at power-up (if any)
			Resolution

Phase 2 | Verifying the Input

P ☐ F ☐ NA ☐

A2.1 Input line-to-line voltages recorded with a true-RMS meter.

Pass: all within plus or minus 10 percent of nominal (432 to 528 V on a 480 V system; 216 to 264 V on 240 V). Check the manual for the drive's actual tolerance. (Ch. 14)

Nominal V L1 to L2 V L2 to L3 V L3 to L1 V

Average V

P ☐ F ☐ NA ☐

A2.2 Voltage imbalance below 3 percent.

Maximum deviation from the average, divided by the average. Above 2 to 3 percent points to a power system problem; investigate before proceeding. (Ch. 13, Ch. 14)

Calculated imbalance %

P ☐ F ☐ NA ☐

A2.3 DC bus voltage within 5 percent of expected.

Expected is about 1.35 times the line-to-line voltage: about 650 VDC on 480 V input, 325 VDC on 240 V input. (Ch. 14)

Expected (1.35 x avg) VDC Measured DC bus VDC

Phase 3 | Motor Nameplate Data Entered

Enter values exactly as the nameplate reads for the winding connection in use. A 50/25 A motor at 230/460 V wired for 460 V is entered as 25 A. Do not use the NEC table value or a calculated FLA. 1 HP = 0.746 kW (20 HP = 15 kW).

Nameplate item	Nameplate value	Value entered in drive	Parameter no.	OK
Power (HP or kW)				☐
Voltage (as connected)				☐
Full-load amps (sets motor overload)				☐
Rated speed (RPM, not synchronous)				☐
Frequency (Hz)				☐

P ☐ F ☐ NA ☐

A3.1 Drive continuous current rating at or above motor nameplate FLA.

Premium-efficiency motors can exceed the NEC table FLA. If nameplate FLA exceeds the drive rating, upsize the drive regardless of the HP match. (Ch. 14)

Phase 4 | Motor Identification (ID) Run

P ☐ F ☐ NA ☐

A4.1 ID Run completed successfully.

Treat every ID Run as if the shaft will turn, even a stationary type. The ID Run is not a rotation direction test. (Ch. 14)

Type: ☐ Normal (rotating) ☐ Reduced (stationary) ☐ Standstill ☐ Advanced ☐ Autophasing (PM / SynRM)

Motor state: ☐ Decoupled ☐ Coupled ☐ Mechanically secured

Result / notes

Phase 5 | Auto Tune

P ☐ F ☐ NA ☐

A5.1 Auto Tune performed with the motor coupled to the load.

Recouple first if the motor was decoupled for a Normal ID Run. Some drives combine ID Run and tuning; some require manual loop tuning. (Ch. 14)

Status: ☐ Performed ☐ Combined with ID Run ☐ Not offered (manual tuning)

Tuning level / group (if applicable)

Phase 6 | Essential Operating Parameters

P ☐ F ☐ NA ☐

A6.1 Control mode selected.

Choose the simplest mode that meets the application. V/Hz for fans, centrifugal pumps, and multi-motor groups. (Ch. 14)

Mode: ☐ V/Hz ☐ Sensorless vector ☐ Closed-loop vector

P ☐ F ☐ NA ☐

A6.2 Motor thermal protection set to the motor, not the drive.

Electronic overload uses motor FLA. If PTC or RTD sensors are fitted, the drive monitors them with the specified response. (Ch. 14, Ch. 16)

Overload set to A Parameter no.

PTC / RTD monitored: ☐ Yes ☐ No ☐ N/A

P ☐ F ☐ NA ☐

A6.3 Acceleration and deceleration ramps set conservatively.

Starting points: fans 60 to 90+ s (large fans 90+), pumps 30 to 60 s, conveyors 15 to 30 s, mixers 10 to 30 s. Factory 5 to 15 s is usually too fast for fans and pumps. (Ch. 14)

Accel s Decel s Min freq Hz Max freq Hz

P ☐ F ☐ NA ☐

A6.4 Run command and speed reference left on local keypad for commissioning.

Changed to the final control source only after load testing (Phase 8 of Part B). (Ch. 14)

Recording the Configuration

P ☐ F ☐ NA ☐

A7.1 Parameter configuration saved before first rotation. (Ch. 14)

☐ Saved to drive internal memory / keypad

Uploaded to laptop or USB, file name

Parameter list printed for the panel documentation folder

Software revision recorded

PART B | FIRST ROTATION AND LOAD TESTING (CHAPTER 15)

Before pressing Run: motor area clear of personnel and out of the line of travel if a guard fails. Coupling and belt guards in place. Driven equipment in a safe state (valves, dampers, belt clear). Drive on local keypad control.

P ☐ F ☐ NA ☐

B0.1 Pre-run conditions confirmed. (Ch. 15)

Motor decoupled for first rotation: ☐ Yes ☐ No (rotation checked under load)

Phase 1 | First Rotation, Uncoupled Motor

P ☐ F ☐ NA ☐

B1.1 Rotation direction correct at minimum speed (about 5 Hz).

Match the rotation arrow or equipment documentation. For the permanent fix, swap two motor leads at the drive output. A direction parameter reverts on a factory reset. (Ch. 15)

Direction: ☐ Correct as wired ☐ Reversed by lead swap ☐ Reversed by parameter

If by parameter: no. and setting

P ☐ F ☐ NA ☐

B1.2 No-load baseline at full speed recorded.

Uncoupled current should be magnetizing current only, typically 25 to 40 percent of FLA. Much higher points to a winding problem or wrong nameplate entry. (Ch. 15)

Speed reference Hz No-load current A Percent of FLA %

Noise: ☐ Normal ☐ Abnormal

Vibration: ☐ Smooth ☐ Slightly rough ☐ Rough

P ☐ F ☐ NA ☐

B1.3 Motor decelerates smoothly under drive control.

Coasting means the stop mode is not ramp. An overvoltage trip means the decel time is too short or a braking resistor is needed. (Ch. 15)

Phase 2 | Coupling the Motor to the Load

☐ P ☐ F ☐ NA **B2.1 Drive locked out before coupling work. (Ch. 15)**

☐ P ☐ F ☐ NA **B2.2 Coupling installed and alignment verified. (Ch. 15)**

Method: ☐ Laser ☐ Dial indicator ☐ Straightedge and feeler ☐ Not decoupled

☐ P ☐ F ☐ NA **B2.3 LOTO removed per facility procedure. (Ch. 15)**

Phase 3 | Low-Speed Operation Under Load

Know the load type and what current to expect before the first rotation. If current is already approaching FLA at 30 Hz, stop and look for binding, a closed valve, or an undersized motor.

Speed	Current (A)	Noise	Vibration	Process output	OK to continue
5 Hz					☐ Y ☐ N
15 Hz					☐ Y ☐ N
30 Hz					☐ Y ☐ N

Phase 4 | Ramping to Full Speed

☐ P ☐ F ☐ NA **B4.1 Speed range covered in 5 to 10 Hz steps with a 10 to 15 s pause at each.**

Watch for any discontinuity: a jump in current or vibration, or a noise that appears and disappears at one speed. (Ch. 15)

Maximum application speed Hz Resonance observed at Hz

Skip frequency band programmed to Hz

Phase 5 | Full-Speed Electrical Measurements

Full speed, full load. Use a true-RMS meter rated for PWM output. Phase currents should balance within about 5 to 10 percent.

Measurement	T1 to T2 / T1	T2 to T3 / T2	T3 to T1 / T3	Average	Imbalance %
Output voltage (V)					
Output current (A)					

☐ P ☐ F ☐ NA **B5.1 Motor current as a percentage of nameplate FLA.**

85 percent leaves 15 percent thermal margin. 98 percent is at the limit. Above 100 percent the motor is overloaded and the situation must be corrected. (Ch. 15)

Average current / FLA %

☐ P ☐ F ☐ NA **B5.2 DC bus, drive temperature, and speed recorded.**

A DC bus more than 5 percent below 1.35 times line voltage points to an input problem. Speed well off the expected nameplate value may mean the ID Run needs repeating. (Ch. 15)

DC bus VDC Drive heatsink temp °F Operating frequency Hz

Motor speed displayed RPM Expected speed RPM

Phase 6 | Mechanical and Thermal Observations

Starting reference only; the steady-state values go on the Form 3 baseline. Bearing temperatures above 176 °F on a standard TEFC motor in a 104 °F ambient need investigation; above 203 °F is cause for immediate concern.

Location	Temperature (°F)	Vibration (in/s or Smooth / Slightly rough / Rough)	Notes
Motor frame			
Motor drive-end bearing			
Motor non-drive-end bearing			
Coupling			
Driven equipment bearing 1			
Driven equipment bearing 2			

☐ P ☐ F ☐ NA

B6.1 Thermal image captured at full speed and load. (Ch. 15)

File name and storage location

Phase 7 | Process Performance Verification

If the process falls short, the cause is almost always mechanical or process design, not the drive. Check maximum frequency and current limit before blaming the drive. Typical tolerance: pumps and fans plus or minus 10 percent at design speed, PD pumps 5 percent, conveyors and mixers 2 percent.

Process variable	Method	Design value	Measured	Within tolerance
				☐ Y ☐ N
				☐ Y ☐ N
				☐ Y ☐ N

Phase 8 | Parameter Adjustments Based on Actual Load

Parameter (name / no.)	Original value	New value	Reason

☐ P ☐ F ☐ NA

B8.1 Final control sources set and verified.

For 4 to 20 mA, confirm 4 mA gives minimum speed and 20 mA gives maximum. For a network, confirm the drive follows commands from the PLC or SCADA. (Ch. 15)

Speed reference: ☐ Analog ☐ Network ☐ Preset ☐ Keypad ☐ PIDStart / stop: ☐ Terminal ☐ Network ☐ Keypad☐ Minimum and maximum reference scaling verified

☐ P ☐ F ☐ NA

B8.2 Updated parameter backup made with all four methods.

Internal memory, laptop or USB, printed list, and CMMS. (Ch. 15, Ch. 17)

Load Test Anomalies

Symptom	Cause found	Action taken	Resolved
			☐ Y ☐ N
			☐ Y ☐ N
			☐ Y ☐ N
			☐ Y ☐ N

PART C | SAFETY SYSTEM VERIFICATION (CHAPTER 16)

Inspection confirms the wire is landed. Only a functional test confirms the safety function works. Activate each function under control and record what actually happens.

Phase 1 | Safe Torque Off (STO)

Run at about 30 Hz, activate STO by the method used in normal operation, confirm the motor coasts and the drive shows STO status, confirm a start is refused, then restore and confirm normal restart. Test every activation point separately.

Activation point (switch, relay, PLC)	Speed (Hz)	STO status shown	Coast-down (s)	Start refused	Normal restart
		☐ Y ☐ N		☐ Y ☐ N	☐ Y ☐ N
		☐ Y ☐ N		☐ Y ☐ N	☐ Y ☐ N
		☐ Y ☐ N		☐ Y ☐ N	☐ Y ☐ N

Phase 2 | Emergency Stop Circuits

Automatic restart when an E-stop is released is a serious safety violation. If it happens, stop the test and correct the configuration before proceeding.

E-stop button (location / ID)	Stop category observed	Decel time (s)	Start refused while latched	No auto restart on release
	☐ 0 ☐ 1 ☐ 2		☐ Y ☐ N	☐ Y ☐ N
	☐ 0 ☐ 1 ☐ 2		☐ Y ☐ N	☐ Y ☐ N
	☐ 0 ☐ 1 ☐ 2		☐ Y ☐ N	☐ Y ☐ N

Phase 3 | Safety Interlocks

Verify the logic direction on every interlock. A normally closed device configured as normally open runs the drive with the door open.

Interlock	Normal state	Test method	Drive response observed	Logic verified	Restart
	☐ NO ☐ NC	☐ Real ☐ Sim		☐ Y ☐ N	☐ Man ☐ Auto
	☐ NO ☐ NC	☐ Real ☐ Sim		☐ Y ☐ N	☐ Man ☐ Auto
	☐ NO ☐ NC	☐ Real ☐ Sim		☐ Y ☐ N	☐ Man ☐ Auto
	☐ NO ☐ NC	☐ Real ☐ Sim		☐ Y ☐ N	☐ Man ☐ Auto
	☐ NO ☐ NC	☐ Real ☐ Sim		☐ Y ☐ N	☐ Man ☐ Auto

Phase 4 | Motor Overload Protection

On an oversized drive the electronic overload is the motor's only protection. Every setting below is for the motor, not the drive.

Parameter	Correct setting	Value found	OK
Motor FLA	Motor nameplate FLA, not drive rated current		☐ Y ☐ N
Thermal overload	Enabled		☐ Y ☐ N
Thermal time constant / class	Per motor type (TEFC Class 10 to 20; ODP Class 10)		☐ Y ☐ N
PTC / RTD monitoring	Enabled if sensors installed		☐ Y ☐ N ☐ NA
Overload trip point	105 to 110 percent of motor FLA		☐ Y ☐ N
Thermal utilization at full load	Well below 100 percent		☐ Y ☐ N

Phase 5 | Fault Response Behavior

Simulate a fault safely, for example by temporarily lowering a protection threshold below the operating point. Confirm the stop matches what the process needs (ramp stops for water hammer, held load for hoists). Restore every threshold afterward.

Fault simulated	Method	Drive response	Process response	Fault code	Reset OK	Restored
		☐ Coast ☐ Ramp ☐ Brake			☐ Y ☐ N	☐ Y ☐ N
		☐ Coast ☐ Ramp ☐ Brake			☐ Y ☐ N	☐ Y ☐ N
		☐ Coast ☐ Ramp ☐ Brake			☐ Y ☐ N	☐ Y ☐ N

RELEASE TO PRODUCTION

Commissioning is complete, every test is performed and documented, every anomaly is resolved or recorded with a plan, and the installation is safe to operate.

Role	Printed name	Signature	Date
Commissioning technician			
Maintenance supervisor			
Production / operations manager			

ABB Certified Start-Up (or equivalent) warranty registration submitted. ABB requires submittal within 10 days of start-up.

Date submitted

Notes